358 Series MCW mass flow controllers

Low-pressure-drop laminar mass flow controllers from 10 smL/min to 100 sL/min full scale

The MCW controller sets and measures gas mass flow and also reports volumetric flow, pressure, temperature and set point on its display. Pressure drop at full scale stays at or below 20.7 mbar. RS-232 and Modbus RTU are standard; analogue inputs and outputs and fieldbus interfaces are options.



100 sL/min	0.5–100 %	±0.75 % rd	20.7 mbar	98
Largest full scale; the smallest is 10 smL/min	Steady-state control range of full scale	Accuracy (min. ±0.1 % FS)	Maximum pressure drop at full scale	Stored gases, plus 20 user-defined mixes

Performance

Reference conditions	Standard 21.11 °C, normal 0 °C, at 1013.25 mbar; configurable
Accuracy [1]	±0.75 % rd or ±0.1 % FS, whichever is greater
High-accuracy option [1]	±0.6 % rd or ±0.1 % FS, whichever is greater
Repeatability (2σ)	±(0.2 % rd + 0.02 % FS)
Control range	0.5–100 % FS, steady state
Turndown ratio	200:1
Control response (T63), adjustable	10 smL/min–2 sL/min: typically 30 ms 5–100 sL/min: 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: ±0.03 % 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: ±0.75 % 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; FKM, alumina ceramic, glass, gold, silicon Glass-reinforced PPS, heat-cured epoxy and silicone rubber 10 smL/min–2 sL/min: also 430FR stainless steel and brass 5–100 sL/min: also 410 stainless steel, acetal and nylon
Ingress protection	IP40
Orientation sensitivity	10 smL/min–2 sL/min: none 5–100 sL/min: mount with the valve upright
Valve	Normally closed
Mounting taps	10–20 smL/min: 2× 8-32 UNC, 4.45 mm deep 50 smL/min–2 sL/min: 2× 8-32 UNC, 7.62 mm deep 5–20 sL/min: 4× 8-32 UNC, 9.53 mm deep 40–100 sL/min: 4× 8-32 UNC, 8.33 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]	10 smL/min–2 sL/min: 12–24 V DC, 250 mA 5–100 sL/min: 24 V DC, 1 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

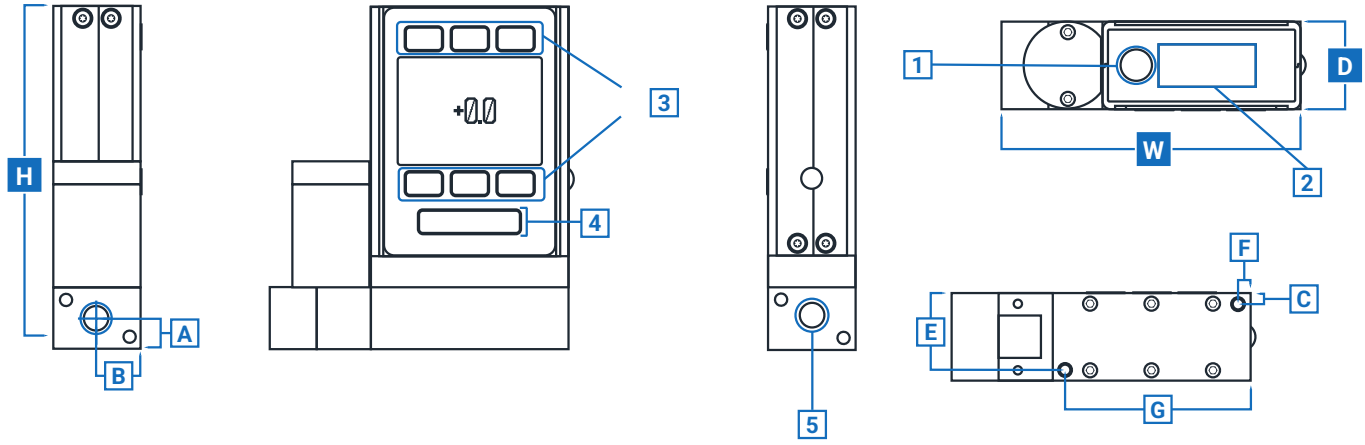
Display	Monochrome LCD or colour TFT, touchpad; shows mass and volumetric flow, pressure, temperature, set point
Gas library	98 gases, properties matched to NIST REFPROP 10 across the operating range
Gas mixes	20 user mixes of up to 5 gases, 0.01 % resolution
Totaliser	±0.1 % rd additional uncertainty

