

# Goodbye transmitters!



**KROHNE**



[goodbye-transmitters.com](http://goodbye-transmitters.com)

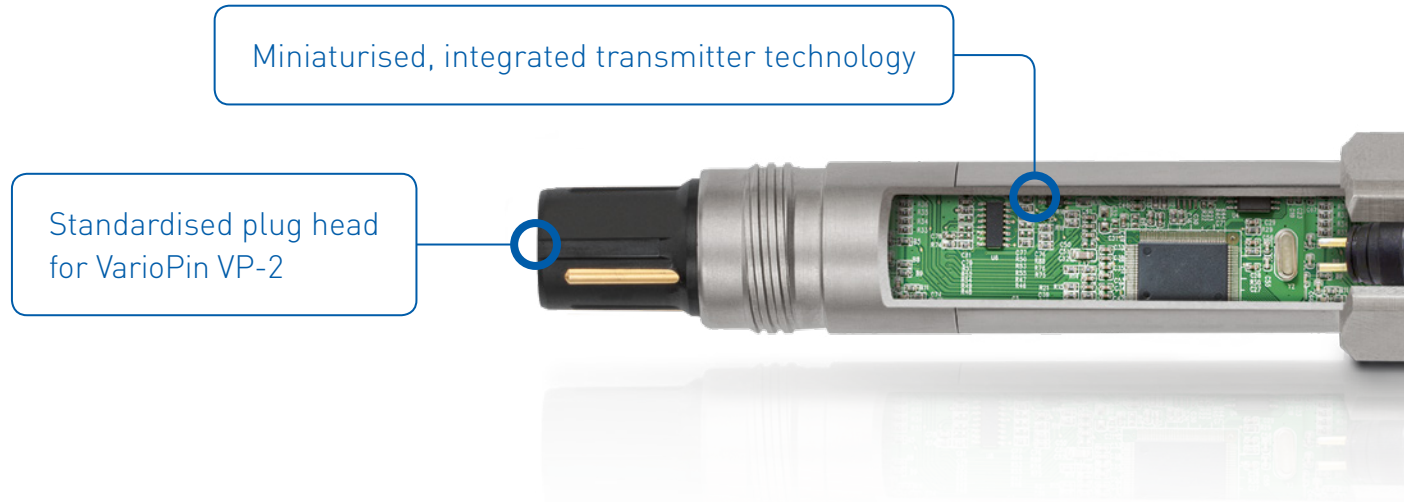
# Here comes **SMARTSENS**

**The first family of analytical sensors  
that no longer require transmitters**



- No external transmitter needed
- Installation in explosive (zone 0) and hygienic areas
- Fits into 98% of all mounting assemblies
- Easy installation and retrofitting
- Offline calibration under controlled conditions
- Consistent software and operating concept
- Provides precise maintenance predictions
- Low investment and maintenance costs

# Has technology and knowledge all in the head



## Minimised to the max

In contrast to competitor products, the entire transmitter technology is integrated into the SMARTSENS analytical sensors. The complete circuitry has been miniaturised and fits into the sensor head. This cuts the price in half compared to all other measuring systems on the market.

## Eliminates weak safety points

Thanks to its special circuit technology, intense miniaturisation and special encapsulation, the SMARTSENS series offers process reliability at a level previously unknown.

## Direct connection to process control system

KROHNE is the only supplier that uses a real open standard – and therefore a direct connection from sensor to the process control system via the standardised fieldbus. The SMARTSENS sensors store all data and transfer it bidirectionally and digitally with the 4...20 mA current signal via the HART® protocol to process control and asset management systems, handhelds, PCs and other peripheral devices.





**Knows best what should  
be done and when**

## Stores more, does more

SMARTSENS sensors store all relevant data, which can be accessed via the HART® protocol, including important information such as calibration frequency, service life and need for replacement.

## Thinks far ahead

The data output from the SMARTSENS series meets the standards of NAMUR NE 107 and VDI/VDE 2650.

SMARTSENS analytical sensors recognise and report the correct time period for maintenance. This prevents calibration from being performed too early. Your benefit: more functionality with lower labour and lower sensor abrasion.



