



Safety instructions

VEGAPULS 62, 63, 66, 67, 68, SR68

Dust ignition protection by enclosure

HW \geq 2.0.0, SW \geq 4.0.0

Two-wire 4 ... 20 mA/HART

Four-wire 4 ... 20 mA/HART

Profibus PA

Foundation Fieldbus



Document ID: 49440



VEGA

Contents

1	Area of applicability.....	4
2	General information.....	4
3	Technical data	5
4	Application conditions	7
5	Installation/construction	9
6	Material resistance	9
7	Grounding.....	10
8	Locking mechanism of housing cover.....	10
9	Important information for mounting	11
10	Type and size of the threads for the cable entries.....	12
11	Removing and replacing the red threaded/dust cover	13
12	Installation with swivelling holder.....	13
13	Versions with rinsing connection.....	13
14	Electrostatic charging (ESD)	14

Supplementary documentation:

- Operating Instructions VEGAPULS 62, 63, 66, 67, 68, SR68
- EU-type approval certificate BVS 04 ATEX E 080 X (Document ID: 55988)
- EU declaration of conformity (Document ID: 43634)

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DE	Sicherheitshinweise für den Einsatz in explosionsgefährdeten Bereichen
EN	Safety instructions for the use in hazardous areas
FR	Consignes de sécurité pour une application en atmosphères explosibles
IT	Normative di sicurezza per l'impiego in luoghi con pericolo di esplosione
ES	Instrucciones de seguridad para el empleo en áreas con riesgo de explosión
PT	Normas de segurança para utilização em zonas sujeitas a explosão
NL	Veiligheidsaanwijzingen voor gebruik op plaatsen waar ontploffingsgevaar kan heersen
SV	Säkerhetsanvisningar för användning i explosionsfarliga områden
DA	Sikkerhedsforskrifter til anvendelse i explosionsfarlig atmosfære
FI	Turvallisuusohjeet räjähdysvaarallisissa tiloissa käyttöä varten
EL	Υποδείξεις ασφαλείας για τη χρησιμοποίηση σε περιοχές που υπάρχει κίνδυνος έκρηξης

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1 Area of applicability

These safety instructions apply to the radar sensors VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, according to EU type approval certificate BVS 04 ATEX E 080 X (certificate number on the type label) and for all instruments with the number of the safety instruction (49440) on the type label.

2 General information

The level measuring instrument VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, is based on radar technology and is used to detect the distance between medium surface and sensor (the antenna) by means of high frequency electromagnetic waves in the GHz range. The electronics uses the running time of the signals reflected by the medium surface to calculate the distance to the medium surface.

The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, consist of a metal housing, a process connection element and a sensor (the antenna). As an option the display and adjustment module can also be integrated.

The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, are used for monitoring or control also in areas with combustible, dust-generating bulk solids requiring instruments of category 1D, 1/2D or 2D.

If the VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, are installed and operated in hazardous areas, the general Ex installation regulations EN 60079-14 as well as these safety instructions must be observed.

The operating instructions as well as the installation regulations or standards that apply for explosion protection of electrical systems must generally be observed.

The installation of explosion-endangered systems must always be carried out by qualified personnel.

The requirements of EN 60079-14 (2008) e.g. with respect to dust and temperatures must be fulfilled.

Category 1D instruments

The electronics housing and the antennas with the mechanical fixing element are installed in explosion-endangered areas, in areas requiring instruments of category 1D.

Category 1/2D or 1/3D instruments

The electronics housing is installed in hazardous areas requiring instruments of category 2D or 3D. The process connection element is installed in the separating wall, which separates areas requiring instruments of category 2D, 3D or 1D. The antenna system with the mechanical fixing element is installed in hazardous areas requiring instruments of category 1D.

Category 2D instruments

The electronics housing and the antenna system with the mechanical fixing element are installed in explosion-endangered areas, in areas requiring instruments of category 2D.

