Supplementary instructions

Centering

for VEGAFLEX series 80

Document ID: 44967

Contents

44967-EN-131119

Editing status: 2013-10-16

1 Product description

1.1 Overview

If VEGAFLEX sensors with rod or cable version are used in standpipes or bypass tubes, contact with the tube wall must be reliably avoided.

Spacers or centering weights fix the measuring probe in the middle of the tube.

Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient.

Spacers - Plastic (K)
Spacers of plastic are suitable for applications up to 250° C (482° F). Notches on the 4-arm spacer make it easy to trim down the spacer to standard diameters. This allows the spacer to be adapted to the tube diameter.

Spacers - Metal (M)
The metallic spacers are suitable for applications with high temperatures. The elastic arms of the spacer fix the probe in the tube. Select the spacer according to the tube inner diameter.

Centering weights (G)
The metallic centering weights are suitable for use with cable versions in standpipes or bypass tubes. Select the centering weight according to the tube inner diameter.

Gravity weights (S)
Gravity weights can be used in combination with a spacer of plastic or metal as a centering weight. For this purpose the gravity weight has a smaller diameter (ø 16 mm) at the lower end, onto which you can plug a suitable plastic spacer.

1.2 Centerings

Spacers - Plastic

These spacers are suitable for bare, metallic probes.

Spacers of plastic are suitable for applications up to 250° C (482° F).

Notches on the 4-arm spacer make it easy to trim down the spacer to standard diameters. The spacer can thus be adapted to the tube diameter.

This kind of spacer is slid onto probes and must be fixed with special retaining rings in the required position. Suitable retaining rings are included in the delivery.

Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient.

There are various versions for different rod or cable probes. You can find out which spacer is suitable for a particular probe in the table at the end of this chapter.

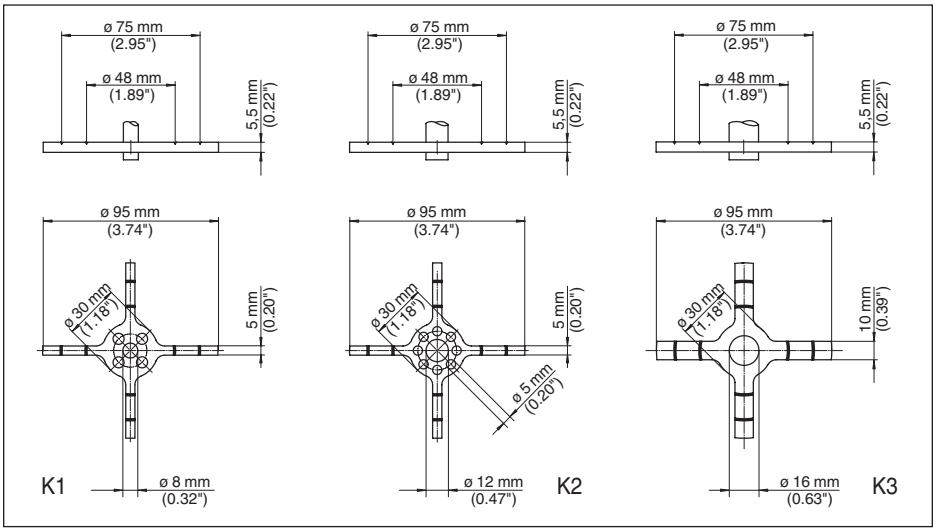

Fig. 1: Spacers of plastic

K1 Spacer of plastic (PEEK or PTFE) for rods with ø 8 mm (0.32 in)
K2 Spacer of plastic (PEEK) for rods with ø 12 mm (0.47 in)
K3 Spacer of plastic (PEEK) for rods and gravity weights with ø 16 mm (0.63 in)

Spacers - Plastic (open on the side)

These spacers are especially suitable for plastic-coated probes.

Spacers of plastic are suitable for applications up to 250° C (482° F).

Notches on the 4-arm spacer allow simple trimming. The spacer can thus be adapted to the tube diameter.

This kind of spacer can be plugged laterally onto the probe and does not need any other fixing components.

Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient.

There are various versions for different rod or cable diameters. You can find out which spacer is suitable for a particular probe in the table at the end of this chapter.

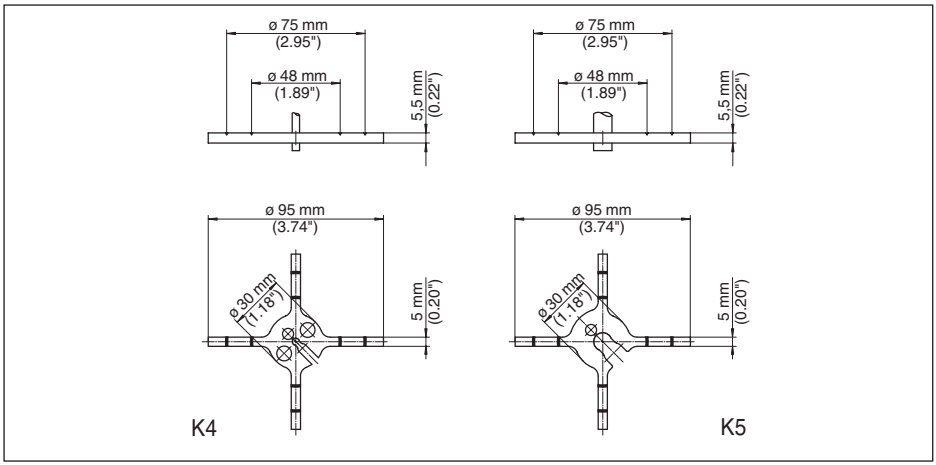

Fig. 2: Spacers of plastic (open on the side)

K4 Spacer of plastic (PEEK) for PFA coated cables with ø 4 mm (0.16 in)
K5 Spacer of plastic (PEEK) for PFA coated rods with ø 10 mm (0.39 in)

Spacers - Metal

The metallic spacers are suitable for applications with high temperatures.

The elastic arms of the spacer fix the probe in the tube. Select the spacer according to the tube inner diameter.

This kind of spacer is slid onto the rod probe and must be fastened with special retaining rings in the required position. Suitable retaining rings are included in the delivery.

Measurement below the spacer is not possible. For that reason mount the spacer as close as possibe to the probe end.

You can find out which spacer is suitable for a particular tube inner diameter in the table at the end of this chapter.

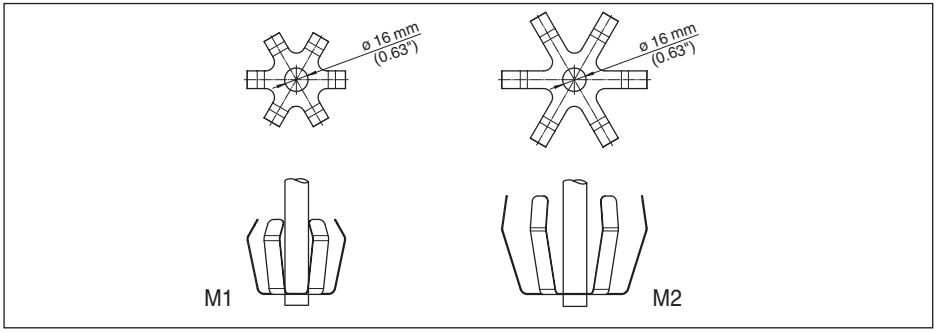

Fig. 3: Spacers of metal for rod versions with ø 16 mm (0.63 in)