SMARTSENS PH 8150



SMARTSENS COND 7200



SMARTSENS ORP 8510

# Makes changeover easy

## Simple retrofitting

Thanks to its standardised connector design, SMARTSENS sensors are compatible with 98 % of the existing mounting assemblies and can be installed in keeping with operational safety. Prefabricated plug heads are available in the nickel-plated brass or PEEK version, VarioPin VP-2.

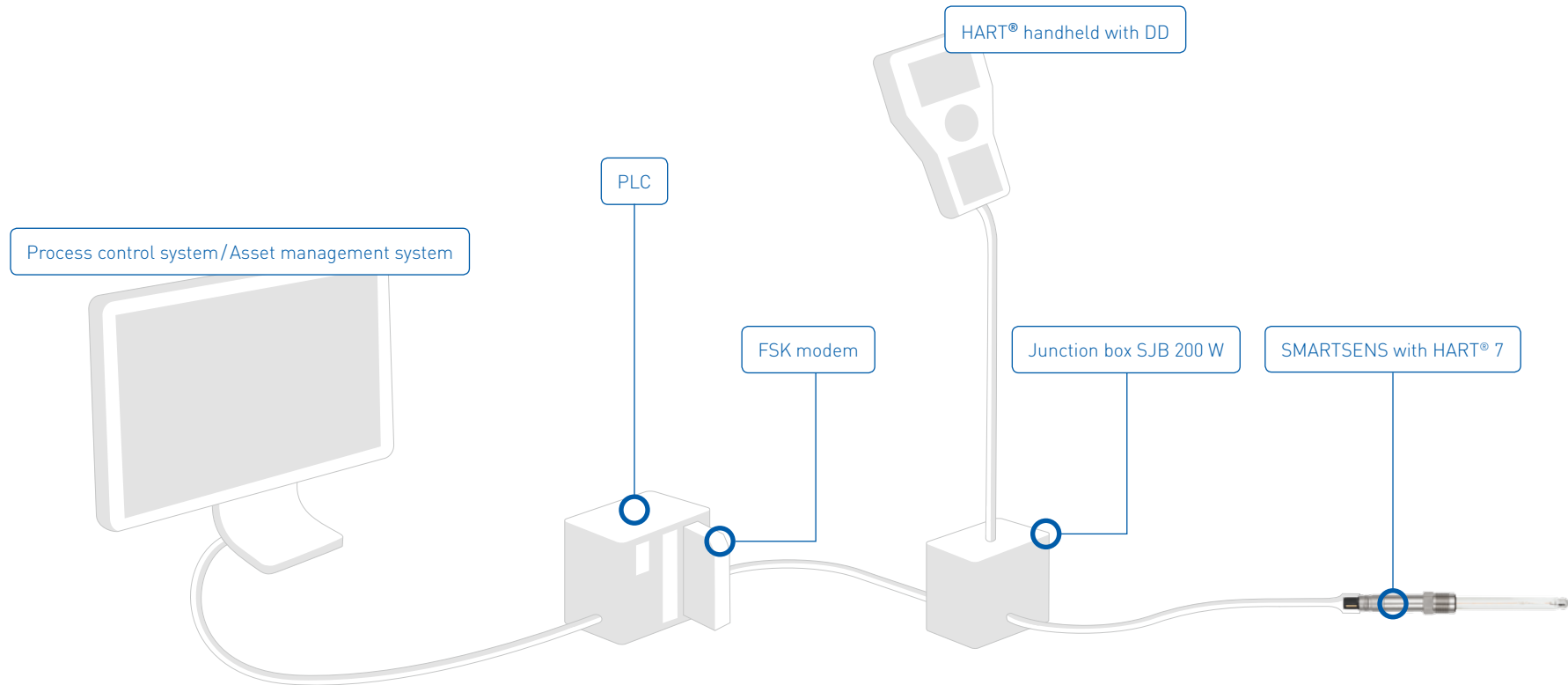


## Easy to install

SMARTSENS sensors function as a 2-wire loop powered system. They can be used both in point-to-point operation and for multi-drop installations. Up to 64 sensors can be connected in a loop of more than 1000 m in length.

