Calorimetric Flow Monitor

Application

- monitoring flow in pipes
- suitable for hydrous, not oil containing media (water content ≥ 50 %), with media temperatures less than 99 °C (compensated up to 80 °C)

Application Examples

- flow monitoring
- monitoring of pumps, filters, agitators etc., protection against dry running
- monitoring of cooling loops, valves

measurable media	not measurable
drinking water juice milk, beer CIP-media	oil gases oil containing media

Hygienic Design / Process Connection

- by using the Negele weld-in sleeve **EMZ-132** or the build-in system **EHG-.../ 1/2"** a flow optimized, hygienic and easy cleanable measurement point will be achieved (EHEDG)
- CIP-cleaning up to 100 °C
- product contacting materials FDA compatible
- sensor completely made of stainless steel
- other connections: TriClamp, diary flange, DRD, Varivent, APV-Inline, BioControl

FKS-141 with weld-in sleeve EMZ-132

EHG-.../ 1/2"

Features

- calorimetric measurement principle, pulsed heating
- only **one** sensor tip, flow optimized shape
- nearly independent of temperature variations, short operating time
- integrated self protection: automatical turn off the heater if T > 100 °C
- switching output free programmable 15...200 cm/s = 7...100 %
- minimum switching output setting 7 %
- integrated indicator (under the lid), switching output with LED

Options / Accessories

- lid with integrated window (option **-SF**)
- cable ex factory for M12 plug-in

Attention: Use only Negele weld-in systems to ensure a save function of the measurement point! The accuracies of the device are valid for laminar flow profiles.

Specification

Process connection	thread	sensor G1/2", comb. with Negele weld-in sleeves
	torque	max. 20 Nm
Materials	connector head	SS 1.4305, ø 60 mm
	connecting thread, tip	SS 1.4404
	window in lid	PMMA
Temperature ranges	ambient	-20...60 °C
	process	0...100 °C
	compensated range	0...80 °C
	CIP cleaning	up to 100 °C
	30 min. max (SIP)	130 ° (without funct.)
Operation pressure		max. 10 bar
Type of protection		IP69K
Measurement range		15...200 cm/s
Operating time		5 s

Accuracy	at compensated range with pipe diameters	± 10 % of full scale DN25...DN100
Hysteresis	alarm value	10 %
Indicator	7 segment LED red	in % of full scale status output
Electr. connection		M12 plug-in 1.4305
	supply voltage	16...32 VDC
	current consumption	typ. 80 mA
Output		PNP, N.O. / N.C. short circuit proof protected against reverse polarity
Response time	temperature shock	max. 10 s with 40 K

Reference conditions: calibration medium is water with ambient temperature.

Order Code

Type	Process conection	lid with window
FKS-141	G1/2"	x (without) SF

Order example: **FKS-141 / SF**

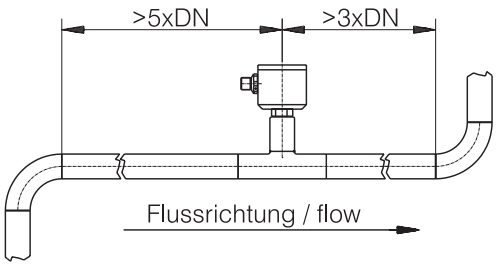
Negele Messtechnik GmbH • Raiffeisenweg 7 • D-87743 Egg a.d. Günz • Telefon +49 (0) 83 33 / 92 04-0 • Fax +49 (0) 83 33 / 92 04-49

Mechanical Connection / Installation:

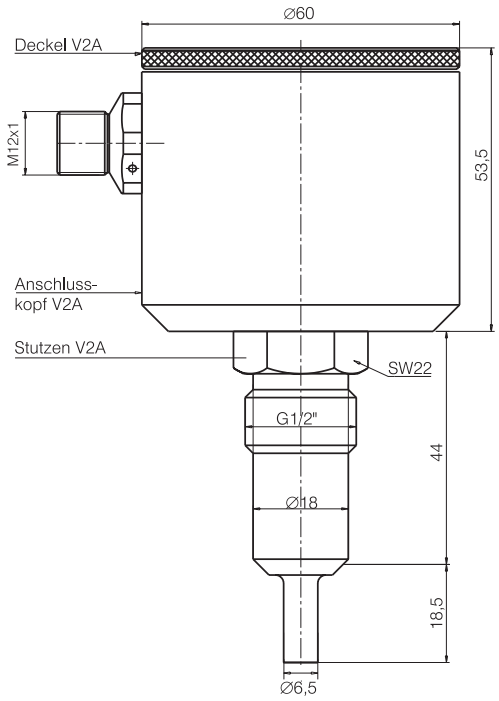
Attention: The cable entry has to point **against the flow** direction. Please notice the marking on the sleeve.

The sensor must be entirely washed around by the medium (fitting in the rising pipeline is recommended).

