SENSOFIT INS Handbook

Assemblies for analytical sensors

KROHNE

IMPRINT

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1.1 Intended use

CAUTION!
Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

INFORMATION!
The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

SENSOFIT INS can be attached to pipes or tanks. In addition, SENSOFIT INS 1000 assemblies can also be installed in open basins by using one of the threads and an appropriate assembly (e.g. SENSOFIT IMM 2000).The assembly serves for mounting a sensor in such a way that it immerses into the process fluid in order to measure chemical or physical characteristics. The material characteristics of the assembly, the gaskets, the sensors and the housing must be chosen depending on the process characteristics (e.g. pressure, temperature, abrasivity). The assembly must be maintained on a regular basis. Establish a maintenance plan which is adjusted to your process.

1.2 Safety instructions from the manufacturer

1.2.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

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We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.2.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.2.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.2.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer can not accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

1.2.5 Warnings and symbols used

Safety warnings are indicated by the following symbols.

DANGER!
This warning refers to the immediate danger when working with electricity.

DANGER!
This warning refers to the immediate danger of burns caused by heat or hot surfaces.

DANGER!
This warning refers to the immediate danger when using this device in a hazardous atmosphere.

DANGER!
These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.

WARNING!
Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.

CAUTION!
Disregarding these instructions can result in damage to the device or to parts of the operator's plant.

INFORMATION!
These instructions contain important information for the handling of the device.

LEGAL NOTICE!
This note contains information on statutory directives and standards.

- HANDLING
  This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

➲ RESULT
This symbol refers to all important consequences of the previous actions.

1.3 Safety instructions for the operator

WARNING!
In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.
This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.

2.1 Scope of delivery

INFORMATION!
Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

INFORMATION!
Do a check of the packing list to make sure that you have all the elements given in the order.

INFORMATION!
Look at the device nameplate to ensure that the device is delivered according to your order.

Figure 2-1: Scope of delivery

① Ordered assembly (example)
② Documentation

INFORMATION!
For further information contact your local sales office.

2.2 Device description

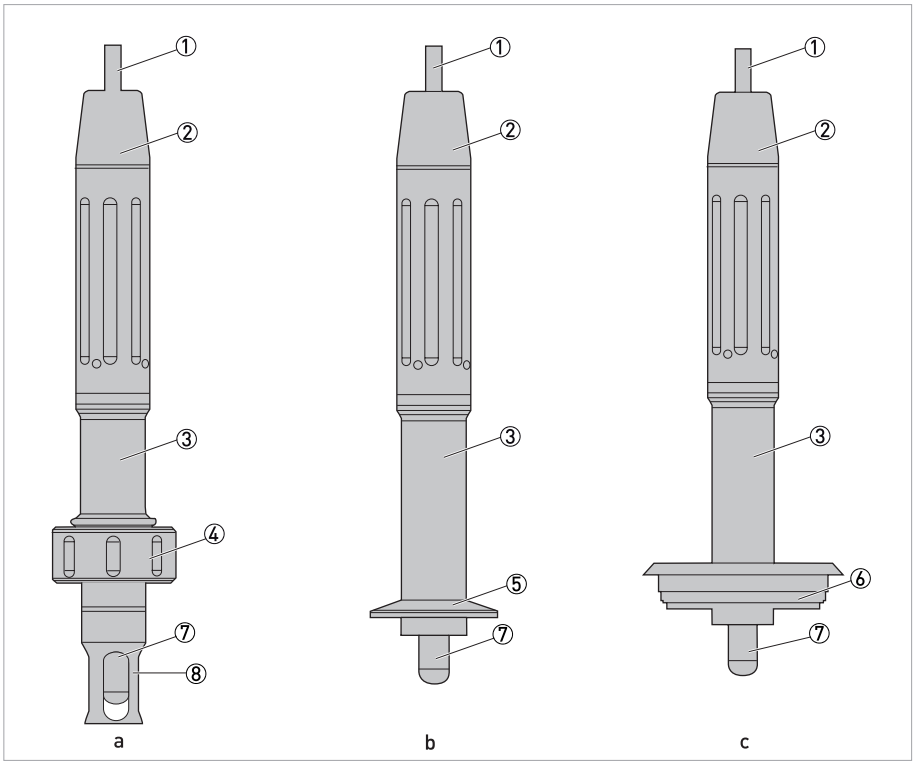

Figure 2-2: Insertion assemblies

a SENSOFIT INS 1310 / b SENSOFIT INS 7311 / c SENSOFIT INS 7312

① Sensor cable
② Protection cap
③ Sensor assembly
④ Process connection Union nut
⑤ Process connection Tri-clamp
⑥ Process connection Varivent
⑦ Sensor
⑧ Protection cage