## Easy to operate

SMARTSENS sensors are HART® 7-certified by the HART Communication Foundation (HCF) and can be easily operated with any commercially available HART® handheld device and the freely available HART® DD.





pH-MESSUNG  
FB2 pH1

Always fits  
perfectly

## For any industrial applications

With a wide variety of pH sensitive glasses, reference systems, diaphragms as well as robust materials and cell constants, SMARTSENS sensors can be used for the measuring of:

- pH
- ORP
- Conductivity
- Chlorine
- Oxygen

## Safe in hazardous areas

In accordance with the explosion protection directives of IECEx, ATEX, FM-CSA and NEPSI, the SMARTSENS series is the only one on the market that can be installed without any limitation in zone 0 and in the applications with temperature classes T3, T4 and T6.

## Perfect for use in hygienic areas

SMARTSENS sensors have also been designed especially for applications with high hygienic requirements. Accordingly, nickel-plated brass versions with corrosion-resistant plug connections are available for this purpose.

## SMARTSENS target industries

- Chemical
- Pharmaceuticals
- Food and beverage
- Cosmetics
- Energy
- Semiconductor manufacturing
- Drinking water treatment
- Waste water treatment
- Pulp and paper
- Steel
- Mining
- Oil and gas



**Is very easy to  
calibrate offline**

## Maximum precision in the laboratory

SMARTSENS sensors are the only ones that can be connected directly to a PC with SMARTBRIDGE (USB interface cable) and calibrated in accordance with a HART® protocol. Offline in the laboratory – instead of at the application site under continually changing conditions.

## Effect 1: Extended service life

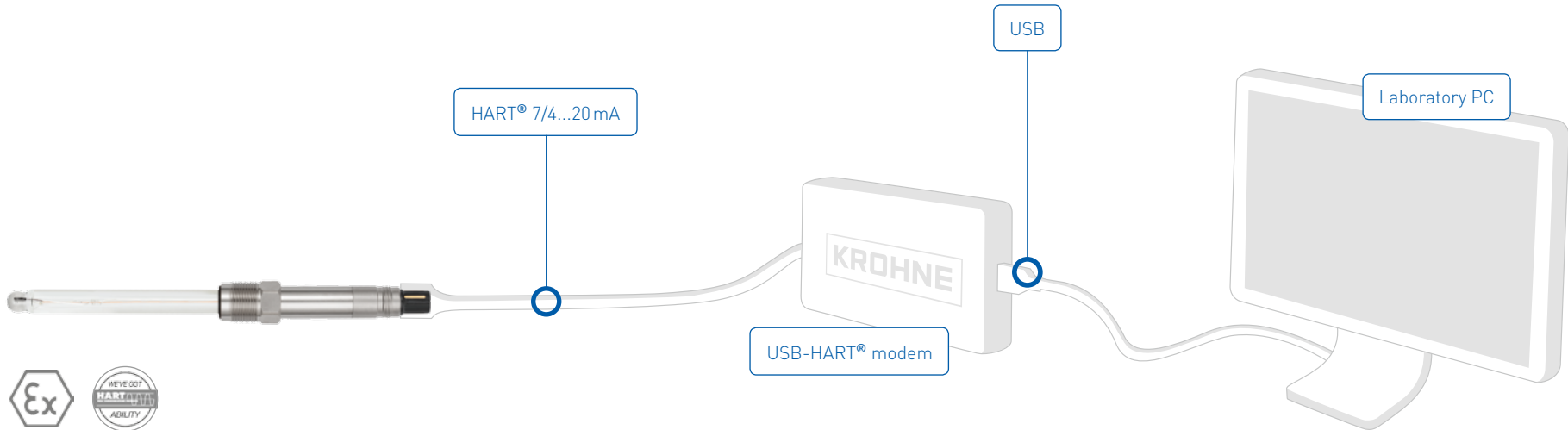
Offline calibration takes place in controlled, clean conditions in the laboratory. The sensors are cleaned and regenerated at the same time. Depending on the application purpose and site, their service life is up to four times longer under these circumstances.

## Effect 2: More precise results

Much more exact calibration can be performed under laboratory conditions. This enables more precise measuring results and higher product quality.

## Effect 3: Faster replacement

SMARTSENS sensors are calibrated in the laboratory and only the replacement takes place at the application site. This reduces the labour to just a few minutes per measuring loop.





