358 Series LC liquid flow controllers

Laminar liquid flow controllers from 0.5 mL/min to 10 L/min full scale, calibrated on water



The LC controller holds a volumetric liquid flow set point and also measures liquid pressure and temperature, all shown on its display. It is calibrated on water; other liquids of similar viscosity need a custom calibration. RS-232 and Modbus RTU are standard; analogue outputs and fieldbus interfaces are options.

10 L/min	±2.0 % FS	0.01–100 %	from 30 ms	6.9 bar g
Largest full scale; the smallest is 0.5 mL/min	Accuracy on water, of full scale	Steady-state control range of full scale	Typical control response (T63)	Pressure sensor range

Performance

Accuracy [1]	±2.0 % of full scale, at calibration conditions
Repeatability	±0.2 % of full scale
Control range [2]	0.01–100 % FS, steady state
Control response (T63)	As fast as 30 ms, flow rate dependent, user adjustable
Indication response [3]	< 10 ms, flow rate dependent
Sensor response	< 1 ms
Warm-up time	< 1 s
Valve	Normally closed
Zero shift	0.02 % FS/°C from tare temperature
Span shift	0.02 % FS/°C from calibration temperature
Pressure sensor range	100 psig (6.9 bar g) full scale; other sensor ranges: ask Analyt-MTC
Pressure accuracy	±0.5 % of full scale
Temperature accuracy	±0.75 °C
Totaliser	±0.5 % rd additional uncertainty

Operating conditions

Minimum operating pressure	Differential pressure must exceed the model's pressure drop (see ranges table)
Damage limits	Common-mode pressure above 13.8 bar g (200 psig) Differential pressure above 5.17 bar (75 psid)
Temperature	−10 to 60 °C, ambient; the liquid must stay liquid at all times
Standard liquid	Ultrapure, highly purified, high-purity, RO or DI water
Other liquids	Compatible with the wetted materials, dynamic viscosity about 0.1–3.0 cP Examples: ethanol, methanol, acetone; custom calibration required

Mechanical

Wetted materials	LC: stainless steel 316L, 303 and 430FR; FKM seals, EPDM or FFKM optional LCS: stainless steel 316L, 303 and 430FR; FFKM seals, EPDM optional LCR: stainless steel 316L, 303, 410 and 430FR; FKM seals, EPDM or FFKM optional LCRS: stainless steel 316L, 303, 410 and 430FR; FFKM seals, EPDM optional
Protection	IP40

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 and Modbus RTU, Modbus TCP/IP, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS
Connector	6-pin locking, 8-pin mini-DIN, 8-pin M12, DB-9 or DB-15; custom pinouts: ask Analyt-MTC
Supply [4]	LC, LCS: 12–30 V DC, 250 mA LCR, LCRS: 24 V DC, 600 mA 4–20 mA output: add 40 mA
Update rates [4]	Digital: 40 Hz at 19 200 baud Analogue: 1 kHz; display: 10 Hz
Display	Monochrome LCD or colour TFT with integrated touchpad; shows volumetric flow, pressure, temperature, set point

