50046 / 6.6 / 2025-10-24 / BK / EU

Product information FWS-141, FWA-141 **FOOD**

Ultrasonic flow switch FWS-141, FWA-141

Application

- Monitoring of flowing liquids in pipes
- Rough measurement of flow rates and flow volume
- Suitable for media with turbidity ≥ 1 NTU and particle size > 50 µm
  e.g.: drinking water, juice (unfiltered), milk, emulsions, CIP-media

Application examples

- Flow monitoring in pipes from DN 25, e.g. for dry-run protection or monitoring of filters or valves
- Because of its very short reaction time and independence from temperature fluctuations and conductivity, the device is ideally suited for monitoring flow rates in CIP processes

Hygienic design/Process connection

- Hygienic process connection with CLEANadapt
- Versions compliant to 3-A Standard 74- available
- All wetted materials are FDA-conform
- Sensor completely made of stainless steel, sensor tip of PEEK material
- Complete overview of process connections: see product information CLEANadapt
- The Anderson-Negele CLEANadapt system offers a flow-optimized, hygienic and easily sterilizable installation solution for sensors.

Features

- CIP/SIP cleaning up to 100 °C (212 °F)
- Ultrasonic Doppler principle
- Not influenced by temperature fluctuations and conductivity
- Very short reaction time
- Freely programmable setpoint
- Optional: with analog or frequency output (switchable)
- Indicator switching output with LED

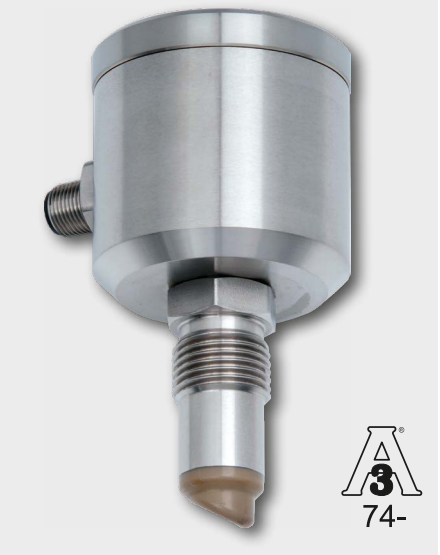
Options/Accessories

- Electrical connection with M12 plug connector
- Cable ex factory for M12 plug connector

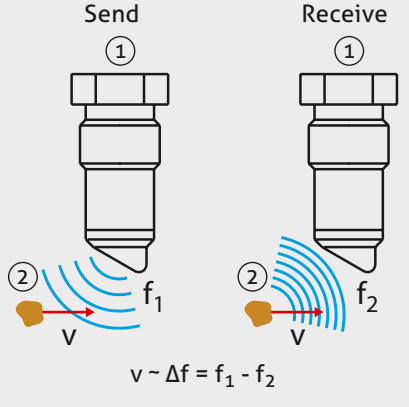
Functional principle

A transmitter (1) sends ultrasound waves into the flowing medium. The ultrasound waves impinge on particles (2), such as sediments, dirt particles or air bubbles, that are moving in the direction of flow. These particles reflect the waves. The receiver now detects the reflected frequency, which has a slight shift because the wavelength was changed by the forward motion of the reflecting particle. The frequency difference between the sent and received frequencies is a measure of the speed of the particle and thus also of the flow rate.

FWS-141/M12, FWA-141/M12



Schematic drawing



Specification		
Process connection	CLEANadapt torque	G1/2" max. 10 Nm
Materials	head connecting thread coupling part	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L) PEEK, FDA number 21 CFR 177.2415
Temperature ranges	ambient process CIP/SIP cleaning	-10...60 °C (14...140 °F) 0...100 °C (32...212 °F) up to 100 °C (212 °F) continuously
Operating pressure		max. 10 bar / 145 psi
Measurement range		0.1...2.5 m/s is equivalent to 100 %
Accuracy		±10 % of full scale acc. to reference conditions*
Reproducibility		< 2 % of full scale
Damping	FWS	1 s
Hysteresis	FWS	0.2 m/s
Temperature drift	zero, span	< 0.02 % of full scale /K
Supply		18...36 V DC
Output	FWS FWA analog (switchable)	PNP (active 25 mA, short-circuit proof) current 4...20 mA frequency 0...1 kHz, square-pulse 18 V DC, ohmic resistance 3...10 kΩ
Electrical connection	cable entry cable connection	M16x1.5, 2-pin terminals 1.5 mm² M12 plug connector, stainless steel 1.4301 (AISI 304)
Protection class		IP 67 (with cable entry) IP 69 K (with cable connection)
Weight		ca. 485 g

***) Reference conditions**:
The calibration medium is water at ambient temperature; turbidity >1 NTU; particle size >50 µm; pipe diameter DN 25.