**Provides a consistent  
operating concept**

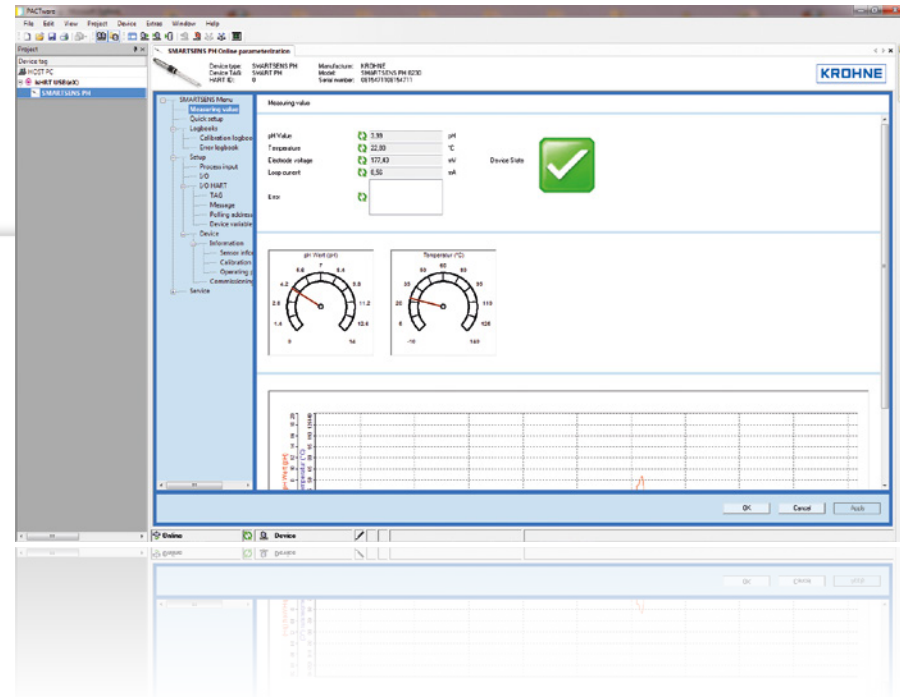
## Effortless user access

The standardised protocols of the SMARTSENS series allow the same software to be used. The result: the consistent operating structure in offline calibration and on the handheld device as well as in the asset management and process control systems. In this way, all users always have access to the same measuring values and data, which can be used in a flexible manner and administered without regard to manufacturer.

The SMARTSENS software runs without any problems on all conventional asset management and process control systems.

## Easier data input by maintenance staff

Thanks to comprehensively standardised operator interfaces, the SMARTSENS software makes entering various parameters easier using PACTware™, FieldCare, PDM8, AMS, DeltaV and many others. This prevents errors and saves time.



# SMARTSENS portfolio

## pH sensors



Sensor type	<b>SMARTSENS PH 8570</b> Hygienic pH sensor for food, beverages and pharma industry	<b>SMARTSENS PH 8150</b> High performance pH sensor for chemical industry	<b>SMARTSENS PH 9950</b> Liquid filled pH sensor for water industry	<b>SMARTSENS PH 8530</b> pH sensor for pure water applications	<b>SMARTSENS PH 8320</b> Durable pH sensor for water and waste water applications
<b>Diaphragm</b>	Ceramic	2 open holes	Platinum	3 × ceramic	PTFE
<b>Reference</b>	RheoLid gel	Duralid polymer gel	Liquid filled KCl	KCl gel	Ag/AgCl/TepoxGel
<b>Glass type</b>	S glass	H glass	H glass	A glass	AH glass
<b>Ambient temperature</b>	0...+140°C; +32...+284°F (CIP, SIP, Autoclavable)	0...+130°C; +32...+266°F	0...+135°C; +32...+275°F	0...+80°C; +32...+176°F	0...+70°C; +32...+158°F
<b>Process pressure</b>	12 bar; 174 psi	12 bar; 174 psi	6 bar; 87 psi	12 bar; 174 psi	16 bar; 232 psi
<b>Communication</b>	1 × 4...20 mA (passive), HART® 7	1 × 4...20 mA (passive), HART® 7	1 × 4...20 mA (passive), HART® 7	1 × 4...20 mA (passive), HART® 7	1 × 4...20 mA (passive), HART® 7
<b>Power supply</b>	15...30V (loop powered)	15...30V (loop powered)	15...30V (loop powered)	15...30V (loop powered)	15...30V (loop powered)
<b>Temperature sensor</b>	Pt1000	Pt1000	Pt1000	Pt1000	Pt1000
<b>Approvals</b>	Biocompatibility, FDA, IECEx, ATEX, FM, NEPSI, CSA (zone 0)	IECEx, ATEX, FM, NEPSI, CSA (zone 0)	-	-	IECEx, ATEX, FM, NEPSI, CSA (zone 0)


