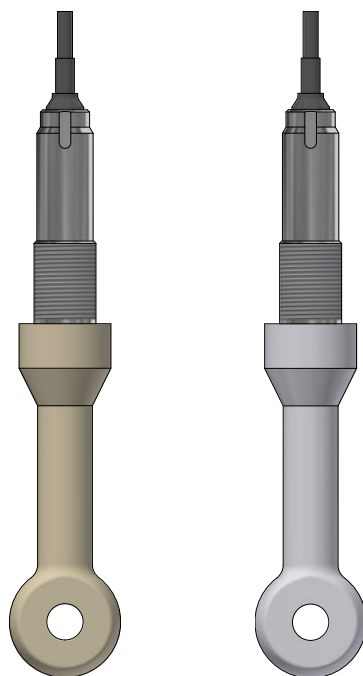


User Manual**SE655/SE656****Toroidal Conductivity Sensor**

Read before installation.
Keep for future use.



www.knick-international.com

Supplemental Directives

READ AND SAVE THIS DOCUMENT FOR FUTURE REFERENCE. BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT, PLEASE ENSURE A COMPLETE UNDERSTANDING OF THE INSTRUCTIONS AND RISKS DESCRIBED HEREIN. ALWAYS OBSERVE ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS IN THIS DOCUMENT COULD RESULT IN SERIOUS INJURY AND/OR PROPERTY DAMAGE. THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

These supplemental directives explain how safety information is laid out in this document and what content it covers.

Safety Chapter

This document’s safety chapter is designed to give the reader a basic understanding of safety. It illustrates general hazards and gives strategies on how to avoid them.

Warnings

This document uses the following warnings to indicate hazardous situations:

Icon	Category	Meaning	Remark
	WARNING!	Designates a situation that can lead to death or serious (irreversible) injury.	The warnings contain information on how to avoid the hazard.
	CAUTION!	Designates a situation that can lead to slight or moderate (reversible) injury.	
<i>Without</i>	NOTICE!	Designates a situation that can lead to property or environmental damage.	

Symbols Used in this Document

Icon	Meaning
	Reference to additional information
	Interim or final result in instructions for action
	Sequence of figures attached to an instruction for action
	Item number in a figure
(1)	Item number in text

Table of Contents

1 Safety	5
1.1 Intended Use	5
1.2 Personnel Requirements	5
1.3 Residual Risks	6
1.4 Hazardous Substances	6
1.5 Operation in Hazardous Locations	7
1.5.1 Electrical and Thermal Parameters for Digital Sensors in Potentially Explosive Atmospheres	7
1.5.2 Electrical and Thermal Parameters for Analog Sensors in Potentially Explosive Atmospheres	9
2 Product	10
2.1 Package Contents	10
Product Identification	10
2.2 Nameplates	11
2.3 Symbols and Markings	12
2.4 Design and Function	13
2.5 Measuring Principle	16
3 Installation	17
3.1 General Installation Instructions	17
3.1.1 Sensor Installation	17
3.2 Installation in Piping	19
3.3 Electrical Installation	20
3.3.1 General Information on Electrical Installation	20
3.3.2 Sensor Cable	20
4 Operation, Cleaning and Calibration	21
4.1 Operation	21
4.2 Cleaning	21
4.3 Calibration	21
5 Decommissioning	22
5.1 Removing the Sensor	22
5.2 Disposal	22

6 Accessories 23

7 Dimension Drawings 24

8 Specifications 25

1 Safety

This document contains important instructions for the use of the product. Always follow all instructions and operate the product with caution. If you have any questions, please contact Knick Elektronische Messgeräte GmbH & Co. KG (hereinafter sometimes referred to as “Knick”) using the information provided on the back page of this document.

Hazards due to pressure, temperature, aggressive media, or explosive atmospheres are possible, depending on the location of use.

1.1 Intended Use

The SE65* sensor (hereafter also called “product”) is used for continuous inductive conductivity measurement in aqueous process media.

Digital sensor SE65**-GE***0*M	Digital conductivity measurement
Analog sensor SE65**	Analog conductivity measurement

The defined rated operating conditions must be observed when using this product.
→ *Specifications, p. 25*

USE CAUTION AT ALL TIMES WHEN INSTALLING, USING, MAINTAINING OR OTHERWISE INTERACTING WITH THE PRODUCT. ANY USE OF THE PRODUCT EXCEPT AS SET FORTH HEREIN IS PROHIBITED, AND MAY RESULT IN SERIOUS INJURY OR DEATH, AS WELL AS DAMAGE TO PROPERTY. THE OPERATING COMPANY SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGES RESULTING FROM OR ARISING OUT OF AN UNINTENDED USE OF THE PRODUCT.

The SE65*X version is certified for operation in potentially explosive atmospheres.
→ *Operation in Hazardous Locations, p. 7*

1.2 Personnel Requirements

The operating company shall ensure that any personnel using or otherwise interacting with the product is adequately trained and has been properly instructed.

The operating company shall comply and cause its personnel to comply with all applicable laws, regulations, codes, ordinances, and relevant industry qualification standards related to product. Failure to comply with the foregoing shall constitute a violation of operating company’s obligations concerning the product, including but not limited to an unintended use as described in this document.

1.3 Residual Risks

The product has been developed and manufactured in accordance with generally accepted safety rules and regulations. The SE65* sensor was subjected to a risk assessment. Nevertheless, not all risks can be sufficiently reduced; the following residual risks remain:

Environmental Influences

The effects of pressure, moisture, corrosion, chemicals, and ambient temperature can negatively impact on safe operation of the product.

