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 MkII, Bronkhorst realised some important improvements and new options. Here are the main MkII-highlights:

- **Hygienic Standards 3-A**
  The ES-103I MkII 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	MkI: 200 ml/min; MkII: 100 ml/min
Maximum full scale flow	1500 ml/min
Minimum flow	2 ml/min
Volume flow accuracy	MkI: ≤ ±1% Rd; MkII: ≤ ±0,8% Rd
Repeatability	≤ 0,1% Rd ± 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)	MkI: ≤ 1 ml/min; MkII: ≤ 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 ℃
Ambient temperature	0 … 60 ℃
Mounting	Any position, attitude sensitivity negligible.
Temperature accuracy	± 1 ℃

Mechanical parts

Sensor	Straight tube, 1,3 mm ID
Material (wetted parts)	stainless steel 316L
Surface quality	Ra < 0,8 µm
Pressure rating (PN)	10 bara at TAMB = 15…35℃, |TAMB - TMED| ≤ 25℃; 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 kΩ; 0 (4)…20 mA (sourcing), max. load impedance < 375 Ω
Analog setpoint	0…5 (10) Vdc, impedance > 100 kΩ; 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

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-113I

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

Bronkhorst®

Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!