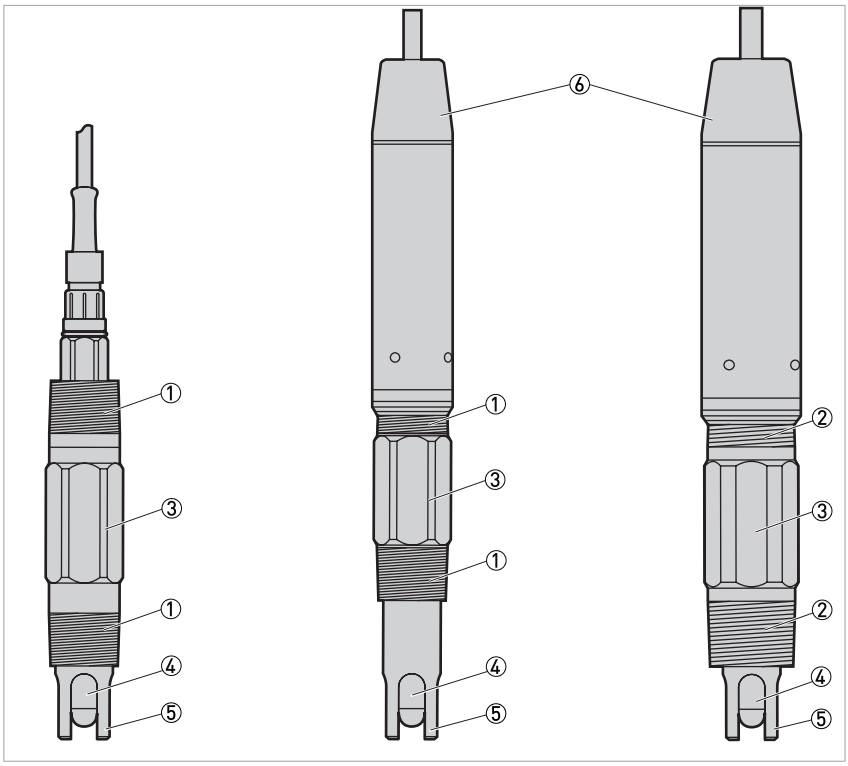

Figure 2-3: Insertion / Immersion assemblies

SENSOFIT INS 1000

① 3/4" NPT
② 1" NPT
③ Hexagonal handle
④ Sensor
⑤ Protection cage
⑥ Protection cap

Assemblies are attached to tanks or pipes by an applicable process connection. You can choose between different process connections, sealing materials and protection cage. The SENSOFIT INS 1000 assemblies can also be installed in open basins by using one of the threads and an appropriate assembly (e.g. SENSOFIT IMM 2000).

Use of the protection cap option for SENSOFIT INS 1000 is recommended for insertion (in-line) applications, especially if SMARTPAT pH /ORP sensors are used.

2.3 Nameplate

Figure 2-4: Example for a nameplate on the assembly body

① Max. static pressure / max. temperature
② Serial number
③ Order code
④ Device name
⑤ Manufacturer
⑥ Observe the operation and installation instruction

3.1 General notes on installation

INFORMATION!
Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

INFORMATION!
Do a check of the packing list to make sure that you have all the elements given in the order.

INFORMATION!
Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Storage and transport

- Store the assembly in its original packaging.
- Store and transport the device in a dry, dust-free environment.
- Store and transport the device in an environment with a temperature between -20...+70°C / -4...+158°F (for PP devices: 0...+70°C / +32...+158°F).
- The original packing is designed to protect the equipment. It has to be used if the device is transported or sent back to the manufacturer.

3.3 Pre-installation requirements

WARNING!
SENSOFIT INS 1000 assemblies made from PP are not suitable for insertion applications with strong or long-lasting UV radiation. Protect the point of installation from UV radiation, or select different material for the assembly in this case.

