

Capacitive level measurement

**VEGACAL 62**

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## Product Information

**VEGA**

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**Take note of safety instructions for Ex areas**



Please note the Ex specific safety information for installation and operation in Ex areas which you will find on our homepage [www.vega.com/services/downloads](http://www.vega.com/services/downloads) and which come with the appropriate instrument. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. The sensors must only be operated in intrinsically safe circuits. The permissible electrical values are stated in the certificate.

## 1 Description of the measuring principle

### Measuring principle

VEGACAL is a capacitive sensor for continuous level measurement.

The instruments are designed for industrial use in all areas of process technology and are universally applicable.

With the introduction of VEGACAL series 60, the proven capacitive measuring principle is now also part of the plics® family and rounds out VEGA's line of sensors.

Together, sensor and vessel form a capacitor. A change of the product level causes a capacitance change which is processed by the electronics and converted into an appropriate level signal.

The sensors are maintenance-free and rugged and are used in all areas of industrial measurement technology. Whereas fully insulated versions are used mainly in liquids, partly insulated versions are preferred for solids. Implementation in very adhesive or corrosive products is no problem. Since the capacitive measuring principle places no special requirements on installation, many different applications can be equipped with the new VEGACAL series 60 sensors.

## 2 Type overview

### VEGACAL 62



### VEGACAL 63



### VEGACAL 64



Preferred application:	solids, non-conductive liquids	conductive liquids	adhesive, conductive liquids
Version:	rod - partly insulated, concentric tube	rod - fully insulated, concentric tube	rod - fully insulated
Insulation:	PTFE	PE, PTFE	FEP
Length:	0.2 ... 6 m	0.2 ... 6 m	0.2 ... 6 m
Process fitting:	thread from G $\frac{3}{4}$ A	thread from G $\frac{3}{4}$ A	thread from G $\frac{3}{4}$ A
Process temperature:	-50 ... 200°C	-50 ... 200°C	-50 ... 130°C
Process pressure:	-1 ... 64 bar (-100 ... 6400 kPa)	-1 ... 64 bar (-100 ... 6400 kPa)	-1 ... 64 bar (-100 ... 6400 kPa)

### VEGACAL 65



### VEGACAL 66



Preferred application:	solids, non-conductive liquids	solids, liquids
Version:	cable	cable - insulated
Insulation:	PA	PTFE
Length:	0.4 ... 32 m	0.4 ... 32 m
Process fitting:	thread from G1A	thread from G $\frac{3}{4}$ A
Process temperature:	-50 ... 200°C	-50 ... 200°C
Process pressure:	-1 ... 64 bar (-100 ... 6400 kPa)	-1 ... 64 bar (-100 ... 6400 kPa)

**Housing**



Plastic



Stainless steel



Aluminium



Aluminium  
(double chamber)

**Electronics**



Relay output



Transistor out-  
put



Contactless  
electronic  
switch



Two-wire output

**Sensors**



Probe

**Approvals**



Gas explosion  
protection



Dust explosion  
protection

### 3 Technical data

#### General data

#### VEGACAL 62

Materials, wetted parts	
– process fitting - thread	1.4435 (316L)
– insulation	PTFE
– probe (rod)	1.4435 (316L)
Materials, non-wetted parts	
– housing	plastic PBT (Polyester), Alu-die casting powder-coated, stainless steel 1.4435 (316L)
– seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– ground terminal	stainless steel 1.4571(316Ti)/1.4435 (316L)
Weights	
– with plastic housing	1150 g (40 oz)
– with Aluminium housing	1600 g (56 oz)
– with stainless steel housing	1950 g (69 oz)
Sensor length	0.2 ... 6 m (0.7 ... 20 ft)
Max. lateral load	400 N (90 lbf)

#### VEGACAL 63

Materials, wetted parts	
– process fitting - thread	1.4435 (316L)
– insulation	PE or PTFE
Materials, non-wetted parts	
– probe (rod)	1.4435 (316L)
– housing	plastic PBT (Polyester), Alu-die casting powder-coated, stainless steel 1.4435 (316L)
– seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– ground terminal	stainless steel 1.4571(316Ti)/1.4435 (316L)
Weight	
– with plastic housing	1150 g (40 oz)
– with Aluminium housing	1600 g (56 oz)
– with stainless steel housing	1950 g (69 oz)
Sensor length	0.2 ... 6 m (0.7 ... 20 ft)
Max. lateral load	400 N (90 lbf)

