

AC/DC HV test set

PGK HB



The figure is illustrative (PGK 70 HB)

PGK 70 HB
PGK 70/2,5 HB
PGK 110 HB
PGK 150 HB
PGK 260 HB

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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 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
	Warning about combustible materials
	Warning about hot surfaces

1.3 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.

1.4 Note on the graphics used

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

2 FOR YOUR SAFETY

All BAUR devices and systems are manufactured according to the state of the art and are safe to operate. 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 and system is tested before delivery.

However, the operational safety and reliability in practice can be achieved only when all necessary measures have been taken. The responsible body¹ and operator² of the device or system are responsible for planning these measures and monitoring their implementation.

Make sure that the responsible body and persons working with the device or system have carefully read through and understood the user manual for the device or system, as well as the user manuals for all associated devices, before starting work.

The responsible body and operator of the device or system are responsible for any injuries or damage resulting from non-compliance with this user manual.

2.1 Instructions for the operator

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

In addition, the operator must have:

- Knowledge of the technical equipment and operation of the product
- Knowledge of the testing and measurement procedures
- Knowledge of plant engineering (cable types, switchgear, etc.).

2.2 Intended use

The BAUR AC/DC HV test sets in the PGK HB series are used to generate continuously adjustable test voltages:

- DC voltages with positive and negative polarity
- AC voltages at mains frequency

If the device is used without observing this condition, safe operation cannot be guaranteed. The operator or 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,
- Compliance with the technical data and connection requirements given on the rating plate and in the user manual,
- Compliance with the inspection and maintenance tasks.

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 Avoid dangers, take safety measures

- ▶ When installing the test system and operating PGK HB observe the following rules and guidelines:
 - Accident prevention and environment protection rules applicable for your country
 - Safety instructions and regulations of the country where PGK HB is being used (according to the latest version)
 - EU/EFTA countries: EN 50191 *Installation and operation of electric testing systems*
Other countries: The standard for installation and operation of electric testing systems applicable for your country
 - EU/EFTA countries: EN 50110 *Operation of electric systems*
Other countries: The standard for operating electric systems applicable for 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)

Technical secure state of the system

Safety, function and availability depend on the proper condition of the system. Upgrades, modifications or alterations to the system are strictly prohibited.

- ▶ Operate the system only in a technical perfect condition.
- ▶ In the event 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 fittings that are not tested and approved by BAUR could adversely affect the safety, function and characteristics of the system.

Check and maintain the safety devices

The safety devices must be inspected regularly for proper condition and function. PGK HB must not be operated in case of defects or non-functional safety devices.

The safety devices must not be changed, bridged or switched off.

No operation with condensation

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

Maximum danger arises when relatively high air humidity and temperature fluctuations occur in a device consecutively, e.g. which is the case when storing the device in an unheated room or when placed outdoors. When the 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.

In 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.

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 zones are e.g. chemical factories, refineries, lacquer factories, paint shops, cleaning plants, mills and storage for milled products, tank and loading plants for combustible gases, liquids and solid matter.

2.3.1 Dangers when working with high voltage



When performing tests and measurements with the system, dangerous - at times a very high - voltage is generated that is fed to the test object via an HV connection cable.



Personnel need to pay special attention and must be very careful while working with high electric voltage.

Commissioning and operation of the system are permitted only in compliance with the EN 50110 and EN 50191 (EU/EFTA countries) or with standards applicable in your country.

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
	<p>High electrical voltage</p> <p>Danger to life or risk of injury due to electric shock.</p> <ul style="list-style-type: none">▶ 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.▶ Connect the system as described in this user manual.▶ Pay particular attention to ensuring the test object and system are earthed correctly.▶ Observe the warning and safety signs on the system. Always check whether the warning signs are available and are legible.▶ Never put the safety devices out of operation. It is forbidden to bypass the safety devices.▶ Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates).▶ Cordon off all metal parts in the area of the test object terminals (connection point and far end). Insulate and earth the metal parts to avoid dangerous charges. <p>The test object may still be live and carry dangerous voltage after a measurement, even after the system or device has been switched off.</p> <ul style="list-style-type: none">▶ Before removing the safety precautions, discharge, earth and short circuit all live parts.

	 DANGER
	<p>Arcing fault when establishing a connection</p> <p>Danger of burn injuries and electro-ophthalmia due to arcing fault.</p> <ul style="list-style-type: none">▶ Use suitable personal protective equipment to protect against arcing faults.▶ Cover the adjacent live parts with an insulating material.▶ Use only undamaged connection cables.▶ Secure the connection points and far end of the test object.▶ Use special locking devices to lock connection points.

2.4 Special personal protective equipment

Personal protective equipment based on the risk assessment for the relevant working conditions is part of the PGK HB 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 protective equipment:

Protection against electrostatic charging, crushing, slipping and other accidents:	<ul style="list-style-type: none"> ▪ Safety footwear
Protection against electrical hazards (arcing fault):	<ul style="list-style-type: none"> ▪ Certified safety clothing ▪ Hard hat with visor ▪ Insulating protective gloves ▪ LV HRC fuse handle with sleeve
Protection against noise:	<ul style="list-style-type: none"> ▪ Ear protection
Protection against dangers from road traffic:	<ul style="list-style-type: none"> ▪ 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:	<ul style="list-style-type: none"> ▪ Safety gloves

3 PRODUCT INFORMATION




The BAUR PGK HB AC/DC HV test set is made up of the following main components:



- Operating unit
The operating unit contains all operating and display elements plus the power supply for the HV transformer, and allows the HV unit to be controlled from a safe distance.
- HV unit
The HV unit comprises an oil-filled housing with an HV transformer inside. Depending on whether DC or AC voltage is to be generated, a rectifier rod (DC voltage) or resistance rod (AC voltage) is inserted into the HV unit. The polarity of the DC voltage can be reversed by rotating the rectifier rod in the HV unit.

3.1 Operating unit

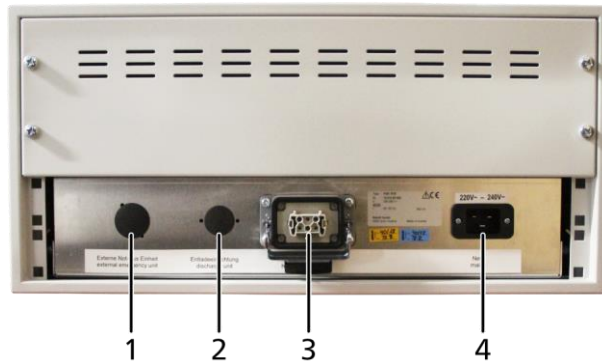
Front view



No.	Element	Function
1	Thermal-magnetic overcurrent protective switch:	Switches the device off if the load is too high
2	 button	Puts the device into the <i>Ready to switch on</i> operating state.
	 key	Puts the device into the <i>In operation</i> operating state.
	 button	Deactivates the high voltage release, activates the EM automatic discharge device (option) and puts the device into the <i>Ready for operation</i> operating state
3	On/Off switch	Is used to switch the device on and off

No.	Element	Function
4	Current indicator	Shows the actual current during the cable or cable sheath test <ul style="list-style-type: none"> DC voltage: Displays the arithmetic mean value of the output current AC voltage: Displays the rms value of the output current The rms value is calculated from the rectified value of the measured output current. If the measured output current is not sinusoidal, the rms value displayed may deviate from the true rms value. Note: During idling, the current that flows across the self-capacitance of the HV transformer is displayed. This current must be taken into account in measurements.
5	Voltage indicator	<ul style="list-style-type: none"> DC voltage: Displays the peak value of the rectified output voltage Note: If the self-capacitance of the test object is very low, voltage fluctuations may occur. This may cause the displayed peak value to deviate from the mean value of the output voltage. AC voltage: Displays the rms value of the output voltage The rms value is calculated from the rectified value of the measured output voltage.
6	Selector switch for selecting the measurement range of the voltmeter.	Is used to select the measurement range of the voltmeter.
7	 selector switch	Is used to select whether DC or AC voltage is generated. <ul style="list-style-type: none"> + : positive DC voltage (with rectifier rod) - : negative DC voltage (with rectifier rod) ~ : AC voltage (with resistance rod)
8	Selector switch for the measurement range of the ammeter	Is used to select the measurement range of the ammeter.
9	 rotary knob	Is used to set the output voltage
10	Indicator lights	Indicate the system operating state: <ul style="list-style-type: none"> Green: <i>Ready for operation</i> Red: <i>Ready to switch on, In operation</i>
11	Emergency off button	Moves the system to the <i>Ready for operation</i> operating state. The emergency off button is equipped with a key lock to protect against restart, unauthorised start-up, and unauthorised or unintentional operation.

Rear view



No.	Element	Function
1	Port for the external emergency off unit	Is used to connect the external emergency off unit (option)
2	Port for the automatic discharge device	Is used to connect the EM automatic discharge device (option)
3	Port for the HV unit	Is used to connect the HV unit of PGK HB
4	Mains connection	Is used to connect the device to mains voltage (220 – 240 V, 50/60 Hz) Option 100 – 130 V, 50/60 Hz (with external auto transformer)

3.2 HV unit

The HV unit is an oil-filled housing with an HV transformer. Depending on the selected operating mode, a rectifier rod (DC voltage) or a resistance rod (AC voltage) is inserted into the HV unit.



No.	Element	Function
1	Protective earthing connection	Is used to connect the protective earthing
2	Field control ring	Is used to control the electric field around the HV unit Controlling the electric field can prevent internal and external partial discharges.
3	Anti-corona protection hood	Is used to: <ul style="list-style-type: none"> ▪ to protect against corona discharges ▪ as an expansion vessel for the insulating oil in the HV transformer
4	HV electrode	Is used to connect the test object to the HV connection cable
5	Connection for the operating part	Is used to connect the PGK HB operating unit

3.3 Connection cables and accessories



No.	Element	Function
1	Rectifier rod	Is used to generate positive/negative DC voltage
	Resistance rod	Is used to generate AC voltage
2	HV electrodes (differ depending upon model)	Is used to connect the HV connection cable Depending upon the model, the HV electrode may be spherical or a knurled screw.
3	Screw plug	Is used to seal the HV unit after the rectifier or resistance rod has been inserted.
4	Wrench	Is used to open the screw plug
5	Protective earthing cable	Is used to connect the device to the protective earthing
6	Mains supply cord	Is used to connect the device to the mains voltage
7	HV connection cable	Is used to connect the device to the test object
8	Connection cables	Is used to connect the operating unit and HV unit

3.4 Safety devices

3.4.1 Automatic discharge device EM (option)

The EM automatic discharge device is used to discharge and earth the test object and the HV components of the device.

After the high voltage release has been deactivated on the operating unit, the test object and the HV components of the device are discharged and earthed using the EM automatic discharge device.

