FLOWave SAW flowmeter

- Without any parts in the measuring tube
- Conforms to hygienic requirements, CIP/SIP capable
- Ideal for liquids with low or no conductivity
- Digital communication, parameter setting via communicator, display and Wi-Fi
- Compact, lightweight and low energy consumption

Type 8098 can be combined with…

Type 8802
ELEMENT continuous control valve systems

Type 8619
multiCELL Transmitter/Controller

Type 8647
Electropneumatic Automation System

Type ME43
Fieldbus Gateway

The Type 8098 flowmeter is part of the FLOWave product range. It is based on SAW (Surface Acoustic Waves) technology and is mainly designed for applications with the highest hygienic demands. This is achieved by using:
- suitable stainless steel materials
- a measuring tube free of any wetted parts except for the actual tube
- the ideal outer hygienic design.

FLOWave offers a range of integrated functions, including the advantages of flexibility, ease of cleaning, compact dimensions, lightweight, easy installation and handling, and is compliant with numerous standards. Optimal measurement results can be achieved with homogeneous, air and solid free liquids.

Integrated viscosity compensation can be used for higher viscous liquids. Gas and steam cannot be measured; however, their flow does not have any negative effect on the device or its operation. Other liquids flowing through again afterwards are measured correctly as before.

Special functions derived from further process values (density factor, acoustic transmission factor) offer additional information about the particular liquid in use (for details, see data sheet page 8).

General data	
Fluids	Non dangerous liquids complying with article 4, §1 of 2014/68/EU directive (see * on page 4)
Process connection/pipe size acc. to	
·DIN 32676 series B (ISO 1127)	DN15, DN25, DN40 and DN50
·DIN 32676 series C (ASME BPE)	¾", 1", 1½", 2"
·DIN 32676 Series A (DIN 11850)	DN15, DN25, DN40 and DN50
·DIN 11864-2 form A series A or B	Aseptic collar flange (BF)[1]: DN15, DN25, DN40, DN50
·DIN 11864-2 form A series C	Aseptic collar flange (BF)[1]: ¾", 1", 1½", 2"
·DIN 11864-3 form A series A or B	Aseptic collar clamp (BKS)[1]: DN15, DN25, DN40, DN50
·DIN 11864-3 form A series C	Aseptic collar clamp (BKS)[1]: ¾", 1", 1½", 2"
·SMS 3017 (SMS 3008)	DN25, DN40, DN50
Electrical connection	2 x M20 x 1.5 cable glands and 1 x 5 pin M12 male fixed connector (A-coded) or 2 x 4 pin M12 female fixed connectors (D-coded) and 1 x 5 pin M12 male fixed connector (A-coded)
Materials	See materials view on page 6
Wetted parts	
Measurement tube and clamp	Stainless steel 316L/1.4435 BN2
Unwetted parts	
Transmitter and sensor housings	Stainless steel 304/1.4301
Seal / Display	VMQ[2] silicone / Float glass, stainless steel 304/1.4301
Cable glands/blind plugs	Nickel plated brass/Black POM[3] or stainless steel/PA6
4 pin M12 female connector and screwed plug	Stainless steel
5 pin M12 male connector and screwed plug	Nickel plated brass or stainless steel
Pressure compensating element	Diaphragm in ePTFE, o-ring in silicone 60 Shore A, body in stainless steel
Name plate	Matt white top coated polyester
Surface finish[4]	
Measurement tube (inner surface)	Ra < 0.8 µm *(30 µin.)* or Ra < 0.4 µm *(15 µin.)* (electro-polished)
Meas. tube (outer surface), housing	Ra < 1.6 µm (excluding welding seams)

[1] BF = *Bundflansch*, BKS= Bundklemmstutzen
[2] VMQ = Methyl Vinyl Silicone
[3] POM = polyoxymethylene
[4] according to ISO 4288

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General data - continued				
Display module	2.4", monochrome graphic (240 × 160 pixels) German, English, French languages			
Wi-Fi module (Can be used in conjunction with the display. Approved for Europe, USA and Canada)	Wi-Fi module (wireless standards 802.11b/g/n) with integrated web server. Offers the same features as the display. Transmission power: approx. 50 mW Radio range limited to approx. 10 m. Integration into existing Wi-Fi infrastructure possible. Requirements: - Windows 7, 8.1 or 10: IE11, Edge, Google Chrome, from version 53 - Android with Google: Chrome, from version 53 - Apple: Safari, from iOS 9.3.5			
Volume flow rate measurement[1] Measuring range Measurement deviation[2] from 10 % of F.S.* up to F.S.* from 1 % of F.S.* up to 10 % of F.S.* Repeatability from 10 % of F.S.*up to F.S.* from 1 % of F.S.* up to 10 % of F.S.* Refresh time	 0…7 m³/h to 0…90 m³/h (see ordering chart on page 14) ±0.4 % of the measured value <±0.08 % of F.S.* ±0.2 % of the measured value ±0.04 % of F.S.* 40 ms; 80 ms; 130 ms selectable			
Temperature measurement Measuring range Measurement deviation[2] for T° ≤100 °C 100 °C < T° <140 °C Refresh time	 -20…+140 °C *(-4…+284 °F)* ±1 °C ±1.5 % 1 s			
Additional measurement (optional)	See special function on page 8 - ATF: acoustic transmission factor - DF: density factor			
Fluid temperature (the maximum fluid temperature can be restricted by the ambient operating temperature) Maximum temperature gradient	-20…+110 °C *(-4…+230 °F)* Max. conditions for sterilisation process: up to +140 °C for 60 min. 10 °C/s *(18 °F/s)* (measured by the integrated sensor on the device)			
Fluid nominal pressure max for	DN15, DN25, ¾", 1", 1½"	DN40	DN50, 2"	
	PN25	-PN25 for DIN 11866 Series A (DIN 11850) & SMS 3008 pipe -PN16 for DIN 11866 Series A (ISO 1127) pipe	PN16	
Recommended cable for Cable glands -in nickel plated brass -in stainless steel 5 pin M12 male connector (A-coded) 4 pin M12 female connector (D-coded)	 0.2…1.5 mm² cross-section -cable with maximum operating temperature greater than +90 °C; 5…14 mm diameter, shielded cable, -cable with maximum operating temperature greater than +100 °C; 6…12 mm diameter, shielded cable Cable with maximum operating temperature greater than +80 °C; 3…6.5 mm diameter, shielded cable, 0.75 mm² cross-section to connect to 5 pin M12 female connector (A-coded, not supplied) Cable with maximum operating temperature greater than +90 °C; 5e / CAT-5 min. category, 100 m max. length, shielded conductor with minimum STP			
Weight (approx. - kg)	DN15 / ¾"	DN25 / 1"	DN40 / 1½"	DN50 / 2"
Clamp	2	2.2	3	3.2
Flange	2.4	2.7	3.6	3.8

[1] Under reference conditions i.e. measuring fluid = water free from gas bubbles and solids, ambient and water temperature = 23 °C *(73.4 °F)*, and standard refresh time 130 ms, while maintaining the minimum inlet (40 x DN) and outlet (1 x DN) distances and the appropriate internal diameter of the pipes. Deviation from reference conditions can be adjusted through the use of a built-in K factor adjustment or Teach in Procedure.

