

**Description**

Compact single point flow monitor, MIN or MAX monitoring options, suitable for water, oil, air or media with similar thermal conductivities. With screw-in or plug-in type monitoring head for ease of installation and correct positioning.

**If the flow rate falls below (MIN) or exceeds (MAX) the pre-adjusted value, the signal output will be switched and the yellow LED will light.**

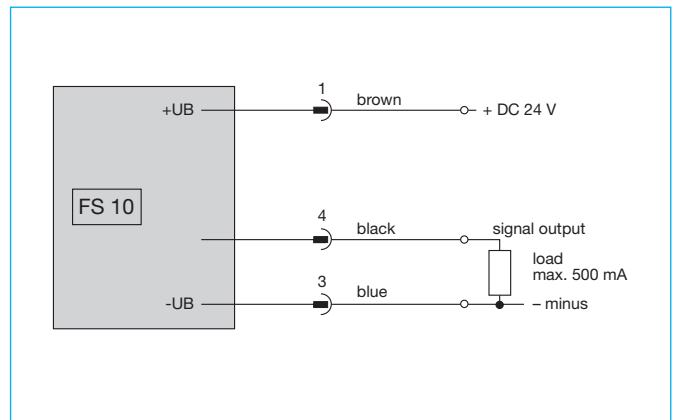
**Features**

- wear-resistant compact design, with stainless steel 1.4571 monitoring head and housing
- switch point steplessly adjustable by means of potentiometer
- status indication by green LED
- media temperature range -25°C...+100°C
- M12 plug-in electrical connection
- LED fault indication
- signal output with HighSide-FET output
- protected against short circuits and overloads



**FS10..**

**Connection diagram FS10**



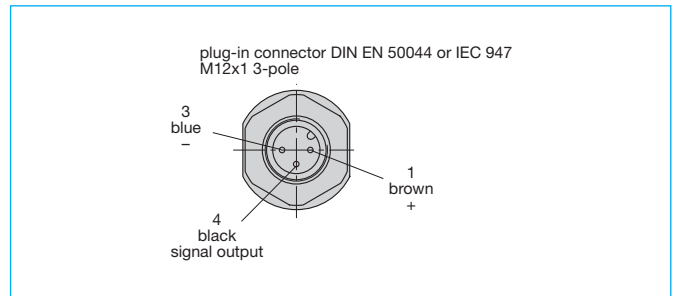
**Ordering information**

**Flow monitor (calorimetric)**

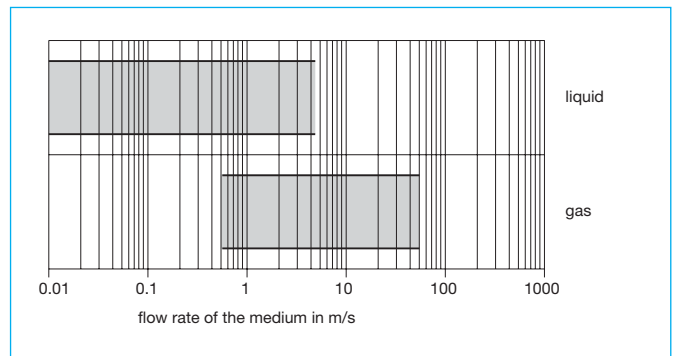
<b>FS10</b>	flow monitor and integral compact housing
<b>Power supply</b>	
<b>U1</b>	DC 24 V
<b>Flow switch point</b>	
<b>MIN</b>	
<b>MAX</b>	
<b>Process connection</b>	
<b>01</b>	G1/2A (to DIN 3852-A), length 36 mm
<b>02</b>	NPT1/2"-14, length 36 mm
<b>11</b>	plug-in type (following DIN ISO 6149), length 18.2 mm for TP or BV adaptes
<b>Media</b>	
<b>A</b>	air, gases
<b>W</b>	water, oil, liquids
<b>Fitting material</b>	
<b>M1</b>	stainless steel 1.4571
<b>Electrical connection</b>	
<b>E12</b>	M12x1, 3-pole
<b>Certification</b>	
<b>T0</b>	without certificate *)
<b>FS10 - U1 MAX 01 W - M1 E12 T0</b>	ordering example

\*) for detailed information please see section 0.