Depending upon the device, the following discharge devices may be mounted:

- EM 70
- EM 70/2,5
- EM 110
- EM 150
- EM 260

Max. discharge energies

Discharge unit	Max. discharge energy
EM 70	20 kJ
EM 70/2,5	45 kJ
EM 110	45 kJ
EM 150	45 kJ
EM 260	90 kJ

- ▶ Wait 20 minutes between discharges.

Discharging, earthing and short-circuiting the test object

Even if the test object and the HV components of the device have been discharged by an automatic discharge device, a dangerous level of voltage may exist at the test object. Cables have a capacitance and can continue to hold a charge even after the HV transformer has been switched off, and can be recharged after a temporary short-circuit due to recurring voltages.

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

3.4.2 Emergency off button

The emergency off button is on the device's operating unit.

- ▶ In case of danger, press the emergency off button.
 - This puts the device into the *Ready for operation* operating state.
 - The power supply to the HV unit is switched off.
 - When the automatic discharge device (option) is mounted, the short-circuit rod of the discharge device discharges the HV transformer and the test object via the discharge resistor.
 - The red indicator light goes off.
 - The green indicator light comes on.
 - No test can be performed as long as the emergency off button is activated.
- ▶ To put the device back into operation after pressing the emergency off button, unlock the emergency off button.

Notes:

- The voltage indicator ceases to display a voltage once the emergency off button has been operated, but dangerous voltage may still be present at the test object.
 - ▶ 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.

Further information: Chapter *Discharging and earthing the test object* (on page 45)
- The test object is not disconnected from the HV unit. You need to disconnect the test object from the HV unit yourself.

3.4.3 External emergency off unit (option)

The BAUR external emergency off unit is designed in compliance with EN 13849 according to Category 3. This means that the occurrence of a single fault in the safety circuit does not lead to a loss of the safety function. For example, it is not possible to bypass the emergency off button because the connection cable is jammed, compressed or damaged.

As the connection cable is 25 m / 50 m long, the emergency off unit can be installed outside the barrier so that it is safe to operate at any time in the event of danger.



No.	Element	Function
1	Emergency off button	<p>In the event of an emergency, moves the system to the safe <i>Ready for operation</i> operating state</p> <ul style="list-style-type: none"> ▪ The power supply to the HV unit is switched off. ▪ If the automatic discharge device (option) is fitted, the short-circuit rod of the discharge device discharges the HV transformer and the test object via the discharge resistor. ▪ The indicator light on the operating unit turns green. ▪ No test can be performed as long as the emergency off button is activated. <p>Notes:</p> <ul style="list-style-type: none"> ▪ The voltage indicator ceases to display a voltage once the emergency off button has been operated, but dangerous voltage may still be present at the test object. <ul style="list-style-type: none"> ▶ 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. Further information: Chapter <i>Discharging and earthing the test object</i> (on page 45) ▪ The test object is not disconnected from the HV unit. You need to disconnect the test object from the HV unit yourself.
2	Green indicator light	Displays the <i>Ready for operation</i> operating state
3	Red indicator light	<p>Indicates the system operating state:</p> <ul style="list-style-type: none"> ▪ <i>Ready to switch on</i> ▪ <i>In operation</i>

3.5 Device operating modes

The following operating modes may be available on the PGK HB depending on the load on the connected test object and the set test voltage:

- Continuous operation
- Short-time operation

3.5.1 Continuous operation

Use: Idling to limit load

During continuous operation the device can be continuously loaded.

3.5.2 Short-time operation

Use: Limit load to short-circuit

To reduce the thermal load on the device, the device temporarily switches on current-limiting lamps in the primary circuit of the HV transformer.

If the device is overloaded, the thermal-magnetic overcurrent protective switch trips and switches the device off after a certain time. The time it takes for the switch to trip depends upon the load. After cooling, you can operate the device again.

3.6 Device operating states

3.6.1 “Out of operation” operating state

- All safety measures necessary before stepping into the test area have been met.
- All power supplies, signal and control electric circuits are switched off.

3.6.2 “Ready for operation” operating state

- The safety measures of the *Out of operation* operating state that are necessary before stepping into the danger area are still in place.
- The test voltage supply is switched off and secured against accidental start.
- The green indicator light on the operating unit comes on.

Procedure


- ▶ To put the device into the *Ready for operation* operating state, switch the device on using the On/Off switch on the operating unit.

Further information: Chapter *Switching on the device* (on page 42)


3.6.3 “Ready to switch on” operating state

- All accesses to the test area are closed. The safety measures of the *Out of operation* operating state that are necessary before stepping into the danger area are lifted.
- The test voltage supply is switched off.
- The red indicator light on the control panel comes on.


Procedure

- ▶ To put the device into the *Ready to switch on* operating state, release the high voltage on the device. To do this, press the  key on the operating unit.

3.6.4 “In operation” operating state


- All accesses to the test area are closed.
- The device is in the *Ready to switch on* operating state.
- The test voltage supply is switched on.
- The red indicator light on the operating unit comes on.
- The  key illuminates.

Procedure

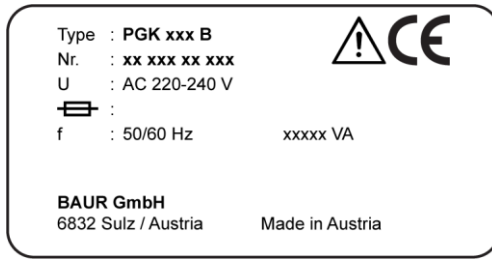
- ▶ To put the device into the *In operation* operating state, press the  key on the operating unit.

3.7 Markings on the device

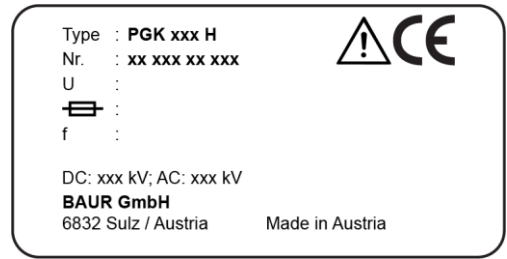
Safety markings

Location and type	Explanation
On the HV unit:	
	<p>Risk of electric shock</p> <p>High voltage may be present at the HV unit after the measurement has been completed and this can give rise to serious injuries due to electric shock if touched.</p>
<p>Achtung! Caution! Attention! Atención!</p> <p>Nur stehend betreiben und transportieren. Operate and transport only in vertical position. Service et transport seulement en position verticale. Funcionamiento y transporte sólo en posición vertical.</p>	<p>Information sign stating that the HV unit must be in an upright position during operation and transport.</p>
On the operating unit:	
<p>ACHTUNG Bei unsachgemäßer Inbetriebnahme kann die Bedienung dieses Hochspannungsgerätes lebensgefährlich sein. Das Gerät darf nur von geschultem und bevollmächtigtem Personal gemäß den örtlichen Sicherheitsvorschriften betrieben werden. Beachten Sie die Hinweise in der Bedienungsanleitung!</p> <p>CAUTION This is high voltage equipment which can be lethal if used improperly. It must be operated only by trained and authorised personnel in accordance with all local safety regulations. Please pay attention to the instructions in our manual.</p> <p>ATTENTION Le présent appareil haute-tension peut présenter un danger mortel en cas d'utilisation inconsiderée. Cet appareil ne doit être mis en service que par des personnes spécialement formées et dûment accréditées, conformément aux prescriptions de sécurité en vigueur. Tenir compte des instructions de la notice d'emploi.</p>	<p>Information sign stating that the device may only be operated by trained and authorised personnel.</p>

Rating plates



On the operating unit



On the HV unit

Element	Description	
	Operating unit	HV unit
Type	Device designation	Device designation
Nr.	Serial number	Serial number
U	Supply voltage If several supply voltages are possible, these are given consecutively one after another.	Not applicable here
☐	Not applicable here	Not applicable here
f	Mains frequency	Not applicable here
VA	Max. recorded apparent output	Not applicable here
[TEXT]	Not applicable here	Max. output voltage of device <ul style="list-style-type: none"> ▪ PGK 70 HB: DC: 70 kV; AC: 50 kV ▪ PGK 70/2,5 HB: DC: 70 kV; AC: 50 kV ▪ PGK 110 HB: DC: 110 kV; AC: 78 kV ▪ PGK 150 HB: DC: 150 kV; AC: 106 kV ▪ PGK 260 HB: DC: 260 kV; AC: 184 kV
⚠	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.	
BAUR GmbH 6832 Sulz / Austria	Name and address of the manufacturer	
Made in Austria	Indicates the country in which the device was manufactured. Austria: Austria	

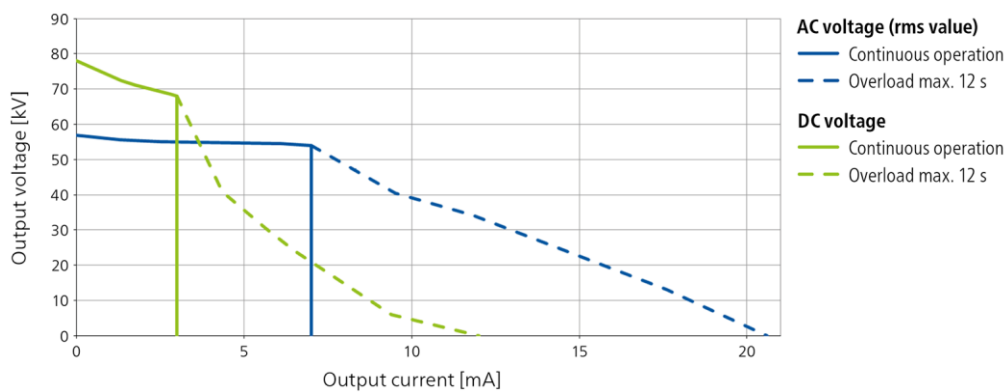
4 TECHNICAL DATA

4.1 PGK 70 HB

Testing	
Output voltage	<ul style="list-style-type: none"> ▪ AC 0 – 55 kV_{rms} ▪ DC 0 to ±70 kV
Output current (continuous)	<ul style="list-style-type: none"> ▪ AC 7 mA_{rms} ▪ DC ±3 mA
Short-circuit current	<ul style="list-style-type: none"> ▪ AC 20 mA_{rms} ▪ DC ±12 mA
Accuracy	
Voltmeter (kV)	2.5%
Ammeter (mA)	2.5%

General	
Power supply	200 – 260 V, 50/60 Hz
Option	100 – 130 V, 50/60 Hz (with external auto transformer)
Power consumption	640 VA
In short-circuit	1,200 VA
Ambient temperature (operational)	0°C to +45°C
Storage temperature	-20°C to +60°C
Relative humidity	Non-condensing
Dimensions	
Operating unit (W x H x D)	Approx. 506 x 258 x 319 mm, (19", 5 RU)
HV unit (Height / Diameter)	Approx. 824 mm / Ø ca. 385 mm
Weight	
Operating unit	Approx. 13.5 kg
HV unit	Approx. 26 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

