358 Series MC mass flow controllers

Multi-gas laminar mass flow controllers from 50 sL/min to 5000 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.

5000 sL/min	0.01–100 %	from 30 ms	98	11.0 bar a
Largest full scale; the smallest is 50 sL/min	Widest 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]	±(0.8 % rd + 0.2 % FS)
High-accuracy option [1]	50–500 sL/min: ±(0.4 % rd + 0.2 % FS)
Repeatability (2σ)	±(0.2 % rd + 0.02 % FS)
Control range	50–100 sL/min: 0.01–100 % FS, steady state 250–5000 sL/min: 0.2–100 % FS, steady state
Turndown ratio	50–100 sL/min: 10 000:1 250–5000 sL/min: 500:1
Control response (T63), adjustable, flow dependent	50–100 sL/min: as fast as 30 ms 250–5000 sL/min: as fast as 100 ms
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 tare pressure
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	50–100 sL/min: stainless steel 302, 303, 304, 316L, 430FR; brass 250–5000 sL/min: stainless steel 302, 303, 304, 316L, 410; acetal, nylon All: FKM, alumina ceramic, glass, gold, silicon, polyamide, heat-cured epoxy and silicone rubber
Ingress protection	IP40
Orientation sensitivity	50–100 sL/min: none; 250–5000 sL/min: valve must be upright
Valve	Normally closed

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]	50–100 sL/min: 12–24 V DC, 250 mA 250–1000 sL/min: 24 V DC, 0.5 A; 2000–3000 sL/min: 24 V DC, 1 A 5000 sL/min: 24 V DC, 2 A; 4–20 mA output: add 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, 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)

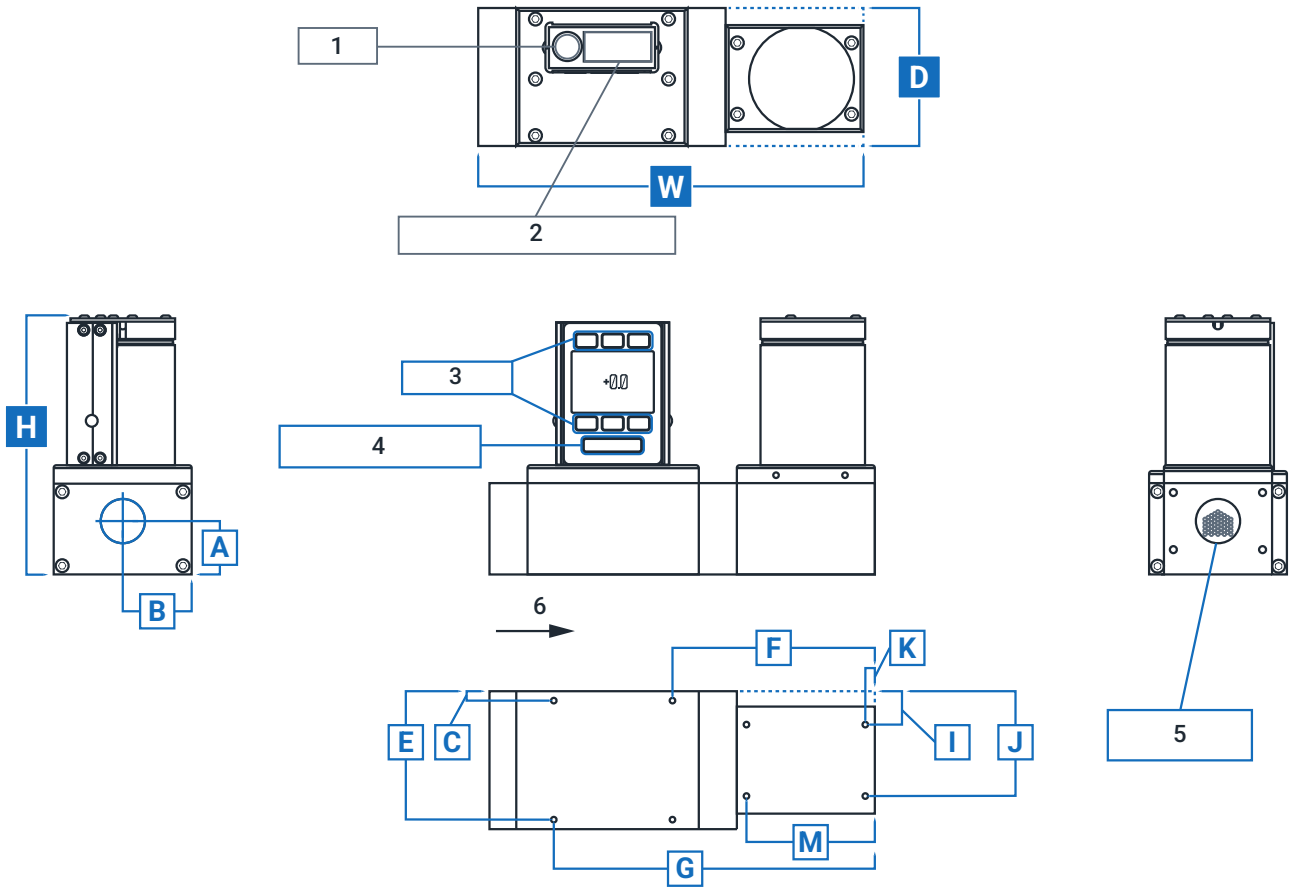
Full scale	Δp, mbar	psid	Process connection
50 sL/min	345	5.0	1/4" NPT female
100 sL/min	1069	15.5	1/4" NPT female
250 sL/min	165	2.4	1/2" NPT female
500 sL/min	448	6.5	3/4" NPT female