WARNING!
In order to avoid ignition hazards due to electrostatic charge, SENSOFIT INS 1000 assemblies made from PP or PVDF may not be used in areas where:

- *processes generate strong charges,*
- *mechanical friction and cutting processes,*
- *spraying of electrons (e.g. in the vicinity of electrostatic painting systems),*
- *dust carried by compressed air.*

CAUTION!
Choosing the right gasket for the process connection depends on the process conditions; the manufacturer can thus only give the general recommendation that the gasket must comply with the individual requirements of the measuring point (e.g. pressure, temperature, chemically aggressive media).

Make sure that pressure and temperature limits of both devices, assembly and sensor, match with process conditions. Max. allowable pressure and temperature conditions are always limited by the lowest rating. For more information refer to *Technical data* on page 20. Also check ratings for the sensor by referring to the user manual of the sensor.

Preparing the system and make sure that

- the process is switched off.
- there is sufficient working space available for operation of the assembly.
- tanks or pipelines are depressurised, empty and clean.
- the assembly connection and the process connection fit together.
- the protection cap is removed and the sensor cable is guided through it. (Option for SENSOFIT INS 1000)
- all wetted sealings are in place and not damaged.
- there is no potentially explosive atmosphere.

Preparing the assembly and make sure that

- the dimensions of the sensor fits into the assembly. For further information refer to *Dimensions* on page 22
- all seals connected to the sensor are available.

3.4 Installing the assembly

WARNING!
For SENSOFIT INS 1000 assemblies:
In case that fluid escapes through the process connection stop the process and depressurize the pipe or tank. Remove the sensor from the assembly and re-seal the process connection by using an appropriate tape or similar. Tighten the assembly again and re-install the sensor.
Never use a wrench at the assembly when a sensor is mounted in it. The sensor may be damaged irreversibly.

Make sure that

1. the system is prepared.
2. the assembly is prepared.
   For more information refer to *Pre-installation requirements* on page 11.

Steps to install the assembly

1. Insert the assembly into the prepared installation position by using an appropriate gasket or sealing material.
2. Connect the process connection and tighten.

DANGER!
Do not operate the assembly without sensor. Otherwise process fluid will be blown out through the assembly.

Steps to install the sensor in the assembly

1. Insert the sensor into the assembly and tighten it carefully.
2. Connect the sensor cable to the sensor.
3. Install the protection cap. (Option for SENSOFIT INS 1000)

Check the correct installation

1. Check if all connections are tight.
2. Check if no fluid escapes the process if the process starts again.

4.1 Maintenance

4.1.1 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.

INFORMATION!
For more precise information, please contact your local sales office.

4.1.2 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are subject to wear and tear under normal operating conditions.

4.1.3 Removing the sensor

DANGER!
Broken glass from the sensor may damage the wetted sealing.

CAUTION!
Ensure that system is pressure-free before replacing the sensor.

CAUTION!
Process liquid will leak when sensor is disconnected from process in an inappropriate way.

CAUTION!
Check wetted seals and replace if necessary.
If necessary, install the seals choosen according to the assembly and the process.

CAUTION!
Drain and clean the pipe or tank before removing the sensor

Remove the sensor

1. Process pipes and tanks must be pressure-free, empty and clean before removing the sensor from the assembly.
2. Remove protection cap. (Option for SENSOFIT INS 1000)
3. Remove sensor cable.
4. Untighten sensor.
5. Replace the sensor or close the process via blind plugs before restarting the processes.

4.1.4 Replace the wetted sealing

DANGER!
Broken glass from the sensor may damage the wetted sealing.

CAUTION!
Check wetted seals and replace if necessary.
If necessary, install the seals choosen according to the assembly and the process.

