

# 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 advanced electronics, 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.

The second generation of the ES-FLOW series, is indicated by suffix MkII.

ES-FLOW model ES-103I liquid flow meters with Tri-Clamps can be delivered with 3-A certificate. Bronkhorst can also supply the Manufacturer Declaration for EC Regulation Nos. 1935/2004 and 2023/2006 (Food Contact Materials). ES-103I can be combined with a GEMÜ 650 pneumatic diaphragm valve to make it an excellent hygienic flow controller for a wide range of applications within the Food & Beverage market. The GEMÜ valve is also 3-A authorised.

### Technical specifications

#### Measurement / control system

|                         |   |
|-------------------------|---|
| Maximum full scale flow | 1500 ml/min   |
| Minimum flow            | 2 ml/min  |
| Volume flow accuracy    | MkI: $\leq \pm 1\%$ Rd;<br>MkII: $\leq \pm 0,8\%$ Rd  |
| Repeatability           | $\leq 0,1\%$ Rd $\pm 0,05$ ml/min   |
| Turndown ratio          | digital 2:100 up to 2:1500 ml/min (full scale value scalable by the user);<br>analog: 1:50 (2...100%);                        |
| Zero stability (ZS)     | MkI: $\leq 1$ ml/min;<br>MkII: $\leq 0,4$ ml/min  |
| Fluids                  | liquids with sound speed between 1000 and 2000 m/s;<br>fluid independent measurement; also suitable for non-conductive fluids |
| Response time (sensor)  | $\leq 50$ msec (t98%)   |
| Refresh (cycle) time    | $\leq 10$ msec  |

**Measurement / control system**

|                      |  |
|----------------------|--|
| 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 µm  |
| Pressure rating (PN)    | 10 bara at TAMB = 15...35°C,  TAMB - TMED  ≤ 25°C;<br>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;<br>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;<br>0 (4)...20 mA (sourcing), max. load impedance < 375 Ω   |
| Analog setpoint        | 0...5 (10) Vdc, impedance > 100 kΩ;<br>0 (4)...20 mA, impedance ~100 Ω   |
| Customised I/O         | Analog control signal output: 0...10 Vdc or 4...20 mA;<br>Pulse output;<br>for more options, see Model number identification in our ES-FLOW brochure   |
| Digital communication  | Standard RS232;<br>Options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP,<br>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);<br>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 /<br>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

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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](#)

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## Related products



**ES-FLOW™ ES-103I**

Min. flow 2 ... 100 ml/min  
Max. flow approx. 1500 ml/min  
Pressure rating 10 bar  
IP66/IP67 display; touchscreen  
Hygienic, flanged type design



**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