**Electrical connection**



**Flow rate ranges**



**Technical Data ( ambient temperature  $T_U = 25\text{ °C}$ , operating voltage  $U_B = \text{DC } 24\text{ V}$ )**

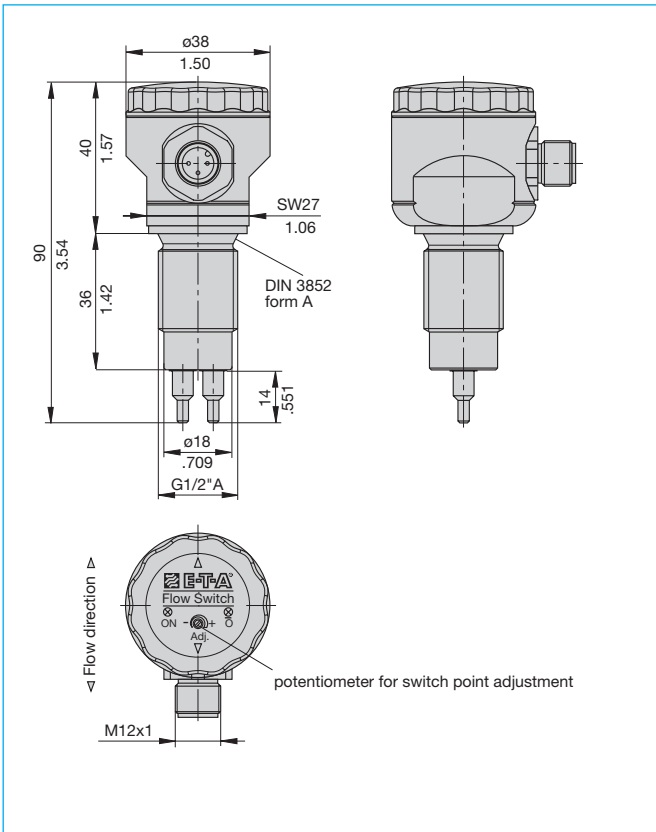
<b>General data</b>		<b>FS10</b>
Media		liquids, gases
Monitoring function	flow speed	switch point (min/max)
	fault indication	LED (yellow)
	signal output	Power Fet, High Side switch, short circuit proof
	max. load	500 mA, inductive load max. 100 mA
Temperature range	media	-25 °C...+100 °C
	ambient	-25 °C...+80 °C
<b>Electrical data</b>		
Operating voltage $U_B$		DC 24 V (18...32 V)
Power consumption (without load)	gases	28 mA $\pm$ 5%
	liquids	57 mA $\pm$ 3%
Status indication		LED (green)
Connection to DIN 50044		M 12 plug-in connection, 3-pole
<b>Flow monitoring</b>		
Flow response level adjustment	air	0.5...50 m/s with atmospheric pressure
	water, oil	0.01...4.5 m/s
Repeatability <sup>(1)</sup>		$\leq \pm 3\%$
Response delay	water	typ. 2 sec <sup>(2)</sup>
	air	typ. 8 sec <sup>(3)</sup>
	oil	typ. 5 sec <sup>(2)</sup>
Switch point drift through temperature change of the medium		approx. $\pm 1.0\%$ /°C
<b>Mechanical data</b>		
Type and size of monitoring head	plug-in	following DIN ISO 6149
	screw-in	G 1/2 A, NPT 1/2"
Pressure resistance of monitoring head	plug-in	100 bar
	screw-in	100 bar
Degree of protection		IP68 (when plugged in)
Materials (standard)	fitting (wetted)	stainless steel 1.4571
	sensor (wetted)	stainless steel 1.4571
	connection sensor/fitting	laser welded
	housing	stainless steel 1.4571
	M12 connector	CuZn, nickel-plated
	cap	PA
	O-ring	Viton
Mass		approx. 240 g

<sup>(1)</sup> of the set value, at constant temperature and flow conditions, and stable thermal conductivity