M1 Spacer of stainless steel (AISI 631) for rods and gravity weights with ø 16 mm (0.63 in) - outer ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)
M2 Spacer of stainless steel (AISI 631) for rods and gravity weights with ø 16 mm (0.63 in) - outer ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)

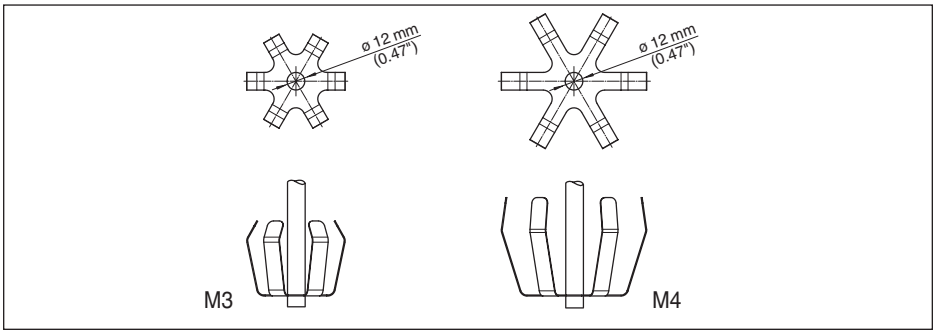

Fig. 4: Spacers of metal for rod versions with ø 12 mm (0.47 in)

M3 Spacer of stainless steel (AISI 631) for rods with ø 12 mm (0.47 in) - outer ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)

M4 Spacer of stainless steel (AISI 631) for rods with ø 12 mm (0.47 in) - outer ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)

Centering weights

Centering weights are fastened to the end of the cable probe, thus straining the cable of the probe by means of their own weight.

The metallic centering weights are suitable for use with cable versions in standpipes or bypass tubes.

Select the centering weight according to the tube inside diameter.

For use in turbulent environments and in extremely tilted positions, the centering weights with ø 40 and 45 mm (1.57, 1.77 in) are available with 90 mm/3.54 in height (instead of 30 mm/1.18 in) and correspondingly greater weight.

You can find out which centering weight is suitable for a particular measuring probe in the table at the end of this chapter.

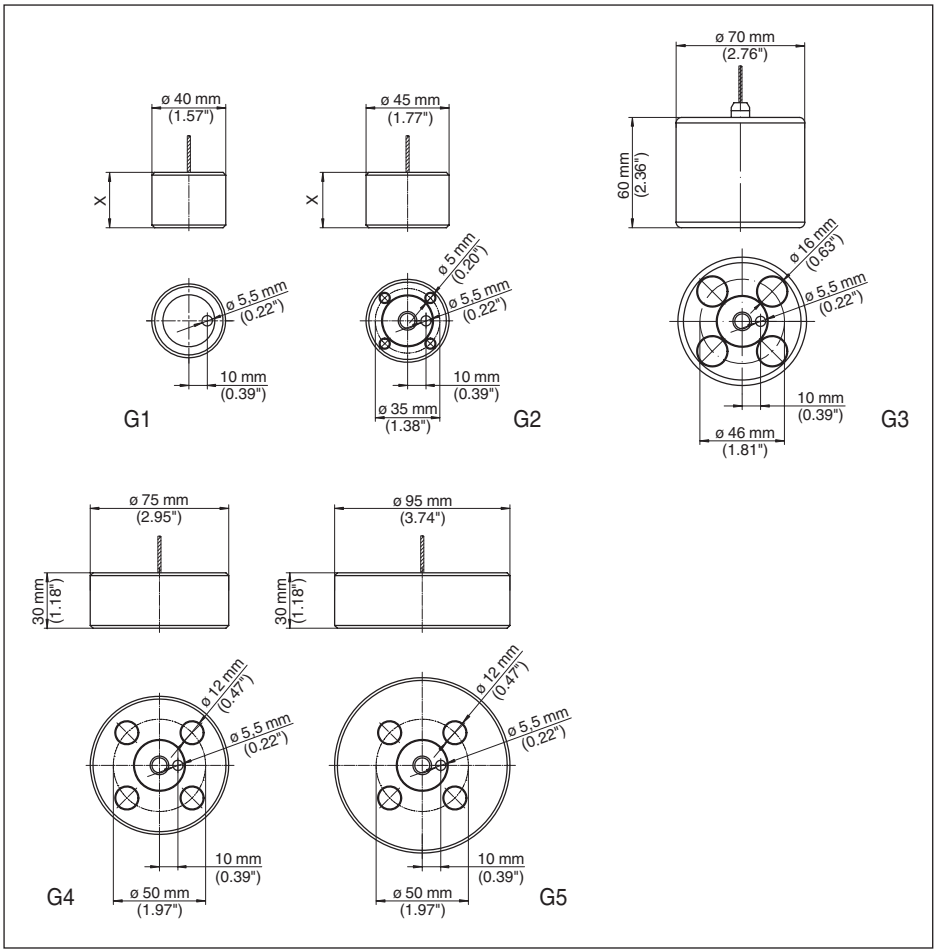

Fig. 5: Centering weights of metal

G1 Centering weight ø 40 mm (1.57 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in) - with cable ø 2 mm (0.08 in) also available with height 90 mm (3.54 in)
G2 Centering weight ø 45 mm (1.77 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in) - with cable ø 2 mm (0.08 in) also available with height 90 mm (3.54 in)
G3 Centering weight ø 70 mm (2.76 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)
G4 Centering weight ø 75 mm (2.95 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in)
G5 Centering weight ø 95 mm (3.74 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in)
x Height: 30 mm (1.18 in) - with cable ø 2 mm (0.08 in) also available with height 90 mm (3.54 in)

Gravity weights

Gravity weights are fastened to the end of the cable probe, thus straining the cable of the probe by means of their own weight.

The metallic gravity weights are suitable for use with cable versions in standpipes or bypass tubes.

For this purpose an additional spacer is required. The gravity weight has a smaller diameter (ø 16 mm) at the lower end, onto which a suitable plastic spacer can be plugged.

Select the spacer according to the tube inside diameter.

You can find out which gravity weight/spacer combination is suitable for a particular measuring probe in the table at the end of this chapter.

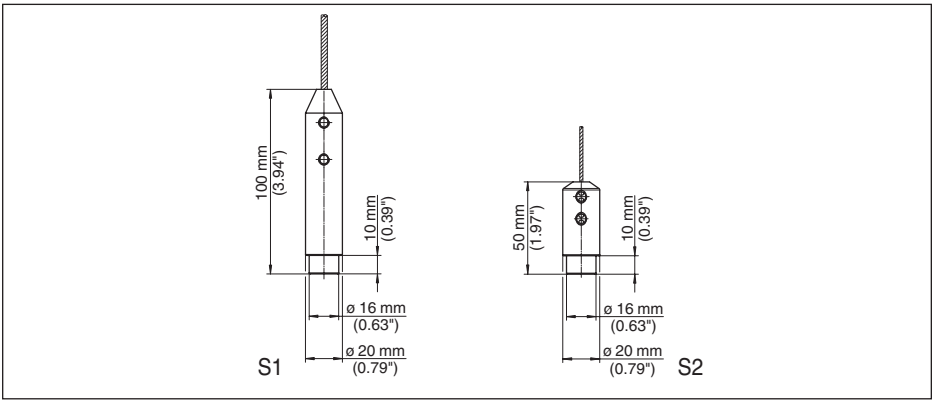

Fig. 6: Gravity weights of metal

S1 Gravity weight, length 100 mm (3.94 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in)

