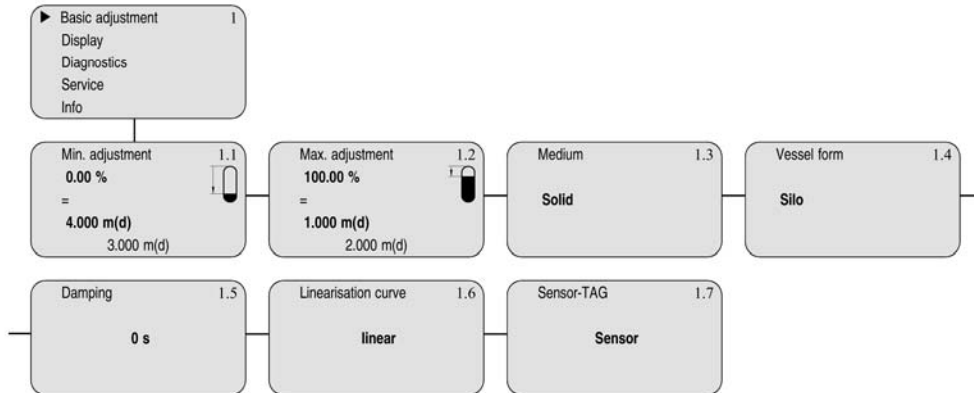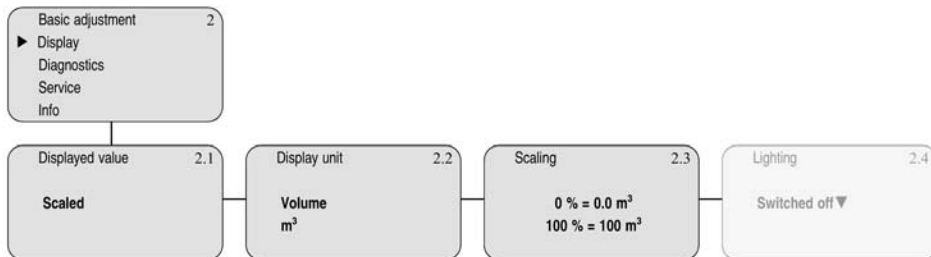## 6.5 Menu schematic

i **Information:**
Depending on the version and application, the light-coloured menu windows are not always available or offer nor selection possibility.
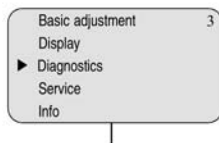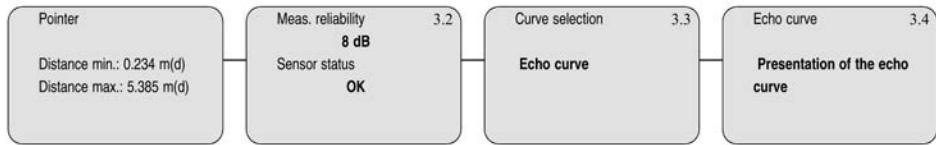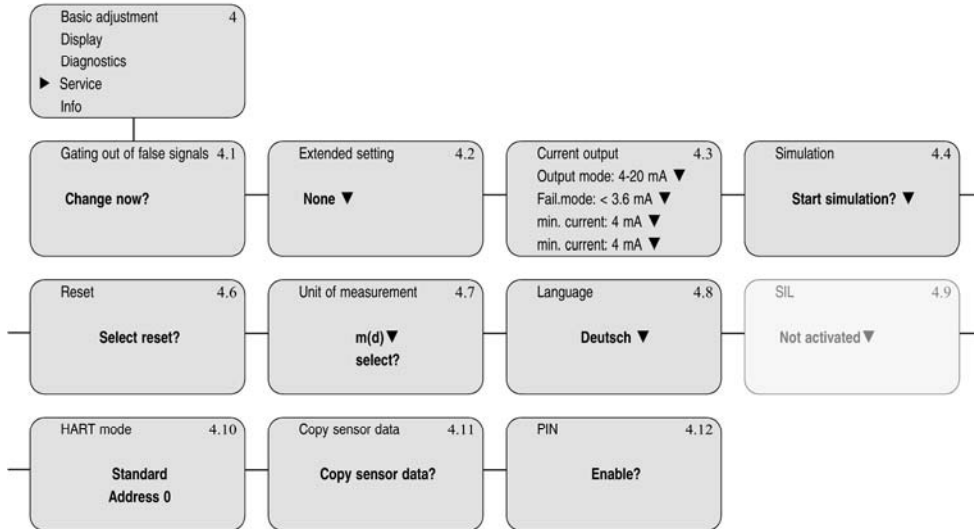
Basic adjustment

▶ Basic adjustment	1
Display	
Diagnostics	
Service	
Info	

Min. adjustment	1.1
0.00 %	
=	
4.000 m(d)	
3.000 m(d)	

Max. adjustment	1.2
100.00 %	
=	
1.000 m(d)	
2.000 m(d)	