[2] = "measurement bias" as defined in the standard JCG M 200:2012

* F.S. = of full scale (see ordering chart on page 14)

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Electrical data	
Operating voltage (The minimum voltage to be supplied depends on the fluid temperature and on the ambient operating temperature, see drawing on page 4)	12…35 V DC, filtered and regulated, tolerance: ±10 % connection to main supply: permanent ((through external SELV (Safety Extra Low Voltage) and LPS (Limited Power Source) power supply))
Reversed polarity of DC	Protected
Power consumption (without any consumption of output)	Max. 5 W (for device with 2 x M20 x 1.5 cable glands and 1 x 5 pin M12 connector) or max. 8 W (for device with 2 x 4 pin M12 connectors and 1 x 5 pin M12 connector, Ethernet version) or max. 9 W (for device with 2 x 4 pin M12 connectors and 1 x 5 pin M12 connector, Ethernet version, with display and Wi-Fi module)
Power Source (not suplied)	Limited power source according to UL/EN 60950-1 standards or limited energy circuit according to UL/EN 61010-1 §9.4
Outputs	3 (1 digital, 1 analogue and 1 configurable: digital or analogue)
Digital outputs Transistor	Overload information (through diagnostics software function) Type: NPN or PNP (wiring dependent), open collector, galvanically isolated; Operating modes: pulse (by default), On/Off, threshold, frequency (user configurable) 0…2 kHz, 5…35 V DC, 700 mA max., max. pulse duration: 65 ms; Protected against polarity reversals of DC and overloads
Frequency resolution	0.05 Hz over 0…2 kHz range
Analogue output Current	Open loop detection (through diagnostics software function) 4…20 mA; 3.6 mA or 22 mA to indicate an error (only if 4…20 mA scale selected); galvanically isolated; max. loop impedance: 1300 Ω at 35 V DC, 1000 Ω at 30 V DC, 700 Ω at 24 V DC, 450 Ω at 18 V DC
4…20 mA output uncertainty	±0.04 mA
4…20 mA output resolution	0.8 µA
Environment conditions	
Ambient temperature Operation Storage	Depends on the fluid temperature (see drawing on page 4) -10…+70 °C *(+14…+158 °F)* (for device with 2 x M20 x 1.5 cable glands and 1 x 5 pin M12 connector) or -10…+55 °C *(+14…+131 °F)* (for device with 2 x 4 pin M12 female connectors and 1 x 5 pin M12 connector, Ethernet version) -10…+70 °C *(+14…+158 °F)* / -20…+70 °C *(-4…+158 °F)*
Relative humidity	< 85 %, without condensation
Height above sea level	max. 2000 m
Operating condition	Continuous
Equipment mobility	Fixed
Use	Indoor and outdoor (Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions)
Pollution degree	Degree 2, according to UL/EN 61010-1
Installation category	Category I, according to UL/EN 61010-1

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Standards, directives and certifications	
Protection rating[1]	IP65, IP67 (according to IEC/EN 60529), NEMA 4X (according to NEMA250), if the product is wired and if the cable glands are tightened and the covers are screwed tight. Unused cable glands must be sealed with the stopper gaskets provided (mounted upon delivery of the product). An unused M12 fixed connector must be protected by the screwed plug.
Standards and directives CE	The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of conformity (if applicable).
Pressure	Complying with article 4, §1 of 2014/68/EU directive*
Certificates	EHEDG (Type EL - CLASS I)[2]; 3A (28-05); FDA certificate; inspection certificate 3.1; certification of compliance ASME BPE; calibration certificate; On request: ECR1935/2004 declaration; test report 2.2; certification of conformity for the surface quality DIN 4762, EN ISO 4287, EN ISO 4288; certification of conformity for passivating and electropolishing processes
Certification	
UL-Listed for US and Canada c UL us	UL 61010-1 + CAN/CSA-C22.2 No.61010-1
PROFINET	pending
EtherNet/IP	EtherNet/IP (pending)
EtherCAT	EtherCAT (pending)

[1] Not evaluated by UL

[2] The EHEDG compliance for Clamp DIN 32676 is only valid if used in combination with gaskets from Combifit International B.V.

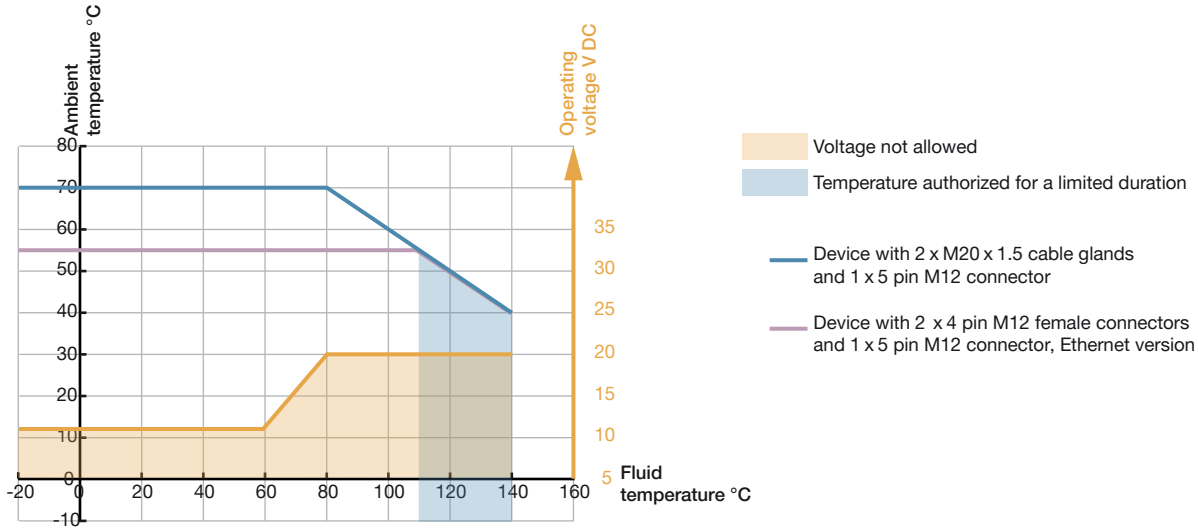
* The device conforms to article 4, §1 of Pressure Equipment Directive 2014/68/EU under the following conditions:

- **used on a pipe** (PS = maximum admissible pressure; DN = nominal diameter of the pipe).

Type of fluid	Conditions
Fluid group 1, article 4, §1.c.i	DN ≤25
Fluid group 2, article 4, §1.c.i	DN ≤32 or PS*DN ≤1000
Fluid group 1, article 4, §1.c.ii	DN ≤25 or PS*DN ≤2000
Fluid group 2, article 4, §1.c.ii	DN ≤200 or PS ≤10 or PS*DN ≤5000

This table is independent of the chemical compatibility of the material and fluid. Please make sure the device materials are compatible with the fluid

Ambient and fluid temperatures



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Technical data – Industrial communication **(Ethernet version)**	
Supported network protocols	Modbus TCP, PROFINET, EtherNet/IP or EtherCAT
LEDs	• 2 Link/Act LEDs (green) • 2 Link LEDs (yellow)
Electrical connection	2 ports 4 pin M12 (D-coded)
Modbus TCP protocol	
Protocol	Internet protocol, version 4 (IPv4)
Network topology	• Tree • Star • Line (open daisy chain)
IP configuration	• Static IP address • Not supported: BOOTP (Bootstrap Protocol); DHCP (Dynamic Host Configuration)
Transmission speed	10 or 100 MBit/s
PROFINET protocol	
PROFINET IO specification	V2.3
Network topology	• Tree • Star • Ring (closed daisy chain) • Line (open daisy chain)
Network management	• LLDP (Link Layer Discovery Protocol) • SNMP V1 (Simple Network Management Protocol) • MIB (Management Information Base)
IP configuration	• DCP (Discovery and Configuration Protocol) • Manual (Device naming and IP setting)
Transmission speed	100 MBit/s full duplex
Maximum supported conformance class	CC-B
Media Redundancy (for ring topology)	MRP client is supported
GSDml file	Available at / Download from: www.burkert.com
EtherNet/IP protocol	
Protocol	Internet protocol, version 4 (IPv4)
Network topology	• Tree • Star • Ring (closed daisy chain) • Line (open daisy chain)
IP configuration	• Static IP address • BOOTP (Bootstrap Protocol) • DHCP (Dynamic Host Configuration Protocol)
Transmission speed	10 or 100 MBit/s
Duplex modes	Half duplex, full duplex, auto-negotiation
MDI modes (Medium Dependant Interface)	auto-MDIX
Predefined standard objects	Identity, Message Router, Assembly, Connection Manager, DLR, QoS, TCP/IP Interface, Ethernet Link object
EDS file	Available at / Download from: www.burkert.com
EtherCAT protocol[1)]	
Industrial Ethernet interface X1, X2	X1: EtherCAT IN, X2: EtherCAT OUT
Maximum number of cyclic input/output data	512 bytes in total
Maximum number of cyclic input data	1024 bytes
Maximum number of cyclic output data	1024 bytes
Acyclic communication (CoE)	• SDO • SDO master-slave • SDO slave-slave (depends on master capacity)
Type	Complex slave
Fieldbus Memory Management Units (FMMUs)	8
Sync Managers	4
Transmission speed	100 Mbit/s

[1)] EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH.