Observe the following instructions:

- Only operate the SE65* sensor in compliance with the stated operating conditions.
→ *Specifications, p. 25*
- If using chemically aggressive process media, regularly check the SE65* sensor for damage.
- Clinging and sticky process media could negatively influence the measurements. Remove clinging substances at regular intervals. In case of heavy soiling, calibrate the SE65* sensor. → *Cleaning, p. 21* → *Calibration, p. 21*

1.4 Hazardous Substances

IN THE EVENT OF ANY CONTACT WITH HAZARDOUS SUBSTANCES OR OTHER INJURY HEREUNDER, SEEK IMMEDIATE MEDICAL ATTENTION OR FOLLOW APPLICABLE PROCEDURES TO ADDRESS HEALTH AND SAFETY OF PERSONNEL. FAILURE TO SEEK IMMEDIATE MEDICAL ATTENTION MAY RESULT IN SERIOUS INJURY OR DEATH.

In certain situations (e.g., sensor replacement), personnel may come into contact with the following hazardous substances:

- Process medium
- Cleaning medium

The operating company is responsible for conducting a job hazard analysis.

See the relevant manufacturers' safety datasheets for hazard and safety instructions on handling hazardous substances.

1.5 Operation in Hazardous Locations

The analog and digital SE65*X-* sensors are certified for operation in potentially explosive atmospheres.

Observe all applicable local and national codes and standards for the installation of equipment in explosive atmospheres. For further guidance, consult the following:

- 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.

1.5.1 Electrical and Thermal Parameters for Digital Sensors in Potentially Explosive Atmospheres

Connection Options:

The SE65*X-* digital sensor is approved for operation in Ex zone 0 (1G) specified environments.

The max. measuring cable length is 100 m.

Certificate Number	Marking
BVS 20 ATEX E 113 X	 II 1G Ex ia IIC T4/T6 Ga
IECEx BVS 20.0087X	Ex ia IIC T4/T6 Ga

Electrical Parameters

The sensor has the following connection values:

Voltage U_i	5.1 V DC
Current strength I_i	130 mA
Output P_i	166 mW
Capacity C_i	18 μ F
Inductance L_i	0.72 μ H/m

The SE65*X-* digital sensor may only be connected to an:

- ATEX/IECEX-approved Memosens sensor output from the Stratos, Protos and Portavo product families
- ATEX/IECEX-approved, intrinsically safe Memosens sensor output that does not supply more than the maximum values listed above.

Thermal Parameters

Suitable measures must be implemented to ensure that the temperature of the sensor connection head and cable are decoupled from the process temperature.

The sensors are suitable for use in the following ambient and process temperature ranges:

Temperature Class	Ambient Temperature Range Sensor Head and Cable	Maximum Permissible Process Temperature
T4	$-20\text{ }^{\circ}\text{C} < T_a < 60\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F} < T_a < 140\text{ }^{\circ}\text{F}$)	$-20\text{ }^{\circ}\text{C} < T_a < 110\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F} < T_a < 230\text{ }^{\circ}\text{F}$)
T6	$-20\text{ }^{\circ}\text{C} < T_a < 60\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F} < T_a < 140\text{ }^{\circ}\text{F}$)	$-20\text{ }^{\circ}\text{C} < T_a < 70\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F} < T_a < 158\text{ }^{\circ}\text{F}$)

Specific Conditions of Use

- Metallic process connection parts must be mounted electrostatically conductive at the mounting location ($< 1\text{ M}\Omega$).
- Memosens sensors must only be used in liquids with a minimum conductivity of 10 nS/cm .
- Non-metallic process connection parts must be protected against electrostatic charging.
- The sensor cable must be protected against electrostatic charging if it is routed through areas requiring EPL-Ga equipment.

1.5.2 Electrical and Thermal Parameters for Analog Sensors in Potentially Explosive Atmospheres

Certificate Number	Marking
DMT 01 ATEX E 088 X	 II 1G Ex ia IIC T4/T6 Ga

The SE65*X-* analog sensor may be connected to the intrinsically safe sensor output circuits of the following devices (maximum sensor cable length = 55 m):

- Modular process analysis systems described in KEMA 03ATEX2530 of the Protos series with Protos type CONDI 3400X-05* module
- Industrial transmitters described in KEMA 08ATEX0100 of the Stratos series with the type MK_CONDI measuring module
- Stratos type 22*2 X Condi transmitters described in TÜV 99 ATEX 1431.

Thermal Parameters

Temperature Class	Ambient Temperature Range Sensor Head and Cable	Maximum Permissible Process Temperature
T4	-20 °C < T _a < 125 °C (-4 °F < T _a < 257 °F)	-20 °C < T _a < 125 °C (-4 °F < T _a < 257 °F)
T6	-20 °C < T _a < 75 °C (-4 °F < T _a < 167 °F)	-20 °C < T _a < 75 °C (-4 °F < T _a < 167 °F)

Specific Conditions of Use

- Metallic process connection parts must be mounted electrostatically conductive at the mounting location (< 1 MΩ).
- Memosens sensors must only be used in liquids with a minimum conductivity of 10 nS/cm.
- Non-metallic process connection parts must be protected against electrostatic charging.
- The sensor cable must be protected against electrostatic charging if it is routed through areas requiring EPL-Ga equipment.