Type of protection marking:

II 1D Ex ta IIIC T... Da

or

II 1/2D Ex ta/tb IIIC T... Da/Db

or

II 1/3D Ex ta/tc IIIC T... Da/Dc

or

3 Technical data

Electrical data

VEGAPULS PS62/63.DK* D/H***, VEGAPULS PS66/68.DK*** H***, VEGAPULS PSSR68.DK*** H*****

Operating voltage: (terminals 1[+], 2[-] in "Ex d" connection compartment) $U = 14 \dots 36 \text{ V DC}$
 $U_m = 253 \text{ V AC}$

VEGAPULS PS62/63.DK* K/L/P/F***, VEGAPULS PS66/68.DK*** P/F***, VEGAPULS PSSR68.DK*** P/F*****

Power supply and signal circuit: (terminal 1, 2 in the "Ex d" connection compartment) $U = 16 \dots 32 \text{ V DC}$
 $U_m = 253 \text{ V AC}$

VEGAPULS PS62/63.RX* D/H/K/L/P/F***, VEGAPULS PS66/67/68.RX*** H/P/F***, VEGAPULS PSSR68.RX*** H/P/F*****

Operating voltage: (terminals 1[+], 2[-] in the electronics compartment, with double chamber housing version in the connection compartment) $U = 9.7 \dots 30 \text{ V DC}$
 $U_{max} = 30 \text{ V DC}$

VEGAPULS PS62/63.RX/DK* G/M/B/I***, VEGAPULS PS66/68.RX/DK*** B/I***, VEGAPULS PS67.RX** G/M/B/I***, VEGAPULS PSSR68.DK** B/I*****

Voltage supply: (terminals 1, 2 in the connection compartment) $U = 90 \dots 253 \text{ V AC}$ or $U = 9.6 \dots 48 \text{ V DC}$ or
 $U = 20 \dots 42 \text{ V AC}$
 $U_m = 253 \text{ V AC}$

Active signal current output: (KI5[+], KI7[-] in the connection compartment) $I_{out} = 4 \dots 20 \text{ mA}$ with superimposed HART signal
 $U_m = 60 \text{ V AC}$

Passive signal current output: (KI6[+], KI7[-] in the connection compartment) $I_{out} = 4 \dots 20 \text{ mA}$ with superimposed HART signal
 $U_m = 60 \text{ V AC}$

VEGAPULS PS62/63.CK* D/H***, VEGAPULS PS66/68.CK*** H***, VEGAPULS PSSR68.CK*** H*****

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment) Type of protection intrinsic safety Ex ia IIC
 For connection to a certified, intrinsically safe circuit.
 Maximum values:

- $U_i = 30 \text{ V}$
- $I_i = 131 \text{ mA}$
- $P_i = 983 \text{ mW}$

The effective internal capacitance C_i is negligible.

The effective internal inductance is $L_i \leq 5 \mu\text{H}$.

The intrinsically safe circuit is electrically isolated from parts which can be grounded. The metallic parts of VEGAPULS PS6*.CK*** D/H***, VEGAPULS PSSR68.CK*** D/H*** are electrically connected with the internal and external earth terminal.

VEGAPULS PS62/63.CK* K/L/P/F***, VEGAPULS PS66/68.CK*** P/F***, VEGAPULS PSSR68.CK*** P/F*****

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment)

Ignition protection type intrinsic safety Ex ia IIC/IIB or Ex ib IIC/IIB

For connection to a certified, intrinsically safe circuit.

Maximum values:

- $U_i = 17.5 \text{ V}$
- $I_i = 500 \text{ mA}$
- $P_i = 5.5 \text{ W}$

The instrument is suitable for connection to a Fieldbus system according to the FISCO model (IEC 60079-27), e.g. Profibus PA or Foundation Fieldbus.

or

- $U_i = 24 \text{ V}$
- $I_i = 250 \text{ mA}$
- $P_i = 1.2 \text{ W}$

The effective internal capacitance C_i is negligible.

The effective internal inductance is $L_i \leq 5 \mu\text{H}$.

The intrinsically safe circuit is electrically isolated from parts which can be grounded. The metallic parts of VEGAPULS PS6*.CK*** K/L/P/F***, VEGAPULS PSSR68.CK*** K/L/P/F*** are electrically connected with the internal and external earth terminal.

VEGAPULS PS62/63.RX/CK/DK* D/H/K/L/P/F***, VEGAPULS PS66/68.RX/CK/DK*** H/P/F***, VEGAPULS PSSR68.RX/CK/DK*** H/P/F***, VEGAPULS PS67.RX** H/P/F*****

Display and adjustment circuit: (terminals 5, 6, 7, 8 in electronics compartment)

Type of protection intrinsic safety Ex ia IIC

Only for connection to an intrinsically safe circuit of the appropriate external display and adjustment unit VEGADIS 81 (BVS 05 ATEX E 023, PTB 02 ATEX 2136 X).

