Application Parameter	Gases	Liquids	Flowmeter type	Page(s)
Low-flow measurement/ control (some types as l ow as 1 sccm air and 0.1 mL/min water, max of range)	•		Gas Mass	624-632
	•	•	Differential pressure	633-634
	•	•	Indicators/switches	622-623, 663-664
	•	•	Turbine	640
	•	•	Variable area	593-621
	•	•	Pelton Wheel	635-638
	•	•	Vortex	662
		•	Gear	652
		•	Paddle wheel	646-651
		•	Magnetic	658-661
		•	Ultrasonic	653-656
High-flow measurement/ control (some types as high as 2300 scfm gas and 2600 GPM liquid)	•		Gas Mass	624-629, 631-632
	•	•	Differential pressure	633-634
	•	•	Indicators/switches	622-623, 663-664
	•	•	Variable area	593-621
	•	•	Pelton Wheel	635-638
	•	•	Vortex	662
		•	Paddle wheel	646-651
		•	Magnetic	658-661
		•	Turbine	640
		•	Ultrasonic	653-656
High pressure (500 psi and above)	•		Gas Mass	627-630, 632
	•	•	Switches	664
	•	•	Variable area	602
		•	Gear	652
		•	Turbine	642-644
		•	Ultrasonic	653-656
High temperature (200°F and above)	•	•	Differential pressure	633-634
	•	•	Variable area	601-607, 609, 614-615, 616-617
		•	Ultrasonic	653, 655-656
		•	Turbine	643
		•	Magnetic	658, 660
		•	Paddle wheel	646-648, 650
		•	Gear	652
High-accuracy measurement (error at or below 1%)	•		Differential pressure	633-634
	•	•	Pelton Wheel	635-638
	•		Gas Mass	624-632
		•	Gear	652
		•	Paddle wheel	646-650
		•	Magnetic	658-661
		•	Turbine	640-644
		•	Ultrasonic	653, 655-656
Aggressive or pure fluids	•		Gas Mass	627-630
	•	•	Turbine	639-645
	•	•	Switches	663-664
	•	•	Variable area	604-605, 608-610, 618-620
		•	Gear	652
		•	Paddle wheel	650-651
		•	Magnetic (aggressive only)	658-661
		•	Ultrasonic	653-656
		•	Vortex	662
Liquids wih heavy particulates or slurries		•	Magnetic	658-661
		•	Ultrasonic	654-656
High-viscosity fluids		•	Gear	652
		•	Magnetic	654-656
No wired power available	•	•	Differential pressure	633-634
	•	•	Slight flow indicators	622-623
	•	•	Turbine	641-645
	•	•	Variable area	593-621
		•	Gear	652
		•	Paddle wheel	650-651
		•	Ultrasonic	654
Intrinsically safe	•	•	Variable area	593-621
		•	Turbine	641-642, 644
Large pipe sizes (3" or larger)		•	Ultrasonic	653-656
		•	Magnetic	659-661
		•	Paddle wheel	646-648
Sanitary (meets 3A standards)		•	Turbine	642-643
		•	Magnetic	661

Application/Selection Guide

Flowmeter Parameter Guide

Flowmeter Type	Best Accuracy	Media Type		Gas Flow Rate	Liquid Flow Rate	Viscosity	Max Pressure	Analog Output	Serial Communication	Pages
		Liquid	Gases							
Variable Area	±2% FS	Yes	Yes	0.1mL/min to 2200 LPM	0.002mL/min to 500 LPM	Water-like only	Typically 200 psig (varies)	Alarm units only	No	593-621
Gas Mass	±0.2% FS	No	Yes	0.01mL/min to 1000 LPM	—	—	Maximum 100 psig	Yes	Yes	624-632
Differential Pressure	±1% FS	Yes	Yes	0.02mL/min to 500 LPM	0 to 10 LPM	Water-like only	Maximum 100 psig	Yes	Yes	633-634
Pelton Wheel	±0.5% FS	Yes	Yes	20mL/min to 500 LPM	13mL/min to 10 LPM	Water-like only	Maximum 500 psig	Yes	Yes	635-638
Turbine	±0.5% of reading	Yes	No	—	0.11 to 17,791 LPM	Water-like only	Maximum 5000 psig	Yes	No	639-645
Paddle Wheel	±1% FS	Yes	No	—	0.03 to 26,411 LPM	Water-like only	Maximum 1500 psig	Yes	No	646-651
Gear	±0.5% of reading	Yes	No	—	0.01 to 227 LPM	Up to 100,000 cps	Maximum 5000 psig	Yes	No	652
Ultrasonic	±0.5% of reading	Yes	No	—	Varies w/ pipe size	Slurries	Varies w/type	Yes	Yes	653-656
Magnetic	≤0.3% of flow rate	Yes	No	—	0.38 to 22,620 LPM	Slurries	Maximum 259 psig	Yes	Yes	658-661
Vortex	±0.75% of flow rate	Yes	Yes	84 to 8228 LPM	Varies w/density	Up to 7.5cps	275 psig	Yes	Yes	662

Cole-Parmer Acrylic Flowmeters for Bench or Panel Mount

Durable single-piece body withstands severe shock and vibration

- Ideal for process plant applications on air sampling equipment, gas analyzers and chemical feed systems for water treatment
- Flexible design allows for panel or bench mounting

Machined from solid acrylic blocks, these meters have integral metering tubes that provide precise readings even in aggressive plant environments. The meters' inlet/outlet ports and mounting studs are extended for easy panel installation. An alternate option is a tripod base (sold separately below) which allows for mobility from bench to bench.

Note: There are many additional types of acrylic flowmeters not listed here. Contact your local dealer for quotes on acrylic meters with special requirements.

2" flowmeter 32457-00 shown with tripod base 32462-50

4" flowmeter 32458-26

Specifications

Accuracy
2" and 50-mm flowmeters: ±5% full-scale
4" and 100-mm flowmeters: ±3% full-scale
5" and 127-mm flowmeters: ±2% full-scale

Repeatability: ±0.5% full-scale

Max pressure: 100 psi (6.9 bar)

Max operating temp: 150°F (65°C)

Connections
2", 4", 50-mm, and 100-mm flowmeters: ⅛" NPT(F)†
5" and 127-mm flowmeters: 1" NPT(F)

Dimensions (W x H x D)
2" and 50-mm flowmeters: 1" x 4" x 2⅛" (2.5 x 10.2 x 5.4 cm)
4" and 100-mm flowmeters: 1⅜" x 6½" x 2⅛" (3.5 x 16.5 x 5.4 cm)
5" and 127-mm flowmeters: 1¾" x 10⅞" x 4¾" (4.4 x 27.6 x 12.1 cm)

Materials of Construction

Part	2" and 50 mm	4" and 100 mm	5" and 127 mm
Body	Acrylic		
Fittings	Brass		PVC
Valve	Brass		
O-rings	Buna N		
Float (for air)	Black glass (BG)	316 SS (SS)	

English-Unit Scales

For liquid applications				For air applications		
Cat. no.	Float‡	Flow range	Price	Cat. no.	Flow range	Price
Flowmeters with 2" scale						
TW-32457-00	BG	0.2 to 2 GPH		TW-32457-10	0.1 to 1 scfh	
TW-32457-02	SS	0.4 to 5 GPH		TW-32457-12	0.2 to 2 scfh	
TW-32457-04	BG	1 to 10 GPH		TW-32457-14	0.4 to 5 scfh	
TW-32457-06	SS	2 to 20 GPH		TW-32457-16	0.5 to 10 scfh	
TW-32457-08	SS	4 to 40 GPH		TW-32457-18	2 to 20 scfh	
—	—	—	—	TW-32457-20	3 to 30 scfh	
—	—	—	—	TW-32457-22	4 to 50 scfh	
—	—	—	—	TW-32457-24	10 to 100 scfh	
—	—	—	—	TW-32457-26	20 to 200 scfh	
Flowmeters with 4" scale						
TW-32458-00	SS	1 to 10 GPH		TW-32458-10	0.4 to 5 scfh	
TW-32458-02	SS	2 to 25 GPH		TW-32458-12	1 to 10 scfh	
TW-32458-04	SS	4 to 50 GPH		TW-32458-14	2 to 20 scfh	
TW-32458-06	SS	6 to 60 GPH		TW-32458-16	4 to 40 scfh	
TW-32458-07†	SS	0.2 to 2.5 GPM		TW-32458-18	10 to 100 scfh	
TW-32458-08†	SS	0.4 to 5 GPM		TW-32458-20	14 to 150 scfh	
—	—	—	—	TW-32458-22	20 to 200 scfh	
—	—	—	—	TW-32458-24†	0.5 to 5 scfm	
—	—	—	—	TW-32458-26†	1 to 10 scfm	
Flowmeters with 5" scale						
TW-32462-00	SS	0.4 to 5 GPM		TW-32462-10	3 to 25 scfm	
TW-32462-02	SS	1 to 10 GPM		TW-32462-12	4 to 50 scfm	
TW-32462-04	SS	2 to 20 GPM		TW-32462-14	10 to 100 scfm	

†These models have dual scale: GPM/GPH, scfm/scfh, LPM/LPH; they also have ¼" NPT(F) connections and use tripod base 32462-60 sold at right.

‡Float material key: BG = black glass, SS = stainless steel

Metric-Unit Scales

For liquid applications				For air applications		
Cat. no.	Float‡	Flow range	Price	Cat. no.	Flow range	Price
Flowmeters with 50-mm scale						
TW-32457-30	BG	5 to 50 mL/min		TW-32457-40	0.04 to 0.5 LPM	
TW-32457-32	BG	10 to 100 mL/min		TW-32457-42	0.1 to 1 LPM	
TW-32457-34	SS	20 to 240 mL/min		TW-32457-44	0.4 to 5 LPM	
—	—	—	—	TW-32457-46	1 to 10 LPM	
—	—	—	—	TW-32457-48	2 to 25 LPM	
—	—	—	—	TW-32457-50	4 to 50 LPM	
—	—	—	—	TW-32457-52	10 to 100 LPM	
Flowmeters with 100-mm scale						
TW-32458-30	BG	4 to 50 mL/min		TW-32458-50	0.4 to 5 LPM	
TW-32458-32	SS	10 to 120 mL/min		TW-32458-52	1 to 10 LPM	
TW-32458-34	BG	25 to 225 mL/min		TW-32458-54	2 to 20 LPM	
TW-32458-36	SS	40 to 400 mL/min		TW-32458-56	3 to 30 LPM	
TW-32458-38	SS	40 to 660 mL/min		TW-32458-58	4 to 50 LPM	
TW-32458-40	SS	100 to 1500 mL/min		TW-32458-60	10 to 100 LPM	
TW-32458-42	SS	200 to 3000 mL/min		TW-32458-62†	14 to 140 LPM	
TW-32458-44†	SS	0.8 to 9 LPM		TW-32458-64†	30 to 280 LPM	
TW-32458-46†	SS	1.5 to 20 LPM		TW-32458-65†	80 to 560 LPM	
Flowmeters with 127-mm scale						
TW-32462-20	SS	1 to 15 LPM		TW-32462-30	100 to 700 LPM	
TW-32462-22	SS	4 to 36 LPM		TW-32462-32	100 to 1400 LPM	
TW-32462-24	SS	5 to 75 LPM		TW-32462-34	400 to 3000 LPM	

Tripod Bases

Durable acrylic base with three leveling screws and spirit level.

Catalog number	Description	Price
TW-32462-50	For one flowmeter with 2" or 50-mm scale	
TW-32462-55	For one flowmeter with 4" or 100-mm scale	
TW-32462-60	For one flowmeter with ¼" connections	

MORE online!
For pressure drop information for these flowmeters, go to . . .
ColeParmer.com

Cole-Parmer® Valved Acrylic Flowmeters for Bench or Panel Mount

Meter with valve provides flow control through a highly durable meter body

- Ideal for process plant applications on air sampling equipment, gas analyzers and chemical feed systems for water treatment
- Integrated precision valve allows precise manual flow across the full scale
- The flexible design allows for panel or bench mounting

Machined from solid acrylic blocks, these meters have integral metering tubes that provide precise readings even in aggressive plant environments. The meters' inlet/outlet ports and mounting studs are extended for easy panel installation. An alternate option is a tripod base (sold separately below) which allows for mobility from bench to bench.

Note: There are many additional types of acrylic flowmeters not listed here. Contact your local dealer for quotes on acrylic meters with special requirements.

2" Flowmeter 32460-18 shown with tripod base 32462-50

4" flowmeter 32461-08

Specifications

Accuracy
2" and 50-mm flowmeters: ±5% full-scale
4" and 100-mm flowmeters: ±3% full-scale
5" and 127-mm flowmeters: ±2% full-scale

Repeatability: ±0.5% full-scale

Media type: liquids or gases

Max pressure: 100 psi (6.9 bar)

Max operating temp: 150°F (65°C)

Connections
2", 4", 50-mm, and 100-mm flowmeters: ⅛" NPT(F)†
5" and 127-mm flowmeters: 1" NPT(F)

Dimensions (W x H x D)
(not including valve stem):
2" and 50-mm flowmeters: 1" x 4" x 2⅛" (2.5 x 10.2 x 5.4 cm)
4" and 100-mm flowmeters: 1⅜" x 6½" x 2⅛" (3.5 x 16.5 x 5.4 cm)
5" and 127-mm flowmeters: 1¾" x 10⅞" x 4¾" (4.4 x 27.6 x 12.1 cm)

Materials of Construction

Part	2" and 50 mm	4" and 100 mm	5" and 127 mm
Body	Acrylic		
Fittings	Brass		PVC
Valve	Brass		
O-rings	Buna N		
Float (for air)	Black glass (BG)	316 SS (SS)	

English-Unit Scales

For liquid applications				For air applications		
Cat. no.	Float‡	Flow range	Price	Cat. no.	Flow range	Price
Flowmeters with 2" scale						
TW-32460-00	BG	0.2 to 2 GPH		TW-32460-10	0.1 to 1 scfh	
TW-32460-02	SS	0.4 to 5 GPH		TW-32460-12	0.2 to 2 scfh	
TW-32460-04	BG	1 to 10 GPH		TW-32460-14	0.4 to 5 scfh	
TW-32460-06	SS	2 to 20 GPH		TW-32460-16	0.5 to 10 scfh	
TW-32460-08	SS	4 to 40 GPH		TW-32460-18	2 to 20 scfh	
—	—	—	—	TW-32460-20	3 to 30 scfh	
—	—	—	—	TW-32460-22	4 to 50 scfh	
—	—	—	—	TW-32460-24	10 to 100 scfh	
—	—	—	—	TW-32460-26	20 to 200 scfh	
Flowmeters with 4" scale						
TW-32461-00	SS	1 to 10 GPH		TW-32461-10	0.4 to 5 scfh	
TW-32461-02	SS	2 to 25 GPH		TW-32461-12	1 to 10 scfh	
TW-32461-04	SS	4 to 50 GPH		TW-32461-14	2 to 20 scfh	
TW-32461-06	SS	6 to 60 GPH		TW-32461-16	4 to 40 scfh	
TW-32461-07†	SS	0.2 to 2.5 GPM		TW-32461-18	10 to 100 scfh	
TW-32461-08†	SS	0.4 to 5 GPM		TW-32461-20	14 to 150 scfh	
—	—	—	—	TW-32461-22	20 to 200 scfh	
—	—	—	—	TW-32461-24†	0.5 to 5 scfm	
—	—	—	—	TW-32461-26†	1 to 10 scfm	
Flowmeters with 5" scale						
TW-32466-50	SS	1 to 10 GPM		TW-32466-60	3 to 25 scfm	
TW-32466-52	SS	2 to 20 GPM		TW-32466-62	4 to 50 scfm	
—	—	—	—	TW-32466-64	10 to 100 scfm	

†These models have dual scale: GPM/GPH, scfm/scfh, LPM/LPH; they also have ¼" NPT(F) connections and use tripod base 32462-60 sold at right.
‡Float material key: BG = black glass, SS = stainless steel

Metric-Unit Scales

For liquid applications				For air applications		
Cat. no.	Float‡	Flow range	Price	Cat. no.	Flow range	Price
Flowmeters with 50-mm scale						
TW-32460-30	BG	5 to 50 mL/min		TW-32460-40	0.04 to 0.5 LPM	
TW-32460-32	SS	10 to 100 mL/min		TW-32460-42	0.1 to 1 LPM	
TW-32460-34	SS	20 to 240 mL/min		TW-32460-44	0.4 to 5 LPM	
—	—	—	—	TW-32460-46	1 to 10 LPM	
—	—	—	—	TW-32460-48	2 to 25 LPM	
—	—	—	—	TW-32460-50	4 to 50 LPM	
—	—	—	—	TW-32460-52	10 to 100 LPM	
Flowmeters with 100-mm scale						
TW-32461-30	SS	4 to 50 mL/min		TW-32461-50	0.4 to 5 LPM	
TW-32461-32	SS	10 to 120 mL/min		TW-32461-52	1 to 10 LPM	
TW-32461-34	BG	25 to 225 mL/min		TW-32461-54	2 to 20 LPM	
TW-32461-36	SS	40 to 400 mL/min		TW-32461-56	3 to 30 LPM	
TW-32461-38	SS	40 to 660 mL/min		TW-32461-58	4 to 50 LPM	
TW-32461-40	SS	100 to 1500 mL/min		TW-32461-60	10 to 100 LPM	
TW-32461-42	SS	200 to 3000 mL/min		TW-32461-62†	14 to 140 LPM	
TW-32461-44†	SS	0.8 to 9 LPM		TW-32461-64†	30 to 280 LPM	
TW-32461-46†	SS	1.5 to 20 LPM		—	—	—
Flowmeters with 127-mm scale						
TW-32466-54	SS	4 to 36 LPM		TW-32466-66	100 to 700 LPM	
TW-32466-56	SS	5 to 75 LPM		TW-32466-68	100 to 1400 LPM	
—	—	—	—	TW-32466-70	400 to 3400 LPM	

Tripod Bases

Durable acrylic base with three leveling screws and spirit level.

Catalog number	Description	Price
TW-32462-50	For one flowmeter with 2" or 50-mm scale	
TW-32462-55	For one flowmeter with 4" or 100-mm scale	
TW-32462-60	For one flowmeter with ¼" connections	

Cole-Parmer® Acrylic Flowmeters for Gases and Water

Designed for labs and plant processes where multiple gases are used

NEW

- Direct-reading English and metric scales

Versatile acrylic flowmeters are designed specifically for air, oxygen, nitrogen, carbon dioxide, argon, helium, or water. Meters are offered with or without built-in low hysteresis needle valves. Meters without valves can be panel mounted or used in partial or full in-line mounted configurations. Easily disassemble meters for cleaning. Flowmeters feature a stable, easy-to-read float.

68560-24

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For LIQUIDS For GASES

Accuracy: ±5% full-scale
Max pressure: 100 psi (6.9 bar)
Max operating temp: 150°F (65°C)
Connections: ⅛" NPT(F)

Materials of Construction

Body	Acrylic	
Fittings	Brass	316 SS
O-rings	Buna N	Viton®

Max flow rate		Float	Flowmeters without valve				Flowmeters with valve			
			Brass fittings		316 SS fittings		Brass fittings		316 SS fittings	
			Catalog number	Price	Catalog number	Price	Catalog number	Price	Catalog number	Price
Air flowmeters										
2.8 scfh	1.4 L/min	Glass	TW-68560-00		TW-68560-07		TW-68560-14		TW-68560-21	
5.5 scfh	2.75 L/min	SS	TW-68560-01		TW-68560-08		TW-68560-15		TW-68560-22	
7 scfh	3.5 L/min	Carboloy	TW-68560-02		TW-68560-09		TW-68560-16		TW-68560-23	
18 scfh	8.5 L/min	Glass	TW-68560-03		TW-68560-10		TW-68560-17		TW-68560-24	
32.5 scfh	16 L/min	SS	TW-68560-04		TW-68560-11		TW-68560-18		TW-68560-25	
45 scfh	22 L/min	Carboloy	TW-68560-05		TW-68560-12		TW-68560-19		TW-68560-26	
100 scfh	50 L/min	SS	TW-68560-06		TW-68560-13		TW-68560-20		TW-68560-27	
Oxygen flowmeters										
2.5 scfh	1.2 L/min	Glass	TW-68560-28		TW-68560-35		TW-68560-42		TW-68560-49	
5 scfh	2.5 L/min	SS	TW-68560-29		TW-68560-36		TW-68560-43		TW-68560-50	
7 scfh	3.5 L/min	Carboloy	TW-68560-30		TW-68560-37		TW-68560-44		TW-68560-51	
16 scfh	8 L/min	Glass	TW-68560-31		TW-68560-38		TW-68560-45		TW-68560-52	
30 scfh	15 L/min	SS	TW-68560-32		TW-68560-39		TW-68560-46		TW-68560-53	
42.5 scfh	20 L/min	Carboloy	TW-68560-33		TW-68560-40		TW-68560-47		TW-68560-54	
90 scfh	45 L/min	SS	TW-68560-34		TW-68560-41		TW-68560-48		TW-68560-55	
Nitrogen flowmeters										
2.75 scfh	1.3 L/min	Glass	TW-68560-56		TW-68560-63		TW-68560-70		TW-68560-77	
5.5 scfh	2.75 L/min	SS	TW-68560-57		TW-68560-64		TW-68560-71		TW-68560-78	
7.5 scfh	3.5 L/min	Carboloy	TW-68560-58		TW-68560-65		TW-68560-72		TW-68560-79	
16 scfh	8 L/min	Glass	TW-68560-59		TW-68560-66		TW-68560-73		TW-68560-80	
32.5 scfh	16 L/min	SS	TW-68560-60		TW-68560-67		TW-68560-74		TW-68560-81	
45 scfh	22 L/min	Carboloy	TW-68560-61		TW-68560-68		TW-68560-75		TW-68560-82	
100 scfh	45 L/min	SS	TW-68560-62		TW-68560-69		TW-68560-76		TW-68560-83	
Carbon dioxide flowmeters										
2.2 scfh	1.1 L/min	Glass	TW-68560-84		TW-68560-91		TW-68561-00		TW-68561-07	
5 scfh	2 L/min	SS	TW-68560-85		TW-68560-92		TW-68561-01		TW-68561-08	
6.5 scfh	3 L/min	Carboloy	TW-68560-86		TW-68560-93		TW-68561-02		TW-68561-09	
15 scfh	7 L/min	Glass	TW-68560-87		TW-68560-94		TW-68561-03		TW-68561-10	
25 scfh	12 L/min	SS	TW-68560-88		TW-68560-95		TW-68561-04		TW-68561-11	
37.5 scfh	18 L/min	Carboloy	TW-68560-89		TW-68560-96		TW-68561-05		TW-68561-12	
80 scfh	35 L/min	SS	TW-68560-90		TW-68560-97		TW-68561-06		TW-68561-13	
Argon flowmeters										
2.25 scfh	1.1 L/min	Glass	TW-68561-14		TW-68561-21		TW-68561-28		TW-68561-35	
5 scfh	2.2 L/min	SS	TW-68561-15		TW-68561-22		TW-68561-29		TW-68561-36	
6.5 scfh	3 L/min	Carboloy	TW-68561-16		TW-68561-23		TW-68561-30		TW-68561-37	
15 scfh	7 L/min	Glass	TW-68561-17		TW-68561-24		TW-68561-31		TW-68561-38	
26 scfh	13 L/min	SS	TW-68561-18		TW-68561-25		TW-68561-32		TW-68561-39	
37.5 scfh	18 L/min	Carboloy	TW-68561-19		TW-68561-26		TW-68561-33		TW-68561-40	
80 scfh	40 L/min	SS	TW-68561-20		TW-68561-27		TW-68561-34		TW-68561-41	
Helium flowmeters										
4 scfh	2 L/min	Glass	TW-68561-42		TW-68561-49		TW-68561-56		TW-68561-63	
11 scfh	5.5 L/min	SS	TW-68561-43		TW-68561-50		TW-68561-57		TW-68561-64	
17 scfh	8 L/min	Carboloy	TW-68561-44		TW-68561-51		TW-68561-58		TW-68561-65	
40 scfh	18 L/min	Glass	TW-68561-45		TW-68561-52		TW-68561-59		TW-68561-66	
70 scfh	35 L/min	SS	TW-68561-46		TW-68561-53		TW-68561-60		TW-68561-67	
110 scfh	55 L/min	Carboloy	TW-68561-47		TW-68561-54		TW-68561-61		TW-68561-68	
250 scfh	110 L/min	SS	TW-68561-48		TW-68561-55		TW-68561-62		TW-68561-69	
Water flowmeters										
0.3 GPH	20 mL/min	Glass	TW-68561-70		TW-68561-77		TW-68561-84		TW-68561-91	
1.1 GPH	70 mL/min	SS	TW-68561-71		TW-68561-78		TW-68561-85		TW-68561-92	
1.5 GPH	100 mL/min	Carboloy	TW-68561-72		TW-68561-79		TW-68561-86		TW-68561-93	
2.75 GPH	175 mL/min	Glass	TW-68561-73		TW-68561-80		TW-68561-87		TW-68561-94	
6.5 GPH	450 mL/min	SS	TW-68561-74		TW-68561-81		TW-68561-88		TW-68561-95	
11 GPH	700 mL/min	Carboloy	TW-68561-75		TW-68561-82		TW-68561-89		TW-68561-96	
22 GPH	1400 mL/min	SS	TW-68561-76		TW-68561-83		TW-68561-90		TW-68561-97	