#### VEGACAL 64

Materials, wetted parts	
– process fitting - thread	1.4435 (316L)
– insulation	FEP
Materials, non-wetted parts	
– probe (rod)	1.4435 (316L)
– housing	plastic PBT (Polyester), Alu-die casting powder-coated, stainless steel 1.4435 (316L)
– seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
– ground terminal	stainless steel 1.4571(316Ti)/1.4435 (316L)

	Weights	
	– with plastic housing	1150 g (40 oz)
	– with Aluminium housing	1600 g (56 oz)
	– with stainless steel housing	1950 g (69 oz)
	– extension tube	approx. 1450 g/m (15.6 oz/ft)
	Max. lateral load	400 N (90 lbf)
	Sensor length	0.2 ... 6 m (0.7 ... 20 ft)
<b>VEGACAL 65</b>	Materials, wetted parts	
	– process fitting - thread	1.4435 (316L)
	– insulation	PA
	– probe (cable)	1.4401 (316)
	Materials, non-wetted parts	
	– housing	plastic PBT (Polyester), Alu-die casting powder-coated, stainless steel 1.4435 (316L)
	– seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
	– ground terminal	stainless steel 1.4571(316Ti)/1.4435 (316L)
	Weights	
	– with plastic housing	1150 g (40 oz)
	– with Aluminium housing	1600 g (56 oz)
	– with stainless steel housing	1950 g (69 oz)
	Sensor length	0.4 ... 32 m (1.3 ... 105 ft)
	Max. permissible tensile load	3000 N (675 lbs)
<b>VEGACAL 66</b>	Materials, wetted parts	
	– process fitting - thread	1.4435 (316L)
	– Seal	PUR, CR, NBR
	– probe (cable)	1.4401 (316)
	Materials, non-wetted parts	
	– housing	plastic PBT (Polyester), Alu-die casting powder-coated, stainless steel 1.4435 (316L)
	– seal ring between housing and housing cover	NBR (stainless steel housing), silicone (Alu/plastic housing)
	– ground terminal	stainless steel 1.4571(316Ti)/1.4435 (316L)
	Weights	
	– with plastic housing	1150 g (40 oz)
	– with Aluminium housing	1600 g (56 oz)
	– with stainless steel housing	1950 g (69 oz)
	Sensor length	0.4 ... 32 m (1.3 ... 105 ft)
	Max. permissible tensile load	3000 N (675 lbs)

<b>Output variable</b>		
<b>4 ... 20 mA/HART</b>	Output signal	4 ... 20 mA/HART
	Resolution	1.6 $\mu$ A
	Fault signal	current output unchanged, 20.5 mA, 22 mA, < 3.6 mA (adjustable)
	Current limitation	22 mA
	Load	
	– four-wire sensor	max. 500 Ohm <sup>1)</sup>
	– two-wire sensor	see load diagram in Power supply
	Integration time	0 ... 999 s, adjustable
	Fulfilled Namur recommendation	NE 43
<b>Profibus PA</b>	Output signal	digital output signal, format acc. to IEEE-754
	– sensor address	126 (default setting)
	Current value	constantly 10 mA +/- 0.5 mA
	Integration time	0 ... 999 s, adjustable
<b>Foundation Fieldbus FF</b>	Output	
	– signal	digital output signal, Foundation Fieldbus protocol
	– physical layer	acc. to IEC 1158-2
	Channel Numbers	
	– Channel 1	Primary Value
	– Channel 2	Secondary Value 1
	– Channel 3	Secondary Value 2
	– Channel 4	Temperature Value <sup>2)</sup>
	Current value	10 mA +/- 0.5 mA
<b>Input variable</b>		
	Parameter	level of liquids
	Min. dielectric figure	Er >1.5
<b>Accuracy (similar to DIN EN 60770-1)</b>		
	Reference conditions acc. to DIN EN 61298-1	
	– temperature	18 ... 30°C
	– relative humidity	45 ... 75 %
	– pressure	860 ... 1060 mbar (86 ... 106 kPa)

<sup>1)</sup> With inductive load, ohmic share at least 25 Ohm/mH.

