



Flow transmitter / flow switch for general industrial applications

Technical information TI08.20

In brief



IO-Link



Application

- Machinery and plant engineering
- Air-conditioning and refrigeration plant engineering
- Hydraulic and pneumatic systems
- Process industry
- Environmental technology
- Facility and building automation

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
- 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.

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 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 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	≤ 50Nm
Weight	0,35kg
Materials	
Process wetted	Steel 1.4404/316L, Steel 1.4571/316Ti, FPM, EPDM
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 0 Thread G½"A, DIN EN ISO 1179-2 E	Process connection type 3 Thread G¼"A, DIN EN ISO 1179-2 E

Order code

FU4S	Type	Standard
K	Measuring system	Calorimetric sensor
S	Approval	Standard
0	Process connection	Thread ISO 228-1 – G½"A, DIN EN ISO 1179-2 E
3		Thread ISO 228-1 – G¾"A, DIN EN ISO 1179-2 E
Y		others
1	Material process gaskets (process wetted)	FPM – fluorelastomere (e.g. Viton®)
3		EPDM – ethylene-propylene-dienmonomere
Y		others
V	Material process connection (process wetted)	CrNi-steel
C	Material terminal enclosure	CrNi-steel
Sensor length L1		
Process connection		
Type 0 – G½" / Type 3 – G¾"		
0	30 mm	28mm
1	49 mm	47mm
2	79 mm	77mm
3	119 mm	117mm
Electronic – output		
V	RS485 Modbus®-RTU, 4-wire	
L	IO-Link®, 1x current 0/4...20mA / 2x switch, 4-wire	
Electronic – function		
S	Standard	
0	Process temperature	Standard –20°C...+110°C
0		
0		
S	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		
-KF Configuration / Preset		

Fluxicont® FU4S K S 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



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