358 Series MC mass flow controllers

Multi-gas laminar mass flow controllers from 10 smL/min to 20 sL/min full scale

The MC controller sets and 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 inputs and outputs and fieldbus interfaces are options.



20 sL/min	0.01–100 %	from 30 ms	98	11.0 bar a
Largest full scale; the smallest is 10 smL/min	Steady-state control range of full scale	Typical control response (T63)	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]	±0.6 % rd or ±0.1 % FS, whichever is greater
High-accuracy option [1]	±0.5 % rd or ±0.1 % FS, whichever is greater
Repeatability (2σ)	±(0.1 % rd + 0.02 % FS)
Control range	0.01–100 % FS, steady state
Turndown ratio	10 000:1
Control response (T63), adjustable, flow dependent	As fast as 30 ms
Indication response	Typically < 10 ms, flow rate dependent
Sensor response	< 1 ms
Warm-up time	Typically < 1 s
Temperature sensitivity	Zero: ±0.01 % FS/°C from tare temperature Span: ±0.01 % rd/°C from 25 °C
Pressure sensitivity	Zero: ±0.01 % FS/atm from tare pressure Span: ±0.1 % rd/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

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, 430FR; brass, FKM, alumina ceramic, glass, gold Silicon, polyamide, heat-cured epoxy and silicone rubber
Ingress protection	IP40
Orientation sensitivity	None
Valve	Normally closed
Adapter seal	Buna-N O-ring, face seal

Electrical and communication

Analogue I/O	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
Supply [2]	12–24 V DC, 250 mA; 290 mA with 4–20 mA output
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, set point
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
Totaliser	±0.1 % rd additional uncertainty

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

Full scale	Δp, mbar	psid	Process connection
10 smL/min	193	2.8	M5 female
20–50 smL/min	69	1.0	M5 female
100–500 smL/min	69	1.0	1/8" NPT female
1 sL/min	103	1.5	1/8" NPT female

Full scale	Δp, mbar	psid	Process connection
2 sL/min	207	3.0	1/8" NPT female
5 sL/min	138	2.0	1/8" NPT female
10 sL/min	379	5.5	1/8" NPT female
20 sL/min	827	12.0	1/8" NPT female

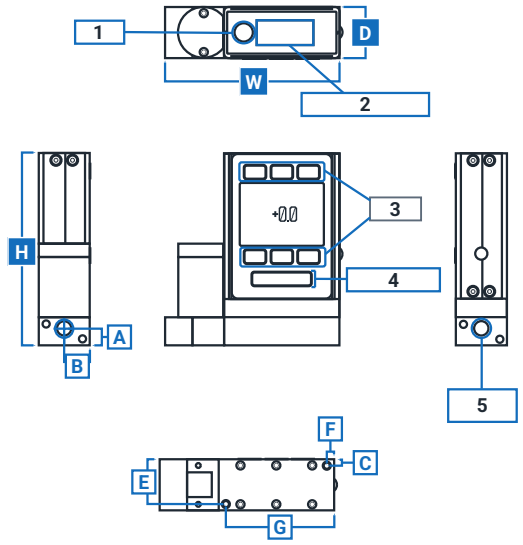
Δp at full scale, standard valve venting air to atmosphere; for a lower Δp, ask Analyt-MTC. M5 ports: 10-32 compatible, shipped with Buna-N O-ring face-seal adapters to 1/8" female NPT.

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

Full scale	Order code
10 smL/min	35824
20 smL/min	35825
50 smL/min	35826
100 smL/min	35827
200 smL/min	35828
500 smL/min	35829

Full scale	Order code
1 sL/min	35830
2 sL/min	35831
5 sL/min	35832
10 sL/min	35833
20 sL/min	35834

Calibrated for air; another gas or a gas mix is selected on the controller. 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, front, side and bottom views of the 10 smL/min to 20 sL/min controllers, with the dimension letters of the table.

Options and accessories

High-accuracy calibration (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	kg	H	W	D	A	B	C	E	F	G	Mounting taps
10–50 smL/min	≈ 0.5	99.0	84.8	26.7	8.5	13.3	3.2	23.5	3.8	56.5	2× 8-32 UNC, 4.45 mm deep
100 smL/min–20 sL/min	≈ 0.5	103.3	91.1	26.7	8.9	13.3	3.2	23.5	3.8	56.5	2× 8-32 UNC, 8.89 mm deep

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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