Load diagram

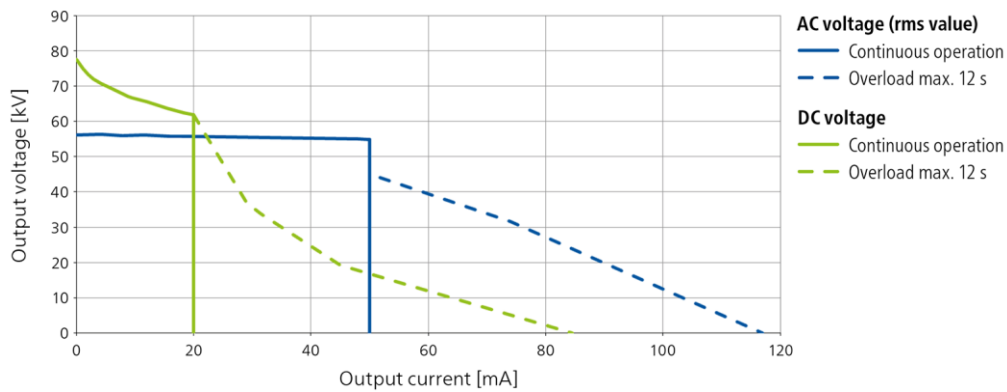


4.2 PGK 70/2,5 HB

Testing	
Output voltage	<ul style="list-style-type: none"> AC 0 – 55 kV_{rms} (at constant input voltage of 230 V) DC 0 to ±70 kV
Output current (continuous)	<ul style="list-style-type: none"> AC 50 mA_{rms} DC ±20 mA
Short-circuit current	<ul style="list-style-type: none"> AC 117 mA_{rms} DC ±84 mA
Accuracy	
Voltmeter (kV)	2.5%
Ammeter (mA)	2.5%

General	
Power supply	200 – 260 V, 50/60 Hz
Option	100 – 130 V, 50/60 Hz (with external auto transformer)
Power consumption	3,200 VA
In short-circuit	6,500 VA
Ambient temperature (operational)	0°C to +45°C
Storage temperature	-20°C to +60°C
Relative humidity	Non-condensing
Dimensions	
Operating unit (W x H x D)	Approx. 506 x 258 x 319 mm, (19", 5 RU)
HV unit (Height / Diameter)	Approx. 1,126 mm / Ø ca. 473 mm
Weight	
Operating unit	Approx. 22 kg
HV unit	Approx. 93 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

Load diagram

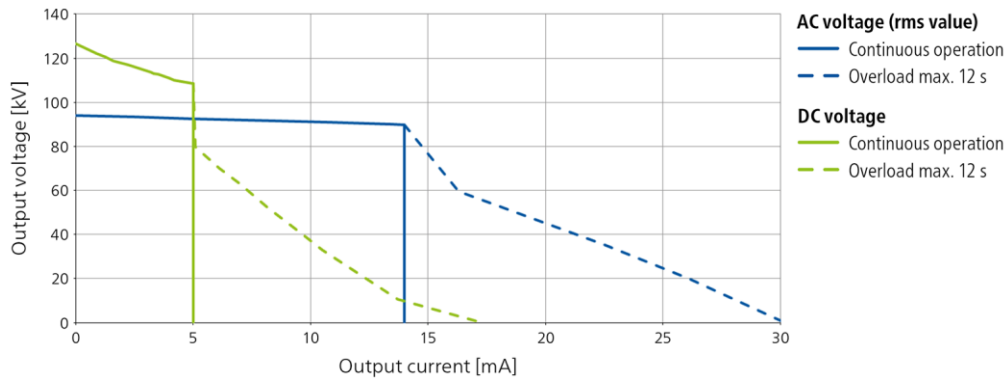


4.3 PGK 110 HB

Testing	
Output voltage	<ul style="list-style-type: none"> ▪ AC 0 – 80 kV_{rms} ▪ DC 0 to ±110 kV
Output current (continuous)	<ul style="list-style-type: none"> ▪ AC 14 mA_{rms} ▪ DC ±5 mA
Short-circuit current	<ul style="list-style-type: none"> ▪ AC 30 mA_{rms} ▪ DC ±17 mA
Accuracy	
Voltmeter (kV)	2.5%
Ammeter (mA)	2.5%

General	
Power supply	200 – 260 V, 50/60 Hz
Option	100 – 130 V, 50/60 Hz (with external auto transformer)
Power consumption	1,380 VA
In short-circuit	2,650 VA
Ambient temperature (operational)	0°C to +45°C
Storage temperature	-20°C to +60°C
Relative humidity	Non-condensing
Dimensions	
Operating unit (W x H x D)	Approx. 506 x 258 x 319 mm, (19", 5 RU)
HV unit (Height / Diameter)	Approx. 1,126 mm / Ø ca. 473 mm
Weight	
Operating unit	Approx. 17 kg
HV unit	Approx. 75 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

Load diagram

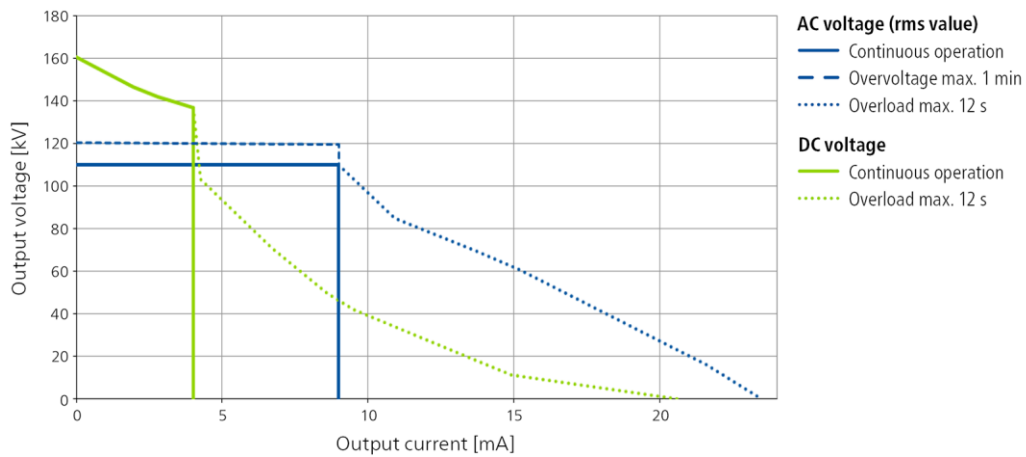


4.4 PGK 150 HB

Testing	
Output voltage	<ul style="list-style-type: none"> ▪ AC 0 – 110 kV_{rms} ▪ DC 0 to ±150 kV
Output current (continuous)	<ul style="list-style-type: none"> ▪ AC 9 mA_{rms} ▪ DC ±4 mA
Short-circuit current	<ul style="list-style-type: none"> ▪ AC 23 mA_{rms} ▪ DC ±20 mA
Accuracy	
Voltmeter (kV)	2.5%
Ammeter (mA)	2.5%

General	
Power supply	200 – 260 V, 50/60 Hz
Option	100 – 130 V, 50/60 Hz (with external auto transformer)
Power consumption	1,380 VA
In short-circuit	2,650 VA
Ambient temperature (operational)	0°C to +45°C
Storage temperature	-20°C to +60°C
Relative humidity	Non-condensing
Dimensions	
Operating unit (W x H x D)	Approx. 506 x 258 x 319 mm, (19", 5 RU)
HV unit (Height / Diameter)	Approx. 1,433 mm / Ø ca. 473 mm
Weight	
Operating unit	Approx. 17 kg
HV unit	Approx. 83 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

Load diagram

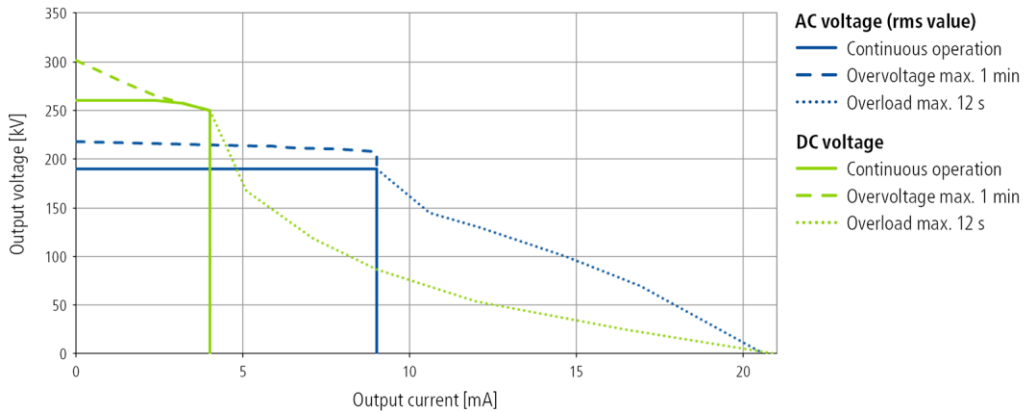


4.5 PGK 260 HB

Testing	
Output voltage	DC 0 to ±260 kV
Option	AC 0 – 190 kV _{rms}
Output current (continuous)	DC ±4 mA
Option	AC 9 mA _{rms}
Short-circuit current	DC ±20 mA
Option	AC 20 mA _{rms}
Accuracy	
Voltmeter (kV)	2.5%
Ammeter (mA)	2.5%

General	
Power supply	200 – 260 V, 50/60 Hz
Option	100 – 130 V, 50/60 Hz (with external auto transformer)
Power consumption	2,600 VA
In short-circuit	5,000 VA
Ambient temperature (operational)	0°C to +45°C
Storage temperature	-20°C to +60°C
Relative humidity	Non-condensing
Dimensions	
Operating unit (W x H x D)	Approx. 506 x 258 x 319 mm, (19", 5 RU)
HV unit (Height / Diameter)	Approx. 2,055 mm / Ø ca. 1,265 mm
Weight	
Operating unit	approx. 19 kg
HV unit	approx. 280 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

Load diagram





5 CHECKS TO PERFORM BEFORE COMMISSIONING

1. Operate the device only in a technically perfect condition.
2. Check the device and mechanical connections for damage.
3. Check electrical connections and cables for damage.
Use only undamaged connection cable.
4. Check the safety devices regularly for proper condition and function.
This particularly applies for signal systems, emergency stop devices, earthing and short-circuit devices and ports.

