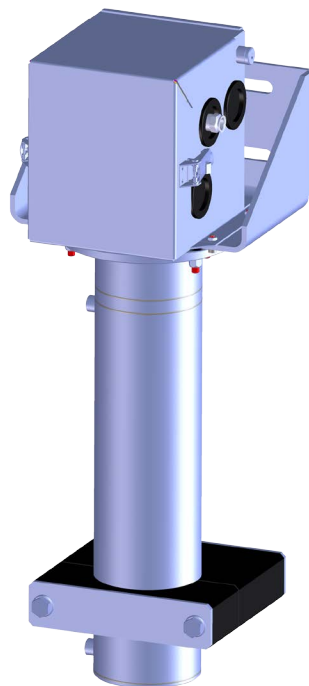


## Supplementary instructions

### Air cooling - SOLITRAC 31, POINTRAC 31

Active air cooling system for radiometric sensors



Document ID: 50338



# VEGA

Contents

1 Product description ..... 3

1.1 Configuration..... 3

2 Mounting..... 5

3 Replacement parts..... 18

3.1 Available spare parts - air cooling..... 18

4 Supplement ..... 20

4.1 Technical data ..... 20

4.2 Dimensions ..... 22

# 1 Product description

## 1.1 Configuration

The active air cooling system is suitable for radiometric sensors of series SOLITRAC 31 and POINTRAC 31.

The air cooling system consists of several modules.

### Housing cooling box (A)

The housing cooling box is placed above the instrument housing and enables cooling of the instrument housing.

### Scintillator cooling (B)

The cooling module for the scintillator cools the active measuring part of the sensor.

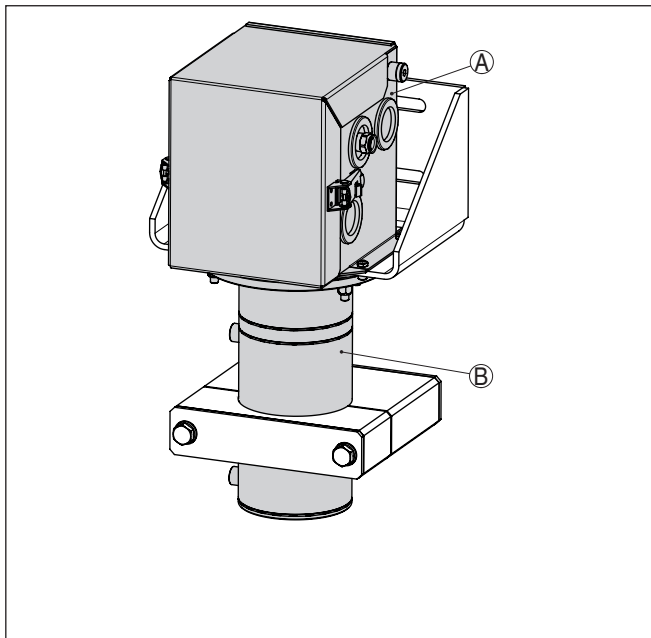


Fig. 1: Active air cooling system with fastening bracket

A Housing cooling box

B Scintillator cooling

### Scope of delivery

The following parts belong to the scope of delivery of the air cooling system:

- Scintillator cooling (1 piece)
- Mounting clamp (quantity depending on sensor length)
- Fastening bracket
- Housing cooling box with detachable lid
- Eddy current cooler (type FOS 208SS 25 HVE BSP) for housing cooling box

- Vortex cooler (type FOS 208SS 35 HVE BSP) for scintillator cooling
- Hexagon socket screw M5 x 14 (6 pieces)
- Spring ring for M5 (6 pieces)
- Sealing ring 78 x 3 (2 pcs.)
- Isolating sleeve (6 pieces)
- Fixing screw M8 x 35 (2 pieces)
- Fixing screw M8 x 40 (4 pieces)
- Washer for M8 (10 pieces)
- Hexagon nut M8 (4 pieces)
- Blind plug ¼" (1 pce.)
- NPT threaded adapter for vortex cooler (optional)

**Information:**

When the sensor is ordered with cooling, the sensor and the air cooling system are shipped pre-assembled.

If the air cooling system is ordered later, you have to mount it on the sensor yourself.

You can find further information in chapter "*Mounting*".

## 2 Mounting

### Mounting preparations

#### Operating instructions

Take note of the operating instructions manuals of the corresponding radiometric sensors and the source holder.



#### Warning:

During all mounting and dismounting work, the source container must be in switch position "OFF" and secured by a lock.

Carry out all work within the shortest possible time and at the largest possible distance. Provide suitable shielding.

Avoid risk to other persons by taking suitable measures (e.g. safety fence, etc.).

Mounting may only be carried out by authorized, qualified personnel who are monitored for radiation exposure according to local laws or the handling permit. Take note of the specifications in the handling permit. Also take the local conditions into account.



#### Caution:

The cooling system is used in areas with high temperatures. Therefore, use temperature-resistant cable and install it in such a way that contact with hot components is avoided.

#### General mounting instructions



#### Information:

When the sensor is ordered with cooling, the sensor and the air cooling system are shipped pre-assembled.

If the air cooling system is ordered later, you have to mount it on the sensor yourself.