The rules for the interconnection of intrinsically safe circuits between VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, and the external display and adjustment unit VEGADIS 81 are fulfilled, provided that the total inductance and total capacitance of the connection cable between VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, and the external display unit VEGADIS 81 $L_{\text{cable}} = 310 \mu\text{H}$ and $C_{\text{cable}} = 2 \mu\text{F}$ are not exceeded.

A display and adjustment module mounted in VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, is taken into account.

Display and adjustment module circuit: (spring contacts in the electronics compartment, additionally in the termination compartment with double chamber housing version)

Type of protection intrinsic safety Ex ia IIC

For connection to the display and adjustment module or VEGACONNECT (PTB 07 ATEX 2013 X).

With the double chamber housing version, the display and adjustment module may be mounted either in the electronics compartment or in the termination compartment.

The intrinsically safe circuits of VEGAPULS PS6*/PSSR68.DK(*)***** are grounded.

The circuits of VEGAPULS PS6*/PSSR68.RX/DK/CK(*)***** are electrically isolated from parts which can be grounded. The metallic parts of VEGAPULS PS6*/PSSR68.RX/DK/CK(*)***** are electrically connected with the internal and external earth terminal.

VEGAPULS PS62/63.RX/DK*** G/M/B/I**, VEGAPULS PS66/68.RX/DK*** B/I***, VEGAPULS PSSR68.RX/DK*** B/I***, VEGAPULS PS67.RX** G/M/B/I***

Display and adjustment module circuit: (spring contacts in the electronics compartment, additionally in the termination compartment with double chamber housing version)

Type of protection intrinsic safety Ex ia IIC

Only for connection to the display and adjustment module PLICSCOM or VEGACONNECT (PTB 07 ATEX 2013 X).

The intrinsically safe circuits of VEGAPULS PS6*/PSSR68.DK(*)***** are grounded.

The circuits of VEGAPULS PS6*/PSSR68.RX(*)***** are electrically isolated from parts which can be grounded. The metallic parts of VEGAPULS PS6*/PSSR68.RX(*)***** are electrically connected with the internal and external earth terminal.

4 Application conditions

Permissible ambient temperatures

On the sensor (antenna), category 1D or 2D			
VEGAPULS PS62(*)..*****X****	X:	2	FKM (SHS FPM 70C3 GLT) and PTFE / -40 ... +130 °C
		3	FFKM (Kalrez 6375) and PTFE / -20 ... +130 °C
		6	FFKM (Kalrez 2035) and PTFE / -15 ... +130 °C
		7	FFKM (Kalrez 6230) and PTFE / -15 ... +130 °C
		A	FKM (SHS FPM 70C3 GLT) and PEEK / -15 ... +200 °C
		C	FFKM (Kalrez 2035) and PEEK / -15 ... +210 °C
		E	FFKM (Kalrez 6230) and PEEK / -15 ... +250 °C
		F	FFKM (Kalrez 6375) and PEEK / -20 ... +250 °C
		H	Graphite and ceramic / -196 ... +450 °C

On the sensor (antenna), category 1D or 2D			
VEGAPULS PS63(*).**X****	X:	N	Aseptically encapsulated horn antenna / PTFE / -40 ... +200 °C
		J	Aseptically encapsulated horn antenna / TFM-PTFE / -196 ... +200 °C
		R	Aseptically encapsulated horn antenna / PTFE (8 mm) / -40 ... +200 °C
		L	Aseptically encapsulated horn antenna / PFA / -40 ... +200 °C
		M	Aseptically encapsulated horn antenna / PFA (8 mm) / -40 ... +200 °C
		V	aseptically encapsulated horn antenna / TFM-PTFE + FKM / -20 ... +130 °C
		E	aseptically encapsulated horn antenna / TFM-PTFE + EPDM / -40 ... +130 °C
		U	aseptically encapsulated horn antenna / PTFE (8 mm) / -196 ... +200 °C
		*	several suitable horn antennas
VEGAPULS PS66(*).****X****	X:	2	FKM (A+P GLT FPM 70.16-06) / -40 ... +150 °C
		3	FFKM (Kalrez 6375) / -20 ... +150 °C
		5	EPDM (A+P 70.10-02) / -40 ... +150 °C
		G	Graphite and ceramic / -60 ... +250 °C with temperature adapter
		H	Graphite and ceramic / -60 ... +400 °C with temperature adapter
VEGAPULS PS67(*).**X*****	X:	B	PP / -40 ... +80 °C
		*	several suitable versions
VEGAPULS PS68(*).****X****	X:	2	FKM (SHS FPM 70C3 GLT) and PTFE / -40 ... +130 °C
		3	FFKM (Kalrez 6375) and PTFE / -20 ... +130 °C
		7	FFKM (Kalrez 6230) and PTFE (FDA) / -15 ... +130 °C
		A	FKM (SHS FPM 70C3 GLT) and PEEK / -15 ... +200 °C
		C	FFKM (Kalrez 2035) and PEEK / -15 ... +210 °C
		E	FFKM (Kalrez 6230) and PEEK / -15 ... +250 °C
		F	FFKM (Kalrez 6375) and PEEK / -20 ... +250 °C
		H	Graphite and ceramic / -196 ... +450 °C

