

ENSURING THE FLOW.

## **BAUR cable testing and diagnostics.**

Networks are sensitive.  
**We help you protect them.**





## Improved security and cost-effectiveness of cable networks. High voltage testing and diagnostics with BAUR.

Underground cable networks are expensive. Condition-based maintenance (CBM) is getting more important for operators of power cable networks. Precise knowledge about the condition of cable circuits becomes a competitive advantage. This is understandable if one realises that not only do setting up new circuits and replacing existing ones require huge investments, but also power supply interruptions involve enormous costs.

Guaranteeing supply is by no means an insignificant argument for power suppliers in a scenario of ever-increasing competition for customers of electrical power. BAUR offers a verifiable profit-enhancing contribution for the cost-effective maintenance planning of cable networks with its testing and diagnostics technology. BAUR makes CBM possible, to a much greater extent than other systems do.







**ENSURING THE FLOW.**

**BAUR products cover all key requirements of network operators with respect to cable testing and cable diagnostics.**

**Traditional DC or AC voltage testing.**

PGK series: DC voltage up to 260 kV

AC voltage (50 Hz) up to 190 kV<sub>rms</sub>\*



**Partial discharge measurement and location**

Mobile solutions integrated into VLF generators or modular designed for condition assessment.

**State of the art VLF testing**

World-class VLF\* test procedures with truesinus® digital technology. Standard testing with especially compact and light devices gives reliable results quickly.



**Dissipation factor measurement**

Non-destructive 0.1 Hz  $\tan \delta$  measurement enables significant deterioration diagnostics.

\* VLF: Very Low Frequency, e.g., AC voltage with a frequency of 0.1 Hz



## Cable testing

Underground cables have to be tested before on-site commissioning or recommissioning. Although cables are tested by the manufacturer before delivery, they may be damaged while being laid. As well joints or terminations may be defective. Therefore laying construction companies and network operators are obligated to carry out standard\* tests. In the past paper insulated cables have been tested with DC voltage with the leakage current being an indication of the circuits quality. Modern cables with EPR/XLPE insulation require a sinusoidal voltage (BAUR truesinus® VLF) and should be tested in accordance with the most recent national or international specifications. Such specifications define the voltage level and time for which the user performs the test. If at the end of the test time the circuit has withstood the applied voltage, then it gives the user a very high degree of confidence that when he switches it in it will operate satisfactorily. Such a test is limited in that it gives no information about the quality of the circuit. The test result is a simple "pass/fail" information. BAUR truesinus® test equipment can be used on both traditional and modern type cables.



## Cable diagnostics

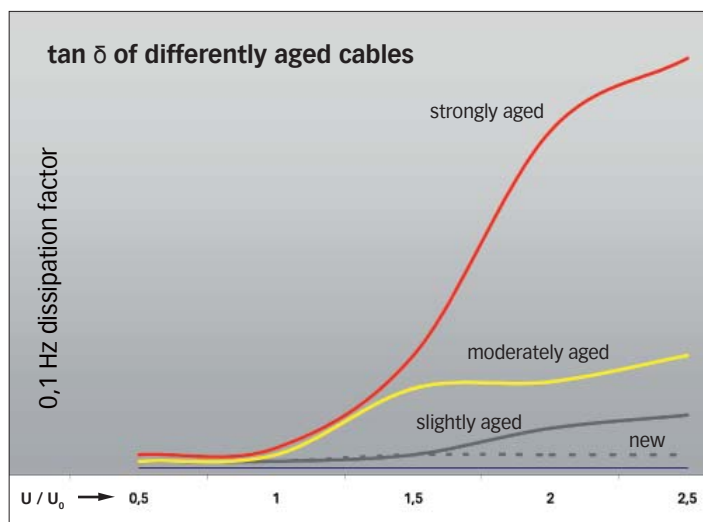
Cable diagnostics provide the user with information about quality and condition of the circuit. This goes far beyond the "pass/fail" information from cable testing. The diagnostic information that is available with the BAUR equipment gives "present and future analysis" of the insulation status of cable systems. BAUR's cable diagnostics is used as a precautionary measure for protection against failures, it ensures optimal CBM. The target is to perform maintenance measures only if necessary and not to plan purely based on operating time or error probability of a cable circuit. Based on VLF test voltage, the **dissipation factor** measurement  $\tan \delta$  and **partial discharge** diagnostics give the necessary information without destructive testing, which can be put into a database and provide trend analysis. BAUR diagnostics technology can be used to test all cable types like plastic cables or paper-mass cables.



