



*Flow transmitter / flow switch
for hygienic and aseptic applications*

Technical information TI08.20

In brief



IO-Link **CE**

Application

- Food and beverage industry
- Pharmaceutical industry
- Biotechnology
- Sterile process engineering

Main features

- Flow velocities from 3cm/s to 300cm/s
- Wide variety of process connections and sensor lengths
- Wear-free calorimetric sensor
- Process temperature range -20°C to +110°C
- Useable for CIP/SIP cleaning
- Elastomer-free and free of dead space metallic sealing connection
- High process pressure tightness up to 40bar
- Fully welded robust steel enclosure
- High protection class IP69K/IP67
- Evaluation electronic RS485 Modbus®-RTU / IO-Link®



Description

The device is an electronic flow resp. temperature switch for monitoring, control and continuous measurement of flow and temperatures in liquids. A high variety of versions of process connections and electronic types allows the use for a wide range of applications, also for demanding measuring requirements. The process connection with metallic sealing has been specifically designed for the hygienic, dead-space and elastomer-free process adaption. Due to its high accuracy and the digital adjustability by RS485 Modbus®-RTU or IO-Link® the device can be suited to a wide variety of applications.

The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration stress or aggressive media. A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device. Obviously is the optional marking of a measurement point designation resp. TAG, of course also per laser marking. A LABS- resp. silicone-free version and a customer specific configuration

resp. preset is also optionally available like a material test certificate EN10204 3.1 or a factory certifications for drink water resp. food suitability. Customer specific special versions can be realized short-term on request, e.g. special designs for the process connection or other process materials.

Technical Data

Measuring range	
Measurement principle	Calorimetric flow velocity
Measurement range	3...300 cm/s Greatest sensitivity: 3...100 cm/s
Temperature gradient	≥ 300 K/min
Output type V – RS485 Modbus®-RTU	
Interface	RS485, bidirectional / Modbus®-RTU / 9600 Baud (4800...38400 Baud)
Input resistance	112kΩ
Time behavior	Flow: T90 ≤ 6s (t _d = 0s / 0% >> 90% / 100% >> 10%) / ton ≤ 10s (t _d = 0s) Temperature: T90 ≤ 4s / ton ≤ 2s
Output type L – IO-Link®	
Interface	IO-Link® V1.1 / Com2 (38400 Baud)
Cycle time	≥ 2,3ms
Analogue output	0...20mA: 0...20,5mA / ≤ 0,05mA / ≤ 22mA / dI ≤ 1μA 4...20mA: 3,8...20,5mA / ≥ 3,6mA / ≤ 22mA / dI ≤ 1μA
Permitted load	RL ≤ (Us - 8V) / 22mA
Time behavior	Flow: T90 ≤ 6s (t _d = 0s / 0% >> 90% / 100% >> 10%) / ton ≤ 10s (t _d = 0s) Temperature: T90 ≤ 4s / ton ≤ 2s
Switch output	2x PP (Push-Pull), switch to +L/-L
Output	Uout ≤ 0,2V, ≥ Us - 2V / Iout 0...200mA (current limited ≤ 450mA, short circuit protected)
Time behavior	Flow: T90 ≤ 6s (t _d = 0s / 0% >> 90% / 100% >> 10%) / ton ≤ 10s (t _d = 0s) Temperature: T90 ≤ 4s / ton ≤ 2s trise < 30μs (RL < 3kR / IOut > 4,5mA)
Switch cycles	≥ 100.000.000
Auxiliary power	
Supply voltage Us polarity protected Residual ripple voltage Supply current	Type V – RS485 Modbus®-RTU: 6...35VDC / ≤ 2Vpp / ≤ 100mA (no load) Type L – IO-Link®: 9...35VDC, without IO-Link® / ≤ 2Vpp / ≤ 110mA (no load) Type L – IO-Link®: 18...30VDC, with IO-Link® / ≤ 2Vpp / ≤ 110mA (no load)
Measuring accuracy	
Reference conditions	EN/IEC 60770-1: Characteristic deviation – Limit value adjustment 15...25°C / 860...1060kPa / 45...75%r.F. / ton240s / 24VDC±0,1V / measuring medium water, vertical, sensor downside, inner tube diameter 26mm, upstream pipe 1m, downstream pipe 0,5m, alignment ±5°
	Accuracy = Nonlinearity + Hysteresis + Zero offset and end value deviation FSO = Full Scale Output = Nominal measuring range MV = Measuring value MEV = Measuring end value
Resolution measuring input	FSO ≥ 12 Bit
Accuracy	Flow: ≤ ±5% MEV (5...100cm/s) / (-20°C...+85°C) ≤ ±10% MEV (100...175cm/s) / (-20°C...+85°C) Temperature: ≤ ±1,5K (≥ 20cm/s)
Reproducibility	Flow: ≤ 2cm/s (5...100cm/s) / (-20°C...+85°C) Temperature: ≤ ±0,5K (≥ 20cm/s)
Influence of auxiliary power	≤ ±0,1% MEV / 10V
Long term drift	Flow: ≤ ±10% MV / year (-20°C...+85°C)
Temperature deviation	Flow: ≤ ±0,4cm/s / K (-20°C...+85°C)
Process conditions	
Process temperature	-20°C...+110°C maximum -30°C...+120°C, +140°C/1h compensated -20°C...+85°C
Process pressure	≤ 40 bar
Environmental conditions	
Environmental temperature	-20°C...+100°C
Protection level	IP69K/IP67 (EN/IEC 60529)
Climatic classification	4K4H (EN/IEC 60721-3-4)
Shock classification	50g [11ms] (EN/IEC 60068-2-27)
Vibration classification	20g [10...2000 Hz] (EN/IEC 60068-2-6)
EM compatibility	Operation device class B / Industrial range (EN/IEC 61326)
Insulation voltage	500Vac
MTTF	463 years
Tightening torque	15Nm (5...20Nm)
Weight	0,35kg
Materials	
Process wetted	Steel 1.4404/316L, Steel 1.4571/316Ti
Not process wetted	CrNi-steel, PUR, Acrylic copolymer, FPM

