#### Flow switch for liquid media

## flow-captor 412x.1x

The flow-captor 412x.1x is ideally suited for use in automation processes or other industrial applications where liquid media must be monitored. The sensor works according to the calorimetric measuring principle, fully electronic and without mechanically moving parts. The flow-captor detects the flow velocity of the medium and converts it into an electrical signal.

- precise switching flow monitor
- high switching accuracy even with slower flows
- separate adjustment of set point and range
- display of the flow and the switching point via LED chain
- LED for output status
- robust industrial design (special encapsulation)
- ISO 9001:2015





### **Control and Display Panel**

LED-chain for display of flow

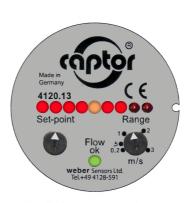
Flashing LED for display of adjusted set-point

Potentiometer for flow setpoint

Potentiometer for adjustment of measuring range from .2 to

LED for display of output status

## **Example of operation**



Measuring range adjusted to 3 m/s = 100 % (9. LED)

Set-point adjusted to 50 % of end value (5. LED)

Flow speed equates 75 % (7. LED)

Green LED is ON: Flow rate is above the adjusted set-point.



1/2" BSP thread standard size



1/4" BSP thread for smaller pipe diameter

The flow-captor 412x.1x is available with different sensor head versions:

- 1/2" BSP thread standard size -
- extended sensor probes with 1/2" BSP thread are available
- NPT thread as option
- 1/4" BSP thread for smaller pipes

#### Sensor heads

The sensor head constructed of only one piece of electropolished stainless steel and without sensor element intruding into the medium. Easy installation by means of T-piece or welded fitting.

For aggressive media other materials can be offered on request.

The housing is constructed of glass fibre reinforced PBTP (Ultradur ®). The electronics inside is epoxy resin completely encapsulated.



flow-captor 412x.1x S101

Cooling version for medium temperature up to 130 °C

#### weber

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## Flow switch for liquid media