Medium	1.3
Solid	

Vessel form	1.4
Silo	

Damping	1.5
0 s	

Linearisation curve	1.6
linear	

Sensor-TAG	1.7
Sensor	

Display

Basic adjustment	2
▶ Display	
Diagnostics	
Service	
Info	

Displayed value	2.1
Scaled	

Display unit	2.2
Volume	
m³	

Scaling	2.3
0 % = 0.0 m³	
100 % = 100 m³	

Lighting	2.4
Switched off ▼	

Diagnostics

Basic adjustment	3
Display	
▶ Diagnostics	
Service	
Info	

Pointer		Meas. reliability 3.2	Curve selection 3.3	Echo curve 3.4
Distance min.: 0.234 m(d) Distance max.: 5.385 m(d)		**8 dB** Sensor status **OK**	**Echo curve**	**Presentation of the echo curve**

Service

Basic adjustment　　　4
Display
Diagnostics
▶ Service
Info

Gating out of false signals 4.1	Extended setting 4.2	Current output 4.3	Simulation 4.4
Change now?	**None ▼**	Output mode: 4-20 mA ▼ Fail.mode: < 3.6 mA ▼ min. current: 4 mA ▼ min. current: 4 mA ▼	**Start simulation? ▼**

Reset 4.6	Unit of measurement 4.7	Language 4.8	SIL 4.9
Select reset?	**m(d) ▼** **select?**	**Deutsch ▼**	Not activated ▼

HART mode 4.10	Copy sensor data 4.11	PIN 4.12
Standard **Address 0**	**Copy sensor data?**	**Enable?**

Info

Basic adjustment　　　5
Display
Diagnostics
Service
▶ Info

Sensor type 5.1	Date of manufacture 5.2	Last change using PC 5.3	Sensor characteristics 5.4
Serial number 12345678	4. July 2007 Software version 3.50	4. July 2007	**Display now?**

6.6 Saving the parameter adjustment data

It is recommended noting the adjusted data, e.g. in this operating instructions manual and archive them afterwards. They are hence available for multiple use or service purposes.

If VEGAPULS 67 is equipped with an indicating and adjustment module, the most important data can be read out of the sensor into indicating and adjustment module. The procedure is described in the operating instructions manual "*Indicating and adjustment module*" in the menu item "*Copy sensor data*". The data remain there permanently even if the sensor power supply fails.

If it is necessary to exchange the sensor, the indicating and adjustment module is inserted into the replacement instrument and the data are written into the sensor under the menu item "*Copy sensor data*".

7 Setup with PACTware™ and other adjustment programs

7.1 Connect the PC via VEGACONNECT 3

Connection via I²C inter-face
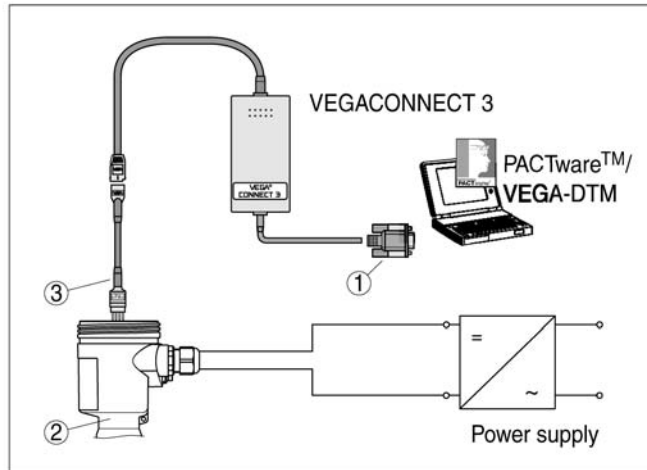
Fig. 27: Connection of the PC directly to the sensor via I²C interface
1   RS232 connection
2   VEGAPULS 67
3   I²C adapter cable for VEGACONNECT 3

Necessary components:

● VEGAPULS 67
● PC with PACTware™ and suitable VEGA DTM
● VEGACONNECT 3 with I²C adapter cable (article no. 2.27323)
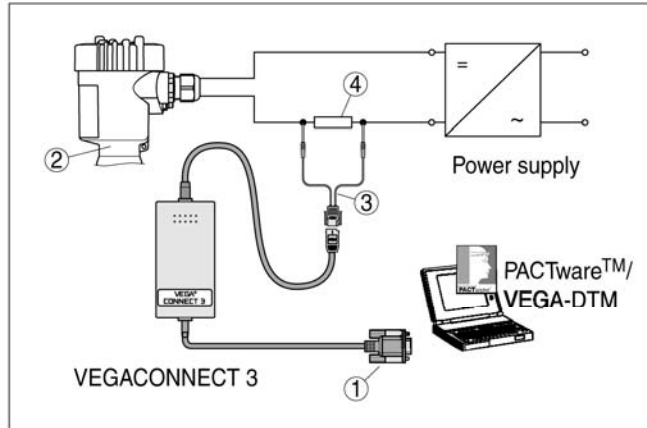● Power supply unit

