Aalborg XFM digital mass flow meters

Digital thermal mass flow meters with totaliser, alarms and relays, 5 smL/min to 1000 sL/min N_2 full scale



The XFM is a digital thermal mass flow meter for clean gases. A capillary sensor tube measures the flow. The electronics store calibrations for 10 gases, show 23 flow units, total the flow and switch two relays at alarm limits. Order it with an RS-232, RS-485 or Profibus DP interface.

1000 sL/min	±1 % FS	±0.15 % FS	10	34.47 bar a
Largest full scale in N_2; smallest 5 smL/min	Accuracy at calibration conditions	Repeatability	Gas calibrations stored	Maximum gas pressure, all models (500 psia)

Performance

Accuracy	±1 % FS at calibration temperature and pressure
Repeatability	±0.15 % FS
Response time	600 ms time constant; about 2 s to within ±2 % of the set flow for 25–100 % FS
Temperature coefficient	0.15 % FS/°C or better
Pressure coefficient	0.01 % FS/psi (6.895 kPa) or better
Calibration conditions	101.4 kPa (14.7 psia) and 21.1 °C (70 °F), unless ordered otherwise
Calibrations supplied	One 10-point, NIST-traceable calibration; for up to 9 more, ask Analyt-MTC
Orientation sensitivity	Up to 1 % off the stated accuracy, after re-zeroing

Operating conditions

Maximum gas pressure	34.47 bar a (500 psia), all models; higher pressure seriously damages the flow sensor
Temperature	Gas and ambient 0–50 °C (32–122 °F) −10 to 50 °C (14–122 °F) with dry gases only
Gas humidity	Up to 70 % relative
Medium	Clean gases only. Never use with liquids.
Leak integrity	1 × 10⁻⁹ smL/s helium maximum, to the outside

Mechanical

Wetted materials [3]	Aluminium models: anodised aluminium, brass, 316 stainless steel, FKM O-rings Stainless steel models: 316 stainless steel, FKM O-rings Optional O-rings: Buna-N, EPR or FFKM
Process connections	Per model, see Model data
Installation	On the bench, or screwed down through the base

Electrical and communication

Flow output	0–5 V DC, linear, load 3000 Ω minimum; noise 20 mV peak-to-peak maximum 4–20 mA, linear, loop resistance 500 Ω maximum Jumper selectable
Supply	11–26 V DC; output noise 100 mV peak-to-peak maximum Consumption 200 mA maximum at 12 V DC, 100 mA maximum at 24 V DC
Circuit protection	Reverse-polarity protection; 300 mA resettable fuse on the power input
Digital interface	RS-232 or RS-485; RS-485 addresses up to 256 units on one line Optional Profibus DP with I&M functions
Data over the interface	Flow, CPU temperature, auto zero, totaliser and alarm settings, gas table, conversion factors, units, response compensation, linearisation table
Relays	Two programmable electromechanical SPDT relays, with latch option
Connector [2]	15-pin D-sub

Compliance

Installation category	Installation level II, pollution degree II (IEC 664)
CE, EMC	EMC compliance with 89/336/EEC as amended Emission standard EN 55011:1991, group 1, class A Immunity standard EN 55082-1:1992

Functions and display

Flow units	23: % FS, mL/s, mL/min, mL/h, L/s, L/min, L/h, m³/s, m³/min, m³/h ft³/s, ft³/min, ft³/h, g/s, g/min, g/h, kg/s, kg/min, kg/h lb/s, lb/min, lb/h and one user-defined unit
Totaliser units	% FS·s, mL, L, m³, ft³, g, kg, lb or user-defined
Gas calibrations	Up to 10 gases; conversion factors for 32 gases plus one user-defined factor, for any of the 10
Totaliser	Integrates the flow over time; reset, start at a preset flow, start and stop, read Action at a preset total; off during sensor warm-up
Flow alarms	High and low limits with a delay of 0 to 3600 s; each relay latched or following its alarm
Auto zero	From the push button or the interface; needs absolutely no flow
Diagnostics	Status LED and self-diagnostic tests
Display	Optional 2 × 16 character LCD with adjustable backlight, flow and total together; not with Profibus DP

Models and ranges (N_2, 21.11 °C, 1013.25 mbar)