On the electronics housing, category 2D		
VEGAPULS PS6* .*****		-40 ... +60 °C
VEGAPULS PSSR68.*****		

Max. surface temperature

On the sensor (antenna), category 1D or 2D	
VEGAPULS PS6* .*****	Process temperature +2 K
VEGAPULS PSSR68.*****	

On the electronics housing, category 1D, 2D or 3D	Zone 20	Zone 21/22
VEGAPULS PS62/63(*).RX****H/D****	Ambient temperature +86 K	Ambient temperature +36 K
VEGAPULS PS62/63(*).RX****P/K/F/L****	Ambient temperature +22 K	Ambient temperature +22 K

On the electronics housing, category 1D, 2D or 3D	Zone 20	Zone 21/22
VEGAPULS PS62/63(*).CK****H/D****	Ambient temperature +43 K	Ambient temperature +43 K
VEGAPULS PS62/63(*).CK****P/K/F/L****	Ambient temperature +22 K	Ambient temperature +22 K
VEGAPULS PS66(*).RX****H****	Ambient temperature +86 K	Ambient temperature +36 K
VEGAPULS PS66(*).RX****P/F****	Ambient temperature +22 K	Ambient temperature +22 K
VEGAPULS PS66(*).CK****H****	Ambient temperature +86 K	Ambient temperature +36 K
VEGAPULS PS66(*).CK****P/F****	Ambient temperature +22 K	Ambient temperature +22 K
VEGAPULS PS67(*).RX****H****	Ambient temperature +86 K	Ambient temperature +36 K
VEGAPULS PS67(*).RX****P/F****	Ambient temperature +22 K	Ambient temperature +22 K
VEGAPULS PS68/SR68(*).RX****H****	Ambient temperature +86 K	Ambient temperature +36 K
VEGAPULS PS68/SR68(*).RX****P/F****	Ambient temperature +22 K	Ambient temperature +22 K
VEGAPULS PS62/63(*).RX****G/M**** VEGAPULS PS62/63/66(*).RX****B/I**** VEGAPULS PS62/63(*).DK****G/M**** VEGAPULS PS62/63/66(*).DK****B/I**** VEGAPULS PS67(*).RX****B/I**** VEGAPULS PS68/SR68(*).RX****B/I**** VEGAPULS PS68/SR68(*).DK****B/I****	Limited to +102 °C by the thermal link	

The max. surface temperature of the instrument with which the hazardous dust atmosphere can come into contact, **is the higher** of the two specified surface temperatures on the electronics housing or the sensor/antenna.

Protection rating

Housing protection classification, category 1D or 2D: IP66

Sensor (antenna), category 1D or 2D: IP68

5 Installation/construction

The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX***** must be mounted in such a way that the antenna or tube extensions cannot bend or touch the vessel wall due to the influence of vessel installations and moving bulk solids. This applies especially to lengths over 3 m.

6 Material resistance

The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX***** must only be used in media against which the materials of the wetted parts are sufficiently resistant.

