User manual



# **Cable identification system**

# KSG 200/KSG 200 T



Figure: KSG 200 T

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## **1** ABOUT THIS MANUAL

### 1.1 Using this manual

This user manual contains all necessary information that is needed for the commissioning and operation of the described product.

- Read this user manual completely before operating the product for the first time.
- Consider this user manual to be a part of the product and store it in an easily accessible location.
- If this user manual is lost, please contact BAUR GmbH or your nearest BAUR representative (http://www.baur.eu/baur-worldwide).

## 1.2 Application of instructions

This user manual applies for cable identification systems:

- KSG 200
- KSG 200 T

### **1.3** Structure of safety instructions

The safety instructions in this user manual are presented as follows:

Danger symbol		
	Type of danger and its source	
	Possible consequences of violation.	
	<ul> <li>Measure to prevent the danger.</li> </ul>	

If a dangerous situation could arise at a specific step, the safety instruction is displayed immediately before this dangerous step and is shown as follows:

## ASIGNAL WORD

Type of danger and its source. Possible consequences of violation.

1. Measure to prevent the danger.

#### Danger levels

Signal words in the safety instructions specify the danger levels.

	Will lead to severe injuries or death.
	May lead to severe injuries or death.
	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

#### **Danger symbols**

	General danger
A	Risk of electric shock

## 1.4 View Settings

Symbol	Meaning
•	You are requested to perform an action.
1.	Perform the actions in this sequence.
2	
a.	If an operation consists of several operating steps, they are specified with "a, b, c".
b	Perform the operating steps in this sequence.
1	Numbering in the legend
2	
•	List
	Indicates further information on the topic.
ß	Indicates tools required for the subsequent tasks.
0	Indicates spare parts required for the subsequent tasks.
7	Indicates required cleaning agents.

## **1.5** Information on the screenshots and graphics used

The screenshots and graphics used are intended to illustrate the procedure and may therefore differ slightly from the actual state.

## 2 FOR YOUR SAFETY

All BAUR devices and systems are reliable and are manufactured as per state-of-the-art technology. The individual parts and the finished devices are subject to continuous testing by our qualified personnel as part of our quality assurance system. Each device is fully tested before delivery.

However, the operational safety and reliability in practice can be achieved only when all necessary measures have been taken. The responsible body<sup>1</sup> and operator<sup>2</sup> of the device or system are responsible for planning these measures and monitoring their implementation.

Before operating the device or system you should read and understand this user manual and the user manuals of all integrated devices.

### 2.1 Intended use

The cable identification system from the KSG series is used to identify single and multi-core cables in a cable bundle or cable loom:

- KSG 200 for de-energised cables
- KSG 200 T for live cables, measurement category CAT IV/ 600 V

If the system is not used without observing this condition, safe operation cannot be guaranteed. The user is liable for any damage to persons and property resulting from incorrect operation!

Proper use also includes

- Compliance with all instructions in this user manual and in the user manuals of integrated and operated devices,
- Compliance with the technical data and connection requirements given on the rating plate and in the user manual (applies for all devices in the system),
- Compliance with the inspection and maintenance instructions.

### 2.2 Instructions to the user

The product may only be operated by authorised and trained electrical engineers. An electrical engineer is a person who, owing to his professional education (electrical engineering), knowledge, experience and acquaintance with the applicable standards and regulations, can assess the tasks assigned to him and detect possible dangers.

In addition, the user must have:

- Knowledge of the technical equipment and operation of KSG 200/KSG 200 T
- Knowledge of plant engineering (cable types, switchboard plant, etc.).

<sup>&</sup>lt;sup>1</sup> Responsible body is the person or group that is responsible for the safe operation of the device and its maintenance (EN 61010-1, 3.5.12).

<sup>&</sup>lt;sup>2</sup> Operator is the person who uses the device for its intended purpose (according to the definition of user in compliance with EN 61010-1, 3.5.11).

## 2.3 Avoiding dangers, taking safety measures

- When installing the test system and operating KSG 200/KSG 200 T observe the following rules and guidelines:
  - Accident prevention and environment protection rules applicable for your country
  - Safety instructions and regulations of the country where KSG 200/KSG 200 T is being used (according to the latest version)
  - EU/EFTA countries: EN 50110 "Operation of electric systems"
  - Other countries: Standards for operating electric systems applicable in your country
  - If necessary, other national and international standards and guidelines in accordance with the latest applicable version
  - Local safety and accident prevention regulations
  - Operational insurance association regulations (if any)

### 2.3.1 Operation only in a technical secure state

Safety, function and availability depend on the proper condition of the system.

- Operate the system and the integrated devices only in a technical perfect condition.
- In case of damage and malfunction, immediately stop the system, mark it accordingly and have the faults rectified by appropriately qualified and authorised personnel.
- Comply with the inspection and maintenance conditions.
- Use only accessories and original spare parts recommended by BAUR. The use of spare parts, accessories and special facilities that are not tested and approved by BAUR could adversely affect the safety, function and characteristics of the product.

### 2.3.2 No operation during condensation

Condensation can form in devices and systems due to temperature fluctuations and high air humidity, which in some components can result in leakage currents, flashovers and short-circuits.

Maximum danger arises when relatively high air humidity and temperature fluctuations occur in a device consecutively, which is the case when storing the system or device in an unheated room or when placed outdoors, for example. When the system or device is then exposed to a high ambient temperature, the cold device surfaces cool the air in the immediate vicinity, which leads to formation of condensation even inside the device.

During this process, two factors are crucial:

- The higher the relative air humidity, the faster the dew point is reached and water is condensed.
- The higher the temperature difference between the surfaces and the ambient air, the stronger the tendency for condensation.
- Always prevent condensation in devices. Temper the device and system before and during the measurements so that no condensation occurs.

### 2.3.3 No operation in areas with risk of explosion and fire

Measurements in direct contact with water, in environments with explosive gases and in areas with fire risks are not permitted. Possible danger areas include e.g. chemical factories, refineries, paint factories, paint shops, cleaning plants, mills and stores of milled products, tank and loading plants for combustible gases, liquids and solid matter.

#### 2.3.4 Dangers when working with electric voltage

During cable identification with systems from the KSG series, a voltage up to 300 V is generated that is connected to the cable to identify via a connection cable. In addition, with KSG 200 T, you can carry out cable identification on live cables. Operating personnel need to pay special attention and must be very careful while working with electric voltage.

Commissioning and operation of KSG 200/KSG 200 T are permitted only in compliance with the EN 50110 (EU/EFTA countries) or with standards applicable in your country.