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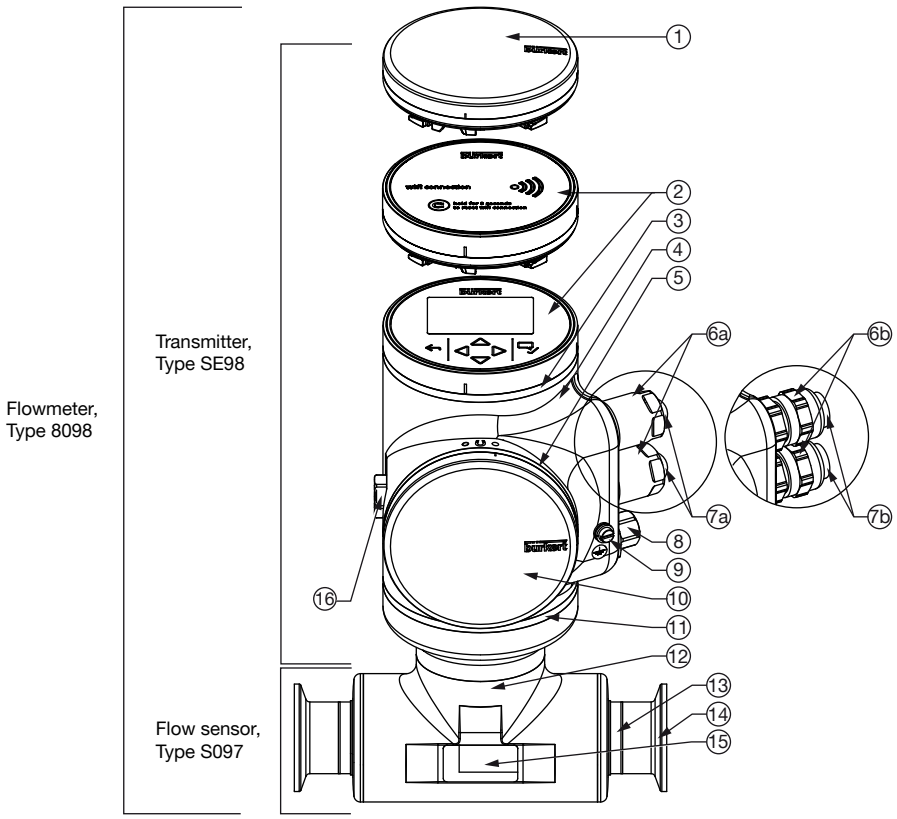
Design and materials view

The **8098 FLOWave flowmeter** consists of a S097 flow sensor and a SE98 transmitter. The flow sensor includes the measurement tube equipped with interdigital transducers, the sensor housing and the process connections in accordance to the standards ISO, ASME BPE, DIN, SMS. At present the sensor size ranges from DN15 to DN50 or from ¾" to 2".The flowmeter is available as a compact device with or without display. The high resolution display includes a capacitive working keypad for all user's interactive actions guided by a user friendly menu system. The output signals include one analogue output and one digital output; while a third output signal can be switched between analogue and digital through parameterization. Electrical connection is done on push-in connectors via two cable glands and/or one M12 connector.

The following pictures describe:
- a device with 2 x M20 x 1.5 cable glands and 1 x 5 pin M12 male connector and with clamp process connection



	Description	Material
1	**Blind cover or**	Stainless steel 304/1.4301
2	**Display module or Wi-Fi module**	Float glass, stainless steel 304/1.4301
3	**Multi-colour LED behind seal** (used for e.g. indicating the status of the product, based on the NAMUR NE 107 standard)	VMQ silicone
4	**Transmitter housing**	Stainless steel 304/1.4301
5	**Seal**	VMQ silicone
6a	**Cable glands**	Stainless steel
6b	**Cable glands**	Nickel plated brass
7a	**Blind plug**	PA6
7b	**Blind plug**	Black POM
8	**5 pin M12 male fixed connector** (wired to büS) **with screwed plug**	Stainless steel (if equipped with 6a) or Nickel plated brass (if equipped with 6b)
9	**Functional earth**	Cylinder screw, washer, washer spring: stainless steel A4 blind rivet nut: stainless steel 1.4578/A4
10	**Blind cover**	Stainless steel 304/1.4301
11	**Seal**	VMQ silicone
12	**Sensor housing**	Stainless steel 304/1.4301
13	**Sensor measurement tube**	Stainless steel 316L/1.4435 BN2
14	**Process connection** (either clamp connections or flange connections)	
15	**Name plate**	Matt white top coated polyester
16	**Pressure compensating element**	Diaphragm: ePTFE; support: polyester; o-ring: silicone 60 Shore A; body: stainless steel (316L/1.4404)

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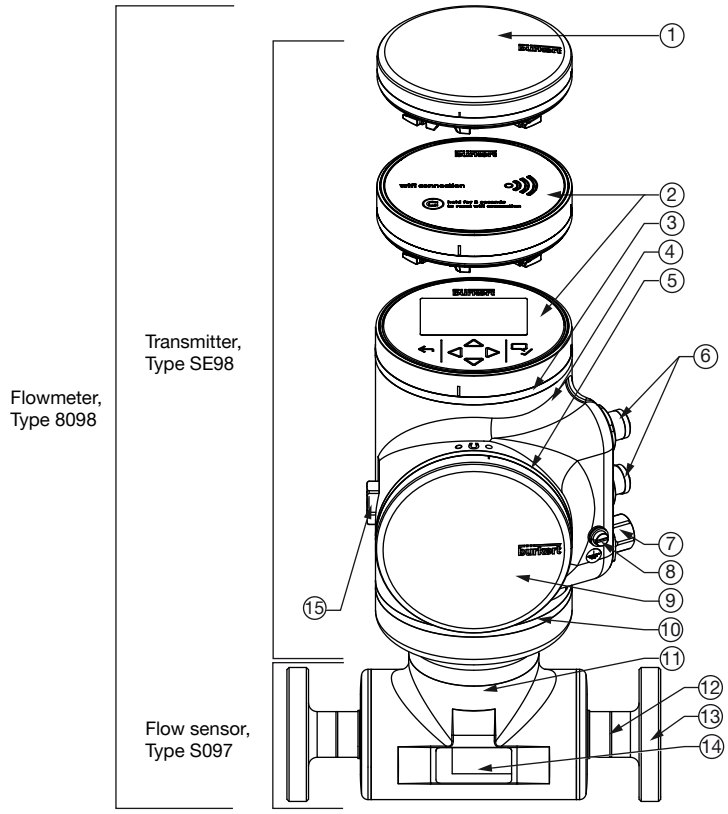
Design and materials view (continued)

- a device (Ethernet version) with 2×4 pin M12 female connectors and 1×5 pin M12 male connector and with flange process connection



	Description	Material
1	**Blind cover or**	Stainless steel 304/1.4301
2	**Display module or Wi-Fi module**	Float glass, stainless steel 304/1.4301
3	**Multi-colour LED behind seal** (used for e.g. indicating the status of the product, based on the NAMUR NE 107 standard)	VMQ silicone
4	**Transmitter housing**	Stainless steel 304/1.4301
5	**Seal**	VMQ silicone
6	**4 pin M12 female fixed connectors with screwed plug**	Stainless steel
7	**5 pin M12 male fixed connector** (wired to büS) **with screwed plug**	Stainless steel
8	**Functional earth**	Cylinder screw, washer, washer spring: stainless steel A4 blind rivet nut: stainless steel 1.4578/A4
9	**Blind cover**	Stainless steel 304/1.4301
10	**Seal**	VMQ silicone
11	**Sensor housing**	Stainless steel 304/1.4301
12	**Sensor measurement tube**	Stainless steel 316L/1.4435 BN2
13	**Process connection** (either clamp connections or flange connections)	
14	**Name plate**	Matt white top coated polyester
15	**Pressure compensating element**	Diaphragm: ePTFE; support: polyester; o-ring: silicone 60 Shore A; body: stainless steel (316L/1.4404)

