

Performing the commissioning procedure

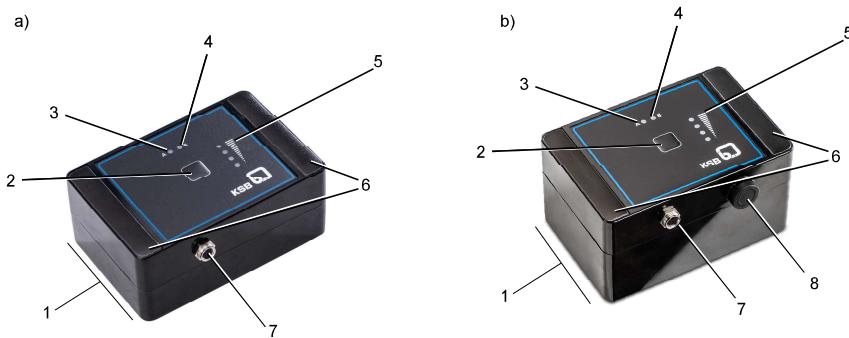


Fig. 10: a) Transmission and battery unit without pressure balancing element, b) Transmission and battery unit with pressure balancing element

1	Position of internal antenna	2	Pushbutton
3	Status LED A	4	Status LED B
5	Level LEDs for indicating the signal strength of the gateway connection	6	Cover for housing screws
7	Connection for connecting cable to sensor unit	8	Pressure balancing element

- ✓ The gateway has been installed and the signal strength indicated is sufficient.
- ✓ The Transmission and battery unit and the Modbus-based device are connected to one another.
- ✓ The system has been energised.

1. Press the pushbutton (2) on the Transmission and battery unit for 2-3 seconds. Release the pushbutton as soon as the status LEDs A and B of the Transmission and battery unit briefly light up simultaneously.

⇒ This activates the Set-up mode. (⇒ Section 5.2.2, Page 18)

⇒ If commissioning was successful, status LED B lights up in green (for approx. 10 seconds) approx. 40 seconds after the Set-up mode has stopped.

⇒ If a different light signal or no flashing signal is displayed, try to identify the source of error. (⇒ Section 9, Page 32)

The device switches to Automatic Measuring Operation operating mode.

6 Operation

6.1 Operating modes of transmission and battery unit

- **Deep Sleep**

The transmission and battery unit is delivered in Deep Sleep mode. The device is in this mode prior to commissioning, after it is switched off, and if the battery is removed for more than 10 seconds. (⇒ Section 6.2, Page 26)

- **Set-up mode**

The Set-up mode helps find a suitable position for the transmission and battery unit.

- **Automatic Measuring Operation**

After successful commissioning and when a sensor unit and pump set have been assigned in the KSB Cloud, the device automatically switches to Stand-by mode following each measuring cycle and transfer cycle in order to save energy. In this status, all LEDs are off. The device wakes up cyclically (default setting: every hour) and takes an automatic measurement.

6.2 Checking that the transmission and battery unit is in Deep Sleep mode

1. Briefly press the pushbutton.

⇒ The red LED briefly flashes once (for approx. 0.2 seconds) in this operating mode. The red LED then has to extinguish immediately and no further LED must light up. (⇒ Section 6.1, Page 26)

6.3 Taking manual measurement and displaying signal strength

	⚠ WARNING Hot surfaces (pump and piping take on the temperature of the fluid handled). Risk of burns! <ul style="list-style-type: none">▷ Do not touch hot surfaces.▷ Use appropriate personal protective equipment.
	⚠ WARNING Sensor unit takes on temperature of bearing bracket or drive lantern Risk of burns! <ul style="list-style-type: none">▷ Observe the operating manual of the pump set.▷ When the pump set is being operated, only touch the sensor unit using suitable protective gloves.
	⚠ WARNING Work in the immediate vicinity of rotating parts Risk of hand injury! <ul style="list-style-type: none">▷ Always have this work performed by trained personnel.▷ Take particular caution when performing this work.