• Before commencing work, the operator must assess the risks for the specific working conditions. Protective measures are based on the risk assessment and must be followed at the workplace.

Other safety information:

- Cable identification on de-energised cables (on page 10)
- Cable identification on live cables (on page 11)

#### Cable identification on de-energised cables

#### **Observe 5 safety rules**

- Comply with the following safety rules before beginning tasks in and on the electrical plant:
- 1. Disconnect the test object.
- 2. Secure against re-connection.
- 3. Verify absence of operating voltage.
- 4. Earth and short all phases.
- 5. Provide protection against adjacent live parts.



#### Cable identification on live cables

You can carry out cable identification on live cables only with KSG 200 T. Note that working on live parts and plants can be fundamentally dangerous.

When connecting the system to the cable that is to be identified, the operator can come close to live parts during preparation and while performing the cable identification. In so doing, there is danger of touching the active parts directly or indirectly.

Working in the vicinity of adjacent live parts		
Danger to life or risk of injury due to electric shock.		
<ul> <li>The KSG 200 T cable identification system may be used only in electric circuits of the measurement category CAT IV/600 V .</li> </ul>		
Mains nominal voltage (outer phase-neutral phase) DC or $AC_{ms}$ : 600 V		
<ul> <li>Use the cable identification on live cables only with the supplied safety measurement cables.</li> </ul>		
Without the safety measurement cables, the KSG 200 T cable identification system has the measurement category 0 and should not be used on live cables.		
<ul> <li>Maintain safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space (EN 50110).</li> </ul>		
<ul> <li>During connection, implementation and monitoring of the measurement, protection must be guaranteed for all plant parts, either</li> </ul>		
<ul> <li>through safety devices, insulating cover material</li> </ul>		
<ul> <li>or by adhering to the necessary safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space.</li> </ul>		
In this regard, comply with EN 50110 or the applicable standards in your country as well as the relevant national and local accident prevention regulations.		
<ul> <li>Working in the vicinity of open cables or faulty systems is forbidden. Notify the responsible authorities immediately.</li> </ul>		
<ul> <li>Use suitable personal protective equipment to protect against arcing faults.</li> </ul>		
<ul> <li>To assess the local conditions adequately, provide sufficient lighting at the work place.</li> </ul>		

#### Dangers during cable cutting after cable identification

Among other things, cable identification is used to determine the right cable before cutting an electrical connection. This helps you avoid cutting a wrong, or live cable accidentally.

In spite of the latest identification procedure, in particular in cable clusters or due to the identification being affected by adjacent cables that are in operation, etc. it is not always possible to clearly determine the de-energised condition of a specific cable that you want to work with. If no current can be ascertained by measuring the current with KSG systems, it does not mean that the cable is disconnected and can be safely cut.

<u>^</u>		
	Dangerous voltage in cables	
	Danger to life or risk of injury due to electric shock; damage to property when cables are cut during incorrect cable identification.	
	<ul> <li>Only use cable cutters in compliance with EN 50340 or cable spiking tools.</li> </ul>	
	<ul> <li>Follow the safety instructions in the user manual for the cable cutter or cable spiking tool used.</li> </ul>	

## 2.4 Special personal protection equipment

Personal safety equipment based on the risk assessment for the relevant working conditions is part of the KSG 200/KSG 200 T safety concept.

• Observe the national safety regulations and your company's working and operating instructions.

Dependent on the conditions of the work place, use the following safety equipment:

Protection against electrostatic charging, crushing, slipping and other accidents:	<ul> <li>Safety footwear</li> </ul>
Protection against electrical hazards (arcing fault):	<ul> <li>Certified safety clothing</li> <li>Hard hat with visor</li> <li>Insulating protective gloves</li> <li>LV HRC fuse handle with sleeve</li> </ul>
Protection against noise:	<ul> <li>Ear protection</li> </ul>
Protection against dangers from road traffic:	<ul> <li>High visibility vest according to EN 471 (Protection class 2) or according to the applicable standards in your country for high visibility clothing for commercial use.</li> <li>Important: No high visibility vest during tasks with risk of arcs!</li> </ul>
Hand protection:	<ul> <li>Safety gloves</li> </ul>

## **3 PRODUCT INFORMATION**

### 3.1 Device types

The cable identification system KSG 200 is available in two types:

- KSG 200 for cable identification on de-energised cables
- KSG 200 T for cable identification on live cables (CAT IV/600 V)

### 3.2 Transmitter

The transmitter contains a pulse capacitor that is charged and later discharged via the cable that is to be identified. The charging and discharging of the pulse capacitor is controlled temporally by a microprocessor. A holder for the receiver has been provided on the transmitter. While inserting the receiver in the transmitter holder, an electrical connection is established between both devices and following actions can be performed automatically:

- The cable identification system is moved to the initial state.
- The super capacitors for power supply to the receiver are charged.
- Data between devices is exchanged via a serial interface.



No.	Element	Function
1	On/Off switch	Is used to switch the device on and off
2	Device protection fuse	Is used to protect the transmitter
		Type: 250 V/T 1 A, rated breaking voltage 1500 V (H)
3	Selector switch for the mains voltage available on site	Is used to set the mains voltage available on site (115 V or 230 V) $\!$
4	Mains voltage connection	Is used to connect the device to the mains voltage available on site (115/230/240 V, 50/60 Hz)
5	LED Л	Lights up in the current pulse cycle
6	LED ON	Indicates whether the transmitter is receiving power
7	LED +	Lights up when the receiver is charging
8	Holder for the receiver	Is used to insert the receiver for charging and calibration
9	Contacts	Are used to connect the transmitter and the receiver
10	Bayonet port	Is used to connect the connection cable to the transmitter

### 3.2.1 Connection cables



No.	Element	Function
1	Bayonet port	Is used to connect the connection cable to the transmitter
2	Red connection clip (transmitter plus pole)	Is used to connect the transmitter to the cable or phase that is to be identified
3	Black connection clip (transmitter minus pole)	Is used to connect the transmitter to the substation earth or to the second phase for the return circuit of the connected current pulse

### 3.2.2 Connection set to connect to live LV cables (KSG 200 T)

The connection set to connect to live LV cables comprises of

- 2 safety measuring cables, CAT IV/600 V
- 2 fuses F 7 A, 50 kA @ AC 600 V (integrated in safety measuring cable)



## 3.3 Receiver

The receiver with the attached flexcoupler is used to record and evaluate the current pulses and to display the measurement results.