\* VDE DIN 0276-620, IEEE P400.2, VDE DIN 0276-621, CENELEC HD 620 and CENELEC HD 621

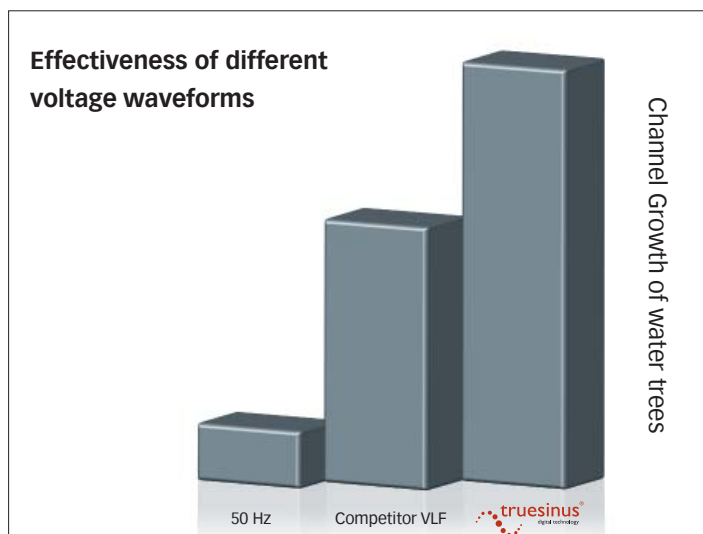
## Dissipation factor measurement $\tan \delta$

Losses in cable insulation accrue due to thermal overload, penetration of moisture or improperly treated joints or terminations. These losses accrue over a long time period. The dissipation factor measurement at 0.1 Hz, as integral measurement method, enables a safe differentiation between new, weak and very old cable systems. In this regard, absolute threshold values should be compared with the  $\tan \delta$  value when the systems are new, since they are strongly depending on the cable type. BAUR enables you to define individual evaluation criteria and to establish a reference database. An advantage of BAUR's diagnostics system is the direct programming of the threshold value in to the software making evaluation especially convenient.



## Partial discharge diagnostics (PD)

BAUR's partial discharge diagnostics allows a quick and reliable evaluation of partial discharge intensity and location of PD source in cable systems. Potential defects can be recognised early and further damage can be reduced. Important criteria for status evaluation are partial discharge inception voltage and absolute PD level of cable circuits. In addition, critical PD-sources have to be located precisely. Despite complex measurement technology, the quick and easy operation is an important feature. The graphical software interface guides the user through the overall measurement procedure and shows partial discharges clearly over the entire cable length. PD diagnostics can be carried out simultaneously with cable testing.



## PD level and location





## Most modern testing technology. Expertise from the market leader.

Efforts spanning several decades in order to achieve technical progress for customers have made BAUR a world leader in cable testing and diagnostics. Technological progress and the benefits associated are the result of an intensive examination of user and market requirements which increases the reliable partnerships and mutual exchanges. This "flow" is the basis for the innovation and expertise that BAUR provides.

**BAUR. Ensuring the flow.**



### The world market leader for good reasons. BAUR's cable testing and diagnostics

BAUR's corporate history is closely linked with the international development of testing technology. BAUR has been participating in the development and improvement of national and international standards for almost 60 years. BAUR experts work together with engineers from universities, laboratories, standardisation and test institutes to promote the development

of cable testing and diagnostics. At the same time, as a long-term partner in the international electricity community, BAUR knows the requirements of its customers in detail. This expertise, general know-how and experience over six decades are incorporated into BAUR's testing devices.