7 Grounding

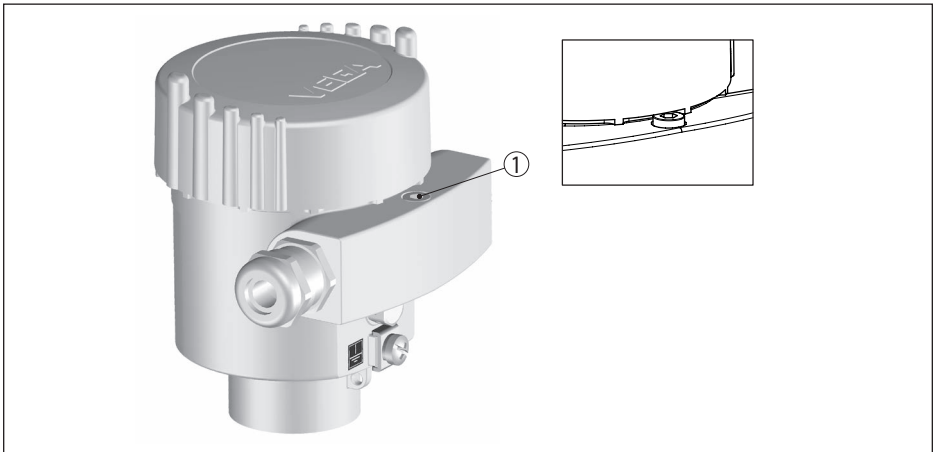
The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, must be grounded.

8 Locking mechanism of housing cover

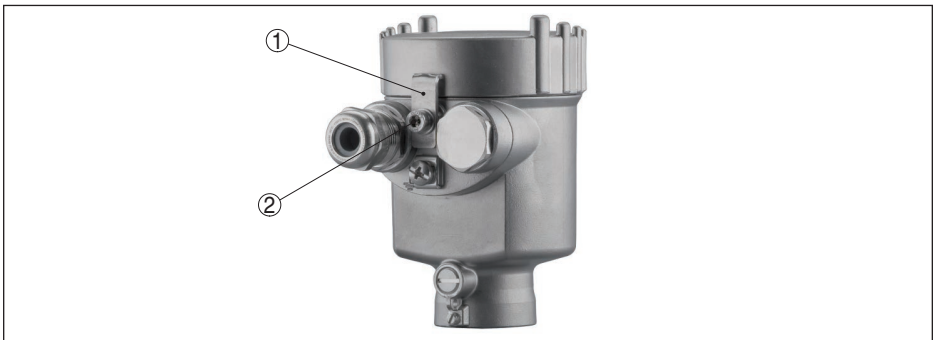
With single-chamber housing versions of VEGAPULS PS6*.CK/RX*****, VEGAPULS PSSR68.CK/RX*****, the lid must be screwed in to the stop and secured with the locking device before setup and use in hazardous atmospheres.

With double-chamber housing versions, the lid of the connection compartment and the lid of the electronics compartment must be screwed in to the stop and secured with the corresponding locking device before setup and use of VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, in hazardous atmospheres.

