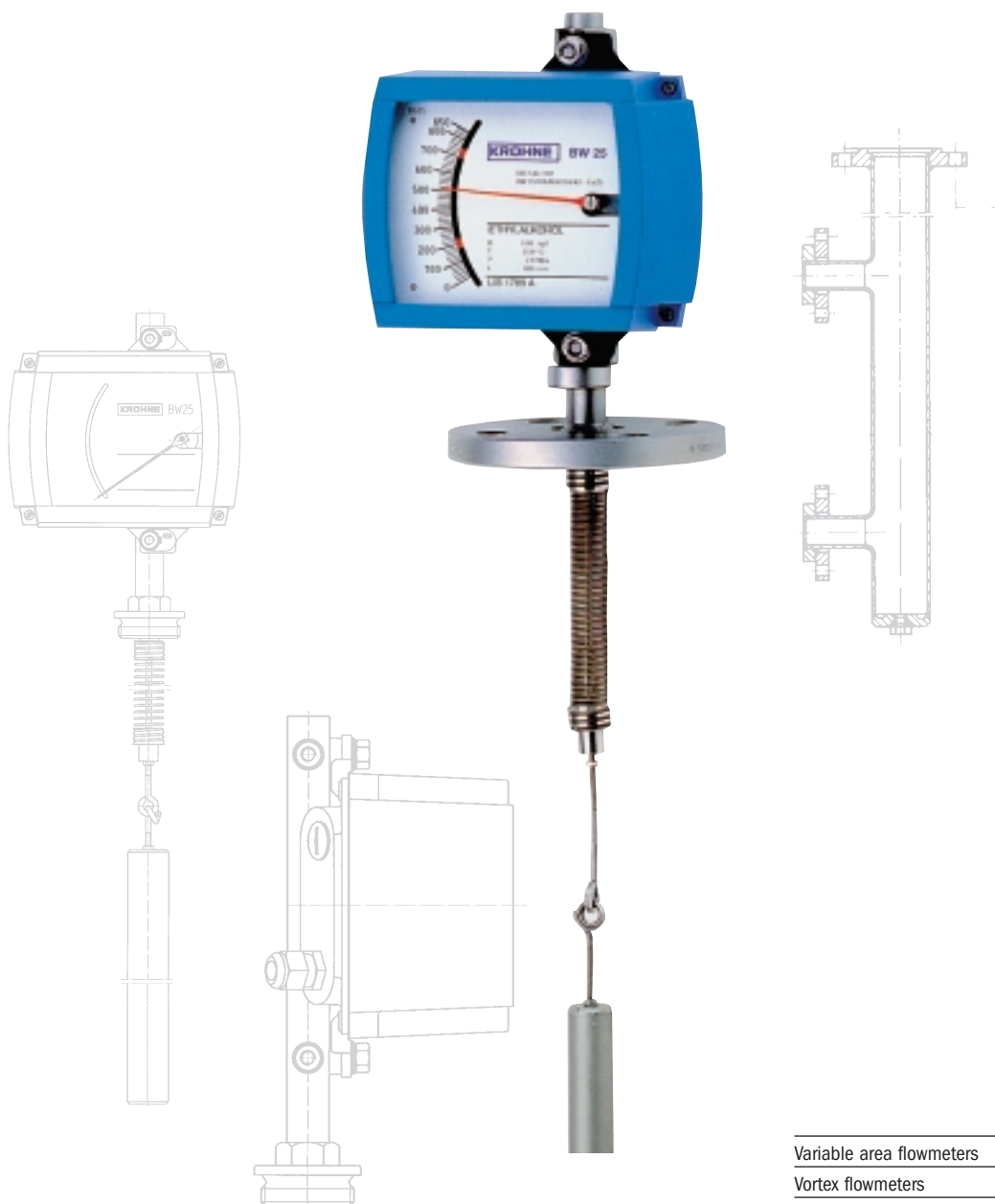


## Liquid level indicator BW 25



Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

**Level measuring instruments**

Communications engineering

Engineering systems & solutions



## Liquid level indicator BW 25

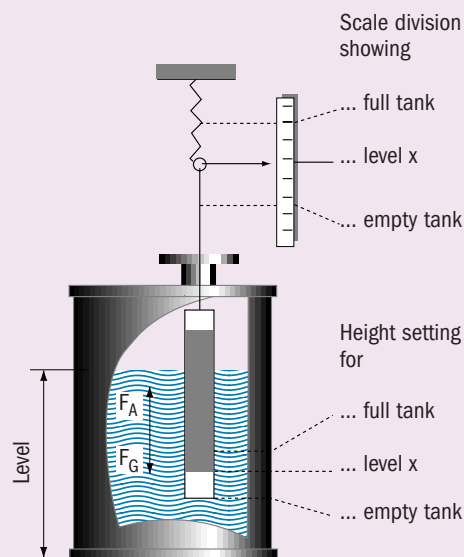
Level measurement of liquids, even at high pressures using the displacement principle