S2 Gravity weight, length 50 mm (1.97 in) of stainless steel (316L) for cables with ø 2 mm (0.08 in)/ø 4 mm (0.16 in)

Combination possibilities - Centerings

Measuring probe	Version	Spacer - Plastic	Spacer - Metal	Centering weight	Gravity weight (spacer)
VEGAFLEX 81	Cable probe ø 2 mm (0.08 in)	-	-	G1, G2, G3, G4, G5	S2 (with K3)
	Cable probe ø 4 mm (0.16 in)	-	-	G1, G2, G4, G5	S1 (with K3)
	Rod probe ø 8 mm (0.32 in)	K1	-	-	-
	Rod probe ø 12 mm (0.47 in)	K2	M3, M4	-	-
VEGAFLEX 83	Cable probe ø 4 mm (0.16 in) + PFA	K4	-	-	-
	Rod probe ø 10 mm (0.39 in) + PFA	K5	-	-	-
	Rod probe ø 8 mm (0.32 in) - polished	-	-	-	-

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Measuring probe	Version	Spacer - Plastic	Spacer - Metal	Centering weight	Gravity weight (spacer)
VEGAFLEX 86	Cable probe ø 2 mm (0.08 in)	-	-	G1, G2, G3, G4, G5	S2 (with M1, M2) or (K3)[1]
	Cable probe ø 4 mm (0.16 in)	-	-	G1, G2, G4, G5	S1 (with M1, M2) or (K3)[2]
	Rod probe ø 16 mm (0.63 in)	K3[3]	M1, M2	-	-

Tab. 1: Combination possibilities of the probes with centerings

[1] only from -60 … +250 °C (-76 … +482 °F)
[2] only from -60 … +250 °C (-76 … +482 °F)
[3] only from -60 … +250 °C (-76 … +482 °F)

2 Mounting

2.1 General instructions

Spacers

Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient. If several spacers are required, they should be mounted large distances apart.

Buildup

Keep in mind that buildup can form on the spacers. Strong buildup can influence the measurement.

Standpipes or bypass tubes

When probes are used in standpipes or bypass tubes, contact with the tube wall must be avoided. We therefore recommend probes with a centering.

Rod probes generally do not require a spacer. However, if there is a risk of the rod probe being pressed against the tube wall by inflowing medium, you should mount a spacer at the probe end to reliably avoid contact with the tube wall. The cable of cable probes can also be strained.

The centering should be mounted at the lower end of the probe rod.

In a bypass tube, select the position of the centering component such that it is below the lower vessel connection tube and hence below the min. adjustment point.

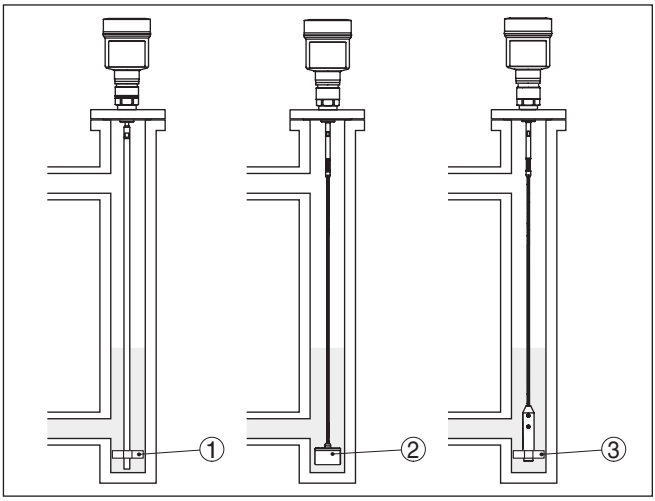

Fig. 7: Examples of the position of the spacer or the centering weight

1 Rod probe with spacer (plastic)
2 Cable probe with centering weight
3 Spacer (plastic) on the gravity weight of a cable probe

2.2 Spacers - Plastic (K1, K2, K3)

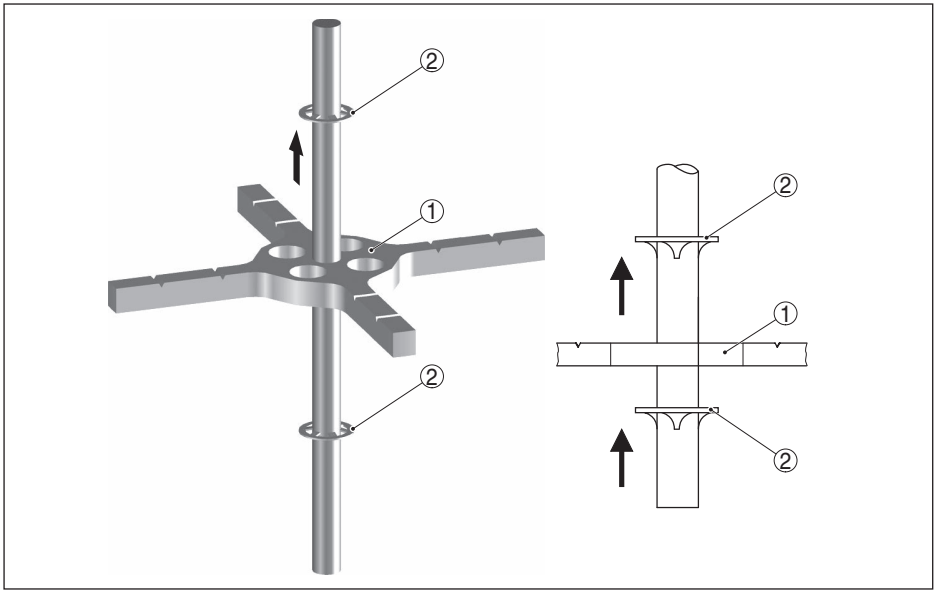

Fig. 8: Mounting the spacer

1 Spacer (K1, K2, K3) for tube inside diameter ≤ 100 mm (4")
2 Retaining ring

1. Measure the diameter of the standpipe or bypass tube and adapt the spacers accordingly. The notches on the 4-arm spacer allow simple trimming down to tube diameters DN 50 (2") and DN 80 (3").

   For cutting, use a metal saw or a pair of strong pincers or side cutters.
2. The spacer should be mounted at the lower end of the probe rod. Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient. If several spacers are required, they should be mounted large distances apart. Determine where a spacer should be placed and mark the position.
3. Slide the retaining ring (2) onto the rod of the probe.

Tip:
Wear gloves when sliding the parts onto the rod or use a piece of thin tubing

With probes of diameter 12 mm (0.47 in), use the supplied tool to slide the spacers.

If you have shortened the probe, it is helpful to slightly chamfer the end of the rod.

4. Slide a spacer (1) and another retaining ring (2) onto the rod of the probe.

The retaining rings fix the spacer in the desired position. A certain clearance is permitted.

Note:
The retaining rings can be moved only in one direction. If you have already passed the desired position, cut the retaining ring with a side cutter. Use a new retaining ring.

