



Flowmeters

Laminar Flow / Gas Mass

Cole-Parmer® Flowmeters and Proportional Controllers for Gases

Versatility and high accuracy from a laminar-based mass flowmeter

- Accuracy of ±0.8% of reading +0.2% full-scale; repeatability of ±0.2%
- Measure 30 standard gases—user selectable from display
- 100 to 1 turndown with ranges of 1 SCCM full-scale up to 1000 SLPM
- Models with 4 to 20 mA output or totalizer are available

These meters measure flow via pressure drop across a laminar flow element (LFE). Because the flow element makes the flow stream laminar, placement in the process does not require straight pipe runs upstream or downstream of the meter, greatly simplifying installation. As compared to thermal mass technologies, the LFE design provides an ultrafast response within 10 milliseconds and offers “instant on” with no warm-up time.

An integrated keypad around the display is all that is required to program the unit for service. The 0 to 5 VDC output allows transmission of the flow value to a remote display, recorder, or controller regulating a valve or pump.

Flow controllers feature an integrated PID to direct the unit’s response to process changes. Flow set point is established with keypad, the optional set point control module, a 0 to 5 V signal, or an RS-232 input signal. Order set point control modules separately from the table. For portable flow metering applications, order the battery pack listed below table.

What’s included: 120/230 VAC power adapter with communications cable 32929-89 and NIST-traceable calibration report supplied by the manufacturer.



Mass flowmeter 32908-59 shown with optional battery pack 32929-50



Flow controller 32907-51



Meters and controllers feature a dynamic display that simultaneously shows flow rate, line pressure, fluid temperature, and (for controllers) the set point. For the units shown, both power and input/output signals are transmitted through a single multi-pin connector.

Specifications

Max particulate size

- Up to 1 LPM: 20 µm
- >1 LPM to 1000 LPM: 50 µm

Accuracy: ±0.8% of reading, +0.2% full-scale

Repeatability: ±0.2%

Response time

- Flowmeters: 10 msec
- Flow controllers: 50 msec

Operating temperature:

- 14 to 122°F (-10 to 50°C)

Max pressure: 145 psig (9.9 bar)

Pressure drop: 0.8 to 3.2 psig (flowmeter)

Output signal: 0 to 5 VDC, RS-232

Input signal: 0 to 5 VDC and RS-232

Wetted materials

- Flowmeters: 302 and 303 SS, Viton®, silicone RTV, and glass-reinforced nylon, aluminum
- Flow controllers: 302, 303; Viton, silicone RTV, glass-reinforced nylon, aluminum, brass, 410 SS, silicon, glass

Power

- Flowmeters: 7 to 30 VDC at 30 mA
- Flow controllers
- Models ≤10 LPM: 12 to 30 VDC at 250 mA
- Models ≤50 LPM: 24 to 30 VDC at 750 mA

Display type: four-digit, seven-line LCD; ¼”H flow display



“Very versatile flow controller”

Racer, CA



Connections

- ≤ 10 mL/min: 10-32 UNF
- 50 mL/min to 10 LPM: ¼” NPT(F)
- 50 to 100 LPM: ¼” NPT(F)
- 100 and 250 LPM: ½” NPT(F)
- 500 and 1000 LPM: ¾” NPT(F)

Flowmeters/controllers†	Dimensions
Models ≤50 mL/min	2¾”L x 3¾”H x 1¼”D (6.0 x 9.8 x 3.2 cm)
Models 100 mL/min to 10 LPM	2¾”L x 4¼”H x 1¼”D (6.0 x 10.8 x 3.2 cm)
Models 50 LPM to 100 LPM	4”L x 4¾”H x 1½”D (10.2 x 11.1 x 4.1 cm)
Models 250 LPM to 1000 LPM	4”L x 5½”H x 1½”D (10.2 x 14.0 x 4.1 cm)
Set point module	2¾”W x 2”H x 1”D (6.0 x 5.1 x 2.5 cm)

†Dimensions do not include control valve.

Flow range	Mass flowmeters		Mass flow controllers		Set point modules‡	
	Catalog number	Price	Catalog number	Price	Catalog number	Price
0.01 to 1 mL/min	TW-32908-51		TW-32907-51		TW-32907-83	
0.05 to 5 mL/min	TW-32908-53		TW-32907-53		TW-32907-85	
0.1 to 10 mL/min	TW-32908-55		TW-32907-55		TW-32907-87	
0.5 to 50 mL/min	TW-32908-57		TW-32907-57		TW-32907-89	
1 to 100 mL/min	TW-32908-59		TW-32907-59		TW-32907-91	
2 to 200 mL/min	TW-32908-61		TW-32907-61		TW-32907-93	
5 to 500 mL/min	TW-32908-63		TW-32907-63		TW-32907-97	
0.01 to 1 LPM	TW-32908-67		TW-32907-67		TW-32907-83	
0.05 to 5 LPM	TW-32908-69		TW-32907-69		TW-32907-85	
0.1 to 10 LPM	TW-32908-71		TW-32907-71		TW-32907-87	
0.5 to 50 LPM	TW-32908-73		TW-32907-73		TW-32907-89	
1 to 100 LPM	TW-32908-75		TW-32907-75		TW-32907-91	
2.5 to 250 LPM	TW-32908-77		TW-32907-77		TW-32907-95	
5 to 500 LPM	TW-32908-79		TW-32907-79		TW-32907-97	
10 to 1000 LPM	TW-32908-81		TW-32907-81		TW-32907-99	

†May be ordered as an option.

[TW-17080-10](#) NIST-traceable recalibration

[TW-32929-50](#) Battery pack, for portable operation of mass or volumetric flowmeter only

[TW-32929-89](#) Replacement communication cable, 8-DIN to stripped ends



Cole-Parmer® Low-Cost Flowmeters/Flow Transmitters

Miniature coil design for fast performance

- All meters feature 0 to 5 VDC output signal for data logging or controlling other instruments

These low-cost flowmeters use a thermal gas flow sensing technique that results in highly accurate readings and repeatability. See "How it Works" on page 589 for more information on mass flowmeter operation. All units are calibrated to air/nitrogen—call our Application Specialists for meters calibrated to other gases or gas mixtures. Meters feature a cable hub connector for a quick connection to a power supply and 0 to 5 VDC output cable; order power supplies/cables below right. Flowmeters are available without display or with 3½-digit LCD. Display tilts up to 90° for easy viewing.

Flowmeters have low pressure drop across the sensor. The output signal can connect to a remote display, recorder, or any instrument that accepts a 0 to 5 VDC signal. Compact size makes it easy to carry around. Order rechargeable battery kit below right.

Wetted materials are anodized aluminum, 316 stainless steel, Viton® O-rings, and acetal fittings (316 stainless steel fittings on models 32711-36 to -52 and 32712-36 to -52). Each meter includes two compression fittings and a 36" (0.9 m) long cable with hub connector. All have metric-reading scales.



1
Flowmeter 32707-08

1
Flowmeter with display 32707-20

TECHNICAL info!

Accuracy: These precalibrated flowmeters operate at inlet pressures between 5 and 40 psi and at gas temperatures between 64 and 77°F (18 to 25°C) while maintaining the stated ±1.5% full scale accuracy and linearity. When operating beyond 5 to 40 psi, add ±0.02%/psi full-scale; if operating beyond 64 to 77°F (18 to 25°C), add ±0.15%/°C full-scale.