#### Required tools:

- Fork wrench SW13 mm (2 pieces) - for the scintillator cooling
- Fork wrench SW19 mm (2 pcs.) - for the mounting clips and the vortex coolers
- Acid-free grease - for greasing the sealing rings

Take note of the following general mounting instructions:

- First of all, mount the fastening bracket and the scintillator cooling, and then the sensor
- The small lid of the instrument housing must point to the front after mounting the fastening bracket (x)
- The sensor together with the air cooling system is very heavy. Use a suitable lifting device for mounting, e.g. a hoisting sling

#### Insert the sealing rings

1. Slightly grease the two sealing rings (14) with acid-free grease.
2. Insert the two sealing rings (14) from the inside into the grooves of the scintillator cooling (B).

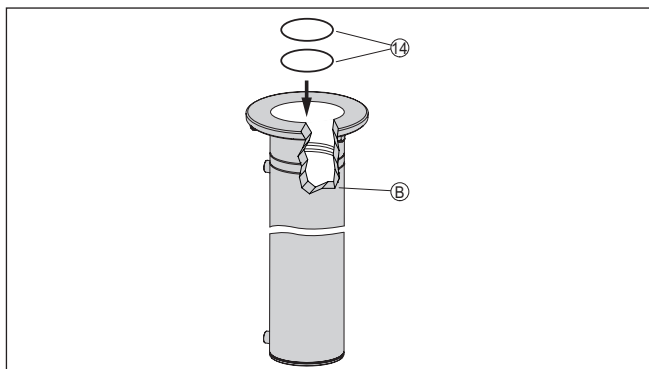


Fig. 2: Insert the sealing rings into the scintillator cooling

14 Sealing ring (2 pieces)

B Scintillator cooling

### Mount the fastening bracket

1. Place the isolating sleeves (4) between the scintillator cooling (5) and the fastening bracket (1).

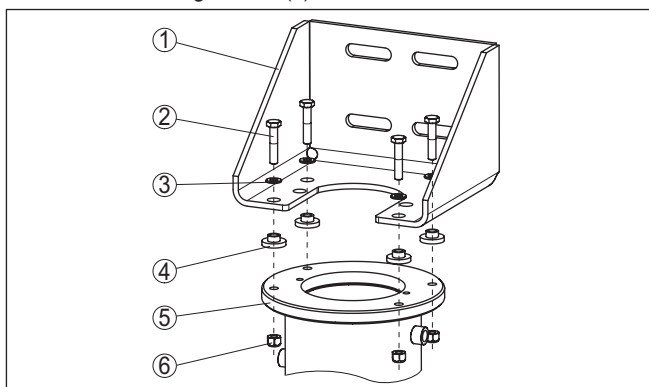


Fig. 3: Scintillator cooling with mounted sensor

- 1 Fastening bracket
- 2 Hexagon screw M8 (4 pieces)
- 3 Washer for M8 (8 pieces)
- 4 Isolating sleeve (4 pieces)
- 5 Scintillator cooling
- 6 Hexagon nut M8 (4 pieces)

2. Place the fastening bracket (1) onto the scintillator cooling (5). Make sure that the coolant connections point in a suitable direction. Rotating the holding bracket later (1) is very difficult.
3. Connect the fastening bracket (1) with the scintillator cooling (5) according to the illustration and tighten the screws (2, 6) with a torque of 15 Nm (11.06 lbf ft).

### Mounting the scintillator cooling

Take note of the following general mounting instructions:

The sensor together with the air cooling system is very heavy. Use a suitable lifting device for mounting

1. The sensor marking is no longer visible when the scintillator cooling is mounted. You can find the position of the sensor marking according to the following illustration.

Add the sensor marking with a waterproof marker or a permanent, coloured adhesive tape to the outside of the scintillator cooling.

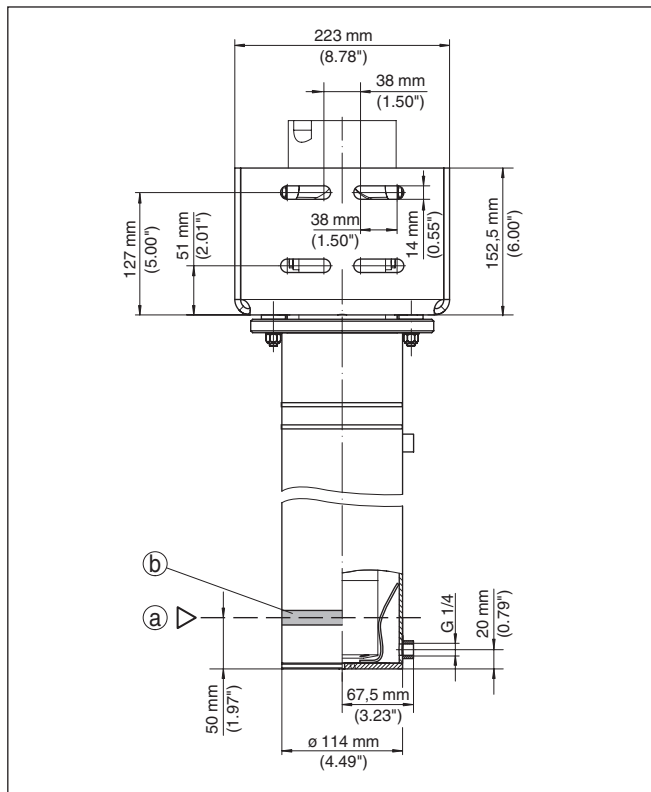
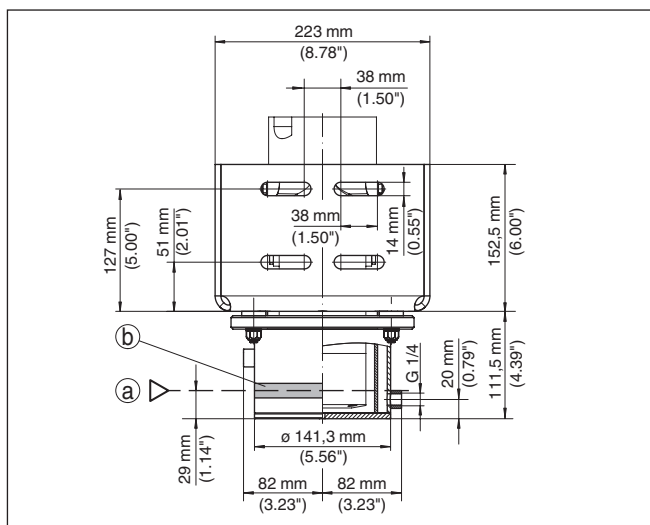