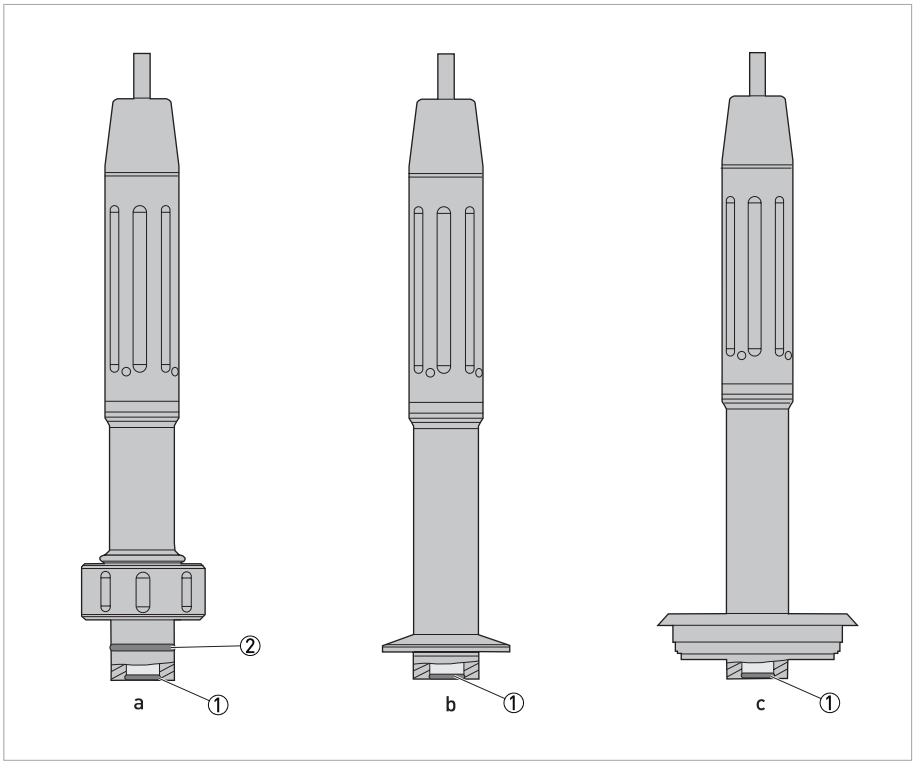

Figure 4-1: Position of the sealings

a SENSOFIT INS 1310 / b SENSOFIT INS 7311 / c SENSOFIT INS 7312

① Internal O-Ring, for further information refer to *Spare part list* on page 17
② External O-Ring, for further information refer to *Spare part list* on page 17

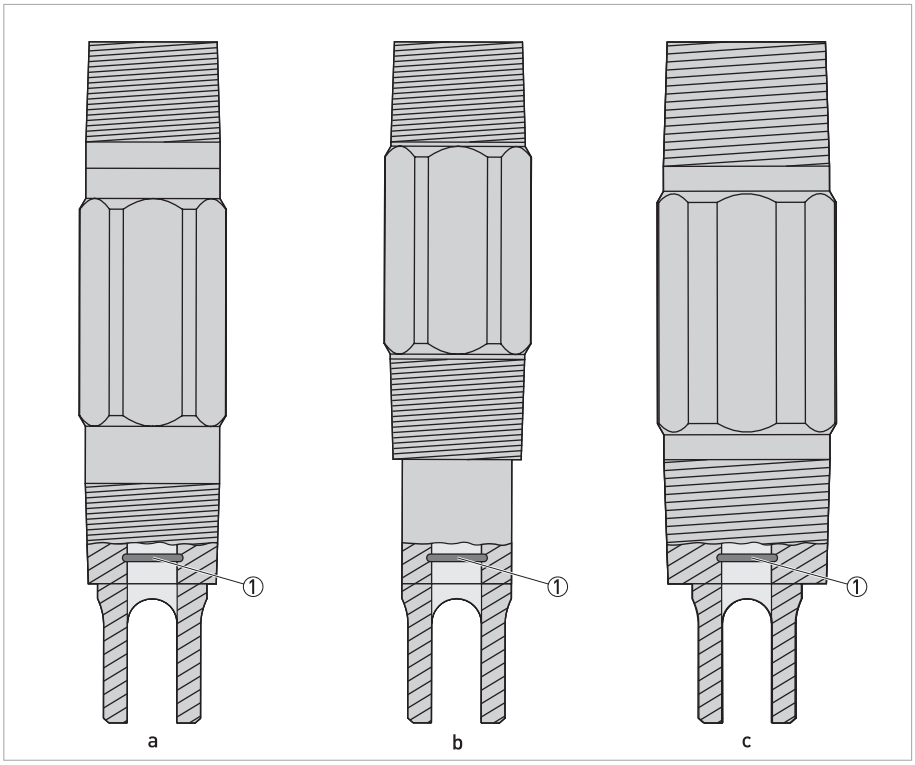

Figure 4-2: Position of the sealings

SENSOFIT INS 1000

① Internal O-Ring, for further information refer to *Spare part list* on page 17

Replace the wetted sealings

1. Remove sensor from the assembly.
2. Remove assembly from the process connection.
3. Remove and replace O-ring seals on the assembly.