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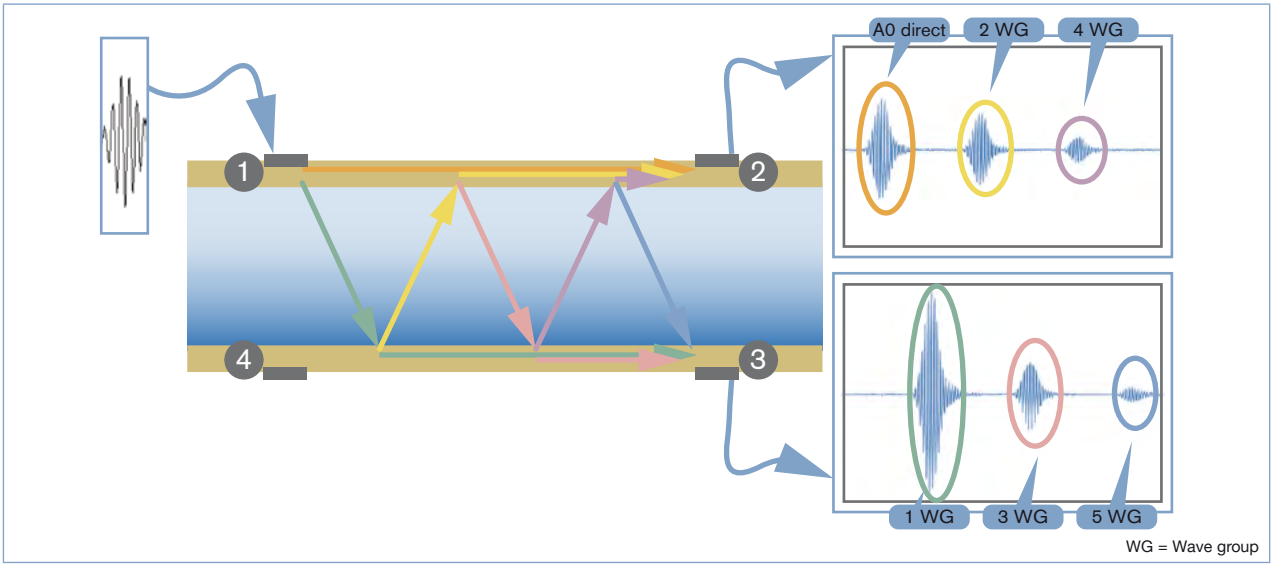
Operating principle

The technology used is based on SAW (Surface Acoustic Waves). The kind of wave propagation is similar to what happens when it comes to earthquakes in the nature.

In the case of FLOWave it is a miniaturized signal, not running on the surface of the earth but on a measurement tube. FLOWave uses so called interdigital transducers which are placed on flattened areas of the tube surface. There are at least 4 of them. Each one acts as emitter as well as receiver. Two of them (no. 1 and 4) are emitting in the forward flow direction, the others (no. 2 and 3) in the backward flow direction. The propagation time is measured from emitter to receiver. The difference between the wave propagation times in the forward and backward directions is proportional to the volume flow.

The high performance measurement is based on:

- Each emitter creates multiple receiving signals at two other receivers
- The results are based on the reception of the signals that pass through the liquid one or more times.
- Several measurements can be performed based on the collected information. Many properties of the liquid can be derived, including the flow velocity, the fraction of the transmitted signal ("acoustic transmission factor"), and the so-called "density factor" (see below), as well as information about the presence of gas bubbles or solid parts.



This figure indicates the receiving signals for just interdigital transducer 1 acting as emitter.
The emitter excitation produces the SAW with a frequency of more than 1 MHz.

There are two effects appearing:

- A wave propagates along the surface of the tube (see orange line).
- A wave couples into the liquid (see green line) and propagates towards the other side of the tube under a certain angle. This angle depends mainly on the propagation speed on the surface and in the liquid, respectively.
- Upon reaching the opposite side of the tube, two effects take place
  - A wave couples into the tube and propagates (see green line) to receiver 3
  - A wave couples out to the liquid (see yellow line) and propagates again to the opposite side of the tube.

These effects get repeated at each reflection, resulting in all the different colour-coded signals indicated in the figure.

Special functions

For detection of gas bubbles and solids the newest firmware version (on from firmware version 01.05.00) includes a so called "acoustic transmission factor" with a measurement range of 10…120 %. The value of this is continuously measured and is directly dependent from gas bubbles and solids in a liquid.
The presence of gas bubbles / solids can be detected via monitoring functions of this process value.
For detection of different liquids respectively differentiation of liquids there is a so called “density factor” available, with a measurement range of 0.8…1.3. This value, which uses water as reference fluid, is also measured continuously, is temperature compensated and so its value is representative in a tight value range for each liquid. Value changes of this process value allow for differentiation of different liquids.

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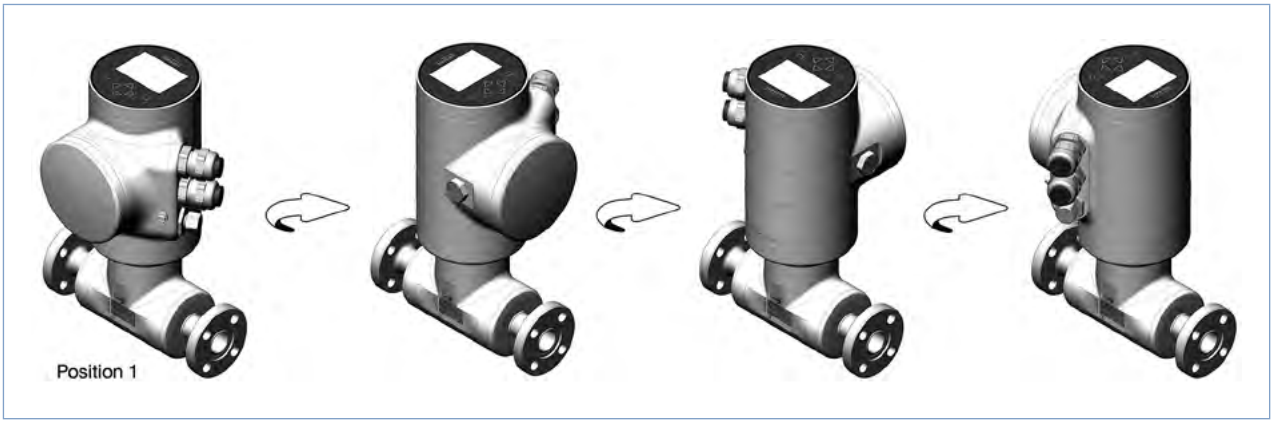
Installation

The product is delivered as described in position 1 in the picture below. The position of the SE98 transmitter can be changed in 90° steps. The position of the display module and the blind cover can also be changed in steps of 90° both on the top of the unit and on the front face.

For safety reasons the display module and blind cover on the top or front are locked. The display module and blind cover can be unlocked with a magnetic key which is included in the delivery of each device.

90° rotation of transmitter



Exchange of blind cover and display

Minimum straight inlet and outlet distances must be observed. According to the pipe design, necessary distances can be bigger or use a flow conditioner to obtain the best results. The minimum inlet and outlet distances can be determined according to the standard ISO 9104.1991.

The device can be installed into either horizontal, oblique or vertical pipes. But an installation on a vertical pipe will be better to prevent air or gas bubbles inside the measurement area.

For proper operation always ensure a totally filled measurement tube.

Conformity to 3A and EHEDG requires an angle of at least 5° (for SMS or series A connections) or 3° (all others available connections) against horizontal to ensure complete draining however this not necessary for proper operation of FLOWave.

The suitable pipe size can be selected using the diagram flow rate/velocity/DN (see diagram on next page).

The flowmeter is not designed for gas or steam flow measurement.

