DATASHEET ES-113I

ES-FLOW™ ES-113I

Low-Flow Ultrasonic Flow Meter for liquids

Low-Flow Ultrasonic Flow Meters for Liquids

ES-FLOW™ model ES-113I Liquid Flow Meters (LFMs) are suited for precise measurement of volume flow ranges between 2 and 1500 ml/min. 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-113I has orbitally welded compression type connections, making this instrument suitable for operating pressures up to 100 bar.

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.

November 2020, launch of ES-FLOW MkII generation

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

Maximum full scale flow	1500 ml/min
Minimum flow	2 ml/min
Volume flow accuracy	MkI: ≤ ±1% Rd ± ≤ 1 ml/min; MkII: ≤ ±0,8% Rd ± ≤ 0,4 ml/min
Repeatability	≤ 0,1% Rd ± 0,05 ml/min
Turndown ratio	digital 2:100 up to 2:1500 ml/min (full scale value scalable by the user); analog: 1:50 (2…100%);
Fluids	liquids with sound speed between 1000 and 2000 m/s; fluid independent measurement; also suitable for non-conductive fluids

Measurement / control system

Response time (sensor)	≤ 50 msec (t98%)
Refresh (cycle) time	≤ 10 msec
Fluid temperature max	-10 … 90 °C
Ambient temperature max	10 … 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 μm
Pressure rating (PN)	10 bara at TAMB = 15…35°C, |TAMB - TMED| ≤ 25°C; for elevated temperatures please consult factory
Process connections	3 mm, 6 mm, 1/8", 1/4" OD compression type or 1/4"face seal male (welded)
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)
Actuator/Remote display	4-pin M8 connector (female)
PROFIBUS DP	bus: 5-pin M12 connector (female); 8-pin power: 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)

Electrical connection

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

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the product page on our website

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Related products

ES-FLOW™ ES-103I

Flow rate 2 ... 1500 ml/min

Pressure rating 10 bar

IP66/IP67 display; touchscreen

Hygienic, flanged type design

ES-FLOW™ ES-113C

Flow rate 2 ... 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