2.3 Spacers - Plastic (open on the side) (K4, K5)

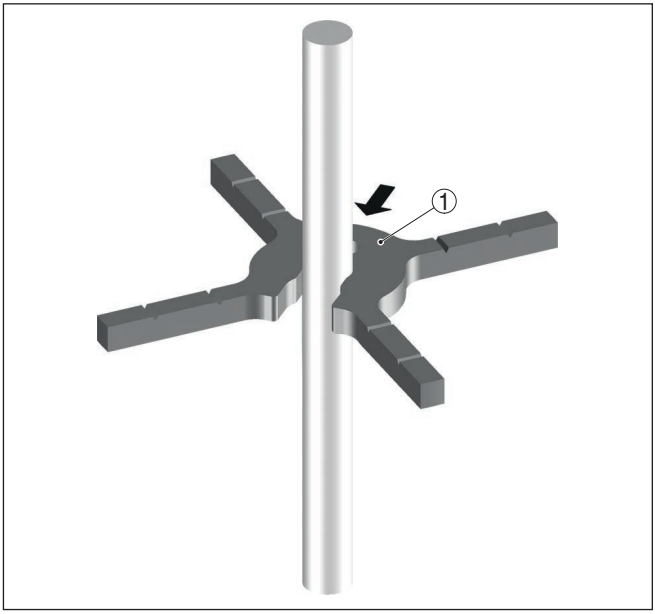

Fig. 9: Mounting the spacer (open on the side)

1 Spacer (K4, K5) for tube inside diameter ≤ 100 mm (4")

1. Measure the diameter of the standpipe or bypass tube and adapt the spacers accordingly. The notches on the 4-arm spacer allow simple trimming down to tube diameters DN 50 (2") and DN 80 (3").

   For cutting, use a metal saw or a pair of strong pincers or side cutters.

2. With rod versions of the probe, the spacer should be mounted at the lower end of the probe rod. Use as few spacers as possible. With rod probes, one spacer at the probe end is usually sufficient. If several spacers are required, they should be mounted large distances apart. Determine where a spacer should be placed and mark the position.

   With cable version, the spacers should be mounted at a min. distance of approx. 1.50 m (5 ft).

3. Plug the spacer (1) from the side onto the rod or cable of the probe.

Note:
The spacer may not be moved in the axial direction. The insulation of the cable or rod could be damaged. You can remove the spacer laterally and attach it again at another position.

2.4 Spacers - Metal (M1, M2, M3, M4)

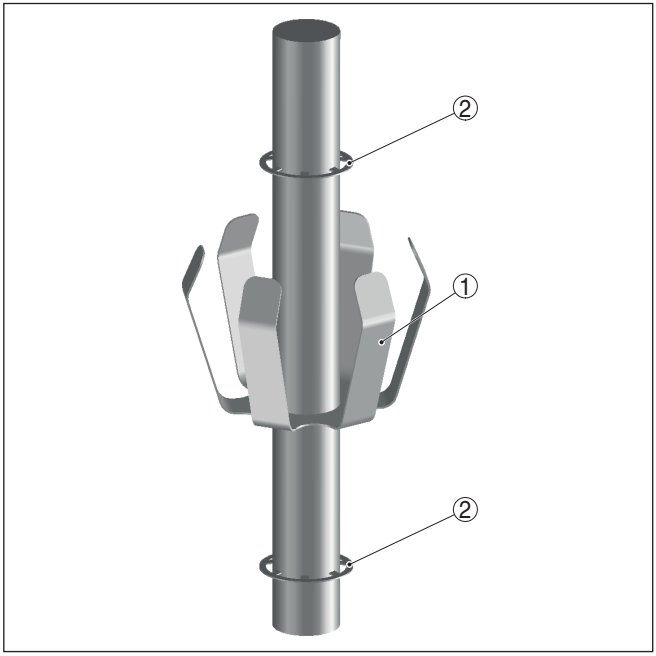

Fig. 10: Mounting the spacer

1 Spacer (M1, M2, M3, M4)
M1, M3 - outer ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)
M2, M4 - outer ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)
2 Retaining ring

1. The spacer should be mounted at the lower end of the probe rod.
2. Slide the retaining ring (2) onto the rod of the probe.

Tip:
Wear gloves when sliding the parts onto the rod or use a piece of thin tubing

If you have shortened the probe, it is helpful to slightly chamfer the end of the rod.

3. Slide the spacer (1) with open elastic arms upward and an additional retaining ring (2) onto the rod of the probe.

   The retaining rings fix the spacer in the requested position.

Note:
The retaining rings can be moved only in one direction. If you have already passed the desired position, cut the retaining ring with a side cutter. Use a new retaining ring.

2.5 Centering weights (G1, G2, G3, G4, G5)

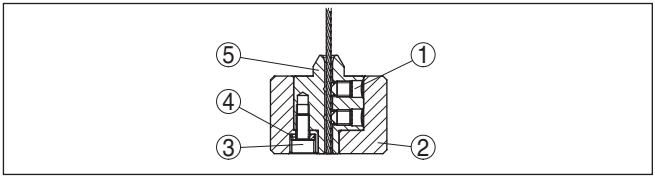

Fig. 11: Mounting the centering weight (G1, G2, G3, G4, G5)

1 Threaded pins
2 Centering weight
3 Fixing screw - centering weight
4 Retaining washer (Nordlock®)
5 Inner insert

1. Select the centering weight (2) according to the tube inside diameter.
2. Loosen the fixing screw (3) and remove the inner insert (5) from the centering weight (2).
3. Lead the cable of the probe through the inner insert (5) until it ends flush with the lower side of the inner insert (5).
4. Fasten the cable of the probe with the two threaded pins (1). Tighten the pins (1) with a torque of 7 Nm (5.16 lbf ft).
5. Place the centering weight (2) from below onto the inner insert (5).
6. Insert the fixing screw (3) and the two retaining washers (4) into the centering weight (2).
7. Fasten the inner insert (1) with the fixing screw (2) on the centering weight (3).
8. Tighten the fixing screw (3) with a torque of 7 Nm (5.16 lbf ft).
9. If you retrofit a centering weight, you have to select the correct probe type in the instrument (e.g. cable ø 4 mm with centering weight). If the probe length has changed, you have to enter the new probe length in the instrument and then carry out the adjustment again (see also "*Setup steps, Carry out min. adjustment - Carry out max. adjustment*").

2.6 Gravity weights (S1, S2)

Mounting the gravity weight

The following process describes the mounting of the gravity weight on the cable of the probe.

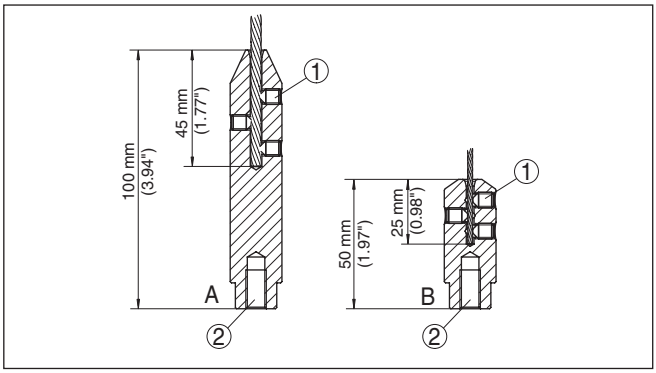

Fig. 12: Mounting the gravity weight (S1, S2)

A Gravity weight - cable ø 4 mm (0.16 in)
B Gravity weight - cable ø 2 mm (0.08 in)
1 Threaded pins
2 Thread M8, e.g. for eye-bolt

1. Slide the cable (according to the drawing) into the gravity weight (A, B) up to the stop
2. Fasten the cable with the threaded pins, torque 7 Nm (5.16 lbf ft)
3. If you retrofit a gravity weight, you have to select the correct probe type in the instrument (e.g. cable ø 4 mm with gravity weight). If the probe length has changed, you have to enter the new probe length in the instrument and then carry out the adjustment again (see also "*Setup steps, Carry out min. adjustment - Carry out max. adjustment*").