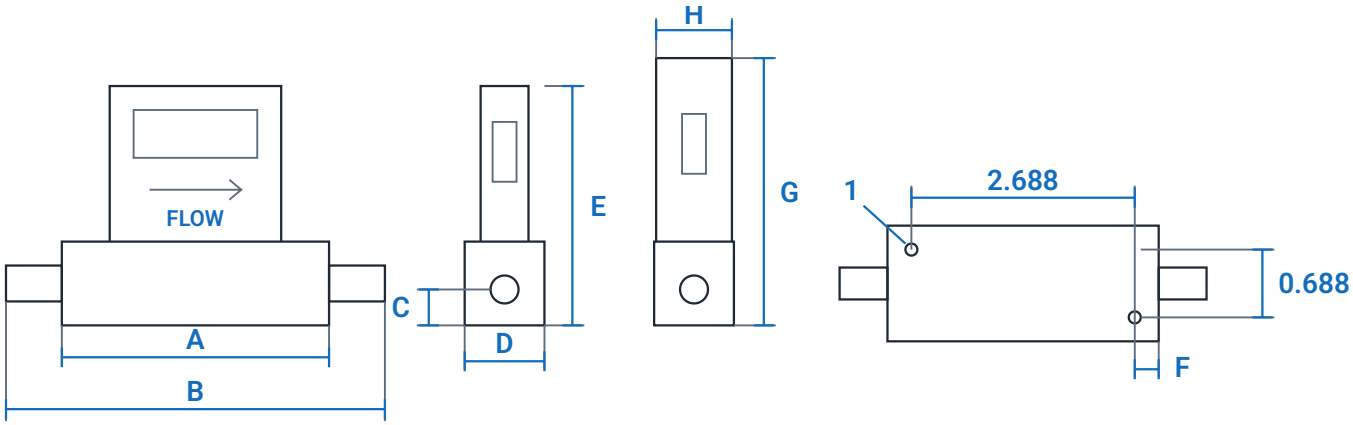
Model	Full-scale ranges (N_2)
XFM 07	5, 10, 20, 50, 100, 200, 500 smL/min
XFM 17	1, 2, 5, 10 sL/min
XFM 37	20, 30, 40, 50 sL/min
XFM 47	60, 80, 100 sL/min
XFM 57	200 sL/min
XFM 67	500 sL/min
XFM 77	1000 sL/min

Model data (N_2, 21.11 °C, 1013.25 mbar)

Model	Largest flow, sL/min	Δp, mmH_2O	Δp, psid	Δp, kPa	Standard connection	Optional connections
XFM 07	0.5	130	0.18	1.275	1/8" compression	1/4" compression
XFM 17	10	130	0.18	1.275	1/4" compression	1/8", 3/8", 6 mm compression; 1/4" VCR
XFM 37	50	2722	3.8	26.2	1/4" compression	3/8", 6 mm compression; 1/4" VCR
XFM 47	100	–	11.8	81.4	3/8" compression	–
XFM 57	200	2720	4.0	27.6	3/8" compression	–
XFM 67	500	3400	5.0	34.5	1/2" compression	–
XFM 77	1000	6120	9.0	62.0	3/4" FNPT	3/4" compression

Δp = maximum pressure drop at the model's largest flow. The ordering code lists the fittings each model takes.

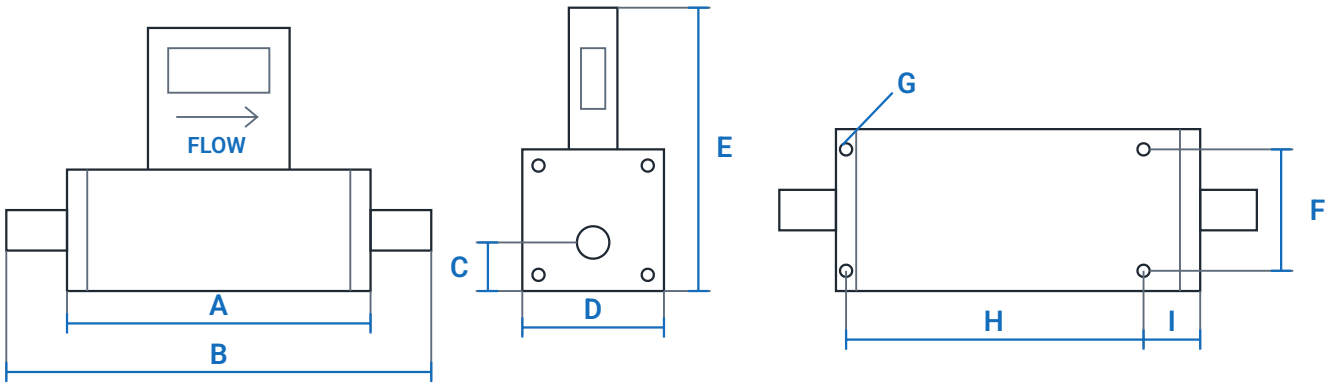
XFM 07, 17, 37 and 47



1 Mounting holes, 2× 6-32 UNC-2B

Front, end and bottom views; on the right of the end view, the Profibus version (H, G). Hole spacing 2.688 and 0.688 in inches, as the source drawing gives it.

XFM 57, 67 and 77



Front, end and bottom views. G marks the four mounting holes; their thread is in the table.