4.1.5 Spare part list

XGHA000010	O-ring set for SENSOFIT INS 1310; Material: EPDM (FDA)
XGHA000020	O-ring set for SENSOFIT INS 1310; Material: FKM
XGHA000050	O-ring for SENSOFIT INS 1000, INS 7311, INS 7312; Material: EPDM (FDA); set of 5 pcs.
XGHA000060	O-ring for SENSOFIT INS 1000, INS 7311; Material: FKM (Viton); set of 5 pcs.
XGHA000070	O-ring for SENSOFIT INS 1000; Material: FFKM (Kalrez); 1 pc.
XGHA000100	Protection cap for SENSOFIT INS 1000, all 3/4“ versions; Material: POM
XGHA000110	Protection cap for SENSOFIT INS 1000, all 1“ versions; Material: POM

4.1.6 Removal of the protection cage tip

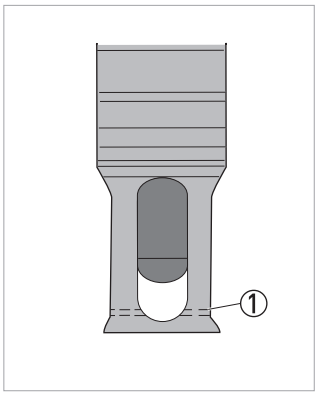

Figure 4-3: Tip of the protection cage

SENSOFIT INS 1000 assemblies made from PP and PVDF come with a ring at the tip of the protection cage. This ring can be cut-off in case of high fibre content in the sample and/or frequent clogging. Appropriate marks at the protection cage are visible. Make sure in any case that the tip of the glass electrode is still sufficiently protected.

4.2 Returning the device to the manufacturer

4.2.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.

WARNING!
Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*

WARNING!
If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that it is safe to handle and stating the product used.*

4.2.2 Form (for copying) to accompany a returned device

CAUTION!
To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

Company:		Address:
Department:		Name:
Tel. no.:		Fax no. and/or Email address:
Manufacturer's order no. or serial no.:		
The device has been operated with the following medium:		
This medium is:		radioactive
		water-hazardous
		toxic
		caustic
		flammable
		We checked that all cavities in the device are free from such substances.
		We have flushed out and neutralized all cavities in the device.
We hereby confirm that there is no risk to persons or the environment through any residual media contained in the device when it is returned.		
Date:		Signature:
Stamp:		

4.3 Disposal

CAUTION!
Disposal must be carried out in accordance with legislation applicable in your country.

5.1 Technical data

Design

Sensor type	120/12 mm PG 13.5	
Process connections	SENSOFIT INS 1000 - Male threads	3/4" - 14 NPT 1" - 11.5 NPT
	SENSOFIT INS 1310 - Union nut	G1 1/4" DN25 (O-Ring position: 25 mm)
	SENSOFIT INS 7311 - Tri-clamp	1"...1.5" (OD 50.5 mm) 2" (OD64 mm)
	SENSOFIT INS 7312 - Varivent® N	DN40...125 mm

Installation conditions

Operating conditions	**SENSOFIT INS 1000**	
	Process temperature range	PP: 0...+90°C / +32...+194°F PVDF: -10...+140°C / +14...+284°F Stainless steel: -10...+140°C / +14...+284°F
	Process pressure	Max. 12 bar / 174 psi; for p/T restrictions see diagrams below
	SENSOFIT INS 1310, 7311, 7312	
	Process temperature range	-10...+140°C / +14...+284°F
	Process pressure	Max. 10 bar / 145 psi
Ambient conditions	Ambient temperature	-10...+70°C / +14...+158°F PP: 0...+70°C / +32...+158°F
	Transport and storage temperature	-20...+70°C / -4...+158°F PP: 0...+70°C / +32...+158°F