Flowmeters

Variable Area, Direct Reading

Cole-Parmer® Acrylic Flowmeter Kits

Seven interchangeable scales for routine gases and water offer flexibility

- Stable, easy-to-read float
- English and metric scales
- Easy disassembly for cleaning

These versatile acrylic flowmeter kits come with seven interchangeable back plates for routine gases (air, water, argon, carbon dioxide, helium, nitrogen, and oxygen). Meters are offered with or without built-in low hysteresis needle valves. Meters without valve can be panel mounted, or used in partial or full in-line mounted configurations.

34500-52

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Accuracy: ±5% full-scale

Max operating temp: 150°F (65°C)

Max pressure: 100 psi (6.9 bar)

Connections: ⅛" NPT(F)

Materials of Construction

Body	Acrylic	
Fittings	Brass	316 SS
O-rings	Buna N	Viton®

Max flow rate, L/min (scfh)							Float	Flowmeters without valve		Flowmeters with valve	
								Brass fittings	Stainless steel fittings	Brass fittings	Stainless steel fittings
Air	Water (GPH)	Argon	CO_2	Helium	Nitrogen	Oxygen		Catalog number	Catalog number	Catalog number	Catalog number
1.2 (2.6)	20 (0.3)	1 (2)	1.1 (2.5)	2 (4)	1.3 (2.75)	1.1 (2.5)	Glass	TW-34500-10	TW-34500-14	TW-34500-12	TW-34500-16
2.5 (5.5)	70 (1.1)	2 (5)	2 (5)	5 (10)	2.5 (5.5)	2.25 (5)	Stainless steel	TW-34500-18	TW-34500-24	TW-34500-22	TW-34500-26
3.5 (7)	100 (1.5)	3 (6.5)	3 (6.5)	8 (17)	3.5 (7.5)	3.5 (7)	Carboloy	TW-34500-28	TW-34500-32	TW-34500-30	TW-34500-34
8.5 (18)	175 (2.75)	7 (15)	7 (15)	18 (40)	8 (16)	8 (16)	Glass	TW-34500-36	TW-34500-40	TW-34500-38	TW-34500-42
16 (32.5)	450 (6.5)	13 (26)	12 (25)	35 (70)	16 (32.5)	15 (30)	Stainless steel	TW-34500-44	TW-34500-48	TW-34500-46	TW-34500-52
22 (45)	700 (11)	18 (37.5)	18 (37.5)	55 (110)	22 (45)	20 (42.5)	Carboloy	TW-34500-54	TW-34500-58	TW-34500-56	TW-34500-60
							Price				

Cole-Parmer® Direct-Reading Multigas Flowmeters

Rotating flowtube allows one meter to be used for five gases

- Rigid, high-quality, compact construction
- Flow graduations in English or metric units

Designed for medium flow range applications, these flowmeters incorporate precision-machined glass and brass or stainless steel frames to provide accurate and economical flow metering solutions. Simply rotate glass flowtube to read the gas you will be using—oxygen, nitrogen, helium, carbon dioxide, and argon.

32605-36

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For GASES

Accuracy: ±5% full-scale

Max pressure: 150 psi (10.3 bar)

Max operating temp: 250°F (121°C)

Connections: ⅜" NPT(F)

Dimensions (W x H)
In-line (including fitting): 2" (5.1 cm) x 11" (28 cm)
Panel-mount: 2" (5.1 cm) x 10¼" (26 cm)

Materials of Construction

Part	Brass	316 SS
Flowtube	Borosilicate glass	
Fittings, valves	Brass	316 SS
O-rings	Viton®	
Float	316 stainless steel	
Frame	Polycarbonate	

Maximum flow rate					Flowmeters without valve				Flowmeters with valve			
					Brass fittings		316 SS fittings		Brass fittings		316 SS fittings	
O_2	N_2	He	CO_2	Ar	Catalog number	Price	Catalog number	Price	Catalog number	Price	Catalog number	Price
In-line flowmeters with English units (scfm)												
4.5	4.5	12	3.8	4.2	TW-32605-00		TW-32605-05		TW-32605-10		TW-32605-15	
9	9.5	23	8	8	TW-32605-01		TW-32605-06		TW-32605-11		TW-32605-16	
14	14	35	12.5	12.5	TW-32605-02		TW-32605-07		TW-32605-12		TW-32605-17	
18	19	42.5	15.5	15.5	TW-32605-03		TW-32605-08		TW-32605-13		TW-32605-18	
28	30	60	24	26	TW-32605-04		TW-32605-09		TW-32605-14		TW-32605-19	
In-line flowmeters with metric units (sL/min)												
130	130	350	105	120	TW-32605-20		TW-32605-26		TW-32605-31		TW-32605-36	
260	270	650	220	230	TW-32605-21		TW-32605-27		TW-32605-32		TW-32605-37	
400	400	1000	360	360	TW-32605-22		TW-32605-28		TW-32605-33		TW-32605-38	
525	550	1250	440	440	TW-32605-24		TW-32605-29		TW-32605-34		TW-32605-39	
800	850	1800	700	750	TW-32605-25		TW-32605-30		TW-32605-35		TW-32605-40	
Panel-mount flowmeters with English units (scfm)												
4.5	4.5	12	3.8	4.2	TW-32605-41		TW-32605-46		TW-32605-51		TW-32605-56	
9	9.5	23	8	8	TW-32605-42		TW-32605-47		TW-32605-52		TW-32605-57	
14	14	35	12.5	12.5	TW-32605-43		TW-32605-48		TW-32605-53		TW-32605-58	
18	19	42.5	15.5	15.5	TW-32605-44		TW-32605-49		TW-32605-54		TW-32605-59	
28	30	60	24	26	TW-32605-45		TW-32605-50		TW-32605-55		TW-32605-60	
Panel-mount flowmeters with metric units (sL/min)												
130	130	350	105	120	TW-32605-61		TW-32605-66		TW-32605-71		TW-32605-76	
260	270	650	220	230	TW-32605-62		TW-32605-67		TW-32605-72		TW-32605-77	
400	400	1000	360	360	TW-32605-63		TW-32605-68		TW-32605-73		TW-32605-78	
525	550	1250	440	440	TW-32605-64		TW-32605-69		TW-32605-74		TW-32605-79	
800	850	1800	700	750	TW-32605-65		TW-32605-70		TW-32605-75		TW-32605-80	

Cole-Parmer® Acrylic In-Line Flowmeters

Highly durable compact design

- Block body with brass-reinforced connections—virtually unbreakable
- Large scale on a flat surface is easy to read
- Many versions have dual time-unit scales

Designed for rough-duty installations, a built-in guide rod stabilizes the float for easier reading. These are suitable for most general process fluids (brass reinforcing the connection does not come in contact with the fluid). Common applications are for RO systems, air-sampling skids and chemical feed systems in water treatment.

Flowmeter for air 32445-00

Flowmeter for air 32445-08

Specifications

Connection	Accuracy	Dimensions (W x H x D)
¼" NPT(M)	±5%	1" x 5 1/32" x 1⅛" (2.5 x 13.6 x 2.8 cm)
½" NPT(F)	±3%	1½" x 9¼" x 1⅝" (3.8 x 23.5 x 4.1 cm)
¾" NPT(F)		1½" x 11¼" x 1⅝" (3.8 x 28.6 x 4.1 cm)

Media type: water or air
Max pressure: 100 psig (6.9 bar)
Max operating temp: 150°F (65°C)

Materials of Construction

Body	Acrylic
Fittings	PVC
Float	316 SS
O-rings	Buna N
Guide rod	SS

Catalog number	Flow range	Connections	Price
For water			
TW-32445-50	1 to 12 GPH	¼" NPT(M)	
TW-32445-52	4 to 25 GPH		
TW-32445-54	6 to 60 GPH		
TW-32445-56	30 to 150 GPH/0.5 to 2.5 GPM	½" NPT(F)	
TW-32445-58	24 to 300 GPH/0.4 to 5 GPM		
TW-32445-60	60 to 600 GPH/1 to 10 GPM	¾" NPT(F)	
TW-32445-62	90 to 900 GPH/1.5 to 15 GPM		
TW-32445-64	120 to 1200 GPH/2 to 20 GPM		
TW-32445-66	4 to 50 LPH	¼" NPT(M)	
TW-32445-68	15 to 100 LPH		
TW-32445-70	30 to 230 LPH		
TW-32445-72	120 to 600 LPH/2 to 10 LPM	½" NPT(F)	
TW-32445-74	120 to 1200 LPH/2 to 20 LPM		
TW-32445-76	240 to 2400 LPH/4 to 40 LPM		
TW-32445-78	360 to 3600 LPH/6 to 60 LPM	¾" NPT(F)	
TW-32445-80	480 to 4200 LPH/8 to 70 LPM		
For air			
TW-32445-00	6 to 60 scfh	¼" NPT(M)	
TW-32445-02	15 to 100 scfh		
TW-32445-04	25 to 300 scfh		
TW-32445-06	180 to 720 scfh/3 to 12 scfm	½" NPT(F)	
TW-32445-08	180 to 1500 scfh/3 to 25 scfm		
TW-32445-10	300 to 3000 scfh/5 to 50 scfm		
TW-32445-11	600 to 4800 scfh /10 to 80 scfm	¾" NPT(F)	
TW-32445-12	200 to 1700 LPH	¼" NPT(M)	
TW-32445-14	500 to 3000 LPH		
TW-32445-16	1000 to 8500 LPH		
TW-32445-18	4800 to 20,400 LPH/80 to 340 LPM	½" NPT(F)	
TW-32445-20	6000 to 42,000 LPH/100 to 700 LPM		
TW-32445-22	9000 to 90,000 LPH/150 to 1500 LPM		
TW-32445-23	12,000 to 13,200 LPH/200 to 2200 LPM	¾" NPT(F)	

Cole-Parmer® High-Flow Acrylic In-Line Flowmeters

Durable design includes union ends for easy installation and maintenance

The one-piece clear acrylic construction is ideal for damp or corrosive process environments. The stainless steel float moves on a guide rod to help provide a steady read. Scales printed right on the flow tube make accurate readings easier in tough conditions or for dirty fluids.

Flowmeter 32448-04 with stainless steel fittings

Flowmeter 32448-32 with PVC fittings

Specifications

Accuracy: ±5% full-scale
Media type: liquids or gases
Max pressure: 100 psig (6.9 bar)
Max operating temp: 150°F (65°C)
Dimensions (W x H x D)
Meters with 1½" connection:
3½" x 13⅜" x 3½" (8.9 x 34.0 x 8.9 cm)
Meters with 2" connection:
4⅛" x 13⅝" x 4⅛" (10.5 x 34.6 x 10.5 cm)

Materials of Construction

Body	Acrylic	
Fittings	PVC	SS
O-rings	Buna N	
Float	Aluminum or SS	
Guide rod	SS	

Flow range	Connections	PVC fittings		SS fittings	
		Cat. no.	Price	Cat. no.	Price
For water					
3 to 30 GPM	1½" NPT(F)	TW-32448-00		TW-32448-04	
4 to 40 GPM		TW-32448-06		—	—
5 to 50 GPM		TW-32448-12		—	—
6 to 60 GPM	2" NPT(F)	TW-32448-20		—	—
8 to 80 GPM		TW-32448-26		TW-32448-30	
10 to 100 GPM		TW-32448-32		TW-32448-36	
For air					
20 to 240 scfm	2" NPT(F)	TW-32448-50		TW-32448-54	

32900-62

High-Accuracy Oxygen and Air Flowmeters

Ideal for use in aquaculture, medical, and laboratory processes

- Available for use with both oxygen and breathing air
- Precision control valve provides accurate, leak-free flow control
- Machined brass base with integral DISS fitting and plated with a high-gloss chrome-like finish

These accurate, low-cost flowmeters are perfect for fish farms, welding apparatus, and medical devices that need to regulate oxygen and air into processes. Flowmeters are made with high-impact resistant Lexan® shield and flow tube. Combined with a sturdy machined brass base, these meters will stand up to the rigors of clinical or field use. The durable, stainless steel stem valve ensures precise control throughout the full flow range and provides for positive flow shut-off. O-ring seals eliminate the leaks that are commonly associated with plastic-base models. Meters are calibrated at 50 psig inlet pressure for accurate flow measurement under a variety of operating conditions. Models 32900-62 and -66 are cleared for oxygen use.

For GASES

Specifications

Media type: oxygen and air

Accuracy
⅛ to 4 LPM: ±0.2 LPM
4 to 8 LPM: ±0.4 LPM
8 to 15 LPM: ±0.6 LPM

Repeatability: ±1% full-scale

Max pressure: 100 psig (6.9 bar)

Operating temp:
32 to 150°F (0 to 65°C)

Connections: ⅛" NPT (F) inlet, 9⁄16-18" male DISS outlet

Dimensions
Fitting-to-fitting: 1 1⁄16" (1.75 cm)
Height: 5¼" (13.3 cm)

Materials of Construction

Case	Brass
Flow tube, shield	Lexan®
Fittings	Nickel-plated brass
O-rings	Buna N

Flow range (LPM)	Float	For oxygen		For air	
		Catalog number	Price	Catalog number	Price
⅛ to 3½	Black glass	TW-32900-62		—	—
¼ to 8	Black glass	TW-32900-64		TW-32900-68	
½ to 15	Stainless steel	TW-32900-66		TW-32900-72	

32900-36

Cole-Parmer®

Impact-Resistant Polycarbonate Flowmeters

Precision-adjusting valve for accurate, leak-free flow control

- High-quality construction
- Economy combined with high accuracy
- Ideal for OEM applications

Molded of high-impact-resistant polycarbonate, these direct-reading flowmeters are supplied with scales in both English and metric units for liquid and air—all with a 10:1 turndown ratio. These flowmeters have been designed to maintain maximum pressures to 100 psig and temperatures to 150°F (65°C).

For LIQUIDS For GASES

Specifications

Media type: noncaustic liquids and air

Accuracy: ±4% full-scale

Repeatability: ±1% full-scale

Turndown ratio: 10:1

Max pressure: 100 psig (6.9 bar)

Operating temp:
32 to 150°F (0 to 65°C)

Connections: ⅛" NPT(F)

Dimensions
Fitting-to-fitting: 3" (7.6 cm)
Height: 4 13⁄16" (12.2 cm)

Materials of Construction

Flow tube	Polycarbonate
Fittings	Stainless steel
O-rings	Viton®
Frame	Polycarbonate

Flow range	Float†	Flowmeters without valve		Flowmeters with valve	
		Catalog number	Price	Catalog number	Price
For liquids; English units					
0.2 to 2.5 GPH	WC	TW-32900-02		TW-32900-28	
1 to 10 GPH	BG	TW-32900-04		TW-32900-30	
4 to 40 GPH	SS	TW-32900-06		TW-32900-32	
For liquids; metric units					
5 to 110 ccm	BG	TW-32900-08		TW-32900-34	
20 to 300 ccm	SS	TW-32900-10		TW-32900-36	
For air; English units					
0.2 to 2.5 scfh	SS	TW-32900-12		TW-32900-38	
1 to 11 scfh	BG	TW-32900-14		TW-32900-40	
4 to 60 scfh	BG	TW-32900-16		TW-32900-42	
For air; metric units					
0.1 to 1.2 LPM	SS	TW-32900-18		TW-32900-44	
0.4 to 5 LPM	BG	TW-32900-20		TW-32900-46	
1 to 10 LPM	SS	TW-32900-22		TW-32900-48	
4 to 50 LPM	SS	TW-32900-24		TW-32900-52	
10 to 100 LPM	TC	TW-32900-26		TW-32900-54	

†Float material key: WC = white ceramic, BG = black glass, SS = stainless steel, TC = tungsten carbide

Pocket Flowmeters

Perfect for quick flow readings of tubing

- Reads 3/16" to 7/16" ID tubing size
- Polycarbonate flow tube
- Stainless steel float

Portable handheld flowmeters are designed to measure flow rates quickly and easily. Measure oxygen or air in the lab, field, or in process areas. Simply attach the flowmeter to tubing vertically to ensure accurate readings. Read center of ball float for the most accurate reading.

32500-82

Specifications

For GASES

Accuracy
1/8 to 4 LPM: ±0.2 LPM
4 to 8 LPM: ±0.4 LPM
8 to 15 LPM: ±0.6 LPM

Max pressure: 100 psi (6.9 bar)

Mounting angle: vertical

Flow conditions: atmosphere

Dimensions (L x dia): 5¼" x ½" (13.3 x 1.3 cm)

Fits tubing size: 3/16" to 7/16" ID

Materials of construction

Flow tube	Polycarbonate
Float	Stainless steel
Fittings	Acrylic

Flow range (LPM)	For oxygen		For air	
	Catalog number	Price	Catalog number	Price
1/8 to 2½	TW-32500-80		—	—
1 to 8	TW-32500-82		TW-32500-86	
2 to 15	TW-32500-84		TW-32500-88	

Easy-View Acrylic In-Line Flowmeters

Highly durable meters provide an unobstructed 360° view

- Flow ranges up to 50 GPM (200 LPM) with dual-unit scales for flexibility
- Machined from high-quality acrylic rod stock—extremely durable
- The one-piece, in-line body consumes less space for a clean installation

These meters are designed for use in more aggressive process environments. In addition to the machined acrylic bodies, the design utilizes SS float guides. The combination is a meter suitable for high-vibration, high-fluctuation process applications. Some versions include polypropylene end fittings reinforced with aluminum stress rings for added strength to the meters' design.

Models for liquids have direct-reading scales in English and metric units; models for air have direct-reading scales in English.

General-purpose flowmeter for liquids 32477-26

General-purpose flowmeter with alarm 32477-50

Large-body flowmeter for liquids 32477-82

Specifications for all flowmeters

Accuracy: ±5% of reading

Max pressure: 150 psi (10.3 bar); 130 psig (8.8 bar) for large-body models

Max operating temp: 150°F (65°C); 130°F (54°C) for large-body models

Dimensions (H x dia)
Models with flow rates up to 5 GPM and 45 scfm air: 8 3/16" x 1¼" (20.8 x 3.2 cm)
Models with flow rates from 10 to 20 GPM: 11" x 1¾" (27.9 x 4.4 cm)
Large-body models: 12" x 2" (30.5 x 5.1 cm)

Materials of Construction

Part	General-purpose	Large-body	Corrosive environment with alarm
Body	Acrylic		
Fittings	PP†	PVC	PVC
O-rings	Viton®		
Guide	316 SS		Hastelloy

†Reinforced with aluminum stress rings.