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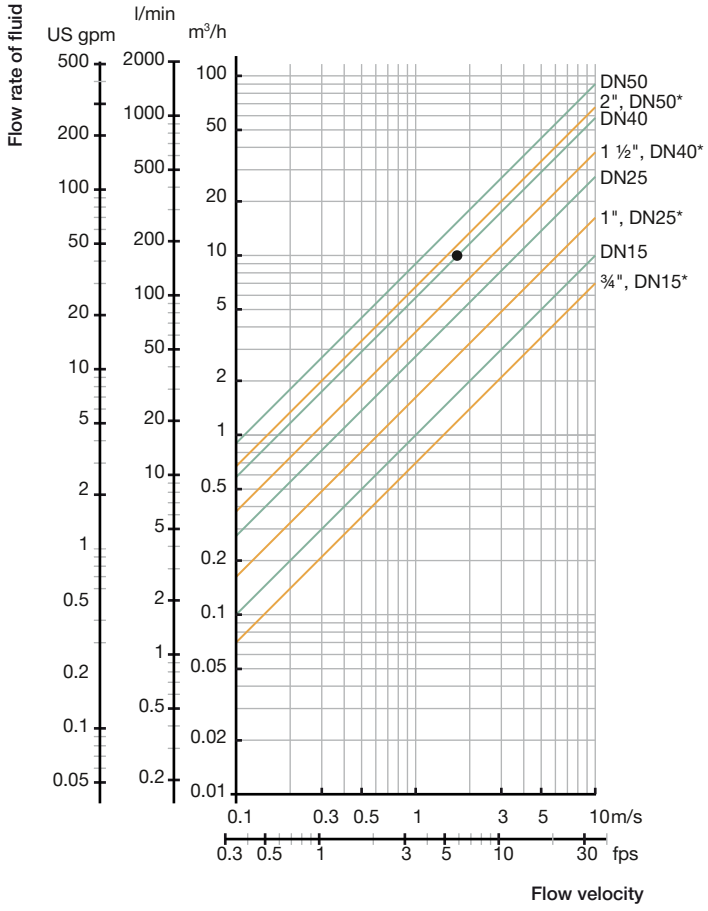
Diagram flow rate/velocity/DN

Example:

- Flow rate: 10 m³/h
- Ideal flow velocity: 1…3 m/s

For these specifications, the diagram indicates a pipe size of DN40



*for:
DIN 32676 series C (ASME BPE)
DIN 32676 series A (DIN 11850)
SMS 3017
DIN 11864-2 form A series A
DIN 11864-3 form A series A

Measurement deviation per measurement area

DN	Pipe standard	Flow velocity [m/s] in sensor tube	0.1		1		10
¾" 15	ASME BPE DIN 11850	Volume flow rate range [m³/h]	0.07		0.7		7
				< ±0.08 % of F.S.		±0.4 % of the measured value	
15	ISO 1127	Volume flow rate range [m³/h]	0.10		1.0		10
				< ±0.08 % of F.S.		±0.4 % of the measured value	
1" 25 25	ASME BPE DIN 11850 SMS 3008	Volume flow rate range [m³/h]	0.14		1.4		14
				< ±0.08 % of F.S.		±0.4 % of the measured value	
25	ISO 1127	Volume flow rate range [m³/h]	0.25		2.5		25
				< ±0.08 % of F.S.		±0.4 % of the measured value	
1½" 40 40	ASME BPE DIN 11850 SMS 3008	Volume flow rate range [m³/h]	0.35		3.5		35
				< ±0.08 % of F.S.		±0.4 % of the measured value	
40	ISO 1127	Volume flow rate range [m³/h]	0.56		5.6		56
				< ±0.08 % of F.S.		±0.4 % of the measured value	
2" 50 50	ASME BPE DIN 11850 SMS 3008	Volume flow rate range [m³/h]	0.64		6.4		64
				< ±0.08 % of F.S.		±0.4 % of the measured value	
50	ISO 1127	Volume flow rate range [m³/h]	0.90		9.0		90
				< ±0.08 % of F.S.		±0.4 % of the measured value	

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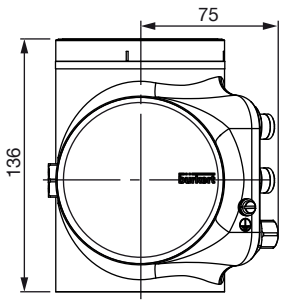
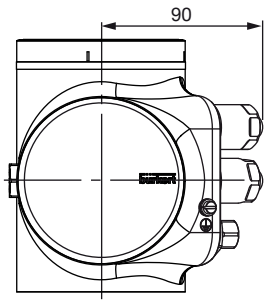
Dimensions [mm]

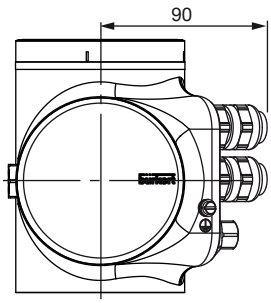
Transmitter SE98



Ethernet version with 2 x 4 pin M12 female connectors and 1 x 5 pin M12 male connector

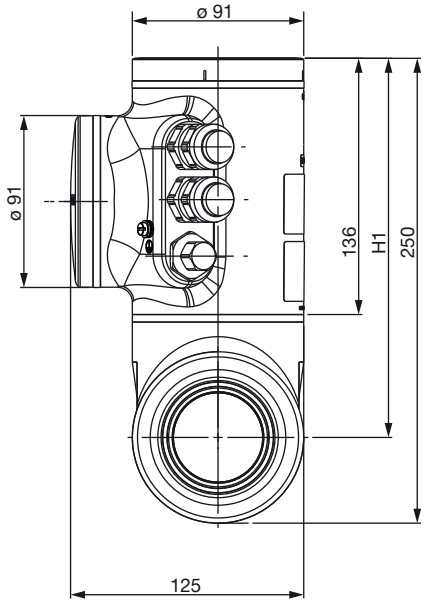


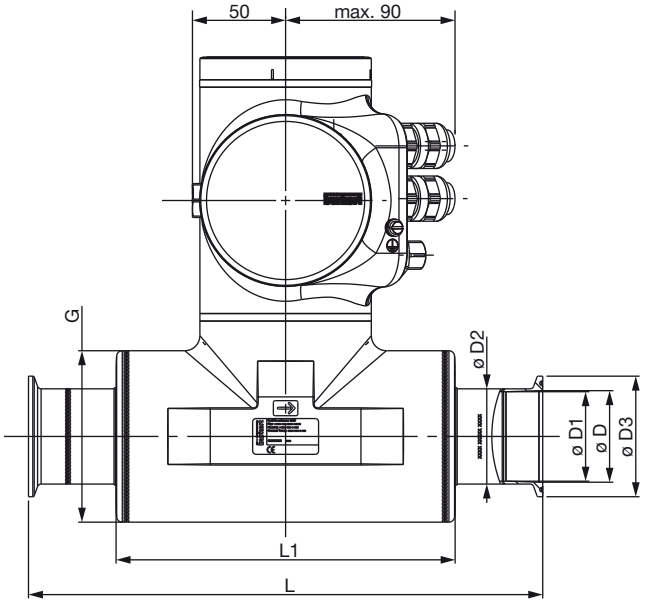
with 2 x M20 x 1.5 cable glands in stainless steel and 1 x 5 pin M12 male connector



with 2 x M20 x 1.5 cable glands in nickel plated brass and 1 x 5 pin M12 male connector