The flexcoupler is available in 2 sizes:

- Ø 150 mm
- Ø 250 mm



No.	Element	Function
1	Flexcoupler	Is used to record the electromagnetic field around the cable that is to be identified
2	Display	Displays information on the measurement and measurement results
3	button	Displays the infocode and starts the current measurement
4	button	Increases the gain in expert mode
5	button	Decreases the gain in expert mode
6	s button	Starts the calibration and displays the signal amplitude
7	Contacts	Are used to connect the transmitter and receiver in the holder
8	Infocodes	Are used to explain the displayed infocodes

## 3.4 Power supply

Power to the KSG 200/KSG 200 T transmitter can be provided from any existing mains supply on site.

Permissible mains voltage: 115/230/240 V

Permissible mains frequency: 50/60 Hz

The receiver is equipped with super capacitors for power supply and is automatically charged in the transmitter holder when the transmitter is switched on. After it is fully charged, the receiver can be used for approx. 1 hour.

### 3.5 Markings on the system

### 3.5.1 Rating plates



Rating plate	Description	
Туре	Device designation	
	In the receiver, the number 150 and 250 specifies the diameter of the connected flexcoupler.	
Nr.	Serial number	
KSG 200 (T)	Displays whether it pertains to the device variants KSG 200 or KSG 200 T	
U	Supply voltage	
	If several supply voltages are possible, these are given consecutively one after another.	
0	Time characteristics and nominal current of the device fuse: time lag (T)	
f	Mains frequency	
50 VA	Max. recorded apparent output	
$\triangle$	General warning sign	
	Indicates that there is a potential risk of danger when using the product and hence the user manual must be observed	
Œ	CE mark	
	Indicates that the device or system conforms to CE.	
	Indicates that the device has additional insulation or is double insulated (protection class II)	

### 3.5.2 Safety and information signs on the system

### **Connection cables**



No.	Element	Function
1	🛦 L	Indicates the red connection cable that is connected to the cable that is to be identified
2	▲N	Indicates the black connection cable that is connected to the station ground or to the second phase for the signal return line.

### Flexcoupler



No.	Element	Function
1	Arrow	Is used as a guide while placing the flexcoupler. The arrow should point towards the far end.
2	Connection diagram	Displays how the flexcoupler should be placed with reference to adjacent cables or phases so as to minimise detection of wrong signals during the cable identification.

#### Receiver

A plate on the back of the receiver displays the explanation of the infocodes. Further information: chapter *Infocodes and their meaning* (on page 25)

## 4 **TECHNICAL DATA**

Transmitter			
Pulse voltage	300 V	Pulse current	Max. 180 A
Pulse sequence	15 pulses/min	Power supply	115/230/240 V, 50/60 Hz
Voltage-proof up to (KSG 200 T)	Max. 400 V, 50/60 Hz	Measurement category (KSG 200 T)	CAT IV / 600 V*
Protection class	II	Degree of protection	IP40

\* Measurement category CAT IV / 600 V: Applicable for measurements at the source of the low voltage installation, e.g. meter, main connection, primary overcurrent protection (IEC/EN 61010-1).

Mains nominal voltage (outer phase-neutral phase) DC or  $AC_{ms}$ : 600 V

#### KSG 200/KSG 200 T receiver

Flexcoupler Ø 150 mm or Flexcoupler Ø 250 mm

Sensitivity

with galvanic impulse coupling 100 % at a loop resistance of 400 Ohm (I = 0.75 A) with inductive impulse coupling 100 % at loop resistance of < 6 Ohm

Load current range	0 - 199 A ± 2 %, 50/60 Hz
Display	LCD display
Power supply	Automatic charging in the transmitter holder
Degree of protection	IP52
Dimensions (W x H x D)	100 x 25 x 211 mm
Weight	with flexcoupler Ø 150 mm: approx. 360 g
	with flexcoupler Ø 250 mm: approx. 470 g

General information on the cable identification systems in the KSG 200 series					
Ambient temperature (operation)		-10 °C to +55 °C	Storage temperature	-20 °C to +50 °C	
Dimensions of case (W x H x D)		594 x 174 x 435 mm	Weight of case with transmitter and receiver	Approx. 6,2 kg	
Safety and EMC		CE-compliant in accordance with Low Voltage Directive (2014/35/EU), EMC Directive (2014/30/EU), EN 60068-2-ff Environmental testing			
Clip-on current transformers (options)					
		AZ 10/D 70	AZ 10/D 80	AZ 10/D 125	
Inner diameter D		70 mm	80 mm	125 mm	
Dimensions					
	А	133 mm	146 mm	182 mm	

336 mm

128 mm

317 mm

125 mm

B 336 mm

126 mm

С

## **5 OPERATING THE SYSTEM**

### 5.1 Cable identification with KSG 200

#### Principle



With the transmitter, current pulses with positive polarity are coupled to the cable that is to be identified. The coupled positive current pulses pass to the far end along the connected cable. On the other hand, the return current spreads to the earthed cable screens or to the other connected phases depending on the selected connection method and shows a negative polarity.

The current pulses are detected and transmitted to the receiver with the identification coil (flexcoupler) with direction display. The receiver evaluates the current pulse in relation to 3 parameters:

- Polarity In the cable that is to be identified, the polarity must be positive.
- Amplitude The signal amplitude
- Time interval The defined interval of the current pulse ensures that no external signals are evaluated.

When all 3 parameters match, it pertains to the desired cable. This is displayed accordingly on the receiver display.

#### Calibration

The first step during cable identification with KSG 200/KSG 200 T is the calibration of the transmitter and receiver.

During calibration, the connected cable is analysed for faults and amplitude. As the amplitude depends on the loop resistance, the receiver automatically sets the gain to 100% of the output amplitude. This ensures that both the direction and the amplitude of the signal is available for the evaluation. This process takes maximum 1 minute. Here, it is important that the flexcoupler at the transmitter connection point encompasses the cable to identify.

The second step is the actual cable identification. At the identification location, the flexcoupler of the receiver is placed around the connected cable with the arrow pointing towards the far end. The cable identification starts with the starts button. The polarity of the received current pulse is displayed on the receiver.

## 5.2 Switching on and off the system

#### Switch on the system



Flat-blade screwdriver 1.0 x 5.5 mm

- 1. Connect the mains supply cord to the transmitter and to a power socket.
- Select the mains voltage that is available on site using the selector switch. To do this, turn the selector switch into the correct position using the flat-blade screwdriver. The white arrow on the selector switch shows the set mains voltage. Possible settings: 115 V or 230 V



3. Switch on the transmitter with the On/Off switch.

#### Switch off the system

- Switch on the transmitter with the On/Off switch.
   Note: After switching off the transmitter, wait approx. 15 seconds before switching it on again.
- 2. To disconnect the transmitter from the mains voltage, pull out the mains plug.
- 3. Remove the mains supply cord from the transmitter.