6 COMMISSIONING

- ▶ Please consider the following provisions and guidelines when installing the testing system and operating the BAUR testing and diagnostic systems:
 - Accident prevention and environmental protection regulations applicable for your country
 - Safety instructions and regulations of the country where the system is being used (according to the latest version)
 - EU/EFTA countries: EN 50191 *Erection and operation of electrical test equipment*
Other countries: The standard for erection and operation of electric test equipment applicable for your country
 - EU/EFTA countries: EN 50110 *Operation of electrical installations*
Other countries: The standards for operating electric systems applicable in your country
 - If necessary, other national and international standards and guidelines in the latest applicable version
 - Local safety and accident prevention regulations
 - Employers' liability insurance association regulations (if any)
- ▶ Use the personal protective equipment for protection against electric shock and burning due to possible arcing faults in compliance with the local work safety and accident prevention regulations.

6.1 Specific safety instructions

	 DANGER
	<p>Dangerous electric step voltage</p> <p>Danger of electric shock or risk of injury</p> <p>The HV unit is equipped with a field control ring</p> <ul style="list-style-type: none"> ▶ Never operate the device without the field control ring.

6.2 Ensure there is no voltage at the work place

1. Disconnect the test object from all phases.
2. Secure the test object against re-energisation.
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.

For cable tests:

Note:

- ▶ If the **cable sheath is not earthed**, establish a short earth connection to the station earth. The station earth is the neutral point of the earth connections.
- ▶ The earthing conductor should be as short as possible and show low impedance. Use a copper **earthing conductor with a cross-section of min. 16 mm²**.

6.3 Preparing the test object terminals

The test object terminals are **the connection point and the far end** of the test object.

1. Disconnect all operating resources that are connected to the test object and are not designed for the stipulated test voltage.
2. Cordon off all metal parts, e.g. lighting masts at the test object terminals or insulate them with insulating safety plates.
3. Earth all metal parts at the terminals to avoid dangerous charging.
4. All cables that are used in danger zones can also carry high voltage potential outwards. Therefore, remove these cables from the danger zone or ensure low-resistive earthing and short-circuit.
5. Follow the cable route and ensure that no work is being carried out underground on gas lines and that there are no other danger points.

For cable sheath tests or cable sheath fault locations:

- ▶ Disconnect the screen of the test object from the station earth on both sides.

6.4 Installing the device

- ▶ Select the place of installation for the device in such a way that
 - a stable base is guaranteed,
 - the device and the test object are easy to access for the connections and 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.

NOTICE

Damage to device due to improper handling.

The HV unit comprises a housing filled with oil.

- ▶ The HV unit must be vertical during operation.

6.5 Preparing the device for the generation of DC voltage

As standard, the rectifier rod for the generation of DC voltage is inserted into the HV unit.

Prerequisites

The connecting parts and hood of the HV unit are clean and dry.

Further information: Chapter *Cleaning the device* (on page 49)



Rectifier rod



One end of the rectifier rod is marked with a + and the other with a –.



Wrench (included in standard delivery)

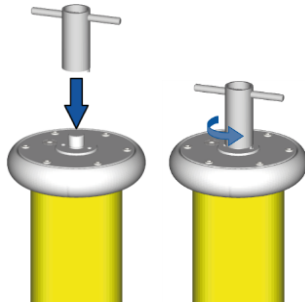
Procedure

On the operating unit

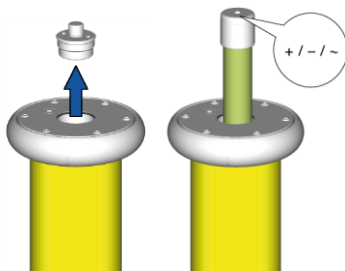
- ▶ To generate negative DC voltage, put the  selector switch into the - position.
- ▶ To generate positive DC voltage, put the  selector switch into the + position.

On the HV unit

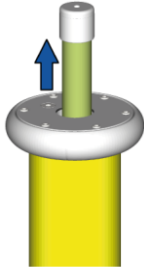
1. Unscrew the HV electrode by hand and remove.
The shape of the HV electrode varies depending upon the model.
2. Undo the screw plug using the wrench.



3. Remove the screw plug from the rod that is in use.
You can tell which rod is in use based on the marking on its end:
 - The end of the resistance rod is marked with a ~.
 - One end of the rectifier rod is marked with a + and the other with a –.



4. If the resistance rod is inserted, slowly lift it out of the tube of the HV unit.
The insulating oil from the HV transformer adheres to the resistance rod. Wait around 1 minute to allow the insulating oil to drip off before pulling the resistance rod all the way out.



5. Clean the withdrawn resistance rod and put it away safely.
6. Clean the rectifier rod and the connecting parts using a lint-free cloth and cleaning solvent.
7. Screw the screw plug onto the rectifier rod:
 - To generate a negative DC voltage**
 - ▶ Screw the screw plug onto the end of the rectifier rod marked -.
 - To generate a positive DC voltage**
 - ▶ Screw the screw plug onto the end of the rectifier rod marked +.
8. Insert the rectifier rod into the tube of the HV unit with the screw plug uppermost.
Ensure that the rectifier rod is sitting in insulating oil up to the metal cap at the top.
Further information: Chapter *Checking and topping up insulating oil level* (on page 53)
9. Tighten the screw plug using the wrench.
10. Screw the HV electrode onto the screw plug by hand.

6.6 Preparing the device for the generation of AC voltage

As standard, the rectifier rod for the generation of DC voltage is inserted into the HV unit. The resistance rod must be inserted for the generation of AC voltage.

Prerequisites

The connecting parts and hood of the HV unit are clean and dry.

Further information: Chapter *Cleaning the device* (on page 49)



Resistance rod


PGK 260 HB: The resistance rod is only available for the PGK 260 HB as an option.



Wrench (included in standard delivery)

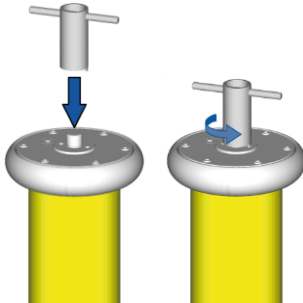
Procedure

On the operating unit

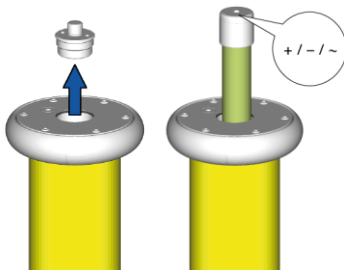
- ▶ Set the  selector switch to the ~ position.

On the HV unit

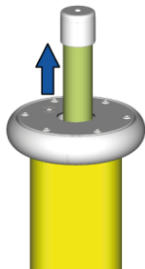
1. Unscrew the HV electrode by hand and remove.
The shape of the HV electrode varies depending upon the model.
2. Undo the screw plug using the wrench.



3. Remove the screw plug from the rod that is in use.
You can tell which rod is in use based on the marking on its end:
 - The end of the resistance rod is marked with a ~.
 - One end of the rectifier rod is marked with a + and the other with a –.



4. If the rectifier rod is inserted, slowly lift it out of the tube of the HV unit.
The insulating oil from the HV transformer adheres to the rectifier rod. Wait approx. 1 minute to allow the insulating oil to drip off before pulling the rectifier rod all the way out.



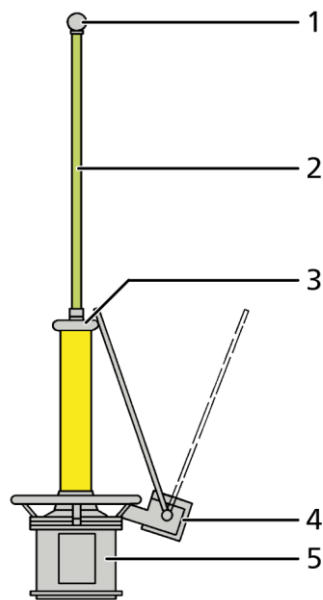
5. Clean the withdrawn rectifier rod and put it away safely.
6. Clean the resistance rod and the connecting parts using a lint-free cloth and cleaning solvent.
7. Screw the screw plug onto the end of the resistance rod marked ~.
8. Insert the resistance rod into the tube of the HV unit with the screw plug uppermost.
Ensure that the resistance rod is sitting in insulating oil up to the metal cap at the top.
Further information: Chapter *Checking and topping up insulating oil level* (on page 53)
9. Tighten the screw plug using the wrench.
10. Screw the HV electrode onto the screw plug by hand.

6.7 Fitting the discharge resistor of the automatic discharge device (option)

For devices with the automatic discharge device (option), the test object is discharged via the discharge resistor of the automatic discharge device.

Important: Adhere to the minimum discharge period based upon the capacitance of the test object.

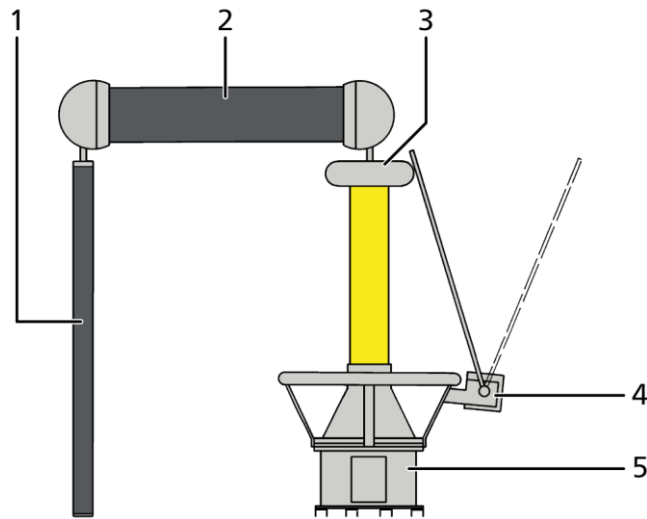
EM 70 automatic discharge device



- | | |
|---|-------------------------------------|
| 1 | HV electrode |
| 2 | Discharge resistor |
| 3 | Anti-corona protection hood |
| 4 | Automatic discharge device (option) |
| 5 | HV unit |

1. Unscrew the HV electrode by hand and remove.
The shape of the HV electrode varies depending upon the model.
2. Screw the discharge resistor onto the screw plug.
3. Screw the HV electrode onto the discharge resistor. Do this using the supplied threaded pin.

Automatic discharge device EM 70/2,5 to EM 260





- | | |
|---|-------------------------------------|
| 1 | Bipod |
| 2 | Discharge resistor |
| 3 | Anti-corona protection hood |
| 4 | Automatic discharge device (option) |
| 5 | HV unit |



1. Unscrew the HV electrode by hand and remove.
The shape of the HV electrode varies depending upon the model.
2. Position the guard on the anti-corona protection hood so that the earth rod of the automatic discharge device strikes the guard when it trips.
3. Insert the holding rod for the discharge resistor through the opening in the guard and screw the holding rod to the screw plug.



4. To affix the guard to the holding rod, screw it to the holding rod on the underside of the guard using the screws.
5. A bipod is supplied with the automatic discharge device. Place one end of the discharge resistor on the bipod bracket.
6. Place the other end of the discharge resistor on the holding rod for the discharge resistor on the HV unit.