Mounting the spacer

The following process describes the mounting of the spacer on the gravity weight.

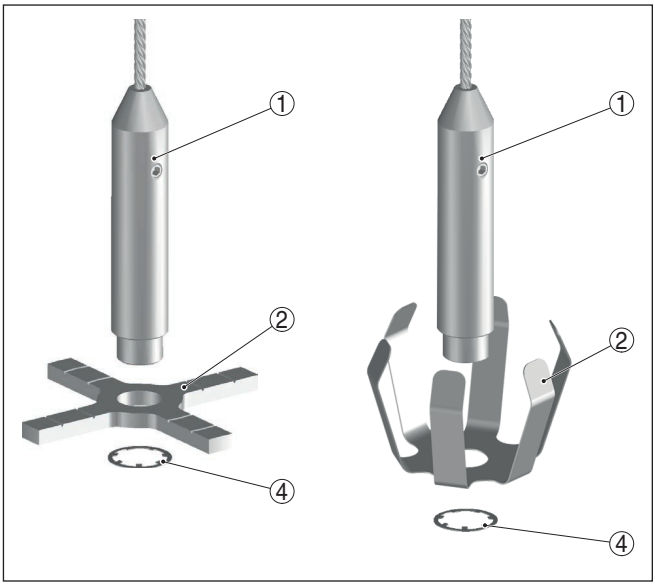

Fig. 13: Mounting the spacer (K3 or M1, M2) on the gravity weight (S1, S2)

1 Gravity weight (S1, S2)
2 Spacer - Plastic (K3) for tube inside diameter ≤ 100 mm (4")
3 Spacers - Metal (M1, M2)
4 Retaining ring

1. Measure the diameter of the standpipe or bypass tube and adapt the spacer (2) accordingly. The notches on the 4-arm spacer (2) allow simple trimming down to tube diameters DN 50 (2") and DN 80 (3").

   For cutting, use a metal saw or a pair of strong pincers or side cutters.

   With spacers of metal (3), you have to use a spacer that fits.
2. Plug the spacer (2 or 3) onto the short neck of the gravity weight (1)
3. Slide a retaining ring (4) onto the short neck of the gravity weight (1)

3 Supplement

3.1 Technical data

Spacer - Plastic (K1, K2, K3, K4, K5)	
316L corresponds to 1.4404 or 1.4435	
Material	
– Spacer (4-leg)	PEEK or PTFE[4]
– Retaining rings	stainless steel PH 15-7 Mo (UNS S 15700)
Outer diameter	ø 95 mm (3.74 in), notches ø 75 mm and ø 48 mm (3 in and 1.9 in)
Product temperature	-60 … +250 °C (-76 … +482 °F)
Weight	approx. 10 g (0.4 oz)

Spacer - Metal (M1, M2, M3, M4)	
Material	
– Spacer (6-arm)	AISI 631 (1.4568)
– Retaining rings	stainless steel PH 15-7 Mo (UNS S 15700)
Outer diameter	ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)
	ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)
Rod diameter	ø 16 mm (0.63 in) - M1, M2
	ø 12 mm (0.47 in) - M3, M4
Product temperature	-196 … +450 °C (-321 … +842 °F)
Weight	approx. 15 g (0.5 oz)

Centering weight (G1, G2, G3, G4, G5)	
Material	
– Centering weight	316L
– Threaded pins	316L
– Retaining washer (Nordlock®)	316L
– Fixing screw	316L
Outer diameter	ø 40 mm (1.57 in)
	ø 45 mm (1.77 in)
	ø 70 mm (2.76 in)
	ø 75 mm (2.95 in)
	ø 95 mm (3.74 in)
Height	30 mm (1.17 in)
	Centering weights ø 40 mm (1.57 in) and ø 45 mm (1.77 in), with cable ø 2 mm (0.08 in) optionally also with 90 mm (3.54 in) height available
	Centering weight with ø 70 mm (1.57 in) with 60 mm (2.36 in) height

[4] PTFE only with rod ø8 mm (0.32 in)

Product temperature	-196 … +450 °C (-321 … +842 °F)
Weight	
– Centering weights with height 30 mm (1.17 in)	approx. 280 … 1540 g (10 … 54 oz)
– Centering weights with height 90 mm (3.54 in)	approx. 410 … 600 g (14.5 … 21.2 oz)

Gravity weight (S1, S2)

Material	
– Gravity weight	316L
– Threaded pins	316L
Diameter	
– Gravity weight	ø 20 mm (0.79 in)
– with plastic spacer	ø 95 mm (3.74 in), notches ø 75 mm and ø 48 mm (3 in and 1.9 in)
Length	50 mm/100 mm (1.97 in/3.94 in)
Product temperature	-196 … +450 °C (-321 … +842 °F)[5)]
Weight	approx. 100 … 200 g (3.5 … 7 oz)

[5)] with plastic spacer only up to +250 °C (+482 °F)

3.2 Dimensions

Spacer (K1) for rod ø 8 mm (0.32 in)

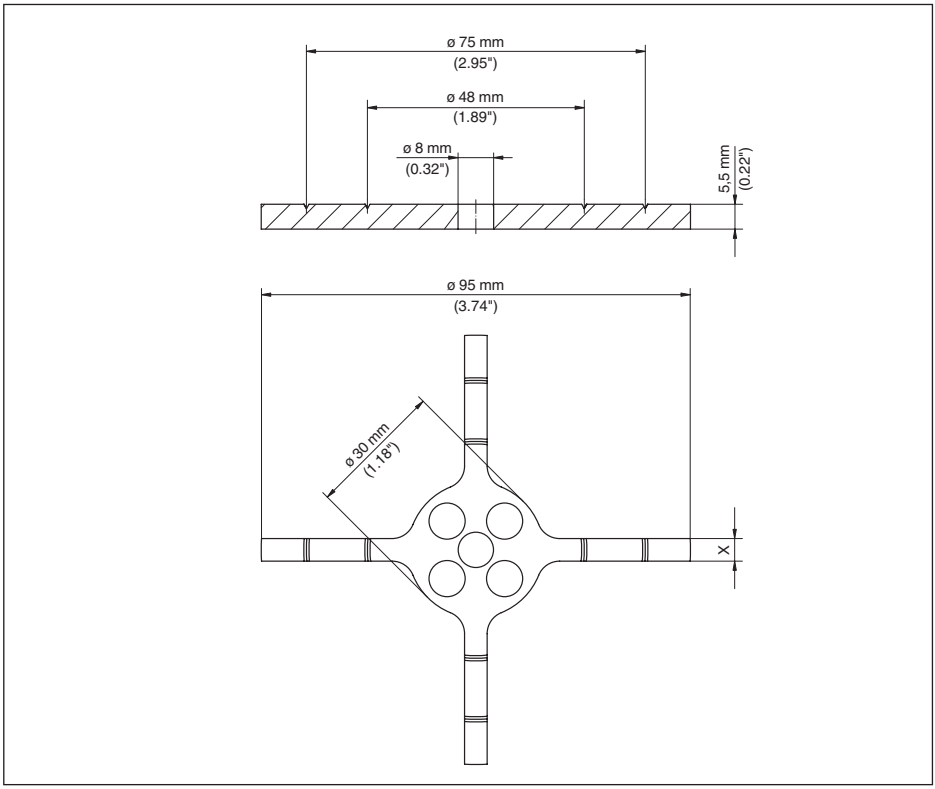

Fig. 14: Spacer of plastic (PEEK or PTFE) for VEGAFLEX 81 in rod version with ø 8 mm (0.32 in)

x PEEK = 5 mm (0.2 in)
x PTFE = 8 mm (0.32 in)