Specifications

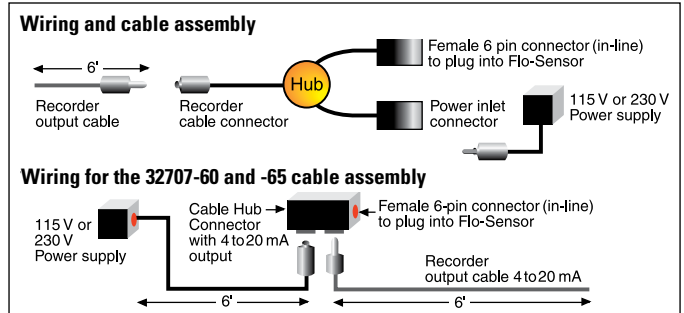
- Max particulate size:** 20 microns
- Accuracy:** ±1.5% full-scale including linearity (see below for details)
- Accuracy coefficient, temperature:** ±0.15% per °C full-scale
- Accuracy coefficient, pressure:** ±0.02% per psi full-scale
- Repeatability:** ±0.5% full scale
- Response time:** 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full scale
- Operating temperature:** 50 to 122°F (10 to 50°C)
- Maximum system pressure:** 150 psi (10.3 bar)
- Leak integrity:** 1 x 10⁻⁴ sccs He (max)
- Transducer input power:** 12.5 to 15 VDC; 100 mA max

- Output signal:** linear 0 to 5 VDC (2500 Ω minimum load)
- Connection fittings**
Models 32707-00 to -10 and 32707-20 to -30: 1/8" compression fittings
Models 32707-12, -14 and 32707-32, -34: 1/4" compression fittings
Models 32707-16, -36, 32711-36, and -40, and 32712-36, and -40: 3/8" compression fittings
Models 32711-44 to -52 and 32712-44 to -52: 1/2" compression fittings
- Dimensions (W x H x D) not including fittings**
Models 32707-00 to -36: 1 7/8" x 3 1/2" x 1 1/4" (4.8 x 8.9 x 2.5 cm);
Models 32711-36 to -44 and 32712-36 to -44: 4 1/2" x 4" x 1 1/4" (11.4 x 10.2 x 3.2 cm)
Models 32711-52 and 32712-52: 5 13/16" x 6" x 3" (14.8 x 15.2 x 7.6 cm)



REQUIRED SYSTEM Components

- 1** Flowmeter
- 2** Power supply/cable



2 Power Supply/Output Cable (required). The cable provides both power to the flowmeter, and transmits output signals. Select a power supply/output cable for 0 to 5 VDC output signal or for 4 to 20 mA output signal. Both power supply cable and output cable are six feet (1.8 m) long. Order from table below.

2 Rechargeable Battery Kit makes your flowmeters portable. Use flow meters for more than 8 hours without recharging. Batteries can be recharged at least 500 times. Kit contains batteries, charger, output cable, and carrying case with shoulder strap. Order from table below.

Flow rate	Pressure drop (max flow)	Without display		With 3½-digit LCD	
		Cat. no.†	Price	Cat. no.‡	Price
1 Flowmeters with acetal fittings					
0 to 20 sccm	1" H ₂ O	TW-32707-00		TW-32707-20	
0 to 50 sccm	1" H ₂ O	TW-32707-02		TW-32707-22	
0 to 100 sccm	2" H ₂ O	TW-32707-04		TW-32707-24	
0 to 200 sccm	2" H ₂ O	TW-32707-06		TW-32707-26	
0 to 500 sccm	2" H ₂ O	TW-32707-08		TW-32707-28	
0 to 1000 sccm	3" H ₂ O	TW-32707-10		TW-32707-30	
0 to 2 sL/min	3" H ₂ O	TW-32707-12		TW-32707-32	
0 to 5 sL/min	3" H ₂ O	TW-32707-14		TW-32707-34	
0 to 10 sL/min	10" H ₂ O	TW-32707-16		TW-32707-36	

1 Flowmeters with stainless steel fittings					
0 to 20 sL/min	3" H ₂ O	TW-32711-36		TW-32712-36	
0 to 50 sL/min	10" H ₂ O	TW-32711-40		TW-32712-40	
0 to 100 sL/min	10" H ₂ O	TW-32711-44		TW-32712-44	
0 to 500 sL/min	50" H ₂ O	TW-32711-52		TW-32712-52	

Description	115 VAC models		230 VAC models	
	Cat. no.	Price	Cat. no.	Price
Power supply and output cable (0 to 5 VDC output)	TW-32707-50		TW-32707-55	
Power supply and output cable (4 to 20 mA output)	TW-32707-60		TW-32707-65	
Rechargeable battery kit	TW-32707-70		TW-32707-75	

- TW-32707-85** Cable from meter to existing power supply
- TW-32707-80** Extension cable lengthens flowmeter cable by six additional feet
- TW-17080-10** NIST-traceable recalibration with data

†Add 1½" to the height of models with display.
‡Power supplies/connectors are required; order separately at right.



Flowmeters

Thermal Dispersion / Gas Mass

Cole-Parmer® Low-Cost Flow Controllers

Integrated valve allows precise flow control

- Use the triple-calibrated models for multiple gas applications

These low-cost mass controllers use a thermal gas flow sensing technique that results in highly accurate readings and repeatability. Models 32708-32 through 32708-42 are calibrated for air, helium (He), and argon (Ar) only. Models 32708-00 through 32708-30 are calibrated for air and nitrogen (N₂) only; models 32708-20 through 32708-30 can be custom calibrated for up to three different gases at an additional charge. Call our Application Specialists for more information.

All models accept a 0 to 5 VDC input signal for remote valve control. Controllers with display also feature a potentiometer for manual valve control. Display is a 3½-digit LCD and tilts up to 90° for easy viewing. Front panel dip switch lets you select one of the factory programmed gases: air, nitrogen, helium, or argon.

Note: All controllers **require** a combined power supply/input/output cable. This cable combines three functions into one unit: power source, plus input or output of 0 to 5 VDC signals. Use the input signal for remote valve control; use the output signal for data logging or controlling other instruments. Order the power supply/input/output cable separately at right.

Wetted materials are anodized aluminum, 316 stainless steel, brass, Viton®, and acetal. Maximum pressure drop across the unit is 15 psi at maximum flow. Differential pressure for controllers up to and including 1 sL/min should not exceed 40 psi; 45 psi for models greater than 2 sL/min.

What's included: two acetal compression fittings, a 36" (0.9 m) L cable with hub connector, and NIST-traceable calibration report supplied by the manufacturer (digital display models only).



1
32708-04



1
32708-26

REQUIRED SYSTEM Components

- 1 Flow meter
- 2 Power supply/cable

TECHNICAL info!

Accuracy: These precalibrated flowmeters operate at inlet pressures between 5 and 40 psi and at gas temperatures between 64 and 77°F (18 to 25°C) while maintaining the stated ±1.5% full scale accuracy and linearity. When operating beyond 5 to 40 psi, add ±0.02%/psi full-scale; if operating beyond 64 to 77°F (18 to 25°C), add ±0.15%/°C full-scale.