## 5.3 Display

### 5.3.1 Symbols

Symbol	Description	
$\stackrel{\scriptstyle \downarrow}{\gg}$	Displays the transmitter connection point	
4	Displays the flexcoupler connection point	
	T next to the flexcoupler displays that it is the receiver for KSG 200 T	
ŧ	Near or far end of the cable	
60	Indicates that the calibration is completed and the cable identification can be started at the identification location	
$\triangleleft$	Displays the negative current polarity (wrong cable)	
	Displays the positive current polarity (right cable)	

Symbol	Description		
Ø	Indicates that the receiver is searching for a current pulse		
Octor	Flashes when the signal amplitude is < 10% or no signal is located		
==	Is displayed during the signal stability test Before the receiver detects a signal as valid, the signal stability (amplitude and polarity) is tested		
ŧ ‡	<ul> <li>Indicates that the cable or phase has been located:</li> <li>Positive current polarity</li> <li>Signal amplitude &gt; 64%</li> </ul>		
ŧŧ	<ul> <li>Indicates that a branch has been detected:</li> <li>Positive current polarity</li> <li>Signal amplitude between 10% and 64%</li> </ul>		
ŧ ŧ	Indicates that no cable has been located		
TEST WRONG	Indicates that this is a wrong cable		
<u>^</u> 100%	<ul> <li>Displays the signal amplitude</li> <li>To display the signal amplitude, press the signal amplitude, press</li></ul>		
83 <sub>ã</sub>	<ul> <li>Displays the current</li> <li>To measure the current, press the <sup>6</sup>/<sub>-4</sub> button</li> </ul>		
	Indicates that the expert mode is active		
\$	Displays the gain		
⚠	<ul> <li>Warning sign: Displays a fault</li> <li>Flashing warning sign (infocode 199): Indicates that the signal amplitude is 120% and that the measurement result can be false</li> </ul>		
0	<ul> <li>Indicates that information on the current measurement is available.</li> <li>To display the infocode, press the <sup>6</sup>/<sub>2</sub> button on the receiver.</li> <li>Information on the meaning of infocodes: chapter <i>Infocodes and their meaning</i> (on page 25)</li> </ul>		
CODE	Displays the infocode		
÷	<ul> <li>Flashes when the receiver charge status is low</li> <li>To charge the receiver, place it in the transmitter holder.</li> </ul>		

## 5.3.2 Infocodes and their meaning

Code	Text on the back of the receiver	Description	
101	Connect transmitter and receiver. Press the <b>Start</b> button to calibrate.		
122	Lay the receiver in the transmitter bracket.	• For the calibration, place the receiver in the transmitter holder.	
131	No signal.	This is not the searched cable.	
		Place the flexcoupler around another cable.	
		The loop resistance is too high.	
132	Incorrect current polarity.	This is not the searched cable.	
		Flexcoupler is attached incorrectly.	
		• Check the direction of the arrow on the flexcoupler. The arrow must point in the direction of the cable end.	
133	Loss of signal.	The signal decreases.	
		Possible causes: cable faults due to earth contact, T-branch or earthed joints	
138	Signal is too weak.	The amplitude fluctuations of the last three measurements were too high. Therefore, no polarity and signal amplitude are displayed.	
139	No evaluation of signal amplitude due to interferences.	The signal amplitude is not displayed, as it fluctuates greatly due to interferences.	
		The pulse and its direction are identified.	
180 – 184	No communication between transmitter and receiver.	Receiver is not placed correctly in the transmitter holder.	
		Contacts on transmitter and/or receiver are dirty.	
		Clean the contacts.	
190	Warning: External voltage at output.	<ul> <li>KSG 200: Disconnect the connection cable from the cable that is to be identified. The connected cable is live.</li> </ul>	
	KSG 200 (A): Risk of electric shock! Disconnect connection cable from test object.	You may carry out cable identification on live cables only with KSG 200 T.	
	<b>KSG 200 T (A):</b> Note the measurement category (CAT).	<ul> <li>KSG 200 T: Observe the safety instructions while carrying out tasks on live cables.</li> </ul>	
193	Flexcoupler is defective.	During calibration and before each reading, the flexcoupler is examined for any faults.	
		<ul> <li>Contact BAUR After Sales Service and note down the displayed infocode as well as the procedure that caused the error.</li> </ul>	
194	Noise signal is too strong.	No measurement is possible. Due to high frequency noise signals, the current pulse cannot be clearly detected.	
195	Current is too high (I > 180 A).	Current pulse is greater than 180 A.	

Code	Text on the back of the receiver	Description
196	Incorrect current polarity during	The flexcoupler is connected incorrectly.
	calibration. Check the connection.	<ul> <li>Check the direction of the arrow on the flexcoupler. The arrow must point in the direction of the cable end.</li> </ul>
		Positive (red) and negative (black) output of the transmitter were replaced.
		<ul> <li>Connect the red connection cable to the cable that is to be identified, the black to the return phase (station earth or other phase).</li> </ul>
		The clip-on current transformer (optional) is connected incorrectly.
		<ul> <li>Check the direction of the arrow on the clip-on current transformer. The arrow must point in the direction of the cable end.</li> </ul>
197 – 198	No signal. Calibration not possible.	No signal could be detected.
199	Signal amplitude > 120%.	The loop resistance has changed.
		<ul> <li>Recalibrate the system.</li> </ul>

## 5.4 Standard and expert mode

KSG 200/KSG 200 T has two operating modes:

Standard mode

In standard mode, the gain is set automatically after the calibration. No other settings are required.

Expert mode

In the expert mode, it is possible to manually adjust the gain. The expert mode is suitable for cable identification on mixed cable routes (e.g. XLPE and PILC cable) or compact stations.

## **6 CONNECTING THE SYSTEM**

### 6.1 Signal coupling types

There are two options to couple the current pulse in the cable that is to be identified:

- galvanic
- inductive with a clip-on current transformer (optional)

The inductively coupled current pulse is essentially weaker than the galvanically coupled pulse. A reliable cable identification is possible with an inductive coupling only when the loop resistance is < 6 Ohm.

In paper-insulated mass-impregnated cables, T-branched networks or earthed joints, the current pulse can decrease with increasing cable length. Therefore, whenever possible, it is recommended to couple the current pulse galvanically.