Connection via HART

Fig. 28: Connecting the PC via HART to the signal cable
1   RS232 connection
2   VEGAPULS 67
3   HART adapter cable for VEGACONNECT 3
4   HART resistor 250 Ω

Necessary components:

● VEGAPULS 67
● PC with PACTware™ and suitable VEGA DTM
● VEGACONNECT 3 with HART adapter cable (art. no. 2.25397)
● HART resistor approx. 250 Ω
● Power supply unit

Note:

With power supply units with integrated HART resistance (internal resistance approx. 250 Ω), an additional external resistance is not necessary. This applies, e. g. to the VEGA instruments VEGATRENN 149A, VEGADIS 371, VEGAMET 381). Also usual Ex separators are most of the time equipped with a sufficient current limitation resistor. In such cases, VEGACONNECT 3 can be connected parallel to the 4 … 20 mA cable.

7.2 Connect the PC via VEGACONNECT 4

Internal connection via I²C interface

Fig. 29: Connection of the PC via VEGACONNECT directly to the sensor
1   USB cable to the PC
2   VEGACONNECT
3   Sensor

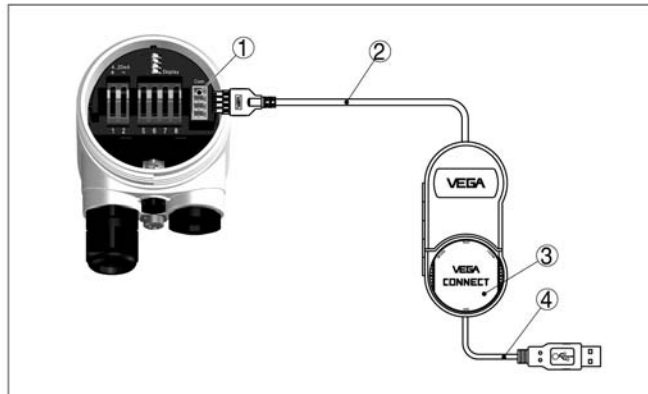**External connection via I²C interface**

Fig. 30: Connection via I²C connection cable
1   I²C bus (com.) interface on the sensor
2   I²C connection cable of VEGACONNECT
3   VEGACONNECT
4   USB cable to the PC

Necessary components:

- VEGAPULS 67
- PC with PACTware™ and suitable VEGA DTM

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- VEGACONNECT
- Power supply unit or processing system
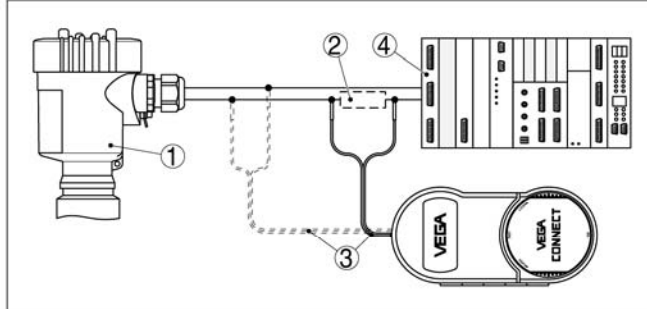
Connection via HART

Fig. 31: Connecting the PC via HART to the signal cable
1   *VEGAPULS 67*
2   *HART resistor 250 Ω (optional depending on processing)*
3   *Connection cable with 2 mm pins and terminals*
4   *Processing system/PLC/Voltage supply*

Necessary components:

- VEGAPULS 67
- PC with PACTware™ and suitable VEGA DTM
- VEGACONNECT
- HART resistor approx. 250 Ω
- Power supply unit or processing system

Note:
With power supply units with integrated HART resistance (internal resistance approx. 250 Ω), an additional external resistance is not necessary. This applies, e. g. to the VEGA instruments VEGATRENN 149A, VEGADIS 371, VEGAMET 381). Standard Ex separators are also usually equipped with sufficient current limitation resistance. In such cases, VEGA-CONNECT 4 can be connected parallel to the 4 … 20 mA cable.

7.3 Parameter adjustment with PACTware™

Further setup steps are described in the operating instructions manual "*DTM Collection/PACTware™*" attached to each CD and which can also be downloaded from our homepage. A detailed description is available in the online help of PACTware™ and the VEGA DTMs.

i

Note:
Keep in mind that for setup of VEGAPULS 67, DTM-Collection in the actual version must be used.

All currently available VEGA DTMs are provided in the DTM Collection on CD and can be obtained from the responsible VEGA agency for a token fee. This CD includes also the up-to-date PACTware™ version. The basic version of this DTM Collection incl. PACTware™ is also available as a free-of-charge download from the Internet.

Go via www.vega.com and "*Downloads*" to the item "*Software*".

7.4 Parameter adjustment with AMS™ and PDM

For VEGA sensors, instrument descriptions for the adjustment programs AMS™ and PDM are available as DD or EDD. The instrument descriptions are already implemented in the current versions of AMS™ and PDM. For older versions of AMS™ and PDM, a free-of-charge download is available via Internet.

Go via www.vega.com and "*Downloads*" to the item "*Software*".