2 Product

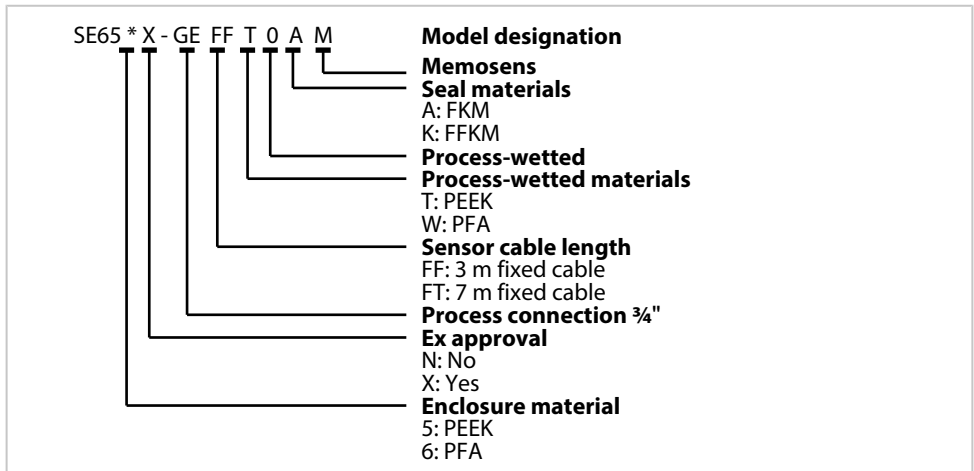
2.1 Package Contents

- SE65* in the version ordered
- Shielding
- Hexagon nut A/F 36
- O-ring 30 × 2.5 mm
- User Manual
- Quality certificate
- Control Drawing¹⁾
- EU Declaration of Conformity¹⁾

Product Identification

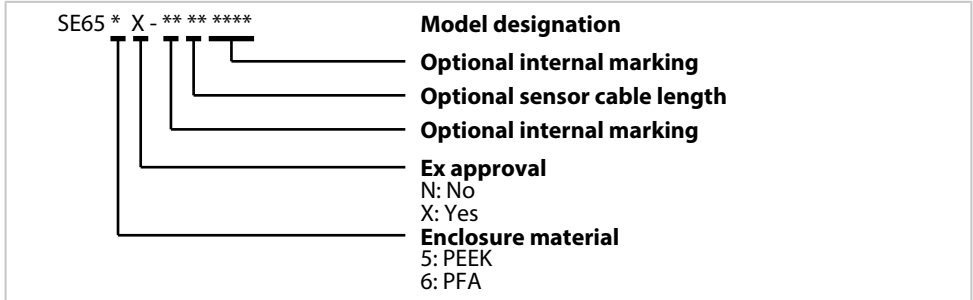
The various versions of the SE65* product are coded in a model designation.

Digital sensor SE65*



¹⁾ Only for versions certified for operation in hazardous locations.

Analog sensor SE65*

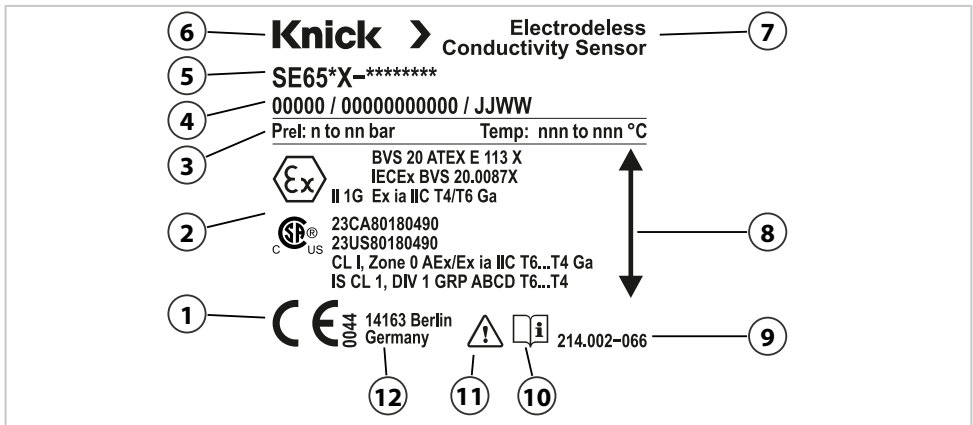


2.2 Nameplates

The body of the SE65* sensor is marked with a nameplate.

Nameplate, Version with Ex Approval

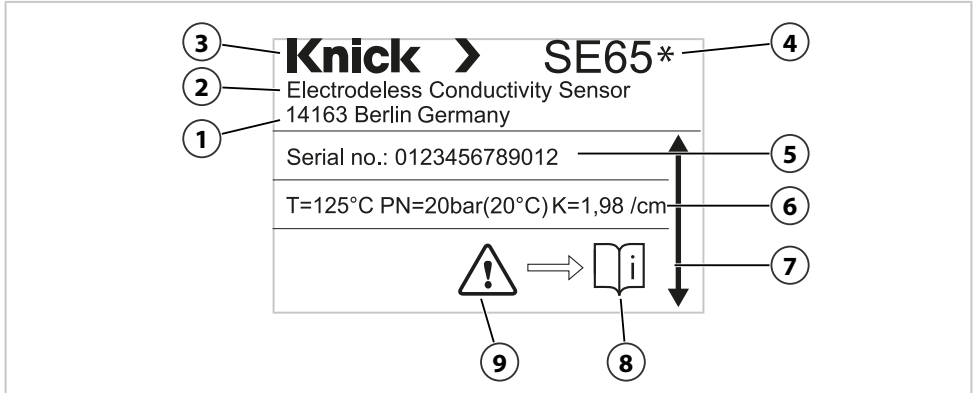
Note: The figure shows an example nameplate in the SE65*X version.