Flowmeter 8098 with clamp according to DIN 32676 series A, B or C, or SMS 3017





Clamp/pipe size		Standard									
[mm]	[inch]	Clamp	Process pipe	H1	D1	D	D2	D3	G	L1	L
15**	-	DIN 32676 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	15.75	16.00	19.05	34.00	60.30	105	166
15	-	DIN 32676 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	18.10	18.10	21.30	50.50	60.30	105	168
15	-	DIN 32676 series B* (ISO 1127)	DIN 11866 series B (ISO 1127)	220	18.10	18.10	21.30	34.00	60.30	105	168
-	¾	DIN 32676 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	15.75	15.75	19.05	25.00	60.30	105	143
25**	-	DIN 32676 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	22.10	26.00	25.40	50.50	60.30	105	236
25	-	DIN 32676 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	29.70	29.70	33.70	50.50	60.30	120	175
-	1	DIN 32676 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	22.10	22.10	25.40	50.50	60.30	105	143
25**	-	SMS 3017	SMS 3008	220	22.10	22.60	25.40	50.50	60.30	105	143
40**	-	DIN 32676 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	34.80	38.00	38.10	50.50	91.00	180	326
40	-	DIN 32676 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	44.30	44.30	48.30	64.00	91.00	180	273
-	1½	DIN 32676 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	34.80	34.80	38.10	50.50	91.00	180	273
40**	-	SMS 3017	SMS 3008	200	34.80	35.60	38.10	50.50	91.00	180	273
50**	-	DIN 32676 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	47.50	50.00	50.80	64.00	91.00	180	306
50	-	DIN 32676 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	56.30	56.30	60.30	77.50	91.00	180	273
-	2	DIN 32676 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	47.50	47.50	50.80	64.00	91.00	180	273
50**	-	SMS 3017	SMS 3008	200	47.50	48.60	50.80	64.00	91.00	180	273

* similar to DIN 32676 series B but with clamp 34.0
** DIN 32676 series A and SMS 3017 based on ASME BPE pipe dimension with adapted concentric clamp design
** design according to EHEDG DOC8 guidelines

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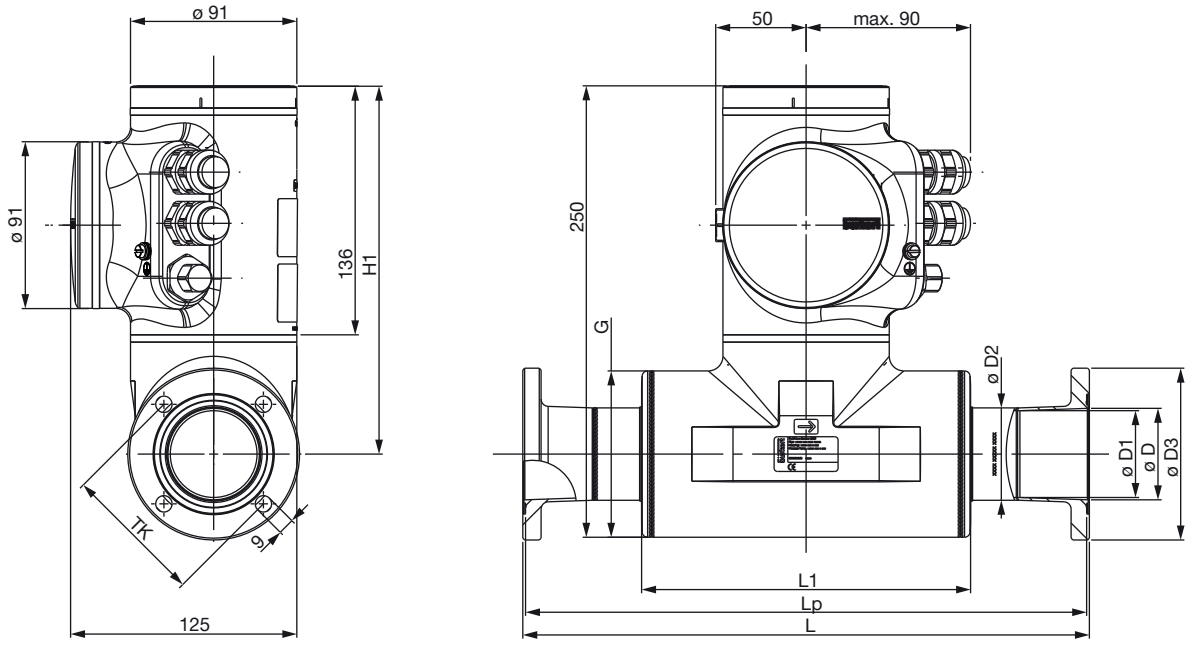
Dimensions [mm] (continued)

Flowmeter 8098 with aseptic collar flange (BF) according to DIN 11864-2 form A series A, B or C



Flange/ pipe size		Standard											
[mm]	[inch]	Flange	Process pipe	H1	TK	D1	D	D2	D3	G	L1	Lp	L
15**	-	DIN 11864-2 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	42	15.75	16.00	19.05	59	60.30	105	163	166
15	-	DIN 11864-2 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	45	18.10	18.10	21.30	62	60.30	105	170	173
-	¾	DIN 11864-2 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	42	15.75	15.75	19.05	59	60.30	105	168	171
25**	-	DIN 11864-2 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	53	22.10	26.00	25.40	70	60.30	105	237	240
25	-	DIN 11864-2 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	57	29.70	29.70	33.70	74	60.30	120	187	190
-	1	DIN 11864-2 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	49	22.10	22.10	25.40	66	60.30	105	165	168
40**	-	DIN 11864-2 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	65	34.80	38.00	38.10	82	91.00	180	327	330
40	-	DIN 11864-2 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	71	44.30	44.30	48.30	88	91.00	180	275	278
-	1½	DIN 11864-2 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	62	34.80	34.80	38.10	79	91.00	180	275	278
50**	-	DIN 11864-2 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	77	47.50	50.00	50.80	94	91.00	180	307	310
50	-	DIN 11864-2 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	85	56.30	56.30	60.30	103	91.00	180	262	265
-	2	DIN 11864-2 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	75	47.50	47.50	50.80	92	91.00	180	275	278

** DIN 11864-2 series A based on ASME BPE pipe dimension with adapted concentric flange design
** design according to EHEDG DOC8 guidelines

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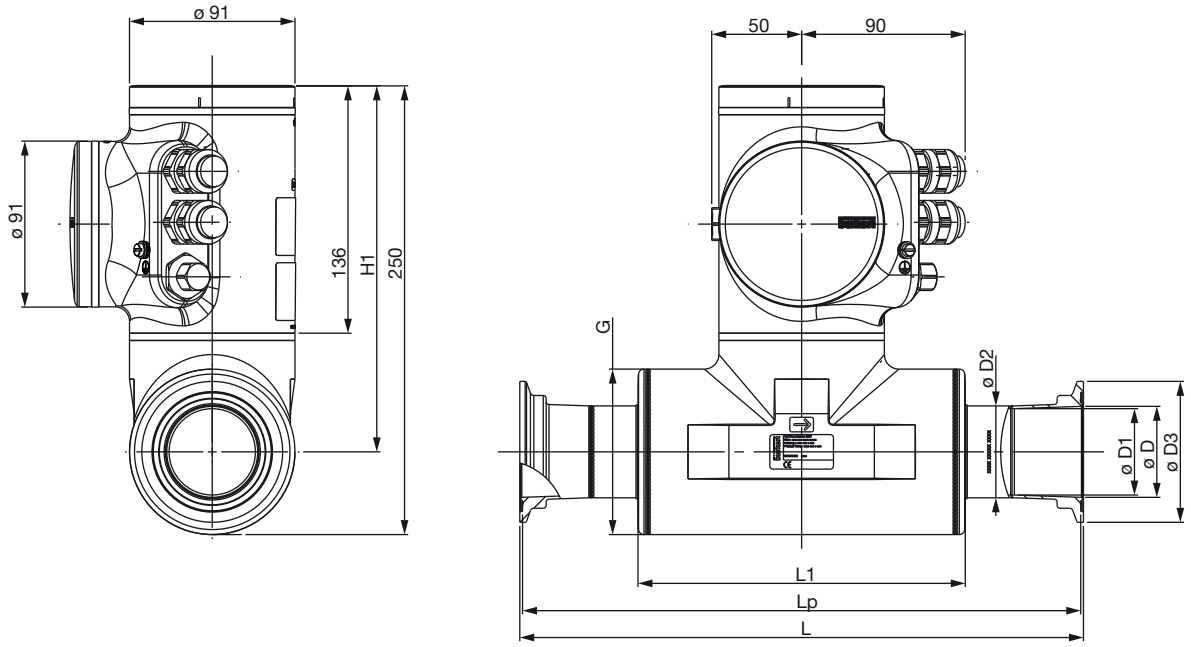
Dimensions [mm] (continued)