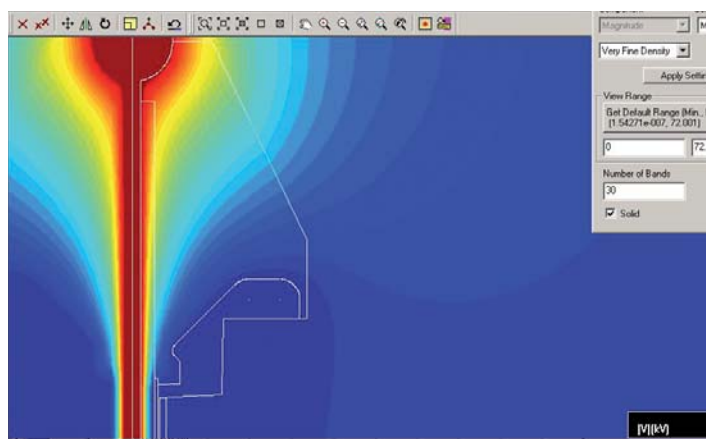


## Highest quality and reliability along with latest technologies.

More than 50 years ago BAUR started developing devices for DC and AC testing in medium-voltage cables. Despite many innovations in the field of cables and testing technology such traditional test methods are still required. New installations of traditional 3-phase or paper-mass cable systems are rare. However existing networks still require maintenance for decades. Therefore BAUR offers simple and cost-effective as well as sophisticated devices. New cable systems such as 1-phase EPR/XLPE cables, ask for AC testing. 50 Hz AC test equipment is bulky. VLF test equipment (Very Low Frequency, AC voltage with for example 0.1 Hz) is much smaller therefore more and more accepted in practice. In this domain BAUR has set the international standards with it's truesinus® digital technology.



BAUR's VLF generators create the most modern and only true sinusoidal VLF high voltage in the market. This technology can be applied to all cable types, is compact and easy to handle. Defects are detected reliably and enable extensive and sophisticated diagnostics of the cable condition. BAUR truesinus® digital technology enables the most dependable detection of defective areas. Medium-voltage cables are tested with utmost care and according to standards \*. Only BAUR truesinus® offers comparability of measurement results by highly modern digital control – without cable lengths influencing the test level and measurement result. A precise output basis for significant cable diagnostics is presented by the sinusoidal voltage characteristics defined by truesinus® digital technology. It enables reproducible tests, dissipation factor measurements  $\tan \delta$  and partial discharge diagnostics at any time. It is the best possible basis for maintenance planning.



## Mobile cable and electrical equipment testing with VLF truesinus®. BAUR's high voltage testing device frida.



**truesinus®**  
digital technology

### Most important benefits

- For medium-voltage cables up to 15 kV
- Latest testing technology VLF truesinus®
- Small, compact and light
- Easy operation - optimal for use in the field
- VLF truesinus® at an affordable price
- Extendable to a diagnostics system



**Extremely small and easy to operate.  
High voltage testing with BAUR frida.**

frida is a part of the revolutionary BAUR product family with VLF truesinus® test technology. frida offers an economical entry into this leading and unique test technology. The small system, which weighs less than 20 kg, combines VLF truesinus®, VLF square wave and DC in one device. frida identifies defects in cable systems and electrical equipment reliably and accurately. The measuring results can be reproduced and can easily be compared easily even with different cable lengths. With frida, the operating reliability of new installed and repaired cable systems is guaranteed and unforeseen breakdowns are prevented. A forward-looking aspect is the extensibility of the testing device frida to a diagnostics system for established CBM e.g., combined with the portable PD diagnostics system BAUR PD Portable for partial discharge diagnostics.



**Facts:**

- Testing of cables and electrical equipment up to 15 kV
- Cable sheath testing/sheath fault location
- Test in accordance with standards \*
- VLF truesinus®, VLF square wave and DC in one device
- Test voltage up to 23 kV<sub>rms</sub> truesinus®  $\triangleq$  34kV<sub>peak</sub>  
30 kV square wave and 30 kV DC
- Automatic frequency variation (0.01 - 0.1 Hz)
- Maximum capacitive load up to 5  $\mu$ F
- Fastest possible breakdown of defective areas
- Very simple operation with control button
- Fully automatic programmable test sequences
- Digital control with professional, self-explanatory multilingual software
- Data communication and saving via USB interface
- Light weight 19.5 kg
- Protection class IP 54

**The highest cost-effectiveness with the world-leading testing technology BAUR VLF truesinus®.**

In any case it is more economical to recognise possible defects proactively it rather than to retroactively eliminate the cause of failures. truesinus®, the latest and only true sinusoidally generated high voltage, is used to meet this objective in the market.

BAUR's high voltage testing device frida is the most economical entry into this technology for your cable networks. In addition, upgrade to a diagnostics system is possible without an additional voltage source.