Specifications

- Max particulate size:** 20 microns
- Accuracy:** ±1.5% full-scale including linearity (see below for details)
- Accuracy coefficient, temperature:** ±0.15%/°C full-scale
- Accuracy coefficient, pressure:** ±0.02%/psi full-scale
- Repeatability:** ±0.5% full-scale
- Response time:** 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale
- Operating ambient:** 50 to 122°F (10 to 50°C)
- Maximum system pressure:** 150 psi (10.3 bar)

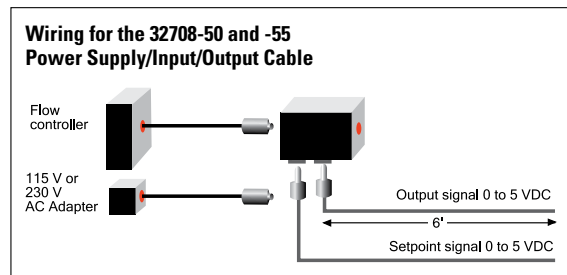
- Leak integrity:** 1 x 10⁻⁴ sccs He (max)
- Transducer input power:** 12.5 to 15 VDC; 250 mA max for controllers
- Output signal:** linear, 0 to 5 VDC (2500 Ω minimum load)
- Connections (included)**
Models up to 1 sL/min:
1/8" acetal compression fittings
Models from 5 and 10 sL/min:
1/4" acetal compression fittings
- Dimensions (not including fittings)**
Without display: 3¼"W x 3¾"H x 1"D (8.3 x 9.5 x 2.5 cm)
With display: 3¼"W x 5¼"H x 1"D (8.3 x 13.3 x 2.5 cm)



2 Power Supply/Input/Output Cable

To power the controller, and to transmit 0 to 5 VDC input and output signals. Comes with everything shown in the diagram below—no extra wires or cables are needed.

- TW-32708-50 Power supply/input/output cable,** 6 ft (1.8 m), 115 VAC
- TW-32708-55 Power supply/input/output cable,** 6 ft (1.8 m), 230 VAC



Accessories

- TW-32707-85 Cable** from meter to existing power supply
- TW-32707-80 Extension cable** adds six feet to the length of power supply/input/output cable 32708-50 or -55
- TW-17080-10 NIST-traceable recalibration** with data

Flow rate [†]	1 Without display		1 With 3½-digit LCD			
	Calibrated for air and N ₂		Calibrated for air and N ₂		Calibrated for air, He, and Ar	
	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
0 to 50 sccm	TW-32708-00		TW-32708-20		TW-32708-32	
0 to 100 sccm	TW-32708-02		TW-32708-22		TW-32708-34	
0 to 500 sccm	TW-32708-04		TW-32708-24		TW-32708-36	
0 to 1 sL/min	TW-32708-06		TW-32708-26		TW-32708-38	
0 to 5 sL/min	TW-32708-08		TW-32708-28		TW-32708-40	
0 to 10 sL/min	TW-32708-10		TW-32708-30		TW-32708-42	

[†]Typical inlet pressure



Compact Gas Mass Flow Sensors/Transmitters

Precisely measure and transmit flow rates

- Proven design uses metal body components for added durability
- Meter can be calibrated to any of 256 different gases†

These flowmeters feature an advanced straight-tube sensor that ensures accurate and repeatable results. Gas flow measurements are unaffected by moderate temperature and pressure variations at the inlet. The meter also allows a four-point calibration across the flow range to improve meter linearity.

Output data from the meter can be sent via a 0 to 5 VDC or 4 to 20 mA signal; an analog-to-RS converter is also available for data collection and analysis on your PC.

The meter is protected from polarity reversal or short circuit by a built-in resettable fuse. Aluminum models have wetted materials of anodized aluminum, brass, and Viton®; stainless steel (SS) models have wetted materials of SS and Viton.

What's included: NIST-traceable calibration report supplied by the manufacturer.

†Contact an Application Specialist to discuss calibration to gases other than air.



Aluminum gas mass flow transmitter 32658-00

TECHNICAL info!

Accuracy: These precalibrated flowmeters operate at inlet pressures between 5 and 40 psi and at gas temperatures between 64 and 77°F (18 to 25°C) while maintaining the stated ±1.5% full scale accuracy and linearity. When operating beyond 5 to 40 psi, add ±0.02%/psi full-scale; if operating beyond 64 to 77°F (18 to 25°C), add ±0.15%/°C full-scale.

Specifications

Max particulate size: 5 µm

Accuracy
±1.5% full-scale
(see above for details)

Accuracy coefficient, temperature:
±0.15%/°C full-scale

Accuracy coefficient, pressure:
±0.01%/psi full-scale

Repeatability: ±0.5% full scale

Response time: 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale

Operating temperature:
32 to 122°F (0 to 50°C)

Max system pressure: 1000 psi (69 bar)

Leak integrity: 1 x 10⁻⁷ sccs He (max)

Transducer input power: 12 VDC, 200 mA max, polarity protected



Output signal: linear 0 to 5 VDC (1000 Ω minimum load), 4 to 20 mA (50 to 250 Ω loop resistance)

Connections (included)
Models ≤50 sL/min:
1/4" compression fittings
100 sL/min models:
3/8" compression fittings
500 sL/min models:
1/2" compression fittings

Dimensions (W x H x D),
not including fittings
Models ≤15 sL/min:
3" x 5" x 1" (7.6 x 12.7 x 2.5 cm)
20 to 100 sL/min models:
4" x 6" x 1 1/4" (10.2 x 15.2 x 3.2 cm)
500 sL/min models:
12" x 10" x 3 1/2" (30.5 x 25.4 x 8.9 cm)

Accessories

Output Cables make it easy to connect your flowmeter to other instruments. Three-foot long cables feature DB9(F) connectors.

[TW-32650-60](#) Output cable for 4 to 20 mA signal

[TW-32650-65](#) Output cable for 0 to 5 VDC signal

Power Supply allows flowmeters to be powered by AC voltage.

[TW-03277-00](#) Power supply, 110 VAC

[TW-03277-05](#) Power supply, 220 VAC

Rechargeable Battery Kit makes your flow transmitters portable. Use transmitters for more than 40 hours without recharging. Batteries can be recharged a minimum of 200 times. Kit contains batteries, charger, output cable, and carrying case with shoulder strap.

[TW-03276-50](#) Rechargeable battery kit, 110 VAC

[TW-03276-55](#) Rechargeable battery kit, 220 VAC

Flow rate	Aluminum bodies		316 stainless steel bodies	
	Catalog number	Price	Catalog number	Price
0 to 10 sccm	TW-32658-00		TW-32658-20	
0 to 20 sccm	TW-32658-01		TW-32658-21	
0 to 50 sccm	TW-32658-02		TW-32658-22	
0 to 100 sccm	TW-32658-03		TW-32658-23	
0 to 200 sccm	TW-32658-04		TW-32658-24	
0 to 500 sccm	TW-32658-05		TW-32658-25	
0 to 1 sL/min	TW-32658-06		TW-32658-26	
0 to 2 sL/min	TW-32658-07		TW-32658-27	
0 to 5 sL/min	TW-32658-08		TW-32658-28	
0 to 10 sL/min	TW-32658-09		TW-32658-29	
0 to 20 sL/min	TW-32658-11		TW-32658-31	
0 to 50 sL/min	TW-32658-14		TW-32658-34	
0 to 100 sL/min	TW-32658-17		TW-32658-37	
0 to 500 sL/min	TW-32658-18		TW-32658-38	

INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

[TW-17080-00](#) NIST-traceable recalibration for air/gas flowmeter, with test data

[TW-17080-10](#) NIST-traceable recalibration for mass flowmeter, with test data

Flowmeters

Thermal Dispersion / Gas Mass

Compact Gas Mass Flowmeters

Precisely measure flow rates and totals

■ Proven design uses metal body components for added durability

These flowmeters feature an advanced straight-tube sensor that ensures accurate and repeatable results. Gas flow measurements are unaffected by moderate temperature and pressure variations at the inlet. The meter also allows a four-point calibration across the flow range to improve meter linearity. Output data from the meter can be sent via a 0 to 5 VDC or 4 to 20 mA signal; an analog-to-RS converter is available for data collection and analysis on your PC.