7.5 Saving the parameter adjustment data

It is recommended to document or save the parameter adjustment data. They are hence available for multiple use or service purposes.

The VEGA DTM Collection and PACTware™ in the licensed, professional version provide suitable tools for systematic project documentation and storage.

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8 Maintenance and fault rectification

8.1 Maintenance, cleaning

When used in the correct way, no special maintenance is required in normal operation.

In some applications, buildup on the antenna system can influence the measuring result. Depending on the sensor and application, make arrangements to avoid strong pollution of the antenna system. If necessary, clean the antenna system in certain intervals.

8.2 Remove interferences

Reaction when malfunctions occur

The operator of the system is responsible for taken suitable measures to remove interferences.

Causes of malfunction

A maximum of reliability is ensured. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Voltage supply
- Signal processing

Fault rectification

The first measures to be taken are to check the output signals as well as to evaluate the error messages via the indicating and adjustment module. The procedure is described below. Further comprehensive diagnostics can be carried out on a PC with the software PACTware™ and the suitable DTM. In many cases, the causes can be determined in this way and faults can be rectified.

24 hour service hotline

However, should these measures not be successful, call the VEGA service hotline in urgent cases under the phone no. **+49 1805 858550**.

The hotline is available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

Checking the 4 … 20 mA signal

Connect a handheld multimeter in the suitable measuring range according to the wiring plan.

? 4 … 20 mA signal not stable

- Level fluctuations
- → Set integration time via the indicating/adjustment module

? 4 … 20 mA signal missing

- Wrong connection
- → Check connection according to chapter "*Connection steps*" and if necessary, correct according to chapter "*Wiring plan*"
- No voltage supply
- → Check cables for breaks; repair if necessary
- supply voltage too low or load resistance too high
- → Check, adapt if necessary

? Current signal greater than 22 mA or less than 3.6 mA

- Electronics module defective
- → Exchange instrument or return instrument for repair

In Ex applications, the regulations for the wiring of intrinsically safe circuits must be observed.

Fault messages via the indicating/adjustment module

? E013

- no measured value available
- → sensor in boot phase
- → Sensor does not find an echo, e.g. due to faulty installation or wrong parameter adjustment

? E017

- Adjustment span too small
- → Carry out a fresh adjustment and increase the distance between min. and max. adjustment

? E036

- no operable sensor software
- → Carry out a software update or send the instrument for repair

? E041, E042, E043

- Hardware error, electronics defective

→ Exchange instrument or return instrument for repair

Reaction after fault rectification

Depending on the failure reason and measures taken, the steps described in chapter "*Set up*" must be carried out again, if necessary.

8.3 Exchanging the electronics module

If the electronics module is defective, it can be replaced by the user.

In Ex applications only one instrument and one oscillator with respective Ex approval may be used.

If there is no electronics module available on site, one can be ordered from the VEGA agency serving you.

Sensor serial number

The order data of the sensor must be downloaded into the new electronics module. This can be done:

- At the factory by VEGA
- Or on site by the user

In both cases, the sensor serial number is necessary. The serial numbers are stated on the type label of the instrument, inside the housing or on the delivery note.

Information:
When loading on site, first of all the order data must be downloaded from the Internet (see operating instructions manual "*Oscillator*").

Assignment

The oscillators are adapted to the respective sensor and differ in their signal output or in their power supply. You can find a suitable oscillator in the following overview.

4 … 20 mA/HART

Oscillator PS-E.60SH is suitable for VEGAPULS 67 and 68 - 4 … 20 mA/HART:

- PS-E.60SH**X** (X = without approvals)
- PS-E.60SH**D** (D = approvals KX, KF according to product list)
- PS-E.60SH**E** (E = approvals CX, DX, CK, CI, DM, XM, CM, DI, EX, GI, GX, UX, UF according to product list)

8.4   Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our Internet homepage www.vega.com under: "*Downloads - Forms and certificates - Repair form*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

● Print and fill out one form per instrument
● Clean the instrument and pack it damage-proof
● Attach the completed form and probably the safety data sheet outside on the packaging
● Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "*Company - VEGA world-wide*"

9 Dismounting

9.1 Dismounting steps

⚠️ **Warning:**
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

9.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects to persons and environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you cannot dispose of the instrument properly, please contact us about disposal methods or return.