Fig. 4: Position of the sensor marking and drilling template of the fastening bracket - SOLITRAC 31, POINTRAC 31

- a Position of the lower measuring range end
- b Sensor marking on the upper edge of the lateral connection nozzle



*Fig. 5: Position of the sensor marking and drilling template of the fastening bracket - POINTRAC 31 - short version (46 mm)*

- a* Position of the lower measuring range end  
*b* Sensor marking on the upper edge of the lateral connection nozzle

2. Insert the sensor into the scintillator cooling.

The small lid of the instrument housing must point to the front after mounting on the fastening bracket (x).

It is advisable to place the sensor and the scintillator cooling on the floor while inserting. This applies mainly to longer sensor versions. Protect the sensor by covering the sensor housing during mounting.

In case of long instrument versions, it can be possible that the sensor does not immediately slide completely into the scintillator cooling due to its own weight. Turn the sensor and the scintillator cooling by 90° and try to slide in the sensor during the rotating movement.

Mount the sensor with the two screws in the respective position.

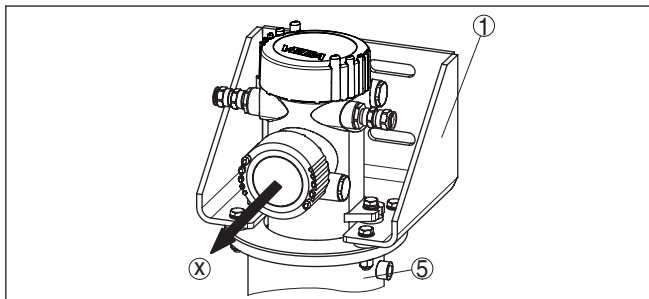


Fig. 6: Mounting direction of the sensor towards the fastening bracket

- 1 Fastening bracket
- 5 Scintillator cooling
- x Mounting direction of the housing

Mount the sensor according to the following assembly drawing:

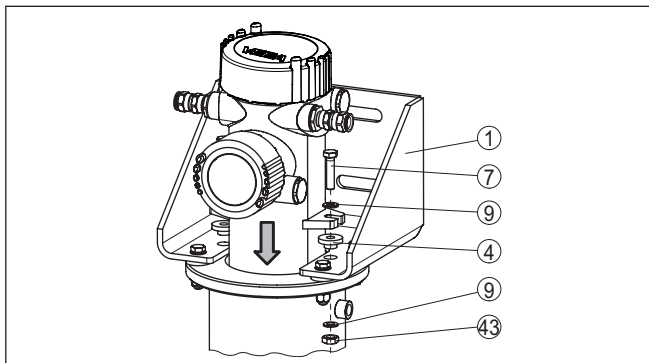


Fig. 7: Mounting the sensor - SOLITRAC, POINTRAC

- 1 Fastening bracket
- 4 Isolating sleeve (2 pieces)
- 7 Hexagon screw M8 (2 pieces)
- 9 Washer for M8 (4 pieces)
- 43 Nut M8, self-locking (2 pcs.)

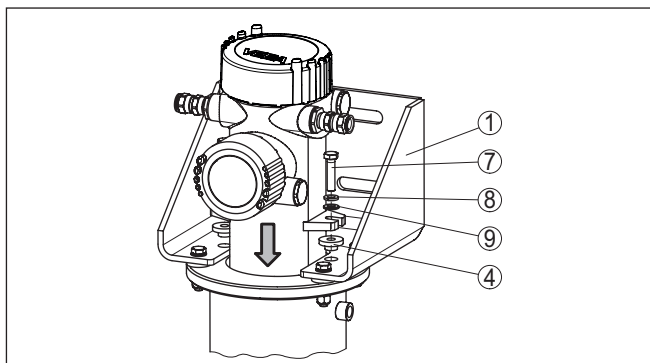


Fig. 8: Mounting the sensor - POINTRAC - short version

- 1 Fastening bracket
- 4 Isolating sleeve (2 pieces)
- 7 Hexagon screw M8 (2 pieces)
- 8 Retaining washer for M8 (2 pieces)
- 9 Washer for M8 (2 pieces)

Mount the scintillator cooling with the fastening bracket in the required position.

