Datasheet ES-113C

Ultrasonic Volume Flow Meter / Controller for Liquids

ES-113C Ultrasonic Liquid Flow Meter

> Introduction

The innovative ES-FLOW™ 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.

> Features & Benefits

- Direct volume flow measurement, independent of liquid properties
- Lowest flow ranges on the market (ultrasonic principle): 2…1500 ml/min user-configurable
- Integrated counter/totalizer and batch dosing functionality
- Additional measurement of temperature and speed of sound
- Bi-directional measurement
- Integrated PID controller
- Wetted parts of stainless steel 316L
- Very small internal volume
- Easy to install, insensitive for external vibrations
- Fast response/cycle time, excellent repeatability and long-term stability, high accuracy
- Saves expensive fluids at repetitive dosing and filling processes
- Reduced downtime: no recalibration required after fluid change

> Applications

Typical applications for the ES-FLOW™ series can be found in:

- **Food, Beverage, Pharma, Analytical and Medical market:** measurement/control of natural additives, solvents, carbonated liquids, H_2O_2 sterilization, demineralized water and liquids containing particles.
- **Chemical, Surface Treatment, Automotive market:** measurement/control of catalysts, reagents, hydrocarbons, fuel, oil and consumption measurement and dosing of colorants, lubricants, non-conductive fluids or unknown mixtures.

ES-113C/C2I Liquid Flow Controller

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> Technical specifications

Measurement / control system

Min. full scale flow	: 0…100 ml/min
Max. full scale flow	: 0…1500 ml/min
Min. flow for controller	: 2 ml/min
Volume flow accuracy	: ≤ ±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	: Speed of sound between 1000 and 2000 m/s; fluid independent measurement; also suitable for non-conductive fluids
Response time (sensor)	: ≤ 200 msec (t98%)
Refresh (cycle) time	: ≤ 10 msec
Fluid temperature	: -10…60°C
Ambient temperature	: 0…60°C
Fluid temperature accuracy	: ±1 °C
Mounting	: any position, attitude sensitivity negligible

Mechanical parts

Sensor	: straight 1/16" tube
Material, wetted parts	: stainless steel 316L (1.4404)
Material, housing	: aluminium
Pressure rating (PN)	: 100 bar(g)
Process connections	: 3 mm, 6 mm, ⅛", ¼" OD compression type; other on request
Seals	: none
Plunger (control valve)	: Kalrez®; other on request
Ingress protection	: IP66 and IP67

Although all specifications in this leaflet are believed to be accurate, the right is reserved to make changes without notice or obligation.

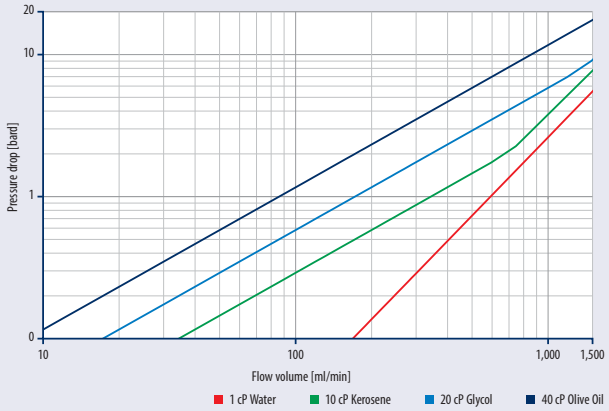
Electrical properties

Power supply	: +15…24 Vdc ±10%
Power consumption	: max. 2,8 W
Analog output (0…100%)	: 0…5 (10) Vdc; 0 (4)…20 mA (sourcing)
Analog setpoint (0…100%)	: 0…5 (10) Vdc, impedance > 100 kΩ; 0 (4)…20 mA, impedance ~250 Ω
Analog control signal output	: 0…10 Vdc or 4…20 mA (I/O option)
Pulse output	: available as programmable I/O option
Digital communication	: Standard : RS232; Options : PROFIBUS DP, DeviceNet™, EtherCAT®, Modbus RTU/ASCII, CANopen®, FLOW-BUS, PROFINET, Modbus/TCP, EtherNet/IP, POWERLINK

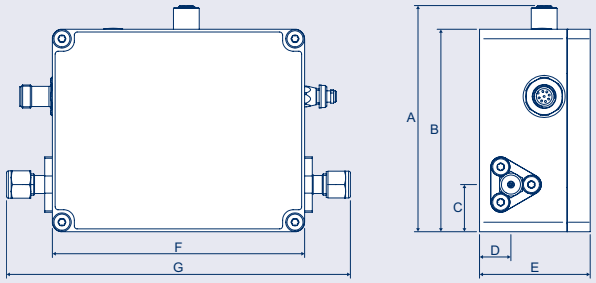
Electrical connections

Analog/RS232	: M12 8-pin connector male
Actuator output	: M8 4-pin connector male
PROFiBUS DP	: M12 5-pin connector male
DeviceNet™, CANopen®	: M12 5-pin connector male
Modbus RTU/ASCII, FLOW-BUS	: M12 5-pin connector male
PROFINET, EtherCAT®, Modbus TCP, EtherNet/IP, POWERLINK	: 2 x 4-pin M12 connector female (in/out)

> Flow rate vs pressure drop



> Dimensions Liquid Flow Meter



Model	*Dimensions in mm*							
	A	B	C	D	E	F	G	
ES-113C	118	106	24.7	16.5	58	132	1/8" OD compression type	170 mm
							¼" or 6 mm OD compression type	180 mm
							3 mm OD compression type	218 mm
							G 1/8" cavity	156 mm

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Bronkhorst High-Tech B.V., Nijverheidsstraat 1a, NL-7261AK Ruurlo, The Netherlands
T +31(0)573 45 88 00 **I** www.bronkhorst.com **E** info@bronkhorst.com

ISO CERTIFIED 9001 & 14001

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