- ✓ Commissioning was completed successfully. (⇒ Section 5.4, Page 24)

1. Briefly press the pushbutton at the Transmission and battery unit once (<1 second).

⇒ The current status of the device is displayed. The green LED flashes when the device is ready for a manual event. If this is not the case, the device is busy (with an automatic measurement, update, etc.).

2. When the device is ready for a manual event, once again briefly press the pushbutton at the Transmission and battery unit.

- ⇒ The sensor data is measured, the signal strength is displayed and the data is transmitted (total duration approx. 20 – 40 seconds).
- Status LED B statically lights up in green for 10 seconds.

After the measurement is taken, the device automatically switches to *Automatic Measuring Operation* and all LEDs extinguish.

6.4 Turning off the transmission and battery unit

There are two options of turning off the Transmission and battery unit. The Transmission and battery unit is always reset to its as-supplied condition in this process.

- Removing the batteries (⇒ Section 7.1, Page 28)
- Manually switching off the device

Manually switching off the device

1. If a sensor unit is connected, disconnect its connecting cable.
2. Press the pushbutton at the Transmission and battery unit until both LEDs extinguish after a flashing pattern.
 - ⇒ The two status LEDs will flash again after 10 to 15 seconds. Then, the Transmission and battery unit reverts to its as-supplied condition. (⇒ Section 6.2, Page 26)

7 Servicing/Maintenance

7.1 Replacing the batteries

The Transmission and battery unit is powered by batteries.

Only use the battery types indicated for the corresponding design:

- Transmission and battery unit **with** pressure balancing element:
two 1.5 V standard alkaline batteries (LR20 / mono cells / size D)
- Transmission and battery unit **without** pressure balancing element:
two 1.5 V standard alkaline batteries (LR14 / baby cells / size C)

Only non-rechargeable batteries must be used.

	CAUTION Electrical connection work by unqualified personnel Damage to the device! <ul style="list-style-type: none"> ▷ Only trained personnel may open the Transmission and battery unit and change the batteries.
	NOTE During battery replacement, take care not to damage the foamed-in housing gasket.



Fig. 11: Covers for housing screws

1	Cover for housing screws
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	CAUTION Incorrect replacing of batteries Damage to the connecting cable between the upper and lower parts of the housing! <ul style="list-style-type: none"> ▷ For version with pressure balancing element carefully lift the upper part off the lower part of the housing. ▷ Never allow the upper part to hang from the connecting cable or suspend it from the connecting cable for transport.
-------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

1. Remove the glued-on covers for the housing screws (1) from the top of the housing using a suitable tool.
2. Unscrew the 4 screws in the corners.
3. Take off the upper part of the housing.
4. Carefully remove the used batteries from the holder. Wait approximately 10 seconds. Press the pushbutton several times.

5. Insert 2 new batteries. Observe the correct polarity.
The prescribed polarity (+/-) is indicated by the corresponding symbols.
6. Briefly press the pushbutton on the top of the housing and check whether red status LED A lights up briefly. If status LED A does not light up, check the battery polarity. If necessary, insert other batteries.
7. Place the upper part of the housing back on the lower part of the housing.
8. Screw the 4 screws back into the corners.
9. Glue both covers for the housing screws (1) back on.
10. Restart the Transmission and battery unit. (⇒ Section 5.4, Page 24)

7.2 Replacing the sensor unit

1. Shut down the Transmission and battery unit (⇒ Section 6.4, Page 27)
2. Disconnect the connecting cable between the sensor unit and the Transmission and battery unit. (⇒ Section 5.2, Page 15)
3. Remove the sensor unit.
4. Install a new sensor unit. (⇒ Section 5.2.4, Page 19)
5. Connect the connecting cable between the sensor unit and the Transmission and battery unit. (⇒ Section 5.2.6, Page 21)
6. Restart Transmission and battery unit (⇒ Section 5.4, Page 24)
7. Have the pump set with new Sensor ID assigned by the KSB Guard Customer Service. (⇒ Section 9, Page 32)