Materials

Wetted	Assembly	Stainless Steel (1.4404, 316L); SENSOFIT INS 1000 also PP, PVDF
	Sealing	EPDM (FDA USP Class VI) or FPM (not for SENSOFIT INS 7312) FFKM (SENSOFIT INS 1000 only)
Non wetted	Protection cap	PA 6.6 GF30 (SENSOFIT INS 1310, 7311, 7312) POM (SENSOFIT INS 1000)

p/T diagram for SENSOFIT INS 1000 PVDF versions

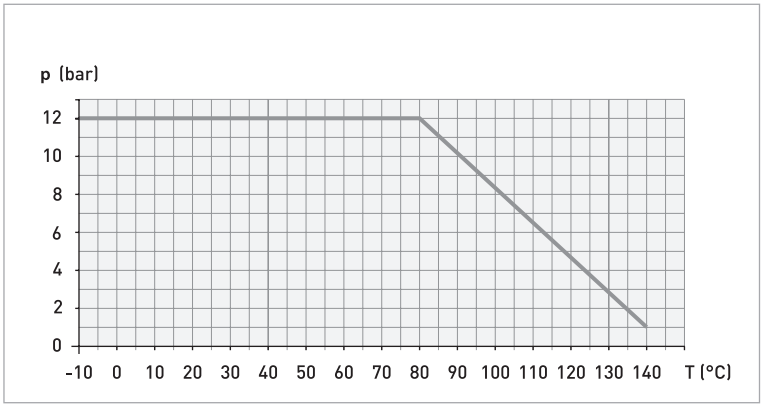

Figure 5-1: Pressure - temperature diagram (PVDF)

p/T diagram for SENSOFIT INS 1000 PP versions

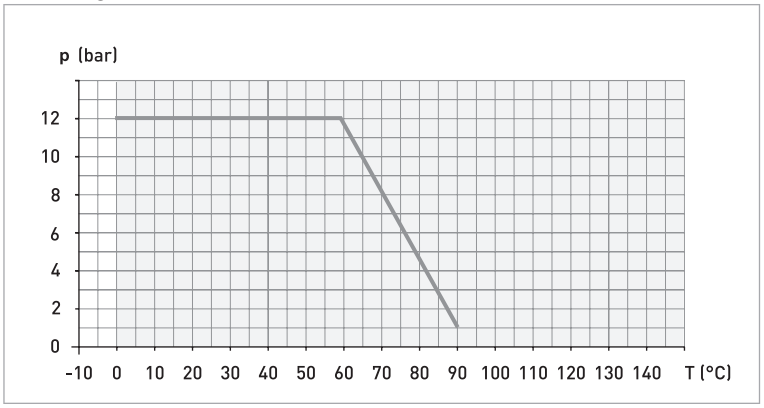

Figure 5-2: Pressure - temperature diagram (PP)