# flow-captor 412x.1x

Medium	Technical data					
Sensor data   O - 20 cm/s to 0 - 300 cm/s, continuously adjustable **   Set-point range   approx. 15 % - 90 % of range setting   approx. 15 % of range setting   approx. 16 % of setting   approx. 16	Type		4120.1x	4121.1x		
Measuring range   0 - 20 cm/s to 0 - 300 cm/s, continuously adjustable **   Set-point range   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   approx. 15 % - 90 % of range setting   2 sec 15 sec. depending on range	Medium	V	vater-based	oil-based		
Sel-spoint range approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 15 % - 90 % of range setting approx. 10 % (450 PSI) (4	Sensor data					
Medium temperature         -20 °C to +80 °C           Ambient temperature         -20 °C to +70 °C           Pressure         max. 100 bar (1450 PSI)           Response time         2 sec10 sec. depending on range setting         2 sec15 sec. depending on range setting           Linearity deviation         < 5 % *1         < 5 % *2           Repeatability tolerance         < 2 %         < 5 % *2           Hysteresis         approx. 10 %            Temperature drift         < 0.3 % K            Mechanical data         Protection class         IP65           Protection class         PBTP, glass fiber enteriorced (Ultradur ®)           Material: Nousing         PBTP, glass fiber enteriorced (Ultradur ®)           Material: Sensor head         stainless steel AISI 303 (other material on request)           Sensor head sizes         (A): Sensor head         Intendity of mm, W BSP         Inflow-captor 412x.1x / W BSP         Ength 30 mm, W BSP         Inflow-captor 412x.1x / W BSP         Ength 30 mm, W BSP         Inflow-captor 412x.1x / W BSP S110/67         Inflow-captor 412x.1x / W BSP S110/67 <th< td=""><td>Measuring range</td><td colspan="2"></td><td colspan="2"></td></th<>	Measuring range					
Ambient temperature Pressure		approx. 15 %		approx. 15 % - 90 % of range setting		
Pressure	Medium temperature					
Response time 2 sec10 sec. depending on range setting 2 sec15 sec. depending on range setting Linearity deviation			-20 °C to	+70 °C		
Linearity deviation	Pressure			(1450 PSI)		
Repeatability tolerance						
Hysteresis   approx. 10 %   Temperature drift   < 0,3 % K   Mechanical data   Protection class   PBTP, glass fibre reinforced (Ultradur ®)   Material: Sensor head   Sensor head sizes (A): Sensor head   AlSi 316 (S110/xx): Length from hexagon bolt to sensor tip   Electrical connection   Body dimensions   Betectrical data   Current consumption   Departing voltage   Current consumption   Current						
Temperature drift  Mechanical data Protection class Material: Housing Material: Sensor head Alsi 316 (A): Sensor head Alsi 316 (S110/xx): Length from hexagon bolt to sensor tip  Electrical connection  integrated plug connection with PGB fitting, 2 m oilflex cable 3 x 0,5 mm² Body dimensions Electrical data Operating voltage Current consumption Power at 12x.1x A / ½ BSP S110/45 Power point 412x.1x A / ½ BSP S110/45 Power point 412x.1x A / ½ BSP S110/45 Power point 412x.1x A /		< 2 %				
Pertorection class   Pertorection   P	-					
Protection class  Material: Housing Material: Sensor head Alsi Sensor head	,	< 0,3 % K				
Material: Housing   PBTP, glass fibre reinforced (Ultradur ®)						
Sensor head sizes (A): Sensor head AISI 303 (other material on request)  (A): Sensor head AISI 316 (S110/xx): Length from hexagon bolt to sensor tip  Electrical connection  Electrical connection  Body dimensions  Electrical data  Operating voltage  Current consumption  Power consumption  Power consumption  Power consumption  Power consumption  Switching current  Olitical peration  Filectrical output  Telectrical output  Te						
Sensor head sizes  (A): Sensor head AISI 316 (S110/xx): Length from hexagon bolt to sensor tip  Electrical connection  Body dimensions  Electrical data  Operating voltage  Current consumption  Power consumption  A port of the protection  Circuit						
(A): Sensor head AISI 316 (S110/xx): Length from hexagon bolt to sensor tip  Electrical connection integrated plug connection with PG9 fitting, 2 m oilflex cable 3 x 0,5 mm² BSP  Electrical data Operating voltage Current consumption max. 150 mA (pulsed) Power consumption approx. 1 W Switching current Circuit protection Circuit protection Circuit protection Electrical output 1.2 x 400 mA Circuit protection Circuit protection Electrical output 2.5 voltainax. load Initial operation experiments of fig. Electrical output 3.2 x 5101 Electrical output 4.2 x 5101 Electrical output 5.3 x 5101 Electrical output 6.3 x 0,5 mm² BSP  Electrical output 7.5 x 600 mA Circuit protection 7.5 x 600 mA Circuit protection 8.5 x 600 mA Circuit protection 9.5 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 9.5 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 9.5 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 9.5 x 600 mA Circuit protection 1.2 x 600 mA Circuit protection 9.5 x 600 mA Circuit pro	Material: Sensor head		stainless steel AISI 303 (other material on request)			
AISI 316 (S110/xx): Length from hexagon bolt to sensor tip    Comparison   Comparis		10 mm				