**Sensor type**
**SMARTSENS PH 8510**

General purpose pH sensor  
for water applications

**SMARTSENS PH 1590**

Rugged pH sensor with 3/4"  
MNPT process connection

**SMARTSENS PH 2390**

Rugged pH sensor with 3/4"  
MNPT process connection

**Diaphragm**

Ceramic

Ceramic

PTFE

**Reference**

Ag/AgCl/TepoxGel

KCl gel

KCl gel

**Glass type**

AH glass

Multi purpose glass

Multi purpose glass

**Ambient temperature**

0...+70°C; +32...+158°F

0...+80°C; +32...+176°F

0...+80°C; +32...+176°F

**Process pressure**

2 bar; 30 psi

6.9 bar; 100 psi at +60°C; +140°F

6.9 bar; 100 psi at +60°C; +140°F

**Communication**

1×4...20 mA (passive), HART® 7

1×4...20 mA (passive), HART® 7

1×4...20 mA (passive), HART® 7

**Power supply**

15...30V (loop powered)

15...30V (loop powered)

15...30V (loop powered)

**Temperature sensor**

Pt1000

Pt1000

Pt1000

**Approvals**

-

CSA

CSA

# SMARTSENS portfolio

## ORP sensors



### Sensor type

#### SMARTSENS ORP 8150

High performance ORP sensor for harsh applications

#### SMARTSENS ORP 8510

General purpose ORP sensor

#### SMARTSENS ORP 1590

Rugged pH sensor with 3/4" MNPT process connection

### Diaphragm

2 open holes

Ceramic

Ceramic

### Reference

Duralid polymer gel

Ag/AgCl/TepoxGel

KCl gel

### Glass type

Platinum

Platinum

Platinum tip

### Ambient temperature

0...+130°C; +32...+266°F

0...+70°C; +32...+158°F

0...+80°C; +32...+176°F

### Process pressure

12 bar; 174 psi

2 bar; 30 psi

6.9 bar; 100 psi at +60°C; +140°F

### Communication

1×4...20 mA (passive), HART® 7

1×4...20 mA (passive), HART® 7

1×4...20 mA (passive), HART® 7

### Power supply

15...30V (loop powered)

15...30V (loop powered)

15...30V (loop powered)

### Temperature sensor

Pt1000

Pt1000

Pt1000

### Approvals

IECEX, ATEX, FM, NEPSI, CSA (zone 0)

-

CSA

## Conductivity sensors



### Sensor type

#### SMARTSENS COND 1200

Conductivity sensor for general purpose water applications

#### SMARTSENS COND 3200

Conductivity sensor for pure water applications

#### SMARTSENS COND 5200

Conductivity sensor for harsh applications

#### SMARTSENS COND 7200

Conductivity sensor for hygienic applications

### Process connections

G3/4A

G3/4A, 3/4" NPT

G3/4A, 3/4" NPT

Varivent DN45-125, Clamp DN25/32/40/50, Aspetik DN40/50

### Measuring ranges

$c = 1 \text{ cm}^{-1}$ : 1...20 mS/cm

$c = 0.01 \text{ cm}^{-1}$ : 0.05...10  $\mu\text{S}/\text{cm}$   
 $c = 0.1 \text{ cm}^{-1}$ : 1...1000  $\mu\text{S}/\text{cm}$

$c = 1 \text{ cm}^{-1}$ : 10  $\mu\text{S}/\text{cm}$ ...15 mS/cm

$c = 0.01 \text{ cm}^{-1}$ : 0.05...10  $\mu\text{S}/\text{cm}$   
 $c = 0.1 \text{ cm}^{-1}$ : 1...1000  $\mu\text{S}/\text{cm}$