SENSOFIT INS 1000 Stainless steel versions: 12 bar from -10°...+140°C

5.2 Dimensions

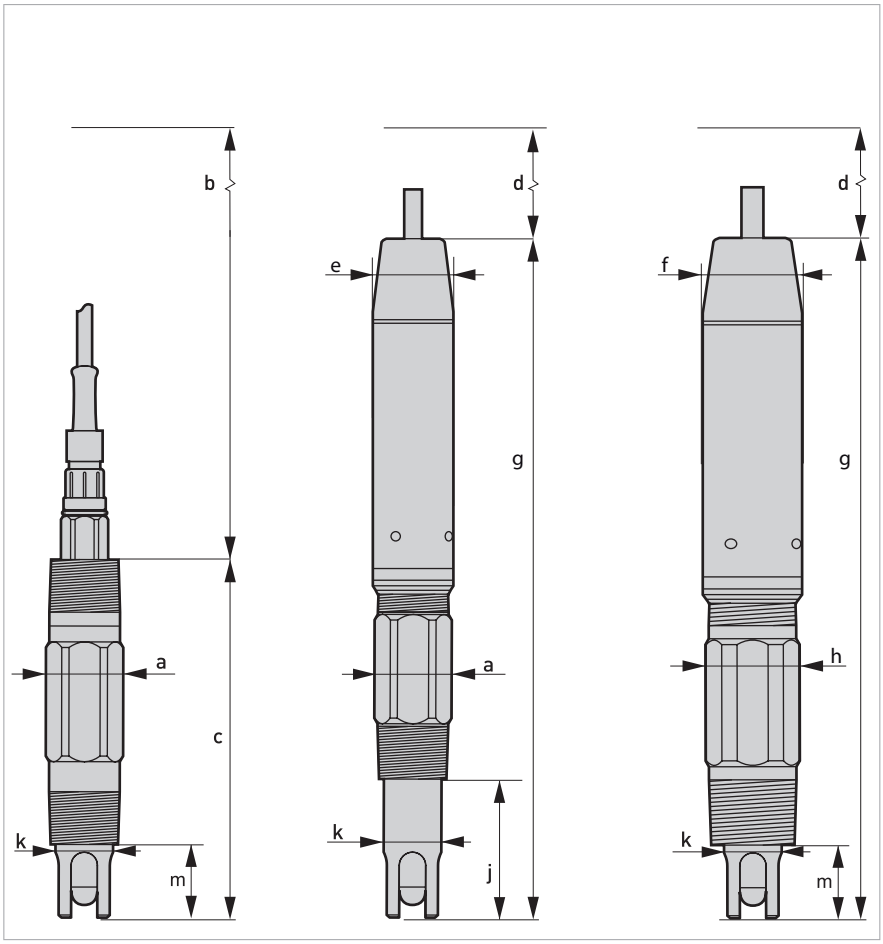

Figure 5-3: Dimensions SENSOFIT INS 1000

	[mm]	[inch]
a	29.5 (WS 27)	1.16
b	320	12.6
c	137	5.39
d	200	7.87
e	30	1.18
f	36	1.42
g	252	9.92
h	36 (WS 34)	1.42
j	53	2.09
k	22	0.87
m	28	1.1