Portable high-performance testing with VLF truesinus®.  
**BAUR's high voltage testing device viola.**



**Most important benefits**

- For medium-voltage cables up to 35 kV
- Latest testing technology VLF truesinus®
- Easily transportable for on-site application
- High-performance, yet mobile
- Small investments for extensive solutions
- Extendable to a diagnostics system



### Power in compact design.

#### High voltage testing with BAUR viola.

viola is more powerful than BAUR frida and is also characterised, by the leading VLF truesinus® testing technology. Despite their power viola can be transported easily and is suited perfectly for on-site application. This is ensured by their compact design with integrated carrying handles. viola identifies reliably defects in cable systems and electrical equipment. With viola, the operating reliability of the new installed in and repaired cable systems is guaranteed and unforeseen failures can be prevented. A forward-looking aspect is the extensibility of the testing device viola to a diagnostics system for established maintenance planning, e.g., combined with the portable PD diagnostics system BAUR PD Portable for partial discharge diagnostics.



#### Facts:

- Testing cables and electrical equipment of up to 35 kV
- Cable sheath testing/sheath fault location
- Test in compliance with standards\*
- VLF truesinus®, VLF square wave and DC in one device
- Test voltage viola of up to 40 kV<sub>rms</sub> truesinus®  $\triangleq$  60kV<sub>peak</sub> 60 kV square wave and 60 kV DC
- Automatic frequency variation (0.01 - 0.1 Hz)
- Maximum capacitive load up to 10  $\mu$ F
- Fastest possible results, user-friendly, automatic discharge mechanism
- Fully automatic programmable test sequences
- Digital control with professional, self-explanatory multilingual software
- Data communication and saving via USB interface
- Two-part, design 25 kg / 50 kg
- Protection class IP 54

#### Maximum efficiency with BAUR's world-wide leading testing technology VLF truesinus®

A medium-sized company loses 20,000 Euros on an average in case there is a single hour of power failure. In case of large industrial and service providers, the losses often range in millions. \*\* It is most important and cost-effective for power

distributors to minimise their own costs for maintenance, and prevent any failure expenses. The globally leading technology for this purpose is BAUR's truesinus® digital technology.

\* VDE DIN 0276-620, CENELEC HG 620, IEEE P400.2 und IEC 60060-3, VDE 0276-621, CENELEC HD 621 und IEEE 400-2001

\*\* According to a study of the University of California/Berkeley for the US Department of Energy.



Modular diagnostics for maximum flexibility.  
**BAUR's partial discharge diagnostics system PD Portable.**



**Most important benefits**

- Most modern non-destructive partial discharge diagnostics (PD)
- Identification and precise location of partial discharges in cable systems
- Measures PD levels and locates PD sources reliably over the entire cable line
- Very easy operation via BAUR's diagnostics software
- Easy-to-transport, 3-part design
- Optimal in combination with BAUR's mobile VLF truesinus® test generators frida or viola

**A small step from testing to diagnostics.**  
**With BAUR's partial discharge diagnostics system PD**  
**Portable.**

The portable system for locating partial discharges, PD Portable, was developed by BAUR as an extension for VLF test generators frida and viola. The background of this modular design is the development from pure testing all the way up to systematic cable testing and diagnostics. BAUR supports power utilities to optimize networks maintenance strategies. This becomes more important with ever increasing competition. The corresponding requirements placed on supply quality ask for extensive cable diagnostics. This is offered by the combination of VLF generators with partial discharge level and position measurement.



**Facts:**

- Measurement of PD levels typically from 20 pC onwards
- Location of PD sources within 1 % accuracy
- Display of PD activity over the cable length
- Applicable with external high voltage up to 40 kV<sub>rms</sub> truesinus®
- Menu-controlled multilingual operating software
- A robust 15" laptop with Windows Operating System
- High noise suppression, completely insulated from the mains voltage
- Calibrator for the on-site PD calibration according to IEC 60270
- Weight, 19.5 kg (coupling capacitor) / 12.5 kg (measurement device) / 3.2 kg (laptop)
- Easily extensible to frida, viola or PHG at any time

**Efficient maintenance by the world-leading PD diagnostics technology with BAUR's VLF truesinus®.**

One challenge for power utilities is to achieve higher network security with less maintenance expenses. In this regard, BAUR supports power utilities in implementing condition-based maintenance with its VLF truesinus® diagnostic systems. The aim is to carry out retrofitting or maintenance only if absolutely necessary. In this regard exact current and trend analyses of

cable systems are necessary. A simple step to achieve this are the mobile BAUR cable diagnostics systems. The benefits for power utilities are obvious with: Small investments in measurement technology a longer life time of cable lines with unchanged system stability is achieved. Maintenance and operating expenses are reduced significantly.