10 Supplement

10.1 Technical data

General data

316L corresponds to 1.4404 or 1.4435, 304 corresponds to 1.4301

Materials, wetted parts
– Horn antenna	PBT-GF30
– Focussing lens	PP
– Adapter flange	PPH
– Seal, adapter flange	FKM (Viton)

Materials, non-wetted parts
– Compression flange	PPH
– Fixing screws, adapter flange	304
– Housing	Plastic PBT (polyester), Alu die-casting powder-coated, stainless steel 316L
– Seal between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– Inspection window in housing cover for PLICSCOM	Polycarbonate (UL-746-C listed)
– Ground terminal	316Ti/316L
Max. torque, mounting screws - strap on the sensor housing	4 Nm
Weight, depending on housing material and version	0.7 … 3.4 kg (1.543 … 7.496 lbs)

Output variable

Output signal	4 … 20 mA/HART
HART output values	
– HART value (Primary Value)	Distance to the level
– HART value (Secondary Value)	Distance to the level - scaled
Signal resolution	1.6 µA
Failure signal current output (adjustable)	mA-value unchanged 20.5 mA, 22 mA, < 3.6 mA (adjustable)
Max. output current	22 mA

Load	see load diagram under Power supply
Damping (63 % of the input variable)	0 … 999 s, adjustable
Fulfilled NAMUR recommendations	NE 43

Input variable

Measured value	distance between process fitting and product surface
Min. distance from antenna end	50 mm (1.969 in)[3]
Measuring range	up to 15 m (49.21 ft)

Reference conditions to measuring accuracy (similar to DIN EN 60770-1)

Reference conditions according to DIN EN 61298-1

– Temperature	+18 … +30 °C (+64 … +86 °F)
– Relative humidity	45 … 75 %
– Air pressure	860 … 1060 mbar/86 … 106 kPa (12.5 … 15.4 psig)

Other reference conditions

– Reflector	ideal reflector, e.g. metal plate 2 x 2 m
– False reflections	Biggest false echo, 20 dB smaller than the useful echo

Characteristics and performance data

Frequency	K-band
Interval	approx. 1 s
Beam angle 3 dB	10°
Step response or adjustment time[4]	> 1 s (dependent on the parameter setting)
Max. level change	Adjustable up to 1 m/min. (dependent on the parameter adjustment)

Received average emitted power reaching an object directly in front of the antenna

– Distance 1 m (3.28 ft)	108 nW per cm^2 (108^{-9} W/cm^2) or 108 nW per 0.155 in^2 (108×10^{-9} W/0.155 in^2)
– Distance 5 m (16.4 ft)	4.3 nW per cm^2 (4.3^{-9} W/cm^2) or 4.3 nW per 0.155 in^2 (4.3×10^{-9} W/0.155 in^2)

[3] In products with low dielectric value up to 50 cm (19.69 in).
[4] Time to output the correct level (with max. 10 % deviation) after a sudden level change.

Measuring accuracy

Resolution, general　　　　　　　　　　max. 1 mm (0.039 in)

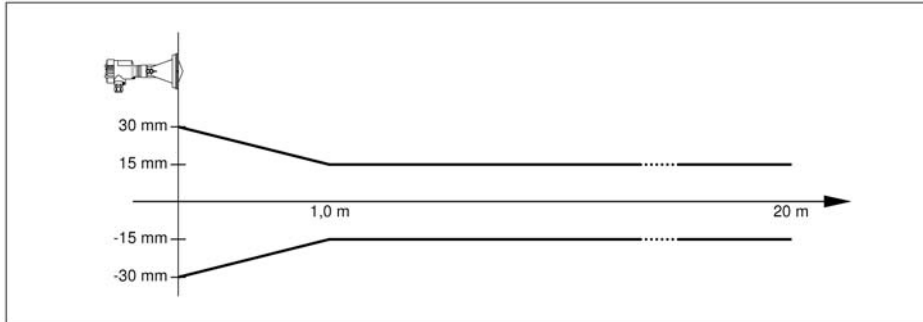Deviation[5]　　　　　　　　　　　　　see diagrams

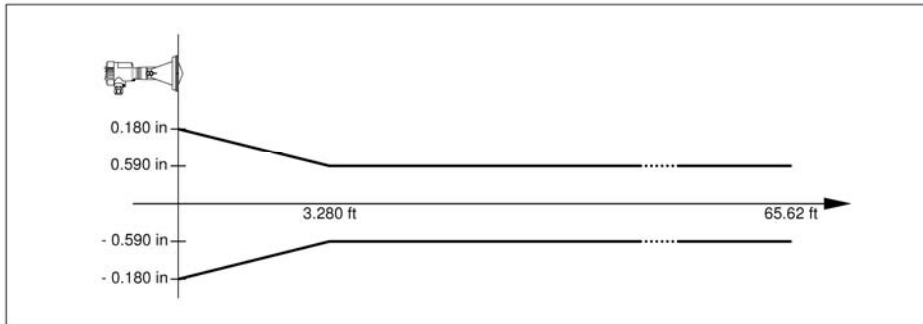*Fig. 32: Deviation VEGAPULS 67 in mm, measuring range in m*

Fig. 33: Deviation VEGAPULS 67 in Inch, measuring range in ft

Influence of the ambient temperature to the sensor electronics[6]

Average temperature coefficient of　　0.03 %/10 K
the zero signal (temperature error)

Ambient conditions

Ambient, storage and transport　　　　-40 … +80 °C (-40 … +176 °F)
temperature

[5]　Incl. non-linearity, hysteresis and non-repeatability.
[6]　Relating to the nominal measuring range.

