Cable identification system

KSG 200 A/KSG 200 TA

Figure: KSG 200 TA

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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 with battery:

- KSG 200 A
- KSG 200 TA

1.3 Structure of safety instructions

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

Danger symbol 	⚠ **SIGNAL WORD**
	Type of danger and its source Possible consequences of violation. ▸ Measure to prevent the danger.

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:

⚠**SIGNAL 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.

⚠ **DANGER**	Will lead to severe injuries or death.
⚠ **WARNING**	May lead to severe injuries or death.
⚠ **CAUTION**	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

Danger symbols

	**General danger**
	**Risk of electric shock**

1.4 View Settings

Symbol	Meaning
▸	You are requested to perform an action.
1. 2. ...	Perform the actions in this sequence.
a. b. ...	If an operation consists of several operating steps, they are specified with "a, b, c". Perform the operating steps in this sequence.
1 2 ...	Numbering in the legend
▪	List
	Indicates further information on the topic.
	Indicates tools required for the subsequent tasks.
	Indicates spare parts required for the subsequent tasks.
	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[1] and operator[2] 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 A – for de-energised cables
- KSG 200 TA – 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 A/KSG 200 TA
- Knowledge of plant engineering (cable types, switchboard plant, etc.).

[1] 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).
[2] 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 A/KSG 200 TA 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 A/KSG 200 TA 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 TA, 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 A/KSG 200 TA 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.

DANGER

Dangerous electric voltage

Danger to life or risk of injury due to electric shock. Danger of burn injuries and electro-ophthalmia due to arcing fault.

- Use suitable personal protective equipment to protect against arcing faults.
- Cover the adjacent live parts with insulating covering material.
- Cordon off all metal parts, e.g. lighting masts, at the terminals of the object under test or insulate them with insulating safety plates.
- Connect the transmitter and receiver as described in this user manual.
- Use only undamaged connection cables.
- Secure the connection points and the far end of the cable to be identified.
- Before removing the safety measures, discharge, earth and short-circuit all live parts.

Cable identification on live cables

You can carry out cable identification on live cables only with KSG 200 TA. 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.

DANGER

Working in the vicinity of adjacent live parts

Danger to life or risk of injury due to electric shock.

- The KSG 200 TA 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_{rms}: 600 V
- Use the cable identification on live cables only with the supplied safety measurement cables.

  Without the safety measurement cables, the KSG 200 TA 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).
- During connection, implementation and monitoring of the measurement, protection must be guaranteed for all plant parts, either
  - through safety devices, insulating cover material
  - or by adhering to the necessary safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space.

  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.
- Working in the vicinity of open cables or faulty systems is forbidden. Notify the responsible authorities immediately.
- Use suitable personal protective equipment to protect against arcing faults.
- To assess the local conditions adequately, provide sufficient lighting at the work place.

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.

DANGER

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.

- Only use cable cutters in compliance with EN 50340 or cable spiking tools.
- Follow the safety instructions in the user manual for the cable cutter or cable spiking tool used.

Dangers when working with the charger

CAUTION

Dangerous electric voltage on the charger

Risk of injury due to electric shock.

The charger is an electrical equipment that feeds voltages and currents that are dangerous for humans.

- Only use the supplied charger for KSG 200 A/KSG 200 TA.
- Protect the charger against humidity.
- Use the charger only in dry spaces.
- If the charger is damp for any reason, do not connect it to the mains voltage under any circumstances.

  If the charger is damp during the charging process, do not touch it. First disconnect it from the mains voltage.

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 A/KSG 200 TA 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:	▪ Safety footwear
Protection against electrical hazards (arcing fault):	▪ Certified safety clothing ▪ Hard hat with visor ▪ Insulating protective gloves ▪ LV HRC fuse handle with sleeve
Protection against noise:	▪ Ear protection
Protection against dangers from road traffic:	▪ 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. **Important:** No high visibility vest during tasks with risk of arcs!
Hand protection:	▪ Safety gloves

3 PRODUCT INFORMATION

3.1 Device types

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

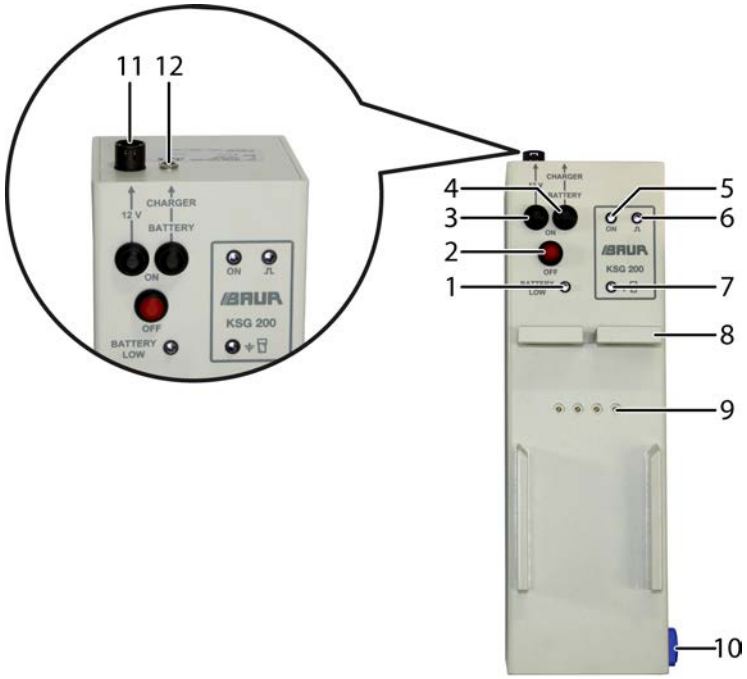
- KSG 200 A for cable identification on de-energised cables
- KSG 200 TA for cable identification on live cables (CAT IV/600 V)

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.