All meters include a detachable 3 1/2-digit LCD that can be tilted up to 90° for easy reading. Remotely mount the display up to three feet using extension cable 32662-70. The optional totalizer 32650-70 displays accumulated flow. The meter is protected from polarity reversal or short circuit by a built-in resettable fuse. Aluminum models have wetted materials of anodized aluminum, brass, and Viton®; stainless steel (SS) models have wetted materials of SS and Viton.

What's included: NIST-traceable calibration report supplied by the manufacturer.



Flowmeter 32648-36

TECHNICAL info!

Accuracy: These precalibrated flowmeters operate at inlet pressures between 5 and 40 psi and at gas temperatures between 64 and 77°F (18 to 25°C) while maintaining the stated ±1.5% full scale accuracy and linearity. When operating beyond 5 to 40 psi, add ±0.02%/psi full-scale; if operating beyond 64 to 77°F (18 to 25°C), add ±0.15%/°C full-scale.

Specifications



Maximum particulate size: 5 microns

Accuracy (including linearity): ±1.5% full-scale (see below for details)

Accuracy coefficient, temperature: ±0.15%/°C full-scale

Accuracy coefficient, pressure: ±0.01%/psi full-scale

Repeatability: ±0.5% full-scale

Response time: 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale

Operating temp: 32 to 122°F (0 to 50°C)

Maximum system pressure: 1000 psi (69 bar)

Leak integrity: 1 x 10⁻⁷ sccs He (max)

Transducer input power: 12 VDC, 200 mA max; polarity protected

Output: linear 0 to 5 VDC (1000 Ω minimum load), 4 to 20 mA (50 to 250 Ω loop resistance)

Connections (included)

Models up to 50 sL/min: 1/4" compression fittings
 100 and 200 sL/min models: 3/8" compression fittings
 500 sL/min models: 1/2" compression fittings
 1000 sL/min models: 3/4" NPT(F) fittings

Dimensions (W x H x D), not including fittings

Models up to 5 sL/min: 3" x 5 5/8" x 1" (7.6 x 14.3 x 2.5 cm)
 Models up to 100 sL/min: 4 1/8" x 6" x 1 1/4" (10.5 x 15.2 x 3.2 cm)
 Models up to 200 sL/min: 6 5/8" x 6 5/8" x 1 3/4" (16.8 x 16.8 x 4.4 cm)
 Models up to 500 sL/min: 7 1/4" x 7 5/8" x 3" (18.4 x 19.4 x 7.6 cm)
 Models up to 1000 sL/min: 7 7/16" x 8 5/8" x 4" (18.6 x 21.9 x 10.2 cm)

Flow rate	Pressure drop (max flow)	Aluminum bodies				Price	316 stainless steel bodies				Price
		Air/N ₂	O ₂	H ₂	Ar		Air/N ₂	O ₂	H ₂	Ar	
		Cat. no.	Cat. no.	Cat. no.	Cat. no.		Cat. no.	Cat. no.	Cat. no.	Cat. no.	
0 to 10 sccm	0.04 psi	TW-32648-00	TW-32649-00	TW-32654-00	TW-32657-00		TW-32648-50	TW-32649-50	TW-32654-50	TW-32657-50	
		TW-32648-02	TW-32649-02	TW-32654-02	TW-32657-02		TW-32648-52	TW-32649-52	TW-32654-52	TW-32657-52	
		TW-32648-04	TW-32649-04	TW-32654-04	TW-32657-04		TW-32648-54	TW-32649-54	TW-32654-54	TW-32657-54	
0 to 100 sccm	0.04 psi	TW-32648-06	TW-32649-06	TW-32654-06	TW-32657-06		TW-32648-56	TW-32649-56	TW-32654-56	TW-32657-56	
		TW-32648-08	TW-32649-08	TW-32654-08	TW-32657-08		TW-32648-58	TW-32649-58	TW-32654-58	TW-32657-58	
		TW-32648-10	TW-32649-10	TW-32654-10	TW-32657-10		TW-32648-60	TW-32649-60	TW-32654-60	TW-32657-60	
0 to 1 sL/min	0.04 psi	TW-32648-12	TW-32649-12	TW-32654-12	TW-32657-12		TW-32648-62	TW-32649-62	TW-32654-62	TW-32657-62	
		TW-32648-14	TW-32649-14	TW-32654-14	TW-32657-14		TW-32648-64	TW-32649-64	TW-32654-64	TW-32657-64	
		TW-32648-16	TW-32649-16	TW-32654-16	TW-32657-16		TW-32648-66	TW-32649-66	TW-32654-66	TW-32657-66	
0 to 15 sL/min	0.09 psi	TW-32648-19	TW-32649-19	TW-32654-19	TW-32657-19		TW-32648-68	TW-32649-68	TW-32654-68	TW-32657-68	
	1.2 psi	TW-32648-34	TW-32649-34	TW-32654-34	TW-32657-34		TW-32648-84	TW-32649-84	TW-32654-84	TW-32657-84	
0 to 50 sL/min	3.3 psi	TW-32648-36	TW-32649-36	TW-32654-36	TW-32657-36		TW-32648-86	TW-32649-86	TW-32654-86	TW-32657-86	
	8.1 psi	TW-32648-42	TW-32649-42	TW-32654-42	TW-32657-42		TW-32648-92	TW-32649-92	TW-32654-92	TW-32657-92	
0 to 200 sL/min	4 psi	TW-32648-43	TW-32649-43	TW-32654-43	TW-32657-43		TW-32659-00	TW-32659-02	TW-32659-04	TW-32659-06	
	6 psi	TW-32648-44	TW-32649-44	TW-32654-44	TW-32657-44		TW-32659-10	TW-32659-12	TW-32659-14	TW-32659-16	
0 to 1000 sL/min	10 psi	TW-32648-45	TW-32649-45	TW-32654-45	TW-32657-45		TW-32659-20	TW-32659-22	TW-32659-24	TW-32659-26	

TW-17080-10 NIST-traceable recalibration

Output Cables make it easy to connect your flowmeter to other instruments. Features DB9(F) connectors.

TW-32650-60 Output cable, for 4 to 20 mA signal, 1-mL

TW-32650-65 Output cable, for 0 to 5 VDC signal, 1-mL

Extension Cable lets you extend display up to three feet away for remote reading.

TW-32662-70 Extension cable

Power Supply allows flowmeters to be powered by AC voltage.

TW-03277-00 Power supply, 110 VAC

TW-03277-05 Power supply, 220 VAC

Flow Totalizer 32650-22 displays instantaneous, total, and accumulated flow rates, has 47 different volumetric and mass flow units, and digital interface.

TW-32650-22 Flowmeter totalizer

MORE online!

For more information of the Flow Totalizer, go to . . .

ColeParmer.com



Compact Gas Mass Flow Controllers

Precisely control flow rates with built-in valve

■ Proven design uses metal body components for added durability
These controllers feature an advanced straight-tube sensor that ensures accurate and repeatable results. Gas flow measurements are unaffected by moderate temperature and pressure variations at the inlet. The meter also allows a four-point calibration across the flow range to improve meter linearity.

The flow rate set point can be established by either a local potentiometer or by a remote 4 to 20 mA or 0 to 5 VDC signal. Output data is sent via a 0 to 5 VDC or 4 to 20 mA signal; an analog-to-RS converter is also available for data collection and analysis on your PC.

All controllers include a detachable 3½-digit LCD that can be tilted up to 90° for easy reading. The display is remote mountable to three feet using extension cable 32662-70.

The controller is protected from polarity reversal or short circuit by a built-in resettable fuse. Aluminum models have wetted materials of anodized aluminum, brass, and Viton®; stainless steel (SS) models have wetted materials of SS and Viton.

