358 Series MCW mass flow controllers

Low-pressure-drop laminar mass flow controllers from 250 sL/min to 1000 sL/min full scale

The MCW controller sets and measures gas mass flow at a low pressure drop and also reports volumetric flow, pressure and temperature on its display. It stores 98 gases and 20 user mixes. RS-232 and Modbus RTU are standard; analogue inputs and outputs and fieldbus interfaces are options.



1000 sL/min	0.5–100 %	113.8 mbar	98	4.1 bar a
Largest full scale; the smallest is 250 sL/min	Steady-state control range of full scale	Maximum pressure drop at full scale	Stored gases, plus 20 user-defined mixes	Maximum operating pressure (60 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]	±(0.4 % rd + 0.2 % FS)
Repeatability (2σ)	±(0.2 % rd + 0.02 % FS)
Control range	0.5–100 % FS, steady state
Turndown ratio	200:1
Control response (T63), adjustable	Typically 150 ms
Indication response (T63), adjustable	As fast as 100 ms, flow rate dependent
Sensor response	< 1 ms
Warm-up time	Typically < 1 s
Temperature sensitivity	Zero and span 0.03 % 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: ±0.75 % rd Below 1 atm: ±6.9 mbar (±0.1 psia)
Temperature accuracy	±0.75 °C

Operating conditions

Operating pressure	0.79–4.1 bar a (11.5–60 psia)
Damage limits	Line: above 5.5 bar a (80 psia) Differential: above 690 mbar (10 psid)
Temperature	−10 to 60 °C, ambient and gas
Humidity	0–95 % non-condensing

Mechanical

Wetted materials	Stainless steel 302, 303, 304, 316L, 410; FKM, alumina ceramic, glass, gold, silicon Glass-reinforced polyphenylene sulfide, acetal, nylon, heat-cured epoxy and silicone rubber
Ingress protection	IP40
Orientation sensitivity	Valves must be upright
Valve	Normally closed
Mounting taps	250–500 sL/min: 4× 8-32 UNC, 8.33 mm deep 1000 sL/min: 4× 8-32 UNC, 7.62 mm deep

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]	250–500 sL/min: 24 V DC, 1 A 1000 sL/min: 24–30 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

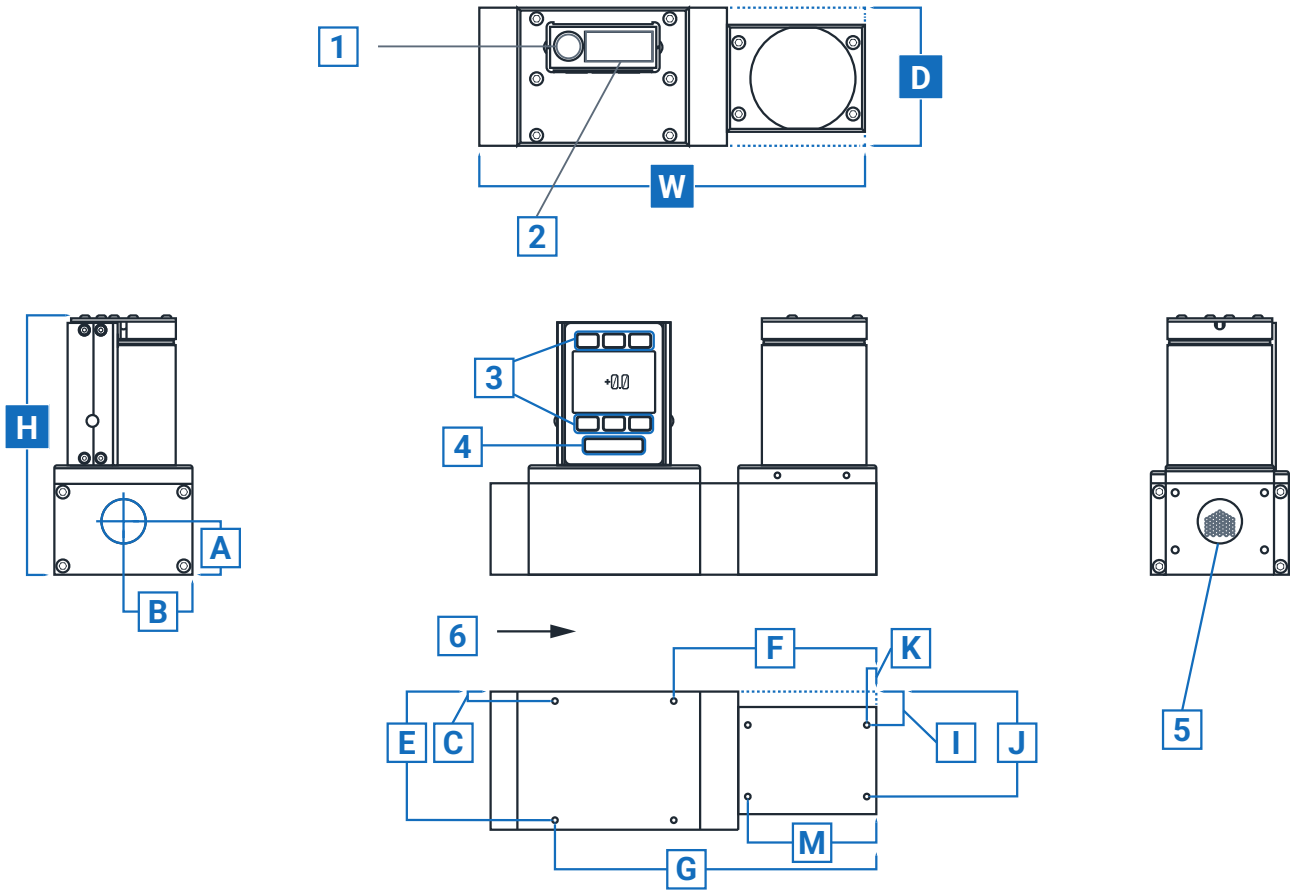
Display and gases

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
250–500 sL/min	47.6	0.69	3/4" NPT female
1000 sL/min	113.8	1.65	2" NPT female

Δp at full scale, venting air to atmosphere.



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 500 sL/min controller. A dash in the table: the letter does not apply.

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

Full scale	kg	H	W	D	A	B	C	E	F	G	I	J	K	M
250 sL/min	≈ 4.1	139.6	184.8	57.2	28.4	28.6	9.5	47.6	116.2	179.7	–	–	–	–
500 sL/min	≈ 5.4	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
1000 sL/min	≈ 12.7	159.2	248.9	114.3	36.8	57.2	15.9	98.4	151.1	214.6	–	–	–	–

Versions, air (21.11 °C, 1013.25 mbar)

Full scale	Order code
250 sL/min	Ask Analyt-MTC
500 sL/min	Ask Analyt-MTC
1000 sL/min	Ask Analyt-MTC

Ask Analyt-MTC for the order code of each full scale.

Options

High-accuracy calibration (see Accuracy)
Weatherproof housing
Compression, face-seal, push-to-connect, BSPP or SAE connections
Swagelok®-compatible tube, VCO® or VCR® connections

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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