Top performance VLF truesinus<sup>®</sup> technology.  
**BAUR's high voltage testing systems PHG 70 and PHG 80.**



**Most important benefits**

- Unique top class VLF test generators
- For medium-voltage cables up to 50 kV
- Latest testing technology VLF truesinus<sup>®</sup>
- Fully automatic programmable test sequences
- Accurate, quick cable testing in accordance with standards
- Possibility for installation in a small vehicle
- Extendable to dissipation factor and partial discharge diagnostics systems

## Maximum power and quality.

### High-voltage testing with BAUR's PHG 70 and PHG 80

BAUR's programmable high-voltage generator PHG is a VLF truesinus® voltage source of the latest generation and the most powerful generator of the VLF family. The PHG system satisfies the highest requirements with respect to security, robustness, convenience of operation, automation and documentation. The PHG can be used for testing plastic and paper-mass cables, sheath testing, testing generators, transformers and switching systems. BAUR offers an optimal device for testing compound networks with its testing device PHG. For high-voltage testing with DC, e.g., in case of paper-mass cables, the PHG 80 makes a stabilised DC output voltage available of 1 – 80 kV. As well as up to 57 kV<sub>rms</sub> truesinus® VLF voltage is available for modern cable systems. Customised test sequences can be defined and saved via the self-explanatory menu control. High-voltage electrical breakdowns are automatically recognised during the test. According to the setting the system either switches off automatically or goes into burn mode after the breakdown. Forward looking is the extendability of PHG testing devices to PHG TD and PHG TD/PD diagnostics systems. Therefore a



“present and future trend analysis” of cable networks and thus for optimal maintenance planning is guaranteed.

#### Facts:

- Test in accordance with standards
- VLF truesinus®, VLF square wave and DC in one device
- Nominal voltage PHG 70 of up to 38 kV<sub>rms</sub> truesinus®  
 $\triangleq 56\text{kV}_{\text{peak}}$  57 kV square wave and +/-70 kV DC
- Nominal voltage PHG 80 of up to 57 kV<sub>rms</sub> truesinus®  
 $\triangleq 84\text{kV}_{\text{peak}}$  80 kV square wave and +/-80 kV DC
- Maximum capacitive load up to 20 µF
- Frequency variation from 0.01 to 1 Hz
- User-friendly, individually programmable sequences
- Fully automatic testing
- Fastest possible results, automatic discharge mechanism
- Digital control with professional, self-explanatory multilingual software
- Weight 250 – 400 kg

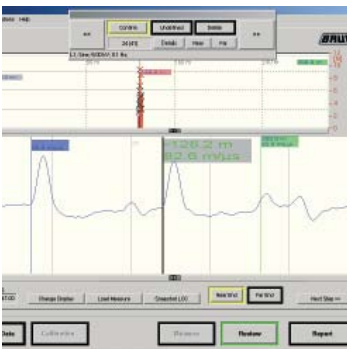
### Highest efficiency with the world's leading testing technology BAUR VLF truesinus®.

You can operate your networks more reliably if potential defects are detected while testing your cable network after they are new installed or repaired. No other testing technology evaluates operational reliability of cable systems so extensively, flexibly and efficiently as does BAUR's truesinus® digital technology. Investments in state of the art devices like PHG 70 and PHG 80

are quickly recovered considering the costs of failures during operation. In addition, the systems can be extended step-wise into diagnostics systems and have complete investment security. The solution is customised to your specific operating conditions by installing it in a BAUR cable test van or using it as a flexibly transportable stand-alone system.



Established, extensive analysis - cost-optimised maintenance.  
**BAUR's cable diagnostics systems PHG 70 TD/PD and PHG 80 TD/PD.**



#### Most important benefits

- The world leading cable diagnostics system
- For medium-voltage cables up to 50 kV
- Cable testing plus dissipation factor measurement  $\tan \delta$ , along with PD partial discharge level measurement and PD location
- Exact, profound and extensive cable diagnostics
- Latest testing and diagnostics technology VLF truesinus® current and future analyses supported by cable database
- Best possible basis for CBM

## State-of-the-art.

### Cable diagnostics with BAUR's PHG 70 TD/PD and PHG 80 TD/PD

The testing and diagnostics systems PHG TD/PD with VLF truesinus® technology are the internationally recognised standard for established cable diagnostics. PHG TD/PD is multifunctional and allows a reliable evaluation, e.g., of continuous "water-tree" – aged cable with low dielectrical strength. The systems combine test, dissipation factor measurement  $\tan \delta$ , partial discharge level measurement and partial discharge location. Users have detailed information about the condition of the cable network for all cable types, independent of cable length. With the cable database trend analyses can be performed to plan maintenance precisely. The extensive, self-explanatory software allows automatic testing and simultaneous diagnostics as well as programmable test sequences. BAUR's PHG TD/PD is offered as stand-alone system or is built into cable test vans and are also suitable for difficult connection situations.