Process conditions

Vessel pressure	-100 … 200 kPa/-1 … 2 bar (-14.5 … 29.0 psig)
Process temperature (measured on the process fitting)	-40 … +80 °C (-40 … +176 °F)
Vibration resistance	mechanical vibrations with 4 g and 5 … 100 Hz[7]

Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar

Cable entry/plug[8]

– Single chamber housing	• 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5
	or:
	• 1 x closing cap M20 x 1.5; 1 x blind stopper M20 x 1.5
	or:
	• 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
	or:
	• 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
– Double chamber housing	• 1 x cable entry M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind stopper M20 x 1.5; 1 x blind stopper M16 x 1.5 or optionally available with 1 x plug M12 x 1 for VEGADIS 61
	or:
	• 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, 1 x blind stopper M16 x 1.5 or optionally 1 x plug M12 x 1 for VEGADIS 61
	or:
	• 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5; 1 x blind stopper M16 x 1.5 or optionally available with 1 x plug M12 x 1 for VEGADIS 61
Spring-loaded terminals for wire cross-section	> 2.5 mm^2 (AWG 14)

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[7] Tested according to the regulations of German Lloyd, GL directive 2.
[8] Depending on the version M12 x 1, according to DIN 43650, Harting, Amphenol-Tuchel, 7/8" FF.

Electromechanical data - version IP 66/IP 68, 1 bar

Cable entry

– Single chamber housing	1 x IP 68 cable gland M20 x 1.5; 1 x blind stopper M20 x 1.5
– Double chamber housing	1 x IP 68 cable gland M20 x 1.5; 1 x blind stopper M20 x 1.5; 1 x blind stopper M16 x 1.5

Connection cable

– Wire cross-section	0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m
– Tensile strength	< 1200 N (270 lbf)
– Standard length	5 m (16.4 ft)
– Max. length	1000 m (3280 ft)
– Min. bending radius	25 mm (0.984 in) with 25 °C (77 °F)
– Diameter approx.	8 mm (0.315 in)
– Colour - standard PE	Black
– Colour - standard PUR	Blue
– Colour - Ex-version	Blue

Indicating and adjustment module

Power supply and data transmission	through the sensor
Indication	LC display in Dot matrix
Adjustment elements	4 keys
Protection	
– unassembled	IP 20
– mounted into the sensor without cover	IP 40
Materials	
– Housing	ABS
– Inspection window	Polyester foil

Voltage supply

Supply voltage

– Non-Ex instrument	15 … 36 V DC
– EEx-ia instrument	15 … 30 V DC
– EExd-ia instrument	20 … 36 V DC

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Supply voltage with lighted indicating and adjustment module

– Non-Ex instrument	20 … 36 V DC
– EEx-ia instrument	20 … 30 V DC
– EExd-ia instrument	20 … 36 V DC

Permissible residual ripple

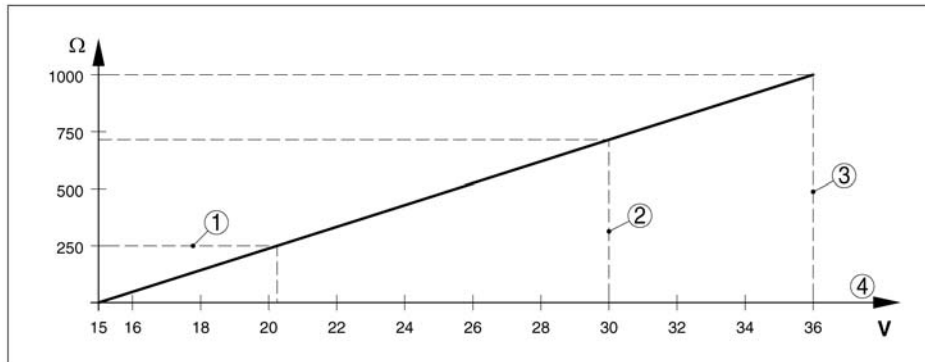|	
– < 100 Hz	U_{ss} < 1 V
– 100 Hz … 10 kHz	U_{ss} < 10 mV

Load see diagram

Fig. 34: Voltage diagram
1 HART load
2 Voltage limit EEx-ia instrument
3 Voltage limit non-Ex/Exd instrument
4 Supply voltage

Electrical protective measures

Protection, depending on housing version

– Plastic housing	IP 66/IP 67
– Aluminium housing, stainless steel housing - investment casting, stainless steel housing - electro-polished	IP 66/IP 68 (0.2 bar)[9]
– Aluminium and stainless housing, investment casting (optionally available)	IP 66/IP 68 (1 bar)

Overvoltage category	III
Protection class	II

[9] A suitable cable is the prerequisite for maintaining the protection class.

Approvals[10]

Approvals

- ATEX D   ATEX II 1/2D IP6X T
- IECEx   IECEx Ex tD A20/A21 IP66 T, A21
- FM/CSA   (NI) CL I, DIV2; (DIP) CL II, III, DIV1

[10]   Available or applied for or planned, depending on the order specification.
      Deviating data with Ex applications: see separate safety instructions.