### Lifting the air cooling system



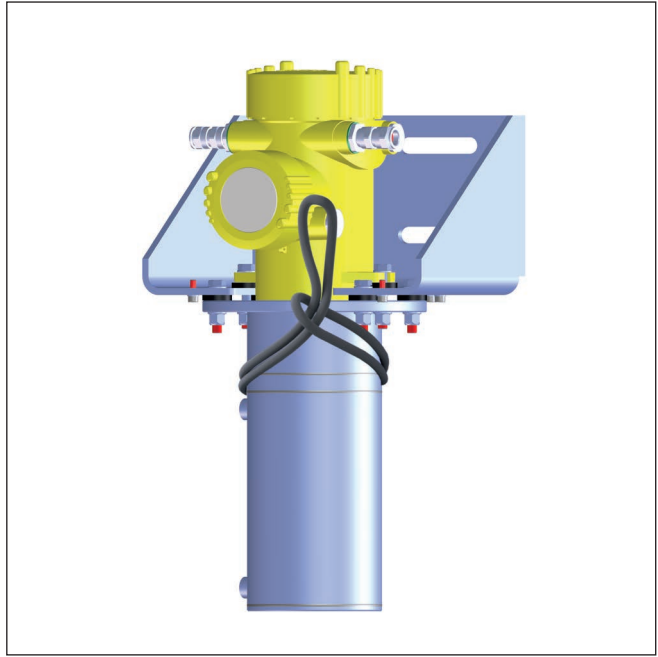
#### Information:

The sensor together with the air cooling system is very heavy. Use a suitable lifting device for mounting.

Use a hoisting sling with sufficient loading capacity. Take note of the sling marking. You can find the respective weight of the air cooling system in chapter "Technical data".

Place the lifting sling around the cooling tube directly below the flange. The loop is a so-called lark's foot.

Fasten the hoisting sling according to the following illustration.



*Fig. 9: Attaching the sling*

### Mounting the sensor

You can mount the sensor on your vessel with the enclosed mounting clamps. Two mounting clamps come with the air cooling system from 1 m (39 in) sensor length.

Adapt the distances of the attached mounting clamps.

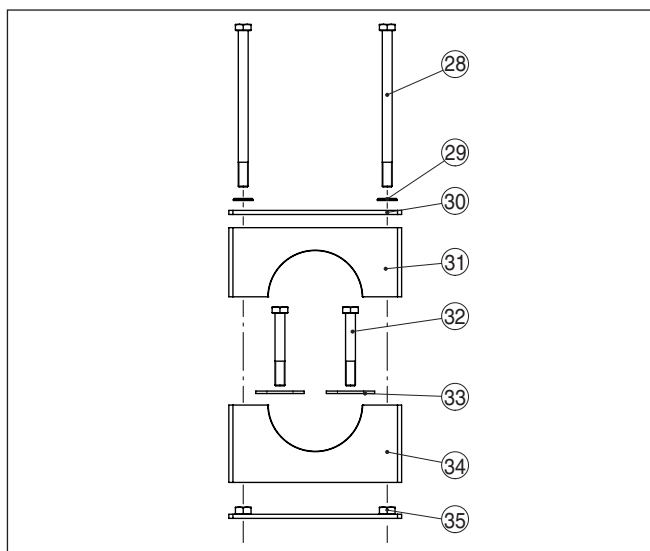


Fig. 10: Mounting clamps

28 Hexagon screw M12 x 190

29 Washer for M12

30 Cover plate - metal

31 Upper clamping jaw

32 Fastening screws (provided by the customer)

33 Metal inserts

34 Lower clamping jaw

35 Bottom plate - metal (with slot holes)

1. Determine the exact mounting position of one or several mounting clamps and mark the holes.

You can find the drilling template in the technical data.

Align the mounting positions exactly and average the distances between the enclosed mounting clamps.

Drill appropriate holes (max. M12) for fastening the mounting clamps.



**Note:**

The mounting clamps do not come with fastening screws. Use fastening elements that are appropriate for the situation in your plant.

2. Insert the two metal inserts (33) into the gaps of the lower clamping jaw (34).
3. Place the lower clamping jaw (34) onto the bottom plate (35) and place the parts in the specified mounting position.
4. Insert the fixing screws (provided by the customer) through the metal inserts (33), the lower clamping jaw (34) and the bottom plate (35) and fasten the lower part of the mounting clamp.
5. Fasten a probable second mounting clamp exactly aligned in the same way.

## Mounting the housing cooling box

6. Insert the sensor with the cooling system into the premounted mounting clamps and align the cooling system.
7. Place the cover plate (30) onto the upper clamping jaw (31) and place the two parts onto the lower clamping jaw (34).
8. Insert the two hexagon screws (28) with the washers (29) into the holes of the upper clamping jaw (31).
9. Tighten the two hexagon screws (28) with a torque of 45 Nm (33.18 lbf ft).

You can find further information on sensor mounting in the operating instructions manual of the sensor.

1. Open the fasteners (36) and remove the lid (37) from the lower part of the housing cooling box (38).
2. To make mounting easier, screw the cable glands of the sensor out of the instrument housing.
3. Place the lower part of the housing cooling box (38) on the fastening bracket (1).
4. Insert the 6 hexagon socket screws (39) from below through the mounting bracket (1) and tighten the screws with a torque of 4.5 Nm (3.3 lbf ft).

