FS121-2UPN8-H1141
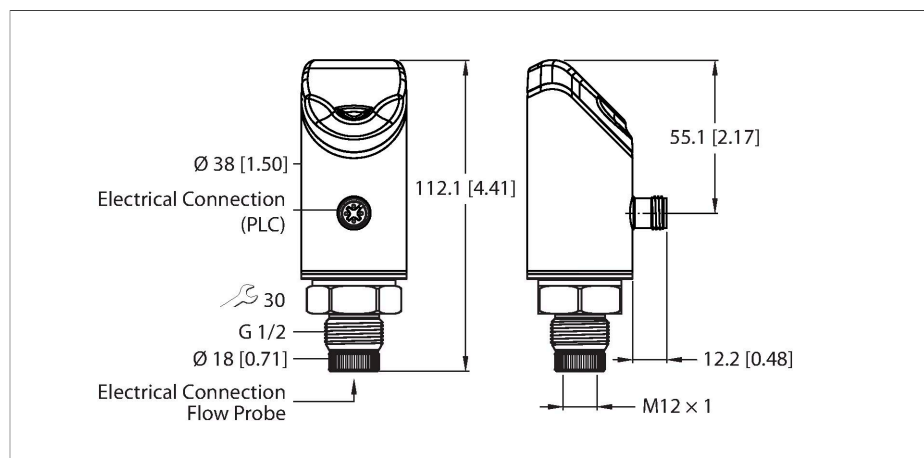# Flow Monitoring Processor Unit – With 2 PNP/NPN Transistor Switching Outputs

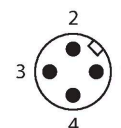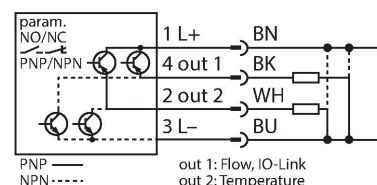## Technical data

Type	FS121-2UPN8-H1141
ID	100047864
Remark to product	Some examples of flow sensors that can be connected can be found under "Functional accessories" at the end of this data sheet.
Mounting	Connection of Turck flow sensors, max. cable length 30 m. Recommendation: shielded cable
Flow Monitoring	
Switching point accuracy	Typically <5 % (depending on the probe connected and the measuring range)
Reproducibility	Typically <3 % (depending on the probe connected and the measuring range)
Response time	Dependent on the probe connected
Hysteresis	5…20 % (depending on the detection range)
Temperature monitoring	
Switching point accuracy	Typically ± 2 K (depending on the probe connected)
Reproducibility	Typically ≤ 0.5 K (depending on the probe connected)
Resolution	0.1 K
Electrical data	
Operating voltage U_B	17…33 VDC
Protective measure	SELV, PELV according to DIN EN 61140

Features

- Sensor housing material 1.4404 (316L)
- Media-contacting material: sensor dependent
- 4-digit, 2-color (red/green), 12-segment display, rotatable by 180°
- Protection class IP66, IP67 and IP69K (connected with sensor/sensor cable)
- Adjustment of flow rate via teach function
- 17…33 VDC
- NO/NC contact, PNP/NPN output, IO-Link
- M12 × 1 connector
- IO-Link with Smart Sensor Profile SSP4.1.2

Wiring diagram

Functional principle

All non-Ex flow sensors from the FP100, FCS-… (immersion sensors) and FCI (inline

Technical data

Short-circuit/reverse polarity protection	yes, cyclic / yes (voltage supply)
Power consumption	≤ 3 W
Voltage drop	≤ 2 VDC
Continuous current carrying capacity of the DC switching output	250 mA
Overload protection	Yes
Insulation class	III
Standby delay time	30 s
Outputs	
Output 1	Flow: Switching output or IO-Link
Output 2	Temperature: Switching output
Communication protocol	IO-Link
Output function	NO/NC programmable, PNP/NPN
IO-Link	
IO-Link specification	V 1.1
IO-Link port type	Class A
Transmission rate	COM 2 (38.4 kBaud)
Process data width	64 bit (2 × 32 bit, of which 2 × 6 bit are not used)
Measured value information	48 bit (2 × (16-bit process values + 8-bit scale))
Switching point information	4 bit (2 × 2 switching points)
Frame type	2.2
Minimum cycle time	6 ms
Function pin 4	IO-Link
Function Pin 2	DI
Maximum cable length	20 m
Profile support	Smart Sensor Profile (SSP4.1.2)
Included in the SIDI GSDML	In preparation
Programming	
Programming options	Switching behavior (PNP/NPN/Auto); switching logic (high/low); switching point set via touchpads: single point, two point, window mode; display: color: red/green including color change when switching, display orientation 0°/180°, update time, temperature unit, password protection
Mechanical data	
Housing material	Stainless-steel/Plastic, 1.4404 (AISI 316L)/Grilamid TR90 UV/Elastollan C 65 A 15 HPM 000/Ultramid A3X2G5
Electrical connection	Connector, M12 × 1