Spacer (K2) for rod ø 12 mm (0.47 in)

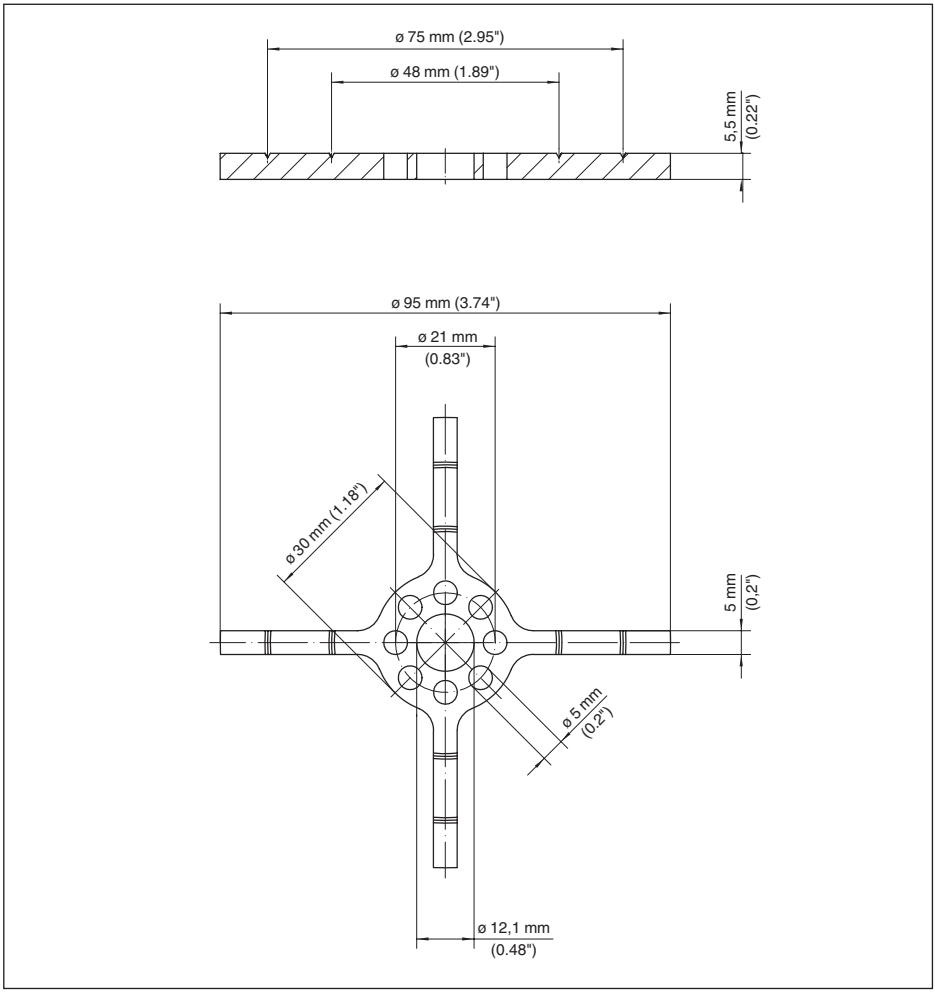

Fig. 15: Spacer of plastic (PEEK) for VEGAFLEX 81 in rod version with ø 12 mm (0.47 in)

Spacer (K3) for rod ø 16 mm (0.63 in)

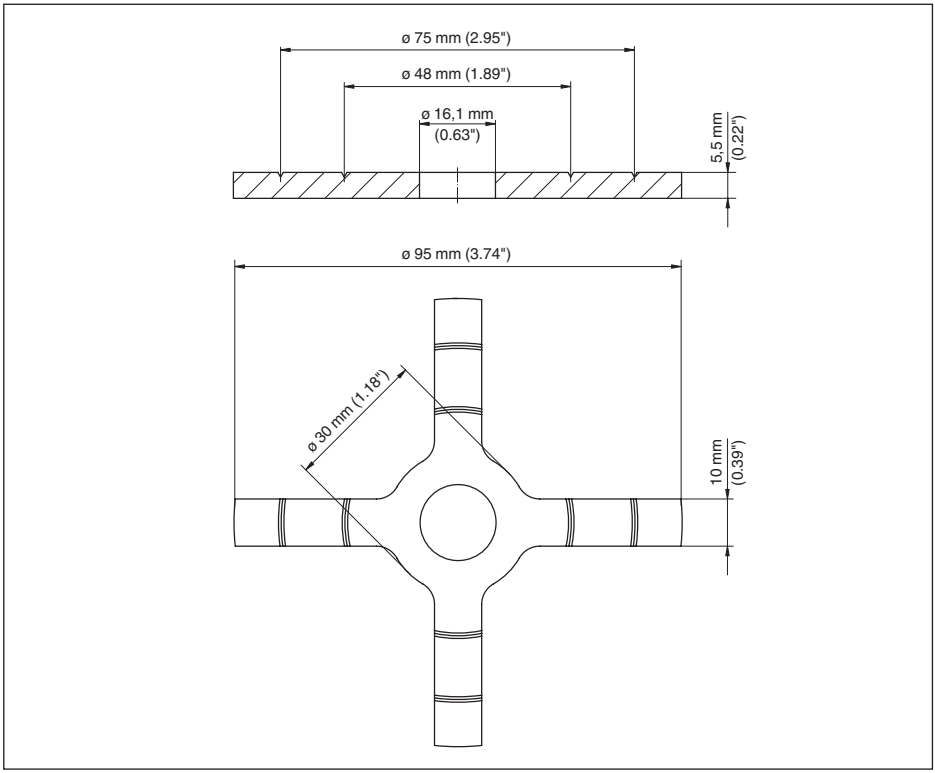

Fig. 16: Spacer of plastic (PEEK) for VEGAFLEX 82, 86 in rod version with ø 16 mm (0.63 in) as well as for the combination with gravity weights