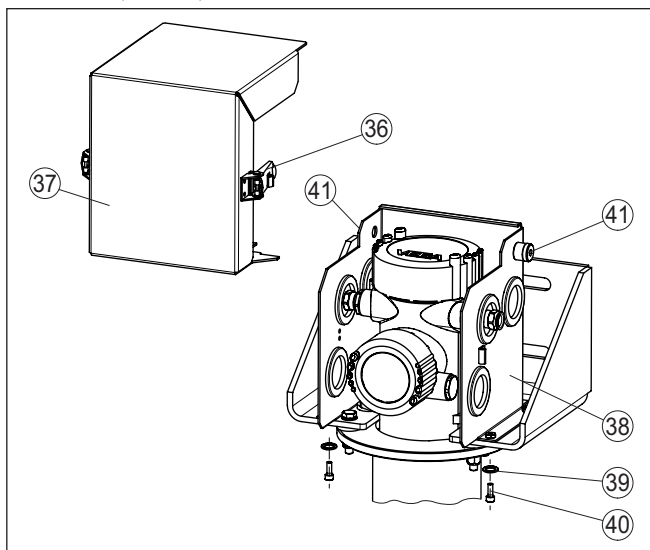


Fig. 11: Mounting the housing cooling box

- 36 Fasteners with safety latch
- 37 Lid of the housing cooling box
- 38 Lower part of the housing cooling box
- 39 Spring ring for M5 (6 pieces)
- 40 Hexagon socket screw M5 x 14 (6 pieces)
- 41 Connection opening for vortex cooler (type FOS 208SS 25 HVE BSP)

## Electrical connection

1. Open the fasteners (36) and remove the lid from the housing cooling box (37).

2. Determine which cable gland you need for connection of the sensor.
3. Pierce a small hole with a sharp tool (e.g. pricking awl, scriber, etc.) in the center through the respective rubber diaphragms (42).

Do not use a knife or similar for puncturing

If you have accidentally pierced the wrong diaphragm, you can simply exchange the rubber diaphragms. If you have pierced a diaphragm too much, you can seal it with self-adhesive fabric tape.

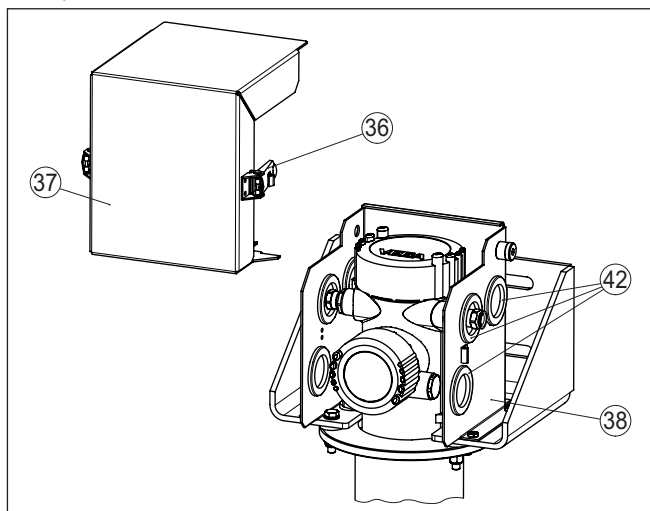


Fig. 12: Preparations for electrical connection

36 Fasteners with safety latch

37 Lid of the housing cooling box

38 Lower part of the housing cooling box

42 Rubber diaphragm

4. Insert the cable gland into the resulting opening and screw it tightly to the sensor housing.  
Make sure that the rubber diaphragm encircles the cable gland completely so that not too much cooling air can escape.
5. Connect the sensor to voltage supply. Keep in mind the information in the operating instructions of the corresponding sensor or in the wiring diagram on the housing lid.



**Note:**

The cooling system is used in areas with high temperatures. Therefore, use temperature-resistant cable and install it in such a way that contact with hot components is avoided.

6. From the front side, place the lid of the housing cooling box (37) onto the lower part of the housing cooling box (38).
7. Close the two lateral fasteners (36).

Make sure that the fasteners (36) are provided with safety latches against unintentional opening. To open a fastener, you have to press the safety latch.

### Connect cooling

The scintillator cooling and the housing cooling box must be connected to the cooling system.

All threads for the cooling connection on the sensor are inner threads.

### Cooling systems (vortex cooler)

So-called Vortex coolers are proven possibilities for cooling the sensor.

You can connect the cooling air output of the vortex cooler directly to the housing cooling box or scintillator cooling.

The two vortex coolers are part of the scope of delivery. The coolers thus fit perfectly to your air cooling system with respect to size, cooling capacity and throughput.

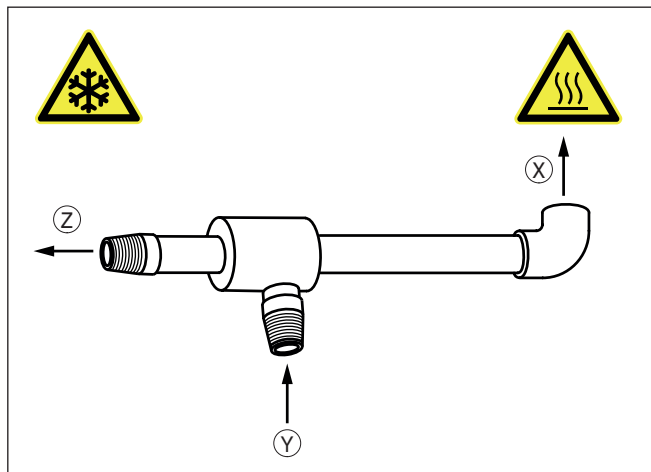


Fig. 13: Eddy current cooler (Vortex cooler)

- x Hot exhaust air
- y Supply air
- z Cooling air



### Caution:

The vortex cooler gets very hot during operation. Hot air at approx. 100 °C (212 °F) escapes from the exhaust opening. Furthermore, the cooler or sensor can be very cold on the cold air side. Wear suitable protective clothing and prevent people from touching the cooling system by installing barriers, etc.