General-Purpose Flowmeters

Cat. no.	Flow range	Float	Connections	Price
For liquids				
TW-32477-00 TW-32477-02	0.025 to 0.25 GPM/0.1 to 1 LPM	PVC	¼" NPT(F) ⅜" NPT(F)	
TW-32477-04 TW-32477-06	0.1 to 1 GPM/0.4 to 4 LPM	PVC	⅜" NPT(F) ½" NPT(F)	
TW-32477-08 TW-32477-10	0.2 to 2 GPM/1 to 7.5 LPM	316 SS	⅜" NPT(F) ½" NPT(F)	
TW-32477-12 TW-32477-14	0.3 to 3 GPM/1.5 to 11.1 LPM	316 SS	⅜" NPT(F) ½" NPT(F)	
TW-32477-16 TW-32477-18	0.5 to 5 GPM/2.0 to 20 LPM	316 SS	⅜" NPT(F) ½" NPT(F)	
TW-32477-20 TW-32477-22	1 to 10 GPM/4 to 38 LPM	316 SS	¾" NPT(F) 1" NPT(F)	
TW-32477-24 TW-32477-26	1 to 17 GPM/4 to 64 LPM	316 SS	¾" NPT(F) 1" NPT(F)	
TW-32477-28 TW-32477-30	2 to 20 GPM/8 to 80 LPM	316 SS	¾" NPT(F) 1" NPT(F)	
For air				
TW-32477-70 TW-32477-72	0.75 to 7.5 scfm	316 SS	⅜" NPT (F) ½" NPT (F)	
TW-32477-74 TW-32477-76	4.0 to 45 scfm	316 SS	¾" NPT (F) 1" NPT (F)	

Large-Body Flowmeters

Cat. no.	Flow range	Float	Connections	Price
For liquids				
TW-32477-78 TW-32477-80 TW-32477-82	5 to 25 GPM (20 to 100 LPM) 8 to 40 GPM (30 to 150 LPM) 10 to 50 GPM (40 to 200 LPM)	316 SS	1½" NPT (M)	

Flowmeters with High/Low Alarms

Catalog number	Flow range GPM	Flow range LPM	Float	Connection	Price
General purpose flowmeters for liquids					
TW-32477-34 TW-32477-36	0.2 to 2.0	1 to 7.5	PVC	¾" NPT(F) 1" NPT(F)	
TW-32477-50 TW-32477-52	0.5 to 5.0	2 to 20	PVC	¾" NPT(F) 1" NPT(F)	
TW-32477-38 TW-32477-40	1 to 10	4 to 38	316 SS	¾" NPT(F) 1" NPT(F)	
TW-32477-54 TW-32477-56	2 to 20	8 to 80	316 SS	¾" NPT(F) 1" NPT(F)	
Corrosive-environment flowmeters for liquids					
TW-32477-42 TW-32477-44	1 to 10	4 to 38	Hastelloy	¾" NPT(F) 1" NPT(F)	
TW-32477-46 TW-32477-48	1 to 17	4 to 64	Hastelloy	¾" NPT(F) 1" NPT(F)	
TW-32477-58 TW-32477-60	2 to 20	8 to 80	Hastelloy	¾" NPT(F) 1" NPT(F)	

INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

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

TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

Polysulfone In-Line Flowmeters

Better than acrylics for aggressive fluids or high temperature and pressure applications

- Flow ranges from less than 0.1 GPM to over 130 GPM and less than 1 scfm to over 230 scfm
- Models with all plastic wetted parts are ideal for ultrapure and deionized water applications

All meters include union connections—installing the meter and cleaning the internals is much easier. The unions also allow simple rotation of the sight-tube for easier reading all while keeping a tight thread seal on the fittings to contain aggressive fluids. With an O-ring seal, a tight seal is assured with O-ring replacement.

Most meters feature dual scales (English and metric) to reduce the need for stocking separate units for shipping to the US or elsewhere. The back-side of the meter body is molded with an opaque surface to make reading easier.

Note: Polysulfone is not suited for direct exposure to sunlight.


In-line flowmeter 32470-03


High-capacity in-line flowmeter 32472-02

Specifications for all flowmeters

Accuracy
Standard in-line and panel mount: ±5% full-scale
High-capacity: ±3% full-scale
Ultrapure: ±2½% full-scale

Max pressure drop: 2 psi (0.1 bar)

In-Line Flowmeters

This design is the standard and fits well into the piping line for confined or high-traffic areas.

Catalog number	Flow range	Float material	Connections	Dimensions (L x dia)	Maximum temp/pressure	Price
Standard in-line flowmeters for water						
TW-32470-00	0.025 to 0.25 GPM/0.1 to 1.0 LPM	PVC	½" NPT(M)	6 3/16" x 1 11/16"	212°F/ 150 psig	
TW-32470-01	0.1 to 1.0 GPM/0.4 to 4.0 LPM	316 SS				
TW-32470-02	0.2 to 2.0 GPM /0.75 to 7.5 LPM	316 SS				
TW-32470-03	0.5 to 5.0 GPM /1.8 to 18 LPM					
TW-32470-04	1.0 to 10.0 GPM /5.0 to 37.5 LPM	316 SS	¾" NPT(M)	7½" x 2"		
Standard in-line flowmeters for air						
TW-32470-05	1 to 12 scfm	316 SS	½" NPT(M)	8 3/8" x 2"	212°F/ 150 psig	
TW-32470-06	4 to 48 scfm		¾" NPT(M)	10" x 2"		
High-capacity in-line flowmeters for water						
TW-32472-00	1.0 to 10 GPM/3.0 to 38 LPM	316 SS	1" NPT(F)	14½" x 3 5/16"	212°F/ 150 psig	
TW-32472-01	2.0 to 20 GPM/7.5 to 75 LPM					
TW-32472-02	3.0 to 30 GPM/12 to 115 LPM					
TW-32472-03	4.0 to 40 GPM/15 to 155 LPM					
TW-32473-01	6.0 to 60 GPM/30 to 230 LPM		2" NPT(F)	18 3/8" x 4 5/8"	150°F/ 130 psig	
TW-32473-02	10 to 80 GPM/40 to 300 LPM					
TW-32473-04	15 to 130 GPM/60 to 500 LPM					
High-capacity in-line flowmeters for air						
TW-32473-10	8 to 80 scfm	316 SS	1" NPT(F)	14½" x 3 5/16"	212°F/150 psig	
TW-32473-11	30 to 230 scfm		2" NPT(F)	18 3/8" x 4 5/8"	150°F/130 psig	

Ultrapure In-Line Flowmeters for Liquids

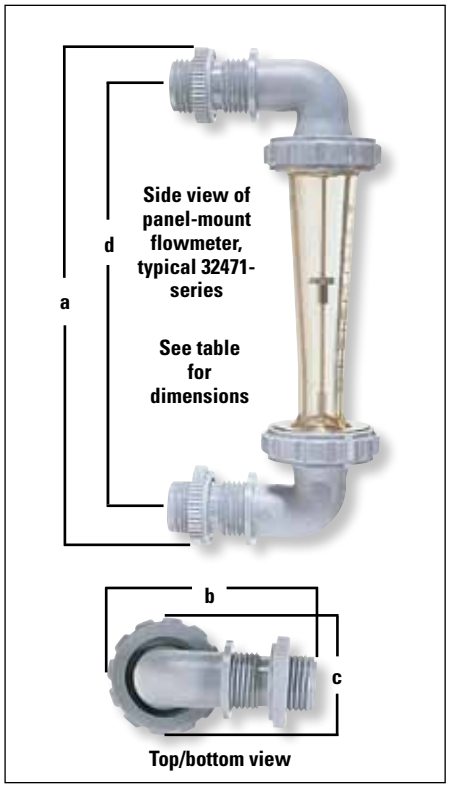
These designs use a fluted meter body instead of a metallic float guide as in the other units. There is no metal in the fluid path with these meters.

Catalog number	Flow range	Float material	Connections	Dimensions (L x dia)	Maximum temp/pressure	Price
TW-32475-10	0.1 to 1.2 GPM/0.4 to 4.4 LPM	PTFE	½" NPT(F)	10" x 1¾"	130°F/ 150 psig	
TW-32475-14	0.2 to 2.0 GPM/0.3 to 8.0 LPM					
TW-32475-22	0.5 to 5.0 GPM/2.0 to 20 LPM					

Panel-Mount Flowmeters

Meters include 90° PVC elbow fittings for panel mounting. Models for air include a valve for control of inlet flow into meter; call your dealer for lower cost air models without a valve.

Catalog number	Flow rate	Float material	Connections	Dimensions (a x b x c, d)	Maximum temp/press	Price
Panel-mount flowmeters for water						
TW-32471-00	0.025 to 0.250 GPM/0.1 to 1.0 LPM	PVC	½" NPT(M)	7" x 4½" x 1 11/16", 6"	212°F/ 150 psig	
TW-32471-01	0.1 to 1.0 GPM/0.4 to 4.0 LPM	316 SS				
TW-32471-02	0.2 to 2.0 GPM/0.75 to 7.5 LPM					
TW-32471-03	0.5 to 5.0 GPM/1.8 to 18 LPM					
TW-32471-04	1.0 to 10.0 GPM/5.0 to 37.5 LPM	316 SS	¾" NPT(M)	8" x 4½" x 2", 6 13/16"		
Panel-mount flowmeters for air						
TW-32471-05	1 to 12 scfm	316 SS	½" NPT(M)	9 7/8" x 3 1/8" x 2", 8 9/16"	212°F/ 150 psig	
TW-32471-06	4 to 48 scfm		¾" NPT(M)	10½" x 3¼" x 2", 9 3/16"		



MORE online!
For pressure drop information for these flowmeters, go to . . .
ColeParmer.com

Cole-Parmer® Flowmeters with Pressure-Compensating Scales

Install in any position

Use for high-pressure industrial applications—install in any configuration, even next to a bend in your pipeline. A calibrated retention spring eliminates the need to mount flowmeters vertically or run straight lengths of pipe prior to or after the meter. These rugged flowmeters are relatively insensitive to shock and vibrations—the spring, piston assembly, and internal magnet compensate for rough process environments.

Graph-style aluminum flowmeter 32206-26

Dual-scale SS flowmeter 32205-12

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

Accuracy: ±2% full-scale
Repeatability: ±1%
Max operating temp: 240°F (115°C)

Max pressure
Aluminum models (gas): 1000 psi (68.9 bar)
Brass models (liquid): 3500 psi (241.3 bar)
Stainless steel models (liquid): 6000 psi (413.6 bar) up to ½" NPT(F); 5000 psi (344.7 bar) up to 1" NPT(F)

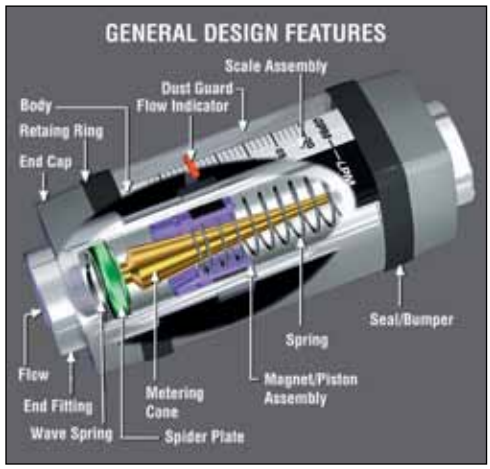
Materials of Construction

Part	Aluminum	Brass	Stainless steel (SS)
Body	Aluminum	Brass	303 SS
Piston/cone	Aluminum	Brass	
Fittings	Anodized aluminum	Brass	303 SS
Spring	302 SS		
Magnet	PPS ceramic		
Seals	Viton®		

Graph-Style Aluminum Flowmeters for Air

Graph-style flowmeters for air are ideal for applications with changing pressures—eliminating the need for calculating correction factors. Flowmeters with built-in pressure gauge allow measurement of inlet pressure, which is necessary to properly read the scale graph. Aluminum construction.

Flow range† Air (scfm)	Connections	Dimensions (W x H x D)	Graph-style flowmeters		Graph-style flowmeters with built-in pressure gauge	
			Catalog number	Price	Catalog number	Price
0.5 to 5	¼" NPT(F)	1¾" x 4 13/16" x 1 15/16" (4.4 x 12.2 x 5.0 cm)	TW-32206-02		TW-32206-52	
1 to 10			TW-32206-04		TW-32206-54	
2 to 20			TW-32206-06		TW-32206-56	
3 to 30			TW-32206-08		—	—
3 to 25	½" NPT(F)	2⅛" x 6⅝" x 2 7/16" (5.4 x 16.8 x 6.2 cm)	TW-32206-12		TW-32206-62	
5 to 50			TW-32206-14		TW-32206-64	
10 to 100			TW-32206-16		TW-32206-66	
15 to 150			—	—	TW-32206-68	
10 to 100	¾" NPT(F)	2½" x 7 3/16" x 2 15/16" (6.4 x 18.2 x 7.5 cm)	TW-32206-20		TW-32206-70	
15 to 150			—	—	TW-32206-72	
25 to 250			TW-32206-24		TW-32206-74	
25 to 250	1" NPT(F)	2½" x 7 3/16" x 2 15/16" (6.4 x 18.2 x 7.5 cm)	TW-32206-26		TW-32206-76	



Dual-Scale Brass and Stainless Steel Flowmeters for Water

Dual-scale flowmeters indicate gallons and liters simultaneously with an easy-to-read linear scale and highly visible red indicator. Available in brass or stainless steel construction.

Flow range† Water		Connections	Dimensions (W x H x D)	Brass flowmeters		303 stainless steel flowmeters	
GPM	LPM			Cat. no.	Price	Cat. no.	Price
0.1 to 1.0	0.4 to 4	¼" NPT(F)	1¾" x 4 13/16" x 1 15/16" (4.4 x 12.2 x 5.0 cm)	TW-32204-04		TW-32205-04	
0.2 to 2.0	1 to 7.5			TW-32204-06		TW-32205-06	
0.2 to 2.0	1 to 7.5	½" NPT(F)	2⅛" x 6⅝" x 2 7/16" (5.4 x 16.8 x 6.2 cm)	TW-32204-08		TW-32205-08	
0.5 to 5.0	1.8 to 18			TW-32204-10		TW-32205-10	
1 to 15	4 to 56			TW-32204-12		TW-32205-12	
1 to 10	4 to 37	¾" NPT(F)	2½" x 7 3/16" x 2 15/16" (6.4 x 18.2 x 7.5 cm)	TW-32204-14		TW-32205-14	
2 to 20	7.5 to 75			TW-32204-16		—	—
3 to 30	11 to 113			TW-32204-18		—	—
1 to 10	4 to 37	1" NPT(F)	2½" x 7 3/16" x 2 15/16" (6.4 x 18.2 x 7.5 cm)	TW-32204-20		TW-32205-20	
2 to 20	7.5 to 75			TW-32204-22		TW-32205-22	
4 to 40	11 to 151			TW-32204-24		—	—

†Flow given at 70°F and 100 psi.

Cole-Parmer® Economical Spring-Loaded Flowmeters

Perfect low-cost durable process meter

- Spring-loaded indicator allows inline mounting in any position
- Nonreactive wetted parts are ideal for applications requiring a high level of purity
- Direct reading in dual English and metric scales
- Versions available with electric switches—field adjustable to trigger high/low alarms or other control devices

Spring-loaded, no-float design means these versatile, economical flowmeters do not depend on gravity for accurate readings. Mount in any position in your flow line. Straight pipe runs are not required before or after the flowmeter. Pressure drop is only 4 psi full scale. Flowmeters feature a knife-edged piston that remains visible and easy to read even through cloudy liquids. Working parts are easily removed for maintenance.

Flowmeters for Water, Air, or Nitrogen are ideal for general water and air applications, including process water and cooling water lines. Flowmeters feature direct reading scales for water in GPM and LPM, as well as for air (at 90 psi) in scfm and SLPM.

Flowmeters for Ultrapure Water are perfect for pharmaceutical and laboratory applications using ultra-pure, distilled, deionized, or demineralized water. Use these flowmeters to indicate flow rate to deionized water returns and UPW returns.

Flowmeters with Electric Switches allow for critical set point monitoring. They are field adjustable to activate high/low alarms or other control devices via a proximity switch in the housing which is actuated by the moving piston.

Note: Polysulfone is not suited for direct contact with sunlight.

Adjustable switch versions allow you to monitor critical flow points.

Flowmeter for water, air, or nitrogen 32211-54

Flowmeter for ultrapure water 32213-10

Specifications

Accuracy: ±5% full-scale flow
Repeatability: ±5% of reading
Pressure drop: 4 psi (0.2 bar) at full scale flow
Max pressure: 250 psig (17.2 bar) liquids; 125 psig (8.6 bar) gases
Max operating temp: 230°F (110°C)

Dimensions
Models with max flow rates up to 15 GPM
Without switch (H x dia): 7" x 2" (17.8 x 5.1 cm)
With switch (W x H x D): 2" x 7" x 3⅜" (5.1 x 17.8 x 9.8 cm)
Models with max flow rates from 20 to 50 GPM
Without switch (H x dia): 7" x 3" (17.8 x 7.6 cm)
With switch (W x H x D): 3" x 7" x 4½" (7.6 x 17.8 x 11.4 cm)

Switch (for appropriate models): three-wire Reed switch, contacts rated at 120 VAC/100 VDC, 300 mA

Materials of Construction

Part	For water, air, or nitrogen	Ultrapure water design
Body	Polysulfone	
Fittings	Brass	316 SS
O-rings	Viton®	
Spring	316 SS	
Shaft	Viton®	

Maximum flow rate				Connections	For water, air, or nitrogen				For ultrapure water only	
Water		Air†			Flowmeters without switch		Flowmeters with switch		Flowmeters without switch	
GPM	LPM	scfm	SLPM		Catalog number	Price	Catalog number	Price	Catalog number	Price
5	20	50	1400	½" NPT(F) 1" NPT(F)	TW-32211-00 TW-32211-02		TW-32211-50 TW-32211-52		TW-32213-00 TW-32213-02	
10	38	90	2500	½" NPT(F) 1" NPT(F)	TW-32211-04 TW-32211-06		TW-32211-54 TW-32211-56		— —	— —
15	55	135	3900	½" NPT(F) 1" NPT(F)	TW-32211-08 TW-32211-10		TW-32211-58 TW-32211-60		— TW-32213-10	—
20	75	200	5500	1" NPT(F) 1½" NPT(F)	TW-32211-12 TW-32211-14		TW-32211-62 —	 —	— —	— —
30	110	300	6000	1" NPT(F) 1½" NPT(F)	TW-32211-16 TW-32211-18		TW-32211-66 TW-32211-68		— TW-32213-18	—
40	150	400	11,000	1" NPT(F) 1½" NPT(F)	TW-32211-20 TW-32211-22		— TW-32211-72	— 	— TW-32213-22	—
50	200	500	14,000	1" NPT(F) 1½" NPT(F)	TW-32211-24 TW-32211-26		— TW-32211-76	— 	TW-32213-24 TW-32213-26	

†Only models 32211-series measure air at 90 psi and 70°F.

INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

TW-17080-00 **NIST-traceable calibration** with data for air/gas flowmeter
TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

Flowmeters

Variable Area, Direct Reading

Cole-Parmer® Stainless Steel Shielded Flowmeters

For the most aggressive process applications

- Flowmeters enclosed in brushed 304 SS case
- Ideal for applications with flow rates up to 116 GPM and 250 scfm

Detachable, clear 3/16"-thick polycarbonate front shield provides protection at maximum rated temperature and pressure. Easily read the graduated direct-reading scale. The interchangeable transparent scale plates mount directly on the front of the flowtube.

Unique float stops allow easy cleaning—remove and replace the float without disturbing either the flowtube or the shield. Tube sizes 3, 4, and 5 are fluted; tube sizes 6, 8, and 9 are tapered with a stainless steel guide rod.

32447-74

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Accuracy: ±3% full-scale

Repeatability: ±0.5% full-scale

Minimum flow rate: approx 10% of max flow rate (see table below)

Max pressure: (at 200°F)
Tube sizes 3, 4, 5, and 6: 200 psi (13.7 bar)
Tube sizes 8, and 9: 125 psi (8.6 bar)

Max operating temp: 200°F (93°C)

Materials of Construction

Flowtube	Borosilicate glass
Fittings	316 SS
O-rings	Viton®
Float, rod	316 SS
Shield	Polycarbonate

Catalog number	Max flow rate		Float type†	Tube size	Pressure drop (" of H_2O)	Connections	Dimensions (W x H x D)	Price
	Water (GPM)	Air (scfm)						
TW-32447-00	0.25	1.0	LP		—			
TW-32447-02	0.36	1.5	SL	3	2	½" NPT(F)	2½" x 11⅞" x 2⁹⁄₁₆" (6.4 x 30.2 x 6.5 cm)	
TW-32447-10	0.74	3.0	SL		5			
TW-32447-20	1.0	4.2	LP	4	6		2½" x 11⅞" x 2⁹⁄₁₆" (6.4 x 30.2 x 6.5 cm)	
TW-32447-32	1.5	6.0	LP	5	—	½" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-30	2.0	8.2	SL	4	10		2½" x 11⅞" x 2⁹⁄₁₆" (6.4 x 30.2 x 6.5 cm)	
TW-32447-34	3.8	16	GS	5	10			
TW-32447-40	5.0	21.5	SL	5	14	1" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-42	6.0	25.5	GV	6	5			
TW-32447-50	9.6	40	GS	6	10	1" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-52	11	45	GS		13			
TW-32447-54	14	62	GS	6	24	1" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-60	20	90	SL	6	39	1" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-62	26	—‡	SL	6	70	1" NPT(F)	3⅜" x 13¾" x 3⅞" (8.6 x 34.9 x 9.8 cm)	
TW-32447-74	41	160	GV	9	5	2" NPT(F)	5⁵⁄₁₆" x 16" x 5⅜" (13.5 x 40.6 x 13.6 cm)	
TW-32447-80	60	245	GS	9	16	2" NPT(F)	5⁵⁄₁₆" x 16" x 5⅜" (13.5 x 40.6 x 13.6 cm)	
TW-32447-82	86	—‡	SL	9	25			

†LP floats have the lowest pressure loss, GV floats are accurate at higher viscosities, GS floats are accurate at lower viscosities than GV and have a higher flow rate, SL floats have the highest flow rate. ‡Flowmeters are for direct reading of water only.

Cole-Parmer® Dual-Media Flowmeters with Dual Scale

Highly flexible design allows a single meter to be used in numerous applications

- Rotate the flow tube to select water or air scale in either English or metric units
- In-line and panel-mount options to suit most system designs
- Ideal for busy process areas—heavy-walled flowtube with metal housing

Panel-mount
32062-30

In-line
32060-02

Rotate scale around flowtube to select water or air scale.

