358 Series MQ and MBQ mass flow meters

Laminar mass flow meters for line pressures to 22.1 bar a, 50 to 12 000 sL/min full scale

The MQ meter measures gas mass flow and also reports volumetric flow, pressure and temperature. It operates at line pressures up to 22.1 bar a and stores 98 gases and 20 user mixes. The MBQ is the battery-powered portable version.



12 000	0.2–100 %	< 1 ms	98	22.1 bar a
Largest full scale, sL/min; the smallest is 50	Flow measurement range of full scale	Sensor response time	Stored gases, plus 20 user-defined mixes	Operating pressure, full scale (320 psia)

Performance

Reference conditions	Standard 21.11 °C, normal 0 °C, at 1013.25 mbar; configurable
Accuracy [1]	±2 % FS
Repeatability (2σ)	±0.2 % FS
Flow measurement range	0.2–100 % FS
Turndown ratio	500:1
Indication response	Typically < 10 ms, flow rate dependent
Sensor response	< 1 ms
Temperature sensitivity	Zero and span ±0.01 % FS/°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
Totaliser	±0.1 % rd additional uncertainty

Operating conditions

Operating pressure	0.79–22.1 bar a (11.5–320 psia)
Damage limits	Line: above 27.6 bar a (400 psia) Differential: 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	4× 8-32 UNC, 8.38 mm deep

Electrical and communication (MQ)

Analogue outputs [3]	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: 12–24 V DC, 40 mA 4–20 mA output: 12–24 V DC, 80 mA
Update rates [2]	Digital: 40 Hz at 19 200 baud Analogue: 1 kHz; display: 10 Hz

Electrical and communication (MBQ)

Supply	5 V DC, 1 A recommended, from a USB outlet adapter
Battery life	Monochrome display: 18 h Colour TFT display: 8 h User-configurable; depends on contrast
Charging temperature	0–45 °C
Communication	Serial over Micro-USB, power over Micro-USB type B Optional: Bluetooth Low Energy, with a compatible Android or iOS device
Size and weight	The MBQ adds 41.81 mm to the height and 90.72 g to the weight