Length from hexagon bolt to sensor tip  Length from hexagon bolt to sensor tip  Length 45 mm, ½" BSP  d) flow-captor 412x.1xA / ½" BSP S110/67 Length 67 mm, ½" BSP  d) flow-captor 412x.1xA / ½" BSP S110/67 Length 97 mm, ½" BSP  e) flow-captor 412x.1xA / ½" BSP S110/67 Length 97 mm, ½" BSP  Electrical connection  Body dimensions  Electrical data  Operating voltage  Current consumption  Switching ournent  Circuit protection  Teverse polarity, short circuit and overload  Voltage drop  Length 90 mm, ½" BSP  18 to 30 VDC, incl. residual ripple  max. 150 mA (pulsed)  approx. 1 W  Switching current  Symbol of the circuit and overload  Voltage drop  Teverse polarity, short circuit and overload  Voltage drop  LED  approx. 10 sec. after connection of power  Electrical output  12 13  Switching condition with flow < switching point  energized, switched  currentless, not switched  ELD  green  green  Temperature data  Type  Medium temperature max.  Ambient temperature max.  Ambient temperature max.  Ambient temperature min.  Flow of the circuit and overload  Currentless, not switched  approx. 10 sec. after connection of power  Electrical output  12 13  Switching condition with flow < switching point  energized, switched  currentless, not switched  energized, switched  energized, switched  energized, switched  approx. 10 sec. after connection of power  Electrical output  130 °C  100	AISI 316 (S110/xx): Length from hexagon bolt					
A				c) flow-captor 412x.1xA / ½" BSP S110/45		
Electrical connection integrated plug connection with PG9 fitting, 2 m oilflex cable 3 x 0,5 mm² see drawing  Electrical data Operating voltage						
Electrical connection   integrated plug connection with PG9 fitting, 2 m oilflex cable 3 x 0,5 mm²				e) flow-captor 412x.1xA / ½" BSP S110/90		
Body dimensions   See drawing	Electrical connection	Length 90 mm, 72 BSF				
Electrical data           Operating voltage         18 to 30 VDC, incl. residual ripple           Current consumption         max. 150 mA (pulsed)           Power consumption         approx. 1 W           Switching current         ≤ 400 mA           Circuit protection         reverse polarity, short circuit and overload           Voltage drop         < 2,5 V at max. load						
Operating voltage         18 to 30 VDC, incl. residual ripple           Current consumption         max. 150 mA (pulsed)           Power consumption         approx. 1 W           Switching current         ≤ 400 mA           Circuit protection         reverse polarity, short circuit and overload           Voltage drop         < 2,5 V at max. load           Initial operation         approx. 10 sec. after connection of power           Electrical output         .12         .13           Switching condition with flow < switching point         energized, switched         currentless, not switched           LED         off         off           Switching condition with flow > switching point         currentless, not switched         energized, switched           LED         green         green           Temperature data           Type         412x.1x S101           Medium temperature in relation to ambient temperature min.         Ambient temperature min.           Medium temperature min.         Ambient temperature min.         Ambient temperature min.			300 dru	wing		
Current consumption       max. 150 mA (pulsed)         Power consumption       approx. 1 W         Switching current       ≤ 400 mA         Circuit protection       reverse polarity, short circuit and overload         Voltage drop       < 2,5 V at max. load		18 to 30 VDC, incl. residual ripple				
Power consumption         approx. 1 W           Switching current         ≤ 400 mA           Circuit protection         reverse polarity, short circuit and overload           Voltage drop         < 2,5 V at max. load	· · · · · · · · · · · · · · · · · · ·					
Switching current         ≤ 400 mA           Circuit protection         reverse polarity, short circuit and overload           Voltage drop         < 2,5 V at max. load	•	· · · · · · · · · · · · · · · · · · ·				
Circuit protection       reverse polarity, short circuit and overload         Voltage drop       < 2,5 V at max. load         Initial operation       approx. 10 sec. after connection of power         Electrical output       12       .13         Switching condition with flow < switching point       energized, switched       currentless, not switched         LED       off       off         Switching condition with flow > switching point       currentless, not switched       energized, switched         LED       green       green         Temperature data         Type       412x.1x S101         Medium temperature in relation to ambient relation to ambient enter in ambient temperature max.       Ambient temperature max.         relation to ambient temperature       130 °C       30 °C         temperature       100 °C       50 °C         100 °C       60 °C       60 °C         90 °C       70 °C         Medium temperature min.       Ambient temperature min.         Ambient temperature min.       Ambient temperature min.						
