

# Instructions for Use for the SE 557 pH Sensors



**WARNING – Failure to observe this warning may result in serious injury.**

The warning symbol on the rating plate means:

**Read these instructions for use, observe the Specifications, and follow the Safety Instructions.**

## 1 Safety Instructions

### 1.1 All Applications – All Sensor Variants

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 – All Sensor Variants

Observe the corresponding local requirements and standards for electrical installations in hazardous areas. 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.

### 1.3 Hazardous Areas – Sensors with Memosens Connector

Memosens Ex sensors are marked by an orange-red ring. The Memosens Ex sensors shall only be connected to a cable of type CA/MS-\*\*\*Y\*\* or type CA/MS-\*\*\*Y\*\*L or to an intrinsically safe and certified Memosens measuring cable which is identical in hardware and function.

### 1.4 Hazardous Areas – Sensors with VP Connector

The sensors shall only be operated with an approved device in floating, intrinsically safe circuits. The electrical input ratings of the sensors shall not be exceeded.

## 2 Intended Use

Together with a suitable fitting, the sensor is used for continuous measurement of pH values in liquid media. The SE 557 is a high-precision sensor with liquid electrolyte. It has an integrated temperature detector for automatic temperature compensation. The sensor is sterilizable.

## 3 Installation and Commissioning

1. On unpacking, check the sensor for mechanical damage. Report any damage to your Knick service team.
2. Remove the watering cap and briefly rinse the sensor with clean water. After rinsing, the sensor should only be dabbed dry with a tissue. Do not rub the pH-sensitive glass, since this can lead to electrostatic charging and sluggish response times.
3. Check the space behind the pH-sensitive glass for the presence of any air bubbles and remove them by gently swinging the sensor in a vertical plane.
4. Open the electrolyte filling hole before inserting the sensor into the fitting. Suitable fittings for operating this sensor type can be found at [www.knick-international.com](http://www.knick-international.com).
5. Install the sensor in the grounded fitting as described in the user manual of the respective fitting.
6. Connect sensor and cable.

## 4 Operation

### 4.1 Calibrating the Sensor

2-point calibration is recommended for the SE 557 sensor. First remove the watering cap. Then dip the sensor successively into two different buffer solutions with given pH values (e.g., pH 7.00 and pH 4.00) and calibrate the pH transmitter to these buffer values. Please refer to the user manual of the pH transmitter for further details.

### 4.2 Sterilizing

For application in sterile processes, such as fermentation, sterilize the sensor before starting the operating cycle. This sensor type allows the whole fermenter/reactor unit including pH sensor to be sterilized.

### 4.3 Pressurizing the Fitting

During possible sensor sterilization and during normal operation, it is important that the fitting and electrolyte pressure is adjusted to be higher than the effective pressure in the reactor vessel. This reduces the risk of process fluid getting into the sensor.

The optimal pressure difference value to keep the junctions clean and obtain acceptable electrolyte refill intervals has to be established empirically from case to case, however it should be at least 0.5 bar.

### 5 Maintenance and Cleaning

Regularly check the applied fitting overpressure during operation, and re-adjust if required. Regularly check the electrolyte level in the sensor. When reaching the end of the bulbous shaft section (reservoir), refill with electrolyte up to the indication line for max. level. Carefully rinse the sensor tip and junction with pure water after each operating cycle. Under no circumstances must measuring solution be allowed to dry on these parts!

When the sensor is not in operation, store it with sensor tip and junction well submerged in electrolyte (ZU 0958). If a sensor is stored dry for a few days by mistake, let it soak in electrolyte for several hours before use.

### 6 Accessories

Connecting cable	3 m	CA/VP6ST-003A
VP6-ST	5 m	CA/VP6ST-005A
	10 m	CA/VP6ST-010A
	20 m	CA/VP6ST-020A

### 7 Specifications

#### Model Designation

The model designation, which is printed on each sensor and on the packaging label, includes the following information:

SE 557X / 1-NMSN

#### Model designation (example)

##### Sensor material (see pH glass table)

N: Alpha glass  
H: Omega glass

##### Sensor connector

VP: VP (VarioPin)  
MS: MS (Memosens®)

##### Solution ground

N: Without

##### Length

1: 120 mm  
2: 250 mm  
4: 450 mm

##### Ex approval

X: Yes

#### Further Data

pH range	0 ... 14
Pressure, relative	-1 ... 6 bar
Junction	Ceramic (2x)
Electrolyte	ZU 0958
Reference system	Ag/AgCl
Mounting	PG 13.5
Temp detector	VP connector: Pt1000 MS connector: NTC 30 kΩ

