DATA SHEET

Type 8138

bürkert
FLUID CONTROL SYSTEMS

Radar level meter for hygienic applications

- For level measurement up to 35 m
- 4...20 mA/Hart, 2 wires
- Adjustable with display/configuration module or PC
- ATEX approvals

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 8644 ▸
Remote Process Actuation Control System AirLINE

Type 8692 ▸
Digital electropneumatic Positioner for the integrated mounting on process control valves

Type 8635 ▸
Digital electropneumatic Positioner SideControl

Type description

Type 8138 is a non-contact radar level meter for continuous level measurement.

It is particularly suitable for use in small vessels that contain beverage liquids under hygienic process conditions.

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1. General technical data

Product properties	
Material	
Please make sure the device materials are compatible with the fluid you are using. Detailed information can be found in chapter "3.1. Chemical Resistance Chart – Bürkert resistApp" on page 5.	
Non wetted parts	
Housing	PBT, stainless steel 316L (1.4404)
Cover	PC transparent
Seal between housing and housing cover	EPDM
Cable gland	PA
Blind plug	PA
Ground terminal	Stainless steel 316Ti/316L (1.4571/1.4435)
Wetted parts	
Process connection	Stainless steel 316L
Process seal	EPDM
Antenna	TFM-PTFE
Dimensions	Detailed information can be found in chapter "4. Dimensions" on page 6.
Weights	3.5…15.5 kg (depending on process connection and antenna)
Measuring variable	Distance between the end of the level meter antenna and the product surface. Detailed information can be found in chapters "5.1. Measurement deviation diagram" on page 9 and "6.1. Measuring principle" on page 9.
Measuring range	Max. 35 m Recommended measuring range: • 0.05…15 m (clamp 2", DN 25 connection or flange DN 50 version) • 0.05…35 m (flange DN 100)
Beam angle[1.]	• 18° (clamp 2", DN 25 connection or flange DN 50 version) • 10° (flange DN 100)
Damping (63 % of the input value)	0…999 s, adjustable
Step response time[2.]	≤3 s
Product accessories	
Display	LCD in full dot matrix (optional, must be ordered separately). Detailed information can be found in chapter "7.4. Ordering chart accessories" on page 12.
Performance data	
Measurement deviation	±2 mm (measuring distance >0.5 m) Detailed information can be found in chapter "5.1. Measurement deviation diagram" on page 9.
Measuring range resolution	1 mm
Measuring frequency	K-Band (26 GHz technology)
Measuring cycle time	Approx. 450 ms
Temperature drift	• Digital output: ±3 mm/10 K, max. 10 mm • Current output: <0.03 %/10K relating to the 16 mA span or ≤0.3 %
Non-repeatability[3.]	≤1 mm
Vibration resistance	4 g with 5…200 Hz according to EN 60068-2-6 (vibration at resonance)
Shock resistance	100 g, 6 ms according to EN 60068-2-27 (mechanical shock)
Electrical data	
Operating voltage (U_n)	• Without display/configuration module: – 9.6…35 V DC – 9.6…30 V DC (Ex ia instrument) • With display/configuration module: – 16…35 V DC – 16…30 V DC (Ex ia instrument)
Power Source (not supplied)	Limited power source according to UL/EN 60950-1 standards or limited energy circuit according to UL/EN 61010-1 §9.4
Starting current	≤3.6 mA; ≤10 mA for 5 ms after switching on
DC reverse polarity protection	Yes
Output signal	4…20 mA/HART

