

DATASHEET ES-113C

ES-FLOW ES-113C

Low-Flow Ultrasonic Flow Meter for liquids



Low-Flow Ultrasonic Flow Meters for Liquids

The innovative ES-FLOW ES-113C Ultrasonic Liquid Flow Meter/Controller is designed for measuring volume flow ranges between 2 and 1500 ml/min with high precision, high linearity and low pressure drop using Ultrasonic Wave Technology in a small bore tube. Liquids can be measured independent of fluid density, temperature and viscosity, therefore recalibration per fluid is unnecessary. The flow meter has a straight sensor tube design with the actuators positioned at the outer surface. Therefore, the instrument is easy to clean. All wetted parts are made of stainless steel, build in an aluminium housing. The on-board PID controller can be used to drive a control valve or pump, enabling users to establish a complete, compact control loop.

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.

Technical specifications

Measurement / control system

| | |
|-------------------------|--|
| Maximum full scale flow | 1500 ml/min |
| Minimum flow | 2 ml/min |
| Volume flow accuracy | ≤ ±0,8% Rd |
| Repeatability | ≤ 0,1% Rd ± 0,05 ml/min |
| Turndown ratio | digital 1:750 (full scale value scalable by the user); analog: 1:50 (2...100%), also applicable for controller |
| Zero stability (ZS) | ≤ 0,4 ml/min |
| Fluids | Speed of sound 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...60 °C |
| Ambient temperature | 0...60 °C |
| Mounting | any position, attitude sensitivity negligible |
| Temperature accuracy | ±1 °C |

Mechanical parts

| | |
|-------------------------|---|
| Sensor | straight 1/16" tube, 1,3 mm ID |
| Material (wetted parts) | stainless steel 316L (1.4404) |
| Housing | aluminium |
| Pressure rating (PN) | 100 bar g |
| Process connections | 3 mm, 6 mm, 1/8", 1/4" OD compression type; other on request |
| Seals | metal |
| Ingress protection | IP66 and IP67 |

Electrical properties

| | |
|------------------------|--|
| Power supply | +15...24 Vdc \pm 10% |
| Max. power consumption | 2,8 W |
| Analog output | 0...5 (10) Vdc; 0 (4)...20 mA (sourcing) |
| Analog setpoint | 0...5 (10) Vdc, impedance > 100 k Ω ; 0 (4)...20 mA, impedance \sim 250 Ω |
| Customised I/O | Analog control signal output (option): 0...10 Vdc or 4...20 mA Pulse output (option) |
| Digital communication | Standard: RS232; Options: PROFIBUS DP, DeviceNet™, EtherCAT®, Modbus RTU/ASCII, CANopen®, FLOW-BUS, PROFINET, Modbus/TCP, EtherNet/IP, POWERLINK |

Electrical connection

| | |
|---|---|
| Analog/RS232 | M12 8-pin connector male |
| Actuator/Remote display | M8 4-pin connector male |
| PROFIBUS DP | M12 5-pin connector male |
| CANopen® / DeviceNet™ | M12 5-pin connector male |
| FLOW-BUS/Modbus-RTU/ASCII | M12 5-pin 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) |

Control valve options

External actuator options to be connected to the controller

Certification for hazardous areas

Approvals / certificates

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-113I

Flow rate 2 ... 1500
ml/min
Pressure rating 100 bar
IP66/IP67 display;
touchscreen



ES-FLOW ES-112C

Flow rate 0,4 ... 200
ml/min
Pressure rating 100 bar
Compact and robust;
IP66/IP67