What's included: NIST-traceable calibration report supplied by the manufacturer.



Adjust flow rate locally with the built-in set point potentiometer.

Controller 32661-22

TECHNICAL info!

Accuracy: These precalibrated flowmeters operate at inlet pressures between 5 and 40 psi and at gas temperatures between 64 and 77°F (18 to 25°C) while maintaining the stated ±1.5% full scale accuracy and linearity. When operating beyond 5 to 40 psi, add ±0.02%/psi full-scale; if operating beyond 64 to 77°F (18 to 25°C), add ±0.15%/°C full-scale.

Specifications

Maximum particulate size: 5 microns

Accuracy (including linearity)
±1.5% full-scale (see above for details)

Accuracy coefficient, temperature:
±0.15%/°C full-scale

Accuracy coefficient, pressure:
±0.01%/psi full-scale

Repeatability: ±0.5% full-scale

Response time: 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale

Operating temperature:
32 to 122°F (0 to 50°C)

Maximum system pressure: 1000 psi (69 bar)

Leak integrity: 1 x 10⁻⁷ sccs He (max)

Transducer input power: 12 VDC, 1100 mA max; polarity protected

Output signal: linear 0 to 5 VDC (1000 Ω minimum load), 4 to 20 mA (50 to 500 Ω loop resistance)

Connections (included)

Models up to 50 sL/min: ¼" compression fittings
200 sL/min models: ⅜" compression fittings
500 sL/min models: ½" compression fittings
1000 sL/min models: ¾" NPT(f) fittings

Dimensions (W x H x D), not including fittings

Models up to 5 sL/min: 4¾" x 5⅝" x 1" (12.1 x 14.3 x 2.5 cm)
15 to 100 sL/min models:
5¼" x 6" x 1¼" (13.3 x 15.2 x 3.2 cm)



Flow rate	Pressure drop (max flow)	Aluminum bodies				Price	316 stainless steel bodies				Price
		Air/N ₂	O ₂	H ₂	Ar		Air/N ₂	O ₂	H ₂	Ar	
0 to 10 sccm	1.06 psi	TW-32660-00	TW-32660-26	TW-32660-52	TW-32660-78		TW-32661-00	TW-32661-26	TW-32661-52	TW-32661-78	
		TW-32660-02	TW-32660-28	TW-32660-54	TW-32660-80		TW-32661-02	TW-32661-28	TW-32661-54	TW-32661-80	
		TW-32660-04	TW-32660-30	TW-32660-56	TW-32660-82		TW-32661-04	TW-32661-30	TW-32661-56	TW-32661-82	
0 to 100 sccm	1.06 psi	TW-32660-06	TW-32660-32	TW-32660-58	TW-32660-84		TW-32661-06	TW-32661-32	TW-32661-58	TW-32661-84	
		TW-32660-08	TW-32660-34	TW-32660-60	TW-32660-86		TW-32661-08	TW-32661-34	TW-32661-60	TW-32661-86	
		TW-32660-10	TW-32660-36	TW-32660-62	TW-32660-88		TW-32661-10	TW-32661-36	TW-32661-62	TW-32661-88	
0 to 1 sL/min	1.06 psi	TW-32660-12	TW-32660-38	TW-32660-64	TW-32660-90		TW-32661-12	TW-32661-38	TW-32661-64	TW-32661-90	
		TW-32660-14	TW-32660-40	TW-32660-66	TW-32660-92		TW-32661-14	TW-32661-40	TW-32661-66	TW-32661-92	
		TW-32660-16	TW-32660-42	TW-32660-68	TW-32660-94		TW-32661-16	TW-32661-42	TW-32661-68	TW-32661-94	
0 to 15 sL/min	3.87 psi	TW-32660-19	TW-32660-45	TW-32660-71	TW-32660-95		TW-32661-19	TW-32661-45	TW-32661-71	TW-32661-95	
	0 to 30 sL/min	3.50 psi	TW-32660-20	TW-32660-46	TW-32660-72		TW-32660-97	TW-32661-20	TW-32661-46	TW-32661-72	
0 to 50 sL/min	11 psi	TW-32660-22	TW-32660-48	TW-32660-74	TW-32660-98		TW-32661-22	—	—	—	
	0 to 100 sL/min	20 psi	TW-32660-24	TW-32660-50	TW-32660-76		TW-32660-99	TW-32661-24	—	—	
0 to 500 sL/min	47 psi	TW-32665-00	—	—	—		TW-32666-00	—	—	—	
		TW-32665-10	—	—	—		TW-32666-10	—	—	—	

TW-17080-10 NIST-traceable recalibration with data

TW-32662-65 Cable, 8-ft (2.4 m) L for connecting flowmeters/controllers to any instrument that accepts analog input signals. DB15(F) connector with bare wire ends

TW-32662-70 Extension cable, for remote placement of display up to three feet away

Power Supplies for operation by AC voltage.

TW-32662-50 Power supply; US plug, 110 VAC

TW-32662-55 Power supply; Euro plug, 220 VAC

TW-32662-60 Power supply; U.K. plug, 240 VAC

Flow Totalizer 32650-22 displays instantaneous, total, and accumulated flow rates, has 47 different volumetric and mass flow units, and digital interface.

TW-32650-22 Flowmeter totalizer

MORE online!

For more information on the Flow Totalizer, go to . . .

ColeParmer.com



Flowmeters

Thermal Dispersion / Gas Mass

Universal Mass Flow Control Systems

Use up to four mass flow controllers

- Configure and direct the operation of up to four controllers either locally, via an RS-232 interface, or via the internet
- Use the integrated batch, totalizer, or timer functions with up to eight relays to control external system devices or alarms
- Controllers feature exceptional repeatability that reduces quality deviations in any process that relies on multiple devices

REQUIRED SYSTEM Components

- 1 Mass Flow Command Module
- 2 Mass Flow Controller



1

Microprocessor command module 32681-25 accepts up to four controllers and communicates via Ethernet.

1 Mass Flow Command Modules

Models feature full menu-driven software for programming parameters. Without the use of an additional programmer module or external software, four buttons on the unit's face can be used to program and control all functions.

A primary benefit of this design is the flexibility with which the process control parameters can be set and monitored. The backlit LCD readout shows flows/totals in any of 13 different mass or volume flow units; up to four controller flow rates are shown in a single view. The local display is capable of displaying flow rate, set point, valve and alarm status along with totalizer data.

For basic process monitoring or control, each controller channel has two normally open (NO) or normally closed (NC) relays available. Program totalizer to activate alarms or actuate devices based on preset volumes. For more advanced control, several programmable functions are included within the module's software—a batch program allows you to execute a custom program of up to 16 steps and a timer program can direct flow control through a user-defined series of up to 96 steps.

Select from models with RS-232 interface or ethernet interface. In addition to the comprehensive local display, an RS-232 port allows for the download of data to a computer for analysis.



Number of controller inputs	RS-232 interface		Ethernet interface	
	Catalog number	Price	Catalog number	Price
4	TW-32681-22		TW-32681-25	

2 Mass Flow Controllers

The meter allows for a four-point calibration across the flow range to improve meter linearity. One key benefit of this design is its strong repeatability characteristics, making it ideal for use in applications where the variability of multiple controllers can affect the quality of a process. Controller is easily connected to the command module using an 8-ft long flat cable with integrated multipin D-sub connector (included). To protect from wiring errors, each controller is protected from shorting or polarity reversal by a resettable fuse. Wetted parts for the controller are 316 SS and Viton® O-rings.

What's included: an NIST-traceable calibration report supplied by the manufacturer is included for each controller unit.