7.3 Replacing the transmission and battery unit

1. Shut down the Transmission and battery unit (⇒ Section 6.4, Page 27)
2. Disconnect the connecting cable between the sensor unit and the Transmission and battery unit.
3. Remove the Transmission and battery unit from the place of installation.
To remove the adhesive pad from the pump set, slide a thin wire underneath the Transmission and battery unit or use a lever tool.
4. Fit a new Transmission and battery unit. (⇒ Section 5.2.5, Page 20)
5. Start up the Transmission and battery unit (⇒ Section 5.4, Page 24)

7.4 Replacing KSB Guard Gateway

1. Disconnect KSB Guard Gateway from the power supply.
2. Remove KSB Guard Gateway from the place of installation.
3. Fit a new KSB Guard Gateway. (⇒ Section 5.2.1, Page 15)
4. Connect the power supply. (⇒ Section 5.2.1.3, Page 17)

8 Dismantling

	WARNING
	Incorrect dismantling Crushing, impact injuries, cuts! <ul style="list-style-type: none">▷ Use suitable tools only.▷ Wear suitable protective equipment.

8.1 Removing KSB Guard Gateway

	DANGER
	Risk of falling when working at a great height Danger to life by falling from a great height! <ul style="list-style-type: none">▷ Do not step onto the pump (set) during installation work or dismantling work.▷ Pay attention to safety equipment, such as railings, covers, barriers, etc.▷ Observe the applicable local health and occupational safety regulations and accident prevention regulations.
	DANGER
	Improper work on electrical connection Electric shock! <ul style="list-style-type: none">▷ KSB Guard Gateway may only be opened by a qualified electrical technician.▷ Electrical work may only be carried out by a qualified electrical technician.

1. Disconnect the equipment from the power supply.
2. Detach the rear adapter of KSB Guard Gateway from the wall bracket.
3. Remove the wall-mounting bracket from the wall.

8.2 Dismantling the transmission and battery unit

	WARNING
	Work in the immediate vicinity of rotating parts Risk of hand injury! <ul style="list-style-type: none">▷ Always have this work performed by trained personnel.▷ Take particular caution when performing this work.
	WARNING
	Hot surfaces (pump and piping take on the temperature of the fluid handled). Risk of burns! <ul style="list-style-type: none">▷ Do not touch hot surfaces.▷ Use appropriate personal protective equipment.

1. Disconnect the connecting cable of the sensor unit.
2. Remove the Transmission and battery unit from the place of installation. To remove the adhesive pad from the pump set, slide a thin wire underneath the Transmission and battery unit or use a lever tool.

8.3 Dismantling the sensor unit

	<p>DANGER</p> <p>Strong magnetic field</p> <p>Danger of death for persons with pacemaker!</p> <p>Interference with magnetic data carriers, electronic devices, components and instruments!</p> <p>Uncontrolled magnetic attraction forces between magnet-equipped components, tools or similar!</p> <p>▷ Keep a safety distance of at least 0.3 m.</p>
	<p>WARNING</p> <p>Work in the immediate vicinity of rotating parts</p> <p>Risk of hand injury!</p> <p>▷ Always have this work performed by trained personnel.</p> <p>▷ Take particular caution when performing this work.</p>
	<p>WARNING</p> <p>Hot surfaces (pump and piping take on the temperature of the fluid handled).</p> <p>Risk of burns!</p> <p>▷ Do not touch hot surfaces.</p> <p>▷ Use appropriate personal protective equipment.</p>

- ✓ The connecting cable leading to the Transmission and battery unit has been removed.
- 1. Carefully remove the sensor unit from the installation location. To do so use a soft-face mallet or plier wrench, for example.

9 Trouble-shooting

If problems occur that are not described in the following tables, consultation with KSB Guard Customer Service is required:

- **24-h hotline** : +49 6233 86 6400
- **E-mail**: ksbguard-support@ksb.com

	NOTE
To ensure quick assistance, have the serial number of the sensor unit readily available.	

