358 Series M mass flow meters

Multi-parameter laminar mass flow meters from 0.5 smL/min to 5 smL/min full scale

The M meter measures gas mass flow and also reports volumetric flow, pressure and temperature on its display. It stores 98 gases and 20 user mixes, so one instrument serves many processes. RS-232 and Modbus RTU are standard; analogue outputs and fieldbus interfaces are options.



5 smL/min	0.01–100 %	< 1 ms	98	11.0 bar a
Largest full scale; the smallest is 0.5 smL/min	Flow measurement range of full scale	Sensor response time	Stored gases, plus 20 user-defined mixes	Maximum operating pressure (160 psia)

Performance

Reference conditions	Standard 21.11 °C, normal 0 °C, at 1013.25 mbar; configurable
Accuracy [1]	±(0.8 % rd + 0.2 % FS)
High-accuracy option [1]	5 smL/min: ±(0.4 % rd + 0.2 % FS)
Repeatability (2σ)	±(0.2 % rd + 0.02 % FS)
Flow measurement range	0.01–100 % FS
Turndown ratio	10 000:1
Indication response	Typically < 10 ms, flow rate dependent
Sensor response	< 1 ms
Warm-up time	Typically < 1 s
Temperature sensitivity	Zero and span 0.02 % FS/°C from 25 °C
Pressure sensitivity	Zero and span ±(0.08 % rd + 0.02 % FS)/atm from calibration conditions
Pressure accuracy [1]	Above 1 atm: ±0.5 % rd Below 1 atm: ±4.8 mbar (±0.07 psia)
Temperature accuracy	±0.75 °C
Totaliser	±0.1 % rd additional uncertainty

Operating conditions

Operating pressure	0.79–11.0 bar a (11.5–160 psia)
Damage limits	Line: above 13.8 bar a (200 psia) Rapid change: above 5.17 bar (75 psid)
Temperature	−10 to 60 °C, ambient and gas
Humidity	0–95 % non-condensing

Mechanical

Wetted materials	Stainless steel 302, 303, 304, 316L; FKM, alumina ceramic, glass, gold, silicon, polyamide Heat-cured epoxy and silicone rubber
Ingress protection	IP40
Mounting holes	2× 8-32 UNC, 4.45 mm deep

Electrical and communication

Analogue outputs	4–20 mA, 0–5 V DC, 1–5 V DC or 0–10 V DC; adds ±0.1 % FS uncertainty
Digital I/O	Standard: RS-232 and Modbus RTU Options: RS-485, Modbus TCP/IP, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS, PROFINET, IO-Link
Connector	6-pin locking, 8-pin mini-DIN, 8-pin M12, DB-9 or DB-15; custom pinouts: ask Analyt-MTC
Supply [2]	0–5 V DC output: 9–24 V DC, 40 mA 0–10 V DC output: 12–28 V DC, 40 mA 4–20 mA output: 12–28 V DC, 40 mA
Update rates [2]	Digital: 40 Hz at 19 200 baud Analogue: 1 kHz; display: 10 Hz

Display and gases

Display	Monochrome LCD or colour TFT, touchpad; shows mass and volumetric flow, pressure, temperature
Gas library	98 gases, properties matched to NIST REFPROP 10 across the operating range
Gas mixes	20 user mixes of up to 5 gases, 0.01 % resolution

Ranges, pressure drop, connections (21.11 °C, 1013.25 mbar)

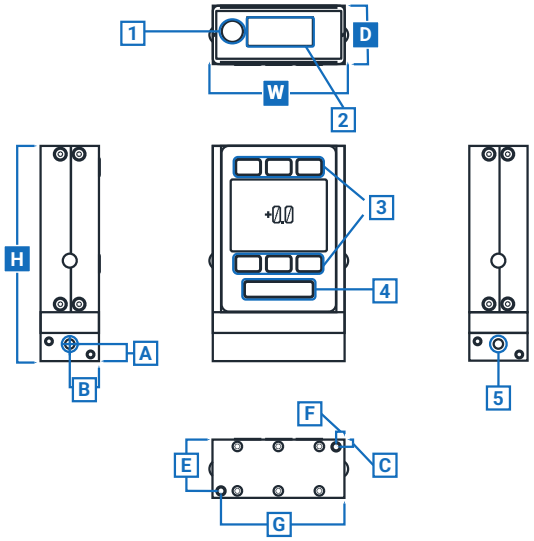
Full scale	Δp, mbar	psid	Process connection
0.5–5 smL/min	69	1.0	M5 female

Δp at full scale, outlet venting to atmosphere; for a lower Δp, ask Analyt-MTC. M5 ports: 10-32 compatible, shipped with Buna-N O-ring face-seal adapters to 1/8" female NPT.

Standard versions, air (21.11 °C, 1013.25 mbar)

Full scale	Order code
0.5 smL/min	35800
1 smL/min	35801
2 smL/min	35802
5 smL/min	35803

Order from Analyt-MTC with the order codes. Calibrated for air; another gas or a gas mix is selected on the meter. For any other version, contact Analyt-MTC.



1 DC power input
2 Input and output port
3 Controls
4 Backlight switch
5 Process connection

Top view; two side views and the front view; bottom view with mounting holes. The table gives the dimensions.

Options and accessories

High-accuracy calibration, 5 smL/min (see Accuracy)	
Weatherproof housing	
Compression, face-seal, push-to-connect, BSPP or SAE connections	
Swagelok®-compatible tube, VCO® or VCR® connections	
Universal benchtop baseplate	35780
RS-232 cable, 8-pin mini-DIN to DB-9, 1.8 m	35754
USB to RS-232 adapter	35782
Inline filter, 1/8" NPT, 20 µm	ILF-1/8-20
Rugged transport case	1200-000-110E

Dimensions, mm and kg (21.11 °C, 1013.25 mbar)

Full scale	H	W	D	A	B	C	E	F	G	kg
0.5–5 smL/min	99.0	60.3	26.7	8.5	13.3	3.2	23.5	3.8	56.5	≈ 0.4

Notes

1. rd = of reading, FS = of full scale. Accuracy holds after tare at equilibrium and includes repeatability and linearity. sL/min and smL/min at 21.11 °C, 1013.25 mbar.
2. Fieldbus versions differ in supply and data rates; ask Analyt-MTC for their documentation.

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