6.8 Connecting the device

	 WARNING
	<p>Danger due to electric voltage, flashovers at the connection point, or arcing fault on connection</p> <p>Electric shock on touching live and active parts and due to residual charges and induction voltages; Burns, electro-ophthalmia, hearing damage.</p> <ul style="list-style-type: none"> ▶ 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.

	 WARNING
	<p>High electric voltage through potential increase</p> <p>A fault can cause flashovers in the device. In this case, a potential increase of the housing is possible due to high short-circuit currents. Danger due to the potential increase is reduced when a protective earthing is connected properly.</p> <ul style="list-style-type: none"> ▶ Connect the protective earthing carefully. The protective earthing cable should be as short as possible and of low impedance.

6.8.1 Connecting for cable test

Prerequisites

- The connection point and far end have been prepared for the test.
- The device has been prepared for the generation of DC or AC voltage
- The protective earthing cable of the discharge and earth rod is connected to the station earth.
- In the case of devices with an automatic discharge device (option), the discharge resistor is mounted

Further information:

- Chapter *Preparing the test object terminals* (on page 31)
- Chapter *Preparing the device for the generation of AC voltage* (on page 33)
- Chapter *Preparing the device for the generation of DC voltage* (on page 32)
- Chapter *Fitting the discharge resistor of the automatic discharge device (option)* (on page 35)

Procedure

1. Ensure the test object has been de-energised. Earth and short-circuit all phases of the test object:

- at the connection point
- at far end

Further information: Chapter *Ensure there is no voltage at the work place* (on page 31)

2. Connect the protective earthing cable to the station earth and HV unit. Proceed as follows:
 - a. Connect the protective earthing cable to the station earth - as close as possible to the station earth connection.
 - b. There are two earthing connections on the HV unit. Connect the protective earthing cable to one of the two earthing connections.

Note: The connection between the connection point for the protective earthing cable and the protective earthing connection of the HV unit should be as short as possible and of low impedance (minimum cross-section 4 mm², copper).

3. Connect the operating unit to the HV unit using the connection cable supplied.
4. Connect the HV connection cable to the test object phase to test. Proceed as follows:
 - a. Connect the HV connection cable to the test object phase to test.
 - b. Connect the HV connection cable on the HV unit to the connection socket of the HV electrode or to the discharge resistor of the automatic discharge device (option).

Note: When working with high voltage, ensure that you maintain the required minimum distance from adjacent parts.

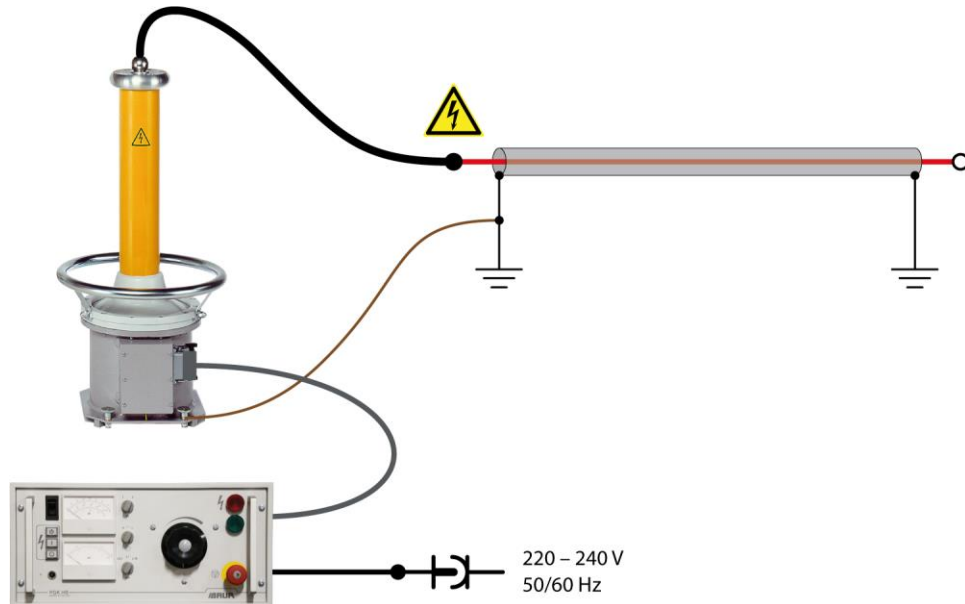
5. If necessary, connect the automatic discharge device (option) at the back of the operating unit to the *discharge unit* port.
6. If necessary, connect the external emergency off unit (option) at the back of the operating unit to the *external emergency unit* port.
7. Remove the earthing and the short-circuit connection from the phase to be tested:
 - at the connection point
 - at far end
8. Make sure that the phases not being tested are earthed and shorted.

Connection examples

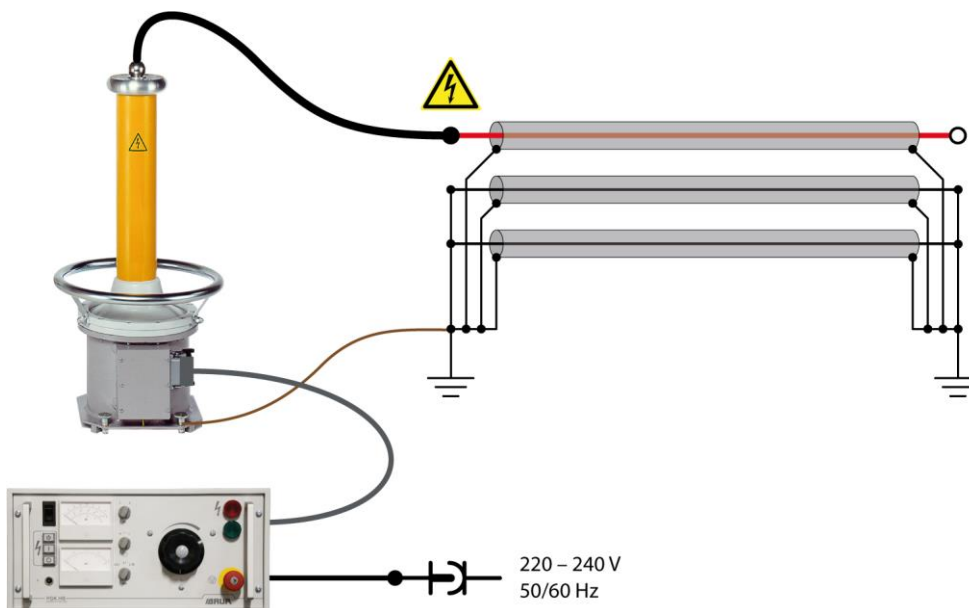
Note:

- ▶ If the **cable sheath is not earthed**, establish a short earth connection to the station earth. The station earth is the neutral point of the earth connections.
- ▶ The earthing conductor should be as short as possible and show low impedance. Use a copper **earthing conductor with a cross-section of min. 16 mm²**.

1-phase shielded cable



3-phase shielded cable



6.8.2 Connecting for cable sheath testing

Prerequisites

- The connection point and far end have been prepared for the test.
- The device has been prepared for the generation of DC or AC voltage
- The protective earthing cable of the discharge and earth rod is connected to the station earth.
- In the case of devices with an automatic discharge device (option), the discharge resistor is mounted

Further information:

- Chapter *Preparing the test object terminals* (on page 31)
- Chapter *Preparing the device for the generation of AC voltage* (on page 33)
- Chapter *Preparing the device for the generation of DC voltage* (on page 32)
- Chapter *Fitting the discharge resistor of the automatic discharge device (option)* (on page 35)

Procedure

1. Ensure the test object has been de-energised. Earth and short-circuit all phases of the test object:
 - at the connection point
 - at far end

Further information: Chapter *Ensure there is no voltage at the work place* (on page 31)

2. Connect the protective earthing cable to the station earth and HV unit. Proceed as follows:
 - a. Connect the protective earthing cable to the station earth - as close as possible to the station earth connection.
 - b. There are two earthing connections on the HV unit. Connect the protective earthing cable to one of the two earthing connections.

Note: The connection between the connection point for the protective earthing cable and the protective earthing connection of the HV unit should be as short as possible and of low impedance (minimum cross-section 4 mm², copper).

3. Connect the operating unit to the HV unit using the connection cable supplied.
4. Connect the HV connection cable to the screen of the test object phase to test. Proceed as follows:
 - a. Connect the HV connection cable to the screen of the test object phase to test.
 - b. Connect the HV connection cable on the HV unit to the connection socket of the HV electrode or to the discharge resistor of the automatic discharge device (option).

Note: When working with high voltage, ensure that you maintain the required minimum distance from adjacent parts.

5. If necessary, connect the automatic discharge device (option) at the back of the operating unit to the *discharge unit* port.
6. If necessary, connect the external emergency off unit (option) at the back of the operating unit to the *external emergency unit* port.

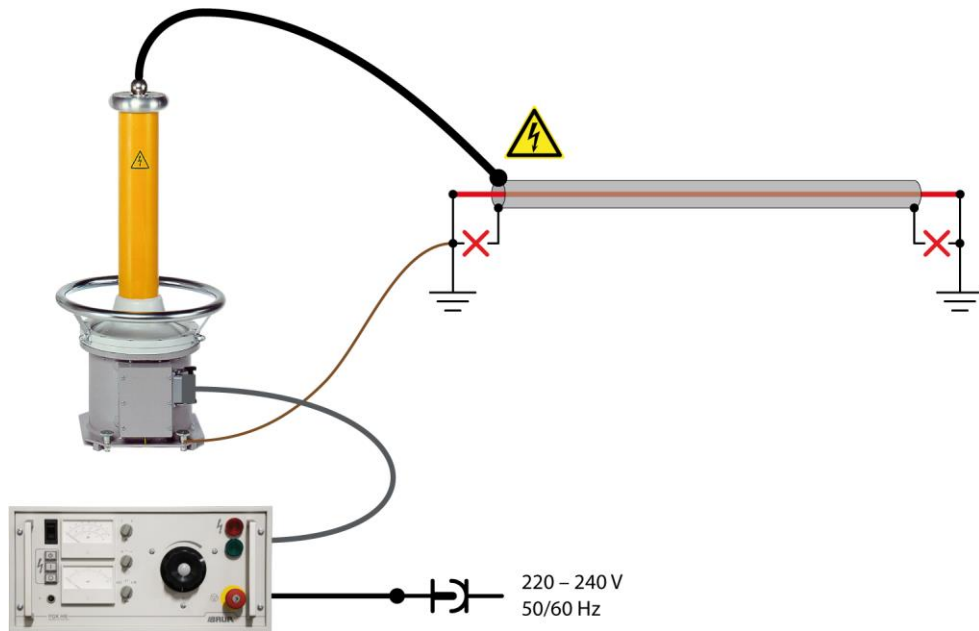
7. Make sure that the screens of all phases of the test object are disconnected from the station earth at both ends:

- at the connection point
- at far end

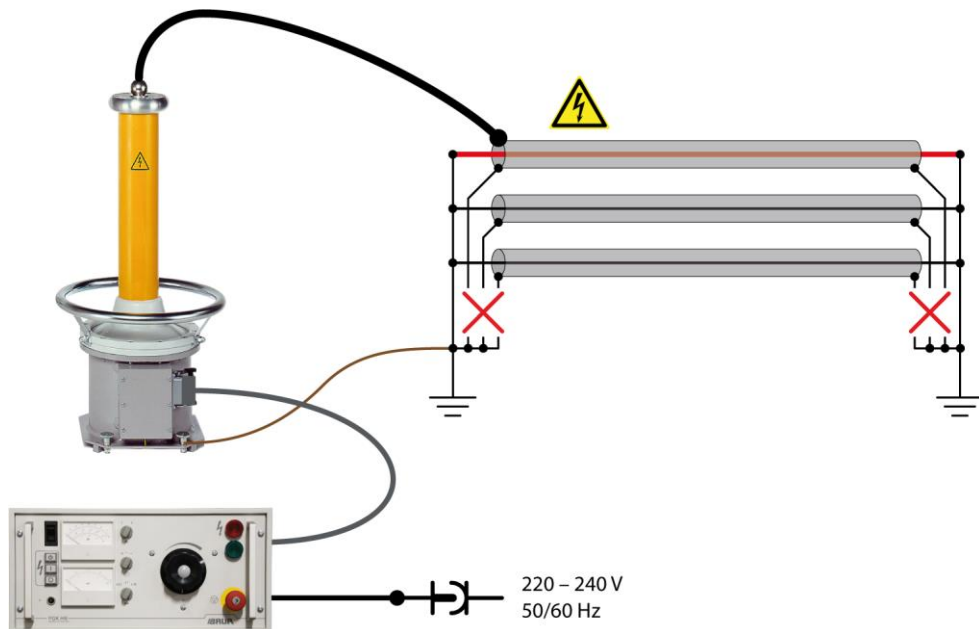
Important: The phases of the test object remain earthed and short circuited.

Connection examples

1-phase shielded cable



3-phase shielded cable



6.8.3 Connecting to the supply voltage

1. Measure the mains voltage with a voltmeter.
2. Compare the mains voltage with the specifications in the technical data for the device.
Further information: Chapter *Technical data* (on page 24)
3. Make sure that the mains supply earth is not isolated from the station earth.



CAUTION

High electric voltage through potential increase. Risk of personal injury due to electric shock. Damage to property due to potential differences from mains input to the housing.

4. Connect the system to the mains voltage. If necessary, use a country-specific adapter.

6.9 Setting the measurement range

NOTICE

Damage to the voltmeter or ammeter due to overload

- ▶ Before each measurement, set the largest possible measurement range for each meter.


Voltmeter

- ▶ Using the voltmeter's measurement range selector switch, select position *II*.
Depending on the test voltage used, you may be able to switch to measurement range *I* during testing to achieve the highest possible resolution.

Ammeter


- ▶ Using the ammeter's measurement range selector switch, select position *x 10*.
The ammeter can withstand brief overloads caused by breakdowns and short-circuits at the test object as long as they are no higher than ten times the set measurement range.

6.10 Switching on the device

1. Turn the  rotary switch all the way to the left.
2. Switch on the device with the On/Off switch on the operating unit.
This puts the device into the *Ready for operation* operating state. The green indicator light comes on.

7 PERFORMING A TEST





Prerequisites

- The device is in the *Ready for operation* operating state.
- The  rotary switch is turned all the way to the left.
- The measurement ranges for the voltmeter and ammeter are set to the highest option available.
- The device has been prepared for the generation of DC or AC voltage

Further information:

- Chapter *Setting the measurement range* (on page 42)
- Chapter *Preparing the device for the generation of DC voltage* (on page 32)
- Chapter *Preparing the device for the generation of AC voltage* (on page 33)

Procedure

1. Put the device into the *In operation* operating state. Proceed as follows:
 - a. Press the  key.
This puts the device into the *Ready to switch on* operating state.
 - b. To put the device into the *In operation* operating state, press the  key.
The  key illuminates.
2. Using the  rotary switch, increase the test voltage to the desired value.
Cable sheath testing: Adhere to the test voltage tolerances during cable sheath testing.
3. Watch the current indicator whilst doing this.
In the event of a breakdown (short-circuit), the current will rise.

Note: If the load is too high, the thermal-magnetic overcurrent protective switch turns the device off. The time it takes to trigger the overcurrent protective switch depends upon the load.

7.1 Note on setting the output voltage for the cable sheath testing

- ▶ Adhere to the tolerances for test voltage during cable sheath testing.
To set the output voltage of the PGK HB as accurately as possible for cable sheath testing, check the output voltage with a suitable voltmeter.





Further information on test voltages for cable sheath testing can be found in the current version of the following standards:




- IEC 60229
 - IEC 60502
 - CENELEC HD 620/621 (VDE DIN 0276-620/621)
-

8 ENDING A TEST

8.1 Taking the device out of operation

	 WARNING
	<p>High electrical voltage</p> <p>Electric shock on touching live and active parts and due to residual charges if earthing is removed too early</p> <ul style="list-style-type: none"> ▶ Disconnect the earth connections as the last connection of the test setup. ▶ Never disconnect the earth connections as long as power and other periphery connections are still connected.

NOTICE
<p>Damage to devices due to improper use.</p> <ul style="list-style-type: none"> ▶ Do not switch off the device under load. ▶ Before switching off the device, put it in the <i>Ready for operation</i> operating state.

1. Turn the  rotary switch all the way to the left.
2. Press the  key on the operating unit.
 - This puts the device into the *Ready for operation* operating state.
 - The light on the  key goes out.
 - The red indicator light goes out.
 - The green indicator light comes on.
 - If the automatic discharge device (option) is fitted, the short-circuit rod of the discharge device discharges the HV transformer and the test object via the discharge resistor.

DANGER

Dangerous voltage at test object. Danger to life or risk of injury due to electric shock. The voltage indicator on the operating unit ceases to display a voltage once the high voltage release has been deactivated, but dangerous voltage may still be present at the test object.

3. 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.



Further information: Chapter *Discharging and earthing the test object* (on page 45)

4. Switch off the device using the On/Off switch.
5. Disconnect the device completely from the mains voltage.
6. Disconnect the HV connection cable.
7. Finally, disconnect the protective earthing cable.
8. If the cables are dirty, clean them and store them in the designated place.
9. If necessary, remove the cordoning.
10. Remove the earthing and the short-circuit on the test object only if no subsequent work is required and if the test object is to be put back into operation.
11. Remove the barriers and marking of the test area.



8.2 Discharging and earthing the test object

There will still be dangerous voltage at the test object after the voltage or cable sheath testing is complete.

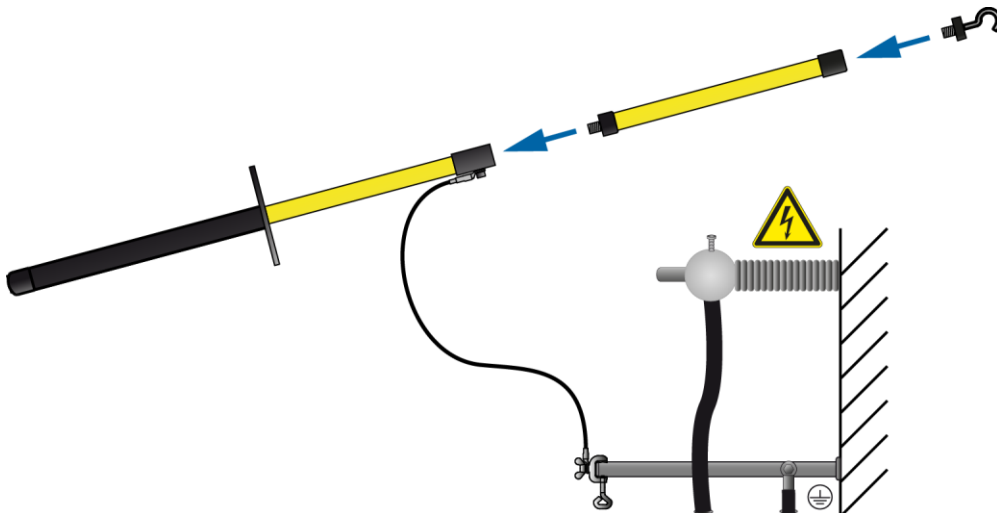
Important: Use the discharge rod for the device in question to discharge and earth the test object. For devices with the automatic discharge device (option), the test object is discharged via the discharge resistor of the automatic discharge device.

	 DANGER
<p>Dangerous voltage in test object.</p> <p>Danger of electric shock or risk of injury</p> <ul style="list-style-type: none"> ▶ Before touching, discharge, earth and short-circuit: The test object at the connection point and at the far end. ▶ You may touch the plant parts that were under voltage only if they are visibly earthed and short-circuited. ▶ Connect the discharge and earth rod correctly to the station earth. ▶ Only use the discharge and earth rod if its surface is clean and dry. ▶ Hold the discharge and earth rod only at the handles! ▶ Observe the minimum discharge period in accordance with the capacitance of the test object. 	

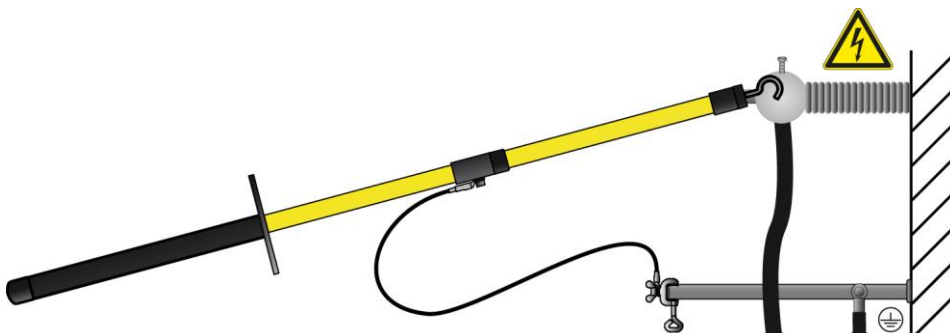
8.2.1 Discharging the test object

	 DANGER
<p>Dangerous voltage in test object</p> <p>Danger to life or risk of injury due to electric shock or electric arcs.</p> <ul style="list-style-type: none"> ▶ Use suitable personal protective equipment against electric shocks and arcing faults. ▶ Keep a distance of at least 50 cm from the protective earthing cable of the discharge and earth rod. 	

1. If not yet connected, connect the earth cable of the protective earthing cable of the discharge and earth rod to the station earth.
2. Assemble the discharge rod:
 - a. Screw the hook onto the discharge part.
 - b. Screw the discharge part onto the handle.