Spacer (K4) for cable ø 4 mm (0.16 in) - open on the side

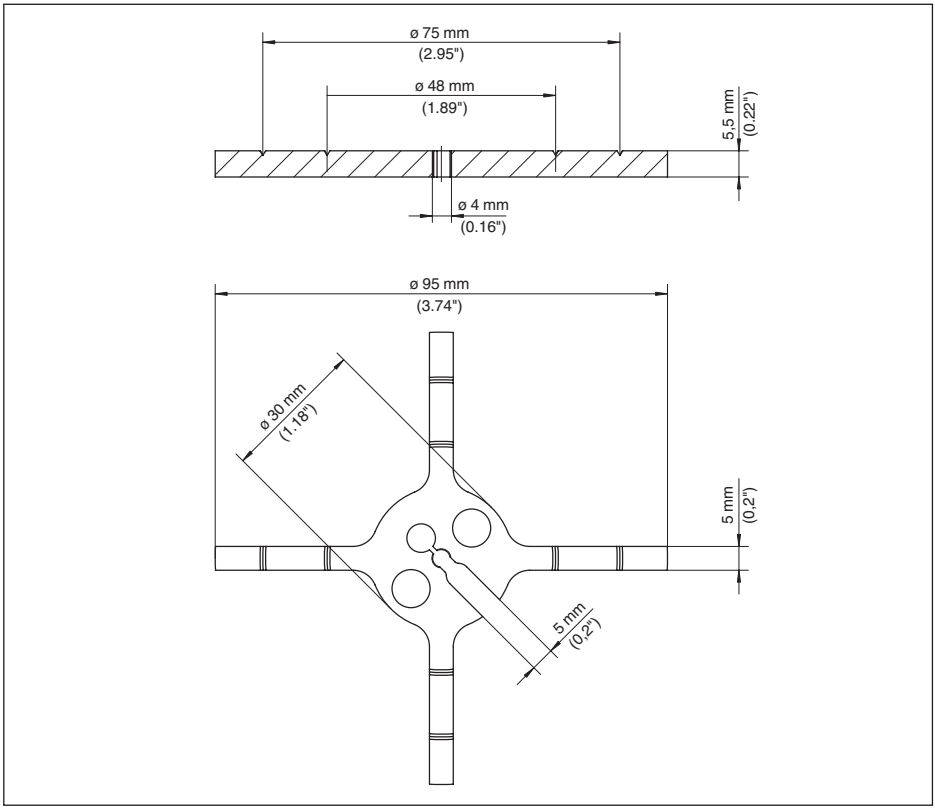

Fig. 17: Spacer of plastic (PEEK) for VEGAFLEX 83 in cable version with ø 4 mm (0.16 in)

Spacer (K5) for rod ø 10 mm (0.39 in) - open on the side

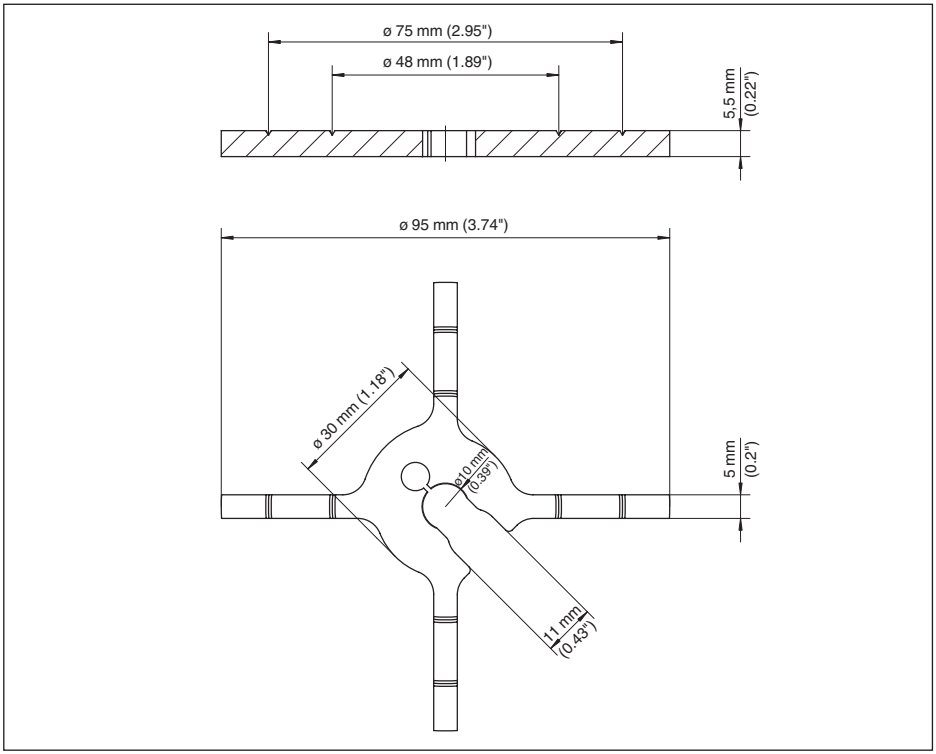

Fig. 18: Spacer of plastic (PEEK) for VEGAFLEX 83 in rod version with ø 10 mm (0.39 in)

Spacer metal (M1, M2) ø 16 mm (0.63 in) - 2"/3" tube

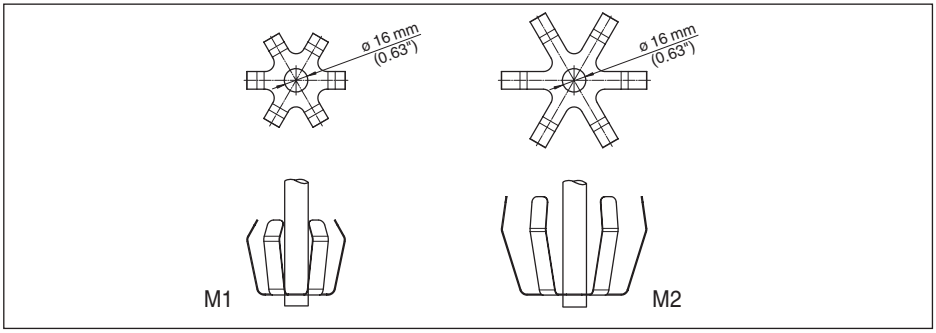

Fig. 19: Spacer of metal for VEGAFLEX 82, 86 in rod version with ø 16 mm (0.63 in) as well as for the combination with gravity weights

A Spacer of stainless steel (316L) for rods and gravity weights with ø 16 mm (0.63 in) - outer ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)

B Spacer of stainless steel (316L) for rods and gravity weights with ø 16 mm (0.63 in) - outer ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)

Spacer metal (M3, M4) ø 12 mm (0.47 in) - 2"/3" tube

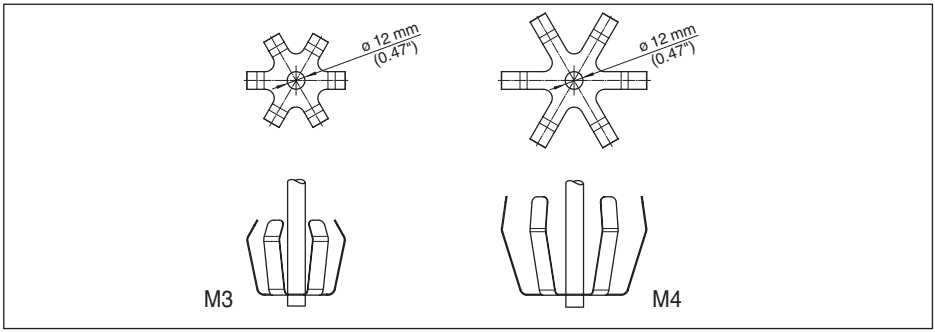

Fig. 20: Spacer of metal for VEGAFLEX 81 in rod version with ø 12 mm (0.47 in)

A Spacer of stainless steel (316L) for rods with ø 12 mm (0.47 in) - outer ø 49.2 up to 56.3 mm (1.9 up to 2.2 in)
B Spacer of stainless steel (316L) for rods with ø 12 mm (0.47 in) - outer ø 66.6 up to 84.9 mm (2.6 up to 3.3 in)

Centering weight (G1, G2, G3, G4, G5) for cable ø 2 mm/ø 4 mm (0.08/0.16 in)