Note: At room temperature (approx. 19 – 21 °C), the battery must be charged **every 2 months**. Intervals for higher storage temperatures: Chapter *Storing the system* (on page 55)



No.	Element	Function
1	LED *Battery LOW*	Lights up when the battery level is low If the charger is not connected, the transmitter is automatically switched off after 10 to 20 minutes.
2	*OFF* button	Switches off the transmitter
3	*ON – 12 V* button	Switches on the transmitter when it receives power via the DC 12 V connection
4	*ON – Battery Charger* button	Switches on the transmitter when it receives power via the rechargeable battery
5	LED *ON*	Indicates whether the transmitter is receiving power
6	LED ⎍	Lights up in the current pulse cycle
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
11	*12 V* port	Is used to connect to a 12 V vehicle battery
12	*Charger* port	Is used to connect the charger 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 TA)

The connection set to connect to live LV cables comprises of

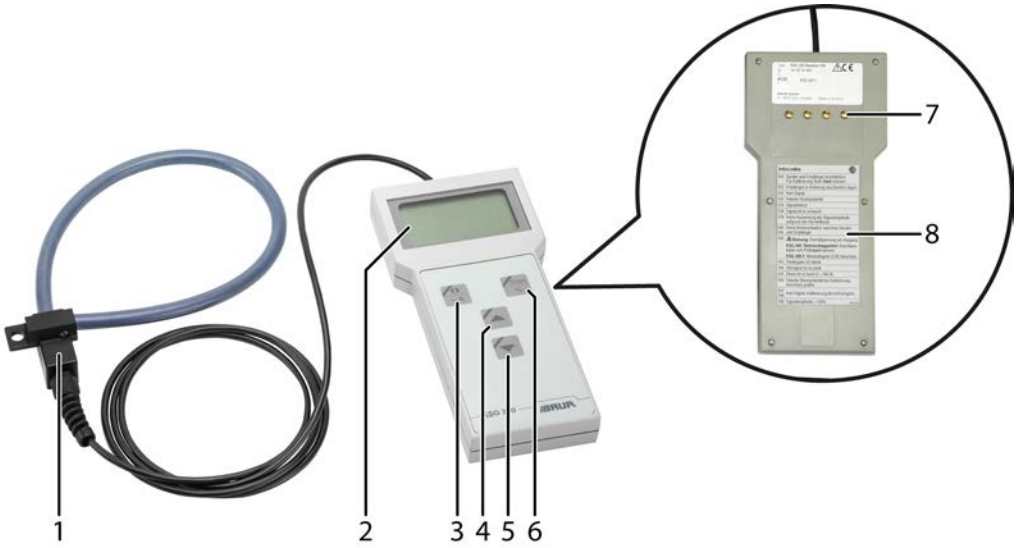
- 2 safety measuring cables, CAT IV/600 V
- 2 fuses F 7 A, 50 kA @ AC 600 V (integrated in safety measuring cable)

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	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 Charger

The supplied plug-in charger is used to charge the NiMH rechargeable battery pack: 10-12 cells, 2.8 - 7.0 Ah.

Technical data			
Output voltage	10.5 – 20 V DC; 1.0 A	Rated capacitance	2.8 – 7.0 Ah
Input voltage	100 – 240 V, 50/60 Hz	Charging current	Main charging: 1,000 mA Charging the fully discharged battery: 250 mA Float charge: 38 mA
Number of cells	10	Charging time	Depends on the battery charge status Complete charging: approx. 4.5 – 5 h
Ambient temperature	0 – 40 °C	Fuse	T 2.0 A
Storage temperature	-40 to +70 °C		

LED display

Display	Description
Constant	Main charging mode: Normal status after battery contact
Flashing (low flash frequency)	Float charge: The battery is full. Switchover to float charge takes place automatically.
Flashing (high flash frequency)	Battery total discharge: Battery voltage ≤ 10.5 V

3.5 Power supply

The KSG 200 A/KSG 200 TA transmitter can be supplied voltage in various ways:

- via the integrated battery
- via a DC 12 V vehicle battery

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.

3.5.1 Battery operation

The KSG 200 A/KSG 200 TA transmitter is equipped with a NiMH rechargeable battery pack.

Technical data			
Voltage	12 V	Battery life	2.5 - 3.5 h
Capacitance	4.2 - 5 Ah	Number of cells	10

If the transmitter battery level is low, the *Battery LOW LED lights up.* The transmitter is automatically switched off after 10 to 20 minutes.

Note: The transmitter cannot be supplied with power for operation via the charger.

Further information: Chapter *Charging the transmitter battery* (on page 50)

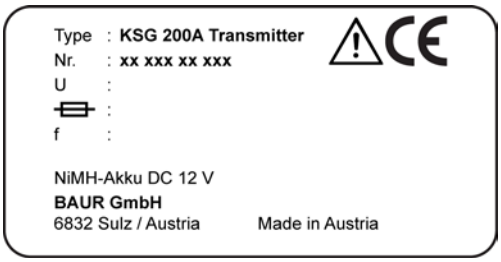
3.5.2 DC 12 V power supply

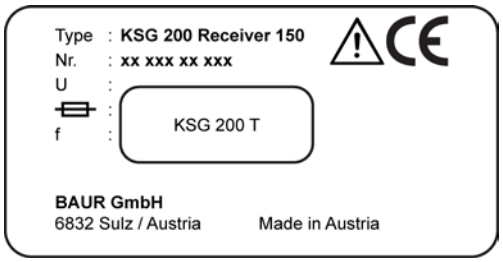
The 12 V port on the transmitter is used to connect to a 12 V vehicle battery.