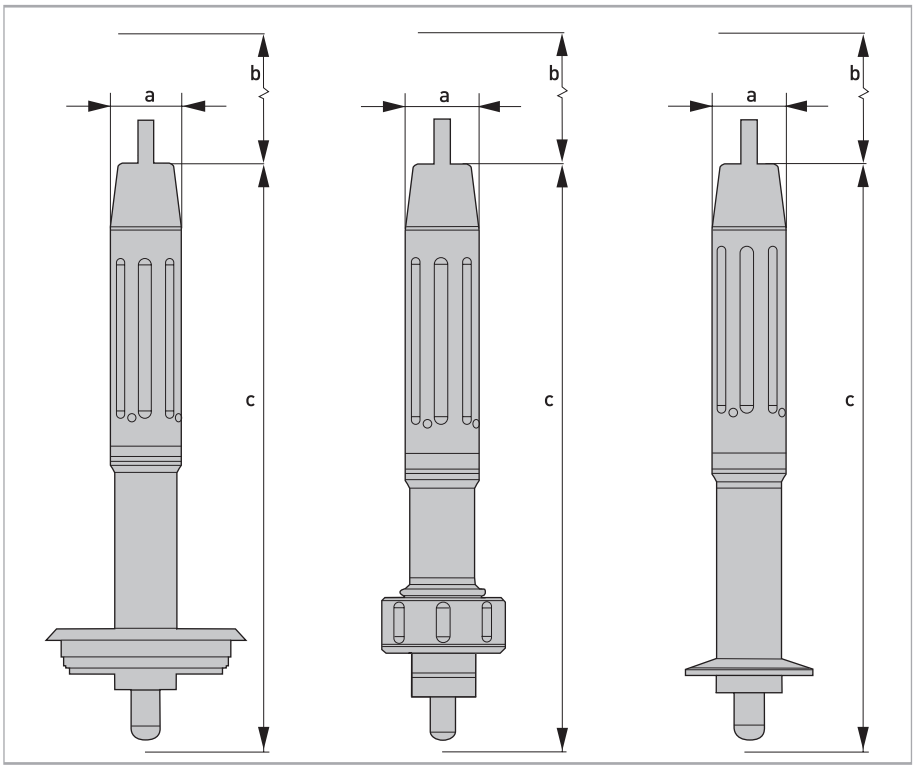

Figure 5-4: Dimensions Overview SENSOFIT INS 7312, INS 1310, INS 7311

	[mm]	[inch]
a	29	1.14
b	200	7.87
c	252	9.92

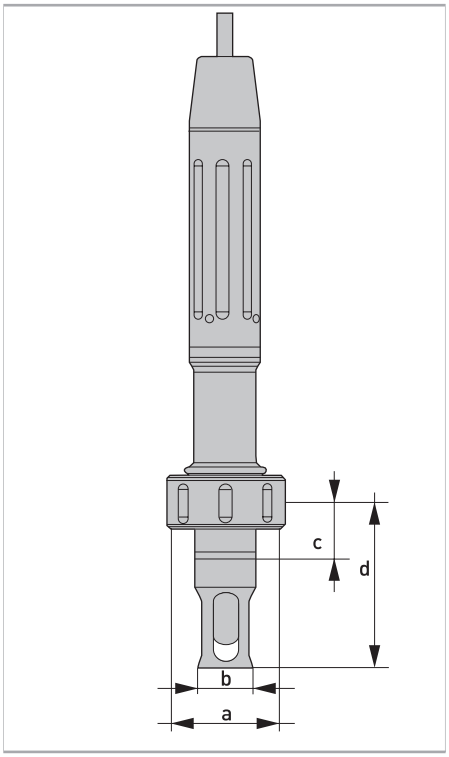

Figure 5-5: Dimensions SENSOFIT INS 1310

	[mm]	[inch]
a	G1 1/4	
b	25	0.98
c	25	0.98
d	70	2.76

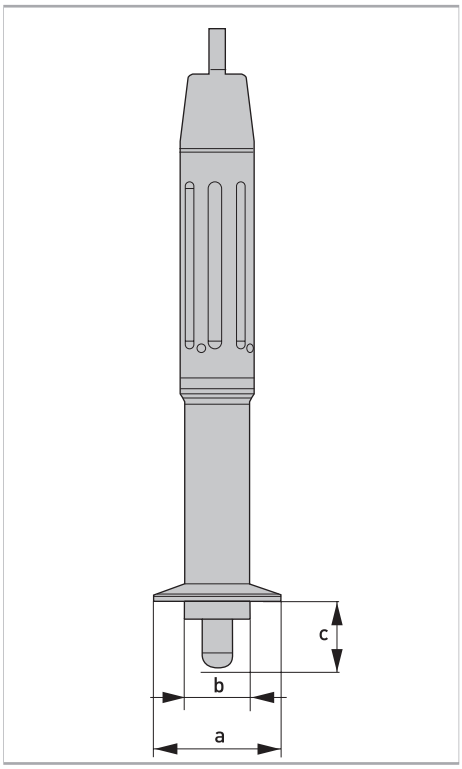

Figure 5-6: Dimensions SENSOFIT INS 7311

	[mm]	[inch]
a	50.5 / 64	1.99 / 2.52
b	25	0.98
c	45	1.77

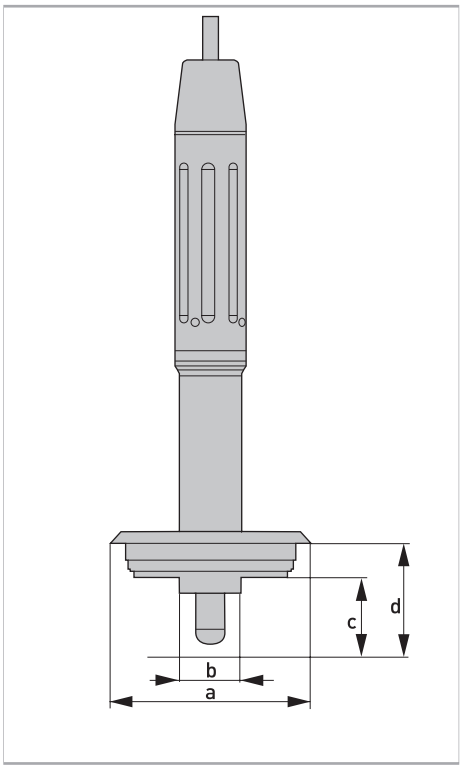

Figure 5-7: Dimensions SENSOFIT INS 7312

	[mm]	[inch]
a	84	3.31
b	25	0.98
c	40	1.57
d	52	2.05

KROHNE – Process instrumentation and measurement solutions

- Flow
- Level
- Temperature
- Pressure
- Process Analysis
- Services

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