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

Accuracy: ±5% full-scale
Max pressure:
150 psi (10.3 bar)
at 200°F (93°C)
Max operating temp:
250°F (121°C)
Connections: ⅜" NPT(F)

Dimensions
In-line (W x H): 2" x 13¼" (5.1 x 33.7 cm)
Panel-mount (W x H x D):
2" x 10⅜" x 1⅞" (5.1 x 26.3 x 4.7 cm);
valve protrudes 1½" (3.8 cm) from face. Space between inlet and outlet is 9" (22.9 cm)

Materials of Construction

Part	Brass	316 SS
Flowtube	Borosilicate glass	
Fittings, valves	Brass	316 SS
O-rings	Viton®	
Float	316 SS	
Frame	Aluminum	

Maximum flow rate				Flowmeters without valve				Flowmeters with valve			
Water		Air		Brass fittings		316 SS fittings		Brass fittings		316 SS fittings	
GPM	LPM	scfm	LPM	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
In-line flowmeters											
1.2	4.0	5	140	—	—	TW-32061-00		TW-32060-10		TW-32061-10	
2.0	8.0	10	280	TW-32060-01		TW-32061-01		TW-32060-11		TW-32061-11	
3.0	11.5	15	425	TW-32060-02		—	—	—	—	TW-32061-12	
4.0	15.0	20	575	—	—	—	—	TW-32060-13		TW-32061-13	
5.0	20.0	30	900	—	—	—	—	—	—	TW-32061-14	
Panel-mount flowmeters											
1.2	4.0	5	140	—	—	—	—	TW-32062-10		TW-32062-30	
2.0	8.0	10	280	TW-32062-02		TW-32062-22		TW-32062-12		TW-32062-32	
3.0	11.5	15	425	—	—	—	—	TW-32062-14		—	—
4.0	15.0	20	575	—	—	—	—	TW-32062-16		TW-32062-36	

Cole-Parmer® Dual-Media PTFE Flowmeters with Dual Scale

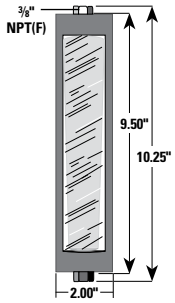
Use one of these safe-design meters in multiple aggressive chemical applications

- Scale rotates to display rates for either air-like or water-like fluids
- Breakaway back plate protects user in case of pressure surge blowout
- Valved units offer both control and indication of flowrate

These meters have been designed to measure aggressive water-like liquid solutions and aggressive air-like gas mixtures. The dual-scale for liquids measures in GPM and LPM; the dual-scale for gases shows flow rate in scfm and LPM.

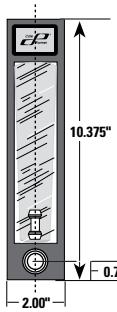
32053-26

In-line flowmeters

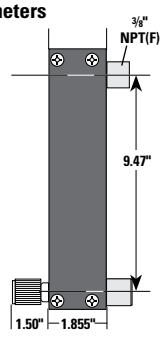


Front view, without valve

Panel-mount flowmeters



Front view, with valve



Side view, with valve

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

Accuracy: ±5% full-scale
Max pressure: 100 psi (6.9 bar)
Max operating temp: 150°F (65°C)
Connections: ⅜" NPT(F)
Leak integrity: Each flowmeter is individually leak-tested to 1 x 10^{-7} sccs of helium or better

Materials of Construction

Part	Material
Flowtube	Borosilicate glass
Fittings, valves	PTFE/PCTFE
O-rings	PTFE
Float	PTFE
Frame	Aluminum

Maximum flow rate				Flowmeters without valve		Flowmeters with valve	
Water		Air					
GPM	LPM	scfm	LPM	Cat. no.	Price	Cat. no.	Price
In-line flowmeters							
0.8	3.0	3.5	100	TW-32053-00		TW-32053-20	
1.5	5.75	7.0	200	TW-32053-02		TW-32053-22	
2.2	8.25	10.5	300	—	—	TW-32053-24	
2.9	11.0	14.0	400	—	—	TW-32053-26	
4.1	15.75	22.0	625	—	—	TW-32053-30	
Panel-mount flowmeters							
0.8	3.0	3.5	100	—	—	TW-32053-60	
1.5	5.75	7.0	200	—	—	TW-32053-62	
2.2	8.25	10.5	300	TW-32053-44		TW-32053-64	
4.1	15.75	22.5	625	—	—	TW-32053-70	

TW-31320-11 **Fitting;** NPT(M) to compression adapter, PFA, ⅜"

150-mm flowmeter
32003-28
with valve

65-mm flowmeter
32012-29
without valve

Cole-Parmer® Panel-Mount Flowmeters

Many unique features make these the ideal economical flowmeters

- Front shield magnifies scale 16% for more accurate readings
- Fused ceramic scale for a precise, permanent measuring guide
- A vertical-tangential locator line for readings with hairline accuracy

Aluminum is economical and good for general use with noncorrosive gases and liquids. A 150-mesh inlet screen is included.

Brass is economical and good for use with water. A 150-mesh inlet screen is included.

316 Stainless Steel (SS) withstands higher temperatures and pressures and features excellent chemical compatibility. A 150-mesh inlet screen is included.

Valved meters have valves mounted at the inlet (bottom) of the flowmeters. This arrangement is typically used for positive pressure applications with liquids and gases. The valve can be reconfigured to mount at the outlet (top), often for vacuum applications.

ISO 9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Specifications

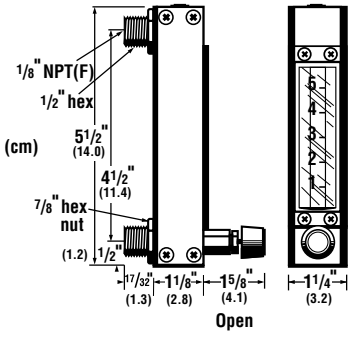
Accuracy: ±5% full-scale
Repeatability: ±0.25% full-scale
Minimum flow rate: approximately 10% of maximum flow rate (see tables on facing page)
Max pressure: 200 psi (13.7 bar)
Operating temp: –15 to 250°F (–26 to 121°C)
Connections: ⅛" NPT(F)

Materials of Construction

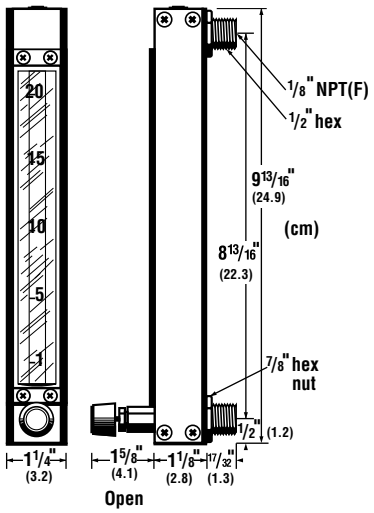
Part	Aluminum	Brass	316 SS
Flowtube	Borosilicate glass		
Fittings, valves	Aluminum	Chrome-plated brass	316 SS
O-rings	Buna N		Viton®
Float	Glass, 316 SS, carboloy, sapphire, or tantalum		
Frame	Aluminum, acrylic, polycarbonate		

To Panel Mount

Drill two holes to fit the inlet and outlet according to the diagrams below. Secure flowmeter with two retaining nuts (included).



65-mm flowmeters

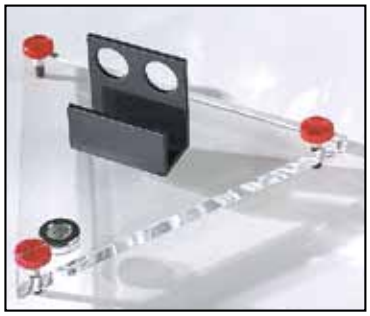


150-mm flowmeters

Tripod Bases

Bench mount up to three flowmeters in any combination. Three leveling screws and spirit level are built into a clear acrylic base.

Catalog number	Number of meters held	Price
TW-03226-10	One	
TW-03226-30	One, two, or three	



65-mm Direct Reading Flowmeters

Max flow	Float‡	Flowmeters without valve						Flowmeters with valve					
		Aluminum fittings†		Brass fittings†		316 SS fittings†		Aluminum fittings†		Brass fittings†		316 SS fittings†	
		Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
For air													
7 mL/min	G	TW-32010-15		—	—	TW-32012-15		TW-32013-15		TW-32014-15		TW-32015-15	
50 mL/min	SS	TW-32010-01		TW-32011-01		TW-32012-01		TW-32013-01		TW-32014-01		TW-32015-01	
100 mL/min	G	TW-32010-03		TW-32011-03		TW-32012-03		TW-32013-03		TW-32014-03		TW-32015-03	
250 mL/min	C	TW-32010-05		—	—	TW-32012-05		TW-32013-05		TW-32014-05		TW-32015-05	
500 mL/min	C	TW-32010-07		TW-32011-07		TW-32012-07		TW-32013-07		TW-32014-07		TW-32015-07	
1.0 LPM	G	TW-32010-09		TW-32011-09		TW-32012-09		TW-32013-09		TW-32014-09		TW-32015-09	
2.0 LPM	SS	TW-32010-11		TW-32011-11		TW-32012-11		TW-32013-11		TW-32014-11		TW-32015-11	
5.0 LPM	G	TW-32010-13		TW-32011-13		TW-32012-13		TW-32013-13		TW-32014-13		TW-32015-13	
10.0 LPM	SS	TW-32010-17		TW-32011-17		TW-32012-17		TW-32013-17		TW-32014-17		TW-32015-17	
16.0 LPM	SS	TW-32010-16		TW-32011-16		TW-32012-16		TW-32013-16		TW-32014-16		TW-32015-16	
2.2 scfh	G	—	—	TW-32011-18		TW-32012-18		TW-32013-18		TW-32014-18		TW-32015-18	
6.0 scfh	G	—	—	—	—	TW-32012-19		TW-32013-19		TW-32014-19		TW-32015-19	
10.0 scfh	SS	—	—	—	—	—	—	TW-32013-21		TW-32014-21		TW-32015-21	
25.0 scfh	SS	—	—	—	—	—	—	TW-32013-23		TW-32014-23		TW-32015-23	
50.0 scfh	SS	—	—	—	—	—	—	TW-32013-24		TW-32014-24		TW-32015-24	
90.0 scfh	SS	—	—	—	—	—	—	TW-32013-27		TW-32014-27		—	—
1.9 scfm	SS	—	—	—	—	—	—	TW-32013-28		TW-32014-28		TW-32015-28	
For water													
0.5 mL/min	G	—	—	—	—	TW-32012-29		TW-32013-29		TW-32014-29		TW-32015-29	
6.0 mL/min	SS	TW-32010-31		TW-32011-31		TW-32012-31		TW-32013-31		TW-32014-31		TW-32015-31	
115 mL/min	SS	TW-32010-33		TW-32011-33		TW-32012-33		TW-32013-33		TW-32014-33		TW-32015-33	
500 mL/min	G	TW-32010-35		—	—	TW-32012-35		TW-32013-35		TW-32014-35		TW-32015-35	
750 mL/min	SS	—	—	—	—	—	—	TW-32003-09		TW-32004-09		TW-32005-09	

150-mm Direct Reading Flowmeters

Max flow	Float‡	Flowmeters without valve						Flowmeters with valve					
		Aluminum fittings†		Brass fittings†		316 SS fittings†		Aluminum fittings†		Brass fittings†		316 SS fittings†	
		Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
For air													
25 mL/min	Sa	TW-32030-00		TW-32031-00		TW-32032-00		TW-32033-00		TW-32034-00		TW-32035-00	
50 mL/min	Sa	TW-32000-00		TW-32001-00		TW-32002-00		TW-32003-00		TW-32004-00		TW-32005-00	
75 mL/min	C	TW-32000-02		—	—	TW-32002-02		TW-32003-02		TW-32004-02		TW-32005-02	
100 mL/min	C	TW-32000-04		TW-32001-04		TW-32002-04		TW-32003-04		TW-32004-04		TW-32005-04	
200 mL/min	SS	TW-32000-06		TW-32001-06		TW-32002-06		TW-32003-06		TW-32004-06		TW-32005-06	
300 mL/min	C	TW-32000-08		TW-32001-08		TW-32002-08		TW-32003-08		TW-32004-08		TW-32005-08	
500 mL/min	Sa	TW-32030-08		TW-32031-08		TW-32032-08		TW-32033-08		TW-32034-08		TW-32035-08	
800 mL/min	G	TW-32030-09		TW-32031-09		TW-32032-09		TW-32033-09		TW-32034-09		TW-32035-09	
1.25 LPM	C	TW-32030-10		TW-32031-10		TW-32032-10		TW-32033-10		TW-32034-10		TW-32035-10	
2.5 LPM	G	TW-32000-10		TW-32001-10		TW-32002-10		TW-32003-10		TW-32004-10		TW-32005-10	
5.0 LPM	Sa	TW-32000-12		TW-32001-12		TW-32002-12		TW-32003-12		TW-32004-12		TW-32005-12	
10.0 LPM	G	TW-32000-14		TW-32001-14		TW-32002-14		TW-32003-14		TW-32004-14		TW-32005-14	
23 LPM	G	TW-32030-14		TW-32031-14		TW-32032-14		TW-32033-14		TW-32034-14		TW-32035-14	
42 LPM	SS	TW-32030-15		TW-32031-15		TW-32032-15		TW-32033-15		TW-32034-15		TW-32035-15	
60 LPM	C	TW-32030-16		—	—	TW-32032-16		TW-32033-16		TW-32034-16		TW-32035-16	
2.5 scfh	C	—	—	TW-32001-16		—	—	TW-32003-16		TW-32004-16		—	—
8.25 scfh	G	TW-32000-18		TW-32001-18		—	—	TW-32003-18		TW-32004-18		TW-32005-18	
16.5 scfh	SS	—	—	—	—	—	—	TW-32003-20		TW-32004-20		TW-32005-20	
23.0 scfh	C	TW-32000-22		TW-32001-22		—	—	TW-32003-22		—	—	—	—
50.0 scfh	G	—	—	TW-32001-24		—	—	TW-32003-24		—	—	TW-32005-24	
94.0 scfh	SS	—	—	—	—	—	—	TW-32003-26		TW-32004-26		TW-32005-26	
1.5 scfm	SS	—	—	—	—	—	—	—	—	TW-32034-27		—	—
For water													
10 mL/min	Sa	TW-32000-28		TW-32001-28		TW-32002-28		TW-32003-28		TW-32004-28		TW-32005-28	
20 mL/min	SS	—	—	TW-32001-30		TW-32002-30		TW-32003-30		TW-32004-30		TW-32005-30	
50 mL/min	G	—	—	TW-32001-32		TW-32002-32		TW-32003-32		TW-32004-32		TW-32005-32	
100 mL/min	G	TW-32000-34		TW-32001-34		TW-32002-34		TW-32003-34		TW-32004-34		TW-32005-34	
200 mL/min	C	—	—	TW-32001-36		TW-32002-36		TW-32003-36		TW-32004-36		TW-32005-36	
500 mL/min	SS	TW-32000-38		TW-32001-38		TW-32002-38		TW-32003-38		TW-32004-38		TW-32005-38	
1.2 LPM	SS	TW-32030-40		—	—	TW-32032-40		TW-32033-40		—	—	TW-32035-40	
2.0 LPM	T	—	—	—	—	—	—	TW-32033-42		—	—	TW-32035-42	

†See our specification table (on page 606) for a complete listing of wetted parts. ‡Sa = sapphire, C = carboloy, SS = 316 stainless steel, G = glass, and T = tantalum

Cole-Parmer® PTFE Flowmeters for Routine Gases

Ideal for gas applications where metal components must be minimized

- Inert PTFE and borosilicate glass wetted parts
- Rugged design with case-enclosed flow tube
- Tubes include a fused ceramic scale as a precise, permanent measuring guide

These meters eliminate the need for correlation charts with direct-reading scales for individual routine gases. The inert PTFE and glass wetted parts combine with the rigid anodized aluminum frame to offer a unique solution for ultra-pure gas applications.

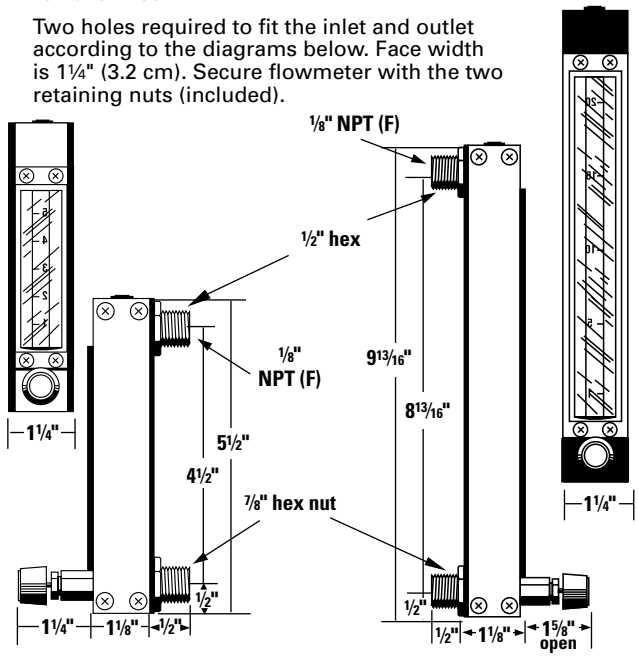
Flowtubes are replaceable—contact your local dealer for details. A longitudinal magnifier lens is molded into the transparent front safety shield to enhance reading resolution by 16%.

65-mm flowmeter
32006-08

150-mm flowmeter
32007-64

To Panel Mount

Two holes required to fit the inlet and outlet according to the diagrams below. Face width is 1¼" (3.2 cm). Secure flowmeter with the two retaining nuts (included).



65-mm flowmeters | 150-mm flowmeters

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For GASES

Accuracy: ±5% full-scale

Repeatability: ±0.25% full-scale

Minimum flow rate: approximately 10% of maximum flow rate

Max pressure: 100 psi (6.9 bar)

Max operating temp: 150°F (65°C)

Connections: ⅛" NPT(F); optional ¼" compression fittings or glass nipples available upon request

Leak integrity: meters are individually tested on a mass spectrometer leak detector and certified to a leak integrity rating of at least 1 x 10^{-7} sccs of helium

Materials of Construction

Part	Aluminum	Brass	316 SS
Flowtube	Borosilicate glass		
Fittings, valves	PTFE		
O-rings	PTFE		
Float	Glass, 316 SS, carboloy, sapphire, or tantalum		
Frame	Aluminum, acrylic, polycarbonate		

65-mm PTFE Direct Reading Flowmeters

Maximum flow rate†	Float‡	Flowmeters without valve		Flowmeters with valve	
		Catalog number	Price	Catalog number	Price
For carbon dioxide					
20 mL/min	T	—	—	TW-32006-08	
55 mL/min	G	—	—	TW-32006-10	
220 mL/min	Sa	—	—	TW-32006-12	
1 LPM	G	TW-32007-14		TW-32006-14	
6 LPM	G	TW-32007-16		TW-32006-16	
10 LPM	T	—	—	TW-32006-18	
For hydrogen					
35 mL/min	G	TW-32007-24		TW-32006-24	
100 mL/min	SS	—	—	TW-32006-26	
150 mL/min	Sa	TW-32007-28		TW-32006-28	
600 mL/min	G	TW-32007-30		TW-32006-30	
1.5 LPM	C	TW-32007-32		TW-32006-32	
3.5 LPM	G	TW-32007-34		TW-32006-34	
6 LPM	G	—	—	TW-32006-36	
42 LPM	SS	TW-32007-38		TW-32006-38	

†Based on flow at STP conditions—70°F and 14.7 psi.
‡Float material key: G = glass, SS = stainless steel, C = carboloy, Sa = sapphire, T = titanium

Tripod Bases

Bench mount up to three flowmeters. Clear acrylic base features three leveling screws and spirit level.

Catalog number	Number of meters held	Price
TW-03226-10	One	
TW-03226-30	One, two, or three	

150-mm PTFE Direct Reading Flowmeters

Maximum flow rate†	Float‡	Flowmeters without valve		Flowmeters with valve	
		Catalog number	Price	Catalog number	Price
For argon gas					
33 mL/min	Sa	TW-32007-64		TW-32006-64	
15 LPM	T	TW-32007-66		TW-32006-66	
For helium					
100 mL/min	Sa	—	—	TW-32006-68	
500 mL/min	C	TW-32007-70		TW-32006-70	
1500 mL/min	G	TW-32007-72		TW-32006-72	
5 LPM	C	—	—	TW-32006-74	
40 LPM	SS	—	—	TW-32006-76	
1025 scfh	Sa	—	—	—	—
For nitrogen					
100 mL/min	G	TW-32007-80		TW-32006-80	
200 mL/min	C	TW-32007-82		TW-32006-82	
300 mL/min	SS	—	—	TW-32006-84	
500 mL/min	Sa	TW-32007-86		TW-32006-86	
2 LPM	G	—	—	TW-32006-88	
1.6 scfh	SS	—	—	TW-32006-90	
For oxygen					
250 mL/min	SS	TW-32007-92		TW-32006-92	
400 mL/min	G	TW-32007-94		TW-32006-94	
5 LPM	Sa	TW-32007-96		TW-32006-96	
16.5 LPM	SS	TW-32007-98		TW-32006-98	
58 LPM	C	TW-32007-99		TW-32006-99	

†Based on flow at STP conditions—70°F and 14.7 psi.
‡Float material key: G = glass, SS = stainless steel, C = carboloy, Sa = sapphire, T = tantalum

TW-31320-07 Fitting; NPT(M) to compression adapter, PFA, ⅛"

TW-17080-10 NIST-traceable calibration

Benchtop Flowmeters with PTFE Fittings

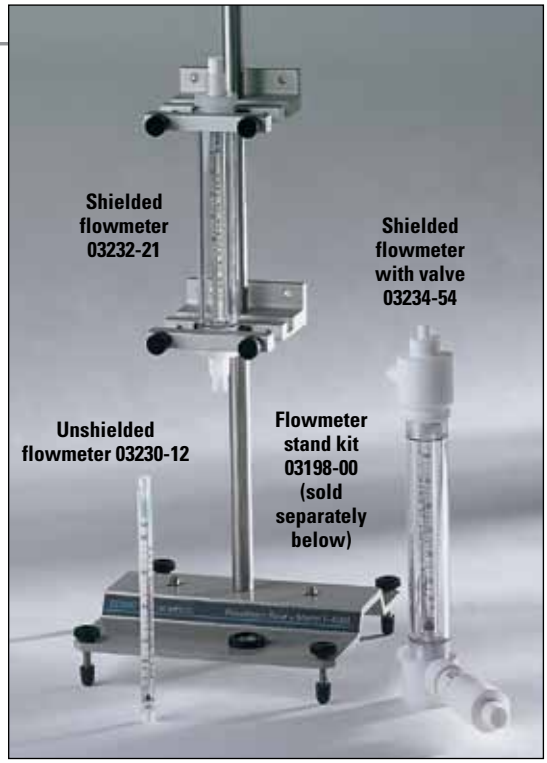
Design makes each meter suitable for a broad range of laboratory applications

- Modular components allow for meter flexibility across a wide range of flow rates
- Multiple end connections to suit process requirements

Unshielded Flowmeters work well in low-pressure applications. Connect the flowtube end directly to tubing having the proper inner diameter—flowtube outer diameters are listed below. Glass taper joints are an alternate connection option which slip on the PTFE stops that contain the float (contact our Application Specialists to order the glass taper joints).

Shielded Flowmeters are better suited to higher-pressure applications or for installations requiring a panel-mounted flowmeter. End bushings are molded with dual connection capability—tubing or threaded; listed below are the appropriate tubing and threaded connections provided with each meter.