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Signal resolution	0.3 µA
Range of the output signal	3.8…20.5 mA/HART (default setting)
Load resistor	$(U_n - U_{min.})/0.022$ A
Fault signal	Current output: mA value unchanged, 20.5 mA, 22 mA or < 3.6 mA (adjustable)
Max. output current	22 mA
Residual ripple (at DC)	• For 9.6 V < U_n < 18 V: ≤ 0.7 V_{eff} (16…400 Hz) • For 18 V < U_n < 35 V: ≤ 1.0 V_{eff} (16…400 Hz)
Voltage supply cable	• Cable diameter: 5…9 mm • Wire cross-section (spring-loaded terminals): – massive wire, stranded wire: 0.2…2.5 mm² (AWG 24…14) – stranded wire with end sleeve: 0.2…1.5 mm² (AWG 24…16)
Medium data	
Process temperature	• With Clamp, flange connection: -40 °C…+200 °C (-40 °F…392 °F) • With DN 25 connection:-40 °C…+130 °C (-40 °F…266 °F)
Process pressure	Vessel pressure: • With Clamp connection: -1…16 bar (-14.51…232.16 PSI/-100…1600 kPa) • With DN 25 connection: -1…10 bar (-14.51…145.1 PSI/-100…1000 kPa) • With flange connection: according to flange rules
Dielectric constant (min.)	εr > 1.6
Process/Port connection & communication	
Process connection	• Clamp 2" • DN 25 connection adapted for GEA Tuchenhagen VARINLINE process connections • Flange DN 50, DN 100 DIN 2501
Electrical connection	Cable glands M20 x 1.5
Approvals and Certificates	
Standards	
Degree of protection according to IEC/EN 60529	IP66/IP67 with M20 x 1.5 gland mounted and tightened
Overvoltage category according to IEC 61010-1	Category III
Protection class according to IEC 61010-1	Class III
Directives	
CE directives	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)
NAMUR recommendations	• NE21 – Electromagnetic compatibility of equipment • NE43 – Signal level for fault information from measuring transducers • NE53 - Compatibility of field devices and display/adjustment components • NE107 - Self-monitoring and diagnosis of field devices
Approvals	
ATEX	EN 60079-0, EN 60079-11, EN 60079-26 Detailed information can be found in chapter "2.1. ATEX-Certification" on page 5.
Environment and installation	
Ambient temperature	Operation and storage: -40 °C…+80 °C (-40 °F…+176 °F)
Relative air humidity	20…85 %, without condensation
Height above sea level	• By default: max. 2000 m • With connected overvoltage protection: max. 5000 m
Pollution degree	Degree 4 (when used with fulfilled housing protection)

1.) Outside the specified beam angle, the energy level of the radar signal is 50 % (-3 dB) less

2.) Time span after a sudden measuring distance change by max. 0.5 m in liquid applications, max 2 m with bulk solids applications, until the output signal has taken for the first time 90 % of the final value (IEC 61298-2)

3.) Already included in the measuring deviation

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2. Approvals

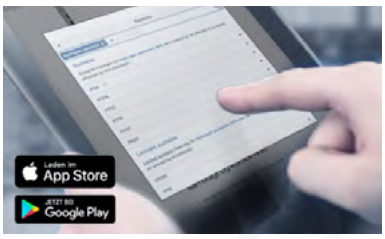
2.1. ATEX-Certification

Note:
Devices with Ex certification have different technical data, see **Supplement ATEX Type 8138** ▸ under user manual.

Certificate	Description
	EU-Type Examination Certificate Number: PTB 08 ATEX 2002X **ATEX** • II 1/2G Ex ia IIC T6 Ga/Gb • II 2G Ex ia IIC T6 Gb Measures to comply with ATEX requirements: refer to the **Supplement ATEX Type 8138** ▸ under user manual. The Ex. certification is only valid if the Bürkert device is used as described in the supplement ATEX. If unauthorized changes are made to the device, the Ex. certification becomes invalid.