<sup>2)</sup> Only with sensors with integrated temperature measurement.

**Characteristic curve deviation and measurement characteristics**

Reference installation conditions

- flange DN 100
- min. distance to installations 1 m

Temperature drift (current output) 0.06 %/10 K relating to the max. measuring range

**Ambient conditions**

Ambient, storage and transport temperature

- without PLICSCOM -40 ... +80°C (-40 ... +176°F)
- with PLICSCOM -20 ... +70°C (-4 ... +158°F)

**Process conditions**

Parameter level of liquids and solids

Process pressure -1 ... 64 bar (-14.5 ... 928 psi) take note of the coating

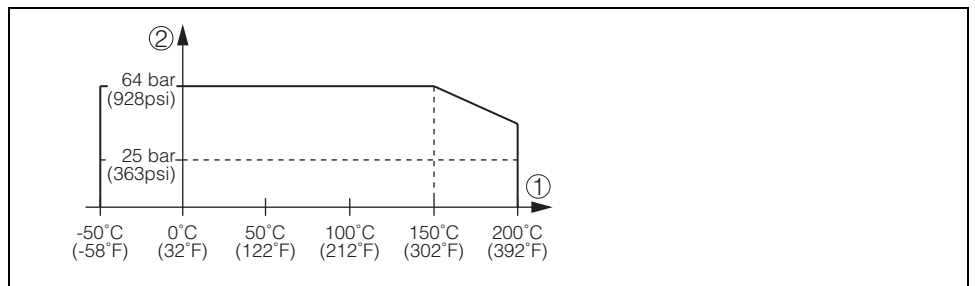


Fig. 1: PTFE coating: Process pressure - Product temperature (VEGACAL 62, 63, 66)

- 1 Product temperature
- 2 Process pressure

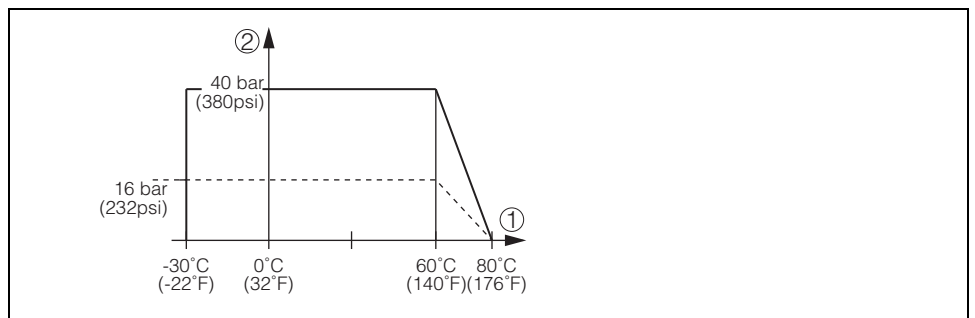


Fig. 2: PA coating: Process pressure - Product temperature (VEGACAL 63, 65)

- 1 Product temperature
- 2 Process pressure

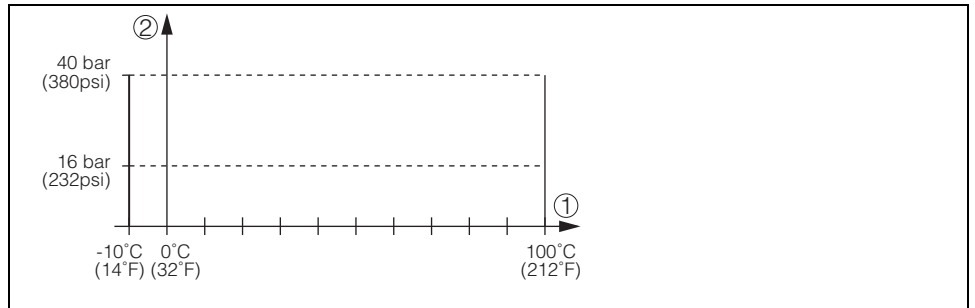


Fig. 3: FEP coating: Process pressure - Product temperature (VEGACAL 64)