1 CE mark with identification number	7 Product family
2 Approval information	8 Position of sensor in direction of flow
3 Permitted pressure and temperature range	9 Drawing number of the Control Drawing
4 Item number/serial number/production year, production week; YYWW	10 Reference to product documentation
5 Product designation	11 Special conditions and danger points
6 Manufacturer	12 Manufacturer address

Nameplate, Version Without Ex Approval

Note: The figure shows an example nameplate of the SE65*N version



1 Manufacturer address	6 Maximum process temperature, nominal pressure, cell factor
2 Product family	7 Position of sensor in direction of flow
3 Manufacturer	8 Reference to product documentation
4 Product designation	9 Special conditions and danger points
5 Serial number	

2.3 Symbols and Markings



Special conditions and danger points! Observe the safety instructions and instructions on safe use of the product as outlined in the product documentation.



Refer to the product documentation.



CE mark with identification number¹⁾ of the notified body involved in the production control.



ATEX marking¹⁾ of the European Union for operation in hazardous locations
→ *Operation in Hazardous Locations, p. 7*



CSA mark for operation in potentially explosive atmospheres in the USA and Canada



The symbol on Knick products means that waste devices must be disposed of separately from unsorted municipal waste.

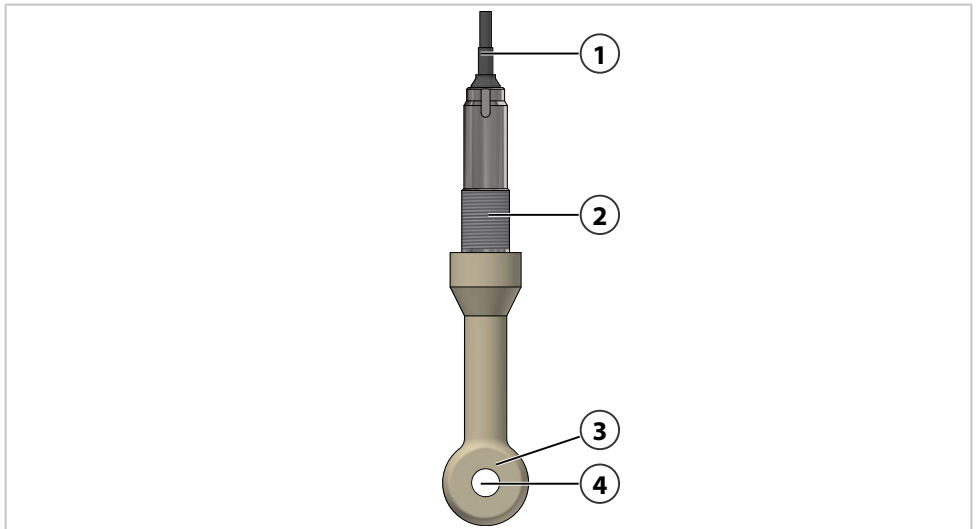
¹⁾ Dependent on the ordered version

2.4 Design and Function

Product properties of the SE65* sensor

- Inductive measuring principle with primary and secondary coil
- Analog or digital electrical connection
- Integrated temperature detector

Note: The temperature detector measures the temperature as secondary measured value. This measurement is primarily intended for automatic compensation of the measured value and not for regulating and controlling the process temperature.

