



DIGITAL MASS FLOW METER

ZFM



Design Features

- Multi-gas/Multi-range functionality up to 8 bar (currently for 6 gases).
- Full scale covered flow ranges from 3.125 sml/min to 10 sL/min are available in seven models.
- Standard accuracy \pm (0.5% RD + 0.2% FS) based on actual calibration.
- Universal 14-24 Vdc power supply input.
- Supports up to 46 Engineering Units (including User-defined).
- Stores additional user- calibration table data for up to 10 gases.
- Two programmable Totalizers indicate total gas quantity.
- User-programmable Pulse Output (via SSR).
- High and low gas flow Alarm limits with preset delay interval.
- One user-programmable solid-state relays with latch option.
- User-selectable analog 0-5 Vdc, 0-10 Vdc, or 4-20mA outputs.
- Internal conversion factors for up to 26 gases.
- Digital interface (RS-232 or RS-485) test/configuration port, optional Modbus RTU with Isolated RS-485 transceiver).
- Multi-Drop capability of up to 247 units (RS-485 option).
- Optional Modbus RTU network interface with Isolated RS-485 transceiver.
- Automatic sensor zero offset adjustment (via digital interface or local push button).
- Extensive Self- diagnostic with status LED or OLED (optional) indication.
- Local 128 x 64 high contrast OLED (optional) graphic display with joystick control.
- Free, easy-to-use configuration and calibration software (RS-232/RS-485).

User Features

- ZFM Meters, with the new “Multi-Gas/ Multi-Range (MGMR) features, cover flow ranges from 0-3.125 sml/min to 0-10 sL/min are available in seven standard configurations and maintain their high accuracy with turndown ranges up to 133.3 to 1.
- OEM users can significantly reduce the number of instruments kept in stock, storage space, and cost of ownership.
- ZFM users can rescale their instruments to the desired gas and full scale range on site saving time and money.
- Save on considerable installation costs, instrument removal from the factory floor, and recalibration service which are no longer applicable.
- Aalborg provides each ZFM meter with free and easy-to-use “ZFM Configuration Utility Software”. By connecting the instrument to the RS232 port of a PC or lap-top and running this configuration utility, the user can select different gas types and flow ranges within a few minutes without removing the instrument from the installation.
- Each instrument comes with the standard user-selectable (0-5Vdc, 0-10 Vdc, or 4-20 mA) analog output signals and the RS232 or RS-485 digital interface. Optional Modbus interface is also available.

TABLE 16 - FLOW RANGES FOR ZFM


ZFM LOW FLOW MASS METERS		
CODE	Nominal Flow Range sL/min [N ₂]	Reconfigurable Full Scale Flow Ranges [Min – Max] sL/min (N ₂)
01	0.0125	0.003125 – 0.0125
03	0.05	0.0125 – 0.05
05	0.2	0.05 – 0.2
06	0.8	0.2 – 0.8
08	2.0	0.5 – 2.0
09	6.0	1.5 – 6.0
10	10.0	2.5 – 10.0