The description and figures below refer to the galvanic coupling of the current pulse. Information on the inductive coupling: chapter *Connecting the system for inductive signal coupling (optional)* (on page 34)

### 6.2 Setting up the system

- Comply with the applicable accident prevention regulations and local conditions.
- Select the installation location for the system in such a way that
  - a stable base is guaranteed for the transmitter,
  - the transmitter is accessible for making connections and for operation,
  - sufficient safety distances are maintained. Comply in this regard with EN 50110 for operation of electric systems (EU/EFTA countries) or the relevant standards applicable in your country.

### 6.3 Checks to perform before commissioning

1. Check the transmitter, receiver and all mechanical connections for damage.

 Check electrical connections and connection cables for damage. Use only undamaged connection cables.

#### Cable identification on live cables (KSG 200 T)

- 1. Before and after each cable identification, check if the fuses in the safety measurement cables are working. For this, perform a continuity test with a multimeter.
- If the fuse is not working, replace the fuse. Further information:
  - Chapter Testing fuses in safety measurement cables (KSG 200 T) (on page 48)
  - Chapter Replacing fuses in safety measurement cables (KSG 200 T) (on page 49)

## 6.4 Important information on connecting the flexcoupler

- The direction arrow of the flexcoupler should point towards the far end.
- Position the flexcoupler closure as far as possible from the adjacent phases.
   The closure is very sensitive to external couplings that can lead to wrong results if the closure is close to a return phase.



• Apply the flexcoupler for the cablibration the same as for the cable identification: Either around the entire cable or around a phase. Otherwise, different signal amplitudes are measured and the cable identification cannot be carried out successfully.

## 6.5 Connecting the system to de-energised cables

### 6.5.1 Safety instructions

<u>A</u>			
	Danger due to electric voltage, flashovers at the connection point, or arcing fault on connection		
	Electric shock on touching live and active parts and due to residual charges and induction voltages;		
	Burns, electro-ophthalmia, hearing damage.		
	• Use suitable personal protective equipment against electric shocks and arcing faults.		
	Observe the phase breaks.		
	<ul> <li>Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates).</li> </ul>		
	• You may touch the parts that were under voltage only if they are visibly earthed and short-circuited.		

### 6.5.2 Ensure there is no voltage at the work place

Before connecting the test object follow the 5 safety rules:

- 1. Disconnect the test object from all phases.
- 2. Secure the test object against reconnection.
- 3. Ensure that there is no voltage.
- 4. In the station, connect all conductors of the test object with the station earth and short-circuit it.
- 5. Secure adjacent live parts against accidental contact and flashovers with suitable covers.

### 6.5.3 Connecting the system for galvanic signal coupling

#### Prerequisite

The workplace must be disconnected from the power supply.
 Further information: chapter *Ensure there is no voltage at the work place* (on page 28)

#### **Connection diagram**

- Return current via the cable screens of adjacent cables (1-phase cable) (on page 29)
- Return current via another phase (1-phase cable) (on page 30)
- Sheath-isolated 3-phase cable (on page 31)

#### Procedure

- 1. Connect the black connection clip to the station earth.
- 2. Connect the red connection clip to the cable phase that is to be identified.
- 3. Earth the phase to read at the far end. **Calibration**
- For the calibration, place the receiver in the transmitter holder.
   Place the flexcoupler at the desired position around the cable to which the transmitter is connected. Observe the following:
  - The direction arrow of the flexcoupler should point towards the far end.
  - Position the flexcoupler closure as far as possible from the adjacent phases.

The area around the closure is very sensitive to external couplings that can produce incorrect results if the closure is located close to a return phase.



- Apply the flexcoupler for the cablibration the same as for the cable identification: Either around the entire cable or around a phase.
- 5. Remove the earthing and the short-circuit connection at the connected phase.
- 6. Remove the earthing of the cable screen at the near end.
- 7. After the calibration, remove the receiver from the transmitter holder.
- 8. Place the flexcoupler on the identification location around the cable. Follow the important instructions for placing the flexcoupler from step 4.

#### Return current via the cable screens of adjacent cables (1-phase cable)

Special features of the connection:

- Adjacent phases are earthed.
- Cable sheath of the cable that is to be identified is disconnected from the earth at the near end.
- Return current flows back via the cable screens of the adjacent cables or phases.

Due to the earthing of the adjacent phases, the return currents passing through them increase, in relation to the phase to identify. This means that the amplitudes of the return currents become higher and can be clearly detected.

**Connection for the calibration** 

Connection for the cable identification



#### Measurement results:

	Polarity:	Signal amplitude:
Cable to be identified (I)	positive	100%*
Other cables or phases $(I_{\scriptscriptstyle R})$	negative	clearly lower depending on the number of return phases (50%)*

\* Note that the specified percentage values serve as orientation for checking the measurement result. Currents and return currents are divided according to the phase resistance. These percentage values no longer apply for additional earth connections, e.g. other cables, earth strip, ducts etc.

#### Return current via another phase (1-phase cable)

Special features of the connection:

- Return current flows back via a couple of adjacent phases.
- Influences due to vagrant currents will be avoided by this connection. It is especially helpful during cable identification in paper-insulated cables (PILC).



Information on the connection for the calibration is given in the chapter *Return current via the cable screens of adjacent cables (1-phase cable)* (on page 29).

#### Measurement results:

	Polarity	Signal amplitude:
Cable to be identified (I)	positive	100%*
Other cables or phases $(I_R)$	negative	1 Phase as return phase: 100%*
		2 Phase as return phase: 50%* respectively

\* Note that the specified percentage values serve as orientation for checking the measurement result. Currents and return currents are divided according to the phase resistance. These percentage values no longer apply for additional earth connections, e.g. other cables, earth strip, ducts etc.

#### Sheath-isolated 3-phase cable

Special features of the connection:

- All phases of the cable that is to be identified are earthed and shorted at the far end.
- Cable sheath of the cable that is to be identified is earthed at the near and far end.
- Return current flows back via the cable screen of the cable that is to be identified and via the cable screens of the adjacent cables.

#### **Connection for the calibration**

#### Connection for the cable identification



## 6.6 Connecting the system to live cables (KSG 200 T)

### 6.6.1 Safety instructions

4				
	orking in the vicinity of adjacent live parts			
	anger to life or risk of injury due to electric shock.			
	The KSG 200 T cable identification system may be used only in electric circuits of the measurement category CAT IV/600 V .			
	Mains nominal voltage (outer phase-neutral phase) DC or $AC_{ms}$ : 600 V			
	Use the cable identification on live cables only with the supplied safety measurement cables.			
	Without the safety measurement cables, the KSG 200 T cable identification system has the measurement category 0 and should not be used on live cables.			
	Maintain safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space (EN 50110).			