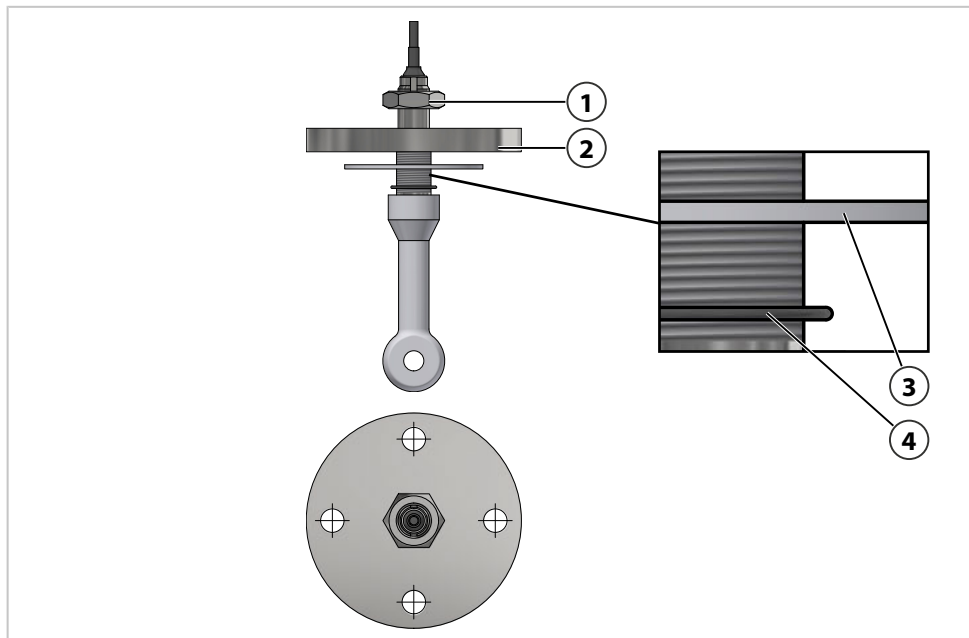


1 Sensor cable

2 Connection thread $\frac{3}{4}$ "

3 Measuring coils (primary and secondary coil)

4 Perfusion opening

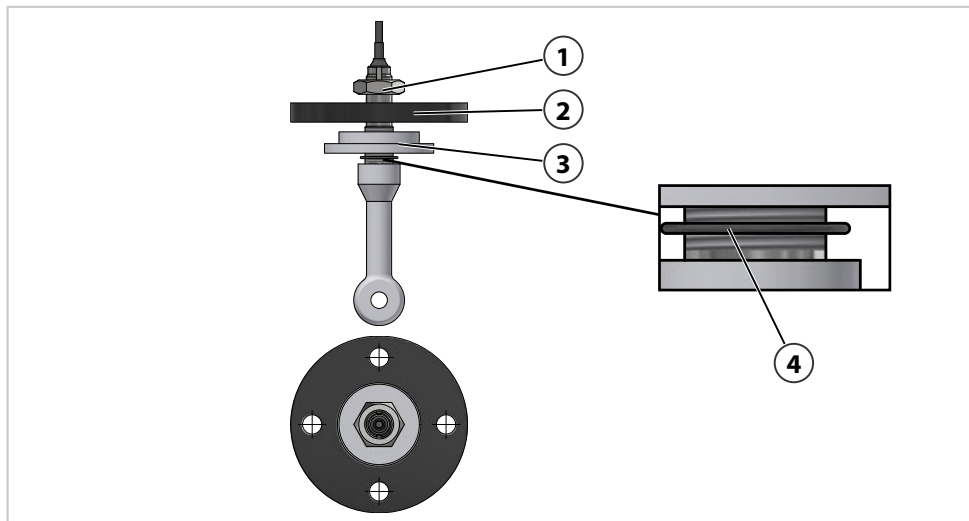
Setup with ZU0343 Flange DN 50 PN 16 and ZU0342N Seal Kit C

1 Hexagon nut A/F 36

2 Flange

3 PTFE washer

4 O-ring 30 x 2.5 mm

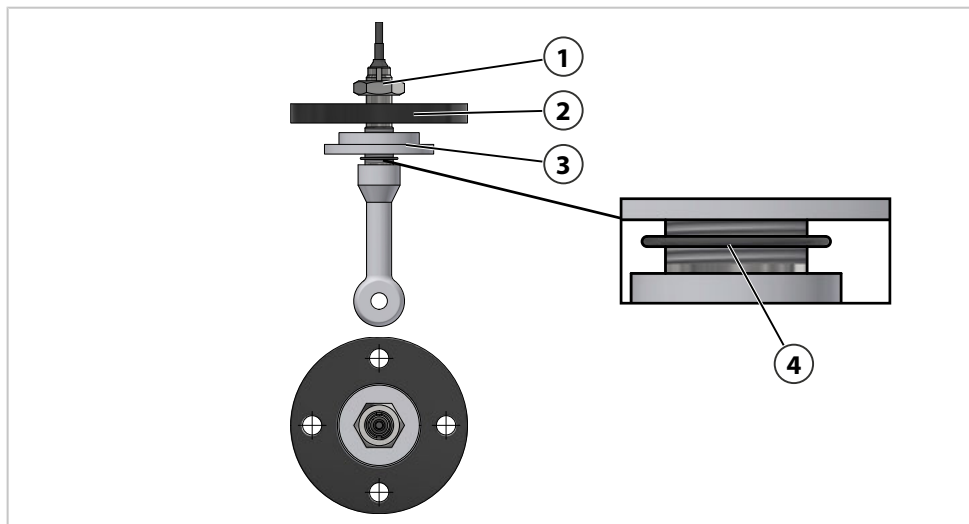
Setup with ZU0344 Flange Set DN 50 PN 10

1 Hexagon nut A/F 36

3 Flange bushing

2 Loose flange

4 O-ring 30 x 2.5 mm

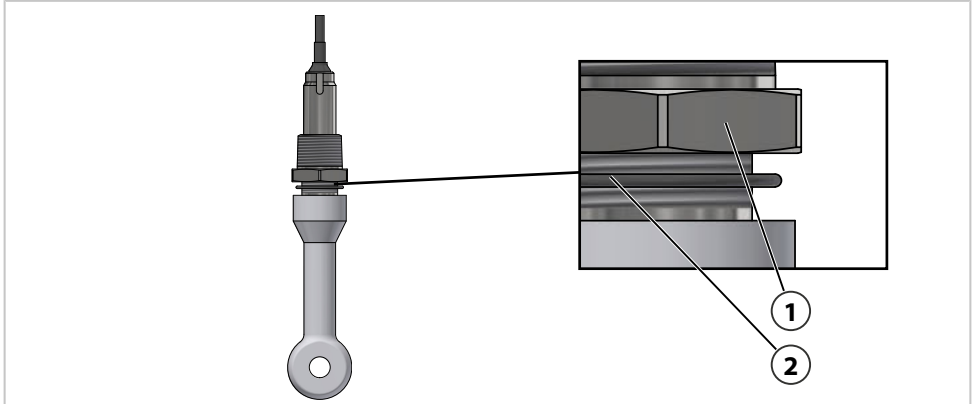
Setup with ZU1035 Flange Set ANSI 2" 150 lbs

1 Hexagon nut A/F 36

3 Flange bushing

2 Loose flange

4 O-ring 30 x 2.5 mm

Setup with ZU1046 or ZU1052 Adapter NPT 1"

1 Adapter NPT 1" ZU1046

2 O-ring 30 x 2.5 mm

2.5 Measuring Principle

Inductive, contactless conductivity measurements involve an oscillator in the primary coil generating an alternating magnetic field. This induces current flow in the process medium, whereby the current intensity is dependent on the concentration of charge carriers (ions) in the process medium. The current flow in the process medium generates a magnetic field in the secondary coil. Conductivity is then determined in the analyzer from the resulting induced current.