#### pH Glass (Sensor Material)

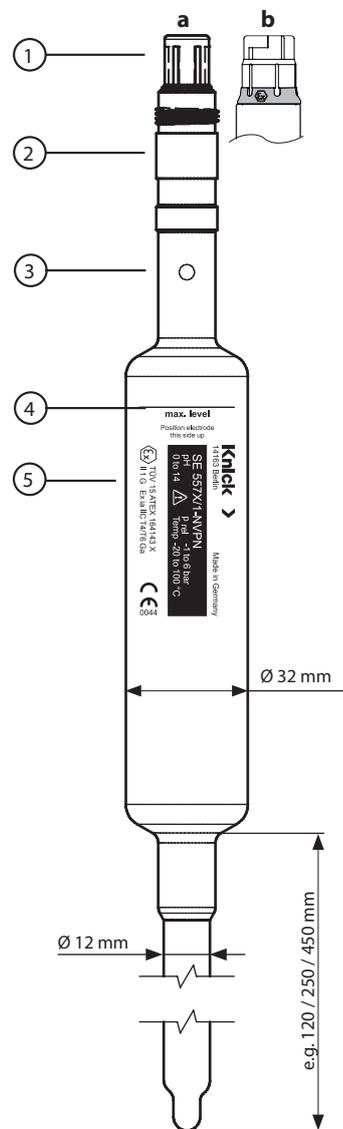
Model Code	Designation	Process temperature	Features
N:	Alpha glass	-20 ... 100 °C	(Medium impedance, universal glass, fluoride resistant)
H:	Omega glass	0 ... 135 °C	(High impedance for high-temperature applications, very low alkali error, CIP/SIP capable)

### 8 Disposal

Observe the applicable local or national regulations for disposal.

**Knick** >

Manual SE 557



- 1 Sensor connector:  
a: VP,  
b: Memosens®
- 2 Serial number
- 3 Filling hole
- 4 Maximum filling height
- 5 Rating plate

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# Hazardous Areas: Electrical and Thermal Parameters

## For Sensors with VP Connector

### Certificate number:

TÜV 15 ATEX 164143 X

### Marking:

 II 1 G Ex ia IIC T4/T6 Ga

### Electrical Parameters:

Temperature class	Maximum input voltage $U_i$	Maximum input current $I_i$	Maximum input power $P_i$
T6	12 V	100 mA	40 mW
T4	18 V	170 mA	200 mW

Permissible internal capacitance  $C_i$  negligible  
 Permissible internal inductance  $L_i$  negligible

### Thermal Parameters:

#### For the pH Sensor Type SE 557X/\*-\*VPN [-\*\*\*]:

Temperature class	Maximum input power $P_i$	Ambient temperature range of connecting head $T_a$	Permissible process temperature
T6	40 mW	-20 °C < $T_a$ < +55 °C	55 °C
T4	200 mW	-20 °C < $T_a$ < +100 °C	100 °C

#### For the pH Sensor Type SE 557X/\*-\*VPH [-\*\*\*]:

Temperature class	Maximum input power $P_i$	Ambient temperature range of connecting head $T_a$	Permissible process temperature
T6	40 mW	0 °C < $T_a$ < +55 °C	55 °C
T4	200 mW	0 °C < $T_a$ < +135 °C	135 °C

### Special Conditions

- For ambient temperature range / process temperature, see parameters.
- The temperature class depends on the ambient temperature and the input power. Observe the user manual.
- Metallic process connection parts shall be connected to the local equipotential bonding. The intrinsically safe circuit is connected to ground. Along this intrinsically safe circuit, potential equalization must exist.

## For Sensors with Memosens Connector

### Certificate number:

BVS 09 ATEX E088 X

### Marking:

 II 1 G Ex ia IIC T3/T4/T6

### Thermal Parameters:

#### For the pH Sensor Type SE 557X/\*-\*MSN

Temperature class	Ambient temperature range of connecting head $T_a$	Permissible process temperature
T6	-20 °C < $T_a$ < +70 °C	70 °C
T4	-20 °C < $T_a$ < +120 °C	100 °C
T3	-20 °C < $T_a$ < +135 °C	100 °C

#### For the pH Sensor Type SE 557X/\*-\*MSH [-\*\*\*]

Temperature class	Ambient temperature range of connecting head $T_a$	Permissible process temperature
T6	-20 °C < $T_a$ < +70 °C	70 °C
T4	-20 °C < $T_a$ < +120 °C	120 °C
T3	-20 °C < $T_a$ < +135 °C	135 °C

### Special Conditions

- The cable and the sensor shall only be used within the ambient temperature range specified for the temperature class.
- Do not operate the Memosens sensors under electrostatically adverse process conditions. Prevent strong vapor and dust streams from acting directly on the connection system.