Fuse: T 8 A

3.6 Markings on the system

3.6.1 Rating plates

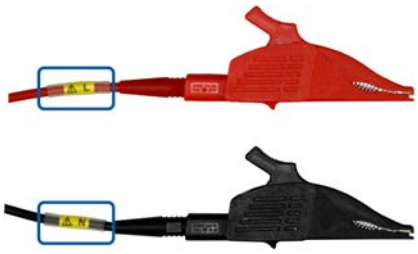




Rating plate	Description
Type	Device designation In the receiver, the number 150 and 250 specifies the diameter of the flexcoupler.
Nr.	Serial number
KSG 200 (T)A	Displays whether it pertains to the device variants KSG 200 A or KSG 200 TA
U	Not applicable here
⊟	Not applicable here
f	Not applicable here
NiMH-Akku DC 12 V	The transmitter receives power supply through a NiMH rechargeable battery (DC 12 V).
⚠	General warning sign Indicates that there is a potential risk of danger when using the product and hence the user manual must be observed
CE	CE mark Indicates that the device or system conforms to CE.

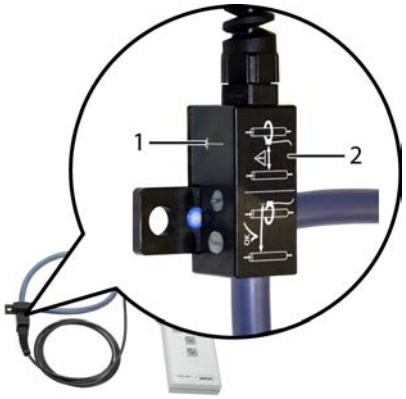
3.6.2 Safety and information signs on the system

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 28)

4 TECHNICAL DATA

Transmitter			
Pulse voltage	300 V	Pulse current	Max. 180 A
Pulse sequence	15 pulses/min	Degree of protection	IP40
Voltage-proof up to (KSG 200 TA)	Max. 400 V, 50/60 Hz	Measurement category (KSG 200 TA)	CAT IV/600 V*
Power supply			
Battery type:	NiMH rechargeable battery 12 V (10 cells); 4.2 –5 Ah		
External supply:	DC 12 V		

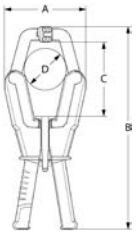
* Measurement category CAT IV/600 V: Applicable for measurements at the source of the low voltage installation, e.g. meter, main connection, primary overcurrent protection (IEC/EN 61010-1).

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

NiMH rechargeable battery	
Battery type	NiMH rechargeable battery 12 V (10 cells); 4.2 – 5 Ah
Battery life	Approx. 2.5 – 3.5 h
Charging time	Approx. 4.5 – 5 h
Charger	
Power supply	100 – 240 V, 50/60 Hz
Output voltage	DC 10.5 – 20 V, 1 A

Receiver KSG 200 A/KSG 200 TA	
Sensor	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

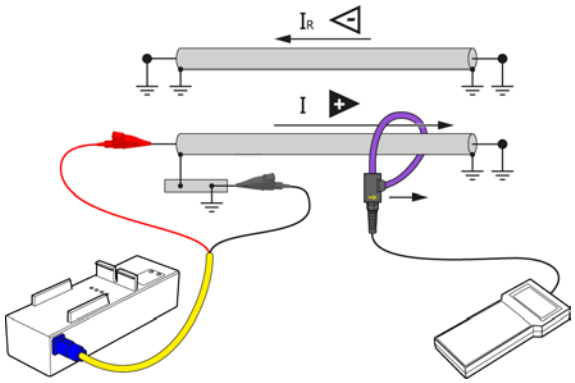
General information on the cable identification systems in the KSG 200 series			
Ambient temperature (operation with rechargeable battery)	-10 to +55 °C	Storage temperature	-20 °C to +50 °C
Dimensions of case (W x H x D)	594 x 174 x 435 mm	Weight of case with transmitter and receiver	Approx. 7,7 kg
Safety 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				
	A	133 mm	146 mm	182 mm
	B	336 mm	336 mm	317 mm
	C	126 mm	128 mm	125 mm

5 OPERATING THE SYSTEM

5.1 Cable identification with KSG 200 A

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 A/KSG 200 TA 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  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	
Battery operation	▸ Press the *ON / Battery Charger* button on the transmitter for approx. one second.
Operation with supply voltage DC 12 V	1. Connect the transmitter to the supply voltage DC 12 V. 2. Press the *ON / 12 V* button on the transmitter for approx. one second.

Switch off the system	
Battery operation	▸ Press the *OFF* button.
Operation with supply voltage DC 12 V	1. Press the *OFF* button. 2. Disconnect the device completely from the supply voltage.

Note: After switching off the transmitter, wait approx. 15 seconds before switching it on again.

5.3 Display

5.3.1 Symbols

Symbol	Description
	Displays the transmitter connection point
	Displays the flexcoupler connection point *T* next to the flexcoupler displays that it is the receiver for KSG 200 TA
	Near or far end of the cable
	Indicates that the calibration is completed and the cable identification can be started at the identification location
	Displays the negative current polarity (wrong cable)
	Displays the positive current polarity (right cable)
	Indicates that the receiver is searching for a current pulse
	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 three times.
	Indicates that the cable or phase has been located: ▪ Positive current polarity ▪ Signal amplitude > 64%

Symbol	Description
	Indicates that a branch has been detected: ▪ Positive current polarity ▪ Signal amplitude between 10% and 64%
	Indicates that no cable has been located
	Indicates that this is a wrong cable
	Displays the signal amplitude ▸ To display the signal amplitude, press the  button.
	Displays the current ▸ To measure the current, press the  button
	Indicates that the expert mode is active
	Displays the gain
	▪ Warning sign: Displays a fault ▪ Flashing warning sign (infocode 199): Indicates that the signal amplitude is 120% and that the measurement result can be false
	Indicates that information on the current measurement is available. ▸ To display the infocode, press the  button on the receiver. Information on the meaning of infocodes: chapter *Infocodes and their meaning* (on page 28)
	Displays the infocode
	Flashes when the receiver charge status is low ▸ To charge the receiver, place it in the transmitter holder.