Make sure that the exhaust airstream can escape safely into the open. Make sure that no heat-sensitive components or cables are in the exhaust airstream.

If you want to direct the exhaust airstream in another direction, you have to use standard, angled metal fittings with 1/4" screw connection.

1. The housing cooling box has two connection openings with  $\frac{1}{4}$ " connection.

Close the free openings with a respective bling plug.

2. Connect the vortex coolers.

All threads for the cooling connection on the sensor are inner threads.

The vortex cooler type FOS 208SS 25 HVE BSP powers the housing cooling box. The vortex cooler type FOS 208SS 35 HVE BSP is connected to the scintillator cooling.

Screw in the short cooling air output of the vortex cooler and tighten it with a torque of 25 Nm (18.43 lbf ft).

### SOLITRAC 31, POINTRAC 31

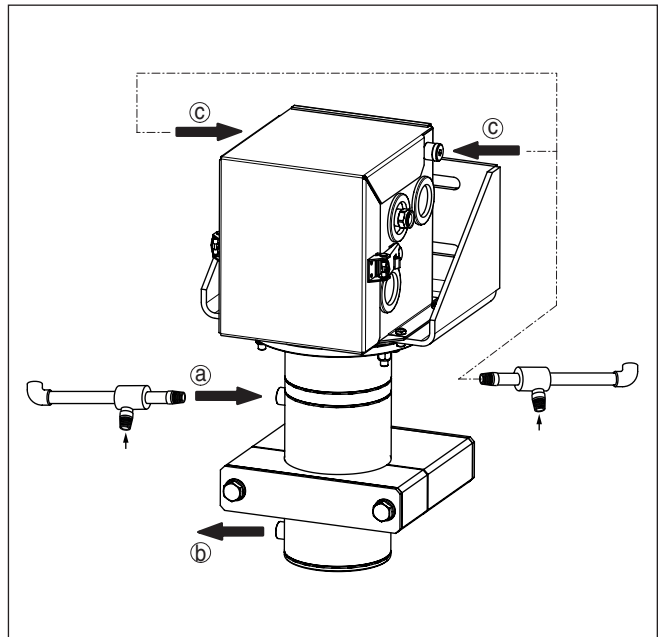


Fig. 14: Connection of the cooling air systems (vortex coolers) - SOLITRAC 31, POINTRAC 31

- a Cooling air inlet - scintillator cooling  
(vortex cooler type FOS 208SS 35 HVE BSP)
- b Cooling air outlet - scintillator cooling
- c Cooling air inlet - Housing cooling box  
(vortex cooler type FOS 208SS 25 HVE BSP)  
Connection on the left or right possible

## POINTRAC 31 - short version (46 mm)

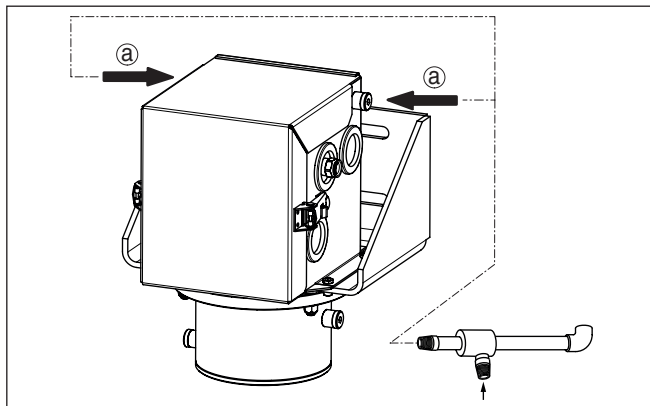


Fig. 15: Connection of the cooling air system (vortex cooler) - POINTRAC 31 - short version (46 mm)

- a Cooling air inlet - Housing cooling box  
(vortex cooler type FOS 208SS 25 HVE BSP)  
Connection on the left or right possible

For cooling, use clean, water-free compressed air of class 3:3:2 acc. to ISO 8573-1:2010. Make sure that your compressor has enough supply capacity. You can find information on quality, pressure, throughput and temperature of the cooling air in chapter "Technical data".

Make sure that the cooling air inlets do not freeze, e.g. in case of a shutdown.



### Caution:

Do not loosen any screws or connections during operation and make sure that the cooling air supply is reliable and interruption-free. Plan the necessary steps for a possible compressed air failure.

We recommend installing a temperature sensor (in the housing cooling box) that triggers an alarm when a critical temperature is reached.



If you want to use the air cooling in an SIL-qualified application, you have to assess the SIL failure rates of the complete air cooling system and the cooling air supply yourself.

## Install a protective grid

Take note of the operating instructions manuals of the corresponding radiometric sensors and the source holder.

When handling radioactive substances, unnecessary radiation exposure must be avoided.

If there are gaps or intervening spaces after mounting, provide protective fences or grids to keep hands away from the dangerous area. Such areas must be marked accordingly.

Install a safety barrier on both sides of the cooling system. A sheet metal cover or an appropriately shaped plastic sheet can also be used.

### 3 Replacement parts

#### 3.1 Available spare parts - air cooling

Selected components of the cooling are available as replacement parts. The following parts are available:

The stated quantity is the quantity delivered.