3. Use the black handle to hold the discharge and earth rod and make contact with the test object by touching it with the tip of the discharge and earth rod.

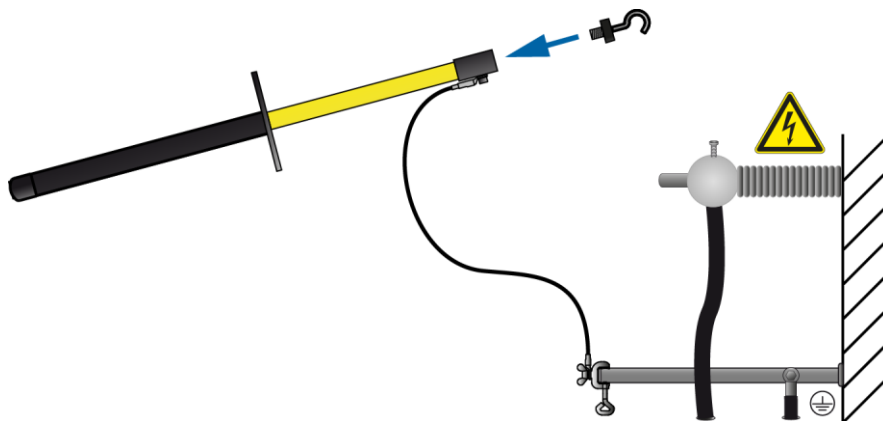


4. Observe the minimum discharge period in accordance with the capacitance of the test object.

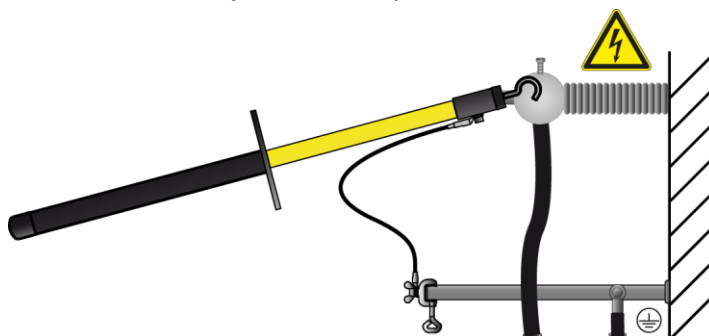
8.2.2 Earthing the test object

	 DANGER
<p>Dangerous voltage in test object</p> <p>Danger to life or risk of injury due to electric shock or electric arcs.</p> <ul style="list-style-type: none"> ▶ Use suitable personal protective equipment against electric shocks and arcing faults. ▶ Keep a distance of at least 50 cm from the protective earthing cable of the discharge and earth rod. 	

1. If not yet connected, connect the earth cable of the protective earthing cable of the discharge and earth rod to the station earth.
2. Assemble the earth rod: Screw the hook into the handle.



3. Contact the test object with the tip of the earth rod.



4. Immediately after earthing, connect the earthing and short-circuit equipment to the test object.

8.3 Exiting the measurement with the emergency off button during emergencies

- ▶ Press the emergency off button on the operating unit or on the external emergency off unit (option).
 - This puts the device into the *Ready for operation* operating state.
 - The power supply to the HV unit is switched off.
 - When the automatic discharge device (option) is mounted, the short-circuit rod of the discharge device discharges the HV transformer and the test object via the discharge resistor.
 - The red indicator light goes off.
 - The green indicator light comes on.
 - No test can be performed as long as the emergency off button is activated.

Notes:

- The voltage indicator ceases to display a voltage once the emergency off button has been operated, but dangerous voltage may still be present at the test object.
 - ▶ 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.

Further information: Chapter *Discharging and earthing the test object* (on page 45)
- The test object is not disconnected from the HV unit. You need to disconnect the test object from the HV unit yourself.

9 MAINTENANCE

9.1 Special maintenance instructions

NOTICE

Damage to devices due to improper handling

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

- ▶ Maintenance tasks must be carried out only by personnel trained and authorised by BAUR.

NOTICE

The HV unit is filled with insulating oil and may not be opened. Leakage of insulating oil can damage the device.

- ▶ Do not dismantle the HV unit. There are no operator-serviceable or -repairable components inside the HV unit.

9.2 Cleaning the device



WARNING

Fire hazard posed by petroleum ether or other cleaning solvent

We recommend using cleaning solvent to clean the connecting parts and hood of the HV unit. The cleaning solvent is highly flammable and in some circumstances may cause a fire.

- ▶ Do not smoke when working with cleaning solvent.
- ▶ Avoid naked flames.

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.

NOTICE**Damage to device due to leaking fluids.**

- ▶ Do not allow liquids to leak into devices.
- ▶ Do not expose the device to rain or moisture.

Prerequisites

- The device is switched off and disconnected from the supply voltage.
Further information: Chapter *Taking the device out of operation* (on page 44)
- The device is earthed and short-circuited.
Cleaning may cause the device to become statically charged.




- Cleaning solvent for cleaning connecting parts and hood of HV unit
- Mild detergent for cleaning the surfaces of the device
- Lint-free cleaning cloth

- ▶ Keep the connecting parts and hood of the HV unit clean and dry. To do this, always clean the connecting parts and the hood of the HV unit with cleaning solvent and a lint-free cloth before use, and allow to dry.
Dirt and moisture will have a negative effect on the measurement results.
- ▶ Clean the device surfaces with mild detergent and a lint-free cloth on a regular basis.
- ▶ Clean the connection cables and terminations with mild detergent and a lint-free cloth.

9.3 Checking that the current-limiting lamps are working

- ▶ Check that the current-limiting lamps in the operating unit are working at regular intervals.

Prerequisites

- The device is connected to the supply voltage.
- The  rotary switch is turned all the way to the left.
- The measurement ranges for the voltmeter and ammeter are set to the highest option available.



- Phillips screwdriver, size 3, or Allen wrench, size 5
The type of screwdriver depends upon the device.







Further information:

- Chapter *Connecting to the supply voltage* (on page 42)
- Chapter *Setting the measurement range* (on page 42)

Procedure

1. Undo the four screws on the back of the operating unit and remove the back panel.



2. Short-circuit the HV electrode to the field control ring of the HV unit. Proceed as follows:
 - a. Connect the HV connection cable to the connection socket of the HV electrode.
 - b. Connect the HV connection cable to the protective earthing connection of the HV unit.
3. Switch on the device with the On/Off switch.
4. Put the device into the *In operation* operating state. Proceed as follows:
 - a. Press the  key.
This puts the device into the operating state *Ready to switch on*.
 - b. To put the device into the *In operation* operating state, press the  key.
The  key illuminates.
5. Using the  rotary switch, slowly increase the voltage until the lamps start to light up.
6. Check that all the lamps come on.
Important: To prevent short-circuit operation damaging the device, keep the function test of the lamps as brief as possible.
7. Turn the  rotary switch all the way to the left.
8. Press the  key on the operating unit.
This puts the device into the operating state *Ready for operation*.
9. If some lamps have not come on, check whether these lamps are defective.
 - ▶ If so, replace the defective lamps and repeat steps 5-7.
Further information: Chapter *Replacing the current-limiting lamps* (on page 52)
 - ▶ If all lamps are OK, contact BAUR GmbH or your nearest BAUR representative (<http://www.baur.eu/baur-worldwide>).
10. Switch off the device using the On/Off switch.
11. Disconnect the device completely from the mains voltage.
12. Affix the back panel to the back of the operating unit using the four screws.
13. Break the short-circuit connection between the HV electrode and the protective earthing connection on the HV unit.

9.4 Replacing the current-limiting lamps

Prerequisites

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



Halogen lamp, 230 V / 1,000 W, base GX6.35 and/or halogen lamp, 230 V / 300 W, base GX6.35-25

The number and type of the halogen lamps differ depending upon the device model.



Phillips screwdriver, size 3, or Allen wrench, size 5

The type of screwdriver depends upon the device.



Safety gloves:

- To protect against burns
- To protect the halogen lamp against grease residues

Procedure



CAUTION

Risk of burns due to hot surfaces

The halogen lamps can reach very high temperatures during and after the operation of the PGK HB operating unit.

- ▶ Always wear protective gloves when touching the halogen lamps.

1. Undo the four screws on the back of the operating unit and remove the back panel.



2. Replace the defective lamps with functional lamps
NOTICE! The halogen lamps can be damaged by grease residues.
3. Always wear protective gloves when touching the halogen lamps.
4. Affix the back panel to the back of the operating unit using the four screws.

9.5 Checking and topping up insulating oil level

Particularly if frequent changes are made between DC and AC voltage generation, some insulating oil may escape each time the rectifier and resistance rod are swapped over. You should therefore check the insulating oil level in the tube of the HV unit at regular intervals.

Prerequisites

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



Insulating oil Technol US 4000 (Nytro 4000 X)

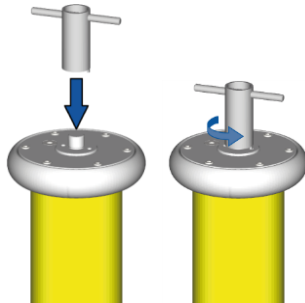
- ▶ Order the insulating oil for topping up from BAUR GmbH or your nearest BAUR representative (<http://www.baur.eu/baur-worldwide>). Please quote the item number 471-716 when placing your order.



- Wrench (included in standard delivery)
- Screwdriver

Procedure

1. Unscrew the HV electrode by hand and remove.
The shape of the HV electrode varies depending upon the model.
2. Unscrew the screw plug using the wrench.



3. Pull the rod that is in use up a little and check the level of the insulating oil.
There should be enough insulating oil in the tube that it reaches the upper metal cap of the rectifier rod or resistance rod.

If there is too little insulating oil in the HV unit tube:

- a. Use the screwdriver to push the rod further into the tube of the HV unit.
- b. Top up the insulating oil in the tube of the HV unit.

Recommendation: The best way to do this is to allow the insulating oil to run along the screwdriver into the tube of the HV unit.

4. Replace the rod that is in use back into the HV unit.
5. Tighten the screw plug using the wrench.
6. Screw the HV electrode onto the screw plug by hand.

9.6 Replacing fuses

Prerequisites

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



- Fuses F1, F2 (primary mains transformer):
time lag, 0.16 A, Ø 5 x 20 mm
- Fuses F3, F4 (+12 V controller):
quick-acting, 2 A, Ø 5 x 20 mm
- Fuses F5, F6 (optional discharge unit):
time lag, 3.15 A, Ø 5 x 20 mm



- Phillips screwdriver, sizes 1 and 3
- Allen wrench, sizes 4 and 5
- Flat-blade screwdriver, size approx. 0.8 x 4.5 mm

The type and size of the screwdriver depend upon the devices.