5.3.2 Infocodes and their meaning

Code	Text on the back of the receiver	Description
101	Connect transmitter and receiver. Press the **Start** 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. **KSG 200 (A): Risk of electric shock!** Disconnect connection cable from test object.	▸ KSG 200 A: Disconnect the connection cable from the cable that is to be identified. The connected cable is live. You may carry out cable identification on live cables only with KSG 200 TA.
	KSG 200 T (A): Note the measurement category (CAT).	▸ KSG 200 TA: Observe the safety instructions while carrying out tasks on live cables.
193	Flexcoupler is defective.	During calibration and before each reading, the flexcoupler is examined for any faults. ▸ Contact BAUR After Sales Service and note down the displayed infocode as well as the procedure that caused the error.
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 calibration. Check the connection.	The flexcoupler is connected incorrectly. ▸ Check the direction of the arrow on the flexcoupler. The arrow must point in the direction of the cable end.
		Positive (red) and negative (black) output of the transmitter were replaced. ▸ Connect the red connection cable to the cable that is to be identified, the black to the return phase (station earth or other phase).
		The clip-on current transformer (optional) is connected incorrectly. ▸ Check the direction of the arrow on the clip-on current transformer. The arrow must point in the direction of the cable end.
197 – 198	No signal. Calibration not possible.	No signal could be detected.
199	Signal amplitude > 120%.	The loop resistance has changed. ▸ Recalibrate the system.

5.4 Standard and expert mode

KSG 200 A/KSG 200 TA 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 37)

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

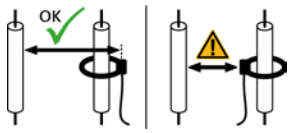
1. Check the transmitter, receiver and all mechanical connections for damage.
2. Check electrical connections and connection cables for damage.
   Use only undamaged connection cables.
3. Check the charger and its connection cable for damage.

Cable identification on live cables (KSG 200 TA)

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.
2. If the fuse is not working, replace the fuse.
   Further information:
   - Chapter *Testing fuses in safety measurement cables (KSG 200 TA)* (on page 52)
   - Chapter *Replacing fuses in safety measurement cables (KSG 200 TA)* (on page 53)

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

	**⚠ WARNING**
	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. ▸ Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates). ▸ 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 31)

Connection diagram

- *Return current via the cable screens of adjacent cables (1-phase cable)* (on page 32)
- *Return current via another phase (1-phase cable)* (on page 33)
- *Sheath-isolated 3-phase cable* (on page 34)

Procedure

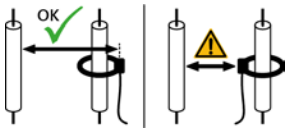
1. Connect the black connection clip to the station earth.
2. Connect the red connection clip to the cable phase that is to be identified.
3. Earth the phase to read at the far end.

   Calibration
4. 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.

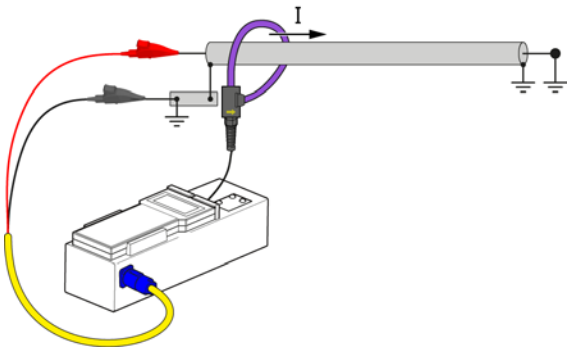
Return current via the cable screens of adjacent cables (1-phase cable)

Special features of the connection:

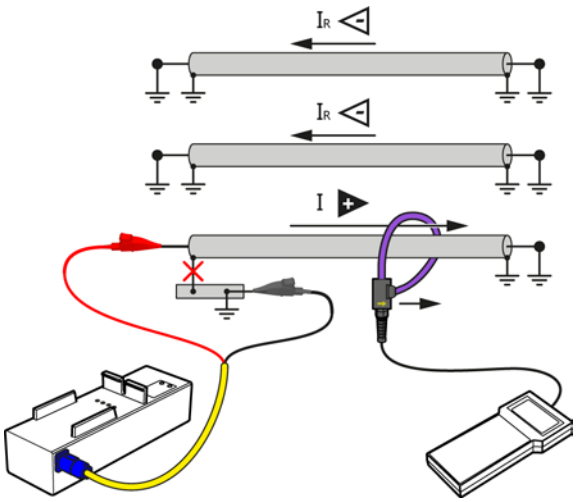
- Adjacent phases are earthed.
- Cable sheath of the cable that is to be identified is disconnected from the earth at the near end.
- Return current flows back via the cable screens of the adjacent cables or phases.