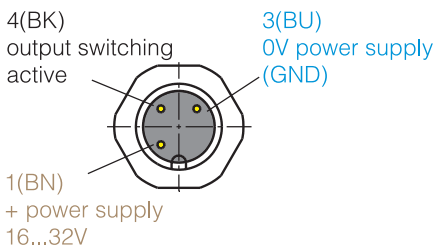
Please note: feeding 5x pipe diameter, flowing-out 3x pipe diameter:



Dimensioned Drawing FKS-141



Electrical Connection FKS-141



1. Setting Instructions FKS-141

- install the **FKS-141** and connect it electrically
- Starting phase: indicator shows "888" (flashing) for about 20s
- after this the indicator shows the velocity in %
- switching output is set according to the switch point

2. Setting Modus and Pushbuttons FKS-141

- calling the setting mode: use 2x ▶, 2x ▲, 2x ■ within10s
- menu head point "SP" (switch point setting) appears in the indicator
- moving in menu points with pushbuttons:
  - ▶ to the right,
  - ▲ to the top, changing figures
  - ■ to the left, store the new parameter, leave the setting modus

3. Setting the Switching Point FKS-141

- enter menu as described above
- from menu head point "SP" edit the old switch point with ▶
- go to the first position with ▶, figure is flashing
- with ▲ set the value you need
- with ▶ edit next position, this figure is flashing, and so on
- push 2x ■ to store the new value
- push 1x ■ to leave the menu mode

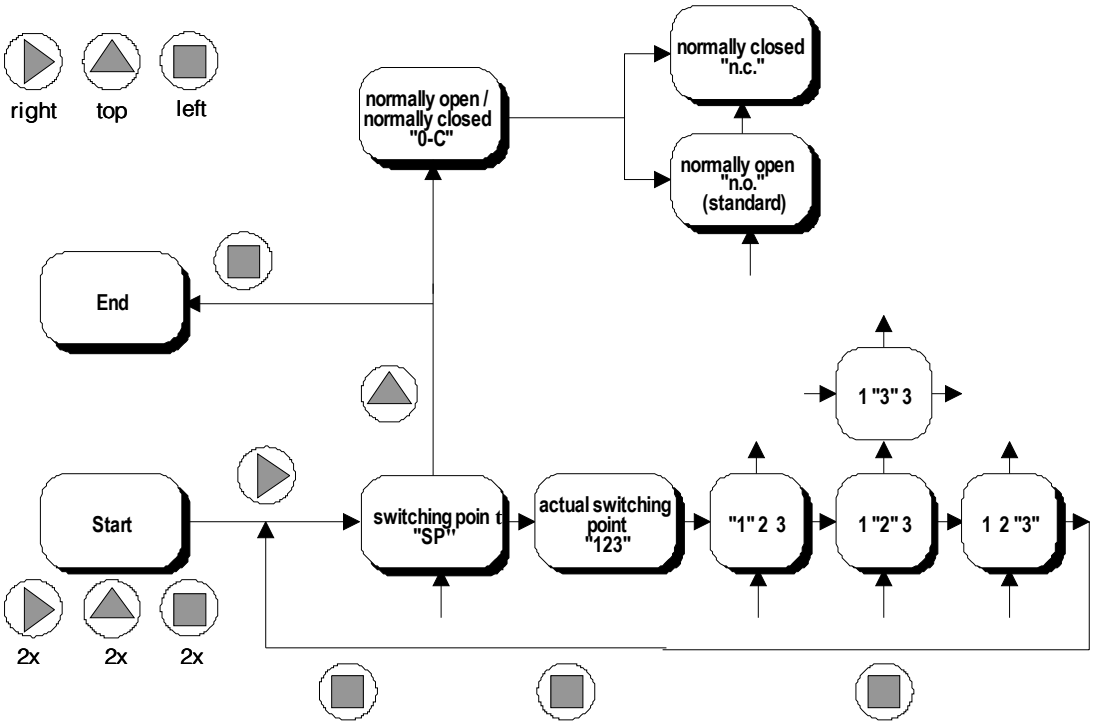
4. Setting of Switching Output FKS-141

- standard setting: normal open "n. o."
- if the function normal closed "n. c." is needed, do following:
- enter menu as described above
- choose menu head point "O-C" with ▲,
- 1x ▶, display shows "n.o." (standard setting)
- 1x ▲, display shows "n.c."
- 2x ■: store the setting and leave setting modus
- push 1x ■ to leave the menu mode

View inside and meaning of buttons

Negele Messtechnik GmbH • Raiffeisenweg 7 • D-87743 Egg a.d. Günz • Telefon +49 (0) 83 33 / 92 04-0 • Fax +49 (0) 83 33 / 92 04-49

Menu Diagramm fks-141



Note:
The flow switch **FKS-141** is furnished with an automatic self protection to avoid damages: if the medium temperature is higher than 100 °C the sensor is turning off the internal heating with a hysteresis of 10 K. The indicator shows 3 lines.