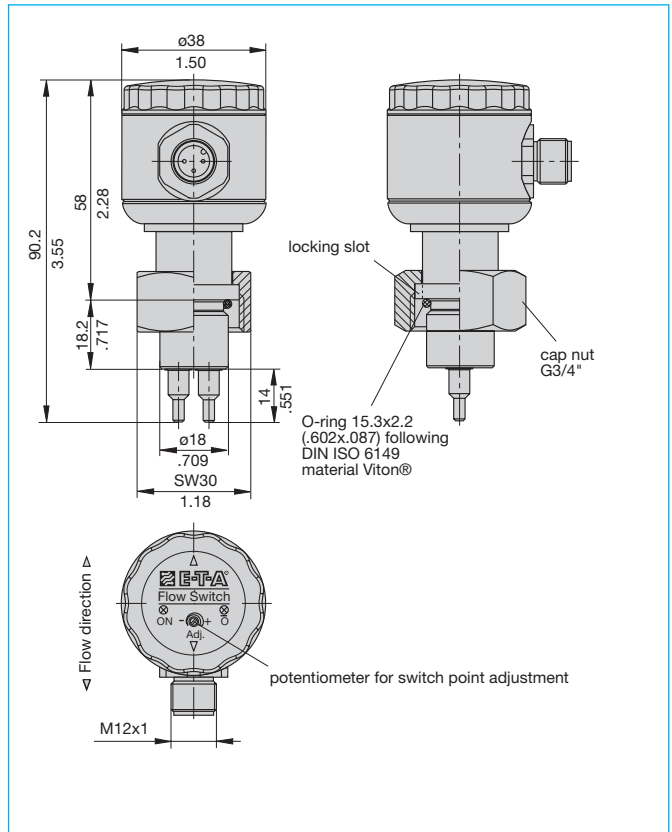
<sup>(2)</sup> delay with the switch point set to 1 m/s and the flow at 2 m/s, after a sudden complete stop

<sup>(3)</sup> delay with the switch point set to 10 m/s and the flow at 20 m/s, after a sudden complete stop

**Dimensions of screw-in type process connection (FS10-U1...01)**



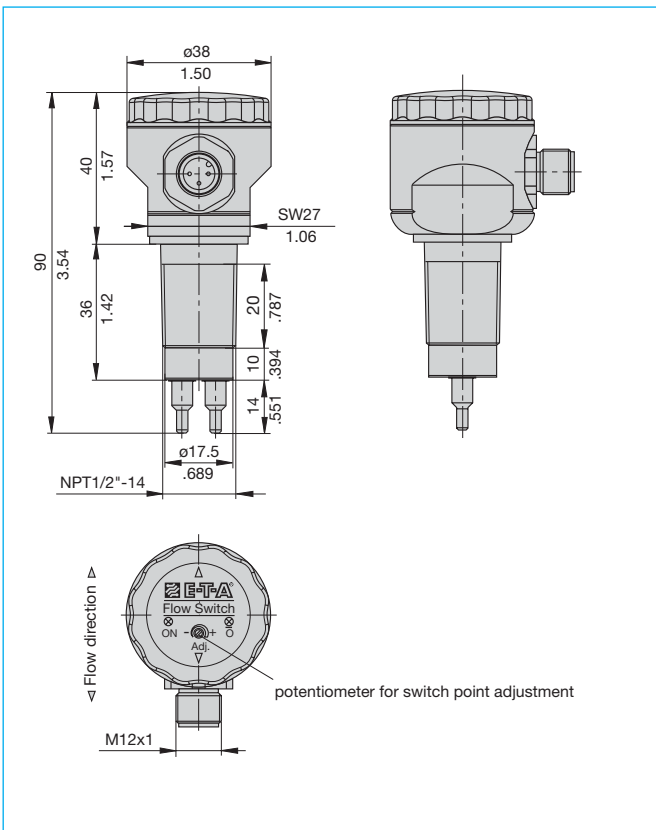
**Dimensions of plug-in type process connection (FS10-U1...11)**



1

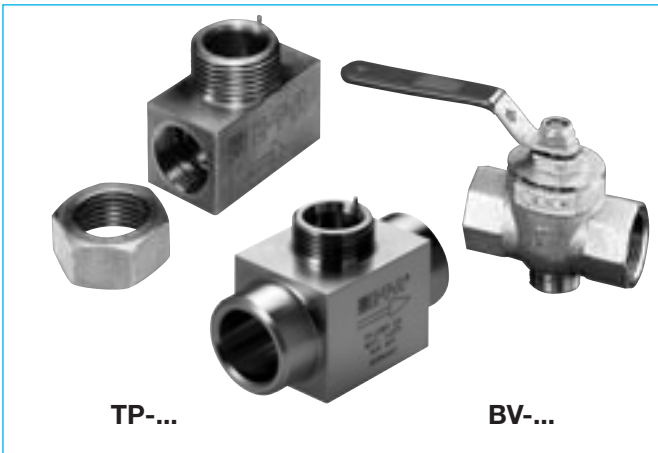
This is a metric design and millimeter dimensions take precedence ( $\frac{mm}{inch}$ )

**Dimensions NPT thread (FS10-U1...02)**



All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

## Sensor adapter TP-.../Ball valve BV-...



TP-...