Note on 3-A Sanitary Standard 74-

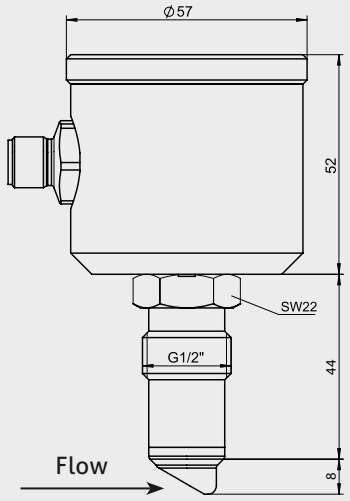
Information on installation according to 3-A standard is available on our website:
www.anderson-negele.com/3A74.pdf

Click on the PDF icon to download the document.

PDF

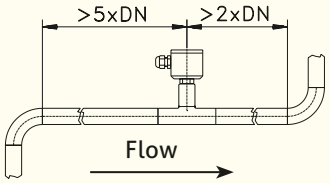
Click or Scan

FWS-141, FWA-141

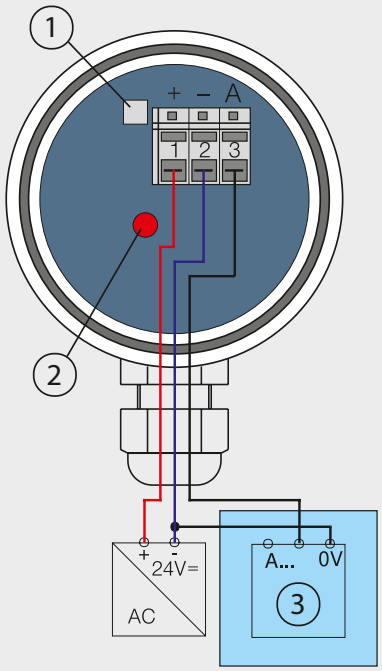


Mechanical connection/Installation

- **Attention**: The cable entry must point in the pipe direction and against the direction of flow!
- Note the marking on the sleeve (marking = cable connection).
- At the sensor mounting point, the pipe must be completely filled with liquid. Therefore, it is recommended that the device be fitted in the rising pipe (upward flow direction).
- Due to the measurement principle, it is not possible to use more than one FWA-141 or FWS-141 device in one pipe.
- Note that the feed-in is 5x the pipe diameter, and the feed-out is 2x the pipe diameter.



Connecting diagram (view from top with open lid)

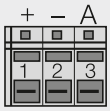


Connecting diagram

1: Button
2: Status LED output
3: Evaluation circuit

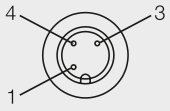
Electrical connection FWS-141

Strip terminal



1: + supply 18...36 V DC
2: - supply
3: output active p-switching

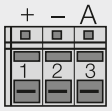
M12 connector



1: + supply 18...36 V DC
3: - supply
4: output active p-switching

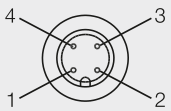
Electrical connection FWA-141

Strip terminal



1: + supply 18...36 V DC
2: - supply
3: output analog, frequency

M12 connector



1: + supply 18...36 V DC
2: output analog, frequency
3: - supply
4: not connected

1. FWS

Teach-in of a setpoint

· Set the flow rate required in the pipe.
· Push the button for three seconds until the LED stops flashing. The setpoint is stored.
· When the setpoint is reached, the LED turns on and the output switches to active.

2. FWA

The device is programmed for analog output mode (4...20 mA). No further adjustments are required.

If you want to switch to frequency output mode (1 kHz) proceed as follows:
· Push the button for three seconds, frequency output is selected, the LED starts flashing.

Set back to the analog output
· Push the button for three seconds, the analog output mode is now selected and the LED is off.

Conversion table m/s to l/min						
DN	**DN 25**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**
Flow [m/s]	**[l/min]**	**[l/min]**	**[l/min]**	**[l/min]**	**[l/min]**	**[l/min]**
0.1	2.9	7.5	11.8	19.9	30	47
0.2	5.9	15.1	23.6	39.8	60	94
0.4	11.8	30.1	47.1	79.6	121	188
0.6	17.7	45.2	70.7	119.4	181	283
0.8	23.6	60.3	94.2	159.2	241	377
1.0	29.4	75.4	117.8	199.0	301	471
1.2	35.3	90.4	141.3	238.8	362	565
1.4	41.2	105.5	164.9	278.6	422	659
1.6	47.1	120.6	188.4	318.4	482	754
1.8	53.0	135.6	212.0	358.2	543	848
2.0	58.9	150.7	235.5	398.0	603	942
2.2	64.8	165.8	259.1	437.8	663	1036
2.4	70.7	180.9	282.6	477.6	723	1130
2.5	73.6	188.4	294.4	497.5	754	1178