- 1 Product temperature
- 2 Process pressure

VEGACAL of 1.4435 (316L)

-50 ... 150°C (-58 ... 302°F) take note of the coating

Process temperature (thread or flange temperature) with temperature adapter (option)

-50 ... 200°C (-58 ... 392°F) take note of the coating

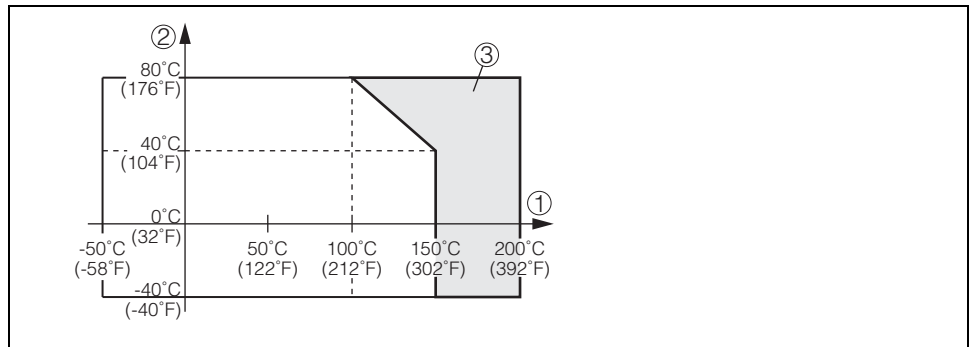


Fig. 4: Ambient temperature - Product temperature

- 1 Product temperature
- 2 Ambient temperature
- 3 Temperature range with temperature adapter

Dielectric value

> 1.5

**Electromechanical data**

Cable entry/plug (dependent on the version)

– single chamber housing

- 1 x cable entry M20x1.5 (cable-ø 5-9 mm), 1 x blind stopper M20x1.5

or:

- 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT

or:

- 1 x plug M12x1, 1 x blind stopper M20x1.5

– double chamber housing

- 1 x cable entry M20x1.5 (cable-ø 5-9 mm), 1 x blind stopper M20x1.5, plug M12x1 for VEGADIS 61

or:

- 1 x closing cap ½ NPT, 1 x blind stopper ½ NPT, plug M12x1 for VEGADIS 61

or:

- 1 x plug M12x1, 1 x blind stopper M20x1.5, plug M12x1 for VEGADIS 61

Spring-loaded terminals

for wire cross sections up to 2.5 mm<sup>2</sup>

**Indicating and adjustment module PLICSCOM**

Power supply and data transmission

through sensor via gold-plated sliding contacts (I<sup>2</sup>C bus)

Display

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

**4 ... 20 mA/HART**

**Power supply VEGACAL - two-wire instrument**

Supply voltage	
– non-Ex instrument	14 ... 36 V DC
– EEx ia instrument	14 ... 30 V DC
– EExd ia instrument	20 ... 36 V DC
Permissible residual ripple	
– < 100 Hz	U <sub>ss</sub> < 1 V
– 100 Hz ... 10 kHz	U <sub>ss</sub> < 10 mV
Load	see diagram

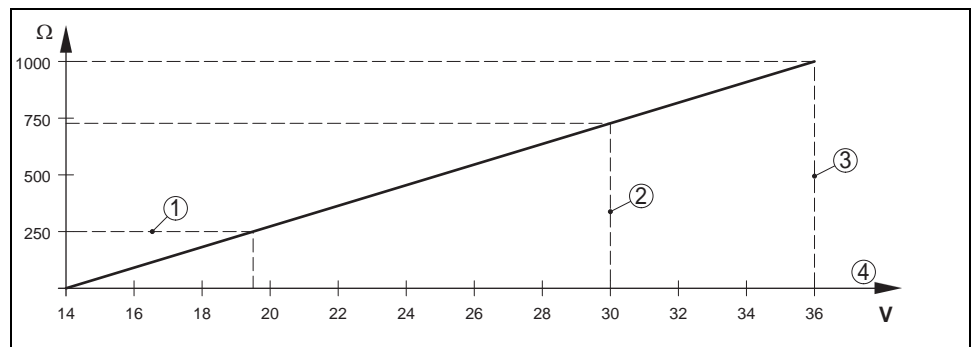


Fig. 5: Voltage diagram

- 1 HART load
- 2 Voltage limit EEx ia instrument
- 3 Voltage limit non-Ex instrument/Exd instrument
- 4 Supply voltage