9.1 Trouble-shooting KSB Guard Gateway

Table 12: Trouble-shooting KSB Guard Gateway

Error / defect description	Possible cause	Remedy
No LED is lit.	<ul style="list-style-type: none"> ▪ No connection to mains power supply 	<ul style="list-style-type: none"> ▪ Plug in the mains plug or connect the power cable inside the device. (⇒ Section 5.2.1.3, Page 17)
Only one or no green level LED is lit at KSB Guard Gateway, but status LED S1 is lit green.	<ul style="list-style-type: none"> ▪ Solid exterior walls ▪ Large amounts of metal in the surrounding area ▪ Unfavourable position in the basement of the building ▪ Poor mobile data connection at the location 	<ul style="list-style-type: none"> ▪ Change the position of the supplied LTE antenna until 3 or 4 level LEDs light up. ▪ If necessary, install a different LTE antenna with a longer cable to achieve a more favourable position. (⇒ Section 5.2.1.4, Page 17) ▪ Install an outdoor LTE antenna outside the building.
Status LED S1 remains off or is lit yellow after the power supply has been established.	<ul style="list-style-type: none"> ▪ Internal fault 	<ul style="list-style-type: none"> ▪ KSB Contact KSB Guard Customer Service.
LED S1 is flashing in green	<ul style="list-style-type: none"> ▪ Device is conducting firmware update. 	<ul style="list-style-type: none"> ▪ Wait until firmware update has been completed.

9.2 Trouble-shooting the transmission and battery unit / sensor unit

Table 13: Trouble-shooting during commissioning

Error / defect description	Possible cause	Remedy
There is no response to a brief press of the pushbutton.	<ul style="list-style-type: none"> ▪ The battery is missing or is discharged. ▪ System error 	<ul style="list-style-type: none"> ▪ Change the batteries. (⇒ Section 7.1, Page 28) ▪ Remove the batteries for 10 seconds. Then reinsert them. ▪ KSB Contact KSB Guard Customer Service.
A brief press of the button produces a longer flashing sequence (last transmission status displayed).	<ul style="list-style-type: none"> ▪ The system has already been commissioned. 	<ul style="list-style-type: none"> ▪ The device may have been inadvertently commissioned. Remove the batteries for 10 seconds. Then reinsert them. ▪ Then perform commissioning. (⇒ Section 5.4, Page 24)
After an extended press of the button, none of the red level LEDs for the Transmission and battery unit to light up.	<ul style="list-style-type: none"> ▪ KSB Guard Gateway has been shut down. ▪ KSB Guard Gateway is out of range. 	<ul style="list-style-type: none"> ▪ Start up KSB Guard Gateway. ▪ If possible, place the Transmission and battery unit within the range of KSB Guard Gateway and test it.

Error / defect description	Possible cause	Remedy
After an extended press of the button, none of the red level LEDs for the Transmission and battery unit to light up.	<ul style="list-style-type: none"> Sensor unit has not yet been connected or is defective. 	<ul style="list-style-type: none"> Check the connection between the Transmission and battery unit and the sensor unit, and replace the sensor if required.
After a manual measurement only 1–2 LEDs of the level LEDs at KSB Guard Gateway light up.	<ul style="list-style-type: none"> Incorrect installation 	<ul style="list-style-type: none"> Establish line of sight between the transmission unit and the entire antenna of KSB Guard Gateway. Remove / avoid any obstacles (especially metal ones) between KSB Guard Gateway and the transmission unit. The direct line between the Transmission and battery unit and KSB Guard Gateway should be perpendicular to the KSB Guard Gateway antenna as the antenna radiates most effectively perpendicular to its axis. The internal antenna of the Transmission and battery unit is located opposite the level LEDs on the left-hand side wall of the unit. Position the unit so this side wall faces KSB Guard Gateway. If necessary, mount the unit to the wall with one of its side surfaces. Only mount KSB Guard Gateway slightly higher than the Transmission and battery units. To allow for better positioning of the Transmission and battery unit use an extension cable between the sensor unit and the Transmission and battery unit.
Status LED A flashes several times in red after a brief press of the pushbutton.	<ul style="list-style-type: none"> No assignment of sensor unit and pump in the KSB Cloud. 	Assign and set up the pump set. (⇒ Section 5.3, Page 23)
KSG Guard does not send any data to the KSB Cloud or does not yet appear there.	<ul style="list-style-type: none"> KSB Guard has not been assigned to a pump set. 	<ul style="list-style-type: none"> Assign KSB Guard to a pump set (⇒ Section 5.3, Page 23).