Shielded Flowmeters with Valves offer flow monitoring along with precise control through an integrated 20-turn micrometer valve. The valve can be adjusted from 0.1 to 100% of maximum flow (semilogarithmic) and provides precise regulation from 0.3 to 60% of maximum flow.



Materials of Construction

Part	Unshielded	Shielded	Shielded with Valve
Tube	Borosilicate glass		
O-rings	Viton®		
Inserts	PTFE	—	
Body	—	PTFE	
Couplings	—	Polypropylene (PP) with PTFE inserts†	
Shield	—	Polycarbonate	
Valve	—	Glass chamber with PCTFE plug‡	

†Order PTFE couplings (below) for a full PTFE connection. ‡Tube sizes 14 and 15 have PTFE plug.

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

Accuracy: ±5% of reading or 2 mm of the scale length, whichever is greater

Repeatability: ±1% of reading or ½ scale graduation, whichever is greater

Max pressure: 60 psi (4.1 bar)

Max operating temp: 150°F (65°C)

Connections

For shielded flowmeters:
Tube sizes 10, 11, 12, 13: ⅜" ID tubing
Tube sizes 14, 15: ⅝" ID tubing

For unshielded flowmeters:
Refer to OD dimensions in table, or contact your local dealer for tapered glass fittings

Dimensions

Tube size(s)	Unshielded	Shielded	Shielded with valves
10, 11, 12 13	5⅛"H x 5⁄16"OD 5⅛"H x 7⁄16"OD	8"H x 1"OD	8⅞"H x 6"W x 1⁵⁄16"OD
14 15	5½"H x 11⁄16"OD 5½"H x 15⁄16"OD	9¾"H x 1½"OD	11"H x 7"W x 1⁵⁄16"OD

Flow ranges		Floats†† included	Tube size	Unshielded flowmeters			Shielded flowmeters				Shielded flowmeters with valves			
Air (mL/min)	Water (mL/min)			Catalog number	Max psi	Price	Catalog number	Ports‡‡ NPT	Max psi	Price	Catalog number	Ports‡ NPT	Max psi	Price
0.2 to 90 0.36 to160	0.002 to 1.1 0.004 to 2.3	Glass 316 SS	10	TW-03230-10	15		TW-03232-20	¼"	125		TW-03234-51	⅛"	125	
1 to 280 2 to 500	0.01 to 4.0 0.02 to 8.6	Glass 316 SS	11	TW-03230-11	15		TW-03232-21	¼"	125		TW-03234-52	⅛"	125	
20 to 2100 36 to 3700	0.4 to 40 0.86 to 86	Glass 316 SS	12	TW-03230-12	15		TW-03232-22	¼"	100		TW-03234-53	⅛"	100	
200 to 14,000 360 to 25,000	2 to 300 4 to 640	Glass 316 SS	13	TW-03230-13	15		TW-03232-23	¼"	75		TW-03234-54	⅛"	75	
1000 to 6,000 1800 to 64,000	10 to 850 21 to 1820	Glass 316 SS	14	TW-03230-14	15		TW-03232-24	½"	60		TW-03234-56	¼"	60	
3000 to 77,000 5300 to 137,000	30 to 1900 64 to 4100	Glass 316 SS	15	TW-03230-15	15		TW-03232-25	½"	50		TW-03234-57	¼"	50	

††When using the stainless steel float, refer to the correlation chart (included) for proper readings.
‡‡Port sizes are relevant only if couplings are removed; otherwise, users should reference information in the specifications list.

Flowmeter Stand Kit contains everything you need to mount your Gilmont flowmeter on a benchtop or wall. Mount valved flowmeters directly—base accepts two large flowmeters (tube size 14 or 15) or three of the smaller flowmeters (tube size 10, 11, 12, and 13).

TW-03198-00 **Flowmeter stand kit.**
Includes one base, one rod, and two mounting clamps

TW-03198-10 **Replacement flowmeter base**

TW-03198-20 **Replacement rod,** 18"L (45.7 cm)

TW-03198-30 **Replacement mounting clamp**

TW-03198-40 **PTFE coupling adapter** with Viton O-rings replaces the threaded polypropylene bushings on shielded flowmeters to provide an all-PTFE connection; ¼" NPT(F) port

TW-31320-07 **Fitting;** NPT(M) to compression adapter, PFA, ⅛"

TW-31320-09 **Fitting;** NPT(M) to compression adapter, PFA, ¼"

TW-31320-13 **Fitting;** NPT(M) to compression adapter, PFA, ½"

INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

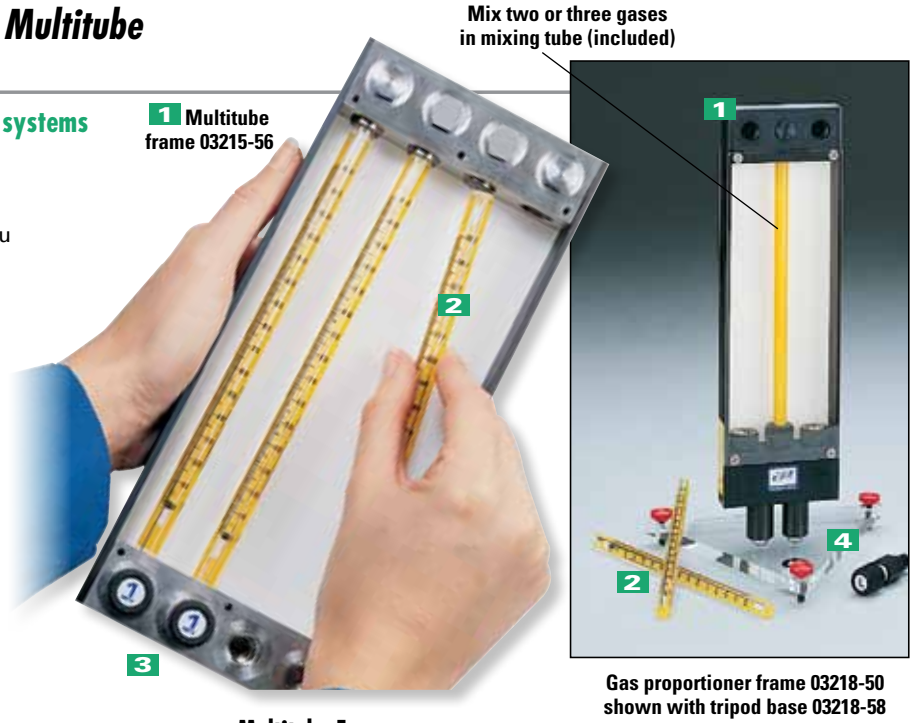
TW-17080-00 **NIST-traceable calibration** with data for air/gas flowmeter

TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

Cole-Parmer® Single and Multitube Flowmeter Systems

Create your own multitube or gas proportioner systems for complete flexibility

Design a flow system to meet your multi-channel metering, mixing, or monitoring applications. We offer a variety of frames and flowtubes so that you can create the system to meet your exact needs. If you need assistance in putting together a system, call your local dealer.



Gas proportioner frame 03218-50 shown with tripod base 03218-58

REQUIRED SYSTEM Components

1 Frames

Chose a frame depending on the flowtube capacity, flow pattern, and wetted parts that you require. For frames with PTFE wetted parts, call your local dealer for information. Single and multitube frames accept both direct-reading and correlated flowtubes; gas proportioner frames accept only correlated flowtubes. All frames include an instruction manual.

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Minimum flow rate: approx 10% of max flow rate of flowtube

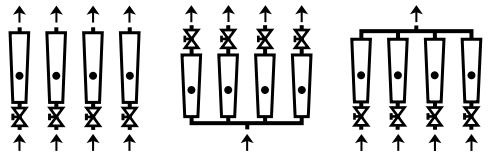
Max pressure: 200 psi (13.7 bar)

Operating temp: –15 to 250°F (–26 to 121°C)

Connections: ⅛" NPT(F)

Materials of construction
Side panels: black anodized aluminum
Front shield: ⅛"-thick polycarbonate
Back plate: ⅛"-thick acrylic
O-rings and packing: Buna N® for aluminum models, Viton® for 316 SS models

Multitube Flow Patterns



Isolated parallel channels | Common inlet with parallel exhausts | Common exhaust with parallel inlets

Single-Tube Frames

Choose a frame with valve port if you plan on adding a valve cartridge (page 613) to control flow.

Number of flowtubes held	Valve port	Aluminum wetted parts Cat. no.	Price	316 SS wetted parts Cat. no.	Price
Single-tube frames for 65-mm flowtubes					
One	No	TW-03220-00		TW-03220-40	
	Yes	TW-03220-08		TW-03220-44	
Single-tube frames for 150-mm flowtubes					
One	No	TW-03220-06		TW-03220-42	
	Yes	TW-03220-10		TW-03220-46	

Multitube Frames

These frames have valve ports which accept valve cartridges to control flow. A tripod base is required to use the multitube frame with the common inlet flow pattern; all other multitube frames are designed for panel and tripod mounting.

Number of flowtubes held	Flow pattern	Aluminum wetted parts Cat. no.	Price	316 SS wetted parts Cat. no.	Price
Multitube frames for 65-mm flowtubes					
Two	Isolated	TW-03214-10		TW-03214-16	
	Common	TW-03214-12		TW-03214-18	
Three	Isolated	TW-03214-28		TW-03214-34	
	Common	TW-03214-30		TW-03214-36	
Four	Isolated	TW-03214-46		TW-03214-52	
	Common	TW-03214-50		TW-03214-56	
Five	Isolated	TW-03214-62		TW-03214-66	
	Common	TW-03214-64		TW-03214-68	
Six	Isolated	TW-03214-74		TW-03214-78	
	Common	TW-03214-76		TW-03214-80	
Multitube frames for 150-mm flowtubes					
Two	Isolated	TW-03215-10		TW-03215-16	
	Common	TW-03215-12		TW-03215-18	
Three	Isolated	TW-03215-28		TW-03215-34	
	Common	TW-03215-30		TW-03215-36	
Four	Isolated	TW-03215-46		TW-03215-52	
	Common	TW-03215-50		TW-03215-56	
Five	Isolated	TW-03215-62		TW-03215-66	
	Common	TW-03215-64		TW-03215-68	
Six	Isolated	TW-03215-74		TW-03215-78	
	Common	TW-03215-76		TW-03215-80	

Gas Proportioner Multitube Frames

These multitube frames with valves allow you to increase or decrease gas concentrations accurately at any time during an experiment—blend two or three gases at the exact concentration you require. Frames include a installation tool and mixing tube. **Note:** use only with the 150-mm correlated flowtubes on page 612. Flow tubes come with gas correlation charts.

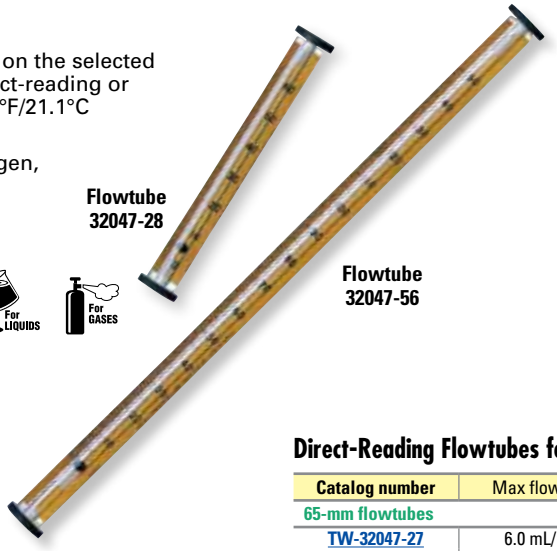
Number of flowtubes held	Flow pattern	Aluminum wetted parts Cat. no.	Price	316 SS wetted parts Cat. no.	Price
Gas proportioner frames for 150-mm correlated flowtubes					
Two	—	TW-03218-50		TW-03218-52	
Three	—	TW-03218-54		TW-03218-56	

See next page for more...

2A Flowtubes for Air and Water

Choose 65- or 150-mm flowtubes depending on the selected frame size. Flowtubes are calibrated for direct-reading or correlated reading of air or water at STP (70°F/21.1°C and 14.7 psi/1 atm).

Flowtubes for specialty gases—argon, nitrogen, hydrogen, helium, carbon dioxide, and oxygen—are available on page 613.



For LIQUIDS

For GASES

Specifications

Repeatability: ±0.25% full-scale

Minimum flow rate: approx 10% of max flow rate

Materials of construction

Flowtube: heavy-walled borosilicate glass
Float: glass, stainless steel (SS), carboloy, sapphire, or tantalum

Catalog number	Max flow rate	Float	Price
65-mm flowtubes			
TW-32047-00	2.2 scfh	Glass	
TW-32047-01	6.0 scfh	Glass	
TW-32047-02	10 scfh	SS	
TW-32047-04	25 scfh	SS	
TW-32047-08	1.9 scfm	SS	
TW-32047-09	1.0 LPM	Glass	
TW-32047-10	1.15 LPM	Glass	
TW-32047-11	2.0 LPM	SS	
TW-32047-12	4.0 LPM	SS	
TW-32047-13	5.0 LPM	Glass	
TW-32047-14	10 LPM	SS	
TW-32047-15	16 LPM	SS	
TW-32047-16	25 LPM	SS	
TW-32047-17	40 LPM	SS	
TW-32047-18	7 mL/min	Glass	
TW-32047-19	50 mL/min	SS	
TW-32047-20	75 mL/min	SS	
TW-32047-21	100 mL/min	Glass	
TW-32047-22	250 mL/min	Carboloy	
TW-32047-23	500 mL/min	Carboloy	
150-mm flowtubes			
TW-32047-50	2.5 scfh	Carboloy	
TW-32047-51	5 scfh	Glass	
TW-32047-53	10 scfh	SS	
TW-32047-55	23 scfh	Carboloy	
TW-32047-56	50 scfh	Glass	
TW-32047-57	90 scfh	SS	
TW-32047-60	1.25 LPM	Carboloy	
TW-32047-61	2.5 LPM	Glass	
TW-32047-62	4.0 LPM	Glass	
TW-32047-63	4.5 LPM	Sapphire	
TW-32047-64	5.0 LPM	Sapphire	
TW-32047-65	10 LPM	Carboloy	
TW-32047-67	23 LPM	Glass	
TW-32047-68	42 LPM	SS	
TW-32047-69	60 LPM	Carboloy	
TW-32047-70	25 mL/min	Sapphire	
TW-32047-71	50 mL/min	Sapphire	
TW-32047-72	75 mL/min	Carboloy	
TW-32047-73	100 mL/min	Sapphire	
TW-32047-74	200 mL/min	SS	
TW-32047-76	500 mL/min	Sapphire	
TW-32047-77	800 mL/min	Glass	

Direct-Reading Flowtubes for Water (Accuracy: ±5%)

Catalog number	Max flow rate	Float	Price
65-mm flowtubes			
TW-32047-27	6.0 mL/min	SS	
TW-32047-28	60 mL/min	SS	
TW-32047-29	115 mL/min	SS	
TW-32047-31	250 mL/min	Glass	
TW-32047-32	500 mL/min	Glass	
150-mm flowtubes			
TW-32047-81	1.2 LPM	SS	
TW-32047-82	2.0 LPM	Tantalum	
TW-32047-84	10 mL/min	Sapphire	
TW-32047-86	50 mL/min	Glass	
TW-32047-88	100 mL/min	Glass	
TW-32047-89	200 mL/min	Carboloy	
TW-32047-90	500 mL/min	SS	

Correlated Flowtubes for Air and Water (Accuracy: ±2%)

Catalog number	Max flow rate			Float	Price
	Air	Air (50 psi)	Water		
65-mm flowtubes					
TW-03219-50	5.8 mL/min	—	0.065 mL/min	Glass	
TW-03219-51	16.7 mL/min	—	0.283 mL/min	SS	
TW-03219-52	48.7 mL/min	—	0.55 mL/min	Glass	
TW-03219-53	145 mL/min	—	2.38 mL/min	SS	
TW-03219-54	202.1 mL/min	—	2.6 mL/min	Glass	
TW-03219-55	522 mL/min	—	12 mL/min	SS	
TW-03219-56	1249 mL/min	—	27 mL/min	Glass	
TW-03219-58	2040 mL/min	—	39.7 mL/min	Glass	
TW-03219-57	2520 mL/min	—	70.7 mL/min	SS	
TW-03219-59	3990 mL/min	—	108.3 mL/min	SS	
TW-03219-60	6318 mL/min	—	147 mL/min	Glass	
TW-03219-62	23,169 mL/min	—	522 mL/min	Glass	
TW-03219-66	58,500 mL/min	—	1866 mL/min	Carboloy	
150-mm flowtubes					
TW-03219-70	18.9 mL/min	83 mL/min	0.19 mL/min	Glass	
TW-03217-05	49.1 mL/min	191.6 mL/min	0.49 mL/min	Glass	
TW-03217-07	60.6 mL/min	242 mL/min	0.945 mL/min	SS	
TW-03217-09	92 mL/min	324 mL/min	0.85 mL/min	Glass	
TW-03217-11	137 mL/min	460 mL/min	2.34 mL/min	SS	
TW-03217-15	264 mL/min	825 mL/min	4.74 mL/min	SS	
TW-03217-13	374 mL/min	1086 mL/min	5.5 mL/min	Glass	
TW-03217-17	814 mL/min	2024 mL/min	20.4 mL/min	SS	
TW-03217-21	2313 mL/min	5528 mL/min	53.5 mL/min	Glass	
TW-03217-19	4562 mL/min	10,813 mL/min	130.4 mL/min	SS	
TW-03217-29	8678 mL/min	19,767 mL/min	210 mL/min	Glass	
TW-03217-23	16,737 mL/min	38,995 mL/min	506 mL/min	SS	
TW-03217-33	22,536 mL/min	49,374 mL/min	541 mL/min	Glass	
TW-03219-72	41,512 mL/min	89,880 mL/min	1288 mL/min	SS	
TW-03219-74	59,494 mL/min	123,846 mL/min	1881 mL/min	Carboloy	

2B Direct Reading Flowtubes for Specialty Gases

Choose 65- or 150-mm flowtubes, depending on the selected frame size. Flowtubes read directly in argon, nitrogen, hydrogen, helium, carbon dioxide, or oxygen at STP (70°F/21°C and 14.7 psi/1 atm).

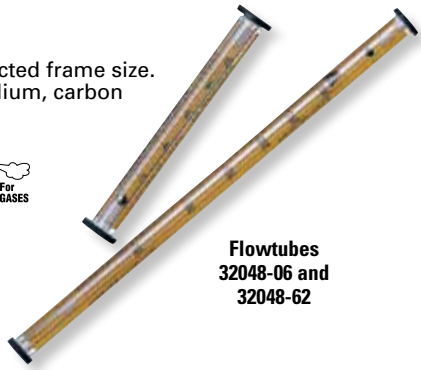
Specifications

ISO9001:2008 CERTIFIED SUPPLIER

For GASES

Accuracy: ±5% full-scale
Repeatability: ±0.25% full-scale
Minimum flow rate: approx 10% of maximum flow rate

Materials of construction
Flowtube: heavy-walled borosilicate glass
Float: glass, stainless steel (SS), carboloy, or sapphire



Flowtubes 32048-06 and 32048-62

Direct-Reading, Carbon Dioxide

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-04	1.0 LPM	Glass	
TW-32048-05	6.0 LPM	Glass	
TW-32048-06	10 LPM	SS	
TW-32048-07	20 mL/min	SS	
TW-32048-08	55 mL/min	Glass	
TW-32048-09	220 mL/min	Sapphire	

Direct-Reading, Nitrogen

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-20	12 LPM	SS	
TW-32048-21	6 mL/min	Glass	
TW-32048-22	50 mL/min	SS	
TW-32048-23	60 mL/min	Sapphire	
TW-32048-24	120 mL/min	Glass	
TW-32048-25	200 mL/min	Sapphire	
150-mm flowtubes			
TW-32048-58	1.6 scfm	SS	
TW-32048-59	2.0 LPM	Glass	
TW-32048-60	100 mL/min	Glass	
TW-32048-61	200 mL/min	Carboloy	
TW-32048-62	300 mL/min	Carboloy	
TW-32048-63	500 mL/min	Sapphire	

Direct-Reading, Hydrogen

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-12	1.5 LPM	Carboloy	
TW-32048-13	3.5 LPM	Glass	
TW-32048-14	6.0 LPM	Glass	
TW-32048-15	42 LPM	SS	
TW-32048-16	35 mL/min	Glass	
TW-32048-17	100 mL/min	SS	
TW-32048-18	150 mL/min	Sapphire	
TW-32048-19	600 mL/min	Glass	

Direct-Reading, Helium

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-10	65 mL/min	Sapphire	
TW-32048-11	120 mL/min	Glass	
150-mm flowtubes			
TW-32048-53	5.0 LPM	Carboloy	
TW-32048-54	40 LPM	SS	
TW-32048-55	100 mL/min	Sapphire	
TW-32048-56	500 mL/min	Carboloy	
TW-32048-57	1500 mL/min	Glass	

Direct-Reading, Argon

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-00	2.5 scfh	Glass	
TW-32048-01	10 scfh	SS	
TW-32048-02	22 scfh	SS	
TW-32048-03	50 scfh	Glass	
150-mm flowtubes			
TW-32048-50	15 LPM	SS	
TW-32048-51	33 mL/min	SS	

Direct-Reading, Oxygen

Cat. no.	Max flow rate	Float	Price
65-mm flowtubes			
TW-32048-26	1.0 LPM	Glass	
TW-32048-27	4.0 LPM	SS	
TW-32048-28	8.0 LPM	SS	
TW-32048-29	15 LPM	SS	
TW-32048-30	50 mL/min	Glass	
TW-32048-31	300 mL/min	SS	
TW-32048-32	500 mL/min	SS	
150-mm flowtubes			
TW-32048-64	5.0 LPM	Sapphire	
TW-32048-65	16.5 LPM	SS	
TW-32048-66	58 LPM	Carboloy	
TW-32048-67	250 mL/min	SS	
TW-32048-68	400 mL/min	Sapphire	

REQUIRED SYSTEM Components

1 Frame: single or multitube 611
2 Flowtube(s) for air, water, and various gases 612–613
3 Valve cartridge(s) to control flow rates 613
4 Tripod base for your benchtop applications 613

3 Valve Cartridges

Use these metering needle valve cartridges to control flow rate. Simply insert into the valve port on the flowmeter frame. Select a valve cartridge compatible with your frame material: aluminum or stainless steel (SS). Choose a high-resolution metering valve cartridge for greater precision of flow rate.

