

▲ WARNING – Failure to observe this warning may result in serious injury. The safety alert symbol on the nameplate means: Read these instructions for use, observe the Specifications, and follow the Safety Instructions.

1. Safety Instructions

1.1 All Applications

Hazards due to pressure, temperature, aggressive media or explosive atmosphere are possible, depending on the location of use. Therefore, the installation, operation, and servicing of the sensor shall only be carried out by suitably trained personnel authorized by the operating company.

1.2 Hazardous Areas

Observe all applicable local codes and standards for the installation of electrical equipment in hazardous locations. For orientation, please refer to IEC 60079-14, EU directives 2014/34/EU and 1999/92/EC (ATEX), NFPA 70 (NEC), ANSI/ISA-RP12.06.01. The electrical and thermal parameters of the sensors must be adhered to. Memosens Ex sensors are marked by an orange-red ring. Combined with a model CA/MS-***X** measuring cable or a certified measuring cable which is identical in hardware and function, the sensor may be connected to a suitable measuring device, as described in the Certificates BVS 15 ATEX E141 X and IECEx BVS 15.0114X.

2. Intended Use

The Knick oxygen sensors of the SE 707 series with Memosens® connector system are low-maintenance and pressure-resistant oxygen sensors with integrated temperature detector.

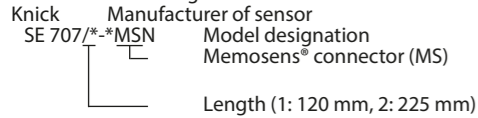
SE 707 sensors are suitable for in-line measurement of dissolved oxygen and temperature in the different fields of analytical chemistry:

- Biotechnology
- Pharmaceutical industry
- Fermentation

SE 707 sensors are suitable for sterilization and autoclaving and are CIP capable.

3. Product Description

The markings on each sensor or on the packaging label include the following information:



-5...80 °C Temperature range

The serial number is printed on and also electronically stored in the sensor head. See also enclosed quality certificate.

4. Hazardous Areas

Certificate Number:

BVS 16 ATEX E 037 X
IECEx BVS 16.0030X
JPEX DEK19.0046X

Marking:

Ex II 1G
Ex ia IIC T4 Ga
Ex ia IIC T4 Ga

Thermal Parameters:

Temp. class	Ambient temperature range Ta	Max. permissible process temperature
T4	-20 °C < Ta < +120 °C	120 °C

Special Conditions

- The cable and the sensor shall only be used within the ambient temperature range specified for the temperature class.
- The measuring cable including its connecting head must be protected from electrostatic charging if it passes through areas of Zone 0 (category 1G).
- The Memosens sensors shall not be operated in electrostatically critical processing conditions. Intense vapor or dust flows directly impacting on the connection system shall be avoided.
- Metallic process connection parts must be mounted at the installation site so that they are electrostatically conductive (< 1 MΩ).
- The sensors may only be used in liquid media with a conductivity of > 10 nS/cm.

5. Installation and Commissioning

1. On unpacking, check the sensor for mechanical damage. Report any damage to your Knick service team.
2. Prior to first use, you must fill the sensor with new electrolyte (see section 8).
3. Remove the protective cap.
4. Refer to the user manual of the relative fitting in order to install the sensor.
5. Sensor and cable are plugged together and locked by a quarter turn of the coupling ring. See function description of Memosens® cable.

Prior to first use, you must polarize the sensor. After 6 hours, the sensor is polarized and ready for operation. See section 6. Polarization for more information.

Note

As delivered, a moderate slope value is stored in the sensor. The sensor must be calibrated before first use.

6. Polarization

Prior to first use or when the sensor has been disconnected from the voltage source for longer than 5 minutes, you must polarize the sensor by connecting it to an operating transmitter and then calibrate it. Polarization time depends on the time without polarization voltage. The respective polarization times are shown in the following table.

Time without polarization voltage d [min.]	Required polarization time [min.]
d > 30	360
30 > d > 15	6 * d
15 > d > 5	4 * d
d < 5	2 * d

7. Calibration of Sensor and Transmitter

When the sensor is continuously used, you must calibrate it at regular intervals. Calibration is also required after replacement of electrolyte, membrane module or interior body.

Note: To check whether the sensor needs to be calibrated, you can take it in the air, dab it dry and check the display on the transmitter. The indicated oxygen saturation should be close to 100 %. If not, you must calibrate the sensor.

7.1 One-Point Calibration

Calibration in air with known water-vapor saturation

1. Take the sensor out of the process medium.
2. Clean the sensor body.
3. Carefully dab the membrane dry with a paper tissue.
4. Perform the calibration as instructed in the transmitter manual.