Table 14: Trouble-shooting during operation

Error / defect description	Possible cause	Remedy
KSB Guard does not provide any data following successful assignment.	<ul style="list-style-type: none"> Problem in the KSB Cloud Hardware is defective. 	<ul style="list-style-type: none"> KSB Contact KSB Guard Customer Service.
Data is suddenly no longer transmitted during operation, or there are frequently large time gaps between 2 transfer cycles.	<ul style="list-style-type: none"> Poor mobile data connection The wireless connection between the Transmission and battery unit and KSB Guard Gateway is too weak or unstable (local interference). 	<ul style="list-style-type: none"> (⇒ Section 9.1, Page 32) Start manual measurement (⇒ Section 6.3, Page 26) and check result. If fewer than 2 red level LEDs on the Transmission and battery unit light up, change the position of the transmission and battery unit and/or KSB Guard Gateway. (⇒ Section 5.2.5, Page 20) (⇒ Section 5.2.1.1, Page 16)

10 Related Documents

10.1 Recommended mounting position for sensor unit

	NOTE
Do not install the sensor unit facing downwards as glue will be used during the installation.	

The position of the sensor unit as shown in the illustrations is recommended, depending on the type series.

If installation location A is accessible and not otherwise used, fasten the sensor unit to this location.

If installation location A is used or inaccessible, use installation locations B, C or D.

Etanorm

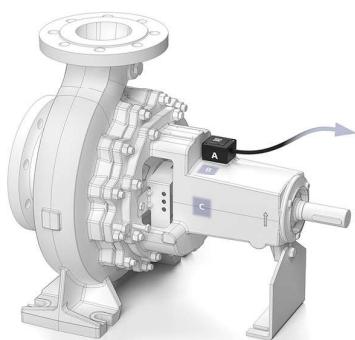


Fig. 12: Etanorm with sensor unit

Etaline

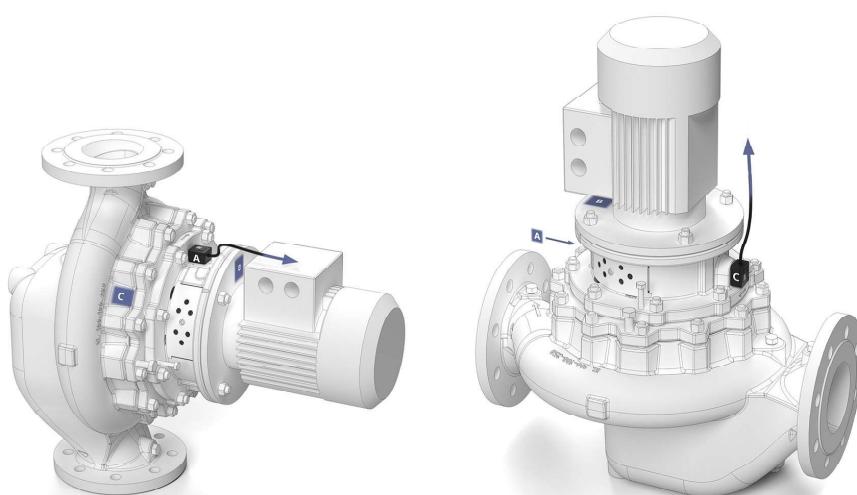


Fig. 13: Sensor unit mounted on horizontally and vertically installed Etaline pumps

Etabloc

Fig. 14: Sensor unit mounted on horizontally and vertically installed Etabloc pumps