03217-92

03218-74

Specifications

Materials of Construction

Frame	Aluminum	316 SS
Standard		
Body	Aluminum	316 SS
Needle	316 SS	
Orifice	PTFE	
O-rings	Buna N	Viton®
High-resolution		
Body	Brass	316 SS
Needle	316 SS	
Orifice	PTFE	
O-rings	Buna N	Viton

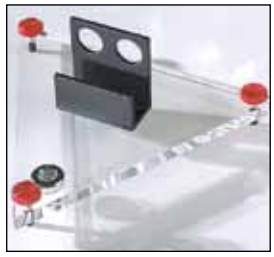
Flow ranges (mL/min)†		Aluminum frame		316 SS frame	
For air and gases	For water	Catalog number	Price	Catalog number	Price
Standard valve cartridges, 10 turn					
5000 to 20,000	0 to 350	TW-03217-92		TW-03217-82	
20,000 to 60,000	0 to 1200	TW-03217-88		TW-03217-84	
60,001	0 to 3500	TW-03217-96		TW-03217-86	
High-resolution valve cartridges, 16 turn					
0 to 200	0 to 6	TW-03218-72		TW-03218-74	
201 to 1000	3.1 to 30	TW-03218-61		TW-03218-67	
1001 to 2500	30 to 70	TW-03218-62		TW-03218-68	
2501 to 6200	71 to 200	TW-03218-63		TW-03218-69	
≥ 6201	≥ 650	TW-03218-64		TW-03218-70	

†If your flowtube is in units other than mL/min, convert them to mL/min and choose a valve within that flow range. See pages 2013–2016 for conversion factors.

4 Tripod Bases

Use base for benchtop applications. Three leveling screws and spirit level are built into a clear acrylic base.

Note: a tripod base is required to use the multitube frame with the common inlet flow pattern; all other multitube frames are designed for panel and tripod mounting.



Tripod base 03226-50

Catalog number	Use with	Price
For multitube frames		
TW-03226-50	2-, 4-, or 6-tube models; or isolated models	
TW-03226-40	3- or 5-tube models; or common inlet models	
For gas proportioner frames		
TW-03218-58	Models 03218-50, -52	
TW-03218-59	Models 03218-54, -56	

Cole-Parmer® 65-mm Flowmeters

Clear polycarbonate front shield magnifies scale 16% for easier reading

- A vertical tangential locator line ensures hairline accuracy in reading float position
- Ceramic millimeter scale is fused directly to flowtube
- 16-turn high-precision valve features a "nonrising stem" to more accurately set your desired flow point

Each flowmeter consists of a heavy-walled glass flowtube mounted in a frame with white acrylic back plate (⅛" thick). **Aluminum** flowmeters are economical and good for general use with noncorrosive gases and liquids. **Brass** flowmeters are economical and good for use with water. **316 Stainless Steel** flowmeters feature excellent chemical compatibility.

Select a flowmeter with a high-resolution valve for superior flow rate control—ideal for low-flow applications or for any application where you need precise flow control. All flowmeters come with correlation data sheets for water and air at standard temperature and pressure (STP). We can also supply calibration data for oxygen, nitrogen, hydrogen, helium, CO_2, argon, other liquids and gases, and for conditions other than STP—call your local dealer for more information.

Brass flowmeter
03268-64

Front shield magnifies the scale 16% for easy reading.

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Accuracy: ±5% full-scale for meters with rate of 0.065 and 0.283 mL/min of H_2O ±2% full-scale for remaning

Repeatability: ±0.25% full-scale

Max pressure: 200 psi (13.7 bar)

Operating temp: –15 to 250°F (–26 to 121°C)

Connections: ⅛" NPT(F)

Materials of Construction

Part	Aluminum	Brass	SS
Flowtube	Borosilicate glass		
Fittings, valves	Aluminum	Chrome-plated brass	316 SS
O-rings	Buna N		Viton®
Float	Glass, 316 SS, or carboloy		
Shield	Polycarbonate		
Frame	Aluminum/acrylic		

MORE online!

For pressure drop information for these flowmeters, go to . . .

ColeParmer.com

Maximum flow rate (mL/min)‡								Float††	Correlated meters without valves		
									Aluminum	Brass	316 SS
H_2O†	Air†	O_2	N_2	H_2	He	CO_2	Ar		Cat. no.	Cat. no.	Cat. no.
0.065	5.8	5.1	5.6	14	5.5	6.6	4.3	G	TW-03266-00	TW-03268-50	TW-03268-01
0.283	16.7	15.3	17.6	32	15.8	20.2	14.2	SS	TW-03266-02	TW-03268-52	TW-03268-03
0.55	48.7	46	51	99	47	59.2	38	G	TW-03266-04	TW-03268-54	TW-03268-05
1.75	104	94	113	284	99	122	86	G	TW-03266-08	TW-03268-58	TW-03268-09
2.38	145	132	149	314	146	160	122	SS	TW-03266-06	—	TW-03268-07
2.6	202.1	189	215	502	211	221	174.2	G	TW-03266-15	—	TW-03268-18
7.74	299	268	312	828	313	310	246	SS	TW-03266-09	TW-03268-60	TW-03268-16
12	522	480	530	1488	636	489	429	SS	TW-03266-17	TW-03268-64	TW-03268-15
20.5	992	970	1015	3218	1903	883	829	G	TW-03266-19	—	TW-03268-20
27	1249	1165	1293	3923	1990	1110	1065	G	TW-03266-16	TW-03268-66	TW-03268-17
39.7	2040	1928	2091	6359	3470	1794	1784	G	TW-03266-20	—	TW-03268-21
52	2678	2323	2624	9410	4853	2237	2171	G	TW-03266-24	—	TW-03268-25
55.5	1946	1842	1983	6598	4128	1699	1645	SS	TW-03266-21	—	TW-03268-22
70.7	2520	2360	2610	8602	4970	2190	2124	SS	TW-03266-18	TW-03268-68	TW-03268-19
108.3	3990	3761	4097	13,600	8699	3449	3388	SS	TW-03266-22	TW-03268-72	TW-03268-23
147	6318	5880	6380	21,712	13,750	5470	5290	G	TW-03266-28	TW-03268-78	TW-03268-29
150	4922	4733	5026	17,966	10,947	4225	4172	SS	TW-03266-26	TW-03268-76	TW-03268-27
309	13,153	12,341	13,412	47,100	29,762	11,156	11,125	G	TW-03266-32	—	TW-03268-33
364	12,058	11,250	12,200	42,040	27,300	10,150	10,175	SS	TW-03266-30	TW-03268-80	TW-03268-31
745	24,680	23,322	25,311	90,323	58,472	20,798	21,116	SS	TW-03266-34	—	TW-03268-35
								Price			
High-flow flowmeters											
522	23,169	21,686	23,506	80,752	51,380	19,379	19,817	G	TW-03266-36	—	TW-03268-37
1261	42,094	40,053	43,487	154,750	104,600	35,100	37,441	SS	TW-03266-38	TW-03268-88	TW-03268-39
1866	58,500	55,539	60,618	220,500	148,114	47,950	50,200	C	TW-03266-40	—	TW-03268-41
								Price			

†Correlation data sheets for water and air are included with flowmeters.
‡Flow rates are at standard temperature and pressure (70°F and 14.7 psi). Minimum flow rate is approx 10% of the maximum flow rate.
††Float material key: G = glass, SS = 316 stainless steel, C = carboloy

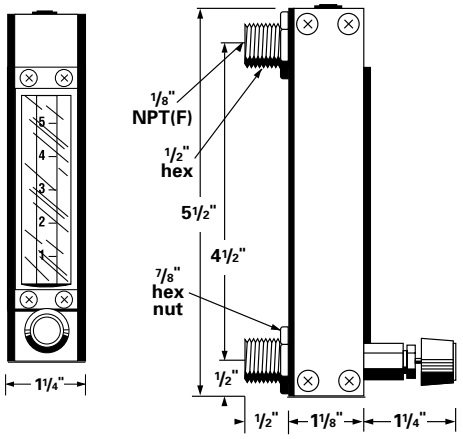
INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

TW-17080-00 **NIST-traceable calibration** with data for air/gas flowmeter
TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

To Panel Mount

Drill two holes to fit the inlet and outlet according to the diagrams below. Face width is 1¼" (3.2 cm). Secure flowmeter with the two retaining nuts (included).



Aluminum flowmeter
03216-00
with valve

Aluminum flowmeter
32044-00 with
high-resolution valve

	Correlated meters with 10-turn valves			Correlated meters with high-resolution 16-turn valves		
	Aluminum	Brass	316 SS	Aluminum	Brass	316 SS
	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.
	TW-03216-00	TW-03293-00	TW-03218-01	TW-32044-00	TW-32045-00	TW-32046-01
	TW-03216-02	TW-03293-02	TW-03218-03	TW-32044-02	TW-32045-02	TW-32046-03
	TW-03216-04	TW-03293-04	TW-03218-05	TW-32044-04	TW-32045-04	TW-32046-05
	TW-03216-08	TW-03293-08	TW-03218-09	TW-32044-08	TW-32045-08	TW-32046-09
	TW-03216-06	TW-03293-06	TW-03218-07	TW-32044-06	TW-32045-06	TW-32046-07
	TW-03216-12	TW-03293-12	TW-03218-13	TW-32044-12	TW-32045-12	TW-32046-13
	TW-03216-10	TW-03293-10	TW-03218-11	TW-32044-10	TW-32045-10	TW-32046-11
	TW-03216-14	TW-03293-14	TW-03218-15	TW-32044-14	TW-32045-14	TW-32046-15
	TW-03216-15	TW-03293-15	TW-03218-16	TW-32044-15	TW-32045-15	TW-32046-16
	TW-03216-16	TW-03293-16	TW-03218-17	TW-32044-16	TW-32045-16	TW-32046-17
	TW-03216-20	TW-03293-20	TW-03218-21	TW-32044-20	TW-32045-20	TW-32046-21
	TW-03216-24	TW-03293-24	TW-03218-25	TW-32044-24	TW-32045-24	—
	TW-03216-17	TW-03293-17	TW-03218-18	TW-32044-17	TW-32045-17	TW-32046-18
	TW-03216-18	TW-03293-18	TW-03218-19	TW-32044-18	TW-32045-18	TW-32046-19
	TW-03216-22	TW-03293-22	TW-03218-23	TW-32044-22	—	TW-32046-23
	TW-03216-28	TW-03293-28	TW-03218-29	TW-32044-28	TW-32045-28	—
	TW-03216-26	TW-03293-26	TW-03218-27	TW-32044-26	TW-32045-26	TW-32046-27
	TW-03216-32	TW-03293-32	TW-03218-33	TW-32044-32	TW-32045-32	TW-32046-33
	TW-03216-30	TW-03293-30	TW-03218-31	TW-32044-30	TW-32045-30	TW-32046-31
	TW-03216-34	TW-03293-34	TW-03218-35	TW-32044-34	—	TW-32046-35
	High-flow flowmeters					
	TW-03216-36	—	TW-03218-37	TW-32044-36	—	—
	TW-03216-38	TW-03293-38	TW-03218-39	TW-32044-38	—	TW-32046-39
	TW-03216-40	TW-03293-40	TW-03218-41	TW-32044-40	TW-32045-40	TW-32046-41

Tripod Bases

Securely stand up to three flowmeters in any combination. Three leveling screws and spirit level are built into a clear acrylic base.

Catalog number	Number of meters held	Price
TW-03226-10	One	
TW-03226-30	One, two, or three	

TW-30904-01 **Fitting;** NPT(M) to barbed adapter, brass, ⅛" x ¼"
TW-31412-34 **Fitting;** NPT(M) to compression adapter, brass, ⅛" x ⅛"
TW-31406-34 **Fitting;** NPT(M) to compression adapter, SS, ⅛" x ⅛"
TW-30621-30 **Fitting;** NPT(M) to barbed adapter, SS, ⅛" x ⅛"

Aluminum flowmeter
03267-00 without valve

Front shield magnifies the scale 16% for easy reading.

Cole-Parmer® 150-mm Flowmeters

Longer 150-mm scale makes these flowmeters perfect for applications demanding high resolution

- Ceramic millimeter scale is fused directly to flowtube
- A vertical tangential locator line ensures hairline accuracy in reading float position
- 16-turn high-precision valve features a "nonrising stem" to more accurately set your desired flow point

Each flowmeter consists of a heavy-walled glass flowtube mounted in a frame with white acrylic back plate (⅛" thick). Aluminum flowmeters are economical and good for general use with noncorrosive gases and liquids. Brass flowmeters are economical and good for use with water. The 316 stainless steel flowmeters feature excellent chemical compatibility. Select a flowmeter with a high-precision valve for superior flow rate control—ideal for low-flow applications, for metering samples, and calibration gases for gas analyzers.

All flowmeters come with correlation data sheets for water and air at standard temperature and pressure (STP). We can also supply calibration data for oxygen, nitrogen, hydrogen, helium, CO_2, argon, other liquids and gases, and for conditions other than STP—call your local dealer for more information.

MORE online!
For pressure drop information for these flowmeters, go to . . .
ColeParmer.com

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

For LIQUIDS

For GASES

Accuracy: ±5% full-scale for meters with rate of 0.19 and 0.94 mL/min H_2O
±2% full-scale for remaining

Repeatability: ±0.25% full-scale

Max pressure: 200 psi (13.7 bar)

Operating temp:
–15 to 250°F (–26 to 121°C)

Connections: ⅛" NPT(F)

Materials of Construction

Part	Aluminum	Brass	SS
Flowtube	Borosilicate glass		
Fittings, valves	Aluminum	Chrome-plated brass	316 SS
O-rings	Buna N		Viton®
Float	Glass, 316 SS, or carboloy		
Shield	Polycarbonate		
Frame	Aluminum/acrylic		

Maximum flow rate (mL/min)‡								Float††	Correlated meters without valves		
									Aluminum	Brass	316 SS
H_2O†	Air†	O_2	N_2	H_2	He	CO_2	Ar		Cat. no.	Cat. no.	Cat. no.
0.19	18.7	17	20	37	16	23.6	15.4	G	TW-03267-00	TW-03269-50	TW-03269-01
0.49	49.1	42	48	94	46.2	56.4	43.5	G	TW-03267-04	TW-03269-54	TW-03269-05
0.85	92	81	92	208	90.1	103.1	75.6	G	TW-03267-08	—	TW-03269-09
0.94	60.5	54	62	123	53	72	49	SS	TW-03267-02	TW-03269-52	TW-03269-03
2.45	137	131	143	301	133	150	113	SS	TW-03267-06	—	TW-03269-07
4.74	264	233	271	627	283	281	218	SS	TW-03267-09	—	TW-03269-16
5.5	374	340	382	1021	450	355	305	G	TW-03267-15	TW-03269-62	TW-03269-18
16.5	844	772	827	2620	1490	725	687	G	TW-03267-16	TW-03269-66	TW-03269-17
20.4	814	753	824	2496	1290	728	676	SS	TW-03267-17	—	TW-03269-15
46	1682	1545	1662	5547	3397	1420	1380	SS	TW-03267-18	TW-03269-68	TW-03269-19
53.5	2313	2169	2395	7817	4880	2048	1949	G	TW-03267-20	TW-03269-70	TW-03269-21
84	3807	3485	3868	13,105	7803	3374	3151	G	TW-03267-24	TW-03269-74	TW-03269-25
134	4562	4341	4685	15,855	9770	3990	3903	SS	TW-03267-22	TW-03269-72	TW-03269-23
210	8678	8269	8916	29,840	19,426	7485	7366	G	TW-03267-28	TW-03269-78	TW-03269-29
217	7825	6992	7722	27,804	15,960	6308	6384	SS	TW-03267-26	TW-03269-76	TW-03269-27
506	16,737	15,710	17,021	59,996	38,576	14,051	14,131	SS	TW-03267-30	TW-03269-80	TW-03269-31
								Price			
High-flow flowmeters											
541	23,742	21,350	23,512	85,812	53,100	18,989	19,761	G	TW-03267-32	TW-03269-82	—
1288	45,227	39,567	43,000	159,699	103,647	34,287	45,227	SS	TW-03267-34	TW-03269-84	TW-03269-35
1881	66,346	54,902	59,580	221,872	146,500	46,311	47,890	C	TW-03267-36	TW-03269-86	TW-03269-37
								Price			

†Correlation data sheets for water and air are included with flowmeters.
‡Flow rates are at standard temperature and pressure (70°F and 14.7 psi). Minimum flow rate is approx 10% of the maximum flow rate.
††Float material key: G = glass, SS = 316 stainless steel, C = carboloy

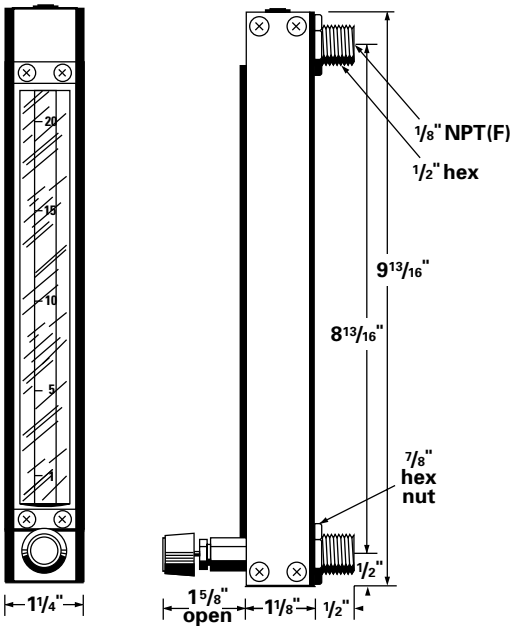
INNOCAL®
INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

TW-17080-00 **NIST-traceable calibration** with data for air/gas flowmeter
TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

To Panel Mount

Drill two holes to fit inlet and outlet according to the diagrams below. Face width is 1¼". Secure flowmeter with the two retaining hex nuts (included).



316 SS flowmeter
03229-01 with
high-resolution valve

Brass flowmeter
03294-16 with valve

	Correlated meters with valves			Correlated meters with high-resolution valves		
	Aluminum	Brass	316 SS	Aluminum	Brass	316 SS
	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.	Cat. no.
	TW-03217-00	TW-03294-00	TW-03219-01	TW-03227-00	TW-03295-00	TW-03229-01
	TW-03217-04	TW-03294-04	TW-03219-05	TW-03227-04	TW-03295-04	TW-03229-05
	TW-03217-08	TW-03294-08	TW-03219-09	TW-03227-08	TW-03295-08	TW-03229-09
	TW-03217-02	TW-03294-02	TW-03219-03	TW-03227-02	TW-03295-02	TW-03229-03
	TW-03217-06	TW-03294-06	TW-03219-07	TW-03227-06	TW-03295-06	TW-03229-07
	TW-03217-10	TW-03294-10	TW-03219-11	TW-03227-10	TW-03295-10	TW-03229-11
	TW-03217-12	TW-03294-12	TW-03219-13	TW-03227-12	TW-03295-12	TW-03229-13
	TW-03217-16	TW-03294-16	TW-03219-17	TW-03227-16	TW-03295-16	TW-03229-17
	TW-03217-14	TW-03294-14	TW-03219-15	TW-03227-14	TW-03295-14	TW-03229-15
	TW-03217-18	TW-03294-18	TW-03219-19	TW-03227-18	TW-03295-18	TW-03229-19
	TW-03217-20	TW-03294-20	TW-03219-21	TW-03227-20	TW-03295-20	TW-03229-21
	TW-03217-24	TW-03294-24	TW-03219-25	TW-03227-24	TW-03295-24	TW-03229-25
	TW-03217-22	TW-03294-22	TW-03219-23	TW-03227-22	TW-03295-22	TW-03229-23
	TW-03217-28	TW-03294-28	TW-03219-29	TW-03227-28	TW-03295-28	TW-03229-29
	TW-03217-26	TW-03294-26	TW-03219-27	TW-03227-26	TW-03295-26	TW-03229-27
	TW-03217-30	TW-03294-30	TW-03219-31	TW-03227-30	TW-03295-30	TW-03229-31
	High-flow flowmeters					
	TW-03217-32	TW-03294-32	TW-03219-33	TW-03227-32	TW-03295-32	TW-03229-33
	TW-03217-34	TW-03294-34	TW-03219-35	TW-03227-34	TW-03295-34	TW-03229-35
	TW-03217-36	TW-03294-36	TW-03219-37	TW-03227-36	TW-03295-36	TW-03229-37

Tripod Bases

Securely stand up to three flowmeters in any combination. Three leveling screws and spirit level are built into a clear acrylic base.

Catalog number	Number of meters held	Price
TW-03226-10	One	
TW-03226-30	One, two, or three	

TW-30904-01 **Fitting;** NPT(M) to barbed adapter, brass, ⅛" x ¼"
TW-31412-34 **Fitting;** NPT(M) to compression adapter, brass, ⅛" x ⅛"
TW-31406-34 **Fitting;** NPT(M) to compression adapter, SS, ⅛" x ⅛"
TW-30621-30 **Fitting;** NPT(M) to barbed adapter, SS, ⅛" x ⅛"

Cole-Parmer® 65-mm Flowmeters with PTFE Components

Designed for high-purity applications with flexibility for a broad array of gases

- Compact design is ideal for small panels or cramped workspaces
- High turndown—minimum flow rate is less than one-tenth of maximum flow
- High-precision valve option allows monitoring and control

Front shield magnifies the scale 16% for easy reading

The substitution of metal fittings with PTFE eliminates a potential contamination source for high-purity applications. The glass tube utilizes a fused ceramic scale for a precise, permanent measuring guide. In addition, a vertical-tangential locator line provides readings with hairline accuracy. Further improving readability is a front shield that magnifies the scale 16%. An anodized aluminum frame protects the heavy-walled glass flowtube; a white acrylic backplate protects and enhances viewing in the protective frame.

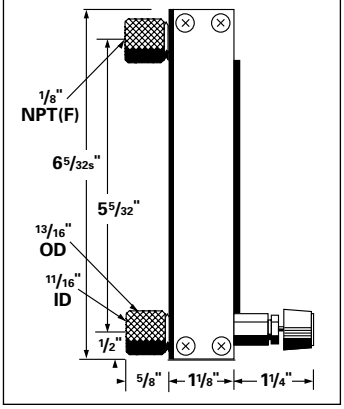
Select a flowmeter with a valve for flow rate control. The standard valve is suitable where high resolution metering is not essential. The high-resolution valve features a fine-adjust 16-turn "non-rising stem" to more accurately set your desired flow rate.

All flowmeters come with correlation data sheets for water and numerous gases (listed below) at standard temperature and pressure (STP).