(Refer to the manual for further calibration methods.)

7.2 Two-Point Calibration

For two-point calibration, always start with the zero calibration before calibrating the slope. With two-point calibration, you achieve a higher accuracy with very low oxygen concentrations. For zero calibration, we recommend an oxygen-free medium, e.g. nitrogen with a purity level of at least 99.995 %. After the sensor signal has stabilized, the sensor and transmitter are calibrated to the zero value of the desired process variable. Please refer to the user manual of the transmitter.

8. Maintenance

The maintenance intervals depend on the sensor application. Maintenance comprises cleaning the sensor and replacing wear parts and consumables such as:

- O-rings
- Electrolyte
- Membrane module
- Interior body

8.1 Disassembly

1. Unscrew the cap sleeve from the sensor body and carefully pull it off the sensor.
 2. Pull off the membrane module from the interior body. Before replacing electrolyte, you must remove the membrane module from the cap sleeve.
 3. Rinse the interior body with distilled water and carefully dab it dry with a paper tissue.
- Perform steps 4 and 5 only when dismantling the interior body.¹⁾
4. Loosen the lock nut using a 3/8" open-end wrench.
 5. Pull the interior body out of the sensor body. (Use a plier if necessary.)

Note

Do not twist the interior body when pulling it out. The contact pins might break off.

8.2 Assembly

Perform steps 1, 2 and 3 for mounting the interior body.

1. Insert the interior body in the sensor body. Turn it until the slot in the interior body engages with the pin in the sensor body.
2. Press the interior body in the sensor body until the stop is reached. Then screw on the lock nut and tighten it using a 3/8" open-end wrench.
3. Check all O-rings for damage. Replace if necessary.
4. Half fill the membrane module with O₂ electrolyte. Make sure that there are no air bubbles in the membrane module.

Note: Air bubbles can be removed by carefully tapping on the membrane module.

▲ CAUTION!

The electrolyte is strongly alkaline. Avoid contact of electrolyte with skin, mucous membranes or eyes. Wear suitable protective gloves and goggles when servicing the sensor.

5. Slip the membrane module over the interior body while holding the sensor in a vertical position. Remove excess electrolyte with a paper tissue.

Note: Make sure that there is no electrolyte, process solution or any other contamination between membrane module and cap sleeve.

6. Carefully slip the cap sleeve over the membrane module and screw it tight.
7. **Note:** After each replacement of electrolyte, membrane module or interior body, you must repolarize (see section 6. Polarization) and recalibrate the sensor (see section 7. Calibration of Sensor and Transmitter).

9. Cleaning the Sensor

Depending on the measured medium, the sensor must be cleaned to ensure accurate measurements. You can clean the sensor body with water and a suitable brush.

Use water and a soft paper tissue to remove dirt particles from the membrane or membrane module. After cleaning, thoroughly rinse with clean water.

Note: Do not use cleaning agents or alcohol. This could damage the sensor or lead to fault currents.

10. Disposal

Observe the applicable local or national regulations concerning the disposal of "waste electrical and electronic equipment".

11. Specifications

Measuring range	pO ₂ < 1200 mbar
Detection limit	1 ppb (3 ppb in in liquids containing CO ₂)
Accuracy	1 % + 1 ppb (1% + 3 ppb in liquids containing CO ₂)
Response time at 25 °C (air -> N ₂)	98 % full scale < 90 s
Signal in ambient air	290 ... 500 nA
Residual signal in O ₂ -free medium	≤ 0.1% of signal in ambient air In CO ₂ : ≤ 0.01% of signal in ambient air
Flow dependence	≤ 5 %
Permissible pressure range (measurement)	0.2 ... 6 bar absolute
Mechanical pressure resistance	Max. 12 bar absolute
Permissible temperature range	-5 ... 80 °C
Temperature range (stability)	-5 ... 121 °C
O-ring material	Silicone (FDA & USP approved up to VI)
Membrane material	PTFE / silicone / PTFE, FDA compliant (steel-mesh reinforced)
Process-wetted sensor parts	Stainless steel, 1.4404 (material certificate 3.1)
Surface roughness	N5 (RA < 0.4 µm)
Temperature detector	NTC 22 kΩ
Interior body incl. sensing electrodes	Replaceable (ZU 0568)
Sensor connector	Memosens®