Electrical connection

Electronic output type V RS485 Modbus®-RTU	Electronic output type L IO-Link®

Dimensions (mm)

Terminal enclosure
Process connection type 2 Thread G 1/2" A, metallic elastomer-free sealing

Order code

FU4SL

K

S

0

V

C

S

0

0

0

S

Type

Hygienic applications

Measuring system

Calorimetric sensor

Approval

Standard

Process connection

Thread ISO 228-1 – G½"A, metallic elastomer-free sealing (socket SEM-22/SEM-42)
others

Material process connection (process wetted)

CrNi-steel

Material terminal enclosure

CrNi-steel

Sensor length L1

0 30 mm
1 50 mm
2 80 mm

Electronic – output

V RS485 Modbus®-RTU, 4-wire
L IO-Link®, 1x current 0/4...20mA / 2x switch, 4-wire

Electronic – function

Standard

Process temperature

Standard –20°C...+110°C

Electrical connection

Plug M12x1

Additional options

-SF LABS-free, silicone-free / paint compatible version
-ML Measurement point designation / TAG – Laser marking
-MZ Material test certificate – EN10204 3.1
-WT Factory certification – drink water suitability
-WL Factory certification – food suitability
-KF Configuration / Preset

Fluxicont® FU4L

K

S

0

V

C

S

0

0

0

S



fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric



IoT-Solutions



ACS-CONTROL-SYSTEM
knowhow with system

Your partner for measuring technology and automation



ACS-CONTROL-SYSTEM GmbH
Lauterbachstr. 57
D- 84307 Eggenfelden

Tel.: +49 (0) 8721/ 9668-0
Fax: +49 (0) 8721/ 9668-30

info@acs-controlsystem.de
www.acs-controlsystem.de