2

Mass flow controller 32668-16

Specifications

- Max particulate size:** 100 microns
- Accuracy:** ±1% full-scale including linearity
- Accuracy coefficient, temperature:** ±0.1%/°C full-scale
- Accuracy coefficient, pressure:** ±0.01%/psi full-scale
- Repeatability:** ±0.2% full-scale

- Response time:** 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale
- Operating temp:** 41 to 122°F (5 to 50°C)
- Maximum system pressure:** 500 psi (34.4 bar)
- Optimum differential pressure:** 25 psi (1.7 bar)
- Maximum differential pressure:** 40 psi (2.6 bar)
- Leak integrity:** 1 x 10⁻⁹ sccs He maximum

- Output signal:** 0 to 5 VDC (2000 Ω minimum load)
- Connections:** ¼" compression fittings
- Display type:** 24" x 2" LCD dot matrix with backlight
- Dimensions (W x H x D)**
 10 sccm to 5 sL/min models: 5½" x 5¾" x 1½"
 (14.0 x 14.6 x 3.8 cm)
 15 to 30 sL/min models: 6½" x 6" x 1¾"
 (16.5 x 15.2 x 4.8 cm)



Flow rate	Pressure drop (max flow)	Air/N ₂ /CO	O ₂	H ₂	He	CO ₂	Price
		Catalog number	Catalog number	Catalog number	Catalog number	Catalog number	
0 to 10 sccm	1.0 psi	TW-32668-00	—	—	—	—	
0 to 100 sccm		TW-32668-06	—	—	—	—	
0 to 200 sccm		TW-32668-08	—	—	—	—	
0 to 500 sccm	1.1 psi	—	—	—	TW-32677-10	TW-32678-10	
0 to 1 sL/min		TW-32668-12	TW-32669-12	TW-32676-12	TW-32677-12	TW-32678-12	
0 to 5 sL/min	2.2 psi	—	—	TW-32676-16	—	—	
0 to 15 sL/min		TW-32668-20	—	—	—	—	

Flowmeters

Gas Mass



Porter Gas Mass Flow Controllers

Fast response and high accuracy in a 1/16 DIN unit

- Pluggable terminal block electrical connections
- Remote analog I/O capability

MPC series mass flow controllers represent a unique concept in cost-efficient mass flow control. The front panel features easy-to-use functions and a large digital display for reading set point, flow rate, and total flow. Alarms, batch control, totalizer, and multiple set points are programmable for enhanced versatility. Flow controllers have remote analog input and output capability.

The MicroFlow silicon micro-machined sensor is manufactured utilizing MEMS and thin film technologies. This results in an extremely fast, accurate and reliable thermal mass flow sensor that is unaffected by pressure and temperature fluctuations.

Program up to four set points via front panel or external input. Air, nitrogen, argon, and carbon dioxide measurement are standard.

What's included: panel-mounting bracket and mating electrical connector.



68025-24

Specifications

- Media:** nitrogen/air, argon, and carbon dioxide. Gas must be dry, clean and oil-free
- Accuracy:** ±2% full-scale (at 20°C and 30 psi)
- Repeatability:** ±1% full-scale
- Operating temperature:** 14 to 122°F (-10 to 50°C)
- Max operating pressure:** 75 psi (5.2 bar)
- Max differential pressure:** 40 psid

- Inputs:** two potential-free contact or open collector
- Output signal:** user-selectable 0 to 5 or 1 to 5 VDC
- Wetted materials:** brass (nickel-plated), stainless steel, PTFE, Viton®
- Process connections:** 1/8" NPT(F)
- Display:** 7-segment LED
- Power:** 24 VDC



Catalog number	Flow range (L/min)				Price
	Air	N ₂	Ar	CO ₂	
TW-68025-24	0.02 to 0.5	0.02 to 0.5	0.02 to 0.5	0.012 to 0.3	
TW-68025-26	0.08 to 2	0.08 to 2	0.08 to 2	0.04 to 1.2	
TW-68025-28	0.1 to 5	0.1 to 5	0.1 to 5	0.06 to 3	
TW-68025-30	0.4 to 20	0.4 to 20	0.4 to 20	0.3 to 16	



Flowmeters

Gas Mass

Digital Gas Mass Flowmeters

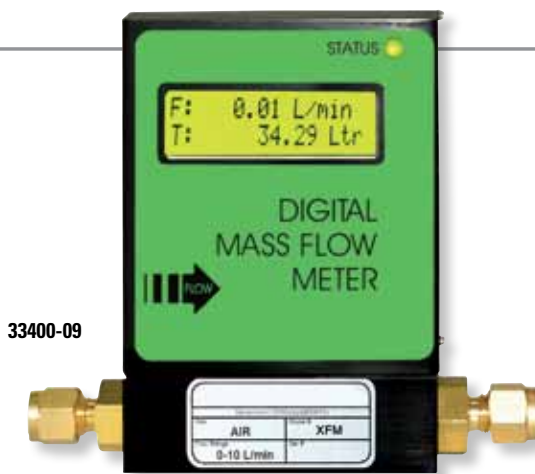
Store calibration data for up to 10 gases

- Self-diagnostic tests
- Automatic sensor zero offset adjustment

Meters incorporate a precision microcontroller and nonvolatile memory that stores all hardware specific variables, up to 10 different calibration tables, conversion factors for up to 32 gases, and supports up to 23 volumetric flow or mass flow engineering units, including user-defined units. This feature allows the same meter to be calibrated for multiple gases while maintaining the rated accuracy on each. In addition, provision is made for a user-defined conversion factor. Conversion factors may be applied to any of the ten gas calibrations via digital interface commands. Program flowmeters remotely via RS-485 or RS-232. Each unit comes with a 15-pin D-connector with a stripped 6-ft, 3-wire computer communications cable and a 3-ft, 2-wire cable for connection to a power supply. Additional cables as well as power supplies for the flowmeters are available below.

Flowmeters support various functions including programmable flow totalizer, high and low flow alarm, automatic zero adjustment, two relay outputs, jumper selectable 0 to 5 VDC or 4 to 20 mA analog outputs, status LED diagnostic, and internal or user-specific K-factors. LCD display with adjustable back light provides flow, total, and diagnostic reading simultaneously. The digital RS-485 and RS-232 interfaces provides access to applicable internal data including flow, CPU temperature, auto zero, totalizer and alarms settings, gas table, conversion factors and engineering units selection, dynamic response compensation and linearization table adjustment. The analog interface provides 0 to 5 VDC or 4 to 20 mA outputs for flow reading. The auto zero feature necessitates a condition of absolutely no flow through the meter during the adjustment process. Provisions are made to either start, read, or save the current auto zero value via digital commands.

The total volume of the gas is calculated by integrating the actual gas flow rate as a function of time. Program high and low gas flow alarm limits via digital interface. Alarm action can be



33400-09

assigned with preset delay interval (0 to 3600 seconds) to activate the contact closure (separate for high and low alarm). Latch mode control feature allows each relay to be latched on or follow the corresponding alarm status.

Lower-cost units are also available without LCD for OEM applications in cooling systems, semiconductor manufacturing, or gas chromatography applications. Meters with Profibus industrial communication capabilities are also available. Contact our Application Specialists for additional information regarding these options.

Note: These mass flowmeters are designed to work only with clean gases; never try to measure flow rates of liquids with these meters.

What's included: power and communication cable and NIST-traceable calibration report supplied by the manufacturer.