Note: Keep the flow-through opening free of deposits. → *Cleaning, p. 21*

3 Installation

3.1 General Installation Instructions

Installation options:

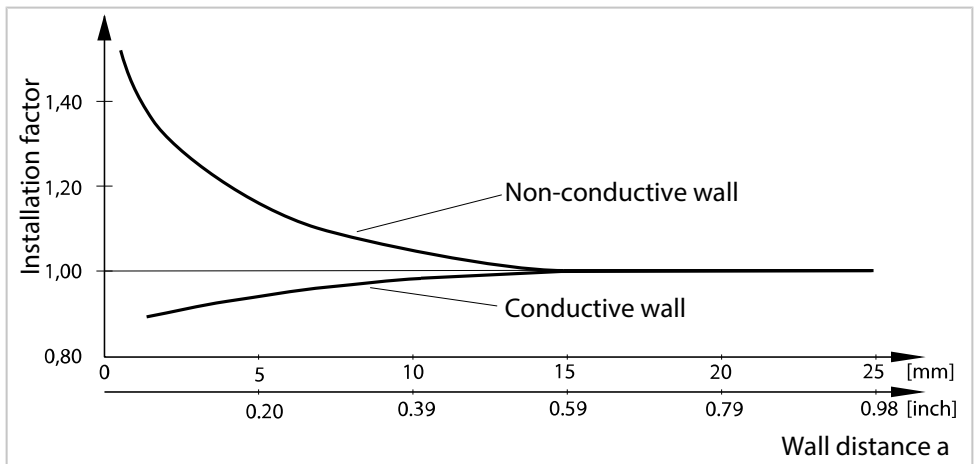
- Piping
- Bypass systems

Note: If the SE65* sensor is combined with products from other manufacturers, the tightness to the process must be tested and evaluated.

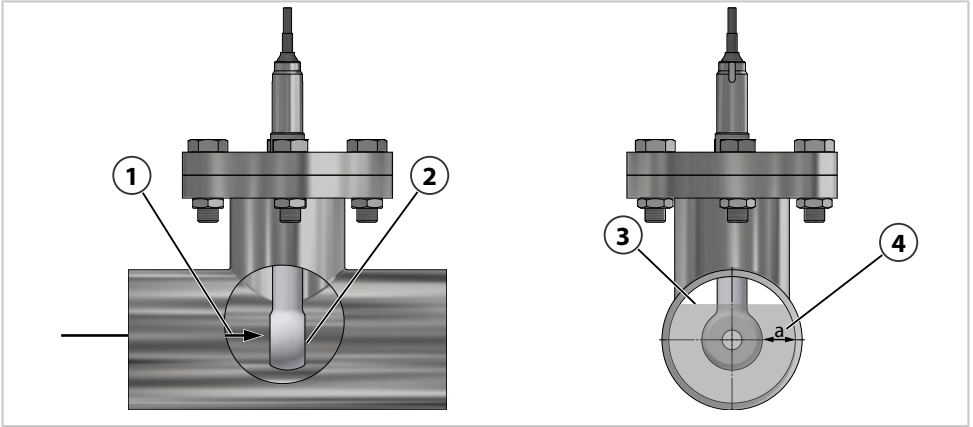
3.1.1 Sensor Installation

When installing the SE65* sensor, the following conditions apply:

- Align the perfusion opening to the flow direction of the process medium.
- Observe the immersion depth of the measuring coils! The measuring coils must be completely exposed to a flow of process medium. → *Design and Function, p. 13*
- Comply with a minimum distance to the pipe wall of 15 mm or take the installation factor into account.



Note: If the minimum distance is less than 15 mm, the installation factor is reduced for conductive walls and increased for non-conductive walls.



1 Flow direction of process medium

2 Alignment of perfusion opening

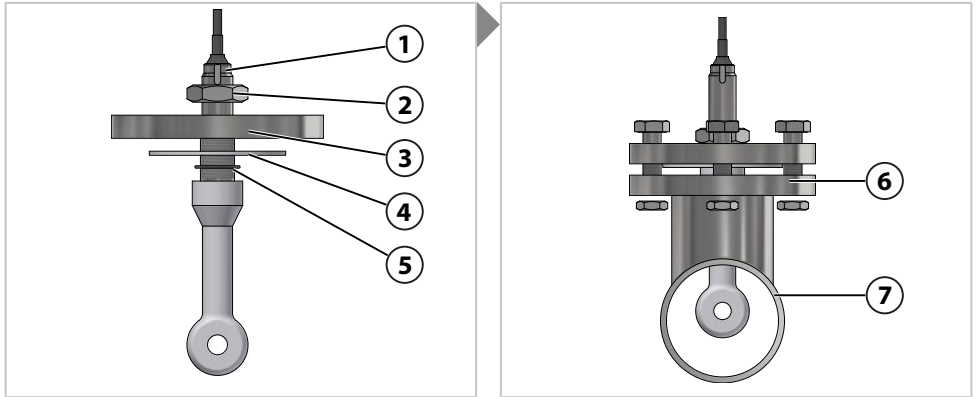
3 Level of process medium

4 Distance to pipe wall ($a = 15 \text{ mm}$)

3.2 Installation in Piping

⚠ CAUTION! When removing the sensor, process medium that contains hazardous substances may escape. Depressurize the process and, if necessary, drain off process medium prior to installing, replacing, or removing the sensor.

Note: This document only describes installation with flange ZU0343 and PTFE washer ZU0342N. Adjust the installation steps if other accessories are chosen.



01. Check the SE65* **(1)** sensor and O-ring 30 x 2.5 mm **(5)** for damage.
02. Check the distance to the pipe wall **(7)**. If the distance is less than 15 mm, adjust the installation factor. → *Sensor Installation, p. 17*
03. Slide O-ring 30 x 2.5 mm **(5)**, PTFE washer ZU0342N **(4)** if required and flange ZU0343 **(3)** onto the sensor **(1)**.
04. Tighten nut A/F 36 **(2)**. Tightening torque 20 Nm.
05. Tightly screw the pre-mounted sensor onto the flange **(6)** of the pipe using screws, nuts and washers.
06. Check the tightness.