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_R)	negative	clearly lower depending on the number of return phases (50%)*

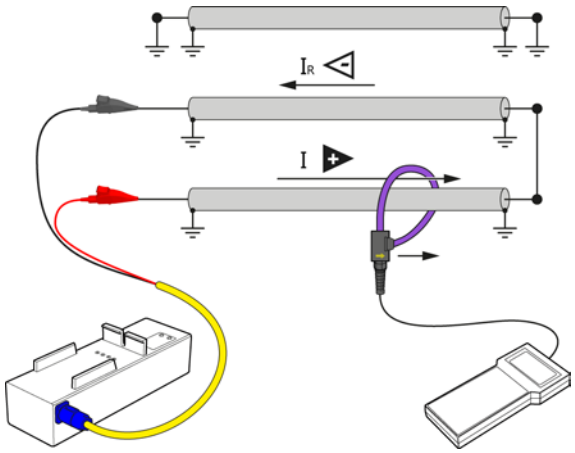
* Note that the specified percentage values serve as orientation for checking the measurement result. Currents and return currents are divided according to the phase resistance. These percentage values no longer apply for additional earth connections, e.g. other cables, earth strip, ducts etc.

Return current via another phase (1-phase cable)

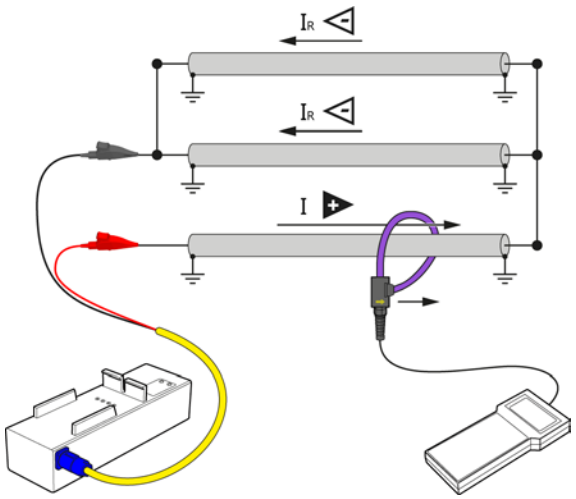
Special features of the connection:

- 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).

1 Use phase as return phase



2 Use phase as return phase



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 32).

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

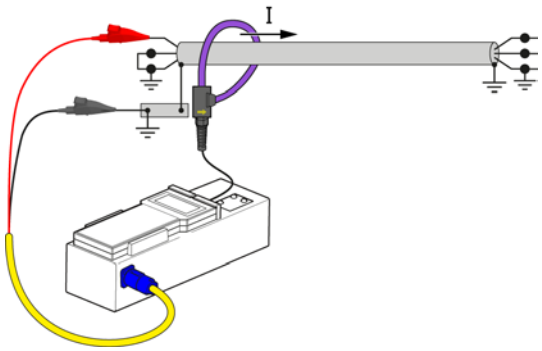
* Note that the specified percentage values serve as orientation for checking the measurement result. Currents and return currents are divided according to the phase resistance. These percentage values no longer apply for additional earth connections, e.g. other cables, earth strip, ducts etc.

Sheath-isolated 3-phase cable

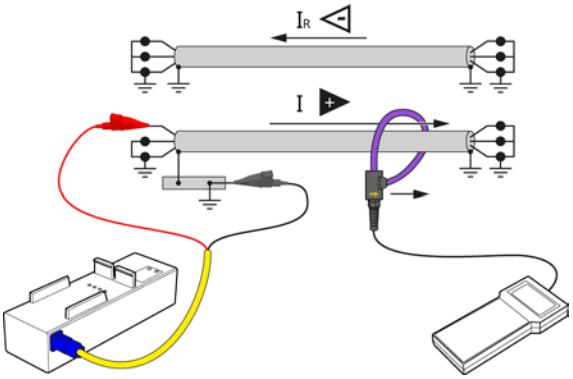
Special features of the connection:

- 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 TA)

6.6.1 Safety instructions

DANGER

Working in the vicinity of adjacent live parts

Danger to life or risk of injury due to electric shock.

- The KSG 200 TA 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_{rms}: 600 V
- Use the cable identification on live cables only with the supplied safety measurement cables.

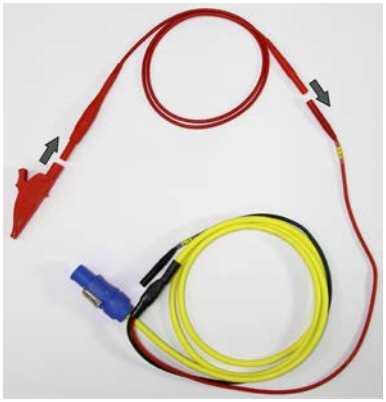
  Without the safety measurement cables, the KSG 200 TA cable identification system has the measurement category 0 and should not be used on live cables.
- Maintain safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space (EN 50110).