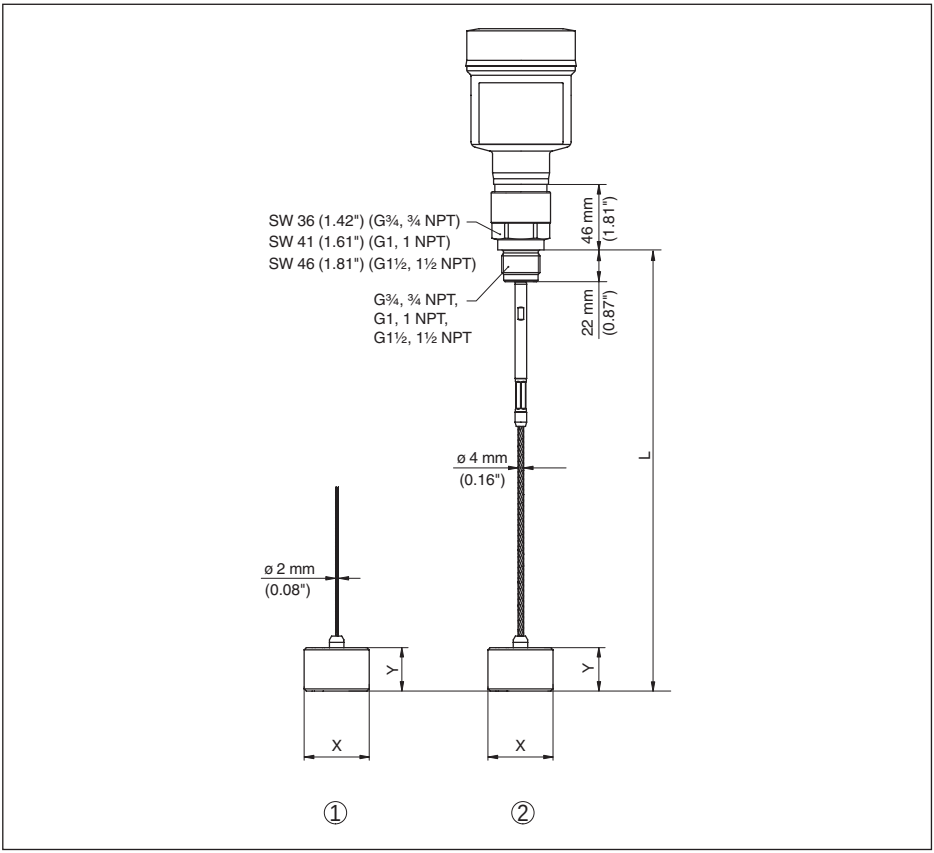

Fig. 21: Centering weight of metal, ø 40, 45, 70, 75, 95 mm (1.57, 1.77, 2.76, 2.95, 3.74 in) for VEGAFLEX 81, 82, 86 in cable version

L Sensor length
x ø 40 mm (1.57 in)
ø 45 mm (1.77 in)
ø 70 mm (2.76 in)
ø 75 mm (2.95 in)
ø 95 mm (3.74 in)
y 30 mm (1.17 oz)
60 mm (2.36 oz) - only with centering weight with ø 70 mm (2.76 in)
90 mm (3.54 oz) - only with centering weight with ø 40 and 45 mm (1.57, 1.77 in) and with cable ø 2 mm (0.08 in)
1 Cable version ø 2 mm (0.08 in) with centering weight
2 Cable version ø 4 mm (0.16 in) with centering weight

Gravity weight (S1, S2) for cable ø 2 mm/ø 4 mm (0.08/0.16 in)

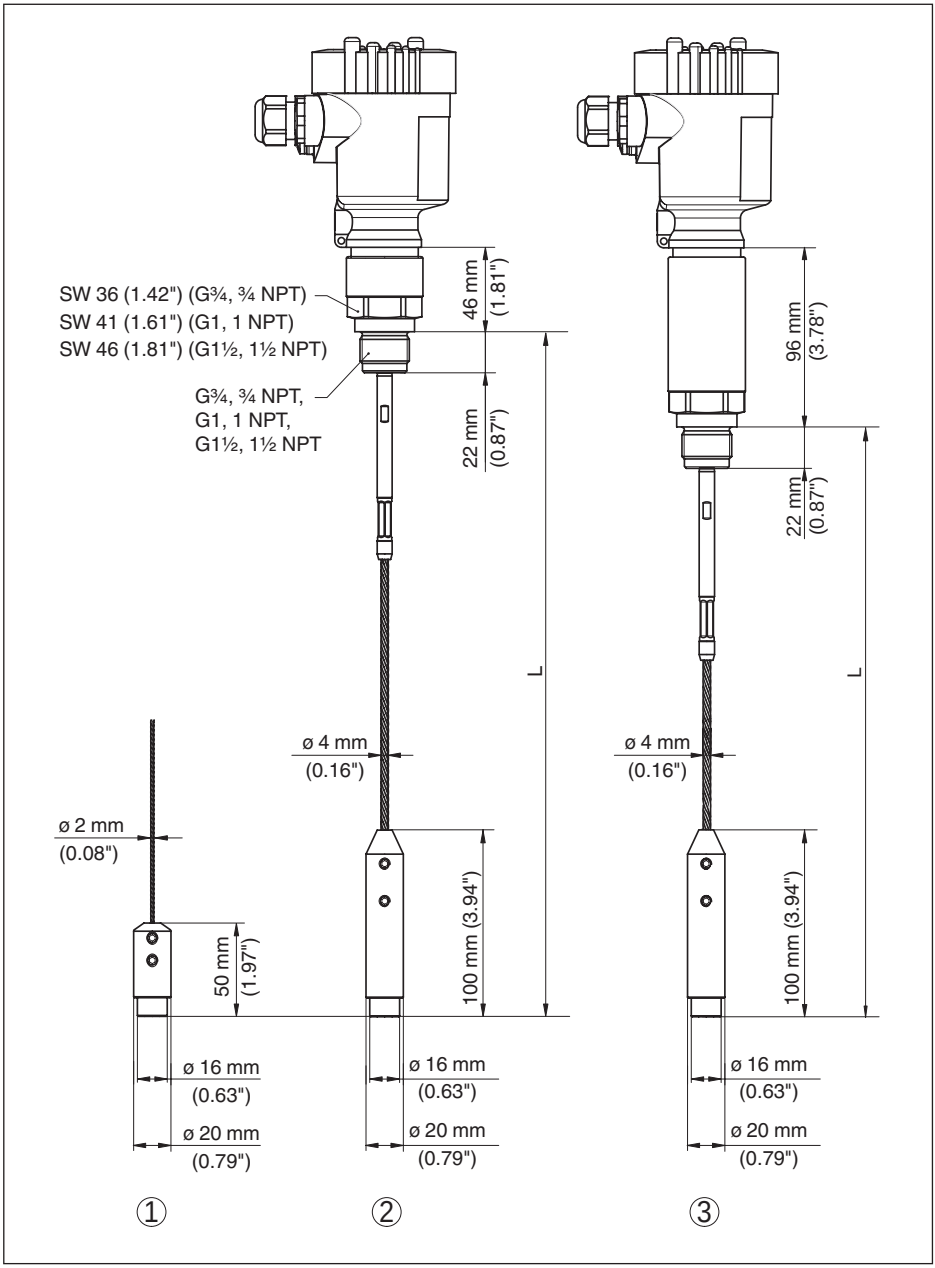

Fig. 22: Gravity weight of metal, length: 50/100 mm (1.97/3.94 in) for VEGAFLEX 81, 86 in cable version with ø 2 mm/ø 4 mm (0.08/0.16 in)

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L Sensor length
1 Cable version ø 2 mm (0.08 in) with gravity weight
2 Cable version ø 4 mm (0.16 in) with gravity weight
3 Cable version with temperature adapter

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Printing date:

44967-EN-131119

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