3. Materials

3.1. Chemical Resistance Chart – Bürkert resistApp



Bürkert resistApp – Chemical Resistance Chart

You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

Start Chemical Resistance Check

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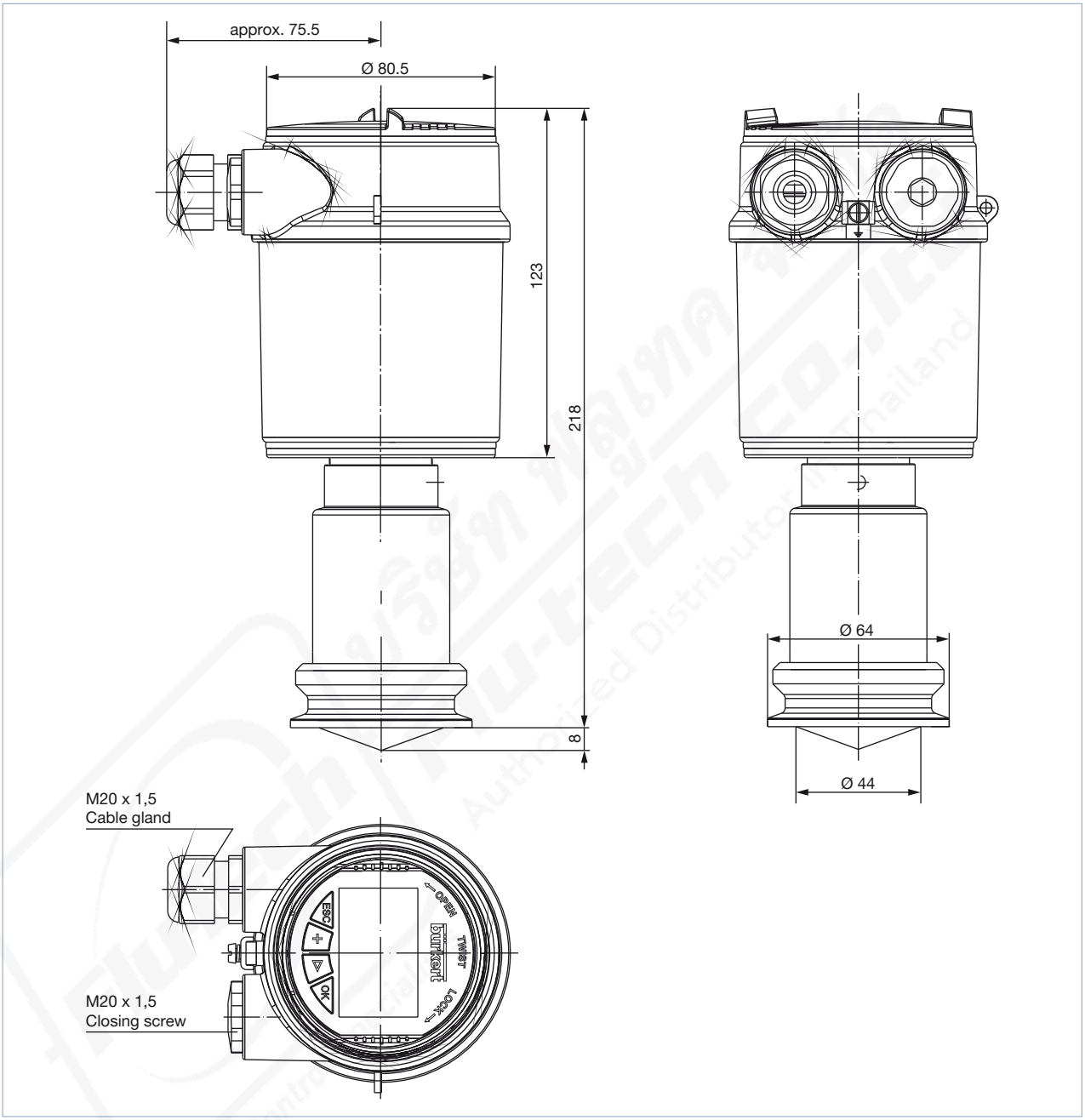
4. Dimensions