sensors) series can be operated with the FS121-… external signal processor.

The signal processor features 4 status LEDs and a 12-segment display for local visual monitoring. Software-based diagnostic options are also available to the user, including detection of sensor-side wire breaks and short circuits, as well as monitoring of the operating and display range for the flow rate and media temperature.

The upper and lower limits of the flow range are taught in using the max./min. teach mode implemented. The flow switching point can be optionally adjusted by means of the Quick-Teach function, without having to teach in the lower and upper limits of the flow range. Working on the calorimetric principle, the connectible sensors not only detect the flow rate but also the media temperature. The flow module can be operated either in IO-Link (IOL) or in standard IO (SIO) mode via the integrated IO-Link interface. In SIO mode, the switching outputs are operated in the standard way. In IOL mode, the current process values are transmitted cyclically in series as digital 32-bit values.

Parametrization can be performed either via touch button or using software via the IO-Link communication interface. The parameterization via IO-Link is performed using tools via DTM or IODD within the FDT frame PACTware or acyclically near the control via on-request data objects.

The flow sensor functions according to the calorimetric principle. The distinctive feature of this principle is that the flow rate correlates directly to the thermal loss of energy in the probe. The increased loss of energy is therefore a direct measure of an increased flow rate.

Technical data

Protection class	IP66 IP67 IP69K
Electromagnetic compatibility (EMC)	DIN EN 60947-5-9: 2007
Environmental conditions	
Ambient temperature	-40…+80 °C
	(UL: -25…+80 °C)
Storage temperature	-40…+80 °C
Shock resistance	50 g (11 ms) EN 60068-2-27
Vibration resistance	20 gDIN EN 60068-2-6
Tests/approvals	
Approvals	cULus
UL registration number	E516036
Displays/Operating elements	
Display	4-digit 12-segment display, rotatable by 180°, red or green
Switching state	2 × LEDs, Yellow
MTTF	120 years acc. to SN 29500 (Ed. 99) 40 °C

LED display

LED	Color	Status	Description
PWR	green	On	Operating voltage applied Device is ready for operation
		Flashing	Operating voltage applied IO-Link communication active (Inverted flash with T on 875 ms and T off 125 ms)
FLT	red	On	Error displayed (For error pattern in combination with other LEDs see manual)
		off	No errors displayed
LOC	yellow	On	Device locked
		off	Device unlocked
		Flashing	Locking/unlocking process active
FLOW	yellow	On	NO: Flow switching point overshot (output "active") NC: Flow switching point undershot (output "active")
		off	NO: Flow switching point undershot (output "inactive") NC: Flow switching point overshot (output "inactive")
		Flashing	Diagnostic display (See manual for specification)
TEMP	yellow	On	NO: Temperature switching point overshot (output "active") NC: Temperature switching point undershot (output "active")
		off	NO: Temperature switching point undershot (output "inactive") NC: Temperature switching point overshot (output "inactive")
		Flashing	Diagnostic display (See manual for specification)

For a detailed description of the display patterns and flashing codes, see manual D100048988/D100048989 (DE/EN)

IO-Link process data image

Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Byte n	Switch (Temp-Physical)	Switch (Temp-Virtual)							8-bit scale (TEMP)							
Bit	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Byte n+1	16-bit process value (TEMP)															
Bit	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Byte n+2	Switch (Flow-Physical)	Switch (Flow-Virtual)							8-bit scale (FLOW)							
Bit	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Byte n+3	16-bit process value (FLOW)															