Flowmeter 8098 with aseptic collar clamp (BKS) according to DIN 11864-3 form A series A, B or C



Clamp/ pipe size		Standard										
[mm]	[inch]	Clamp	Process pipe	H1	D1	D	D2	D3	G	L1	Lp	L
15**	-	DIN 11864-3 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	15.75	16.00	19.05	34.00	60.30	105	163	166
15	-	DIN 11864-3 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	18.10	18.10	21.30	34.00	60.30	105	166	169
-	¾	DIN 11864-3 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	15.75	15.75	19.05	34.00	60.30	105	164	167
25**	-	DIN 11864-3 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	220	22.10	26.00	25.40	50.50	60.30	105	237	240
25	-	DIN 11864-3 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	220	29.70	29.70	33.70	50.50	60.30	120	187	190
-	1	DIN 11864-3 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	220	22.10	22.10	25.40	50.50	60.30	105	161	164
40**	-	DIN 11864-3 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	34.80	38.00	38.10	64.00	91.00	180	327	330
40	-	DIN 11864-3 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	44.30	44.30	48.30	64.00	91.00	180	277	280
-	1½	DIN 11864-3 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	34.80	34.80	38.10	64.00	91.00	180	275	278
50**	-	DIN 11864-3 series A (DIN 11850)	DIN 11866 series A (DIN 11850)	200	47.50	50.00	50.80	77.50	91.00	180	307	310
50	-	DIN 11864-3 series B (ISO 1127)	DIN 11866 series B (ISO 1127)	200	56.30	56.30	60.30	91.00	91.00	180	268	271
-	2	DIN 11864-3 series C (ASME BPE)	DIN 11866 series C (ASME BPE)	200	47.50	47.50	50.80	77.50	91.00	180	276	279

** DIN 11864-3 series A and SMS 3017 based on ASME BPE pipe dimension with adapted concentric clamp design
** design according to EHEDG DOC8 guidelines

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Ordering information for installation of the 8098 flowmeter in a pipe

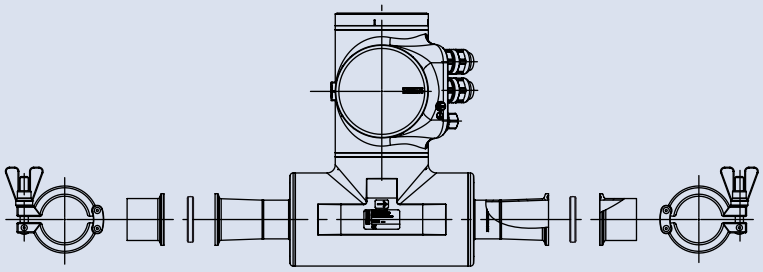
The installation of the flowmeter in a pipe requires the use of counter-connection, seals, fixing elements… depending on the used norm.

For instance with middle-sized devices:

- with clamp according to DIN 32676

To insert a FLOWave DN40 according to DIN 11866 series A (DIN 11850) with DIN 32676 series A (DIN 11850) clamps (with Ra = 0.8 µm) to a pipe, the **correct adapters to be selected and separately ordered** are for instance

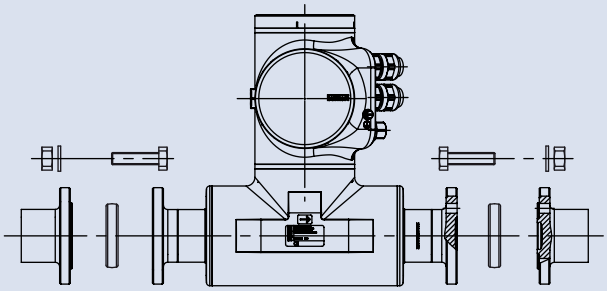
- 2 x **BBS-25** clamp ferrules, article no. 747237 (see separate data sheet) More info.,
- 2 x the appropriate sealings,
- 2 x corresponding clamps, article no. 731164.



- with aseptic collar flange (BF) according to DIN 11864-2 form A

To insert a FLOWave DN40 according to DIN 11866 series B (ISO 1127) with DIN 11864-2 series B (ISO 1127) collar flanges (with Ra = 0.8 µm) to a pipe, the **correct adapters to be selected and separately ordered** are for instance

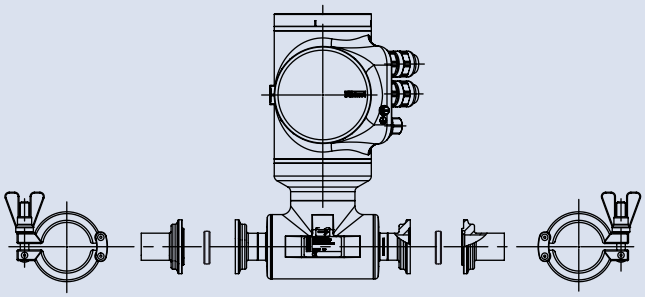
- 2 x **BBS-06** aseptic groove flange, article no. 731860, (see separate data sheet) More info.,
- 2 x the appropriate sealings,
- 8 x the corresponding screws, flat washers and nuts.



- with aseptic collar clamp (BKS) according to DIN 11864-3 form A

To insert a FLOWave DN1" according to DIN 11866 series C (ASME BPE) with DIN 11864-3 series C (ASME BPE) hygienic collar clamps (with Ra = 0.8 µm) to a pipe, the **correct adapters to be selected and separately ordered** are for instance

- 2 x **BBS-05** aseptic groove clamp, article no. 730272, (see separate data sheet) More info.,
- 2 x the appropriate sealings
- 2 x corresponding clamps, article no. 731164.



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Ordering chart for 8098 FLOWave flowmeter

NOTE: To set up a device without a display, please use the USB-büS interface, Type 8920 (has to be ordered separately - see accessories on page 17)
Device with Wi-Fi interface available on request.

Clamp acc. to DIN 32676 series B (ISO 1127) process connection for pipe acc. to DIN 11866 series B (ISO 1127)

All these versions are equipped with the special functions ATF (acoustic transmission factor) and DF (density factor)

Clamp and pipe size [mm]	Measure-ment tube (outer surface), housing	Measure-ment tube (inner surface)	Clamp Dimensions D2 x s - D3 (s = wall thickness)	Operating voltage	Maximal flow rate	Electrical connection	Display	Certifications		Article no.
								3A (28-05)	EHEDG[1)]	
15	1.6 µm	0.8 µm	21.3×1.6 - 50.5	12…35 V DC	10 m³/h	2 cable glands* M20×1.5 +1×5 pin M12 male connector	Yes	Yes	Yes	566187
			21.3×1.6 - 34.0				Yes	Yes	No	566235
			21.3×1.6 - 50.5				No	Yes	Yes	566191
			21.3×1.6 - 34.0				No	Yes	No	566236
		0.4 µm	21.3×1.6 - 50.5				Yes	Yes	Yes	566195
			21.3×1.6 - 34.0				Yes	Yes	No	566237
			21.3×1.6 - 50.5				No	Yes	Yes	566199
			21.3×1.6 - 34.0				No	Yes	No	566238
25	1.6 µm	0.8 µm	33.7×2.0 - 50.5	12…35 V DC	25 m³/h	2 cable glands* M20×1.5 +1×5 pin M12 male connector	Yes	Yes	Yes	566188
							No	Yes	Yes	566192
		0.4 µm					Yes	Yes	Yes	566196
							No	Yes	Yes	566200
40	1.6 µm	0.8 µm	48.3×2.0 - 64.0	12…35 V DC	56 m³/h	2 cable glands* M20×1.5 +1×5 pin M12 male connector	Yes	Yes	Yes	566189
							No	Yes	Yes	566193
		0.4 µm					Yes	Yes	Yes	566197
							No	Yes	Yes	566201
50	1.6 µm	0.8 µm	60.3×2.0 - 77.5	12…35 V DC	90 m³/h	2 cable glands* M20×1.5 +1×5 pin M12 male connector	Yes	Yes	Yes	566190
							No	Yes	Yes	566194
		0.4 µm					Yes	Yes	Yes	566198
							No	Yes	Yes	566202

* Cable gland in nickel plated brass

[1)] **The EHEDG compliance is only valid if used in combination with gaskets from Combifit International B.V.**

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Ordering chart for 8098 FLOWave flowmeter (continued)

NOTE: To set up a device without a display, please use the USB-büS interface, Type 8920 (has to be ordered separately - see accessories on page 17)
Device with Wi-Fi interface available on request.