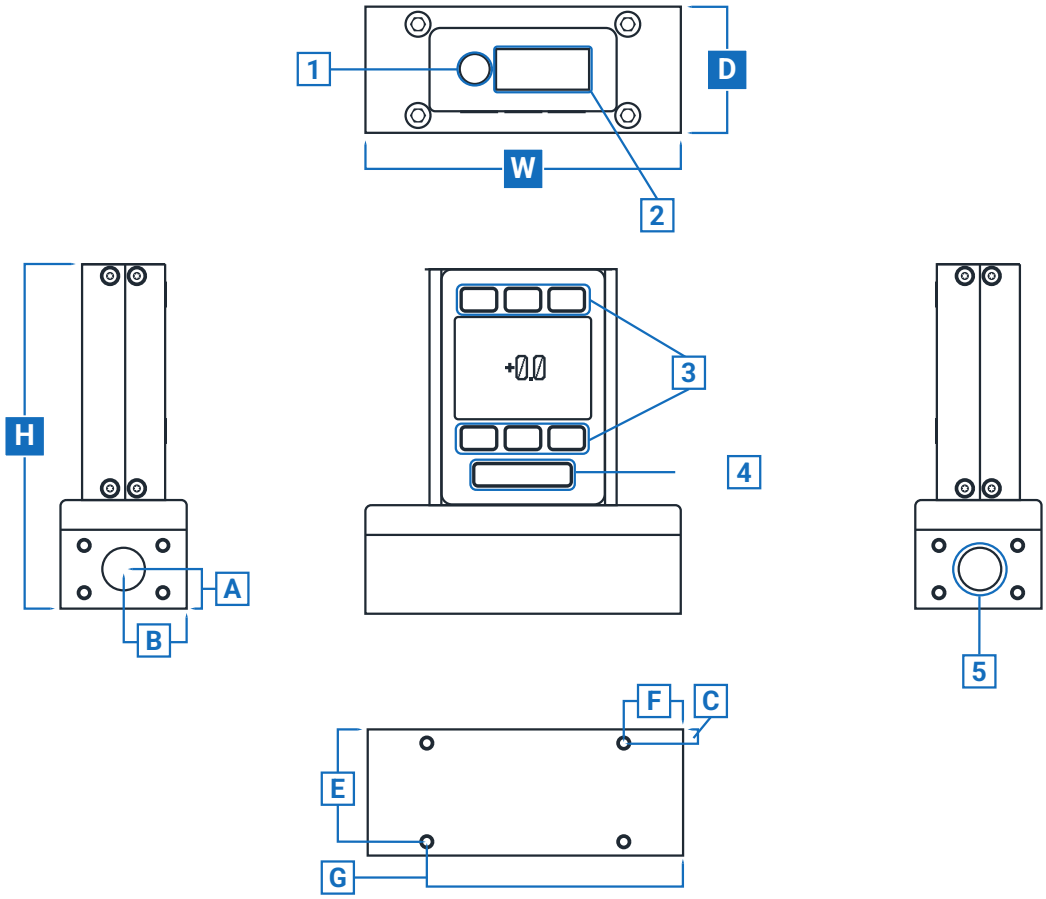
Display and gases

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
50 sL/min	138	2.0	1/4" NPT female
100 sL/min	172	2.5	1/4" NPT female
250 sL/min	145	2.1	1/2" NPT female
500 sL/min	276	4.0	3/4" NPT female
1000 sL/min	414	6.0	3/4" NPT female
2000 sL/min	345	5.0	3/4" NPT female
3000 sL/min	490	7.1	1 1/4" NPT female
5000 sL/min	234	3.4	1 1/2" NPT female
10 000 sL/min	862	12.5	2" NPT female
12 000 sL/min	1055	15.3	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

Top view; two side views and the front view; bottom view with mounting holes. The table gives the dimensions. The MBQ battery section adds 41.81 mm to H.

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

Full scale	W	D	H	A	B	C	E	F	G	kg
50–100 sL/min	101.6	40.6	110.9	12.7	20.3	4.4	36.2	19.1	82.6	≈ 1.1
250 sL/min	101.6	40.6	126.2	20.3	20.3	4.4	36.2	19.1	82.6	≈ 1.1
500 sL/min	101.6	40.6	126.2	20.3	20.3	4.4	36.2	19.1	82.6	≈ 1.6
1000 sL/min	101.6	40.6	126.2	20.3	20.3	4.4	36.2	19.1	82.6	≈ 1.6
2000 sL/min	132.1	73.7	134.3	28.4	36.8	5.1	68.6	34.3	97.8	≈ 2.0
3000 sL/min	132.1	73.7	134.3	24.4	36.8	5.1	68.6	34.3	97.8	≈ 2.0
5000 sL/min	132.1	97.5	159.3	36.8	48.8	7.5	90.0	34.3	97.8	≈ 6.4
10 000–12 000 sL/min	218.4	97.5	173.7	43.2	48.8	7.5	90.0	77.5	141.0	≈ 9.1

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

Full scale	Order code MQ	Order code MBQ
50 sL/min	35815Q	35815BQ
100 sL/min	35816Q	35816BQ
250 sL/min	35817Q	35817BQ
500 sL/min	35818Q	35818BQ
1000 sL/min	35819Q	35819BQ
2000 sL/min	Ask Analyt-MTC	Ask Analyt-MTC
3000 sL/min	Ask Analyt-MTC	Ask Analyt-MTC
5000 sL/min	Ask Analyt-MTC	Ask Analyt-MTC
10 000 sL/min	Ask Analyt-MTC	Ask Analyt-MTC
12 000 sL/min	Ask Analyt-MTC	Ask Analyt-MTC

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.

Options

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.
3. Analogue outputs are not available on the MBQ.

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