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

Full scale	Δp, mbar	psid	Process connection
10–20 smL/min	4.8	0.07	M5 female
50–500 smL/min	4.8	0.07	1/8" NPT female
1 sL/min	6.9	0.10	1/8" NPT female
2 sL/min	12.4	0.18	1/8" NPT female
5 sL/min	6.9	0.10	1/4" NPT female
10 sL/min	8.3	0.12	1/4" NPT female
20 sL/min	17.9	0.26	1/4" NPT female
40 sL/min	9.7	0.14	1/2" NPT female
50 sL/min	11.7	0.17	3/4" NPT female
100 sL/min	20.7	0.30	3/4" NPT female

Δp at full scale, venting to atmosphere. M5 ports are 10-32 compatible. From 5 sL/min the controller has another valve type and a larger body (see the dimensions).

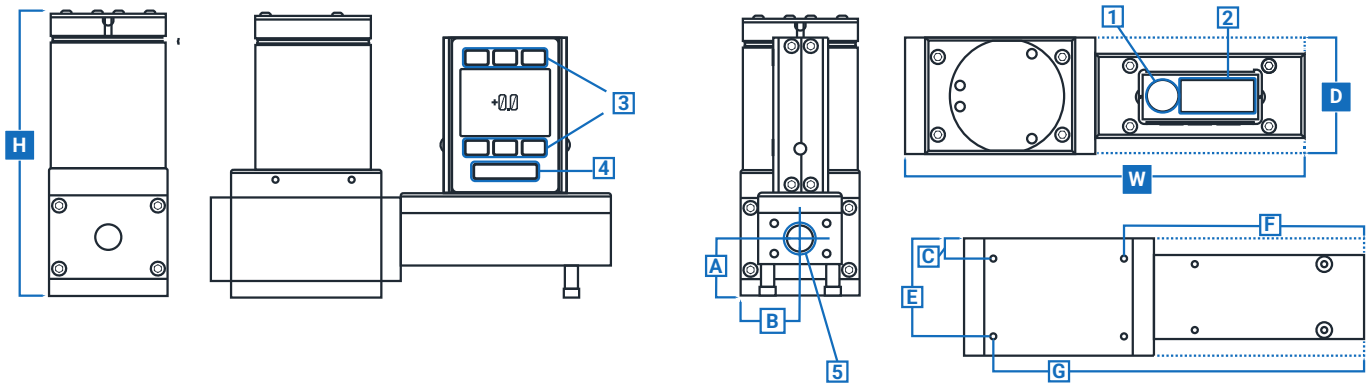
10 smL/min–2 sL/min



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

Top view; front, side and rear views; bottom view with mounting taps. The table gives the dimensions.

5–100 sL/min



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

Top view; front, side and rear views; bottom view with mounting taps. The table gives the dimensions.

Dimensions, mm and kg, 10 smL/min–2 sL/min

Full scale	W	D	H	A	B	C	E	F	G	kg
10–20 smL/min	84.8	26.7	99.0	8.5	13.3	3.2	23.5	3.8	56.5	≈ 0.5
50 smL/min–2 sL/min	91.1	26.7	103.3	8.9	13.3	3.2	23.5	3.8	56.5	≈ 0.5

Dimensions, mm and kg, 5–100 sL/min

Full scale	W	D	H	A	B	C	E	F	G	kg
5–40 sL/min	194.3	57.2	139.6	28.4	28.6	9.5	47.6	116.2	179.7	≈ 4.1
50–100 sL/min	184.8	57.2	139.6	28.4	28.6	9.5	47.6	116.2	179.7	≈ 4.1

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

Full scale	Order code
10 smL/min	35824MLW
20 smL/min	35825MLW
50 smL/min	35826MLW
100 smL/min	35827MLW
200 smL/min	35828MLW
500 smL/min	35829MLW
1 sL/min	35830MLW
2 sL/min	35831MLW
5 sL/min	Ask Analyt-MTC
10 sL/min	Ask Analyt-MTC
20 sL/min	Ask Analyt-MTC
40 sL/min	Ask Analyt-MTC
50 sL/min	Ask Analyt-MTC
100 sL/min	Ask Analyt-MTC

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

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.

ANALYT-MTC Messtechnik GmbH
Sales, service and calibration

www.analyt-mtc.com

German Headquarters
Klosterrunsstraße 18, 79379 Müllheim
+49 7631 5545
info@analyt-mtc.de

French Subsidiary
175 Avenue d'Alsace, 68000 Colmar
+33 3 89 41 47 78
info@analyt-mtc.fr

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