Datasheet ES-1xxC

Ultrasonic Volume Flow Meter / Controller for Liquids

ES-112C or ES-113C Ultrasonic Liquid Flow Meter

> Introduction

The innovative ES-FLOW™ Ultrasonic Liquid Flow Meter/Controller is designed for measuring low volume flow ranges up to 1500 ml/min (90 l/h).

1. **A versatile flow meter for all liquids**: ES-FLOW technology is fluid independent, therefore recalibration is not needed when the liquid changes. Even non-conductive liquids as demi water or oil can be measured.
2. **Compact design with minimum internal volume:** due to the straight sensor tube design, particles have reduced chance of clogging the instrument.
3. **Advanced signal processing:** the on-board PID controller is the perfect choice for driving any control valve or pump. This enables a complete, compact control loop with fast response time. ES-FLOW can also operate as a stand-alone dosing unit.

> Features & Benefits

- Direct volume flow measurement, independent of liquid properties
- Lowest flow ranges on the market based on ultrasonic measurement principle; flow rates from 0,4 up to 1500 ml/min
- 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 and PEEK
- 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 and increases process quality
- Reduced downtime: no recalibration required after fluid change

> Applications

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

- **Food, Beverage and Pharmaceutical market:** measurement/control of natural additives, solvents, carbonated liquids, H_2O_2 sterilization, demineralized water and liquids containing particles.
- **Chemical 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

Flow rates	: 0…200 ml/min (ES-1x2C), 0…1500 ml/min (ES-1x3C)
Volume flow accuracy	: ≤ ±0,8% Rd Zero stability (ZS): < ±0,06 ml/min (ES-1x2C), < ±0,4 ml/min (ES-1x3C)
Repeatability	: ≤ 0,1% Rd ± 0,02 ml/min (ES-1x2C), ≤ 0,1% Rd ± 0,05 ml/min (ES-1x3C)
Turndown ratio	: In digital mode: 1:500 (ES-1x2C), 1:750 (ES-1x3C) (full scale value scalable by the user); analog: 1:50 (2…100%), also applicable for controller
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 1/32" tube (0,6 mm, ES-1x2C), straight 1/16" tube (1,3 mm, ES-1x3C)
Material, wetted parts	: stainless steel 316L (1.4404) and PEEK
Material, housing	: aluminium
Pressure rating (PN)	: 10 or 100 bar(g); see Basic model key
Process connections	: 3 mm, 6 mm, 1/8", 1/4" OD compression type; or 1/4", 1/2 Triclamp flanges, DIN32676-C (welded) other on request
Seals	: metal
Plunger (control valve)	: Kalrez®; other on request
Ingress protection	: IP66 and IP67

Electrical properties

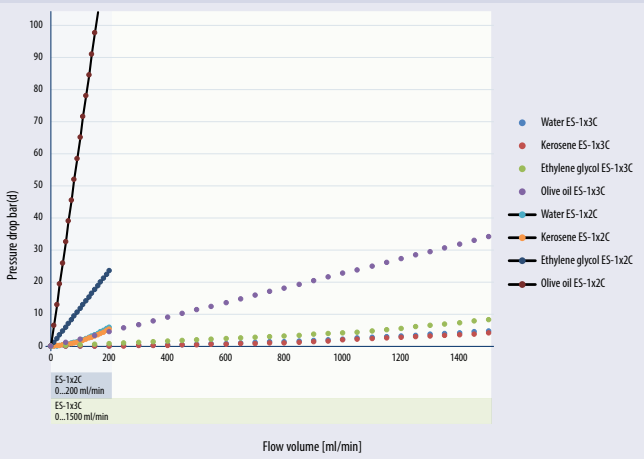
Power supply	: +15…24 Vdc ±10%
Power consumption	: max. 2,8 W
Analog output (0…100%)	: 0…5 (10) Vdc; 0 (4)…20 mA (sourcing)
Analog setpoint (0…100%)	: 0…5 (10) Vdc, impedance > 100 kΩ; 0 (4)…20 mA, impedance ~250 Ω
Analog control signal output	: 0…10 Vdc or 4…20 mA (I/O option)
Pulse output	: available 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

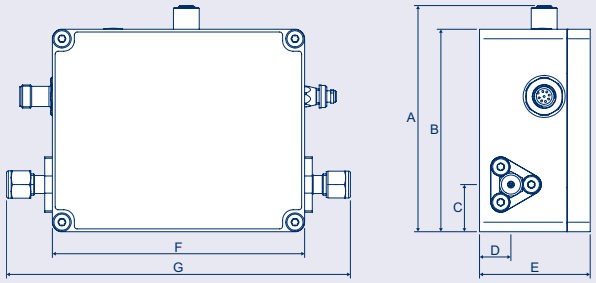
Analog/RS232	: M12 8-pin connector male
Actuator output	: M8 4-pin connector male
PROFiBUS DP	: M12 5-pin connector male
DeviceNet™, CANopen®	: M12 5-pin connector male
Modbus RTU/ASCII, FLOW-BUS	: M12 5-pin connector male
PROFINET, EtherCAT®, Modbus TCP, EtherNet/IP, POWERLINK	: 2 x 4-pin M12 connector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

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

> Flow rate vs pressure drop



> Dimensions Liquid Flow Meter



Model	*Dimensions in mm*							
	A	B	C	D	E	F	G	
ES-1xxC	118	106	24.7	16.5	58	132	1/8" OD compression type	170 mm
							1/4" or 6 mm OD compression type	180 mm
							3 mm OD compression type	218 mm
							1/4" or 1/2" Triclamp flanges	161 mm
							G 1/8" cavity	156 mm

Basic model key

ES-	A	A	A	A

Code	Base
1	Meter

Code	Pressure rating
0	10 bar (g)
1	100 bar (g)

Code	Flow range
2	0.4…200 ml/min
3	2…1500 ml/min

Code	Housing
C	Non-hygienic IP67

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