Application Example:
Flow switches **FKS-141** for monitoring a CIP-circuit of a dairy.

Conversion Table m/s to l/min

DN	25	40	50	65	80	100
0,1 m/s	2,9	7,5	11,8	19,9	30,1	47,1
0,2 m/s	5,9	15,1	23,6	39,8	60,3	94,2
0,4 m/s	11,8	30,1	47,1	79,6	120,6	188,4
0,6 m/s	17,7	45,2	70,7	119,4	180,9	282,6
0,8 m/s	23,6	60,3	94,2	159,2	241,2	376,8
1,0 m/s	29,4	75,4	117,8	199,0	301,4	471,0
1,2 m/s	35,3	90,4	141,3	238,8	361,7	565,2
1,4 m/s	41,2	105,5	164,9	278,6	422,0	659,4
1,6 m/s	47,1	120,6	188,4	318,4	482,3	753,6
1,8 m/s	53,0	135,6	212,0	358,2	542,6	847,8
2,0 m/s	58,9	150,7	235,5	398,0	602,9	942,0
2,2 m/s	64,8	165,8	259,1	437,8	663,2	1036,2
2,4 m/s	70,7	180,9	282,6	477,6	723,5	1130,4
2,6 m/s	76,5	195,9	306,2	517,4	783,7	1224,6
2,8 m/s	82,4	211,0	329,7	557,2	844,0	1318,8
3,0 m/s	88,3	226,1	353,3	597,0	904,3	1413,0

Conversion Table in/s to gal/min

1" =	25,4 mm	25,4 mm	38,1 mm	50,8 mm	76,2 mm	101,6 mm
DN		**1"**	**11/2"**	**2"**	**3"**	**4"**
4,0 in/s	0,10 m/s	0,82	1,84	3,26	7,34	13,05
8,0 in/s	0,20 m/s	1,63	3,67	6,53	14,68	26,10
16,0 in/s	0,41 m/s	3,26	7,34	13,05	29,36	52,20
24,0 in/s	0,61 m/s	4,89	11,01	19,58	44,05	78,30
32,0 in/s	0,81 m/s	6,53	14,68	26,10	58,73	104,41
40,0 in/s	1,02 m/s	8,16	18,35	32,63	73,41	130,51
48,0 in/s	1,22 m/s	9,79	22,02	39,15	88,09	156,61
56,0 in/s	1,42 m/s	11,42	25,69	45,68	102,77	182,71
64,0 in/s	1,63 m/s	13,05	29,36	52,20	117,46	208,81
72,0 in/s	1,83 m/s	14,68	33,03	58,73	132,14	234,91
80,0 in/s	2,03 m/s	16,31	36,71	65,25	146,82	261,01
88,0 in/s	2,24 m/s	17,94	40,38	71,78	161,50	287,12
96,0 in/s	2,44 m/s	19,58	44,05	78,30	176,18	313,22
104,0 in/s	2,64 m/s	21,21	47,72	84,83	190,87	339,32
112,0 in/s	2,84 m/s	22,84	51,39	91,36	205,55	365,42
120,0 in/s	3,05 m/s	24,47	55,06	97,88	220,23	391,52

Overview of Deliverable Process Connections (Basic device and adapters order separately!)

FKS-141 with Adapter

Process Connection	Build-in system EHG (DIN 11850 series 2)	Negele weld-in sleeve*	TriClamp*	Varivent-Inline*	DRD* (press ring optional deliverable)	APV-Inline*	Bio Control*	
Size								
DN25	EHG-25/1/2"	EMS-132	AMC-132/ 1"-1,5"	AMV-132/25	-	-	-	
DN40	EHG-40/1/2"	EMS-132	AMC-132/ 1"-1,5"	AMV-132/40	-	AMA-132	AMB-50/1/2" AMB-65/1/2"	
DN50	EHG-50/1/2"	EMS-132	AMC-132/2"	AMV-132/40	AMK-132/50	AMA-132	AMB-50/1/2" AMB-65/1/2"	
DN65	EHG-65/1/2"	EMS-132	AMC-132/3"	AMV-132/40	-	AMA-132	AMB-50/1/2" AMB-65/1/2"	
DN80	EHG-80/1/2"	EMS-132	AMC-132/80	AMV-132/40	-	AMA-132	AMB-50/1/2" AMB-65/1/2"	
DN100	EHG-100/1/2"	EMS-132	AMC-132/4"	AMV-132/40	-	AMA-132	AMB-50/1/2" AMB-65/1/2"	
Order example:		**APV-Inline DN100:**		**AMA-132**				

***Attention:** To get a sure function we recommend a sensor installation into the **EHG**-system. By using other process connections labeled with * it is necessary to have a laminar flow without turbulences at the sensor tip!

Negele Messtechnik GmbH • Raiffeisenweg 7 • D-87743 Egg a.d. Günz • Telefon +49 (0) 83 33 / 92 04-0 • Fax +49 (0) 83 33 / 92 04-49