**Profibus PA**

Supply voltage	
– non-Ex instrument	9 ... 32 V DC
– EEx ia instrument	9 ... 24 V DC
Power supply by/max. number of sensors	
– DP/PA segment coupler	max. 32 (max. 10 with Ex)
– VEGALOG 571 EP card	max. 15 (max. 10 with Ex)

**Foundation Fieldbus FF**

Supply voltage	
– non-Ex instrument	9 ... 32 V DC
– EEx ia instrument	9 ... 24 V DC
Power supply by/max. number of sensors	
– H1 fieldbus cable/Power supply	max. 32 (max. 10 with Ex)

**Electrical protective measures**

Protection	IP 66/67
Overvoltage category	III
Protection class	
– two-wire, Profibus PA, Foundation Fieldbus	II

**Approvals<sup>3)</sup>**

ATEX II 1G, 1/2G, 2G EEx ia IIC T6,

ATEX II 1/2G, 2G EEx d ia IIC T6

**CE conformity**

EMVG (89/336/EWG), Emission  
EN 61326: 1997 (class B), Susceptibility  
EN 61326: 1997/A1: 1998

NSR (73/23/EWG), EN 61010-1: 2001

Namur recommendation NE 21

R & TTE regulation (1999/5/EC), I-ETS  
300-440 Expert opinion No. 0043052-  
02SEE, Notified Body No. 0499

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<sup>3)</sup> Deviating data with Ex applications: see separate safety instructions

## 4 Dimensions

### Housing

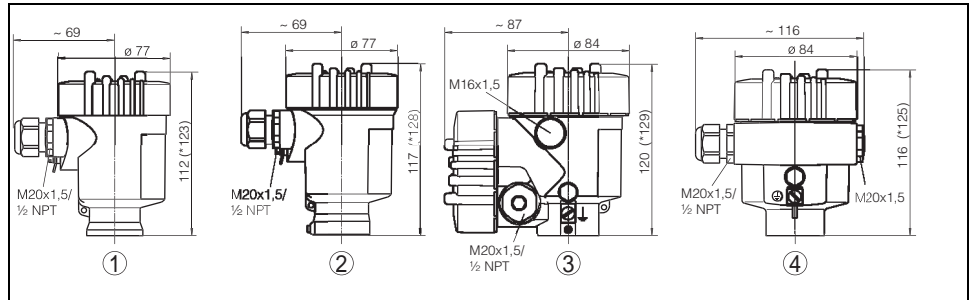


Fig. 6: Housing versions

- 1 Plastic housing (\* dimension with integrated PLICSCOM)
- 2 Stainless steel housing (\* dimension with integrated PLICSCOM)
- 3 Aluminium double chamber housing (\* dimension with integrated PLICSCOM)
- 4 Aluminium housing (\* dimension with integrated PLICSCOM)