BV-...

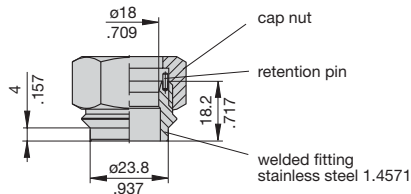
## Ordering information

Type	
BV	ball valve with internal thread
<b>Process connection/Nominal size</b>	
03	DN 25 G1 internal thread length: 88 mm
04	DN 32 G1 1/4 internal thread length: 100 mm
05	DN 40 G1 1/2 internal thread length: 110 mm
06	DN 50 G2 internal thread length: 131 mm
<b>Material of the area exposed to medium</b>	
M3	nickel plated brass, Delrin seal
BV - 03	M3 ordering example

## Accessories

Description	Ref. No.
Blanking plug, brass, with O ring	OZ121Z000186
Union nut, brass	Y 306 901 01
Blanking plug, stainless steel 1.4571/AISI 316 Ti, with viton O ring	OZ121Z000187
Union nut, stainless steel	Y 306 901 03

### Welding set 05 OZ122Z000202



## Description

Sensor adapters TP and BV facilitate correct positioning and exchange of CSP monitoring heads, FM3 or FS10-U1...11 (plug-in type connection) in pipes with process connection DN 15...DN 50. Ball valve BV enables pressure-free installation or removal of CSP monitoring heads and Flow Meter FM3 and FS10-U1...11 (plug-in type connection) simply by closing the input and output pipe. The measuring points are suited to temporary measurements; after completion of the measuring cycle they can be closed by means of blanking plugs.

## Features

- Correct positioning of sensor
- Ease of sensor replacement
- Measuring point can be closed if not used
- Sensor adapter available as screw-in or welding type
- Ball valve also serves as a shutoff valve (both input and out output)

## Ordering information

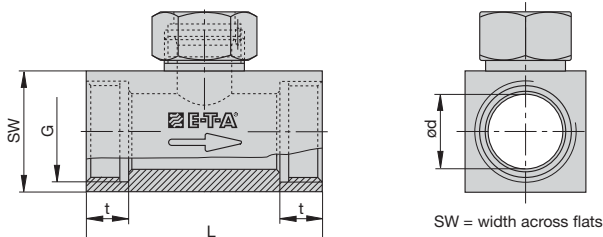
Type	
TP	Sensor adapter with internal thread
<b>Process connection/Nominal size</b>	
01	DN 15 G1/2 internal thread length: 50 mm
02	DN 20 G3/4 internal thread length: 64 mm
03	DN 25 G1 internal thread length: 78 mm
04	DN 32 G1 1/4 internal thread length: 94 mm
05	DN 40 G1 1/2 internal thread length: 110 mm
06	DN 50 G2 internal thread length: 138 mm
<b>Material of the area exposed to medium</b>	
M1	stainless steel 1.4571/AISI 316Ti PN 315 bar
M3	brass (not TP-03..) PN 25 bar
M5	red brass (only TP-03..) PN 16 bar
TP - 01	M3 ordering example

## Ordering information

Type	
TP	Sensor adapter with welding nipples
<b>Process connection/Nominal size</b>	
01	DN 15 dia.d: 16 mm length: 80 mm
02	DN 20 dia.d: 20 mm length: 70 mm
03	DN 25 dia.d: 25 mm length: 80 mm
04	DN 32 dia.d: 32 mm length: 100 mm
05	DN 40 dia.d: 40 mm length: 110 mm
06	DN 50 dia.d: 50 mm length: 140 mm
<b>Material of the area exposed to medium</b>	
M1	stainless steel 1.4571/AISI 316Ti
<b>Process connection</b>	
SA	welded connection
TP - 01	M1 - SA ordering example

## Dimensions

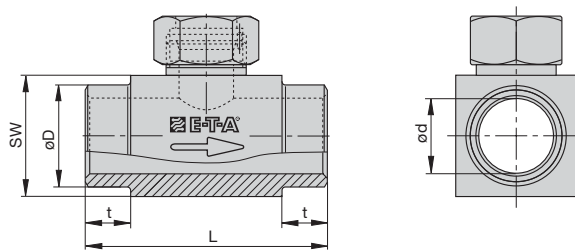
### TP-... Sensor adapter with internal thread