65-mm PTFE flowmeter 03216-50 with valve

To Panel Mount

Drill two holes to fit the inlet and outlet according to the diagram at left. Face width is 1¼" (3.2 cm). Secure flowmeter with the two retaining nuts (included).



Specifications

Accuracy: ±5% full-scale for meters with rate of 0.084 mL/min H_2O
±2% full-scale for remaining
Repeatability: ±0.25% full-scale
Max pressure: 100 psi (6.9 bar)
Operating temp: –15 to 150°F (–26 to 65°C)
Connections: ⅛" NPT(F)

ISO9001:2008 CERTIFIED SUPPLIER

For LIQUIDS For GASES

Materials of Construction

Part	Material
Flowtube	Borosilicate glass
Fittings, valves	PTFE/PCTFE
O-rings	PTFE
Float	PTFE
Frame	Aluminum

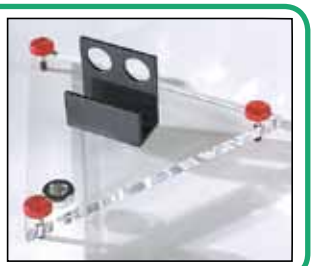
Maximum flow rate (mL/min)‡								Float††	Flowmeters without valves	Flowmeters with valves	Flowmeters with high-resolution valves
H_2O†	Air†	O_2	N_2	H_2	He	CO_2	Ar		Catalog number	Catalog number	Catalog number
0.084	8.3	7.1	8.5	15.3	7.9	10	7.7	Sa	TW-03266-50	TW-03216-50	TW-32044-50
0.55	48.7	46	51	99	47	59.2	38	G	TW-03266-52	TW-03216-52	TW-32044-52
0.98	72.3	72	78	150	71	90	63	Sa	TW-03266-55	TW-03216-55	TW-32044-55
1.75	104	94	113	284	99	122	86	G	TW-03266-57	TW-03216-57	TW-32044-57
3.44	159	147	167	435	157	181	131	Sa	—	TW-03216-60	TW-32044-60
2.6	202.1	189	215	502	211	221	174.2	G	—	TW-03216-62	TW-32044-62
4.7	300	279	312	788	327	307	257	Sa	TW-03266-65	TW-03216-65	TW-32044-65
20.5	986	970	1015	3218	1903	883	829	G	TW-03266-67	TW-03216-67	TW-32044-67
34	1299	1217	1321	4215	2606	1143	1095	Sa	TW-03266-70	TW-03216-70	TW-32044-70
36.7	1623	1575	1710	5470	2950	1500	1395	Sa	—	TW-03216-75	—
39.7	2040	1928	2091	6359	3470	1794	1784	G	TW-03266-77	TW-03216-77	TW-32044-77
61	2704	2522	2859	9130	4932	2314	2279	Sa	TW-03266-80	TW-03216-80	TW-32044-80
147	6318	5880	6380	21,712	13,750	5470	5290	G	TW-03266-82	TW-03216-82	TW-32044-82
217	8145	7640	8280	28,211	18,500	6980	6900	Sa	—	TW-03216-85	—
309	13,153	12,341	13,412	47,100	29,762	11,156	11,125	G	TW-03266-87	TW-03216-87	TW-32044-87
								Price			
High-flow flowmeters											
522	23,169	21,686	23,506	80,752	51,380	19,379	19,817	G	TW-03266-88	TW-03216-88	TW-32044-88
798	29,218	27,901	30,337	106,000	67,754	24,630	24,597	Sa	TW-03266-90	TW-03216-90	TW-32044-90
								Price			

†Correlation data sheets for water and air are included with flowmeters.
‡Flow rates are at standard temperature and pressure (70°F and 14.7 psi). Minimum flow rate is approx 10% of the maximum flow rate. ††Float material key: G = glass, Sa = sapphire

Tripod Bases

Securely stand up to three flowmeters in any combination. Three leveling screws and spirit level are built into a clear acrylic base.

Catalog number	Number of meters held	Price
TW-03226-10	One	
TW-03226-30	One, two, or three	



Find MORE!
For fittings, see **pages 509–575.**
For tubing, see **pages 1823–1859.**

Cole-Parmer® 150-mm Flowmeters with PTFE Components

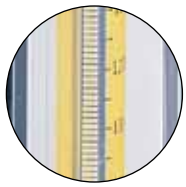
Designed for high-purity applications with flexibility for a broad array of gases

- Longer scale improves control resolution and readability for critical applications
- High turndown—minimum flow rate is less than one-tenth of maximum flow
- High-precision valve option allows monitoring and control

The substitution of metal fittings with PTFE eliminates a potential contamination source for high-purity applications. The glass tube utilizes a fused ceramic scale for a precise, permanent measuring guide. In addition, a vertical tangential locator line provides readings with hairline accuracy. Further improving readability is a front shield that magnifies the scale 16%. An anodized aluminum frame protects the heavy-walled glass flowtube; a white acrylic backplate protects and enhances viewing in the protective frame.

Select a flowmeter with a valve for flow rate control. The standard valve is suitable where high resolution metering is not essential. The high-resolution valve features a fine-adjust 16-turn "nonrising stem" to more accurately set your desired flow rate.

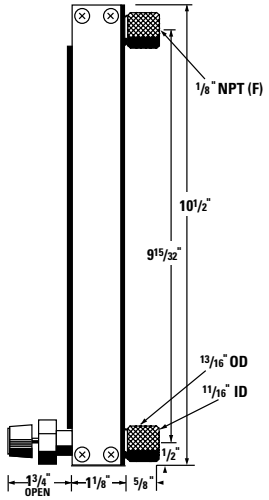
All flowmeters come with correlation data sheets for water and numerous gases (listed below) at standard temperature and pressure (STP).



Front shield magnifies the scale 16% for easy reading

To Panel Mount

Drill two holes to fit the inlet and outlet according to the diagram below. Face width is 1¼" (3.2 cm). Secure flowmeter with the two retaining nuts (included).



Specifications

ISO 9001:2008 CERTIFIED SUPPLIER

Accuracy: ±2% full-scale
Repeatability: ±0.25% full-scale
Max pressure: 100 psi (6.9 bar)
Operating temp: –15 to 150°F (–26 to 65°C)
Connections: ⅛" NPT(F)

Materials of Construction

Flowtube	Borosilicate glass
Fittings, valves	PTFE/PTCFE
O-rings	PTFE
Float	Glass or sapphire
Shield	Polycarbonate
Frame	Aluminum/acrylic

Maximum flow rate (mL/min)‡								Float††	Flowmeters without valves	Flowmeters with valves	Flowmeters with high-resolution valves
H_2O†	Air†	O_2	N_2	H_2	He	CO_2	Ar		Catalog number	Catalog number	Catalog number
0.39	30	27	31	59	26	36.8	24.5	Sa	TW-03267-50	TW-03217-50	TW-03217-52
0.53	49	49	56	100	47	56.8	43.5	G	TW-03267-52	TW-03217-51	TW-03217-53
0.85	92	81	92	208	90.1	103.1	75.6	G	TW-03267-57	TW-03217-56	TW-03217-58
0.99	73	70	76	149	69	84	60.1	Sa	TW-03267-55	TW-03217-55	TW-03217-57
1.92	140	121	139	322	142	157	110.9	Sa	TW-03267-60	TW-03217-60	TW-03217-62
5.5	374	340	382	1021	450	355	305	G	TW-03267-62	TW-03217-61	TW-03217-63
9.9	513	472	520	1497	681	472	429	Sa	TW-03267-65	TW-03217-65	TW-03217-67
16.5	825	772	827	2620	1490	725	687	G	TW-03267-67	TW-03217-66	TW-03217-68
26.1	1093	1024	1110	3546	2059	944	910	Sa	TW-03267-70	TW-03217-70	TW-03217-72
53.5	2313	2169	2395	7817	4880	2048	1949	G	TW-03267-72	TW-03217-71	TW-03217-79
77.8	3079	2860	3142	10,455	6458	2620	2605	Sa	TW-03267-75	TW-03217-75	TW-03217-73
84	3807	3485	3868	13,105	7803	3374	3151	G	TW-03267-77	TW-03217-77	TW-03217-83
126	5005	4652	5090	16,108	10,336	4388	4175	Sa	TW-03267-80	TW-03217-80	TW-03217-74
210	8678	8269	8916	29,840	19,426	7485	7366	G	TW-03267-82	TW-03217-81	TW-03227-84
306	11,356	10,706	11,524	40,006	25,400	9557	9539	Sa	TW-03267-85	TW-03217-85	TW-03217-76
								Price			
High-flow flowmeters											
541	22,536	21,350	23,512	85,812	53,100	18,989	19,761	G	TW-03267-87	TW-03217-87	TW-03227-87
806	29,560	27,181	29,930	110,101	70,100	23,855	24,563	Sa	TW-03267-90	TW-03217-90	TW-03217-78
								Price			

†Correlation data sheets for water and air are included with flowmeters.
‡Flow rates are at standard temperature and pressure (70°F and 14.7 psi). Minimum flow rate is approx 10% of the maximum flow rate.
††Float material key: G = glass, Sa = sapphire

150-mm PTFE flowmeter 03217-55 with valve

INNOCAL® INNOVATIVE CALIBRATION SOLUTIONS

Ensure the accuracy of your flowmeter!

TW-17080-00 **NIST-traceable calibration** with data for air/gas flowmeter
TW-17080-12 **NIST-traceable calibration** with data for liquid flowmeter

Benchtop Flowmeters with PTFE Fittings

Design makes each meter suitable for a broad range of laboratory applications

- Modular components allow for meter flexibility across a wide range of flow rates
- Multiple end connections to suit process requirements
- Correlated scaling for interchangeability among multiple fluids

Unshielded Flowmeters work well in low-pressure applications. Connect the flowtube end directly to tubing having the proper inner diameter—flowtube outer diameters are listed below. Glass taper joints are an alternate connection option which slip on the PTFE stops that contain the float (contact our Application Specialists to order the glass taper joints).

Shielded Flowmeters are better suited to higher-pressure applications or for installations requiring a panel-mounted flowmeter. End bushings are molded with dual connection capability—tubing or threaded; listed below are the appropriate tubing and threaded connections provided with each meter.

Shielded Flowmeters with Valves offer flow monitoring along with precise control through an integrated 20-turn micrometer valve. The valve can be adjusted from 0.1 to 100% of maximum flow (semilogarithmic) and provides precise regulation from 0.3 to 60% of maximum flow.

Computer-calibrated flow charts are included for floats used with both air and water at standard temperature and pressure. An "R factor" chart and formulas are included to convert scale readings for other gases or liquids or for floats other than glass. Order the flow rate analysis software below to generate flow charts specific to other applications.

Materials of Construction

Part	Unshielded	Shielded	Shielded with valve
Tube	Borosilicate glass		
O-rings	Viton®		
Inserts	PTFE	—	
Body	—	PTFE	
Couplings	—	Polypropylene (PP) with PTFE Inserts†	
Shield	—	Polycarbonate	
Valve	—	Glass chamber with PCTFE plug‡	

†Order PTFE Couplings (below) for a full PTFE coupling.
‡ Tube sizes 14 and 15 have PTFE plug.

Dimensions

Tube size(s)	Unshielded	Shielded	Shielded with valves
Micro	5⅛"H x 5/16"OD	8"H x 1"OD	8⅞"H x 6"H x 1 5/16"OD
0, 1, 2 3	7½"H x 5/16"OD 7½"H x 7/16"OD	10¼"H x 1"OD	11"H x 6"W x 1 5/16"OD
4 5	9"H x 1 1/16"OD 9"H x 1 5/16"OD	13¼"H x 1½"OD	14½"H x 6"W x 1 15/16"OD
6	—	15⅞"H x 1¾"OD	—

Specifications

ISO9001:2008 CERTIFIED SUPPLIER

For LIQUIDS For GASES

Accuracy
Micro tube size: ±5% of reading or ±2% of scale, whichever is greater; for water, ±10% of reading or ±3 scale divisions, whichever is greater
All other tube sizes: ±2% of reading or ±1 scale division, whichever is greater

Repeatability: ±1% of reading or ½ scale graduation, whichever is greater

Max operating temp: 150°F (65°C)

Connections (for shielded flowmeters)
Tube sizes micro, 0, 1, 2, 3: ⅜" ID tubing
Tube sizes 4, 5, 6: ⅝" ID tubing

Flow ranges		Floats†	Tube size	Unshielded flowmeters			Shielded flowmeters				Shielded flowmeters with valves			
Air (mL/min)	Water (mL/min)			Catalog number	Max psi	Price	Catalog number	Ports‡‡ NPT	Max psi	Price	Catalog number	Ports‡‡ NPT	Max psi	Price
0.02 to 15	0.0002 to 0.12	Ruby	Micro	TW-03210-00	15		TW-03210-20	¼"	125		TW-03234-50	⅛" (M)	125	
0.2 to 100 0.36 to 180	0.002 to 1.1 0.004 to 2.3	Glass 316 SS	0	TW-03201-02	15		TW-03201-22	¼"	125		TW-03234-10	⅛" (M)	125	
1 to 280 2 to 500	0.01 to 4.0 0.02 to 8.6	Glass 316 SS	1	TW-03201-00	15		TW-03201-20	¼"	125		TW-03234-11	⅛" (M)	125	
10 to 1900 20 to 3400	0.2 to 36 0.43 to 77	Glass 316 SS	2	TW-03202-00	15		TW-03202-20	¼"	100		TW-03234-12	⅛" (M)	100	
200 to 14,000 360 to 25,000	3 to 300 6 to 640	Glass 316 SS	3	TW-03203-00	15		TW-03203-20	¼"	75		TW-03234-13	⅛" (M)	75	
1000 to 36,000 1800 to 64,000	10 to 850 21 to 1820	Glass 316 SS	4	TW-03204-00	15		TW-03204-20	¼"	60		—	—	—	—
3000 to 77,000 5300 to 137,000	30 to 1900 64 to 4100	Glass 316 SS	5	TW-03205-00	15		TW-03205-20	½"	50		TW-03234-16	¼" (M)	50	
25,000 to 330,000 50,000 to 675,000	500 to 8000 1500 to 20,000	Glass 316 SS	6	—	—	—	TW-03205-22	½"	50		—	—	—	—

††When using the stainless steel float, refer to the correlation chart (included) for proper readings.
‡‡Port sizes are relevant only if couplings are removed; otherwise, users should reference information in the specifications list.

Flow Rate Analysis Software generates accurate flow rate tables specific to your fluid, temperature, pressure, density, and viscosity using factory calibration data for the specific Gilmont flow tube used.

TW-32120-10 **Flow rate analysis software** runs with Windows® 95/98/NT computers; CD-ROM

TW-03198-00 **Flowmeter stand kit.** Use to mount a flowmeter on a benchtop or wall. Mount valved flowmeters without intermediate support—base accepts two large flowmeters (tube size 4, 5 or 6) or three of the smaller flowmeters (tube size micro, 0, 1, 2, 3). Includes one base, one rod, and two mounting clamps

TW-03198-10 **Replacement flowmeter base**

TW-03198-20 **Replacement rod,** 18"L (45.7 cm)

TW-03198-30 **Replacement mounting clamp**

TW-03198-40 **PTFE coupling adapter** with Viton O-rings replaces the threaded polypropylene bushings on shielded flowmeters to provide an all-PTFE connection; ¼" NPT(F) port

TW-31320-07 **Fitting;** NPT(M) to compression adapter, PFA, ⅛"

TW-31320-09 **Fitting;** NPT(M) to compression adapter, PFA, ¼"

TW-31320-13 **Fitting;** NPT(M) to compression adapter, PFA, ½"

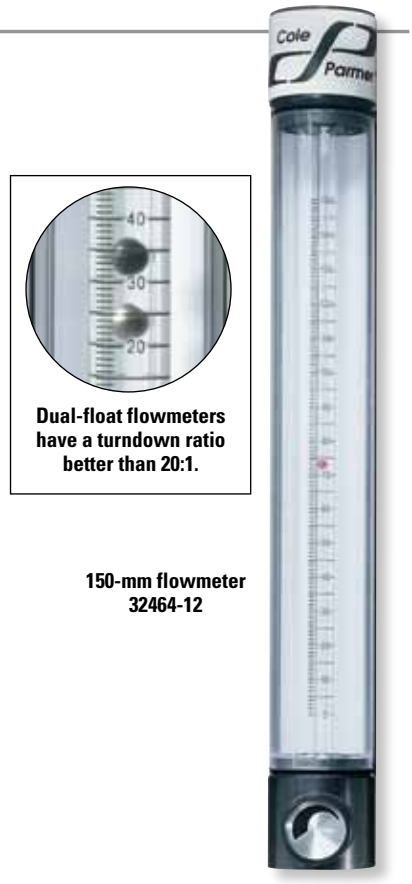
Cole-Parmer® Easy-View Correlated Flowmeters

Perfect for large and small bench-scale or lab systems

- Wide 180° viewing angle—view flow tube and float from either front or side
- Rotating shield magnifies tube for precise readings
- Dual-float models have higher flow rates and allow a better than 20:1 turndown ratio

All meters include correlation charts for water and air. Correlation charts for oxygen, nitrogen, hydrogen, carbon dioxide, and helium are available from our Application Specialists upon request. Inlet and outlet ports are located on the back of the flowmeter to keep tubing out of the way. Mount flowmeters vertically on a control panel or bench mount with tripod base (order separately below). Valve included to control flow.

These are ideal for measuring and regulating flow rates for analytical instruments or industrial chemical processes. Common applications include blending, mixing, and gas purging.



150-mm flowmeter
32464-12

Dual-float flowmeters have a turndown ratio better than 20:1.

Specifications

Media type: water, air, or gases

Accuracy
65-mm flowmeters: ±5% full-scale
150-mm flowmeters: ±3% full-scale

Max pressure: 200 psi (13.7 bar)

Max operating temp: 200°F (93°C)

Connections: ⅛" NPT(F)

Dimensions (W x H x D)
65-mm flowmeters: 1¼" x 5½" x 2⅜" (3.2 x 14.0 x 6.0 cm)
150-mm flowmeters: 1¼" x 9 13/16" x 2⅜" (3.2 x 24.9 x 6.0 cm)

Materials of Construction

Part	Aluminum	316 SS
Frame, fittings, valves	Aluminum	316 SS
O-rings	Buna N	Viton®
Flowtube	Borosilicate glass	

65-mm Flowmeters

Max flow rate (mL/min)†							Float(s)‡	Aluminum		316 SS	
H_2O	Air	O_2	N_2	H_2	He	CO_2		Cat. no.	Price	Cat. no.	Price
Single-float flowmeters											
0.54	50	49	53	102	49	61	G	TW-32463-00		TW-32463-02	
1.23	100	91	106	254	97	115	G	TW-32463-08		—	—
1.28	150	136	159	381	145	172	S	TW-32463-12		TW-32463-14	
6.00	400	368	420	1080	440	408	G	TW-32463-20		TW-32463-22	
30	1175	1116	1210	3748	1997	1046	S	TW-32463-32		TW-32463-34	
55	2500	2375	2550	9525	6725	2025	G	TW-32463-40		TW-32463-42	
146	5000	4750	5100	19,050	13,450	4050	SS	TW-32463-48		TW-32463-50	
240	10,000	9500	10,200	38,100	26,900	8100	G	TW-32463-56		TW-32463-58	
545	20,000	19,000	20,400	96,200	53,800	16,200	S	TW-32463-64		TW-32463-66	
1380	44,425	42,204	45,313	169,259	119,503	35,984	SS	TW-32463-72		—	—

150-mm Flowmeters

Max flow rate (mL/min)†							Float(s)‡	Aluminum		316 SS	
H_2O	Air	O_2	N_2	H_2	He	CO_2		Cat. no.	Price	Cat. no.	Price
Single-float flowmeters											
0.55	50	48	53	102	48	61	G	TW-32464-00		TW-32464-02	
2.15	155	141	164	393	150	178	S	TW-32464-12		TW-32464-14	
5.4	295	271	312	776	310	312	SS	TW-32464-16		TW-32464-18	
23	850	807	867	2584	1334	782	SS	TW-32464-24		TW-32464-26	
27.7	1150	1092	1173	3680	1955	1023	S	TW-32464-28		TW-32464-30	
75	2950	2802	3009	11,239	7935	2389	S	TW-32464-36		TW-32464-38	
126	4550	4322	4641	17,335	12,239	3685	S	TW-32464-40		TW-32464-42	
210	6800	6460	6936	25,908	18,292	5508	SS	TW-32464-44		TW-32464-46	
565	19,050	18,097	19,431	72,580	51,244	15,430	SS	TW-32464-52		TW-32464-54	
1415	46,200	43,890	47,124	176,022	124,278	37,422	SS	TW-32464-60		TW-32464-62	
2200	72,600	68,970	74,052	276,606	195,294	58,806	T	TW-32464-64		TW-32464-66	
Dual-float flowmeters											
2.5	152	142	156	340	153	167	G/SS	TW-32466-00		TW-32466-02	
5.4	290	260	300	640	290	300	G/SS	TW-32466-04		TW-32466-06	
22.2	870	820	895	2175	1435	790	G/SS	TW-32466-08		TW-32466-10	
47.5	1700	1610	1745	5100	3535	1490	G/SS	TW-32466-12		TW-32466-14	
125	4430	4170	4500	15,060	9600	3800	G/SS	TW-32466-16		TW-32466-18	
188	6500	6150	6650	23,400	14,600	5600	G/SS	TW-32466-20		TW-32466-22	
500	17,000	16,000	17,250	64,250	38,600	14,200	G/SS	TW-32466-24		TW-32466-26	

†Minimum flow rate is approximately 10% of the maximum flow rate using a single-float and 5% using a dual-float.
‡Float material key: G = glass, S = sapphire, SS = stainless steel, and T = tantalum.

65-mm flowmeter
32463-40
shown with
tripod base
32465-50

Tripod Base

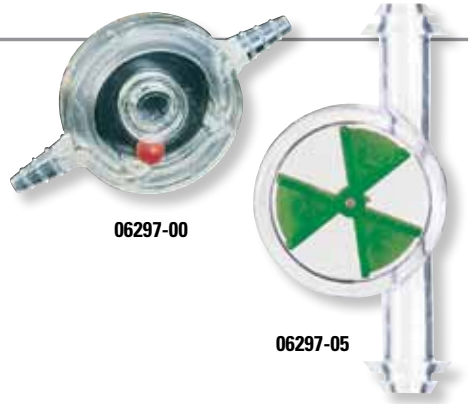
TW-32465-50 **Tripod base** mounts one flowmeter. Includes mounting bracket, leveling screws, and spirit level

Flow Indicators for Liquids and Gases

An inexpensive way to visually monitor flow of liquids and gases

Indicators give visual confirmation of flow through a clear polystyrene housing. All models can be used with noncorrosive liquids and gases. Connect tubing to indicators via hose barb connections; model 06297-05 has straight ends. All models are pressure rated to 10 psig.