6.6.2 Connecting the system for galvanic signal coupling

Prerequisites

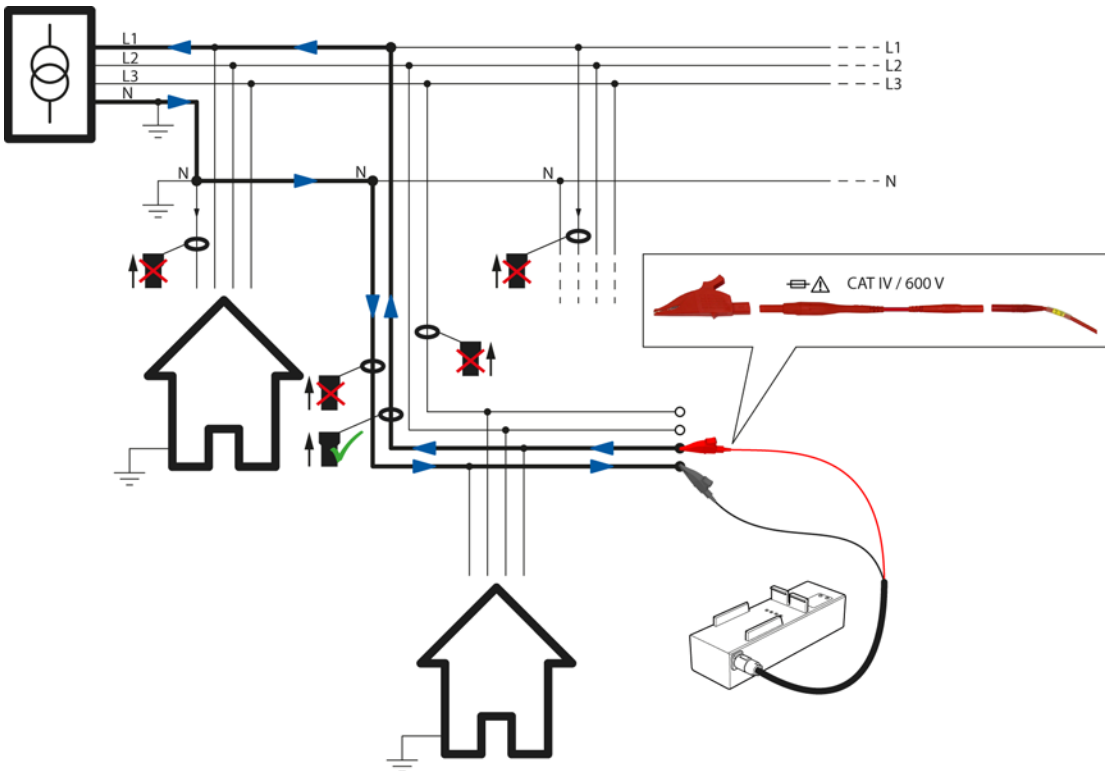
- Cable identification system KSG 200 TA
- Measurement category of electric circuit ≤ CAT IV/600 V
- Connection set to connect to live LV cables (standard delivery)

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



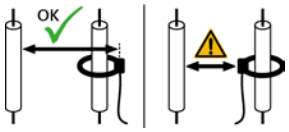
1. Leave all consumers connected.
2. Connect the transmitter with the safety measurement cable in such a way that the current flows in the direction of the transformer station.

   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.

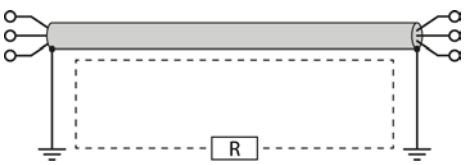
6.6.3 Connecting the system for inductive signal coupling (optional)

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:

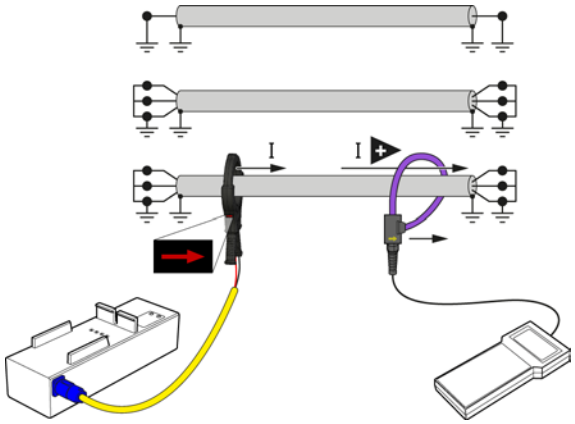
- Live cables
- Cable terminations difficult to reach
- Loop resistance R ≤ 6 Ohm

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 36)

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

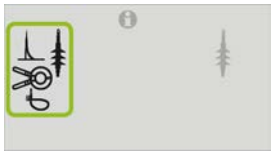
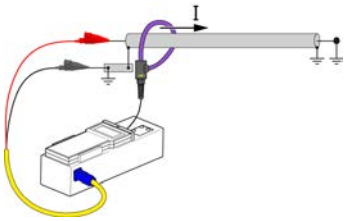
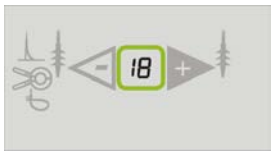
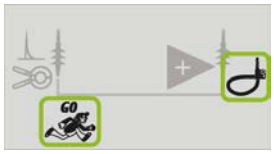
1. Secure the work area in compliance with the road traffic regulations in your country.
2. Make sure that except for the tester, no other person is able to access the work area.
3. Make sure that unauthorised persons have no access to the device and the parts being tested.
4. Mark the work area adequately 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.

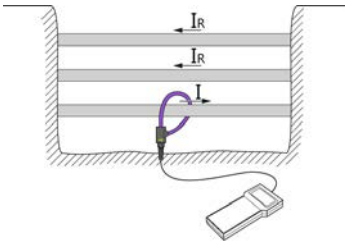
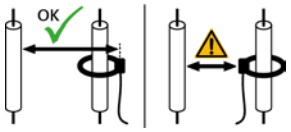
6.8.1 Securing the test area during cable identification on live cables

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.

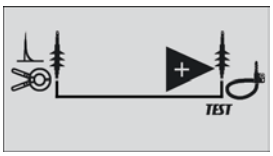
7 CABLE IDENTIFICATION

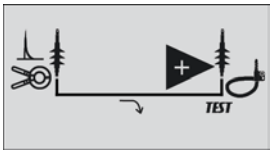
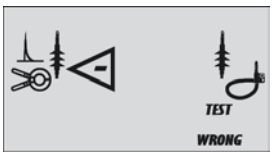
7.1 Calibrating the system and identifying cables

Calibration		
1.		Switch on the transmitter.
2.		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. Place the flexcoupler at the desired position around the cable to which the transmitter is connected. Further information: chapter *Connecting the system* (on page 30)
4.		Press the Start % button 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.
		The calibration is completed automatically. Remove the receiver from the transmitter holder and go to the identification location.
		When you are going to the identification location, the receiver cannot receive any signal.