### VEGACAL 62

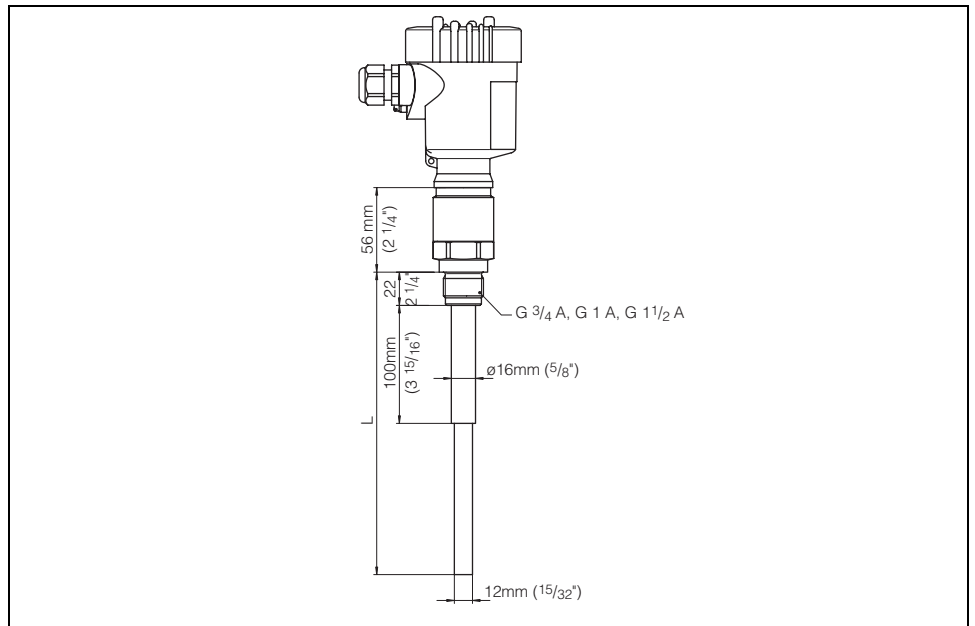
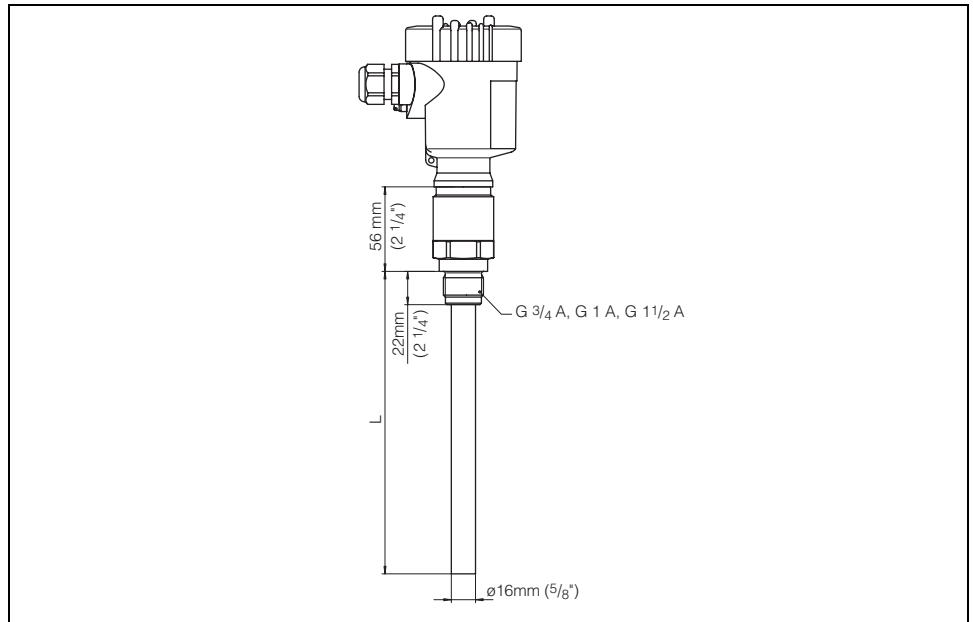
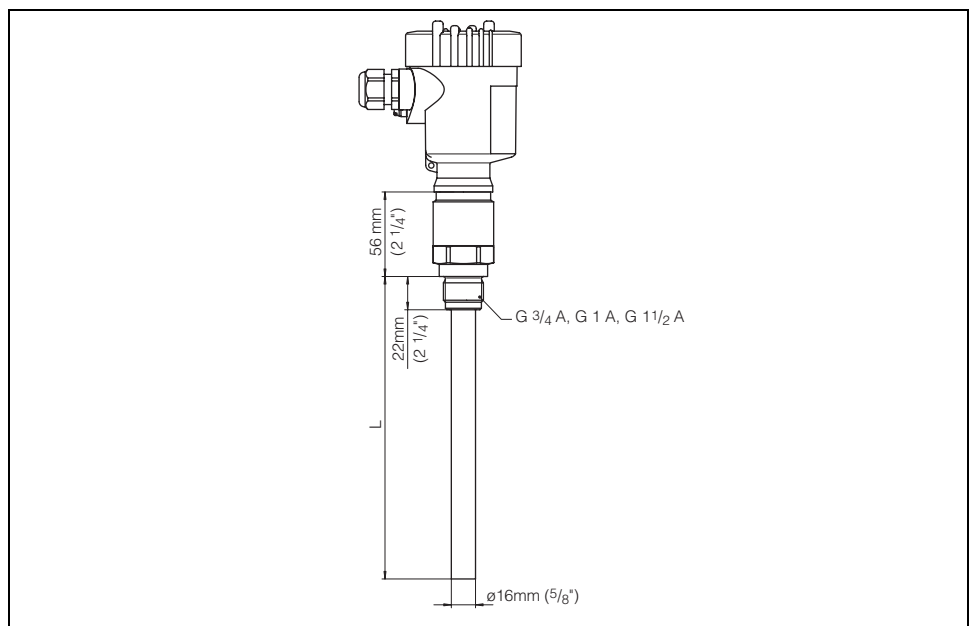