Voltage drop       < 2,5 V at max. load         Initial operation       approx. 10 sec. after connection of power         Electrical output       .12       .13         Switching condition with flow < switching point       energized, switched       currentless, not switched         LED       green       green         Temperature data         Type       412x.1x S101         Medium temperature in relation to ambient englature       Medium temperature max.       Ambient temperature max.         temperature       130 °C       30 °C         temperature       120 °C       40 °C         110 °C       50 °C         Medium temperature min.       Ambient temperature min.         Medium temperature min.       Ambient temperature min.         Ambient temperature min.       -20 °C						
Initial operation         Electrical output       .12       .13         Switching condition with flow < switching point       energized, switched       currentless, not switched         LED       off       off         Switching condition with flow > switching point       currentless, not switched       energized, switched         LED       green       green         Temperature data         Type       412x.1x S101         Medium temperature in relation to ambient temperature in relation to ambient temperature       Medium temperature max.       Ambient temperature max.         temperature       130 °C       30 °C         110 °C       50 °C         110 °C       50 °C         100 °C       60 °C         90 °C       70 °C         Medium temperature min.       Ambient temperature min.         Ambient temperature min.       -20 °C						
Electrical output         .12         .13           Switching condition with flow < switching point						
Switching condition with flow < switching point energized, switched off  LED off off  Switching condition with flow > switching point currentless, not switched energized, switched  LED green green  Temperature data  Type 412x.1x \$101  Medium temperature in relation to ambient temperature	· · · · · · · · · · · · · · · · · · ·			•		
LED         off         off           Switching condition with flow > switching point         currentless, not switched         energized, switched           LED         green         green           Temperature data           Type         412x.1x \$101           Medium temperature max.         Ambient temperature max.           relation to ambient         130 °C         30 °C           temperature         120 °C         40 °C         40 °C         60 °C         70 °C           Medium temperature min.         Ambient temperature min.         Ambient temperature min.         Ambient temperature min.         -20 °C	•	< switching point	energized, switched	currentless, not switched		
LED         green         green           Temperature data           Type         412x.1x S101           Medium temperature max.         Ambient temperature max.           relation to ambient         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C		5 ,	=			
LED         green         green           Temperature data           Type         412x.1x S101           Medium temperature max.         Ambient temperature max.           relation to ambient         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C		> switching point	currentless, not switched	energized, switched		
Temperature data           Type         412x.1x \$101           Medium temperature in relation to ambient         Medium temperature max.         Ambient temperature max.           temperature         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C		<b>.</b> .		-		
Type         412x.1x S101           Medium temperature in relation to ambient         Medium temperature max.         Ambient temperature max.           temperature         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C	Temperature data		_			
Medium temperature in relation to ambient relation to ambient         Medium temperature max.         Ambient temperature max.           temperature         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C	-	412x.1x S101				
relation to ambient         130 °C         30 °C           temperature         120 °C         40 °C           110 °C         50 °C           100 °C         60 °C           90 °C         70 °C           Medium temperature min.         Ambient temperature min.           -20 °C         -20 °C						
110 °C       50 °C         100 °C       60 °C         90 °C       70 °C         Medium temperature min.       Ambient temperature min.         -20 °C       -20 °C	relation to ambient	120 °C		·		
100 °C       60 °C         90 °C       70 °C         Medium temperature min.       Ambient temperature min.         -20 °C       -20 °C	temperature			40 °C		
90 °C 70 °C  Medium temperature min. Ambient temperature min.  -20 °C -20 °C		110 °C		50 °C		
Medium temperature min.  -20 °C  Ambient temperature min.  -20 °C  -20 °C						
-20 °C -20 °C		90 °C		70 °C		
-20 °C -20 °C		Medium temperature min.		·		
-30 °C -10 °C						
			-30 °C	-10 °C		

#### weber

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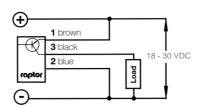
<sup>\*1</sup> related to water
\*2 calibrated with insulation oil type "Shell Diala S4 ZX-I"

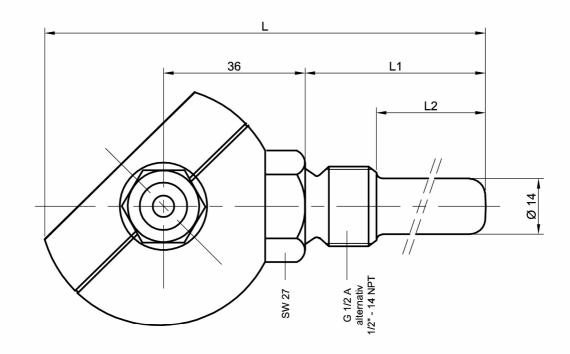
## Flow switch for liquid media

# flow-captor 412x.1x



#### Connection diagram:





Тур	L	L1	L2
Standard	95	30	12,5
S110/45	110	45	27,5
S110/67	132	67	49,5
S110/90	155	90	73,0

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