### Operating principle

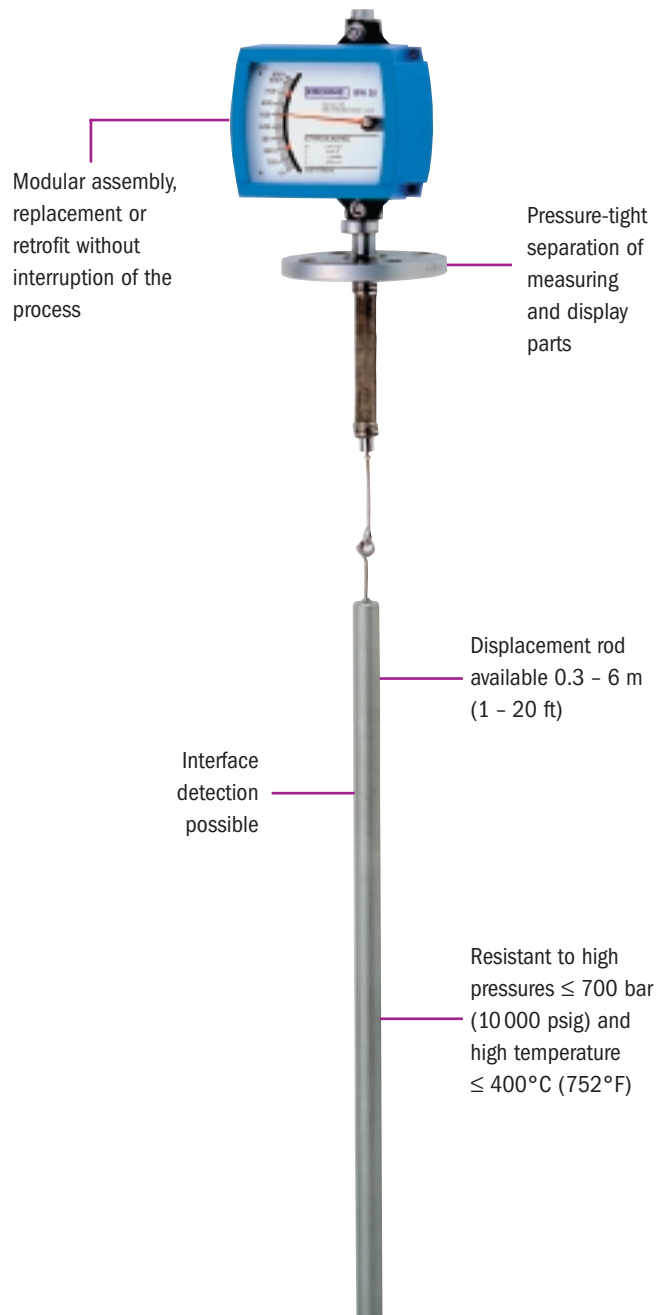
The BW 25 liquid level indicator operates on the displacement principle.

The length of the displacement rod corresponds to the measuring range.

A displacement body suspended on a measuring spring is immersed in the liquid and is subjected to an upthrust based on Archimedes' principle, this being proportional to the mass of the liquid displaced. Every change in the weight of the rod corresponds to a certain change in the length of the spring, and is therefore an indication of the liquid level. Extension of the spring is transmitted by magnetic coupling from the measuring zone to an indicator. This transmission method permits pressure-tight separation of the measuring spring system and the scale.



$F_A$  = Buoyancy  
 $F_G$  = Weight



**Application range**

The limit switch can be used for various materials.