Fig. 7: VEGACAL 62 - Screwed version

**VEGACAL 63***Fig. 8: VEGACAL 63 - Screwed version***VEGACAL 64***Fig. 9: VEGACAL 64 - Screwed version*

**VEGACAL 65**

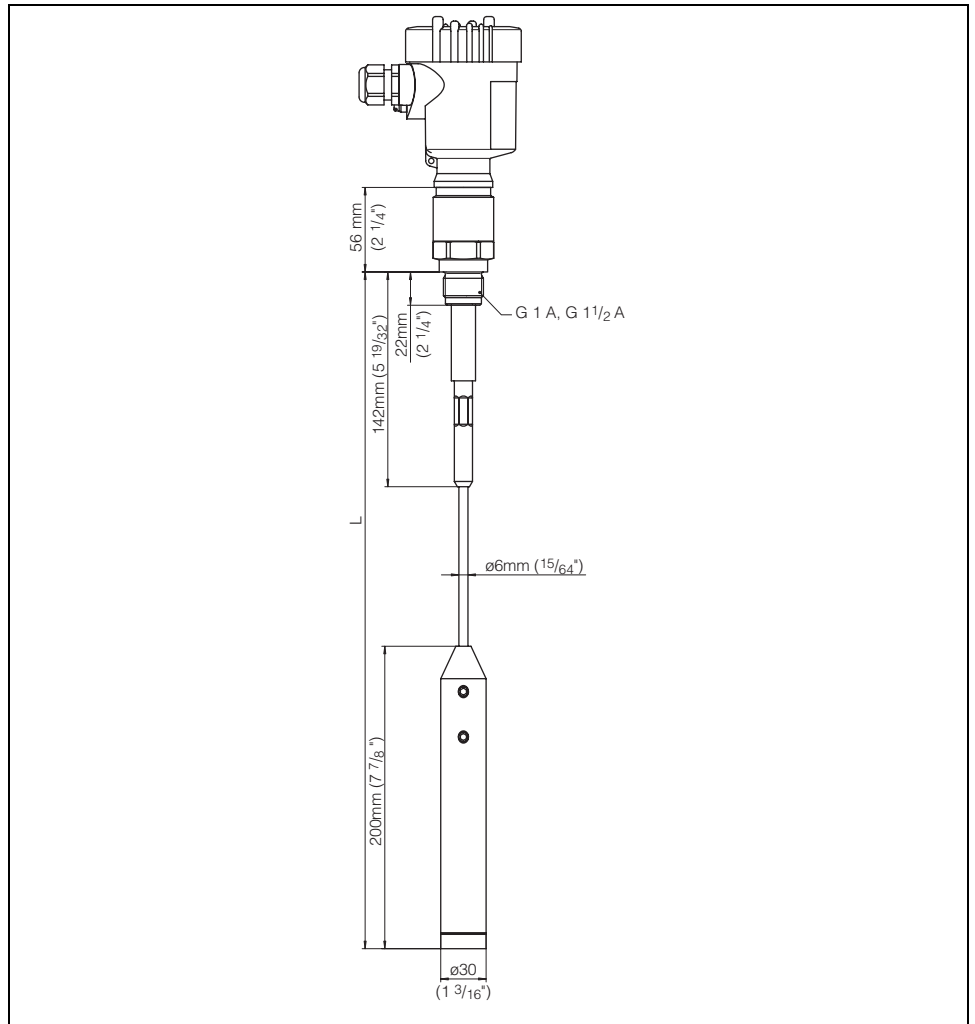