XFM 07 to 47, dimensions in mm

Model	Fitting (tube OD)	A	B	C	D	E	F	H, Profibus	I, Profibus
XFM 07	1/4"	78.6	129.7	12.7	28.6	126.6	4.0	35.9	132.6
XFM 17	1/4"	78.6	129.7	12.7	28.6	126.6	4.0	35.9	132.6
XFM 37	1/4"	104.8	156.0	15.9	31.8	142.4	9.2	38.6	142.4
XFM 47	3/8"	104.8	158.8	15.9	31.8	142.4	9.2	38.6	142.4

XFM 57 to 77, dimensions in mm

Model	Fitting (tube OD)	A	B	C	D	E	F	H	I	Mounting holes
XFM 57	3/8"	169.8	223.7	22.2	44.5	152.0	35.3	119.0	25.4	10-24 UNC
XFM 67	1/2"	184.2	244.3	38.1	76.2	175.2	57.2	171.4	6.4	1/4-20 UNC
XFM 77	3/4"	184.2	–	50.8	101.6	201.2	76.2	171.4	6.4	1/4-20 UNC

Ordering code (N_2, 21.11 °C, 1013.25 mbar)

Position	Code	Meaning
Model	07, 17, 37, 47, 57, 67, 77	Max. flow 0.5, 10, 50, 100, 200, 500, 1000 sL/min
Material	A, S	A aluminium; S stainless steel
Seals	V, B, E, T	V FKM; B Buna; E EPR; T PTFE / FFKM
Fitting	A	1/4" compression (XFM 07, 17, 37)
Fitting	B	1/8" compression (XFM 07, 17)
Fitting	C	1/4" VCR (XFM 17, 37)
Fitting	D	3/8" compression (XFM 17, 37, 47, 57)
Fitting	E	1/2" compression (XFM 67)

Position	Code	Meaning
Fitting	F	3/4" FNPT (XFM 77)
Fitting	G	3/4" compression (XFM 77)
Fitting	H	6 mm compression (XFM 07, 17, 37)
Display	N, L	N no display; L LCD readout
Power	6	Universal 11–26 V DC
Output signal	A, B	A 0–5 V DC; B 4–20 mA
Digital interface	2, 5, 9	2 RS-232; 5 RS-485; 9 Profibus

Example XFM17S-VAL6-A2: XFM 17, stainless steel, FKM seals, 1/4" compression, LCD readout, 11–26 V DC, 0–5 V DC output, RS-232; 5 sL/min N_2, 20 psig.

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

Model	Body	No display, RS-232	LCD, RS-232	No display, Profibus DP
XFM 07	Aluminium	XFM07A-N0	XFM07A-L0	XFM07A-NP
XFM 07	Stainless steel	XFM07S-N0	XFM07S-L0	XFM07S-NP
XFM 17	Aluminium	XFM17A-N0	XFM17A-L0	XFM17A-NP
XFM 17	Stainless steel	XFM17S-N0	XFM17S-L0	XFM17S-NP
XFM 37	Aluminium	XFM37A-N0	XFM37A-L0	XFM37A-NP
XFM 37	Stainless steel	XFM37S-N0	XFM37S-L0	XFM37S-NP
XFM 47	Aluminium	XFM47A-N0	XFM47A-L0	XFM47A-NP
XFM 47	Stainless steel	XFM47S-N0	XFM47S-L0	XFM47S-NP
XFM 57	Aluminium	XFM57A-N0	XFM57A-L0	XFM57A-NP
XFM 57	Stainless steel	XFM57S-N0	XFM57S-L0	XFM57S-NP
XFM 67	Aluminium	XFM67A-N0	XFM67A-L0	XFM67A-NP
XFM 67	Stainless steel	XFM67S-N0	XFM67S-L0	XFM67S-NP
XFM 77	Aluminium	XFM77A-N0	XFM77A-L0	XFM77A-NP
XFM 77	Stainless steel	XFM77S-N0	XFM77S-L0	XFM77S-NP

Order from Analyt-MTC with the order codes. FKM seals, 11–26 V DC, 0–5 V DC output. For any other version, contact Analyt-MTC.

Accessories

Power supply 230 V AC EU, 12 V DC, without analogue/relays	PS-XFM-230EU-2
Power supply 230 V AC EU, 12 V DC, with analogue/relays	PS-XFM-230EU-2-A
Power supply 110 V AC NA, 12 V DC, with/without analogue/relays	
Power supply 240 V AC AU, 12 V DC, with/without analogue/relays	
Power supply 240 V AC UK, 12 V DC, with/without analogue/relays	
Shielded 15-pin D-sub cable, 6 ft, stripped ends; all signals	CBL-DGS
USB to RS-232 adapter	35782
USB to RS-232 adapter, 8 ports	USB-RS232
Universal benchtop baseplate	35780
Rugged transport case	1200-000-110E

Notes

1. FS = full scale. Flows in the ranges table are for N_2 at its reference conditions.
2. The interface cable CBL-XFM ships with every unit: a 15-pin D-sub female connector with two 6 ft branches with stripped ends for power and the digital interface; no analogue or relay signals.
3. You choose the model and its wetted materials to suit the gas; the manufacturer gives no guarantee of corrosion resistance.
4. B depends on the fitting; XFM 07 is listed with 1/4", not its standard 1/8". The drawing labels the Profibus height G, the table I. Dimensions may change; ask Analyt-MTC for certified dimensions.
5. Power supplies without / with analogue and relays: NA PS-XFM-110NA-2 / PS-XFM-110NA-2-A; AU PS-XFM-240AU-2 / PS-XFM-240AU-2-A; UK PS-XFM-240UK-2 / PS-XFM-240UK-2-A.

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