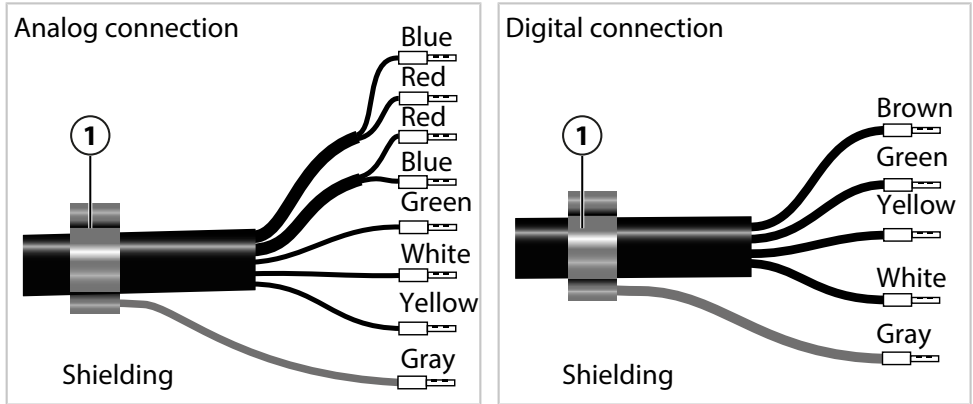
3.3 Electrical Installation

3.3.1 General Information on Electrical Installation

The SE65* sensor is electrically connected to a transmitter.

Note: For more information on Knick transmitters, see: → www.knick-international.com

3.3.2 Sensor Cable



01. Guide the sensor cable through the cable gland of the transmitter.
02. Use the clip **(1)** to clamp the shielding cable included in the package contents to the exposed shielding braid of the cable.
03. Establish an electrical connection between the sensor and transmitter. See the user manual of the transmitter.

4 Operation, Cleaning and Calibration

4.1 Operation

Depending on the process medium, the SE65* sensor must be cleaned and calibrated at regular intervals.

Note: The operating company specifies the corresponding cleaning and calibration intervals.

4.2 Cleaning

If there are thick deposits, clean the SE65* sensor.

01. Soften and dissolve coatings and deposits, e.g., with water or diluted hydrochloric acid.
02. Remove coatings and deposits using a soft brush.
03. Rinse the sensor with water and dry.

Recommended Cleaning Media

Soiling	Cleaning Medium
Water-soluble substances	Deionized water
Greases and oils	Warm water and household detergent
Heavy soiling	Ethanol or isopropyl alcohol
Limescale and hydroxide coatings	Acetic acid (5 %), alternatively hydrochloric acid (1 %)

4.3 Calibration

⚠ WARNING! For process media that contain hazardous substances: The sensor has direct contact with the process medium. Rinse and clean the SE65* after removing it from the process medium. Follow the information on hazardous substances.

⚠ CAUTION! When removing the sensor, process medium that contains hazardous substances may escape. Depressurize the process and, if necessary, drain off process medium prior to installing, replacing, or removing the sensor.

01. Remove the sensor.
02. Clean, rinse, and dry the sensor. → *Cleaning, p. 21*
03. Immerse the sensor in the conductivity standard.
04. Use the transmitter to calibrate the SE65* sensor and adjust if necessary.
See the user manual of the transmitter.

Note: For more information on Knick transmitters, see:
→ www.knick-international.com

5 Decommissioning

5.1 Removing the Sensor

⚠ WARNING! For process media that contain hazardous substances: The sensor has direct contact with the process medium. Rinse and clean the SE65* after removing it from the process medium. Follow the information on hazardous substances.

⚠ CAUTION! When removing the sensor, process medium that contains hazardous substances may escape. Depressurize the process and, if necessary, drain off process medium prior to installing, replacing, or removing the sensor.

01. Remove the sensor cable from the transmitter.
02. Remove the flange¹⁾ and remove the sensor.
03. Seal the process connection suitably.

5.2 Disposal

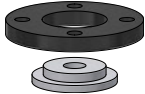
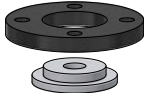
To dispose of the product properly, follow the local regulations and laws.

Customers can return their electrical and electronic waste devices.

For details on how to return and dispose of electrical and electronic devices in an environmentally friendly manner, please refer to the manufacturer's declaration on our website. If you have any queries, suggestions, or questions about how Knick recycles electrical and electronic waste devices, please send us an email: → support@knick.de