Fig. 10: VEGACAL 65 - Screwed version

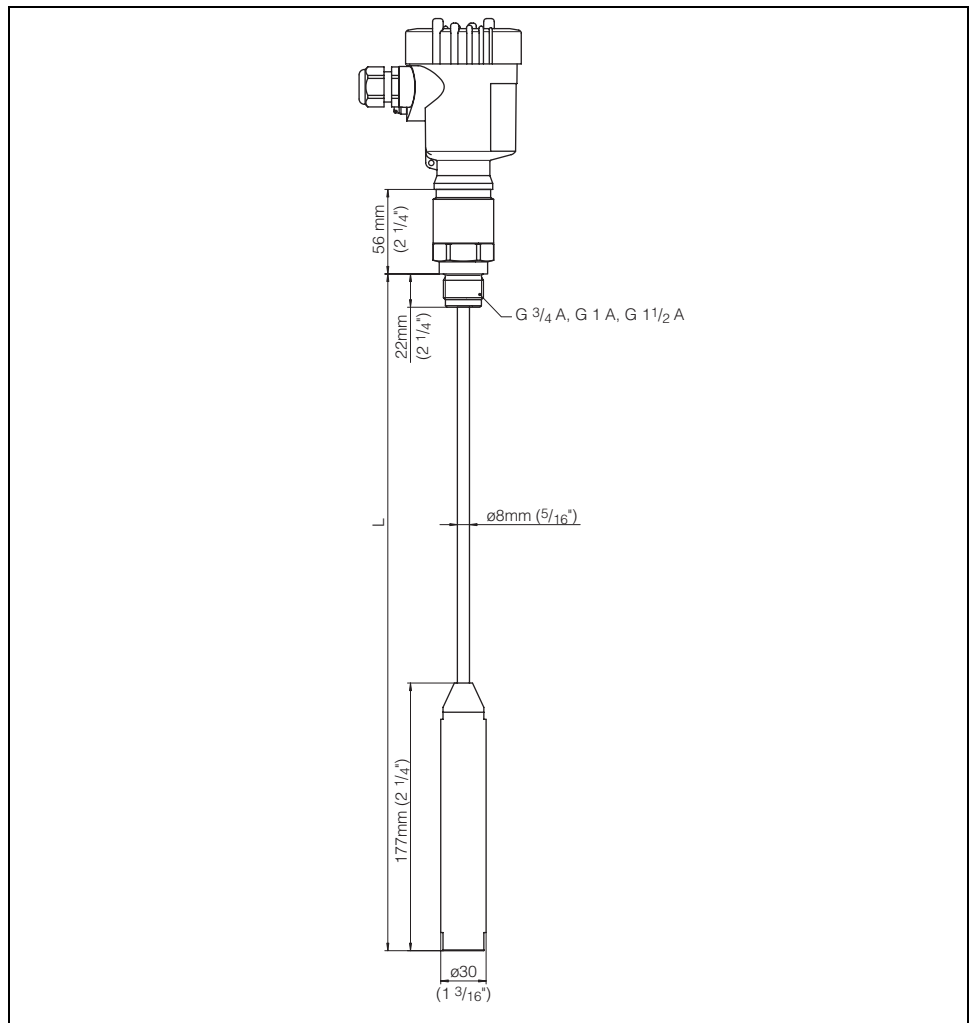
**VEGACAL 66**

Fig. 11: VEGACAL 66 - Screwed version







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