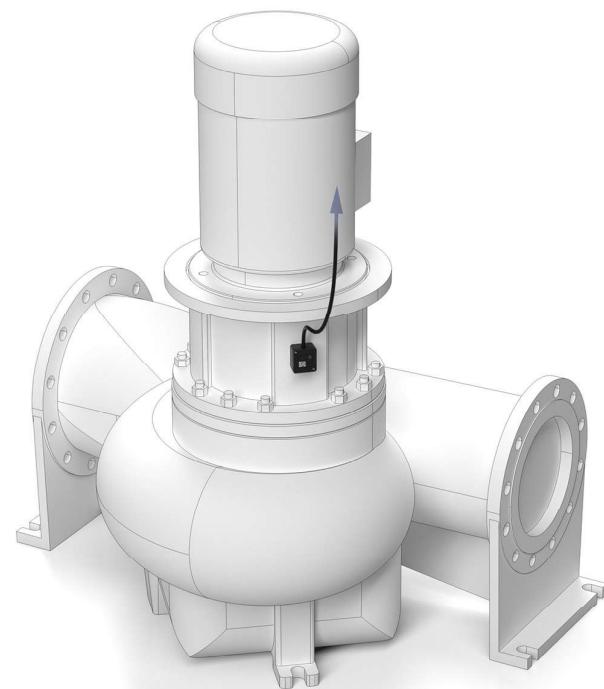
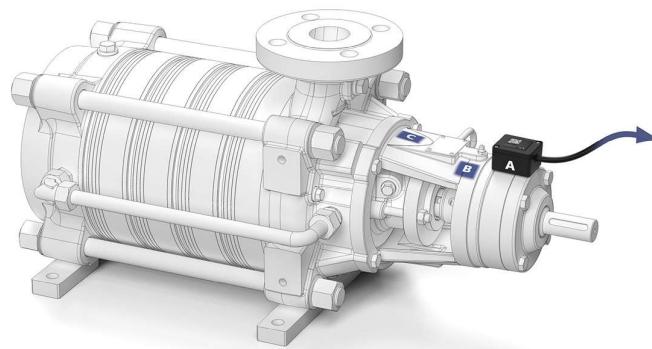
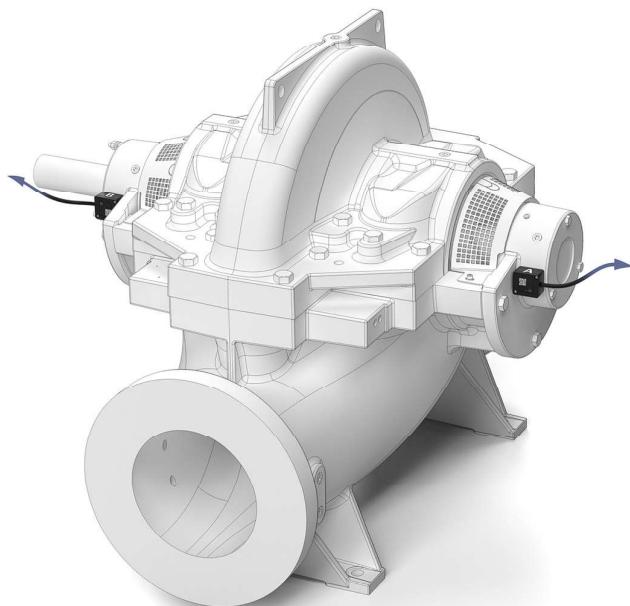
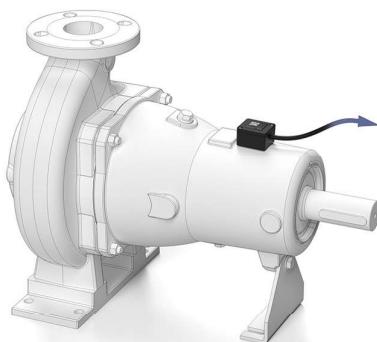
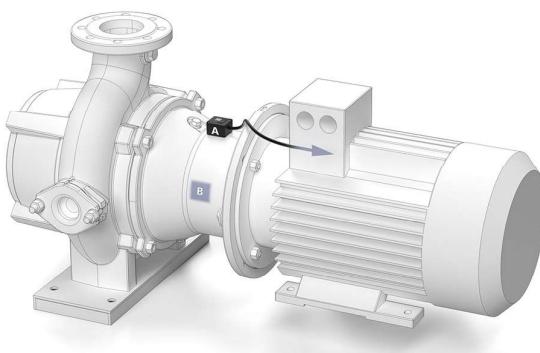
Etaline R