Full-scale ranges and pressure drop

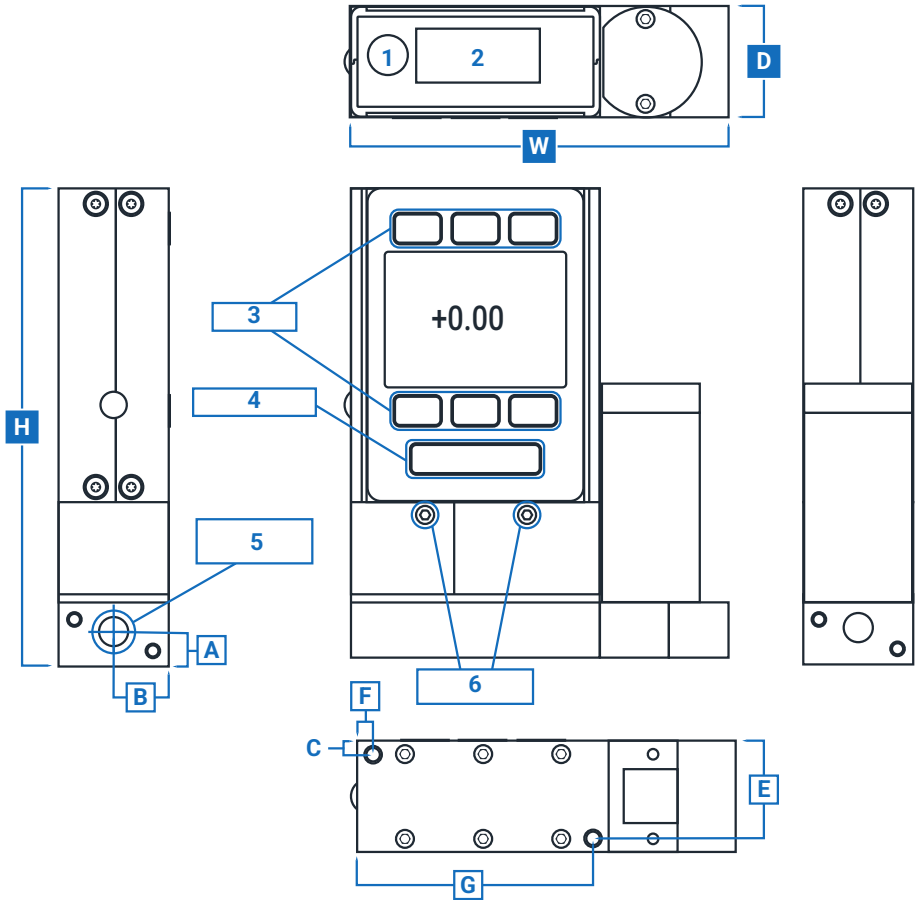
Full scale	Model	Δp, mbar	psid
0.5–1 mL/min	LC, LCS	345	5.0
2 mL/min	LC, LCS	172	2.5
5–100 mL/min	LC, LCS	345	5.0
200–500 mL/min	LC, LCS	517	7.5
1–2 L/min	LCR, LCRS	276	4.0
5 L/min	LCR, LCRS	689	10.0
10 L/min	LCR, LCRS	1724	25.0

Δp at full scale, default valve, water at 25 °C venting to atmosphere.

Model data

Full scale	Model	Process connection	Mounting taps, depth	Weight, kg
0.5–1 mL/min	LC, LCS	M5×0.8 mm female	2× 8-32 UNC, 4.45 mm	≈ 0.5
2 mL/min	LC, LCS	1/8" NPT female	2× 8-32 UNC, 6.35 mm	≈ 0.5
5–100 mL/min	LC, LCS	1/8" NPT female	2× 8-32 UNC, 6.35 mm	≈ 0.5
200–500 mL/min	LC, LCS	1/8" NPT female	2× 8-32 UNC, 6.35 mm	≈ 0.5
1–2 L/min	LCR, LCRS	1/4" NPT female	4× 8-32 UNC, 8.33 mm	≈ 4.1
5 L/min	LCR, LCRS	1/4" NPT female	4× 8-32 UNC, 8.33 mm	≈ 4.1
10 L/min	LCR, LCRS	1/4" NPT female	4× 8-32 UNC, 8.33 mm	≈ 4.1

M5 ports: 10-32 UNF compatible, shipped with two 316L stainless-steel M5 male O-ring face-seal fittings to 1/8" female NPT.



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

Top, front, side and bottom views with dimension letters. LCR controllers use the same letters; the table gives the values for each body size.

Dimensions in mm

Full scale	Model	H	W	D	A	B	C	E	F	G
0.5–1 mL/min	LC, LCS	114.00	84.79	26.67	8.53	13.34	3.18	23.50	28.27	80.98
2–500 mL/min	LC, LCS	118.31	91.14	26.67	8.89	13.34	3.18	23.50	34.62	87.33
1–10 L/min	LCR, LCRS	149.30	194.31	57.15	28.45	28.58	9.53	47.63	14.61	78.11

Standard versions LC and LCS, water

Full scale	LC, order code	LCS, order code
0.5 mL/min	Ask Analyt-MTC	35908
1 mL/min	Ask Analyt-MTC	35909
2 mL/min	Ask Analyt-MTC	35907
10 mL/min	35918	35918S
20 mL/min	35919	35919S
100 mL/min	35875	35875S
200 mL/min	35876	35876S
500 mL/min	35877	35877S

Standard versions LCR, water

Full scale	Order code
1 L/min	35920
2 L/min	35921
5 L/min	35960
10 L/min	35879

Order from Analyt-MTC with the order codes. Calibrated for water. For any other version, contact Analyt-MTC.

Options

Colour TFT display

EPDM or FFKM seals

Custom calibration for other liquids

Compression, face-seal, push-to-connect, BSPP, SAE or Swagelok® connections (tube, VCO®, VCR®)

Notes

1. FS = of full scale, rd = of reading. Specifications apply to water only.
2. Achievable steady-state control may be limited by PID tuning and process conditions; dynamic control is also limited by the control response time.
3. Indication response includes a user-adjustable averaging setting of 1–255 ms.
4. Fieldbus versions differ in supply and data rates; ask Analyt-MTC for their documentation.

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