### 6.6.2 Connecting the system for galvanic signal coupling

#### Prerequisites

- Cable identification system KSG 200 T
- Measurement category of electric circuit ≤ CAT IV/600 V
- Connection set to connect to live LV cables (standard delivery)

#### Prepare safety measurement cable



- 1. Remove the connection clip from the red connection cable.
- 2. Connect the red safety connection cable to the plug of the red connection cable.
- 3. Connect the connection clips to the safety measurement cable.
- 4. Repeat steps 1 3 for the black connection cable.

#### **Connect system**



- 1. Leave all consumers connected.
- 2. Connect the transmitter with the safety measurement cable in such a way that the current flows in the direction of the transformer station.

Unlike during signal coupling to disconnected cables, during cable identification on live cables, the flow of the current pulse is determined from the impedance of the connected consumers and feed source (transformer station).

3. Place the flexcoupler for the calibration at the same position around the cable to which the transmitter is connected.

Observe the following:

- The direction arrow of the flexcoupler should point towards the far end.
- Position the flexcoupler closure as far as possible from the adjacent phases.
   The area around the closure is very sensitive to external couplings that can produce incorrect results if the closure is located close to a return phase.



- Apply the flexcoupler for the cablibration the same as for the cable identification: Either around the entire cable or around a phase.
- 4. After the calibration, place the flexcoupler on the identification location around the cable that is to be identified. Follow the important instructions for placing the flexcoupler from the previous step.

### 6.6.3 Connecting the system for inductive signal coupling (optional)

With a clip-on current transformer, you can couple current pulses in the cable that is to be identified inductively. Note that the current pulse during an inductive coupling is essentially weaker than during a galvanic coupling. Identifying the cable can be essentially difficult due to external influences.

Inductive signal coupling is particularly suitable for following conditions:

- Live cables
- Cable terminations difficult to reach
- Loop resistance R ≤ 6 Ohm

#### Loop resistance



**Note:** If the loop resistance is R > 6 Ohm, the receiver can receive no signal. The error message *197* is displayed.

#### **Connection example**



- 1. Place the clip-on current transformer in such a way that the arrow on the current transformer points in the direction of the far end.
- 2. Place the flexcoupler in such a way that the arrow on the flexcoupler also points in the direction of the far end.

Connection diagram: chapter *Connecting the system for galvanic signal coupling* (on page 33)

### 6.7 Applying the flexcoupler with flexible rod

The flexible rod is used to safely apply the flexcoupler to live cables. With that, the operator can guide the flexcoupler around the cable at a safe distance from live parts.

The flexible rod is a fully isolated flexible arm with a length of approx. 50 cm and can be turned to any position.



- 1. Open the loop of the flexcoupler.
- 2. Hook the flexible rod in the hole provided for the purpose in the flexcoupler.
- 3. Bend the flexible rod in such a way that you can guide it around the cable that is to be identified.
- 4. Position the flexcoupler around the cable.
- 5. Close the flexcoupler and remove the hook from the flexcoupler.

## 6.8 Securing the test area

- 1. Secure the work area in compliance with the road traffic regulations in your country.
- 2. Make sure that except for the tester, no other person is able to access the work area.
- 3. Make sure that unauthorised persons have no access to the device and the parts being tested.
- 4. Mark the work area adequately with signs and traffic installations.
- 5. Pinpointing work on roads must be kept to the minimum and carried out during low traffic hours as far as possible.
- 6. Discontinue the pinpointing work and clear the work area if the safety of the testing personnel is no longer assured in the event of poor visibility conditions, e.g. fog or drifting snow, or can no longer be assured by the use of traffic signs and installations.
- 7. During darkness, limit the work to urgent exceptional cases.
- 8. Wear a high visibility vest so that road users can recognise you better.
- 9. Discontinue the pinpointing work and clear the work area if the safety of the testing personnel is no longer assured due to poor weather, e.g. thunderstorm or heavy gales.

### 6.8.1 Securing the test area during cable identification on live cables

- 1. Mark out the path for pedestrians.
- 2. Secure the connection cable, e.g. with cable bridges or rubber mats. The cables must be protected against damage and there must be no danger of people tripping.
- 3. Mark the test area and terminals clearly. It must be very obvious that a measurement is in progress.
- 4. Make sure that unauthorised persons cannot access the local mains stations.

## 7 CABLE IDENTIFICATION

## 7.1 Calibrating the system and identifying cables

Cali	Calibration				
1.		Switch on the transmitter.			
2.	0	Leave the receiver in the transmitter holder.			
		The cable identification system is moved to the initial state. The receiver is charged.			
3.		Connect the transmitter to the cable that is to be identified.			
	Ţ.	Place the flexcoupler at the desired position around the cable to which the transmitter is connected.			
		Further information: chapter <i>Connecting the system</i> (on page 27)			
4.		Press the sutton on the receiver.			
		The receiver analyses the cable and sets the gain at 100% of the output amplitude. The gain is displayed during the calibration.			
	7 I I	The calibration is completed automatically.			
		Remove the receiver from the transmitter holder and go to the identification location.			
	to to	When you are going to the identification location, the receiver cannot receive any signal.			

Cab	le identification	
5.		<ul> <li>Place the flexcoupler around the cable that is to be identified or the phase in such a way that the arrow on the flexcoupler points towards the far end.</li> <li>Important:</li> <li>The flexcoupler sensor must be placed as far as possible from the adjacent phases:</li> <li>Important:</li> <li>Apply the flexcoupler for the cablibration the same as for the cable</li> </ul>
		identification: Either around the entire cable or around a phase.
		Firstly, three measurements are automatically carried out for the signal stability test. The polarity and amplitude of the signal must be the same in the three measurements.
		If the stability test is successful, the current polarity is displayed.
6.		To display the signal amplitude, press the 🎑 button.
		The next step depends on the measurement results: chapter Evaluating measurement results (on page 38)

## 7.2 Evaluating measurement results

Display	Ot	her steps
	1.	To check the measurement result, carry out the measurements on all adjacent cables and phases. The signal polarity on the adjacent cables or phases should be negative.
The cable that is to be identified is detected:	2.	If a positive polarity is displayed on adjacent cables:
<ul> <li>Positive current polarity</li> </ul>		a) Check if the arrow on the flexcoupler or clip-on
<ul> <li>Signal amplitude: according to the connection method used</li> </ul>		current transformer points to the cable end. If the direction of the arrow is wrong, place the flexcoupler or the clip-on current transformer
<ul> <li>Cable start and cable end are connected with a line.</li> </ul>		correctly around the cable that is to be identified.
		b) Repeat the measurement.