TABLE 17 - ZFM SPECIFICATIONS

FLOW MEDIUM:	Please note that ZFM Mass Flow Meters are designed to work only with clean gases. Never try to measure flow rates of liquids with any ZFM.
CALIBRATIONS:	Performed at standard conditions [14.7 psia (101.4 kPa) and 70 °F (21.1 °C)] unless otherwise requested or stated.
ENVIRONMENTAL (PER IEC 664):	Installation Level II; Pollution Degree II.
FLOW ACCURACY (INCLUDING LINEARITY):	±(0.5% RD + 0.2% FS) based on actual calibration (at calibration temperature and pressure).
REPEATABILITY:	±0.15% of full scale.
FLOW TEMPERATURE COEFFICIENT:	0.05% of full scale/ °C or better.
FLOW PRESSURE COEFFICIENT:	0.01% of full scale/psi (6.895 kPa) or better.
FLOW RESPONSE TIME:	1000ms time constant; approximately 2 seconds to within ±2% of set flow rate for 0% to 100% of full scale flow.
MAXIMUM PRESSURE:	1000 PSIG (6894 kPa gauge).
MAXIMUM PRESSURE DROP:	About 0.8 psi at 10 L/min flow (TBD).
GAS AND AMBIENT TEMPERATURE:	32 °F to 122 °F (0 °C to 50 °C).
RELATIVE GAS HUMIDITY:	Up to 70%.
LEAK INTEGRITY:	1 x 10 ⁻⁹ sccs He maximum to the outside environment.
ATTITUDE SENSITIVITY:	Incremental deviation of up to 0.5% FS from stated accuracy, after re-zeroing.
OUTPUT SIGNALS:	Linear 0-5 Vdc (3000 ohms min load impedance); Linear 0-10 Vdc (5000 ohms min load impedance); Linear 4-20 mA (500 ohms maximum loop resistance). Maximum noise 10mV peak to peak (for 0-5 Vdc output).
METER INPUT POWER:	14 to 26 Vdc, 100 mV maximum peak to peak noise. Power consumption: maximum 100 mA @ 24Vdc; Circuit board have built-in polarity reversal protection, 300mA resettable fuse provide power input protection.
**MATERIALS FLUID CONTACT:	Aluminum Models: Anodized aluminum, brass, 316 stainless steel, Viton® O-rings. Stainless Steel Models: 316 stainless steel, Viton® O-rings. Optional O-ring Materials: Buna-N® , EPR® (Ethylene Propylene), or Kalrez® .



Aalborg makes no expressed or implied guarantees of corrosion resistance of mass flow meters as pertains to different flow media reacting with components of meters. It is the customers' sole responsibility to select the model suitable for a particular gas based on the fluid contacting (wetted) materials offered in the different models

CONNECTIONS:	Model ZFM 17/37 standard 1/4" compression fittings. Optional 6mm, 1/8" or 3/8" compression fittings and 1/4" VCR fittings are available.
DISPLAY:	Optional local 128x64 graphic yellow OLED with Esc button and Joystick interface.
CALIBRATION OPTIONS:	Build-in support based on empirical K-Factors for additional 5 gases (Air, CO2, O2, Argon, and Helium) included.
	 NOTE: Calibration certificate by default provided for Nitrogen only. If Calibration certificate required for other gases optional "as found" calibration must be ordered.
CE COMPLIANCE:	Optional, up to 10 additional custom calibrations (with calibration certificate) may be ordered at additional charge. EMC Compliance with 2004/108/EC as amended. CISPR 11. Emission Standard: IEC 61000-6-3. Immunity Standard: IEC 61000-6-1.