Procedure

NOTICE

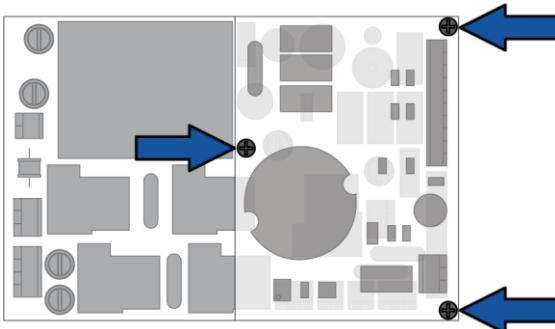
Damage to device due to static electricity

- ▶ To prevent the transfer of charge to electronic components, earth yourself before working on the device. The best way to do this is by using an earthing wrist strap.

1. Undo and remove the four screws on the front panel and back of the operating unit.

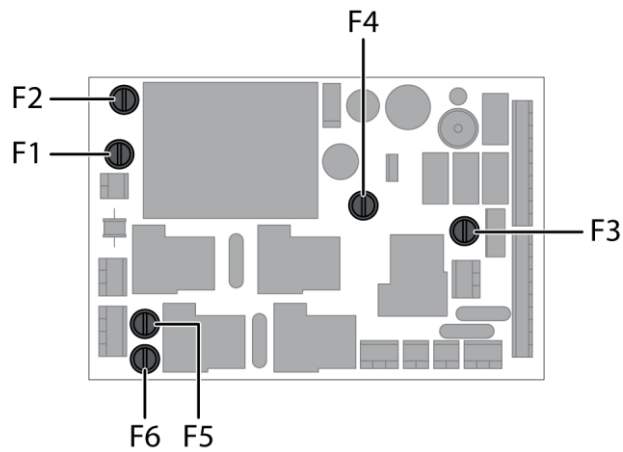


2. Remove the back panel.
3. Withdraw the front panel from the frame using the handles.
4. Undo and remove the three screws from the upper circuit board.



5. Fold back the upper circuit board to gain access to all fuses.

6. Open the fuse holders with the flat-blade screwdriver and check whether the fuse in question is defective.
7. Replace the defective fuses, making sure that the fuse rating is correct.



8. Close the fuse holders.
9. Secure the upper circuit board using the three screws.
10. Insert the front panel into the frame at the front of the operating unit.
11. Secure the front panel with the four screws.
12. Affix the back panel to the back of the operating unit using the four screws.

10 TRANSPORTATION AND STORAGE

NOTICE**Damage to device due to improper handling.**

The HV unit comprises a housing filled with oil.

- ▶ The HV unit must be kept vertical during transport and storage.
- ▶ Never remove the anti-corona protection hood.
The anti-corona protection hood is used as an oil expansion vessel.
- ▶ Protect the anti-corona protection hood against bumps and knocks.

10.1 Transportation

During transportation, or if you send the device to BAUR GmbH, a BAUR representative or the Technical Service department for repair or for any other reason, please follow the instructions below:

- ▶ **NOTICE!** Damage to device due to improper transportation. **The device may only be transported in an upright position.** It is best to use the original transport boxes.
- ▶ Mounting holes can be found in the base plate. Use the mounting holes to secure the HV unit in the transport box.
To improve stability, the HV unit should also be connected to the field control ring.
- ▶ Do **not** use the yellow housing of the HV unit to secure the HV unit.
The yellow housing of the HV unit must not be subjected to bending.
- ▶ During transportation, ensure that the environmental conditions are as specified in the technical data for the device. Information on the technical data is given in the corresponding section of this user manual.
- ▶ Protect all system components against the following during transportation:
 - Damage,
 - Vibrations,
 - Moisture and humidity

10.2 Storage

- ▶ Always store the device in an upright position. It is best to use the original transport boxes.
- ▶ During storage, ensure that the environmental conditions are as specified in the technical data for the device. Information on the technical data is given in the corresponding section of this user manual.
- ▶ Protect the device against humidity.
- ▶ Protect the device against unauthorised access.

11 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. Wear parts are excluded from the warranty.

After Sales

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



BAUR GmbH

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6832 Sulz / Austria
service@baur.at
www.baur.eu

12 DISPOSAL

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

Device components do not belong in the domestic waste.

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

13 DELIVERY INCLUDES AND OPTIONS

13.1 PGK 70 HB

Standard delivery

- PGK 70 HB AC/DC HV test set
- GDR 80-500 discharge and earth rod
- Connection cable, 5 m, for connecting the HV unit to the operating unit
- HV connection cable, 2.5 m, with connection clip
- Rectifier rod for DC voltage operation, screwed into the HV unit
- Resistance rod for AC voltage operation
- Wrench for changing the rectifier and resistance rod
- Earth cable, 3 m, with earth terminal
- Mains supply cord, 2.5 m
- User manual

Options

- GDR 80-500 discharge and earth rod
- Hinged stand for 19" devices, height 5 RU (222 mm)
- EM 70 automatic discharge unit; 20 kJ
- Transport case for operating unit
Dimensions (W x H x D) approx. 515 x 430 x 255 mm
- Transport case for HV unit
Dimensions (W x H x D) approx. 450 x 1,030 x 450 mm
- External emergency off unit with signal lamps,
incl. connection cable, 25 m, on hand drum
- External emergency off unit with signal lamps,
incl. connection cable, 50 m, on hand drum
- External auto transformer 110/230 V; 1.5 kVA
- Rectifier rod
- Resistance rod

13.2 PGK 70/2,5 HB

Standard delivery

- PGK 70/2,5 HB AC/DC HV test set
- GDR 80-500 discharge and earth rod
- Connection cable, 5 m, for connecting the HV unit to the operating unit
- HV connection cable, 2.5 m, with connection clip
- Rectifier rod for DC voltage operation, screwed into the HV unit
- Resistance rod for AC voltage operation
- Wrench for changing the rectifier and resistance rod
- Earth cable, 3 m, with earth terminal
- Mains supply cord, 2.5 m
- User manual

Options

- GDR 80-500 discharge and earth rod
- Trolley for HV part
- Hinged stand for 19" devices, height 5 RU (222 mm)
- EM 70/2,5 automatic discharge unit; 45 kJ
- Transport case for operating unit
Dimensions (W x H x D) approx. 515 x 430 x 255 mm
- Transport case for HV unit
Dimensions (W x H x D) approx. 530 x 1,345 x 530 mm
- External emergency off unit with signal lamps,
incl. connection cable, 25 m, on hand drum
- External emergency off unit with signal lamps,
incl. connection cable, 50 m, on hand drum
- External auto transformer 110/230 V; 3.0 kVA
- Rectifier rod
- Resistance rod

13.3 PGK 110 HB

Standard delivery

- PGK 110 HB AC/DC HV test set
- GDR 120-750 discharge and earth rod
- Connection cable, 5 m, for connecting the HV unit to the operating unit
- HV connection cable, 2.5 m, with connection clip
- Rectifier rod for DC voltage operation, screwed into the HV unit
- Resistance rod for AC voltage operation
- Wrench for changing the rectifier and resistance rod
- Earth cable, 3 m, with earth terminal
- Mains supply cord, 2.5 m
- User manual

Options

- GDR 120-750 discharge and earth rod
- Trolley for HV part
- Hinged stand for 19" devices, height 5 RU (222 mm)
- EM 110 automatic discharge unit; 45 kJ
- Transport case for operating unit
Dimensions (W x H x D) approx. 515 x 430 x 255 mm
- Transport case for HV unit
Dimensions (W x H x D) approx. 530 x 1,345 x 530 mm
- External emergency off unit with signal lamps,
incl. connection cable, 25 m, on hand drum
- External emergency off unit with signal lamps,
incl. connection cable, 50 m, on hand drum
- External auto transformer 110/230 V; 1.5 kVA
- Rectifier rod
- Resistance rod

13.4 PGK 150 HB

Standard delivery

- PGK 150 HB AC/DC HV test set
- GDR 160-1000 discharge and earth rod
- Connection cable, 5 m, for connecting the HV unit to the operating unit
- HV connection cable, 2.5 m, with connection clip
- Rectifier rod for DC voltage operation, screwed into the HV unit
- Resistance rod for AC voltage operation
- Wrench for changing the rectifier and resistance rod
- Earth cable, 3 m, with earth terminal
- Mains supply cord, 2.5 m
- User manual

Options

- GDR 160-1000 discharge and earth rod
- Trolley for HV part
- Hinged stand for 19" devices, height 5 RU (222 mm)
- EM 150 automatic discharge unit; 45 kJ
- Transport case for operating unit
Dimensions (W x H x D) approx. 515 x 430 x 255 mm
- Transport case for HV unit
Dimensions (W x H x D) approx. 530 x 1,665 x 530 mm
- External emergency off unit with signal lamps,
incl. connection cable, 25 m, on hand drum
- External emergency off unit with signal lamps,
incl. connection cable, 50 m, on hand drum
- External auto transformer 110/230 V; 1.5 kVA
- Rectifier rod
- Resistance rod

13.5 PGK 260 HB

Standard delivery

- PGK 260 HB AC/DC HV test set
- GDR 260-1750 discharge and earth rod
- Connection cable, 5 m, for connecting the HV unit to the operating unit
- HV connection cable, 2.5 m, with connection clip
- Rectifier rod for DC voltage operation, screwed into the HV unit
- Wrench for changing the rectifier and resistance rod
- Earth cable, 3 m, with earth terminal
- Mains supply cord, 2.5 m
- User manual

Options

- GDR 260-1750 discharge and earth rod
- Trolley for HV part
- Hinged stand for 19" devices, height 5 RU (222 mm)
- EM 260 automatic discharge unit; 90 kJ
- Transport case for operating and HV unit
Dimensions (W x H x D) approx. 1,350 x 2,220 x 1,350 mm
- External emergency off unit with signal lamps,
incl. connection cable, 25 m, on hand drum
- External emergency off unit with signal lamps,
incl. connection cable, 50 m, on hand drum
- External auto transformer 110/230 V; 3.0 kVA
- Resistance rod for AC voltage operation
- Rectifier rod

14 DECLARATION OF CONFORMITY

We



BAUR GmbH
Raiffeisenstraße 8
6832 Sulz / Austria
headoffice@baur.at
www.baur.eu

declare, under our sole responsibility, that the AC/DC HV test set

- PGK 70 HB
- PGK 70/2,5 HB
- PGK 110 HB
- PGK 150 HB
- PGK 260 HB

to which this declaration refers, conforms to the following standards or standard documents:

- Low Voltage Directive 2014/35/EC
EN 61010-1:2010
EN 50191:2010
- EMC Directive 2014/30/EU
EN 55011:2009 + A1:2010
EN 61000-4-2:2009
EN 61000-4-4:2012
- Environmental testing
EN 60068-2-ff

Signed: Torsten Berth, Technical Director
 Dr. Eberhard Paulus, Director QM/QS

Sulz, 14/12/2015

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