Full scale	Δp, mbar	psid	Process connection
1000 sL/min	965	14.0	3/4" NPT female
2000 sL/min	1972	28.6	3/4" NPT female *
3000 sL/min	1158	16.8	1 1/4" NPT female
5000 sL/min	972	14.1	1 1/2" NPT female

Δp at full scale, standard valve venting air to atmosphere; for a lower Δp, ask Analyt-MTC. * 1 1/4" NPT: ask Analyt-MTC.

Model data (21.11 °C, 1013.25 mbar)

Full scale	Weight, kg	Mounting taps
50–100 sL/min	≈ 1.4	4–8× 8-32 UNC, 8.38 mm deep
250 sL/min	≈ 4.1	4–8× 8-32 UNC, 8.38 mm deep
500–1000 sL/min	≈ 4.1	4–8× 8-32 UNC, 8.38 mm deep
2000 sL/min	≈ 5.4	4–8× 8-32 UNC, 8.38 mm deep
3000 sL/min	≈ 5.4	4–8× 8-32 UNC, 8.38 mm deep
5000 sL/min	≈ 12.7	4–8× 8-32 UNC, 8.38 mm deep



1 DC power input
2 Input and output port
3 Controls
4 Backlight switch
5 Process connection
6 Flow direction, valve downstream

Top, front, side and bottom views, shown on a 250 to 3000 sL/min controller. Letters I to M apply to these controllers only.

Dimensions in mm (21.11 °C, 1013.25 mbar)

Full scale	H	W	D	A	B	C	E	F	G	I	J	K	M
50–100 sL/min	110.9	137.4	40.6	12.7	20.3	4.4	36.2	19.1	82.6	–	–	–	–
250 sL/min	139.6	194.3	57.2	28.4	28.6	4.4	36.2	111.8	175.3	9.5	47.6	14.6	78.1
500–1000 sL/min	139.6	184.9	57.2	28.4	28.6	4.4	36.2	102.2	165.7	9.5	47.6	5.1	68.6
2000 sL/min	139.6	205.7	73.7	28.4	36.8	5.1	68.6	108.0	171.5	17.8	55.9	5.1	68.6
3000 sL/min	139.6	226.1	73.7	24.4	36.8	5.1	68.6	128.3	191.8	17.8	55.9	25.4	88.9
5000 sL/min	159.2	248.9	97.5	36.8	48.8	7.5	90.0	151.3	214.8	–	–	–	–

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

Full scale	Order code	Full scale	Order code
50 sL/min	35835	1000 sL/min	35839
100 sL/min	35836	2000 sL/min	35912
250 sL/min	35837	3000 sL/min	35913
500 sL/min	35838	5000 sL/min	35966

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

Options and accessories

High-accuracy calibration, 50–500 sL/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, 1/4" NPT, 40 µm	ILF-1/4-40
Inline filter, 1/2" NPT, 40 µm	ILF-1/2-40
Inline filter, 3/4" NPT, 40 µm	ILF-3/4-40
Rugged transport case	1200-000-110E

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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