#### Display



The current pulse decreases when the cable length increases, this leads to lower signal amplitude. This indicates a T-branch, a paper-insulated mass-impregnated cable or earthed joint.

However, the cable that is to be identified is detected:

- Positive current polarity
- Signal amplitude: 10 64%
- Cable start and cable end are connected with a line.



Incorrect cable:

- Negative current polarity
- Different signal amplitudes depending on return current path
- Cable start and cable end are not connected with a line.

If the display shows a flashing warning symbol, the signal amplitude is > 120%.

Although the receiver can detect the current polarity, the measurement result could be wrong.

- Positive current polarity
- Signal amplitude: 120 %
- Flashing warning sign

#### Other steps

- 1. If possible, couple the current pulse galvanically.
- To check the measurement result, carry out the measurements on all adjacent cables and phases. The signal polarity on the adjacent cables or phases should be negative.
- 3. If a positive polarity is displayed on adjacent cables:
  - a) Check if the arrow on the flexcoupler or clip-on current transformer points to the cable end. If the direction of the arrow is wrong, place the flexcoupler or the clip-on current transformer correctly around the cable that is to be identified.
  - b) Repeat the measurement.
- 1. Check if the arrow on the flexcoupler or clip-on current transformer points to the cable end.
  - a) If the direction of the arrow is correct, the flexcoupler or the clip-on current transformer has been placed around the wrong cable.
     Place the flexcoupler or the clip-on current transformer around another cable.
  - b) If the direction of the arrow is wrong, place the flexcoupler or the clip-on current transformer correctly around the cable to identify.

#### 2. Repeat the measurement.

- 1. Calibrate the cable identification system again.
- 2. Repeat the measurement.
- 3. To check the measurement result, carry out the measurements on all adjacent cables and phases.

## 7.3 Carrying out the measurement in expert mode

The expert mode is suitable for cable identification on mixed cable routes (e.g. XLPE and PILC cable) or compact stations. If no signal can be received in the calibrated standard mode with automatic gain in the cable trench, in expert mode, you can manually adjust the gain.

### 7.3.1 Activating the expert mode

The expert mode can only be activated after calibrating the system.

- Calibrate the system.
   Further information: Chapter Calibrating the system and identifying cables (on page 37) (Steps 1 to 6)
- 2. To activate the expert mode, press the A and A gain buttons on the receiver simultaneously for more than 2 seconds.

The display shows the current gain setting (between 0 and 99) for few seconds. displayed on the top right. Thereafter, the receiver changes to the expert mode window where the signal amplitude is always displayed.



### 7.3.2 Adjusting the gain

- ➤ To increase the gain, press the ▲ button on the receiver.
- ► To decrease the gain, press the <sup>▲</sup> button on the receiver.

The defined gain is displayed between the two arrows and is applied for the next signal search.



When the receiver receives a signal, three measurements are automatically carried out for the stability test.



The polarity and amplitude of the signal must be the same in the three measurements. If the stability test is successful, the current polarity and signal amplitude are displayed.



### 7.3.3 Deactivating the expert mode

 To turn off the expert mode, press the and gain buttons simultaneously for more than 2 seconds.

The receiver is reset to standard mode. The gain is automatically set to the calibration value.

## 8 **CURRENT MEASUREMENT**

<u>A</u>			
	Da	ngerous voltage in cable that is to be identified	
	Danger to life or risk of injury due to electric shock.		
	<ul> <li>Do not use the current measurement with KSG 200/KSG 200<sup>-1</sup> determine that the cable is disconnected.</li> </ul>		
		If no current can be ascertained in the cable by measuring with KSG systems, it does not mean that the cable is disconnected and can be safely cut.	

With KSG 200/KSG 200 T, you can measure current (50/60 Hz) up to 199 A on the connected cable.

1. To measure the current on the cable that is to be identified after calibration, press the button.

If you want to measure current without prior calibration, press the 🧟 button twice. The receiver displays the following:

- Standard mode: If an infocode is available for the current measurement situation, the infocode is displayed first. Finally, the rms value of the current is displayed.
- Expert mode: The rms value of the current is displayed. To display any existing infocode, press the A button once again.

The current measurement is completed automatically after many measurement cycles. If a value above 199 A is measured, the display flashes the number 199.

2. To manually complete the current measurement, press the 🔄 button.

## **9 PHASE DETERMINATION (OPTIONAL)**

The phase determination with KSG 200/KSG 200 T works similar to the cable identification.

On the earthed and shorted substation, current pulses are coupled to the phases L1, L2, L3 detected there with the clip-on current transformer AZ (optional). At the place of installation, the receiver is connected to the specific phases one after the other. If the detected current pulse shows the positive polarity and the corresponding signal amplitude, the respective phase L1 or L2 or L3 is detected.

#### Prerequisite

- The phases to determine are earthed and shorted in the substation.
- Required accessories: Clip-on current transformer AZ (optional)

#### Procedure

Phase determination through the cable screen

#### Phase determination through the phase



- 1. Switch on the system. Further information: chapter *Switching on and off the system* (on page 23)
- 2. Calibrate the system.

Place the clip-on current transformer AZ around the phase screen or directly around the inner phase.

Further information: chapter Calibrating the system and identifying cables (on page 37)

 Perform the measurement. Proceed in exactly the same way as during cable identification. If the detected current pulse shows the positive polarity and the corresponding signal amplitude, the respective phase is detected.

Further information: chapter Evaluating measurement results (on page 38)

- 4. Determine the second phase:
  - a. Connect the transmitter to the next phase.If all phases have the same extension, there is no need for recalibration.
  - b. Perform the measurement on the second phase.