#### Air cooling - vortex cooler - SOLITRAC 31, POINTRAC 31

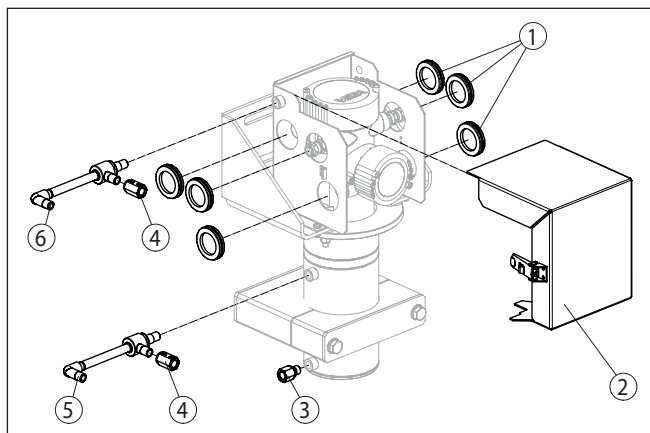


Fig. 16: Spare parts - air cooling SOLITRAC, POINTRAC

- 1 Rubber diaphragm (2 pcs.)
- 2 Lid of the housing cooling box
- 3 Threaded adapter ¼ NPT (1 pce.)
- 4 Threaded adapter for vortex cooler ¼ NPT (1 pce.)
- 5 Vortex cooler type FOS 208SS 35 HVE BSP (input for cooling air - scintillator cooling)
- 6 Vortex cooler type FOS 208SS 25 HVE BSP (input for cooling air - housing cooling box)

### Air cooling - vortex cooler - POINTRAC 31 - short version (46 mm)

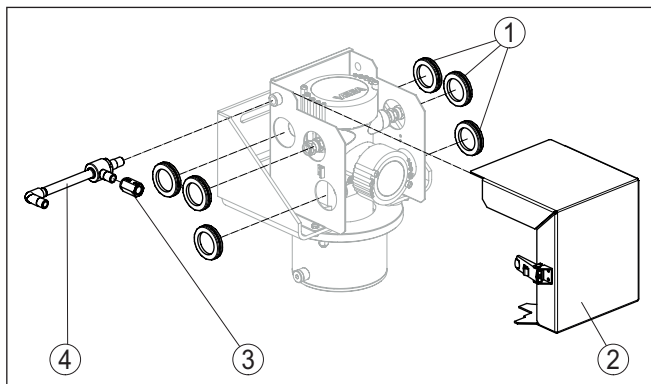


Fig. 17: Spare parts - air cooling POINTRAC - short version (46 mm)

- 1 Rubber diaphragm (2 pcs.)
- 2 Lid of the housing cooling box
- 3 Threaded adapter for vortex cooler ¼ NPT (1 pce.)
- 4 Vortex cooler type FOS 208SS 25 HVE BSP (input for cooling air - housing cooling box)

## 4 Supplement

### 4.1 Technical data

#### General data

Take note of the information in the operating instructions manual of the installed SOLITRAC 31 or POINTRAC 31 level sensor and the source holder

Material 316L corresponds to 1.4404 or 1.4435

#### Materials

– Scintillator cooling	316L
– Housing cooling box	316L
– Seal	NBR

Application temperature      See following tables (throughput - coolant)

#### Weight

– Housing cooling (basic weight)	2.3 kg (5.1 lbs)
– Scintillator cooling	8.8 kg/m (19.4 oz/ft)
– Housing cooling box	3.2 kg (7.1 lbs)
– Fastening bracket	4.8 kg (10.6 lbs)
– Fastening clamp	2.47 kg (5.45 lbs)

Total length of the air cooling system      3 m (118 in)

#### Torques

– Screws, Sensor mounting (M8)	15 Nm (11.06 lbf ft)
– Nuts, housing cooling (M8)	15 Nm (11.06 lbf ft)
– Threaded fittings, vortex coolers	25 Nm (18.43 lbf ft)
– Screws for mounting clamps	45 Nm (33.18 lbf ft)

Connection thread of the cooling air inputs      ¼" DIN ISO 228 outer thread  
(adapters for NPT fittings are enclosed with respective version)

#### Throughput - Coolant air

Quality of the compressed air	ISO 8573-1:2010 [3:3:2]
Supply capacity - Compressor <sup>1)</sup>	
– Type FOS 208SS 25 HVE BSP	708 L/min (25 SCFM)
– Type FOS 208SS 35 HVE BSP	991 L/min (35 SCFM)
Air pressure of the supply air	5 ... 7.9 bar (72 ... 114 psig)
Temperature of the supply air	< +20 ... 25 °C (+68 ... 77 °F)
Ambient temperature	+120 °C (+248 °F)

<sup>1)</sup> at 6.9 bar (100 psig)

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**Approvals**

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If you use an air cooling system in hazardous areas, make sure that the max. permissible temperatures in the Ex safety instructions are maintained around the sensor. If this is ensured, the sensor can also be used with an air cooling system in hazardous areas.