### Materials

Electrodes: stainless steel  
 Process connection: PVDF

Electrodes: stainless steel  
 Process connection: PVDF

Electrodes: graphite  
 Process connection: PVDF

Electrodes: stainless steel  
 Process connection: stainless steel

### Process temperature

0...+135°C; +32...+275°F

0...+135°C; +32...+275°F

0...+130°C; +32...+266°F

0...+135°C; +32...+275°F

### Process pressure

16 bar; 232 psi (at +25°C; +77°F)

16 bar; 232 psi (at +25°C; +77°F)

16 bar; 232 psi (at +25°C; +77°F)

16 bar; 232 psi (at +25°C; +77°F)

### Communication

1 × 4...20 mA (passive); HART® 7

1 × 4...20 mA (passive); HART® 7

1 × 4...20 mA (passive); HART® 7

1 × 4...20 mA (passive); HART® 7

### Power supply

15...30V (loop powered)

15...30V (loop powered)

15...30V (loop powered)

15...30V (loop powered)

### Temperature sensor

Pt1000

Pt1000

Pt1000

Pt1000

### Connector

VP (VarioPin)

VP (VarioPin)

VP (VarioPin)

VP (VarioPin)

### Approvals

-

IECEX, ATEX, FM, NEPSI, CSA (zone 0)

IECEX, ATEX, FM, NEPSI, CSA (zone 0)

IECEX, ATEX, FM, NEPSI, CSA (zone 0)

# Accessories

## SJB 200 W

Junction box for connecting the sensor with the process control system (zone 1).



## HART® Handheld

Mobile version for configuration and calibration in the field (zone 1).



## SMARTBRIDGE

USB interface cable for offline calibration and operation on a PC with PACTware™ (FDT-DTM), also suitable for zone 1.



## SMARTBASE

Database with PACTware™ operating philosophy for easy handling of sensor data during offline calibration. Additionally equipped with optional statistic module.



### Display SD 200 W/R

Fixed display for reading current measuring values in the field (zone 1).



### SMARTMAC 200

Fixed calibration and operation device with logbook function (zone 1).



### Sensor cables

Shielded VP cables in various lengths.



Please note:

PACTware™ and DD/DTMs drivers with full functionality for FDT-based systems are available free of charge, without licence.

A person wearing a blue lab coat and blue nitrile gloves is shown in profile, working in a laboratory. They are holding a multi-channel pipette tip rack with their right hand and a single pipette tip with their left hand. The background is a blurred laboratory environment. A semi-transparent blue banner with white diagonal lines is at the bottom, containing the text "Saves a lot of money, time and effort".

**Saves a lot of money,  
time and effort**

## SMARTSENS cost advantage as no external transmitter required

The elimination of the external transmitter reduces the price considerably in comparison with any other competing measuring system.

Cost of investment	SMARTSENS	Analog
Sensor	300 EUR	300 EUR
Cable	200 EUR	200 EUR
Display/transmitter	–	1,000 EUR
Commissioning sensor	60 EUR	180 EUR
Equipment for the offline calibration (non-recurring)	3,500 EUR	–
<b>Cost of investment per 100 measuring loops</b>	<b>59,500 EUR</b>	<b>168,000 EUR</b>

**108,500 EUR**

**SMARTSENS cost advantage as no external transmitter required**

Please contact us to get a more precise overview of the savings potential based on your parameters.

## SMARTSENS cost advantage with offline calibration

Offline calibration reduces time and effort significantly. At the same time, it increases productivity and efficiency. A big plus is that the service life of the sensors increases by up to a factor of 4, with an average factor of 2.

	SMARTSENS	Analog
No. calibrations of measuring loop per month	1	1
Replacement interval of sensor in month	4	2
<b>Cost of maintenance per 100 measuring loops per year</b>	<b>150,000 EUR</b>	<b>384,000 EUR</b>

**234,000 EUR**

**SMARTSENS cost advantage with offline calibration per year**

The maintenance costs consist of expenditure of time and labour costs for specialist and non-specialist, depending on the task.

## Contact

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The current list of all  
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[www.krohne.com](http://www.krohne.com)



[goodbye-transmitters.com](http://goodbye-transmitters.com)