Fig. 15: Etaline R with sensor unit

MegaCPK

Fig. 16: MegaCPK with sensor unit

Movitec**Fig. 17:** Movitec with sensor unit**Multitec****Fig. 18:** Multitec with sensor unit**Omega****Fig. 19:** Omega with sensor unit

Sewatec**Fig. 20:** Sewatec with sensor unit**Sewabloc****Fig. 21:** Sewabloc with sensor unit

11 Purchase Order Specifications

11.1 Ordering spare parts

Always quote the following data when ordering replacement or spare parts:

- Order number
- Order item number
- Consecutive number
- Type series
- Size
- Material variant
- Seal code
- Year of construction

Refer to the name plate for all data.

Also specify the following data:

- Part No. and description
- Quantity of spare parts
- Shipping address
- Mode of dispatch (freight, mail, express freight, air freight)

11.2 Accessories

Table 15: Accessories

	Description	Length	Mat. No.	[kg]
		[m]		
	Extension cable between transmission and battery unit and sensor unit, with heat shrink tube	3	01922262	0.16
		5	01922263	0.26
		10	01922264	0.5
-	Outdoor LTE antenna (2G/3G/4G) for the KSB Guard Gateway	5	05064195	0
		20	05064194	0

12 EU Declaration of Conformity

Manufacturer:

KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

The manufacturer herewith declares that **the product**:

KSB Guard

Serial number ranges:

KSB Guard sensor unit: GS118W22xxxx to GS130W52xxxx
KSB Guard transmission and battery unit: GT118W22xxxx to GT130W52xxxx
KSB Guard Gateway: G94x18S22xxxxxx to G94x30S52xxxxxx

- is in conformity with the provisions of the following Directives as amended from time to time:
 - 2014/53/EU: Radio Equipment Directive (RED)
 - 2011/65/EU: Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

The manufacturer also declares that the following harmonised international standards have been applied:

- **KSB Guard sensor unit and KSB Guard transmission and battery unit**
 - IEC 60529 (2nd edition): 2013-08
 - IEC 62368-1: 2014 (2nd edition) and Cor. 1: 2015
 - EN 62368-1: 2014/AC: 2015/ A11:2017
 - ETSI EN 300 328 V2.1.1
 - ETSI EN 301 489-1 V2.2.0: 2017-03
 - ETSI EN 301 489-17 V3.2.0: 2017-03
- **KSB Guard Gateway**
 - ETSI EN 300 328 V2.1.1
 - DIN EN 55024:2016-05
 - DIN EN 55032:2016-02
 - EN 62368-1:2014 + AC:2015-05 + AC:2015-11

The EU Declaration of Conformity was issued in/on:

Frankenthal, 24 June 2024



Thomas Paulus

Head of Corporate Function Digital
KSB SE & Co. KGaA
Johann-Klein-Str. 9
67227 Frankenthal (Germany)

13 EU Declaration of Conformity

Manufacturer:

KSB SE & Co. KGaA
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

The manufacturer herewith declares that **the product**:

KSB Guard with Global Gateway

Serial number ranges:

KSB Guard sensor unit:	GS118W22xxxx to GS130W52xxxx
KSB Guard transmission and battery unit:	GT118W22xxxx to GT130W52xxxx
KSB Guard Global Gateway:	G95720S01xxxxx to G98730S52xxxxxx