## 4.2 Dimensions

### Active air cooling system - SOLITRAC 31, POINTRAC 31

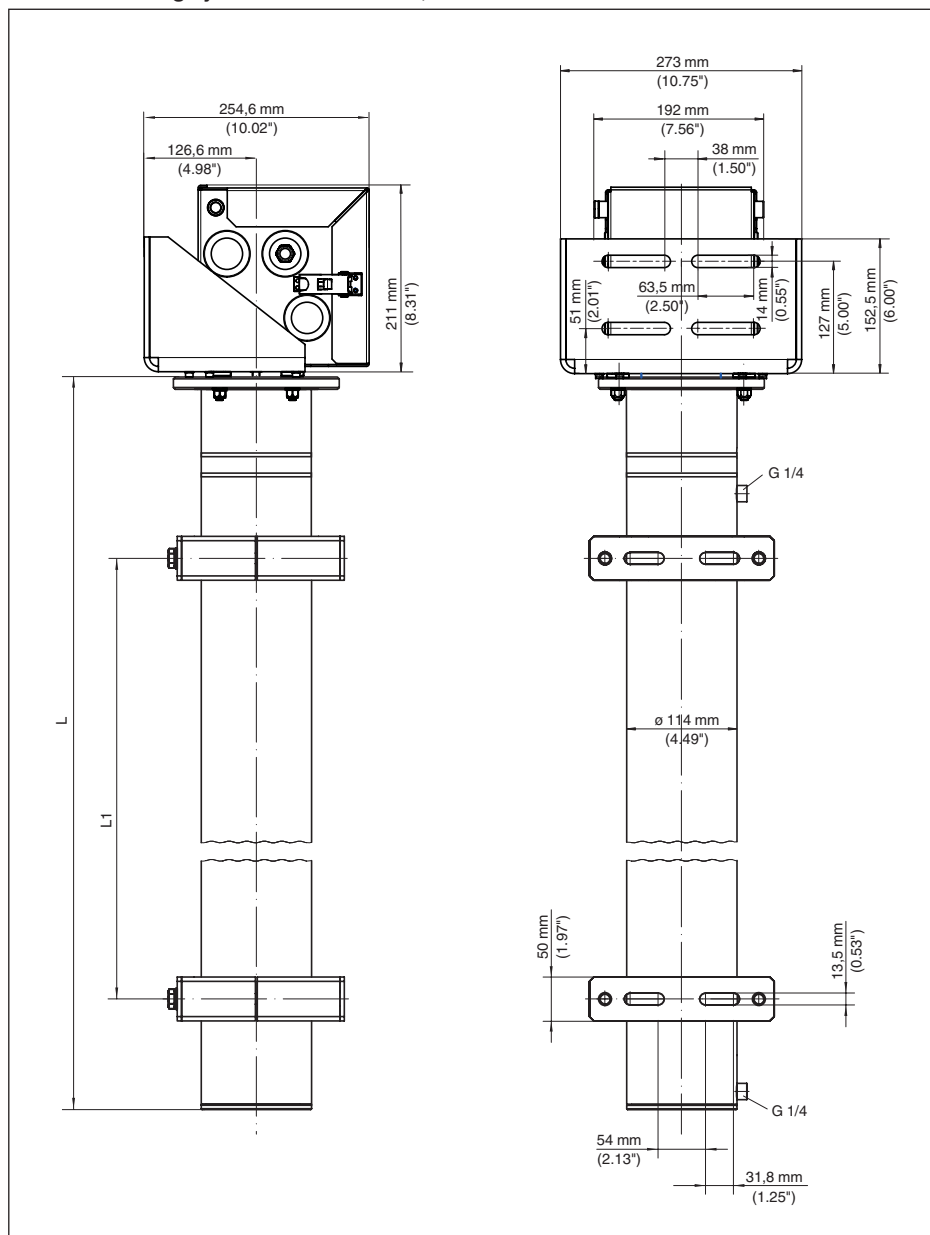


Fig. 18: Active air cooling system with scintillator cooling and housing cooling box - SOLITRAC 31, POINTRAC 31

- 1 Position of the lower measuring range end (on the upper edge of the lower screwed connection)  
 L Total length of the air cooling system  
 L1 Distance between the mounting clips = approx. 450 mm (17.72 in)

**Active air cooling system - POINTRAC 31 - short version (46 mm)**

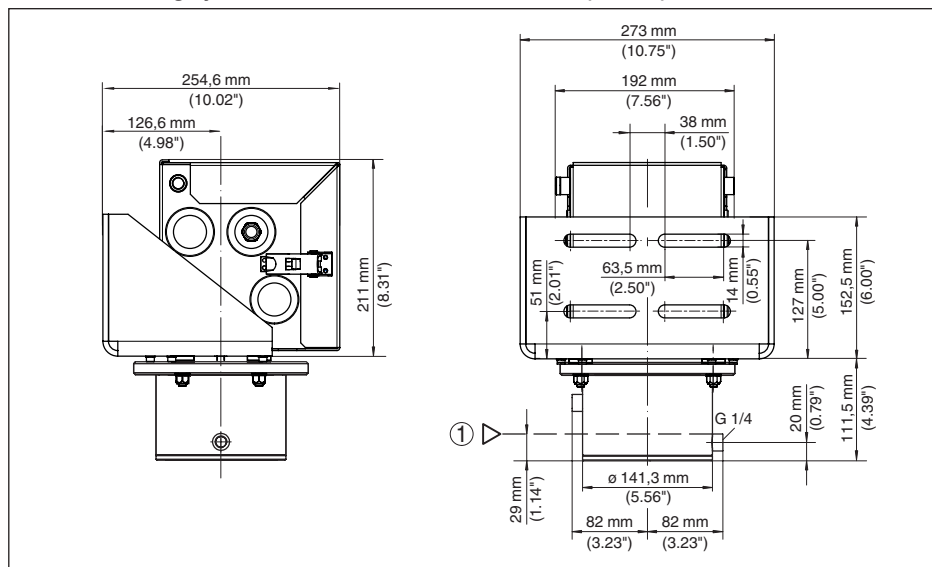


Fig. 19: Active air cooling system with housing cooling box - POINTRAC 31 - short version (46 mm)

- 1 Position of the measuring range end









Printing date:

# VEGA

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.

Subject to change without prior notice

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