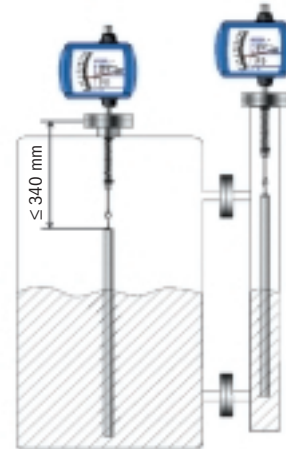
This device is suitable for extreme ambient conditions.

Temperatures -60 ... +400°C (-76 ... +752°F)

Pressure Up to 700 bar (10 000 psig)

If the display cannot be installed from above, e.g. there is an agitator in the container, it is possible to install it lateral with the special reference chamber.

In both cases it is important to note that the non-measurable depth is 340 mm because of the spring mounting.



With special versions it is possible to measure the level of the interface between two immiscible liquids of different densities. The displace rod must be covered completely with liquid. The difference in density should be min. 100 g/l.

**Typical products are:**

- Water, aqueous liquids
- Acids/alkalis
- Organic and inorganic solvents

**Typical application in the chemical industry**



**Modularity**

The M9 indicator is of modular design.

This offers the following advantages:

- Electrical functions can be retrofitted
- Installation without interrupting the process
- No re-calibration necessary
- Easy and quick to replace through plug-in-technology



<b>Product</b>	Ammonia
Pressure	450 bar (6525 psig)
Temperature	70°C (158°F)
Measuring range	1500 mm (4.9 ft)

**Technical data**

**Operating conditions**

Product	Liquids
Density	≥ 0.45 kg/l
Measuring range	0.3 – 6 m (1 – 20 ft)
Measuring accuracy	± 1.5 % of full scale range
Temperature	-60 ... +400°C (-76 ... +752°F)
Ambient temperature	≤ 60°C (≤ 40°F)
Operating pressure	
Standard	40 bar (580 psig)
Optional	700 bar (10 000 psig)
Indication	Linear scale markings mm, cm, m, inch, ft, %, volume

**Material**

Housing	Die-cast aluminium
Displacement rod	
Standard	Stainless steel 1.4571 (316 Ti)
Optional	Titanium
Spring	
Standard	Stainless steel 1.4571 (316 Ti)
Optional (> 100°C / 212°F)	ATS 340
Flange with pressure gland	Stainless steel 1.4571 (316 Ti)

**Connection**

Flange	DIN 2501 or ANSI 16.5
Standard	DN 50, PN 40
Optional	DN 40/50/80/100, PN 40; DN 50, PN 64/100 1½"/ 2"/ 3"/ 4", 150/300 lb
Screw	G 1½" Others on request

<b>Protection category</b> (EN 60529 / IEC 529)	IP 65
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<b>Electromagnetic compatibility (EMC)</b>	EN 50081-1, EN 50082-2
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**Limit switches and electrical signal output**

One or two limit switches can be built into the indicators.

**Limit switches SC 3.5 N0**

2-wire limit switches are connected in conformity with DIN 19234 (NAMUR). For operation, an isolation switching amplifier is required.

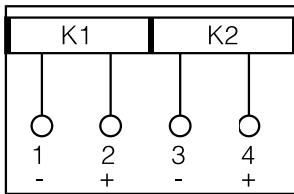
Technical data	SC 3.5-N0
Connection	2-wire
Voltage	8 V DC
Ambient temperature	-25 ... +100°C (-13 ... +212°F)
Protection category to EN 60529 / IEC 529	IP 67
Self-inductance (L <sub>i</sub> )	150 µH
Self-capacitance (C <sub>i</sub> )	100 nF
Electromagnetic compatibility (EMC)	EN 50081-2, EN 50082-2
Spark protection	EEx ia IIC T6, EEx ib IIC T6
Approval	PTB No. Ex-95.D.2195 X
Technical Data	Auto cut-off
No-load voltage U <sub>i</sub>	16 V
Short-circuit current I <sub>i</sub>	52 mA
Output P <sub>i</sub>	169 mW

**Connection diagram**

SC 3.5-N0

K1 = 1 Limit switch

K2 = 2 Limit switches



**Limit switches SB 3.5-E2-Y**

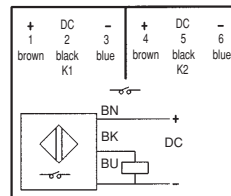
This 3-wire limit switch has a 10 – 30 V DC connection. The switching point is visible on the scale.