Catalog number	Flow range (L/min)	Tubing ID	Indicator type (PP)	Max fluid temperature	Price
TW-06297-00	0.2 to 6.5	1/4" to 3/8"	Ball	125°F (50°C)	
TW-06297-05	0.5 to 10.0	1/4"	Paddle	150°F (65°C)	
TW-06297-06	0.5 to 10.0	3/16" to 1/4"	Paddle	150°F (65°C)	
TW-06297-07	0.5 to 10.0	1/4" to 7/16"	Paddle	150°F (65°C)	



06297-00

06297-05

Sight Flow Transmitters

Output signal for local and remote indication

These sight flow sensors are designed for low-cost applications where visual indication and sensing output signals are required—available with 4 to 20 mA, pulse, relay, or 0 to 5 VDC output. Durable polypropylene body is compatible with a variety of fluids. Sensors offer a flow measuring accuracy of ±2% full-scale, and are capable of handling pressures up to 150 psig and temperatures up to 150°F (66°C).

Specifications

Wetted materials: glass-filled polypropylene casing, clear polycarbonate cover, Buna N seal, acetal copolymer turbine, PEEK bearing, stainless steel shaft

Measuring accuracy: ±2% full-scale

Repeatability: ±0.5% full-scale

Process connection: ½" NPT(F)

Electrical connection: 3-wire pigtail, 12 ft (3.6 m)

Turndown ratio: 10:1

Max pressure: 150 psig (10.3 bar)

Operating temp: 20 to 150°F (–7 to 66°C)

Standard calibration media: tap water at 70°F (21°C)

Dimensions (W x H x D): 3¾" x 3½" x 2½" (9.5 x 9 x 6.3 cm)

Catalog number	Output type	Flow range	Power	Price
TW-32825-00 TW-32825-02 TW-32825-04	4 to 20 mA	0.5 to 5 GPM 1 to 10 GPM 1.5 to 15 GPM	12 to 35 VDC	
TW-32825-06 TW-32825-08 TW-32825-10	Pulse	0.5 to 5 GPM 1 to 10 GPM 1.5 to 15 GPM	5 to 24 VDC	
TW-32825-12 TW-32825-14 TW-32825-16	Relay	0.5 to 5 GPM 1 to 10 GPM 1.5 to 15 GPM	12 to 35 VDC	
TW-32825-18 TW-32825-20 TW-32825-22	0 to 5 VDC	0.5 to 5 GPM 1 to 10 GPM 1.5 to 15 GPM	12 to 35 VDC	

32825-00

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: ⅛" 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	2⅜"L x 3⅞"H x 1¼"D (6.0 x 9.8 x 3.2 cm)
Models 100 mL/min to 10 LPM	2⅜"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 4⅜"H x 1⅝"D (10.2 x 11.1 x 4.1 cm)
Models 250 LPM to 1000 LPM	4"L x 5½"H x 1⅝"D (10.2 x 14.0 x 4.1 cm)
Set point module	2⅜"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.

REQUIRED SYSTEM Components

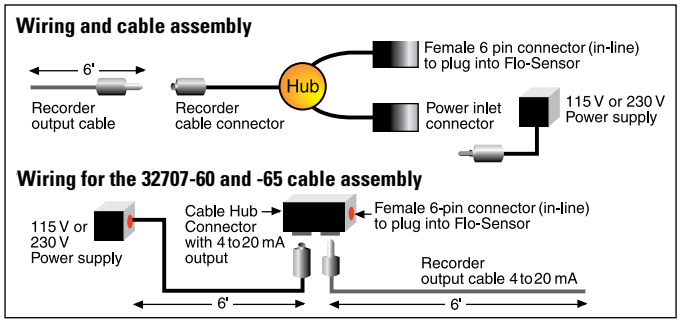
1 Flowmeter
2 Power supply/cable

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: ⅛" compression fittings
Models 32707-12 , -14 and 32707-32, -34: ¼" compression fittings
Models 32707-16, -36, 32711-36, and -40, and 32712-36, and -40: ⅜" compression fittings
Models 32711-44 to -52 and 32712-44 to -52: ½" compression fittings
Dimensions (W x H x D) not including fittings
Models 32707-00 to -36: 1⅞" x 3½"† x 1" (4.8 x 8.9 x 2.5 cm);
Models 32711-36 to -44 and 32712-36 to -44: 4½" x 4"† x 1¼" (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)

Flow rate	Pressure drop (max flow)	Without display Cat. no.‡	Price	With 3½-digit LCD Cat. no.‡	Price
1 Flowmeters with acetal fittings					
0 to 20 sccm	1" H_2O	TW-32707-00		TW-32707-20	
0 to 50 sccm	1" H_2O	TW-32707-02		TW-32707-22	
0 to 100 sccm	2" H_2O	TW-32707-04		TW-32707-24	
0 to 200 sccm	2" H_2O	TW-32707-06		TW-32707-26	
0 to 500 sccm	2" H_2O	TW-32707-08		TW-32707-28	
0 to 1000 sccm	3" H_2O	TW-32707-10		TW-32707-30	
0 to 2 sL/min	3" H_2O	TW-32707-12		TW-32707-32	
0 to 5 sL/min	3" H_2O	TW-32707-14		TW-32707-34	
0 to 10 sL/min	10" H_2O	TW-32707-16		TW-32707-36	
1 Flowmeters with stainless steel fittings					
0 to 20 sL/min	3" H_2O	TW-32711-36		TW-32712-36	
0 to 50 sL/min	10" H_2O	TW-32711-40		TW-32712-40	
0 to 100 sL/min	10" H_2O	TW-32711-44		TW-32712-44	
0 to 500 sL/min	50" H_2O	TW-32711-52		TW-32712-52	

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



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.

Description	115 VAC models Cat. no.	Price	230 VAC models 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

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 (N_2) 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.

1
32708-04

1
32708-26

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).

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:
⅛" acetal compression fittings
Models from 5 and 10 sL/min:
¼" 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)

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	

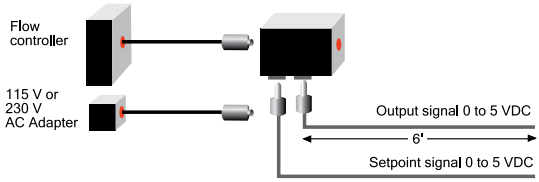
†Typical inlet pressure

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

Wiring for the 32708-50 and -55 Power Supply/Input/Output Cable



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

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

ISO9001:2008 CERTIFIED SUPPLIER CE For GASES

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)

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	

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

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

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 3½-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

ISO9001:2008 CERTIFIED SUPPLIER

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: ¼" compression fittings
100 and 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: 3" x 5⅝" x 1" (7.6 x 14.3 x 2.5 cm)
Models up to 100 sL/min: 4⅛" x 6" x 1¼" (10.5 x 15.2 x 3.2 cm)
Models up to 200 sL/min: 6⅝" x 6⅝" x 1¾" (16.8 x 16.8 x 4.4 cm)
Models up to 500 sL/min: 7¼" x 7⅝" x 3" (18.4 x 19.4 x 7.6 cm)
Models up to 1000 sL/min: 7 5/16" x 8⅝" 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	
0 to 20 sccm		TW-32648-02	TW-32649-02	TW-32654-02	TW-32657-02		TW-32648-52	TW-32649-52	TW-32654-52	TW-32657-52	
0 to 50 sccm		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	
0 to 200 sccm		TW-32648-08	TW-32649-08	TW-32654-08	TW-32657-08		TW-32648-58	TW-32649-58	TW-32654-58	TW-32657-58	
0 to 500 sccm		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	
0 to 2 sL/min		TW-32648-14	TW-32649-14	TW-32654-14	TW-32657-14		TW-32648-64	TW-32649-64	TW-32654-64	TW-32657-64	
0 to 5 sL/min		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	
0 to 30 sL/min	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	
0 to 100 sL/min	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	
0 to 500 sL/min	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

ISO9001:2008 CERTIFIED SUPPLIER CE For GASES

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	
		Cat. no.	Cat. no.	Cat. no.	Cat. no.		Cat. no.	Cat. no.	Cat. no.	Cat. no.	
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	
0 to 20 sccm		TW-32660-02	TW-32660-28	TW-32660-54	TW-32660-80		TW-32661-02	TW-32661-28	TW-32661-54	TW-32661-80	
0 to 50 sccm		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	
0 to 200 sccm		TW-32660-08	TW-32660-34	TW-32660-60	TW-32660-86		TW-32661-08	TW-32661-34	TW-32661-60	TW-32661-86	
0 to 500 sccm		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	
0 to 2 sL/min		TW-32660-14	TW-32660-40	TW-32660-66	TW-32660-92		TW-32661-14	TW-32661-40	TW-32661-66	TW-32661-92	
0 to 5 sL/min		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	TW-32661-97	
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	—	—	—	
0 to 1000 sL/min		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

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.

ISO 9001:2008 CERTIFIED SUPPLIER CE

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 controller 32668-16

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.

Specifications

ISO 9001:2008 CERTIFIED SUPPLIER CE For GASES

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 1⅞" (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		—	—	—	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	1.1 psi	—	—	TW-32676-16	—	—	
0 to 15 sL/min	2.2 psi	TW-32668-20	—	—	—	—	

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	

Thermal Noninvasive Ultra Low-Flow Flowmeters

Nano-and micro-flow measurements for precision laboratory applications

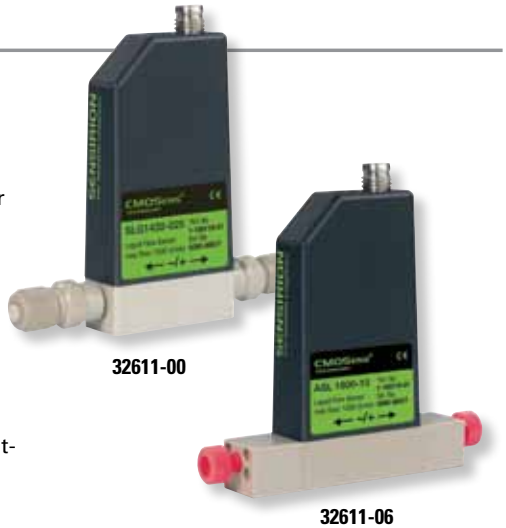
- Resolutions down to 500 pL/min

These liquid mass flowmeters enable extremely fast and accurate measurements of ultra-low liquid mass flows, and operate with total media isolation, very little dead volume, and no moving parts. CMOSens® sensor technology combines a high-precision thermal sensor element with digital signal processing on one single CMOS chip. In addition, the digital intelligence of the CMOSens sensor technology enables digital interfaces that permit an easy link with PCs, PLC, and other controllers.

All measurement data is fully calibrated and temperature compensated by means of an internal microcontroller. Excellent chemical resistance and bio-compatibility are ensured, and the process medium only gets in contact with the straight sensor capillary. The process medium only gets into contact with the straight sensor capillary, the PEEK fittings, and (for models 32611-06 to -10) PTFE as a sealing material.

Models 32611-00 to -08 are calibrated for water only. Superior repeatability of the measurement signal is still maintained for other media and thus allows after-measurement-correction on a computer or microcontroller. **Model 32611-10** is calibrated for IPA only but can also be used for repeatable measurements of other hydrocarbons such as ethanol, acetone, diesel, petroleum, ether, and most other media; however it does not work with aqueous solutions.

What's included: Models 32611-00 to -04: PC software, 2 µm in-line filters (model -00 only), OD360 PEEK® capillaries, RS-232 data cable, and AC adapter for 110 to 230 VDC. Models 32611-06 and -08: PC software, UNF 10-32 fitting, barb and luer connectors, RS-232 data cable, and AC adapter for 110 to 230 VDC. Model 32611-10: pigtail cable, fittings for 1/8" OD plastic tubing, and barb and luer connectors.



32611-00

32611-06

32611-10

Specifications

Accuracy at ≥calibrated min flow
Models 32611-00 to -04: 10% of measured value
Models 32611-06 to -08: 3% of measured value
Model 32611-10: 10% of measured value

Operating temperature
Models 32611-00 to -04: 50 to 113°F (10 to 45°C)
Models 32611-06 to -08: 32 to 140°F (0 to 60°C)
Model 32611-10: 50 to 104°F (10 to 40°C)

Fittings: PEEK

Catalog number	Calibrated flow range	Resolution	Max pressure drop	Internal sensor capillary	Process connection	Power supply	Electrical connection	Output	Price
TW-32611-00	50 to 1500 nL/min	0.5 nL/min	22 psi (1.5 bar)	Fused silica	Micro fitting for 360 µm capillaries	7 to 18 VDC	4-pin M8	RS-232	
TW-32611-02	250 to 7000 nL/min	1.5 nL/min	0.7 psi (0.05 bar)						
TW-32611-04	1 to 40 µL/min	7 nL/min	0.3 psi (0.02 bar)						
TW-32611-06	40 to 1000 µL/min	1.5 µL/min at max flow	<0.01 psi (1 mbar)	Borosilicate glass	UNF 10-32	7 to 18 VDC	4-pin M8	RS-232	
TW-32611-08	200 to 4000 µL/min	5 µL/min at max flow	<0.01 psi (1 mbar)						
TW-32611-10	0 to 80 mL/min	—	0.6 psi (40 mbar)	Borosilicate glass	¼–28	16 to 26 VDC	8-pin M8	0 to 10 VDC	

Digital Gas Mass Flowmeters

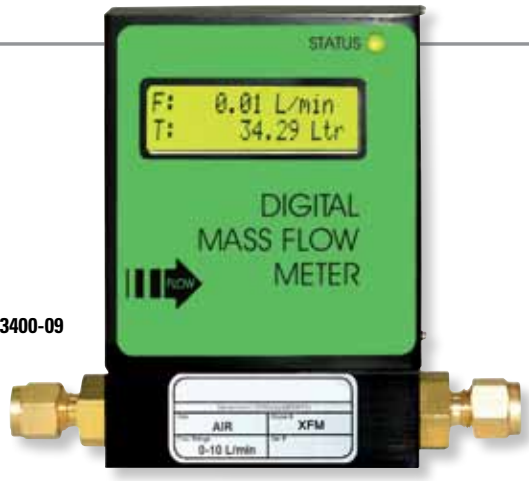
Store calibration data for up to 10 gases

- 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 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.



33400-09

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

ISO 9001:2008 CERTIFIED SUPPLIER CE For GASES

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: 3⅛" 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

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

REQUIRED SYSTEM Components

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

32700-00

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).

32700-12

32700-18

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)

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"	10 psi	
TW-32700-02	40 to 200 mL /min	1/4"		
TW-32700-04	100 to 500 mL /min	1/4"		
TW-32700-06	0.2 to 1 LPM	1/4"	10 psi	
TW-32700-08	0.4 to 2 LPM	1/4"		
TW-32700-10	1 to 5 LPM	1/4"		
TW-32700-12	2 to 10 LPM	3/8"	10 psi	
TW-32700-14	4 to 20 LPM	3/8"		
TW-32700-16	10 to 50 LPM	3/8"		
TW-32700-18	20 to 100 LPM	3/8"	10 psi	
TW-32700-20	40 to 200 LPM	1/2"		
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

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.

32706-72

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

Liquid or Gas Turbine Flowmeters/Transmitters

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

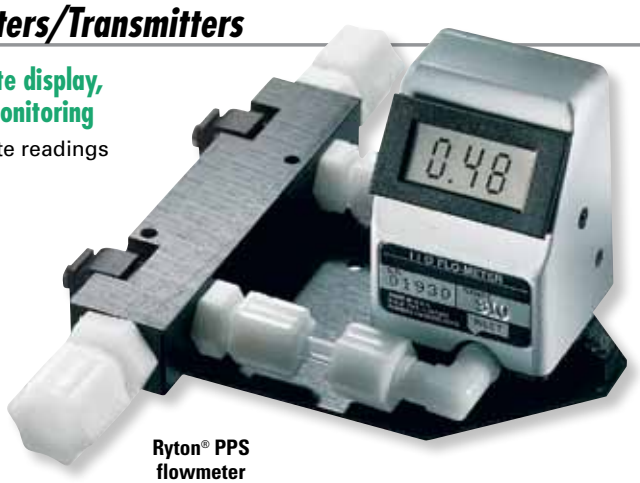
- The 3½-digit LCD provides direct flow rate readings

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, ⅞"H

Output signal: 0 to 5 VDC

Input power: 12 VDC

Dimensions (W x H x D):
1⅞" x 3" x 1¾" (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	⅛"	10 psi	TW-32709-50		TW-32709-70	
20 to 200 mL/min	¼"		TW-32709-52		TW-32709-72	
50 to 500 mL/min	¼"		TW-32709-54		TW-32709-74	
0.1 to 1 L/min	¼"	6 psi	TW-32709-56		TW-32709-76	
0.2 to 2 L/min	¼"	10 psi	TW-32709-58		TW-32709-78	
0.5 to 5 L/min	⅜"	6 psi	TW-32709-60		TW-32709-80	
Flowmeters for air						
20 to 100 mL/min	⅛"	10 psi	TW-32709-02		TW-32709-22	
40 to 200 mL/min	⅛"		TW-32709-04		TW-32709-24	
100 to 500 mL/min	⅛"	10 psi	TW-32709-06		TW-32709-26	
0.2 to 1 L/min	⅛"		TW-32709-08		TW-32709-28	
0.4 to 2 L/min	¼"		TW-32709-10		TW-32709-30	
1 to 5 L/min	¼"	10 psi	TW-32709-12		TW-32709-32	
2 to 10 L/min	¼"		TW-32709-14		TW-32709-34	
4 to 20 L/min	⅜"		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**

Adjustable Flow Switches for Liquids and Gases

F Liquid Flow Switches for High In-line Pressures

The one-piece magnetic PPS composite piston makes these normally open switches ideal for high pressure applications. Switches withstand up to 1500 psi at 70°F (21°C)! Use a 100 µm filter to protect your switch. Switches include 24 to 26"L leads.

Specifications

Switch: SPST, NO, 20 VA
Max temperature: 275°F (135°C)
Max pressure: 1500 psi at 70°F (10.3 bar at 21°C)
Wetted materials: brass or SS, PPS composite, 316 SS, and fluorocarbon
Connections: 3/8" NPT(M)

Flow setting	Catalog number	Price
Brass switches		
0.25 GPM	TW-32774-30	
0.50 GPM	TW-32774-32	
1.00 GPM	TW-32774-34	
1.50 GPM	TW-32774-36	
2.00 GPM	TW-32774-38	
Stainless steel switches		
0.25 GPM	TW-32774-40	
0.50 GPM	TW-32774-42	
1.00 GPM	TW-32774-44	
1.50 GPM	TW-32774-46	
2.00 GPM	TW-32774-48	

G UL-Approved Liquid Flow Switches for High In-Line Pressures

These high-pressure SPDT switches withstand pressures up to 1000 psi at 225°F (107°C)! They provide reliable and consistent performance; ±1% repeatability. Switches are UL-listed for use in Class I, Division 2, Groups A, B, C, D hazardous environments. Use a 50 µm filter to protect your switch. Switches include 24"L leads.

Specifications

Switch: SPDT, 20 VA
Operating temp: 225°F (107°C)
Operating pressure: 1000 psi at 225°F (68.9 bar at 107°C)
Wetted materials: brass, polysulfone, 316 SS, Viton®, and epoxy
Connections: 1/4" NPT(F)

Flow setting	Catalog number	Price
0.10 GPM	TW-32778-06	
0.25 GPM	TW-32778-08	
0.50 GPM	TW-32778-10	
0.75 GPM	TW-32778-12	
1.00 GPM	TW-32778-14	
1.50 GPM	TW-32778-16	

Adjustable set points trigger SPST contacts rated for 70 VA

- Brass models handle pressures up to 1500 psi

As liquid or gas flows past the switch, it displaces a magnetic piston—this actuates a hermetically sealed reed switch. All flow switches have actuation points for air at 68°F and 14.7 psi with increasing flow. Withstand temperatures from –40 to 220°F. UL-recognized.

A Mini Low-Flow Switches are configured to open the SPST contact when flow goes beyond the set point or stops. Typical applications include gas/liquid sampling, chemical injection, pollution control monitoring, atmospheric furnaces, and process systems.

Specifications

Repeatability: ±2%
Wetted materials
Model 32929-00: brass, epoxy, and Viton®
Model 32929-02: TFE

Connections	Flow range Air (scc/min)	Flow range Water (cc/min)	Max pressure psi (bar)	Material	Catalog number	Price
1/8" NPT(F)	30.0 to 16,000	1.0 to 500	1500 (103)	Brass	TW-32929-00	
			80 (5.5)	TFE	TW-32929-02	

A 32929-00

B Standard Low-Flow Switches are normally closed (NC) but can be wired for normally open (NO). Typical applications include chemical process and vapor deposition systems, industrial gas lines, pollution control monitoring, and atmospheric furnaces.

Specifications

Repeatability: ±2%
Wetted materials
Models 32929-10 and -14: brass, epoxy, and Viton®
Models 32929-12 and -16: TFE

Connections	Flow range Air (scc/min)	Flow range Water (cc/min)	Max pressure psi (bar)	Material	Catalog number	Price
1/8" NPT(F)	100 to 20,000	3.0 to 500	1500 (103.4)	Brass	TW-32929-10	
			100 (6.9)	TFE	TW-32929-12	
1/8" NPT(F)	200 to 60,000	5.0 to 950	1500 (103.4)	Brass	TW-32929-14	
			100 (6.9)	TFE	TW-32929-16	

B 32929-10

C Industrial Flow Switches are normally closed (NC) but can be wired for normally open (NO). Typical applications include lubrication, process and fire control, cooling systems, heat pumps, hydraulic lifts, and water treatment.

Specifications

Repeatability: ±2%
Wetted materials: brass, epoxy, and Viton®
Back pressure: 5 psi required for gas applications

Connections	Flow range Air (scfm)	Flow range Water (GPM)	Max pressure psi (bar)	Material	Catalog number	Price
1/4" NPT(F)	0.5 to 50.0	0.1 to 4.0	1500 (103.4)	Brass	TW-32929-20	
3/8" NPT(F)					TW-32929-22	
1/2" NPT(F)	1.0 to 75.0	0.5 to 10.0			TW-32929-24	
3/4" NPT(F)	5.0 to 120	1.0 to 20.0			TW-32929-26	

C 32929-22