Clamp acc. to DIN 32676 series C (ASME BPE) process connection for pipe acc. to DIN 11866 series C (ASME BPE)

All these versions are equipped with the special functions ATF (acoustic transmission factor) and DF (density factor)

Clamp and pipe size [inch]	Measurement tube (outer surface), housing	Measurement tube (inner surface)	Clamp dimensions D2 x s - D3 (s = wall thickness)	Operating voltage	Maximal flow rate	Electrical connection	Display	Certifications 3A (28-05)	Certifications EHEDG[1)]	Certifications UL	Article no.
¾	1.6 µm	0.8 µm	19.05 × 1.65 - 25.0	12…35 V DC	7 m³/h	2 cable glands* M20 × 1.5 + 1 × 5 pin M12 male connector	Yes	Yes	Yes	No	566203
							No	Yes	Yes	No	566207
		0.4 µm					Yes	Yes	Yes	No	566211
							No	Yes	Yes	No	566215
							Yes	Yes	Yes	Yes	569675
						2 × 4 pin M12 female connectors + 1 × 5 pin M12 male connector (Ethernet version)	Yes	Yes	Yes	No	570444
							Yes	Yes	Yes	Pending	569679
1	1.6 µm	0.8 µm	25.4 × 1.65 - 50.5	12…35 V DC	14 m³/h	2 cable glands* M20 × 1.5 + 1 × 5 pin M12 male connector	Yes	Yes	Yes	No	566204
							No	Yes	Yes	No	566208
		0.4 µm					Yes	Yes	Yes	No	566212
							No	Yes	Yes	No	566216
							Yes	Yes	Yes	Yes	569676
						2 × 4 pin M12 female connectors and 1 × 5 pin M12 male connector (Ethernet version)	Yes	Yes	Yes	No	570445
							Yes	Yes	Yes	Pending	569680
1½	1.6 µm	0.8 µm	38.1 × 1.65 - 50.5	12…35 V DC	35 m³/h	2 cable glands* M20 × 1.5 + 1 × 5 pin M12 male connector	Yes	Yes	Yes	No	566205
							No	Yes	Yes	No	566209
		0.4 µm					Yes	Yes	Yes	No	566213
							No	Yes	Yes	No	566217
							Yes	Yes	Yes	Yes	569677
						2 × 4 pin M12 female connectors and 1 × 5 pin M12 male connector (Ethernet version)	Yes	Yes	Yes	No	570446
							Yes	Yes	Yes	Pending	569681
2	1.6 µm	0.8 µm	50.8 × 1.65 - 64.0	12…35 V DC	64 m³/h	2 cable glands* M20 × 1.5 + 1 × 5 pin M12 male connector	Yes	Yes	Yes	No	566206
							No	Yes	Yes	No	566210
		0.4 µm					Yes	Yes	Yes	No	566214
							No	Yes	Yes	No	566218
							Yes	Yes	Yes	Yes	569678
						2 × 4 pin M12 female connectors and 1 × 5 pin M12 male connector (Ethernet version)	Yes	Yes	Yes	No	570447
							Yes	Yes	Yes	Pending	569682

* Cable gland in nickel plated brass

[1)] **The EHEDG compliance is only valid if used in combination with gaskets from Combifit International B.V.**

Further versions on request

For any other version, please use the quote request table on page 18.

3D model available on the Type 8098 flowmeter web page More info. **under "Applications & Tools".**

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Ordering chart for accessories for Type 8098 (has to be ordered separately)

Specification		Article no.
Display module, Type ME31		265468
Blind cover in stainless steel 304/1.4301		265467
	USB-büS-Interface , Type 8920 (see drawing below)	772426
	Unlocking magnetic key	690309
	5 pin M12 female straight cable plug with plastic threaded locking ring, to be wired	917116
	5 pin M12 female and male straight cable plug moulded on cable (1 m, shielded)	772404
	5 pin M12 female and male straight cable plug moulded on cable (3 m, shielded)	772405

USB-büS-Interface

CD - Communicator
(30-day license without registration, update and licensing over Burkert home page) More info.

Cable with 5 pin M12 plug, mini USB and circular plug-in connectors for power supply

büS Stick -
(Adaptor USB - büS/CANopen)

5 pin M12 male connector wired on free end cable

Quick-Start

Power supply
100…240 V AC/ 24 V DC 1 A

Adaptors for power supply worldwide use

büS terminating resistor on büS Y-splitter

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bürkert

Note
You can fill out the fields directly in the PDF file before printing out the form.

Standard configuration – request for quotation

Please fill out this form and send to your local Bürkert Sales Centre with your inquiry or order.

Company:	Contact person:
Customer no.:	Dept:
Address:	Tel./Fax:
Town / Postcode:	E-Mail:

= Mandatory fields **Quantity:** **Desired delivery date:**

Operating data

Process fluid

Type of fluid [X] **Liquids**

	min.	max.	Unit
Flow rate (Q)[1]			
Temperature			
Absolute pressure			
Viscosity			
Density			

[1] Standard unit: Fluid Q = m^3/h

Process connection

Pipe DIN 11850	**Pipe ISO 1127**	**Pipe ASME BPE**	**Pipe SMS 3008**
Clamp DIN 32676 (Index 1)	Clamp DIN 32676 (Index 1)	Clamp DIN 32676 (Index 1)	SMS 3017 (Index 2)
Clamp DIN 11864-3 (Index 2)	Clamp DIN 11864-3 (Index 2)	Clamp DIN 11864-3 (Index 2)	
Flange DIN 11864-2 (Index 2)	Flange DIN 11864-2 (Index 2)	Flange DIN 11864-2 (Index 2)	

index 1: 3A & EHEDG certificate available
index 2: 3A & EHEDG certificate pending

Additional configuration

Electrical connection	Cable glands and M12 male connector (A-coded), in nickel plated brass (standard version)	Cable glands and M12 male connector (A-coded), in stainless steel (Full stainless steel version)	M12 female connectors (D-coded) and M12 male connector (A-coded) in stainless steel (Ethernet version)
Surface finish (inner surface)	Ra < 0.8 µm	Ra < 0.4 µm	
Display module	With	Without	
Wi-Fi module (only for EU and north America)	With	Without	
Certification	UL listed 1 + CULus		
Ethernet protocols	Modbus TCP	PROFINET	EtherNet/IP
	EtherCAT®		
Special functions	With density factor (DF)	Without density factor (DF)	
	With acoustic transmission factor (ATF)	Without acoustic transmission factor (ATF)	

Certification

Test report 2.2 acc. to EN 10204 (article no. 803722)	EHEDG - TYPE EL-CLASS I[1] (included in delivery)
Inspection certificate 3.1 acc. to EN 10204 (included in delivery)	3A -28-05 (included in delivery)
Certification of conformity for the surface quality DIN 4762; EN ISO 4287; EN ISO 4288 (article no. 804175)	Calibration certificate (included in delivery)
Certification of conformity for passivating and electropolishing processes (article no. 444900)	FDA certificate (included in delivery)
Certification of compliance ASME BPE (included in delivery)	

Reset form

[1] The EHEDG compliance for DIN 32676 is only valid if used in combination with gaskets from Combifit International B.V.
Note: If a certification which is not included in delivery with the FLOWave is requested, please order it separately. If you want to order one or more later, please contact your Bürkert office.

To find your nearest Bürkert facility, click on the orange box → **www.burkert.com**

In case of special application conditions, please consult for advice.

Subject to alteration.

1811/8_EU-en_00895282

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