4.1. Clamp connection

Note:
Dimensions in mm



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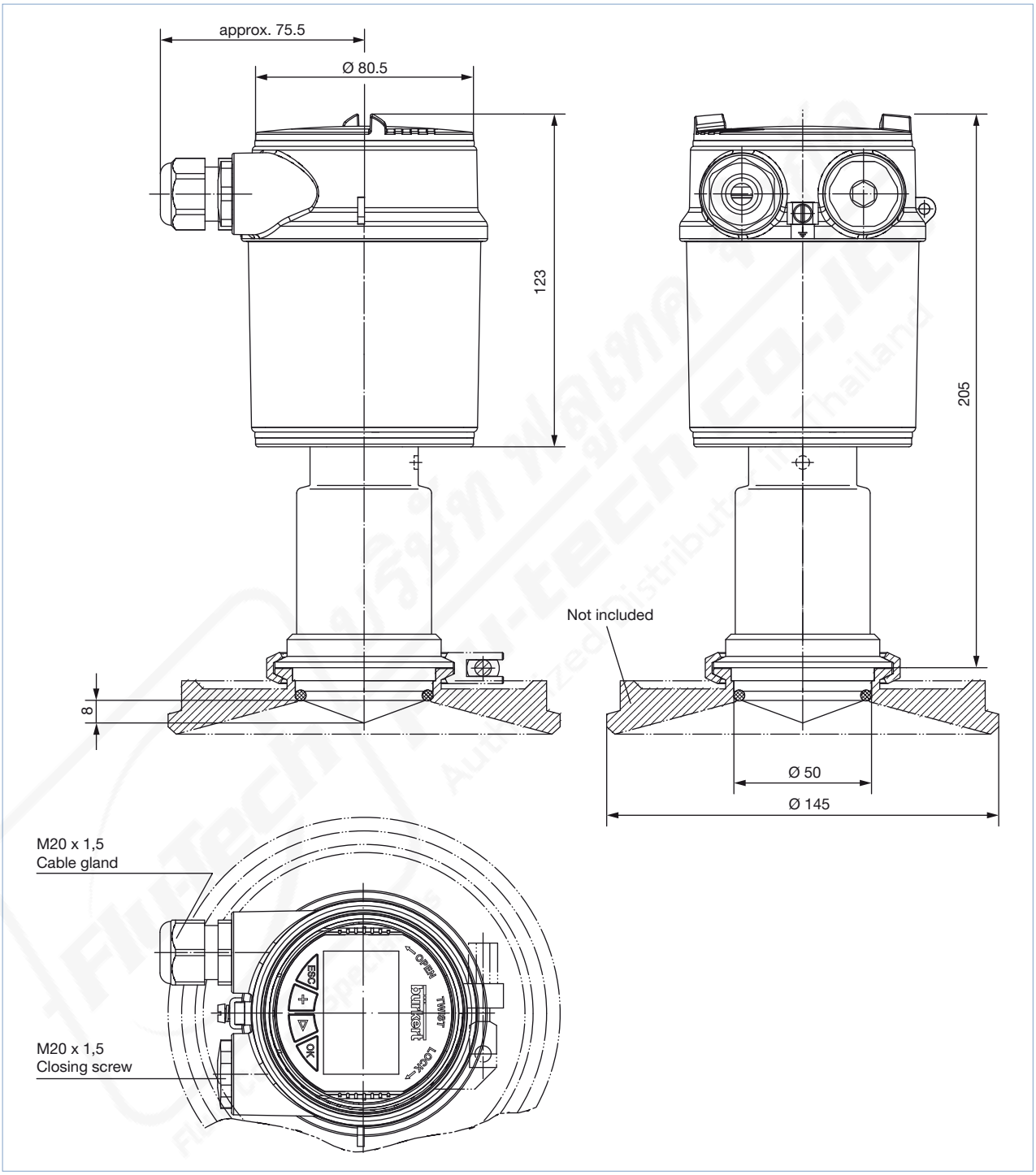
4.2. DN 25 connection

Note:

- Adapted for GEA Tuchenhagen VARINLINE process connections
- Dimensions in mm



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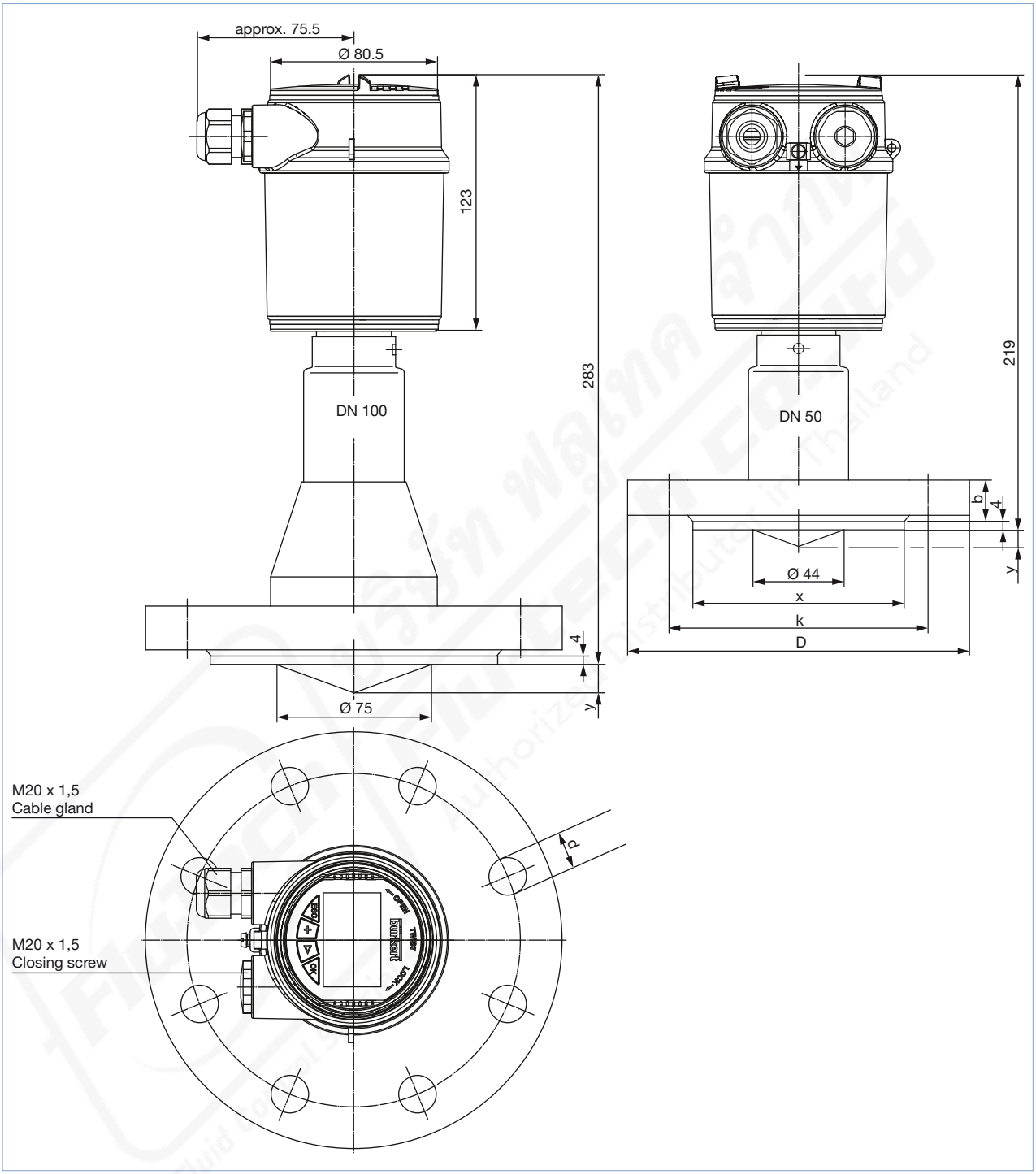
4.3. Flange connection