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10.2   Dimensions

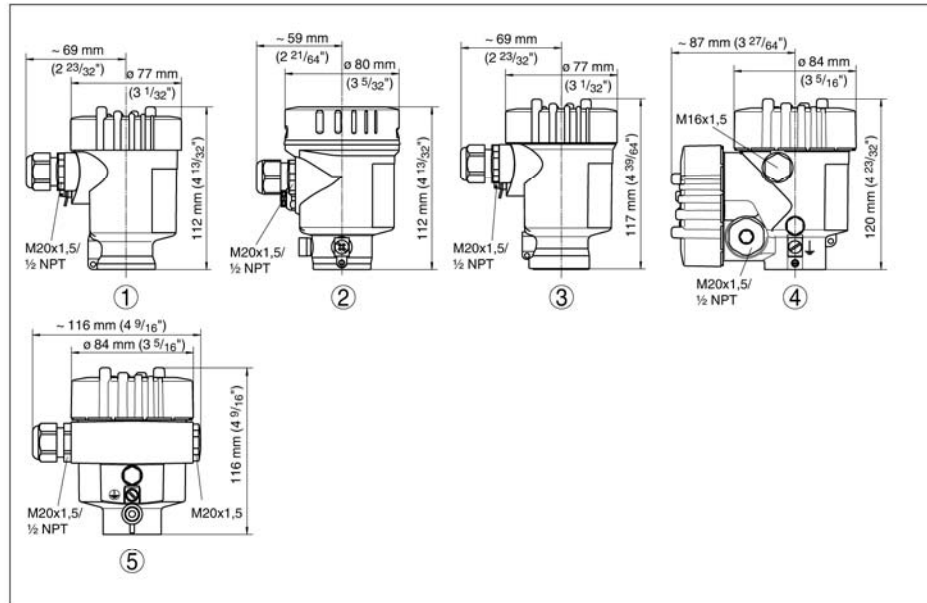**Housing in protection IP 66/IP 67 and IP 66/IP 68; 0.2 bar**

Fig. 35: Housing versions in protection IP 66/IP 67 and IP 66/IP 68, 0.2 bar (with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher)

1   Plastic housing
2   Stainless steel housing, electropolished
3   Stainless steel housing - precision casting
4   Aluminium double chamber housing
5   Aluminium housing
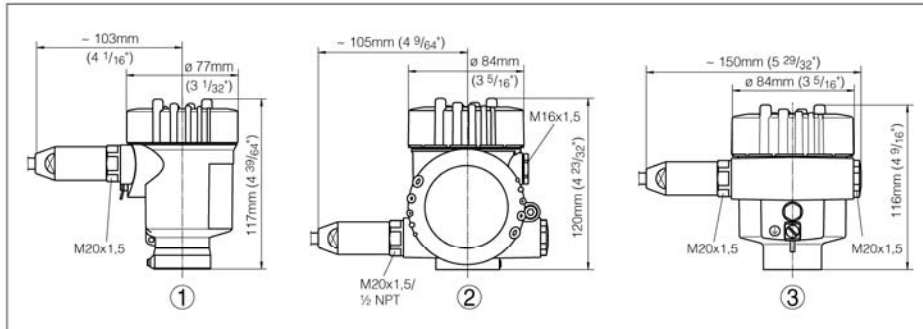
Housing in protection IP 66/IP 68, 1 bar

Fig. 36: Housing versions in protection IP 66/IP 68, 1 bar (with integrated indicating and adjustment module the housing is 9 mm/0.35 in higher)
1   *Stainless steel housing*
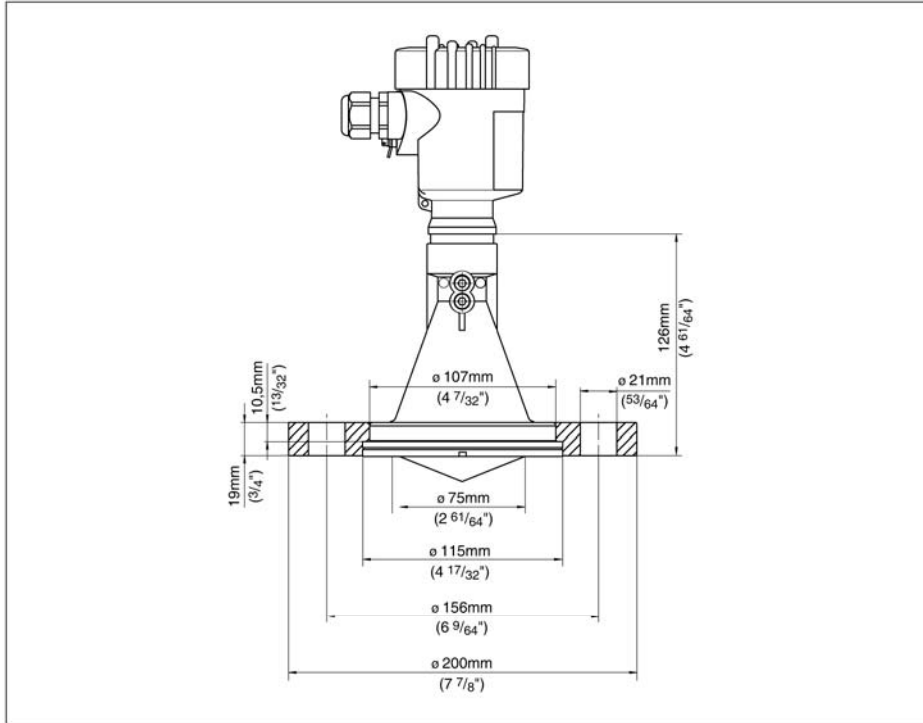2   *Aluminium double chamber housing*
3   *Aluminium housing*