Specifications

Accuracy (including linearity): ±1% of full-scale at standard temperature and pressure

Accuracy coefficient, temperature: ±0.15% of full-scale/°C or better

Accuracy coefficient, pressure: ±0.01% full-scale/psi or better

Repeatability: ±0.25% of full-scale

Max pressure drop: 0.18 psid

Response time: 2 seconds (typical) to within ±2% of actual flow rate from 25 to 100% of full-scale

Operating temp: 41 to 122°F (5 to 50°C)

Max system pressure: 500 psig (34.5 bar)

Leak integrity: 1 x 10⁻⁹ mL/sec HE

Power: 11 to 26 VDC

Output: 0 to 20 mA, 0 to 5 VDC, and RS-485

Process connections: ¼" compression

Dimensions (W x H x D), not including fittings:
3½" x 4½" x 1" (7.9 x 11.4 x 2.5 cm)



Flow rate	Aluminum bodies						Price
	Air/N ₂ /CO	O ₂	H ₂	Ar	He	CO ₂	
	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	
0 to 5 sccm	TW-33400-00	TW-33400-10	TW-33400-20	TW-33400-30	TW-33400-40	TW-33400-50	
0 to 10 sccm	TW-33400-01	TW-33400-11	TW-33400-21	TW-33400-31	TW-33400-41	TW-33400-51	
0 to 20 sccm	TW-33400-02	TW-33400-12	TW-33400-22	TW-33400-32	TW-33400-42	TW-33400-52	
0 to 50 sccm	TW-33400-03	TW-33400-13	TW-33400-23	TW-33400-33	TW-33400-43	TW-33400-53	
0 to 100 sccm	TW-33400-04	TW-33400-14	TW-33400-24	TW-33400-34	TW-33400-44	TW-33400-54	
0 to 200 sccm	TW-33400-05	TW-33400-15	TW-33400-25	TW-33400-35	TW-33400-45	TW-33400-55	
0 to 500 sccm	TW-33400-06	TW-33400-16	TW-33400-26	TW-33400-36	TW-33400-46	TW-33400-56	
0 to 1 LPM	TW-33400-07	TW-33400-17	TW-33400-27	TW-33400-37	TW-33400-47	TW-33400-57	
0 to 5 LPM	TW-33400-08	TW-33400-18	TW-33400-28	TW-33400-38	TW-33400-48	TW-33400-58	
0 to 10 LPM	TW-33400-09	TW-33400-19	TW-33400-29	TW-33400-39	TW-33400-49	—	

Flow rate	316 stainless steel bodies						Price
	Air/N ₂ /CO	O ₂	H ₂	Ar	He	CO ₂	
	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	
0 to 5 sccm	TW-33401-00	TW-33401-10	TW-33401-20	TW-33401-30	TW-33401-40	TW-33401-50	
0 to 10 sccm	TW-33401-01	TW-33401-11	TW-33401-21	TW-33401-31	TW-33401-41	TW-33401-51	
0 to 20 sccm	TW-33401-02	TW-33401-12	TW-33401-22	TW-33401-32	TW-33401-42	TW-33401-52	
0 to 50 sccm	TW-33401-03	TW-33401-13	TW-33401-23	TW-33401-33	TW-33401-43	TW-33401-53	
0 to 100 sccm	TW-33401-04	TW-33401-14	TW-33401-24	TW-33401-34	TW-33401-44	TW-33401-54	
0 to 200 sccm	TW-33401-05	TW-33401-15	TW-33401-25	TW-33401-35	TW-33401-45	TW-33401-55	
0 to 500 sccm	TW-33401-06	TW-33401-16	TW-33401-26	TW-33401-36	TW-33401-46	TW-33401-56	
0 to 1 LPM	TW-33401-07	TW-33401-17	TW-33401-27	TW-33401-37	TW-33401-47	TW-33401-57	
0 to 5 LPM	TW-33401-08	TW-33401-18	TW-33401-28	TW-33401-38	TW-33401-48	TW-33401-58	
0 to 10 LPM	TW-33401-09	TW-33401-19	TW-33401-29	TW-33401-39	TW-33401-49	—	

Accessories

TW-33401-90 Power and communication cable; 15-pin D-connector with a stripped 6-ft (1.8-m), 3-wire connector with communications cable and a 3-ft (0.9-m), 2-wire cable for connecting to a power supply

TW-17080-10 NIST-traceable calibration with data

TW-33401-91 Power supply with communication cable; 115 V to 15-pin D-connector

TW-33401-92 Power and communication cable; 115 V to 15-pin D-connector with additional 9-wire analog output

Flowmeters Pelton Wheel

Economical Modular Flow Rate Sensor Systems

Ryton® PPS materials for use in aggressive and non-aggressive gas or liquid systems

- A range of available configurations to suit most applications
- Voltage output to monitor and record flow rates and totals
- Interface with data acquisition system

1 Flow Sensors

These sensors are ideal for low-flow applications involving mildly acidic or slightly corrosive gases and liquids. Economically designed, sensors provide a single 0 to 5 VDC output signal. This single signal is ideal for simple, low-cost flow rate measurement or for integration of the sensor into an existing central control system.

Ryton® PPS sensors are ideal for liquids or air. Sensors for liquids can be used with a wide variety of transparent, low-viscosity liquids under 10 cSt. Sensors measure a wide flow range from as low as 20 mL/min to as high as 500 L/min.

The wetted materials are epoxy, glass-filled polyphenylene sulfide (Ryton® PPS), glass, stainless steel, sapphire, and Viton®.

Note: A power supply is required for these flow sensors—order separately at right. If using an existing power supply, order cable assembly 32704-52 (below table).

REQUIRED SYSTEM Components

- 1 Flow sensor
- 2 Power supply/adapter
- 3 Flow display/totalizer for local indication



Specifications

Max particulate size: 25 microns

Accuracy: ±3% full-scale including linearity

Accuracy coefficient, temperature: ±0.2% per °C

Accuracy coefficient, pressure: ±0.07% per mm Hg (for air at 1 to 3 atm)

Repeatability: ±1% full-scale

Operating temp: 131°F (55°C) max

Max system pressure

For liquids: 100 psi (6.9 bar) at 20°C

For gases: 40 psi (2.7 bar) at 20°C

Output signal: 0 to 5 VDC

Input power: 10 to 15 VDC, 30 mA

Dimensions: (L x W x H, excluding fittings) 2 3/8" x 1 5/8" x 1 1/2" (6.0 x 4.1 x 3.8 cm)



2 Power Supply/Adapters

A power supply will be required for the sensors listed at left.

TW-32700-50 Power supply; 120 VAC, 60 Hz

TW-32700-55 Power supply; 240 VAC, 50/60 Hz

3 Flow Rate Indicators

Miniature 3 1/2-Digit LCD. View the 0.4" high digits in any flow unit combination to which the sensor output signal is scaled. Panel cutout is 1.665"L x 0.915"H (x 1.00"D). The input signal is 0 to 5 VDC.



TW-32706-72 DC-powered display

Universal Rate/Totalizer/Batch Controllers. For display of flow rates and totals plus options for doing batch process control. Displays in any engineering unit through a 1/8-DIN face. See page 657 for detailed information and other available models.