3-wire limit switches (with integrated preamplifier) can be connected directly to a PLC.

Technical data	SB 3.5-E2-Y
Electrical connection	3-wire
Voltage	10 - 30 V DC
No-load power consumption	≥ 15 mA
Continuous current	100 mA
Ambient temperature	-25 ... +70°C (-13 ... +158°F)
Protection category to EN 60529/IEC 529	IP 67
Electromagnetic compatibility (EMC)	EN 50081-2, EN 50082-2
Display	LED

**Connection diagram**

SB 3.5-E2-Y



**Electrical signal output ESK II**

The ESK II can be installed in the indicators as an option.

Given an intrinsically safe feed unit, the transmitter may also be used in hazardous areas.

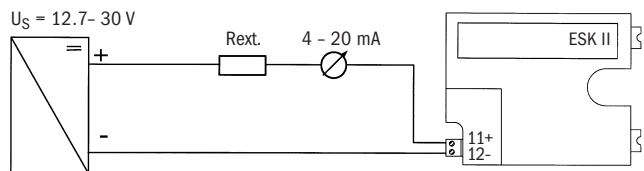
Technical data	
Electrical connection	2-wire
Power supply	12.7 – 30 V DC
Current output	4 – 20 mA
Power influence	< 0.1%
Load resistance dependence	< 0.1%
Temperature drift	≤ 5 µA/ K
Load impedance	(U - 12 V)/20 mA, max. 800 Ω
Ambient temperature	-25 ... +85°C
Effective inner self-inductance	negligible
Effective inner self-capacitance	≤ 20 nF
Protection category to EN 60529/IEC 529	IP 20
Spark protection	EEx ia IIC T6
Approval	PTB No. Ex-94.C.2067

**Only for connection to intrinsically safe circuits with the following peak values:**

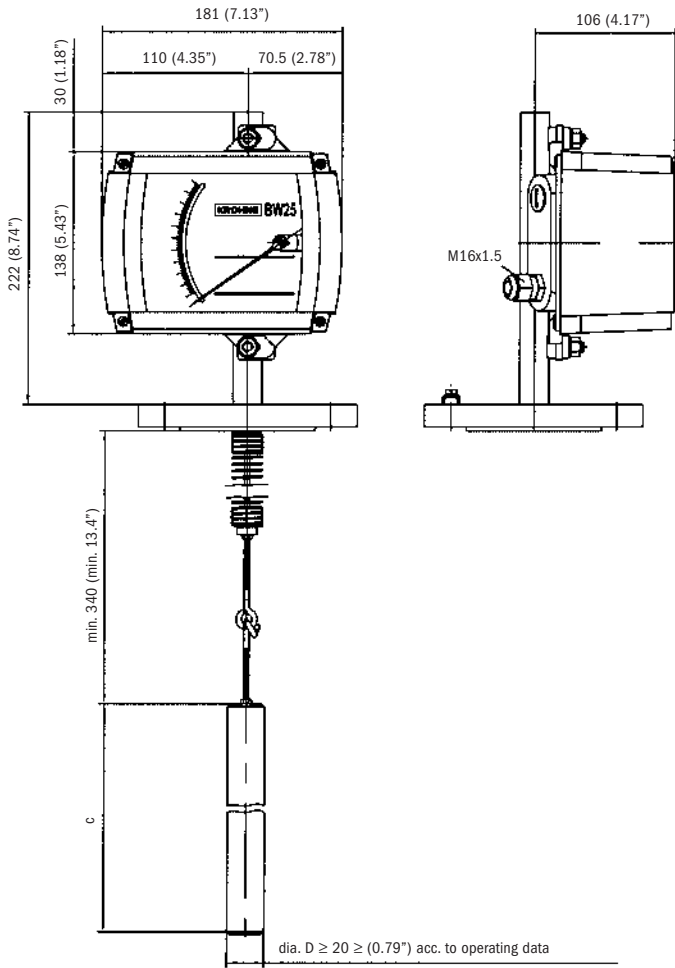
No-load voltage U <sub>i</sub>	30 V
Short-circuit current I <sub>i</sub>	100 mA
Output P <sub>i</sub>	1 W