¹⁾ Only if using accessories. → *Accessories*, p. 23

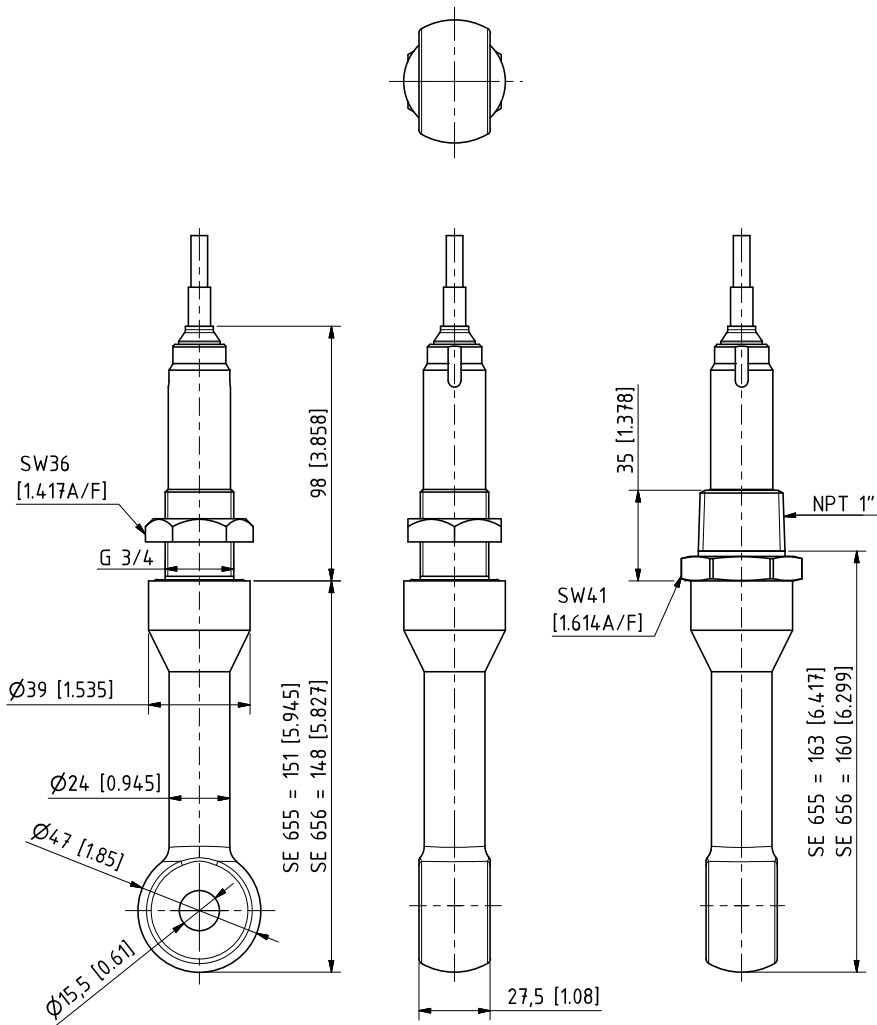
6 Accessories

ohne Abbildung	Conductivity Standard CS-C12880K/ 500
	Measured value: 12.88 MS/cm at 25 °C (77 °F) $\pm$ 1.5 % Volume size: 500 ml Order No.: CS-C12880K/500
	ZU0340N Seal Kit A Hexagon nut A/F 36 O-ring 30 x 2.5 mm; FKM (3 pc.)
	ZU0341N Seal Kit B Hexagon nut A/F 36 O-ring 30 x 2.5 mm; FFKM (1 pc.)
	ZU0342N Seal Kit C Flange protector DN 50; PTFE
	ZU0343 Flange DN 50 PN 16¹⁾ Flange DN 50; stainless steel 316L
	ZU0344 Flange Set DN 50 PN 10 Loose flange DN 50; flange bushing; PVDF
	ZU1035 Flange Set ANSI 2" 150 lbs Loose flange ANSI 2; flange bushing; PVDF
	ZU1046 Adapter NPT 1" Adapter NPT 1"; stainless steel
	ZU1052 Adapter NPT 1" Adapter NPT 1"; PEEK

¹⁾ For aggressive process media, use seal kit C (ZU0342N).

7 Dimension Drawings

Note: All dimensions are listed in millimeters [inches].



8 Specifications

Cell Factor¹⁾	
Digital sensor	1.98 /cm
Analog sensor	Approx. 2 /cm
Transfer Ratio	
Analog sensor	120.0
Measuring Range	
	0 ... 2000 mS/cm
Resolution	
Digital sensor	0.002 mS/cm
Analog sensor	0.001 mS/cm
Measurement Uncertainty	
-20 ... 100 °C (-4 ... 212 °F)	± (0.005 mS/cm +0.5 % of measured value)
> 100 °C (212 °F)	± (0.010 mS/cm +0.5 % of measured value)
Temperature Response Time t₉₀	
SE655	Approx. 7 min
SE656	Approx. 11 min
Temperature Detector	
Digital sensor	Pt1000
Analog sensor	Pt100
Process Conditions	
Process Temperature	
Digital sensor	-20 ... 110 °C (-4 ... 230 °F)
Analog sensor	-20 ... 125 °C (-4 ... 257 °F)
Process Pressure	
Digital sensor	0 ... 20 bar (0 ... 290 psi)
Analog sensor	0 ... 16 bar (0 ... 232 psi)
Ambient Conditions	
Ambient temperature, operation	
Digital sensor	-20 ... 60 °C (-4 ... 140 °F)
Analog sensor	-20 ... 70 °C (-4 ... 158 °F)
Ambient temperature transport/storage	
	-20 ... 80 °C (-4 ... 176 °F)

¹⁾ Depends on distance to pipe wall. → *Sensor Installation*, p. 17

Material	
Sensor body	
SE655	PEEK
SE656	PFA
O-rings 30 × 2.5 mm	FKM EPDM-FDA FFKM
Process Connection	G ¾"
Electrical Connection	Fixed cable with ferrules
Cable Lengths¹⁾	
Digital sensor SE655N-GEFFT0AM	3 m
Digital sensor SE65**-GEFT*0*M	7 m
Analog sensor	5 m
Degree of Protection²⁾	IP68
Dimensions	See dimension drawing
Weight	Approx. 1 kg

¹⁾ Other lengths on request

²⁾ Applies only in installed state with original O-rings.



Knick
Elektronische Messgeräte
GmbH & Co. KG

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

Translation of the original instructions
Copyright 2025 • Subject to change
Version 5 • This document was published on June 19, 2025.
The latest documents are available for download on our
website under the corresponding product description.

TA-300.115-KNEN05



104557