Conversion table in/s to gal/min						
DN		**1"**	**1½"**	**2"**	**3"**	**4"**
Flow [in/s]	**Flow [m/s]**	**[gal/min]**	**[gal/min]**	**[gal/min]**	**[gal/min]**	**[gal/min]**
4.0	**0.10**	0.82	1.84	3.26	7.34	13.05
8.0	**0.20**	1.63	3.67	6.53	14.68	26.10
16.0	**0.41**	3.26	7.34	13.05	29.36	52.20
24.0	**0.61**	4.89	11.01	19.58	44.05	78.30
32.0	**0.81**	6.53	14.68	26.10	58.73	104.41
40.0	**1.02**	8.16	18.35	32.63	73.41	130.51
48.0	**1.22**	9.79	22.02	39.15	88.09	156.61
56.0	**1.42**	11.42	25.69	45.68	102.77	182.71
64.0	**1.63**	13.05	29.36	52.20	117.46	208.81
72.0	**1.83**	14.68	33.03	58.73	132.14	234.91
80.0	**2.03**	16.31	36.71	65.25	146.82	261.01
88.0	**2.24**	17.94	40.38	71.78	161.50	287.12
96.0	**2.44**	19.58	44.05	78.30	176.18	313.22
100.0	**2.54**	20.39	45.88	81.57	183.53	326.27

Overview of detectable media		
Medium	**detectable/ measurable**	**not detectable/ not measurable**
fluid pastry	x	
drinking water	x	
juice (unfiltered)	x	
milk	x	
beer (in pressure pipe)		x
weiss beer	X	
cola		x
gases		x
CIP media	x	

Intended use

- Not suitable for filtered media with turbidity < 1 NTU, particle size < 50 µm.

Intended use

- Not suitable for applications in potentially explosive areas.
- Not suitable for applications in safety-relevant system parts (SIL).

Weld-in sleeves and adapters

G1/2"						
Diameter		**Build-in system EHG** (DIN 11865 series 2)	**Weld-in ball**	**Cylindrical sleeve with weld-in ring**	**Varivent-Inline**	
DN25	**1"**	EHG-DIN2-25 / 1/2"	KEM-132 * (for sloped installation)	EMS-132 * (for installation on pulled-out pipes)	AMV-132/DN25	
DN32		EHG-DIN2-32 / 1/2"			AMV-132/DN25	
DN40	**1½"**	EHG-DIN2-40 / 1/2"			AMV-132/DN40	
DN50	**2"**	EHG-DIN2-50 / 1/2"			AMV-132/DN40	
	2½"	-			AMV-132/DN40	
DN65		EHG-DIN2-65 / 1/2"			AMV-132/DN40	
	3"	-			AMV-132/DN40	
DN80		EHG-DIN2-80 / 1/2"			AMV-132/DN40	
DN100		EHG-DIN2-100 / 1/2"			AMV-132/DN40	

*) Deliverable with material 1.4435 (AISI 316L) and 3.1 inspection certificate on request.

Cleaning/Maintenance



· When using a pressure washer, do not point the nozzle directly at the electrical connections.

Standards and guidelines



· Compliance with the applicable regulations and directives is mandatory.

Transport/Storage



· Do not store outside
· Store in an area that is dry and dust-free
· Do not expose to corrosive media
· Protect against solar radiation
· Avoid mechanical shock and vibration
· Storage temperature 0...40 °C (32...104 °F)
· Relative humidity max. 80 %

Reshipment



· Sensors and process connection must be clean and must not be contaminated with hazardous media and/or heat-conductive paste. Please note the cleaning notice!
· To avoid damage of the equipment, use suitable transport packaging only.

Notice on CE



· Applicable directives:
Electromagnetic Compatibility Directive 2014/30/EU
· Compliance with the applicable EU directives is identified by the CE label on the product.
· The operating company is responsible for complying with the guidelines applicable to the entire installation.

Disposal



· Electrical devices should not be disposed of with household trash. They must be recycled in accordance with national laws and regulations.
· Take the device directly to a specialized recycling company and do not use municipal collection points.

Order code (Ⓐ: 3-A compliant)

FW Ultrasonic flow switch CLEANadapt G1/2" Ⓐ

Signal output
- **S-141** With switch output
- **A-141** With analog output

Display and closing cap
- **X** Stainless steel cap without window
- **KF** Stainless steel cap with control window and LED

X **Fixed value**

Electrical connection
- **X** Cable gland M16x1.5
- **M12** M12 connector

FW A - 141 / KF / X / M12

Accessories

PVC-cable with M12 connection, brass nickel-plated, IP69K, shielded

M12-PVC/5G-8m	5 pin, length 8 m
M12-PVC/5G-15m	5 pin, length 15 m
M12-PVC/5G-30m	5 pin, length 30 m

CERT / 2.2 / FWS-FWA	Factory certificate 2.2 acc. to EN 10204 (product-contacting surface only)

Stainless steel cap with control window and LED



ANDERSON INSTRUMENT COMPANY
156 Auriesville Road
Fultonville, NY 12072, USA
Phone 800-833-0081
info@anderson-negele.com
techservice@anderson-negele.com

NEGELE MESSTECHNIK GMBH
Raiffeisenweg 7
87743 Egg an der Guenz, GERMANY
Phone +49 (0) 83 33 . 92 04 - 0
sales@anderson-negele.com
support@anderson-negele.com