**Connection diagram**

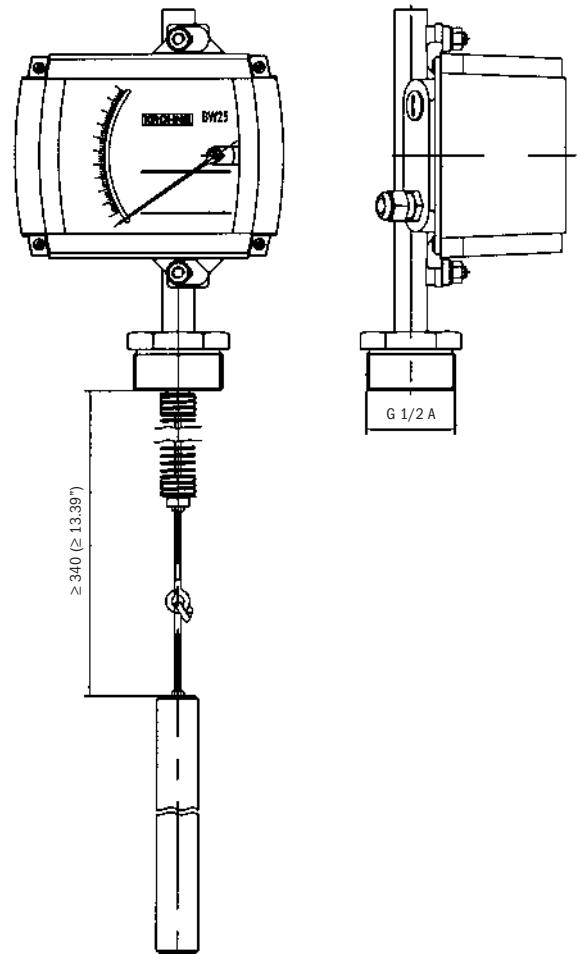
ESK II-wire configuration, 4 – 20 mA



**Flange version**



**Screw version**

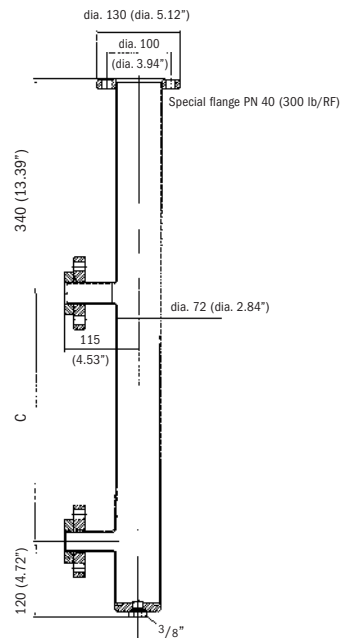


Dimension C = length of displacer rod (measuring range)

Dimensions in mm (inches)

**Reference vessel**

<b>Connection</b>	DIN 2501 or ANSI B 16.5
<b>Flanges</b>	DN 25/50, PN 40 1 1/2" - 2" / Class 150/300 lb
<b>Drain</b>	
<b>Plug</b>	3/8"
Other connections on request	



Dimension C = Distance between sockets (measuring range)

**Approvals**

Application	Instrument version	Certification mark
<b>With explosion protection:</b> In stationary storage tanks for flammable liquids of dangerous materials classes AI, AII and B, excl. carbon disulphide (CS <sub>2</sub> ), in Zone 0.	BW 25 /... /... /... /... - .. / Z0	PTB No. III B/S 1970

**Note:** Certified devices are not standard versions! Deviations in design and technical data are possible!

**Type code**

**Instrument**

**BW 25** Liquid level indicator

	<b>Material (flange)</b>				
	R	Stainless steel	1.4571		
		<b>Measuring section</b>			
	N	No reference vessel			
	B	Reference vessel			
		<b>Top-mounted indicator</b>			
	M 9	Indicator M 9			
		<b>Built-in equipment</b>			
	KI..	Limit switch SC 3.5-NO with 1-2 contacts			
	KD..	Limit switch SB 3.5-E2-Y with 1-2 contacts			
	ESK	Electrical signal output			
	ESK/K..	Electrical signal output and 1-2 limit switches			
		<b>Safety function</b>			
	Ex	Explosion-protected electrical equipment			
		<b>Application</b>			
	N	Non-Ex			
	Z0	Flammable liquids of dangerous materials classes AI, AII and B			
		<b>Options</b>			
	TS	Liquid/liquid interface detection			
<b>BW 25</b>					

## Notes