Description (relays and/or outputs)	115 VAC, 50/60 Hz		230 VAC, 50/60 Hz	
	Cat. no.	Price	Cat. no.	Price
None	TW-94787-00		TW-94787-05	
Two relays	TW-94787-40		TW-94787-45	
Two relays and 4 to 20 mA output	TW-94787-50		TW-94787-55	

TW-05656-55 Benchtop stand accepts 1/8-DIN meters. Tilt-back angle allows easy reading. Features nonslip rubber feet

TW-50001-00 Line cord with US standard plug, 6-ft (1.8-m) L. For 120 VAC operation

Catalog number	Flow rates	Connections (tube OD)	Pressure drop (max flow)	Price
1 Ryton PPS sensors for liquids*				
TW-32703-50	13 to 100 mL/min	1/8"	10 psi	
TW-32703-52	50 to 500 mL/min	1/4"	10 psi	
TW-32703-54	100 to 1000 mL/min	1/4"	6 psi	
TW-32703-55	0.2 to 2 LPM	1/4"	10 psi	
TW-32703-56	0.5 to 5 LPM	3/8"	10 psi	
TW-32703-58	1 to 10 LPM	3/8"	10 psi	
1 Ryton PPS sensors for air				
TW-32700-00	20 to 100 mL/min	1/8"		
TW-32700-02	40 to 200 mL/min	1/4"	10 psi	
TW-32700-04	100 to 500 mL/min	1/4"		
TW-32700-06	0.2 to 1 LPM	1/4"		
TW-32700-08	0.4 to 2 LPM	1/4"	10 psi	
TW-32700-10	1 to 5 LPM	1/4"		
TW-32700-12	2 to 10 LPM	3/8"		
TW-32700-14	4 to 20 LPM	3/8"	10 psi	
TW-32700-16	10 to 50 LPM	3/8"		
TW-32700-18	20 to 100 LPM	3/8"		
TW-32700-20	40 to 200 LPM	1/2"	10 psi	
TW-32700-22	100 to 500 LPM	1/2"		

*Flow rates given are for water and other low-viscosity fluids less than 10 centistokes

TW-32704-52 Power cable assembly, 36" (0.9 m). Required when using an existing power supply



Flowmeters

Pelton Wheel

Liquid or Gas Turbine Flowmeters/Transmitters

Output signal lets you connect to a remote display, data logger, or recorder for continuous monitoring

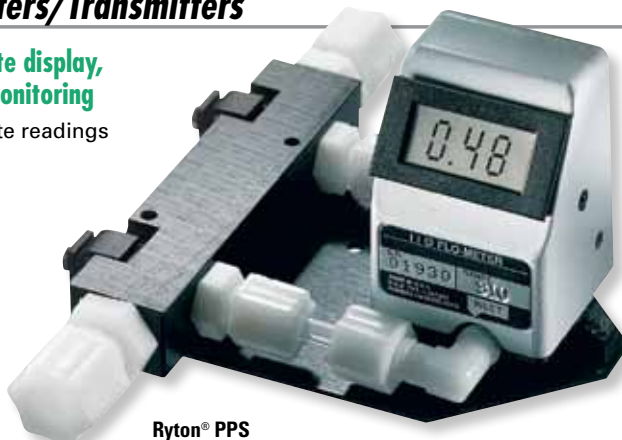
- The 3½-digit LCD provides direct flow rate readings

These low-flow liquid and air flowmeters are ideal for industrial, commercial, laboratory, or OEM applications. They are compact and offer excellent liquid or air measurements. All models provide direct flow rate readings in mL/min or L/min and a 0 to 5 VDC linear output.

Choose from Ryton® PPS or brass flowmeters. Ryton® PPS meters are an economical alternative to brass models. Order brass meters for high-pressure applications—meters withstand up to 500 psi. Use flowmeters for liquids with a wide variety of transparent, low viscosity (below 10 cSt) liquids. Flowmeters for air cover flow rates from 10 mL/min to 20 L/min.

Wetted materials are epoxy, glass-filled polyphenylene sulphide (Ryton® PPS), glass, stainless steel, sapphire, Viton®, and acetal (for Ryton® PPS flowmeters) or brass (for brass flowmeters).

Order base plate 32709-90 below right to allow Ryton® PPS flowmeters (except 32709-16) stand on their own. Power flowmeters with an AC adapter or a rechargeable battery kit; battery kit provides up to 20 hours of portability. If your application requires a remote display, see page 657 for our universal rate/totalizer/batch controllers.



Ryton® PPS flowmeter 32709-16



Ryton® PPS flowmeter 32709-08



Brass flowmeter 32709-28

INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

TW-17080-00 NIST-traceable calibration with data for air/gas flowmeters

TW-17080-12 NIST-traceable calibration with data for liquid flowmeters

Specifications

- Max particulate size:** 25 µm
- Accuracy:** ±1% full-scale including linearity for liquids; ±3% full-scale for air.
- Accuracy coefficient, temperature:** ±0.2% per °C
- Repeatability**
Meters for liquids: ±0.2%, full-scale (20 to 100%)
Meters for air: ±0.5%, full-scale (50 to 100%)
- Operating temp:** 0 to 55°C (32 to 131°F)

- Max system pressure**
Ryton® PPS: 100 psi (6.9 bar) meters for liquids, 40 psi (2.7 bar) meters for air
Brass: 500 psi (34.5 bar) meters for liquid; 40 psi (2.7 bar) meters for air
- Display:** 3½-digit LCD, 7/8"H
- Output signal:** 0 to 5 VDC
- Input power:** 12 VDC
- Dimensions (W x H x D):** 1 7/8" x 3" x 1 3/4" (4.8 x 7.6 x 4.4 cm), for models up to 5 L/min



Flow rates†	Connections (tube OD)	Pressure drop (max flow)	Ryton PPS flowmeters		Brass flowmeters	
			Catalog number	Price	Catalog number	Price
Flowmeters for transparent liquids						
13 to 100 mL/min	1/8"	10 psi	TW-32709-50		TW-32709-70	
20 to 200 mL/min	1/4"		TW-32709-52		TW-32709-72	
50 to 500 mL/min	1/4"		TW-32709-54		TW-32709-74	
0.1 to 1 L/min	1/4"	6 psi	TW-32709-56		TW-32709-76	
0.2 to 2 L/min	1/4"	10 psi	TW-32709-58		TW-32709-78	
0.5 to 5 L/min	3/8"	6 psi	TW-32709-60		TW-32709-80	
Flowmeters for air						
20 to 100 mL/min	1/8"	10 psi	TW-32709-02		TW-32709-22	
40 to 200 mL/min	1/8"		TW-32709-04		TW-32709-24	
100 to 500 mL/min	1/8"		TW-32709-06		TW-32709-26	
0.2 to 1 L/min	1/8"	10 psi	TW-32709-08		TW-32709-28	
0.4 to 2 L/min	1/4"		TW-32709-10		TW-32709-30	
1 to 5 L/min	1/4"	10 psi	TW-32709-12		TW-32709-32	
2 to 10 L/min	1/4"		TW-32709-14		TW-32709-34	
4 to 20 L/min	3/8"		TW-32709-16		TW-32709-36	

†Flow rates for air are given at 760 mm Hg and 23°C. Flow rates for liquids are given for water at 23°C.

Accessories

- TW-32709-90** Base plate for Ryton® PPS flowmeters (except 32709-16) at left. Allows meter to stand by itself. Base plate includes mounting screws
- TW-32709-92** AC adapter; 115 VAC, 50/60 Hz. Adapter includes signal output cable
- TW-32709-94** AC adapter; 230 VAC, 50/60 Hz. Adapter includes signal output cable
- TW-32709-96** Rechargeable battery kit, 115 VAC. Provides up to 20 hours of portable operation. Battery kit includes charger, cables, and carrying case
- TW-32704-52** Power cable assembly. Measures 30" (0.9 m) L. For use with an existing power supply

Analog Signal-to-RS Converters for collection and analysis of data on a PC. Includes software, a bidirectional A/D and D/A signal conditioner with switch for 0 to 5 VDC or 4 to 20 mA input, and 110 VAC power supply; uses screw terminal connections.

- TW-03277-70** Analog signal-to-RS-232 converter
- TW-03277-75** Analog signal-to-RS-485 converter