Single chamber housing



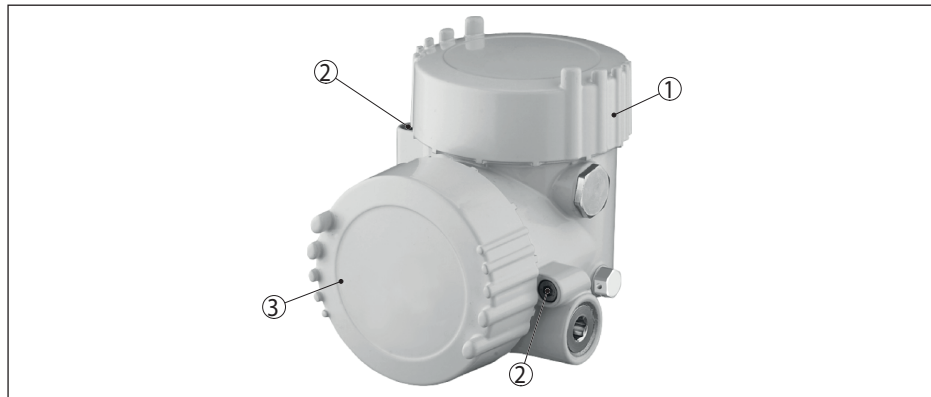
1 Locking screw of the lid



1 Bracket

2 Locking screw of the lid

Double chamber housing with "Ex d" connection compartment



1 "Ex i" connection compartment with electronics module

2 Locking screw of the lid

3 "Ex d" connection compartment with integrated barrier

9 Important information for mounting

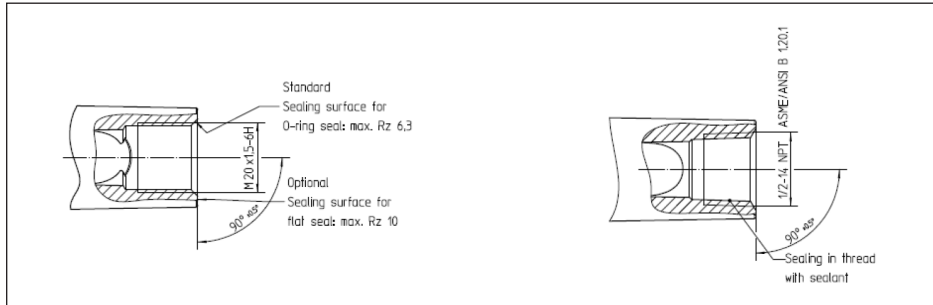
Cable glands, threaded openings

Type	Thread	Cable diameter [mm]	Torques [Nm]
Hummel EXIOS A2F 1.608.2003.50	M20 x 1.5	6 ... 12 mm	8
Hummel EXIOS A2F 1.608.1203.70	½ NPT	6 ... 12 mm	8
Hummel EXIOS MZ 1.6Z5.2000.51	M20 x 1.5	9 ... 13 mm	8
Hummel EXIOS MZ 1.6Z5.1200.70	½ NPT	9 ... 13 mm	8
Hummel HSK-M-Ex 1.640.2000.51	M20 x 1.5	5 ... 9 mm	8

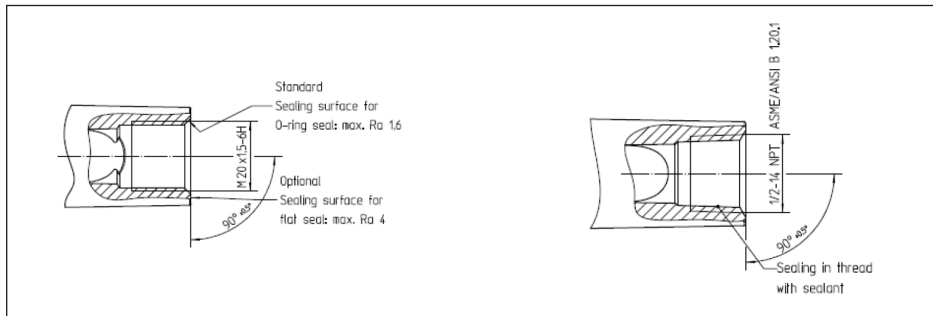
The specified tightening torques are test torques and are to be seen only as recommended values. These were determined according to the specifications of the listed valid standards. The tightening torques may deviate depending on the type and characteristic of the cables/lines. If assembly instructions of the manufacturer are provided, these must be observed.

If suitable cable glands or cable insertion possibilities not included in the scope of supply are used, these must be compatible with the threaded openings.

Aluminium housing with M20 x 1.5 thread, ½ NPT thread



Stainless-steel housing (fine cast) with M20 x 1.5 thread, ½ NPT thread



Non-grounded, metallic parts

The resistance between aluminium housing to metal measuring point identification plate is $> 10^9$ Ohm.

The capacitance of the metal measuring point identification plate was measured as follows:

Measurement loop identification label	Capacitance
45 x 23 mm (standard)	21 pF
100 x 30 mm	52 pF
73 x 47 mm	61 pF

10 Type and size of the threads for the cable entries

The VEGAPULS PS6*(*)CK/DK/RX**...* **M*** are designed with an M20 x 1.5 thread for the cable entries, sealing screw(s) or plug connection(s).

The VEGAPULS PS6*(*)CK/DK/RX**...* **N*** are designed with a ½-14 NPT thread for the cable entries, sealing screw(s), plug connection(s) or conduit system.

In the version with the two-chamber housing, the electronics housing in the VEGAPULS PS6*(*)CK**...* **M*** version additionally has an M16 x 1.5 thread and in the VEGAPULS PS6*(*)CK**...* **N*** version a ¾-18 NPT thread for installation of a cable entry, sealing screw or plug connection.