Note:
Dimensions in mm



DN	D	b	k	d	x	y
50	Ø 165	20	Ø 125	4 x Ø 18	Ø 102	8.01
100	Ø 220	20	Ø 180	8 x Ø 18	Ø 158	13.65

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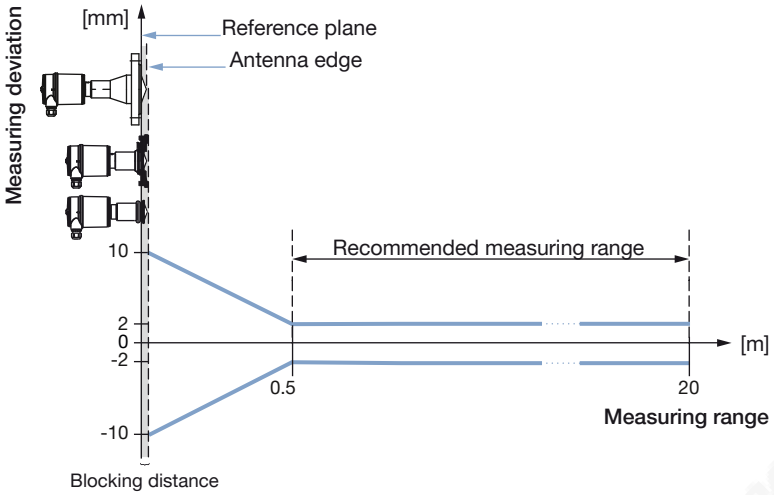
5. Performance specifications

5.1. Measurement deviation diagram



6. Product operation

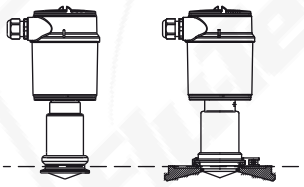
6.1. Measuring principle

The radar measuring device consists of an electronic housing, a process connection element the antenna and a sensor. The antenna emits short radar pulses with a duration of approximate 1 ns to the medium. These pulses are reflected by the medium surface and received by the antenna as echoes. Radar waves travel at the speed of light. The running time of the radar pulses from emission to reception is proportional to the distance and hence to the level. The determined level is converted into an output signal and transmitted as a measured value.

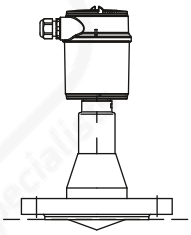
The measuring range of the radar level measuring device begins physically at the end of the antenna. However, the min./max. adjustment begins at the reference plane. The position of the reference plane depends on the sensor version.