Cable identification	
5. 	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. **Important:** • The flexcoupler sensor must be placed as far as possible from the adjacent phases:  • Apply the flexcoupler for the cablibration the same as for the cable 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 Start % button. The next step depends on the measurement results: chapter *Evaluating measurement results* (on page 41)

7.2 Evaluating measurement results

Display	Other steps
 The cable that is to be identified is detected: ▪ Positive current polarity ▪ Signal amplitude: according to the connection method used ▪ Cable start and cable end are connected with a line.	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. 2. 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.

Display	Other steps
 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.	1. If possible, couple the current pulse galvanically. 2. 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.
 Incorrect cable: ▪ Negative current polarity ▪ Different signal amplitudes depending on return current path ▪ Cable start and cable end are not connected with a line.	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.
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	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

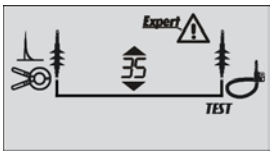
The expert mode can only be activated after calibrating the system.

1. Calibrate the system.

   Further information: Chapter *Calibrating the system and identifying cables (on page 40) (Steps 1 to 6)*

2. To activate the expert mode, press the and gain buttons on the receiver simultaneously for more than 2 seconds.

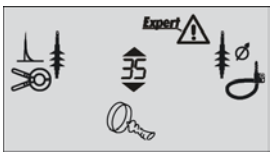
   The display shows the current gain setting (between 0 and 99) for few seconds. Expert is displayed on the top right. Thereafter, the receiver changes to the expert mode window where the signal amplitude is always displayed.



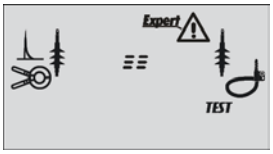
7.3.2 Adjusting the gain

- To increase the gain, press the button on the receiver.
- To decrease the gain, press the button on the receiver.

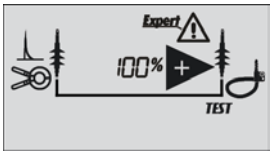
The defined gain is displayed between the two arrows and is applied for the next signal search.



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

DANGER

Dangerous voltage in cable that is to be identified

Danger to life or risk of injury due to electric shock.

- Do not use the current measurement with KSG 200 A/KSG 200 TA to determine that the cable is disconnected.

  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 A/KSG 200 TA, 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 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 A/KSG 200 TA works similar to the cable identification.

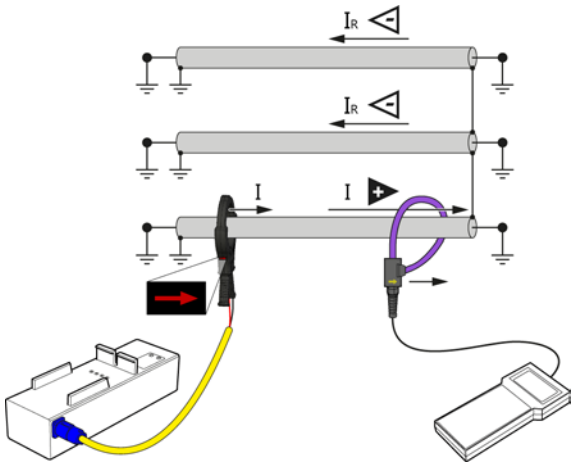
On the earthed and shorted substation, current pulses are coupled to the phases L1, L2, L3 detected there with the clip-on current transformer AZ (optional). At the place of installation, the receiver is connected to the specific phases one after the other. If the detected current pulse shows the positive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

Prerequisite

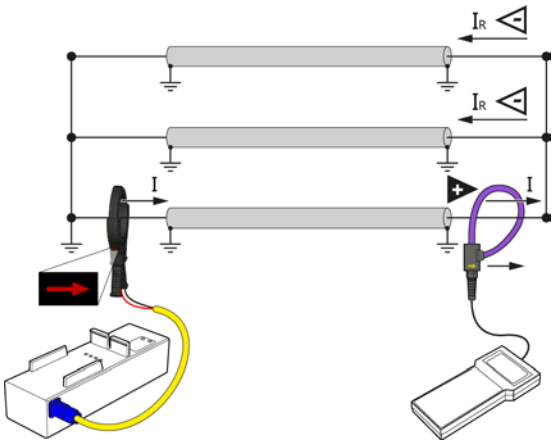
- The phases to determine are earthed and shorted in the substation.
- Required accessories: Clip-on current transformer AZ (optional)

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 26)
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 40)

3. 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 41)
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

DANGER

Dangerous voltage in test object.

Danger to life or risk of injury due to electric shock.

- Before touching the test object, discharge, earth and short it: at the connection point and at the far end.
- You may touch the parts that were under voltage only if they are visibly earthed and short-circuited.

Cable identification on live cables

DANGER

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.

- 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.
- Use suitable personal protective equipment to protect against arcing faults and electric shocks.
- Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates).
- Maintain safety distances. Safety distances depend on the voltage level, plant model, personnel qualification and available space (EN 50110).

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.
9. Charge the battery fully after each use. If you do not use the transmitter for a long period, observe the intervals for the charging of the battery.

   Further information:

   - Chapter *Charging the transmitter battery* (on page 50)
   - Chapter *Storing the system* (on page 55)

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 switched off and is disconnected from the supply voltage.