Depending on the selected feature in the selection "cable entry/connection" in the type key of the VEGAPULS PS6*(*)CK/DK/RX**...* _ ("_" = position selection feature) the housing openings in the as-delivered state are sealed by a suitable cable gland, sealing plug, plug connection or red

threaded/dust protection cap accordingly. The feature "1/Q" resp. "M/N" in the type key is then replaced by the appropriate feature of the connection possibility.

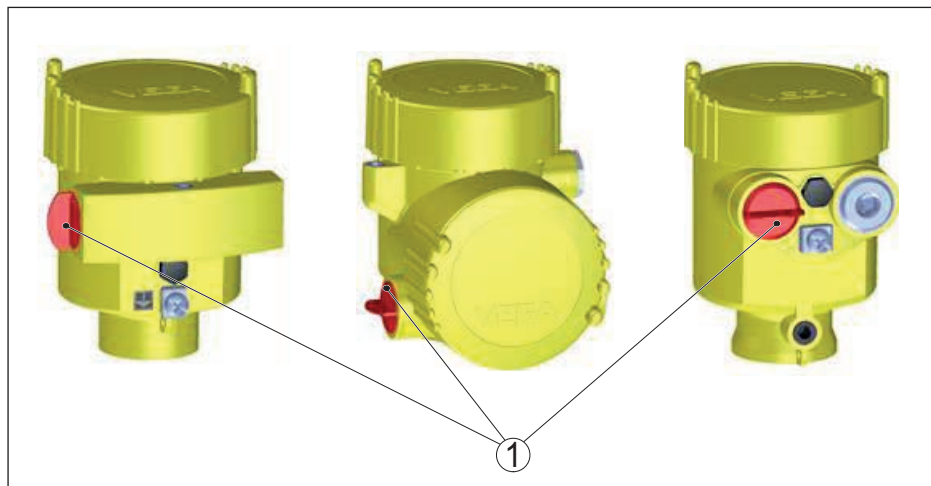
There is an information plate bearing the thread designation on the housing next to all threads.

11 Removing and replacing the red threaded/dust cover

When the VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, are delivered, depending on the version, the red threaded or dust protection caps must be removed before installing the device and the openings must be sealed according to the requirements of the type of protection and the IP protection type specified on the type label.

When using certified i.e. suitable cable glands, sealing plugs or plug connectors, they must be mounted correctly and the respective certificates/documents must be observed.

The sealing plugs included in the delivery by VEGA meet the necessary requirements.



1 Red threaded or dust protection cap

12 Installation with swivelling holder

The VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, in the version with swivelling holder must be mounted so that, after the antenna has been aligned by means of the swivelling holder and the clamping flange has been screwed down, protection class IP66 is maintained between zone 20 and 21.

13 Versions with rinsing connection

For the VEGAPULS PS6*.CK/DK/RX*****, VEGAPULS PSSR68.CK/DK/RX*****, in the version with rinsing connection, please make sure that protection IP66 is ensured at the connection to the reflux valve. After removal of the reflux valve or the rinsing connection on the reflux valve, the opening must be closed with a suitable plug screw in order to maintain protection IP66.

Please make sure that there is no explosive atmosphere present during rinsing processes in the antenna or sensor cleaning.

14 Electrostatic charging (ESD)

In case of instrument versions with electrostatically chargeable plastic parts, the danger of electrostatic charging and discharging must be taken into account!

The following parts can charge and discharge:

- Lacquered housing version or alternative special lacquering
- Plastic housing, plastic housing parts
- Metal housing with inspection window
- Plastic process fittings
- Plastic-coated process fittings and/or plastic-coated sensors
- Connection cable for separate versions
- Type label
- Isolated metallic labels (measuring point identification plate)

Take note in case of danger of electrostatic charges:

- Avoid friction on the surfaces
- Do not dry clean the surfaces

The instruments must be mounted/installed in such a way that the following can be ruled out:

- in the case of extremely flammable dusts with a minimum ignition energy of less than 3 mJ, the device must not be used in areas where intensive electrostatic charging processes can be expected
- electrostatic charges during operation, maintenance and cleaning.
- process-related electrostatic charges, e.g. by measuring media flowing past

The warning label indicates danger:

WARNING - POTENTIAL ELECTROSTATIC
CHARGING HAZARD - SEE INSTRUCTIONS

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All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

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