- Clamp or DN 25 (adapted for GEA Tuchenhagen VARINLINE process connections) connections version: The reference plane is the highest contact point between sensor process fitting and welded socket .
- Flange connection version: the reference plane is the lower side of the flange.

Version clamp or DN 25 connection



Version flange connection



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6.2. Product operation notes

Operating techniques

The measuring device provides different operating techniques:

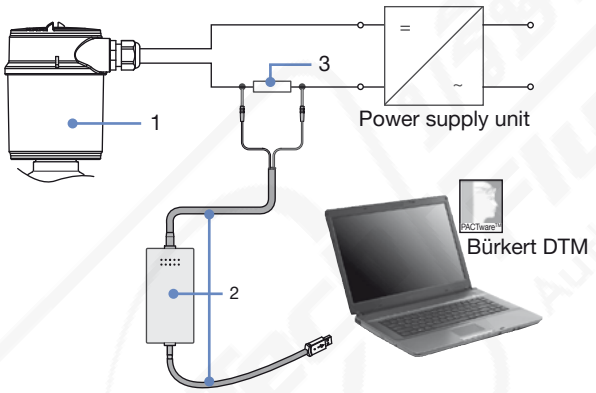
- the display/configuration module
- the suitable Bürkert DTM in conjunction with adjustment software according to the FDT/DTM standard, e.g. PACTware™ and PC
- a HART handheld

The entered parameters are generally saved in the measuring device Type 8138. Optionally, parameters may also be uploaded and downloaded with the display/configuration module or saved in a file by using PACTware™/8138-DTM.

Set up with display/configuration module

Display/configuration module	Description
	The display/configuration module can be inserted into the measuring device and removed again at any time. It is not necessary to interrupt the power supply. The measuring device is adjusted via the four keys of the display/configuration module.

Set up with PACTware™/DTM and HART communication

Assembly	Description
	The measuring device can be operated thanks to PACTware™, via HART communication. An interface adapter is necessary for the adjustment with PACTware™. For the setup of the Type 8138, the DTM in the actual version must be used. The basic version of DTM incl. PACTware™ is available as a free-of-charge download from the internet at **www.burkert.com** ▶. **Connecting the PC via HART** **No. / Description** **1** Measuring device Type 8138 **2** HART-USB Modem **3** Resistance 250 Ω Necessary components: • Measuring device Type 8138 • PC with PACTware™ and suitable Bürkert DTM • HART-USB Modem • Resistance approx. 250 Ω • Power supply unit

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7. Ordering information

7.1. Bürkert eShop – Easy ordering and quick delivery

Bürkert eShop – Easy ordering and fast delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

7.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements? Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

7.3. Ordering chart

Note:
All following versions are supplied without display/configuration module.

Operating voltage	Output	Process connection	Electrical connection	Article no.
Standard version				
9.6…35 V DC	4…20 mA/HART (2 wires)	Clamp 2"	Cable gland M20 x 1.5	560169
		DN 25 connection adapted for GEA Tuchenhagen VARINLINE process connections		560171
		Flange DN 50 DIN 2501/16 bar		560173
		Flange DN 100 DIN 2501/16 bar		560175
Ex version – ATEX approval				
9.6…30 V DC	4…20 mA/HART (2 wires)	Clamp 2"	Cable gland M20 x 1.5	560170
		DN 25 connection adapted for GEA Tuchenhagen VARINLINE process connections		560172
		Flange DN 50 DIN 2501/16 bar		560174
		Flange DN 100 DIN 2501/16 bar		560176

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Further versions on request	
	Process connection • Flange: – DN 80 PN 40 Form C DIN 2501 – DN 150 PN 16 Form C DIN 2501 – DN 150 PN 40 Form C DIN 2501 – 2" 150 lb RF; ANSI B16.5 3" 150 lb RF; ANSI B16.5 4" 150 lb RF; ANSI B16.5 6" 150 lb RF; ANSI B16.5 • Clamp – 3" – 4"

7.4. Ordering chart accessories

Description	Article no.
Set with 2 reductions M20 x 1.5/NPT½ + 2 neoprene flat seals for cable gland + 2 screw-plugs M20 x 1.5	551782
Hart-USB Modem	560177
Set with a display/configuration module, a transparent cover and a seal ring	559279
Set with a transparent cover and a seal ring	561006

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