VEGAPULS 67 - version with compression flange

Fig. 38: VEGAPULS 67 - compression flange DN 80/3"/JIS80

VEGAPULS 67 - version with adapter flange

mm	øD	øk	ød	
DN100 PN16	220	180	18	8x45°(=360°)
DN150 PN16	285	240	22	8x45°(=360°)
ASME" 150psi	228,6	190,5	19,1	8x45°(=360°)
ASME" 150psi	279,4	241,3	22,4	8x45°(=360°)
JIS DN100 10K	210	175	19	8x45°(=360°)
JIS DN150 10K	280	240	23	8x45°(=360°)

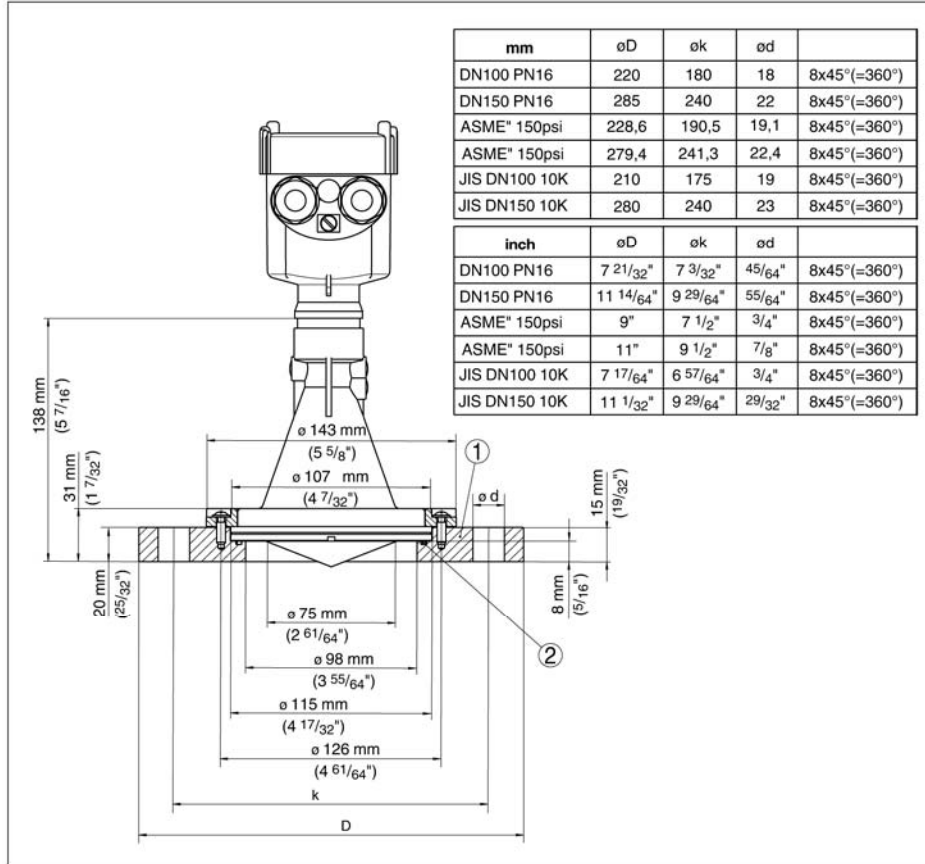| inch	øD	øk	ød	
DN100 PN16	7 21/32"	7 3/32"	45/64"	8x45°(=360°)
DN150 PN16	11 14/64"	9 29/64"	55/64"	8x45°(=360°)
ASME" 150psi	9"	7 1/2"	3/4"	8x45°(=360°)
ASME" 150psi	11"	9 1/2"	7/8"	8x45°(=360°)
JIS DN100 10K	7 17/64"	6 57/64"	3/4"	8x45°(=360°)
JIS DN150 10K	11 1/32"	9 29/64"	29/32"	8x45°(=360°)

Fig. 39: VEGAPULS 67 - adapter flange DN 100/DN 150
1   Adapter flange
2   Seal

10.3　Industrial property rights

VEGA product lines are global protected by industrial property rights. Further information see http://www.vega.com.
Only in U.S.A.: Further information see patent label at the sensor housing.

VEGA Produktfamilien sind weltweit geschützt durch gewerbliche Schutzrechte.
Nähere Informationen unter http://www.vega.com.

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All statements concerning scope of delivery, application,
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