## **10 COMPLETING THE CABLE IDENTIFICATION**

## 10.1 Safety instructions

Cable identification on de-energised cables

	Dangerous voltage in test object.
	Danger to life or risk of injury due to electric shock.
	<ul> <li>Before touching the test object, discharge, earth and short it: at the connection point and at the far end.</li> </ul>
	<ul> <li>You may touch the parts that were under voltage only if they are visibly earthed and short-circuited.</li> </ul>

#### Cable identification on live cables

4	
	Danger due to electric voltage, flashovers at the connection point, or arcing fault on removing the connection
	Danger to life or risk of injury due to electric shock, flashes.
	<ul> <li>Comply with EN 50110 or the applicable standards in your country as well as the relevant national and local accident prevention regulations for carrying out tasks in the vicinity of live parts.</li> </ul>
	• Use suitable personal protective equipment to protect against arcing faults and electric shocks.
	<ul> <li>Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates).</li> </ul>
	<ul> <li>Maintain safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space (EN 50110).</li> </ul>

## **10.2** Dismantling the test structure

- 1. Remove the flexcoupler from the cable or phase.
- 2. Switch off the transmitter with the *OFF* button.
- 3. Place the receiver in the transmitter holder.
- 4. Disconnect the transmitter connection cables.
- 5. If necessary, remove the cordoning.
- 6. If the cable screen of the cable that is to be identified was removed from the earthing for the cable identification, restore the earthing of the cable screen.
- 7. If needed, remove the earthing on the test object only if no subsequent work is required and if the test object is to be put back into operation by the responsible individuals.
- 8. Remove the barriers and marking of the test area.

## **11 MAINTENANCE**

## **11.1 Safety instructions**

#### NOTICE

#### Damage to devices due to improper handling

The user is liable for any damage caused due to improper maintenance or care.

- Never take apart the system and installed components. This can damage the device. There are no components in the system or other integrated components that can be serviced or repaired by the operator.
- Maintenance tasks must be carried out only by personnel trained and authorised by BAUR.

### **11.2** Cleaning system components

#### NOTICE

Damage to the device may be caused by using the wrong cleaning agents

- > Do not use any abrasive, corrosive cleaning agents or strong solvents.
- Ensure material compatibility.
- > Do not clean the product with acetone or thinner.
- Never clean electrical devices with water.

#### Prerequisite

The system is disconnected from the supply voltage and is switched off.

#### Procedure

1. If required, clean the surfaces and connection cables with mild detergent and a lint-free cloth.

NOTICE! Damage due to fluid leaks.

2. Do not allow liquids to leak into the devices.

## 11.3 Charging the receiver

When the receiver charge status is low, the  $\pm$  sign flashes on the receiver display.

• To charge the receiver, place it in the transmitter holder.



The cable identification system is moved to the initial state. The receiver is charged.

## 11.4 Replacing the transmitter safety fuse

#### Prerequisites



Flat-blade screwdriver 1.0 x 5.5 mm



1.

2.

3.

Device protection fuse: 250 V / 1A time lag, rated breaking capacity 1500 A (H)

#### Procedure



Release the fuse holder of the transmitter safety fuse.





Screw the fuse holder back into the groove.

## 11.5 Testing fuses in safety measurement cables (KSG 200 T)

#### Prerequisites



Multimeter

3

Fuse: F 7 A, 50 kA @ AC 600 V

#### Procedure



## 11.6 Replacing fuses in safety measurement cables (KSG 200 T)

#### Prerequisites



Fuse: F 7 A, 50 kA @ AC 600 V

#### Procedure

1.	Unscrew the fuse holder from the safety measurement cable
2.	Remove the faulty fuse from the fuse holder.
3.	Insert an operational fuse into the fuse holder.
4.	Screw the fuse holder back on the safety measurement cable.

## **12 FAULTS AND CORRECTIVE MEASURES**

## 12.1 Safety instructions

### NOTICE

#### Damage to the system due to improper handling

The user is liable for damages caused due to repairs.

- Never dismantle the system components. This may lead to damages. Inside the system components there are no components that could be serviced or repaired by the operator.
- Repairs must be carried out only by personnel trained and authorised by BAUR

## 12.2 Troubleshooting

When a fault occurs, proceed as follows:

- 1. Check the supply voltage and the connection cable.
- 2. Check the charging status of the receiver and put it in the holder of the connected transmitter for charging.
- 3. Pay attention to the messages on the receiver display. Further information: chapter *Infocodes and their meaning* (on page 25)
- 4. If the fault occurs again, contact your BAUR representative (http://www.baur.eu/baur-worldwide).

It may be possible for the BAUR GmbH After Sales Service Team to determine the cause of the fault remotely. To do so, please specify the following data:

- Serial numbers of the transmitter and receiver.
- Message on display
- Procedure that caused the error.

## **13 TRANSPORTATION AND STORAGE**

### **13.1** Transporting the system

Observe the following during transportation or dispatch:

- NOTICE! Damage to system due to improper transportation.
   During transportation, comply with the ambient conditions specified in the technical data of the system.
  - Further information: Chapter Technical data (on page 20)
- > Transport the system components only in the intended transport cases.
- Protect all system components against strong vibrations.
- Protect all system components against humidity.

### 13.2 Storing the system

- > Store the system components only in the intended transport cases with closed lids.
- During storage, comply with the ambient conditions specified in the technical data of the system.

Further information: chapter Technical data (on page 20)

- > Protect all system components against humidity.
- Protect the system against unauthorised access.

## **14 WARRANTY AND AFTER SALES**

#### Warranty

For warranty claims, please contact BAUR GmbH or your local BAUR representative (http://www.baur.eu/baur-worldwide). Warranty is cancelled in case of misuse.

#### After Sales

For questions contact BAUR GmbH or your BAUR representative (http://www.baur.eu/baur-worldwide).



BAUR GmbH

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## 15 DISPOSAL

## 15.1 Disposing off the system

The final decommissioning and disposal of the system must be carried out only in compliance with country-specific laws, regulations and standards.

System components do not belong in the domestic waste.

- Dispose of electrical system components in accordance with the applicable national regulations.
- Dispose of the various system components in an environmentally friendly manner and in accordance with the applicable national regulations.

## **16 DELIVERY SCOPE AND OPTIONS**

KSG 200		KSG 200 T		
• KS	SG 200 transmitter	•	KSG 200 T transmitter	
<ul> <li>KS as</li> </ul>	SG 200 pulse receiver with flexcoupler (variants s selected):	•	KSG 200 pulse receiver with flexcoupler (variants as selected):	
Fl€	excoupler ø 150 mm		Flexcoupler ø 150 mm	
Fle	excoupler ø 250 mm		Flexcoupler ø 250 mm	
• Co	onnection cable 2m, with connection clips	•	Connection cable 2 m, with connection clips	
<ul> <li>Ma</li> </ul>	ains supply cord 1.8 m	•	Connection set to connect to live LV cables	
• Tra	Transport case for all components User manual		Flexible rod, fully insulated (for applying the	
<ul> <li>Us</li> </ul>			flexcoupler to live cables)	
		•	Mains supply cord 1.8 m	
		•	Transport case for all components	
		•	User manual	
Options				

- Clip-on current transformer AZ 10/D 70
- Clip-on current transformer AZ 10/D 80
- Clip-on current transformer AZ 10/D 125

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