

DATASHEET ES-103I

ES-FLOW™ ES-103I

Low-Flow Ultrasonic Flow Meter for Liquids



Low-Flow Ultrasonic Flow Meters for Liquids

ES-FLOW™ model ES-103I Liquid Flow Meters (LFMs) are suited for precise measurement of volume flow ranges between 2 and 1500 ml/min at operating pressures up to 10 bar. The LFM consists of a innovative ultrasonic flow sensor and an IP66/IP67 protected measuring head with bright LCD display and capacitive touchscreen for adjustment of the settings e.g. for flow indication, alarm, totalisation and control (if applicable). The electronics include a PID controller for optional flow control by means of a separately mounted control valve or pump. ES-FLOW™ model ES-103I has orbitally welded TriClamp flanges for hygienic applications.

Bronkhorst® ES-FLOW™ series are equipped with a digital pc-board, offering high accuracy, excellent temperature stability and fast response. The main digital pc-board contains all of the general functions needed for measurement and control. In addition to the standard RS232 output the instruments also offer analog I/O. As an option, an on-board interface can be mounted to provide CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS protocols.

With the introduction of the second generation of our ES-FLOW series, indicated by suffix MklI, Bronkhorst realised some important improvements and new options. Here are the main MklI-highlights:

- **Hygienic Standards 3-A**
The ES-103I MklI with Tri-Clamp flanges is authorized by 3-A, meeting the highest hygienic standards.
- **Hygienic Flow Controller**
Combining the ES-FLOW flow meter with a GEMÜ 650 pneumatic diaphragm valve makes an excellent hygienic flow controller for a wide range of applications within the Food & Beverage market. The GEMÜ valve is also 3-A authorized.
- **EC Regulation Nos. 1935/2004 and 2023/2006 (Food Contact Materials)**
By meeting the requirements, Bronkhorst can provide a Manufacturer Declaration for these regulations.
- **Improved accuracy and rangeability**
- **Additional functionalities and EtherNet fieldbus options**

Technical specifications

Measurement / control system	
Minimum full scale flow	Mkl: 200 ml/min; MklI: 100 ml/min
Maximum full scale flow	1500 ml/min
Minimum flow	2 ml/min
Volume flow accuracy	Mkl: $\leq \pm 1\%$ Rd; MklI: $\leq \pm 0,8\%$ Rd
Repeatability	$\leq 0,1\%$ Rd $\pm 0,05$ ml/min

Measurement / control system

Turndown ratio	digital 2:100 up to 2:1500 ml/min (full scale value scalable by the user); analog: 1:50 (2...100%);
Zero stability (ZS)	Mkl: ≤ 1 ml/min; MklI: $\leq 0,4$ ml/min
Fluids	liquids with sound speed between 1000 and 2000 m/s; fluid independent measurement; also suitable for non-conductive fluids
Response time (sensor)	≤ 50 msec (t98%)
Refresh (cycle) time	≤ 10 msec
Fluid temperature	-10 ... 90 °C
Ambient temperature	0 ... 60 °C
Mounting	Any position, attitude sensitivity negligible.
Temperature accuracy	± 1 °C

Mechanical parts

Sensor	Straight tube, 1,3 mm ID
Material (wetted parts)	stainless steel 316L
Surface quality	Ra < 0,8 μ m
Pressure rating (PN)	10 bara at TAMB = 15...35°C, TAMB - TMED ≤ 25 °C; for elevated temperatures please consult factory
Process connections	1/4" Triclamp flanges, DIN32676-C (welded); other on request
Seals	none
Weight	Meter: 1,3 kg; Controller: on request
Ingress protection	IP66 and IP67

Electrical properties

Power supply	+ 15 ... 24 Vdc
Max. power consumption	2.8 W
Analog output	0...5 (10) Vdc, min. load impedance > 2 k Ω ; 0 (4)...20 mA (sourcing), max. load impedance < 375 Ω
Analog setpoint	0...5 (10) Vdc, impedance > 100 k Ω ; 0 (4)...20 mA, impedance ~ 100 Ω
Customised I/O	Analog control signal output: 0...10 Vdc or 4...20 mA; Pulse output; for more options, see Model number identification in our ES-FLOW brochure
Digital communication	Standard RS232; Options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS

Electrical connection

Analog/RS232	8-pin M12 connector (male)
Configured I/O / Actuator output	8-pin M12 Connector (male)

Electrical connection

Actuator/Remote display	4-pin M8 connector (female)
PROFIBUS DP	bus: 5-pin M12 connector (female); power: 8-pin M12 connector (male)
CANopen® / DeviceNet™	5-pin M12 connector (male)
FLOW-BUS/Modbus-RTU/ASCII	5-pin M12 connector (male)
Modbus TCP / EtherNet/IP / POWERLINK	2 x 4-pin M12 connector female (in/out)
EtherCAT®/ PROFINET	2 x 4-pin M12 connector female (in/out)
PROFINET	8-pin M12 connector (male)

Control valve options

External actuator options to be connected to the controller

Ex-proof specifications

Approvals / certificates

Food contact	EC 1935/2004; 3-A Sanitary standard on F-103I MkII
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Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

Related products



ES-FLOW™ ES-1131

Min. flow 2 ... 100 ml/min
Max. flow approx. 1500 ml/min
Pressure rating 100 bar
IP66/IP67 display; touchscreen



ES-FLOW™ ES-113C

Min. flow 2 ... 100 ml/min
Max. flow approx. 1500 ml/min
Pressure rating 100 bar
Compact and robust; IP66/IP67



ES-FLOW™ ES-FLOW METER WITH PUMP

Min. flow 2 ... 100 ml/min
Max. flow approx. 1500 ml/min
Compact, integrated dosing solution
Direct pump control