**The selection of materials of construction, is the responsibility of the customer. The company accepts no liability.

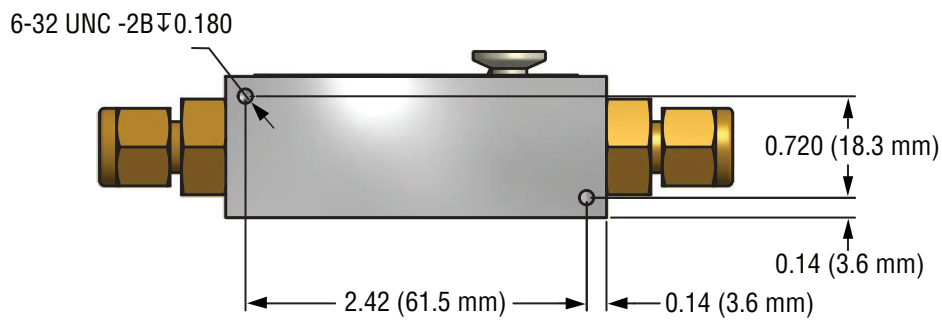
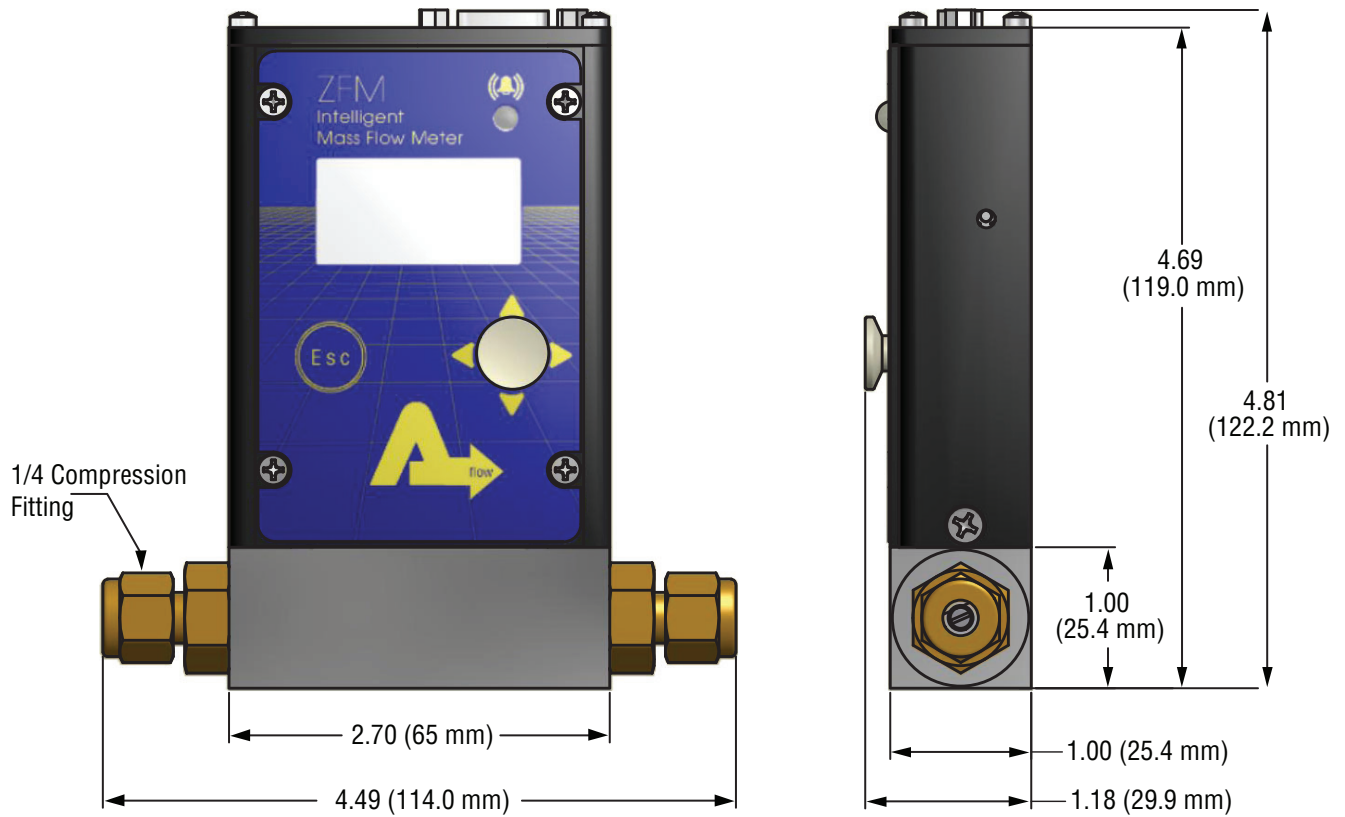