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 transmitter battery

	**⚠ CAUTION**
	Dangerous electric voltage on the charger Risk of injury due to electric shock. The charger is an electrical equipment that feeds voltages and currents that are dangerous for humans. ▸ Only use the supplied charger for KSG 200 A/KSG 200 TA. ▸ Protect the charger against humidity. ▸ Use the charger only in dry spaces.

Note: At room temperature (approx. 19 – 21 °C), the battery must be charged **every 2 months**. Intervals for higher storage temperatures: Chapter *Storing the system* (on page 55)

If the transmitter battery level is low, the *Battery LOW LED lights up.* The transmitter is automatically switched off after 10 to 20 minutes.

1. Connect the connection cable of the charger on the transmitter to the *Charger* jack.

2. Connect the charger to the mains voltage.
   The charging process starts and is indicated by the LED on the charger.
   When the battery is charged fully, the charger automatically changes to the float charge mode.
   Information on the charging currents of the charger is given in the chapter *Charger* (on page 19).
3. After the transmitter battery is charged, disconnect the charger from the mains and from the transmitter.

11.4 Charging the receiver

When the receiver charge status is low, the ⏚ 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.

11.5 Charging battery via the vehicle charge cable

The 12 V connection on the transmitter is designed only for charging the battery fully. However, if you are unable to connect the charger at the place of use, you can charge the empty battery partially via the car battery onboard power outlet and complete the measurement.

Prerequisite

The residual voltage of the battery is at least 0.3 V below the voltage at the *12 V* jack.

Procedure

1. If the *Battery LOW* LED lights up on the transmitter and you have no mains connection at the place of use, connect the vehicle charge cable to the*12 V* jack on the transmitter.
2. Connect the vehicle charge cable to the car onboard power outlet.

   Charging current when charging the battery via the car onboard power outlet:

Battery voltage	Car onboard power outlet voltage	Charging current
11.7 (empty)	12.5 V	45 mA
11.7 (empty)	13 V	210 mA
11.7 (empty)	14.4 V	500 mA
13.3 V	14 V	100 mA
13.3 V	14.4 V	200 mA

11.6 Check if the charger is damaged

The charger is low maintenance. Checking the charger regularly for damage keeps it in good condition.

- Before commissioning the charger each time, check the plug and charge cable for any damage.

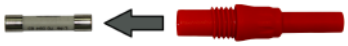
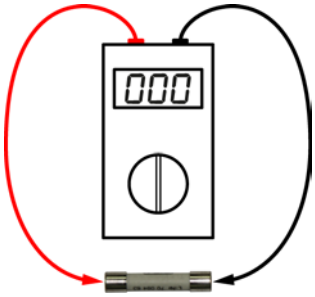
11.7 Testing fuses in safety measurement cables (KSG 200 TA)

Prerequisites

Multimeter

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

Procedure

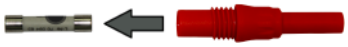
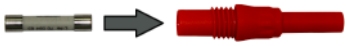
1.		Unscrew the fuse holder from the safety measurement cable
2.		Remove the fuse from the fuse holder.
3.		Check if the fuse is working. For this, perform a continuity test with a multimeter.
4.		If the fuse is not working, replace the fuse. Further information: chapter *Replacing fuses in safety measurement cables (KSG 200 TA)* (on page 53)
5.		Screw the fuse holder back on the safety measurement cable.
6.		Check the fuse of the second safety measurement cable.

11.8 Replacing fuses in safety measurement cables (KSG 200 TA)

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 transmitter battery level and connect the charger if required.
3. Check the charging status of the receiver and put it in the holder of the connected transmitter for charging.
4. Pay attention to the messages on the receiver display.
   Further information: chapter *Infocodes and their meaning* (on page 28)
5. 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 *Technische Daten*
- 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 *Technische Daten*
- Do not store the transmitter with a discharged battery.
- Store the transmitter in a cool place.

  At room temperature (approx. 19 – 21 °C), the battery must be charged **every 2 months**.

  Storage at higher temperatures increases the self-discharge of the battery. At temperatures up to approx. 40 °C the battery must therefore be charged every month; at temperatures above 40 °C it must be charged every 2-3 weeks .
- 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 of 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.

15.2 Disposing of rechargeable battery pack and charger

The KSG 200 A and KSG 200 TA transmitters are equipped with a NiMH rechargeable battery pack. The NiMH rechargeable battery pack and the charger must not be disposed of in the domestic waste, rather must be disposed of as hazardous waste.

The rechargeable battery pack may be removed from the device for disposal.

- Dispose of the rechargeable battery pack and the charger in an environmentally friendly manner and in accordance with the applicable national regulations.
- Dispose of the rechargeable battery pack only when it is fully discharged.

16 DELIVERY SCOPE AND OPTIONS

KSG 200 A	KSG 200 TA
▪ KSG 200 A transmitter with integrated rechargeable battery ▪ KSG 200 pulse receiver with flexcoupler (variants as selected): Flexcoupler ø 150 mm Flexcoupler ø 250 mm ▪ Connection cable 2 m, with connection clips ▪ Charger charger incl. country-specific adapter (UK, Europe, USA) ▪ Vehicle charge cable ▪ Transport case for all components ▪ User manual	▪ KSG 200 TA transmitter with integrated rechargeable battery ▪ KSG 200 pulse receiver with flexcoupler (variants as selected): Flexcoupler Ø 150 mm Flexcoupler Ø 250 mm ▪ Connection cable 2 m, with connection clips ▪ Connection set to connect to live LV cables ▪ Flexible rod, fully insulated (for applying the flexcoupler to live cables) ▪ Charger incl. country-specific adapter (UK, Europe, USA) ▪ Vehicle charge cable ▪ 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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