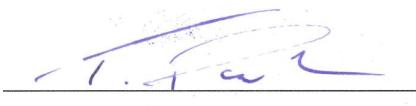
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 - ETSI EN 300 328 V2.1.1
 - ETSI EN 301 489-1 V2.2.0: 2017-03
 - ETSI EN 301 489-17 V3.2.0: 2017-03
- **KSB Guard Gateway**
 - ETSI EN 300 328 V2.2.2: 2019-07
 - IEC 62368-1:2014 (2nd edition) + Cor.1:2015 + Cor.2: 2015
 - EN 62368-1: 2014 + AC: 2015-05 + AC: 2015-11
 - ETSI EN 301 489-1 V2.2.3: 2019-11
 - ETSI EN 301 489-17 V3.2.2 (Draft): 2019-12
 - ETSI EN 301 489-52 V1.1.0 (Draft): 2016-11
 - ETSI EN 301 511 V12.5.1: 2017-03
 - ETSI EN 301 908-1 V13.1.1: 2019-11
 - ETSI EN 301 908-2 V13.1.1: 2020-06
 - ETSI EN 301 908-13 V13.1.1: 2019-11
 - ETSI TS 151 010-1 V12.8.0: 2016-05
 - EN 62311:2018

The EU Declaration of Conformity was issued in/on:

Frankenthal, 24 June 2024



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14 Country-specific certifications

14.1 USA: FCC

This device complies with **part 15 of the FCC Rules**. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

14.2 Canada: IC

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence- exempt RSS(s).

Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

This radio transmitter 26749-GRDGW01 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated.

- PulseLarsen W1038: Peak Antenna Gain 3.8dBi, 50 Ohm
- MC Technologies MC0114530: Peak Antenna Gain 1.0dBi, 50 Ohm

Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Ce transmetteur radio 26749-GRDGW01 a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antennes listés ci-dessous, avec le gain maximal admissible indiqué.

- PulseLarsen W1038 : Gain d'antenne maximal 3,8 dBi, 50 Ohm
- MC Technologies MC0114530 : Gain d'antenne maximal 1,0 dBi, 50 Ohm

Les types d'antennes non inclus dans cette liste et ayant un gain supérieur au gain maximal indiqué pour tout type listé sont strictement interdits pour une utilisation avec cet appareil.

Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

Index

A

- Adhesive curing 20
- Ambient conditions
 - Storage 9
- Antennas 17
- Assignment
 - Sensor unit 23
- As-supplied condition 21, 24
- Automatic measurement 26
- Automatic Measuring Operation 26

B

- Batteries 28
- Bearings 9

C

- Changing the batteries 28
- Commissioning / start-up 24
- Connecting cable 19
- Control elements
 - Transmission and battery unit 14
- Covers for housing screws 28

D

- Deep Sleep 24, 26
- Dismantling
 - Sensor unit 31
- Disposal 10

E

- EU Declaration of Conformity 39, 40
- Event of damage 5
 - Ordering spare parts 38

F

- Faults 32
 - Causes and remedies 33
- Trouble-shooting KSB Guard Gateway 32
- Trouble-shooting the transmission and battery unit / sensor unit 32

Function 13

G

- Gateway 17, 18

H

Hotline 32

I

Improving data transmission 18

Installation

- Transmission and battery unit 21

Installation location

- Installing the transmission and battery unit 21

Intended use

K

Key to safety symbols/markings 5

KSB Guard Gateway 18

- LED indicators 13

KSB Guard Customer Service 32

KSB Guard Gateway 13

L

LED indicators

- KSB Guard Gateway 13

- Transmission and battery unit 14

Limit values 24

M

Magnetic base antenna 17

Manual measurement 26

Measured values 13

N

Name plate 11

O

Operating modes 26

Other applicable documents 5

P

Place of installation

- Gateway 16

- Sensor unit 20

Positioning the sensor unit 20

R

Registration 23

Removing

- KSB Guard Gateway 30

- Transmission and battery unit 30

Resetting to as-supplied condition 27

Routing the connecting cable 22

S

Safety 7

Safety awareness 8

Sensor unit 14, 20

Set-up mode 18

Shutdown

 Transmission and battery unit 27

Signal strength of the mobile data connection 17

Spare part

 Ordering spare parts 38

Storage 9

T

Technical data

 KSB Guard Gateway 12

 Sensor unit 11

 Transmission and battery unit 12

Transmission and battery unit 14, 25

 LED indicators 14

Transport 9

W

Wall bracket 18

Warnings 5

Warranty claims 5



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