Material stainless steel (-M1): PN 315 bar / 4630.5 PSI  
 Material brass (-M3): PN 25 bar / 367.5 PSI  
 Material red brass (-M5): PN 16 bar / 235.2 PSI

Type	DN		dia. d		G	t		L		SW	
	mm	in.	mm	in.	in.	mm	in.	mm	in.	mm	in.
TP-01 ...	15	.591	16	.630	1/2"	11	.433	50	1.97	27	1.06
TP-02 ...	20	.787	20	.787	3/4"	12	.472	64	2.52	32	1.26
TP-03 ...	25	.984	25	.984	1"	14	.551	78	3.07	40	1.57
TP-04 ...	32	1.26	32	1.26	1 1/4"	15	.591	94	3.70	50	1.97
TP-05 ...	40	1.57	40	1.57	1 1/2"	15	.591	110	4.33	55	2.16
TP-06 ...	50	1.97	50	1.97	2"	19	.748	138	5.43	70	2.76

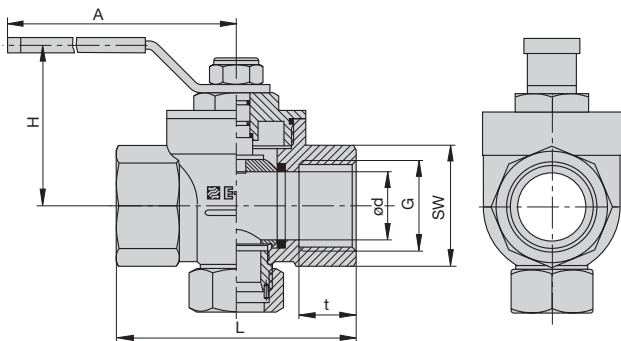
### TP-...M1-SA Sensor adapter with welding nipples



PN 315 bar / 4630.5 PSI

Type	DN		dia. d		dia. D		t		L		SW	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
TP-01M1-SA	15	.591	16	.630	21.3	.839	15	.591	80	3.15	27	1.06
TP-02M1-SA	20	.787	20	.787	26.9	1.06	15	.591	70	2.76	32	1.26
TP-03M1-SA	25	.984	25	.984	33.7	1.33	15	.591	80	3.15	40	1.57
TP-04M1-SA	32	1.26	32	1.26	42.4	1.67	15	.591	100	3.94	50	1.97
TP-05M1-SA	40	1.57	40	1.57	48.3	1.90	15	.591	110	4.33	55	2.16
TP-06M1-SA	50	1.97	50	1.97	60.3	2.37	15	.591	140	5.51	70	2.76

### BV-...M3 Ball valve with internal thread



PN 25 bar / 367.5 PSI

Type	DN		dia. d		G	t		L		SW		H		A	
	mm	in.	mm	in.	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
BV-03M3	25	.984	25	.984	1"	21	.827	88	3.47	41	1.61	59	2.32	115	4.53
BV-04M3	32	1.26	32	1.26	1 1/4"	24	.945	100	3.94	50	1.97	65	2.56	115	4.53
BV-05M3	40	1.57	40	1.57	1 1/2"	24	.945	110	4.33	54	2.13	77	3.03	150	5.91
BV-06M3	50	1.97	50	1.97	2"	28	1.10	131	5.16	70	2.76	85	3.35	150	5.91

This is a metric design and millimeter dimensions take precedence ( $\frac{\text{mm}}{\text{inch}}$ )

**Cable type 24**



**Description**

M12 plug-in electrical connection for connection of supply voltage and switching output.

**Technical data**

**Cable type 24**

**Features:** Protection degree IP68 (only with connector fitted)  
Resistant to chemicals and oils

Temperature range:	-25 °C...+80 °C
Contact resistance:	< 5 mΩ
Current carrying capacity:	4 A
Insulation resistance:	> 10 <sup>9</sup> Ω
Withstand voltage:	2.0 kV <sub>eff.</sub> / 60 s

**Ordering information**

**Cable and cable connector**

**Do + Ka type 24 - 5 m** with connector to IEC60947-5-2, 3-pole  
M12 and PUR insulated cable 3x0.34 mm<sup>2</sup> (AWG 22)

**Do + Ka type 24 - 5 m** ordering example