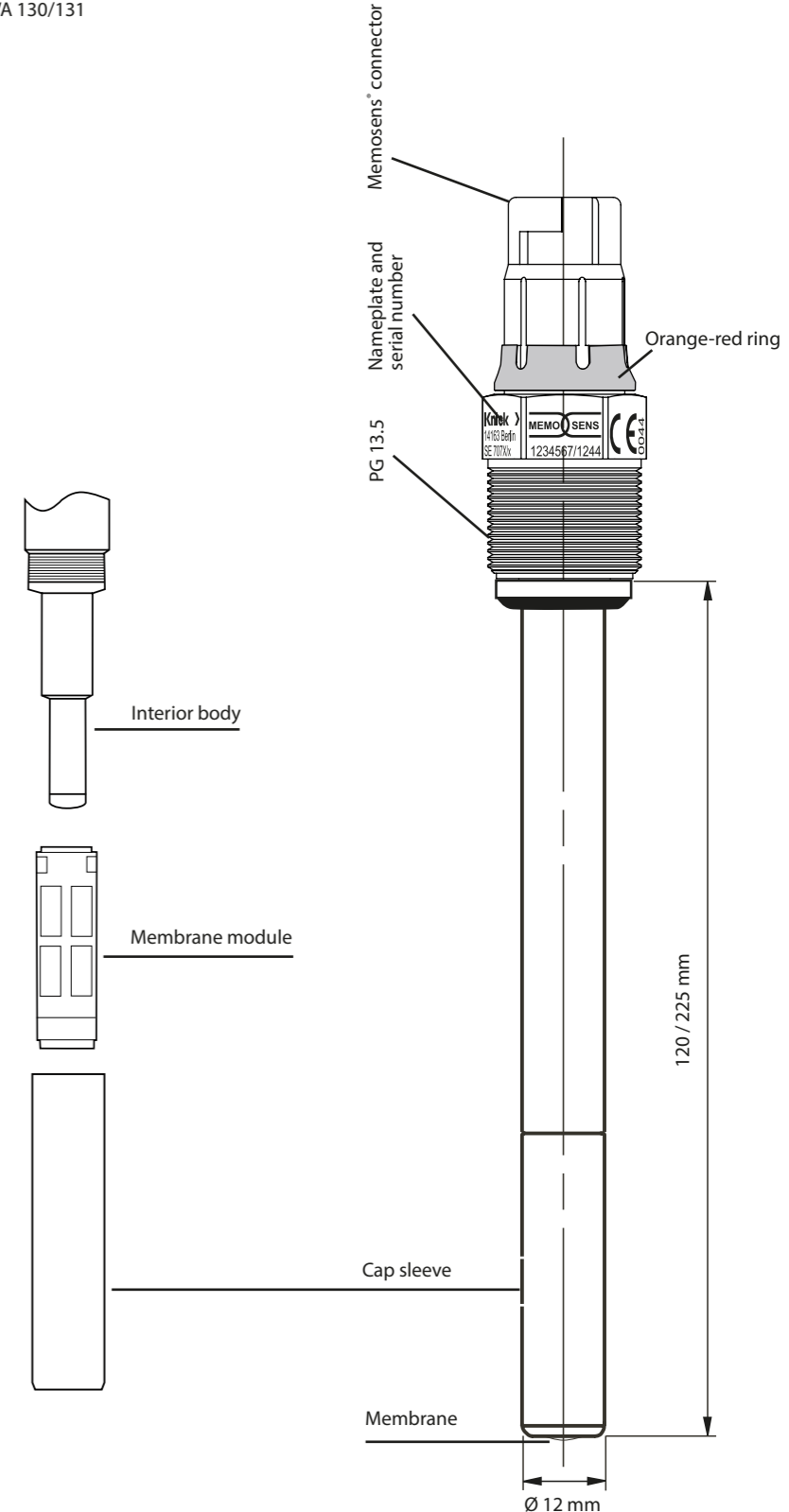
12. Accessories / Spare Parts

O ₂ membrane module, separate	ZU 0563
O ₂ membrane kit, consisting of: Membrane module (4x), O-ring set (1x), 25 ml electrolyte (1x)	ZU 0564
O ₂ electrolyte, 25 ml	ZU 0565
Interior body for SE 707	ZU 0568
O-ring set, silicone, FDA	ZU 0679

Recommended Fittings:

ARI 106
ARF 200/202
ARF 210
ARD 230
SensoGate® WA 130/131

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**Knick
Elektronische Messgeräte GmbH & Co. KG**

Headquarters

Beuckestraße 22 • 14163 Berlin, Germany
Phone: +49 30 80191-0
Fax: +49 30 80191-200
info@knick.de
www.knick.de

Local Contacts:

www.knick-international.com



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¹⁾ The interior body must only be replaced if the electrode system is poisoned or the interior body is broken.