TABLE 18 - ZFM ACCESSORY'S

MODEL NO.	DESCRIPTION
POWER SUPPLIES	
PS-ZFM-110NA-4	ZFM power supply 110VAC North America plug 24 vdc with DC jack power adapter.
PS-ZFM-230EU-4	ZFM power supply 230VAC Europe plug 24Vdc with DC jack power adapter.
PS-ZFM-240UK-4	ZFM power supply 240VAC U.K. plug 24Vdc with DC jack power adapter.
PS-ZFM-240AU-4	ZFM power supply 240VAC Australia plug 24Vdc with DC jack power adapter.
CABLES	
ZFM-APW-BX	Adapter for ZFM DC Power DB9 M/F 2.1 mm DC jack in the box (for user supplied power supply).
CSM9MF-5	Shielded cable D-Sub M/F 9 pins 5.0 feet long.
CSM9MF-10	Shielded cable D-Sub M/F 9 pins 10.0 feet long.
CSM9MF-15	Shielded cable D-Sub M/F 9 pins 15.0 feet long (recommended for 4-20 mA analog output option only).
CSM9MF-25	Shielded cable D-Sub M/F 9 pins 25.0 feet long (recommended for 4-20 mA analog output option only).
CSM9MF-50	Shielded cable D-Sub M/F 9 pins 50.0 feet long (recommended for 4-20 mA analog output option only).
KIT-ZFM-2.5FT	ZFM Electrical Connection Kit: 2.5 feet M/F shielded cable and screw terminal with cover for field termination (included with each ZFM).
CBL-A232	Communication Cable for ZFM with RS-232 Interface 6 FT 3.5mm stereo audio con. with 3-wire to 9 pins female D-connector (included with each ZFM equipped with RS-232 port).
CBL-A485	Communication Cable for ZFM with RS-232 Interface 6 FT 3.5mm stereo audio con. with 3-wire to stripped ends (included with each ZFM equipped with RS-485 port).
COMMUNICATION PORT ACCESSORIES	
USB-RS232	USB to RS232 converter.
CBL-A232	USB to RS485 converter.
CBL-A485	Adapter RJ45 TO DB9 female (8X8) for ZFM Modbus interface cable to usb/rs485 converter (USB-RS485).
MODBUS INTERFACE ACCESSORIES	
ECS803-1	RJ45 shielded Y-adapter (Passive TAP).
TDG1026-8C	RJ45 Modular Coupler.
MOD27T	RJ45 Line Terminator (100 Ohm 0.25 W).
JMOD4S-1	RJ45 Splitter fully shielded (5xRJ45, 1 input 4 outputs).
TRD815BL-2	Category 5E Patch Twisted Pair Cable, RJ45 / RJ45, Blue 2.0 feet.
TRD815BL-10	Category 5E Patch Twisted Pair Cable, RJ45 / RJ45, Blue 10.0 feet.
TRD815BL-25	Category 5E Patch Twisted Pair Cable, RJ45 / RJ45, Blue 25.0 feet.

ZFM	MODEL									
MAX FLOW (N ₂)										
17	10 L/min									
37	50 L/min (Future)									
47	100 L/min (Future)									
MATERIAL										
A	Aluminum									
S	Stainless Steel									
SEALS										
V	Viton®									
B	Buna®									
E	EPR									
T	PTFE / Kalrez®									
FITTINGS		MODEL								
A	1/4" Compression	ZFM 17, 37								
B	1/8" Compression	ZFM 17								
C	1/4" VCR®	ZFM 17, 37								
D	3/8" Compression	ZFM 37, 47								
H	6mm Compression	ZFM 17, 37								
DISPLAY										
N	NO Display									
L	LCD Readout									
POWER										
6	Universal 11 to 26 Vdc									
OUTPUT SIGNAL										
A	0-5Vdc									
B	4-20mA									
M	0-10 Vdc									
DIGITAL INTERFACE										
2	RS232									
5	RS485									
3	RS232 with MODBUS									
ZFM	17	S	—	V	A	L	6	—	A	2

EXAMPLE: ZFM17S-VAL6-A2 5 L/min [N₂] 20 psig

SPECIFY: FLOW RANGE, GAS, and PRESSURE *n.a. = not applicable.