#### Facts:

- High-performance VLF diagnostics system
- Comprehensive overview of the quality and aging condition of a medium-voltage cable systems up to 50 kV
- Fast assessment of all cable types (3-phase approx. 1 hour)
- Graphical multilingual software interface
- Integrated industrial PC (MS Windows) with 15.1" TFT display
- Cable database enables current and future analyses
- Fully automatic programmable testing and diagnostics
- Individual definition of interruption criteria in case of exceeding the threshold value
- Voltage range  
PHG 70: 1 - 38 kV<sub>rms</sub>, truesinus®, +/- 70 kV DC  
PHG 80: 1 - 57 kV<sub>rms</sub>, truesinus®, +/- 80 kV DC
- $\tan \delta$ : Accuracy: 1% from the measured value  
Measuring range:  $0,1 \times 10^{-3}$  bis  $1000 \times 10^{-3}$   
Load range: > 10 nF (500 pF, optional)  
Monitoring of parasitic currents, numerical and graphical  $\tan \delta$  presentation
- PD: Location accuracy to 1 % of the cable length  
PD level: up to 20 pC  
Sampling rate: 10 ns (100 Msamples/s)  
Overview presentation of PD activity over the whole cable length  
Resolution:  $1 \times 10^{-5}$

### Intelligent technology improves the efficiency of power distribution of BAUR's diagnostics systems PHG 70/80 TD/PD.

The cost pressure on operations and maintenance of power cable networks is further increasing. Implementing a condition-based maintenance strategy is enabling power utilities to achieve ambitious cost targets. The investment in a BAUR truesinus® diagnostic system has a very short pay back period. Replacing 200 meter of cable circuits instead of 2.000 meter makes a big difference.

Only with the extensive information provided by BAUR's diagnostics system PHG TD/PD power utilities can use their infrastructures optimally. The life time of cable systems can be increased without the risk of expensive network breakdowns. In addition, servicing and operating costs can be minimised by targeted maintenance.



## Precisely locating PD defects. BAUR's partial discharge inductor tracy.



### Most important benefits

- For exact location of partial discharge points directly at the exposed cable sections
- Direct application at the exposed cable sections
- For avoiding cost-intensive and possibly needless replacement of cable equipment which is free of partial discharge
- Robust, small and handy

**User-friendly, precise, light.**

**PD pin-pointing with BAUR tracy.**

BAUR's partial discharge inductor tracy induces a signal from outside to prelocated fault location in the cable. In combination with a PD measurement system, e.g., PHG TD PD, the signal induced can be located and compared with the result of the partial discharge location. The partial discharge location can be determined precisely.



**Facts:**

- Small, handy and robust
- Very easy to maintain, precise PD location
- IP 54 - Protection class
- Light weight - 550 g
- Rechargeable battery NiMH Mignon AA 2700 mAh
- Suitable for cables and electrical equipment
- Signal input without damaging the cable
- 10 current levels, 25 ns impulse width
- Comparison of the induced signal with the prelocation result in the partial discharge system

**Highest efficiency and cost-effectiveness with BAUR.**

Replacing good cable joints by mistake is causing unnecessary costs. With PD pin-pointing user can verify sources of PD and

therefore potential fault areas exactly. Investing in BAUR's testing technology helps saving money and time.



**Compact, mobile and universal.**  
**BAUR's mobile high voltage testing device PGK 25.**



**Most important benefits**

- DC testing of low and medium-voltage cables up to 25 kV
- Determination of insulation resistance
- Light weight for portable use onsite
- Compact and extremely robust construction
- 12 V rechargeable battery mode and mains operation

**Easy, quick and universal.**

**DC voltage testing with BAUR's PGK 25.**

Cables need to be tested according to national and international standards: before commissioning new cable networks and recommissioning existing cable networks, e.g., after exchanging cable lines, repairing damages of terminations or joints. BAUR's mobile cable testing device PGK 25 is used for DC voltage testing in older low and medium voltage cables. It is characterised by its light weight of 16.5 kg, its user friendliness and solid construction for on-site testing. The integrated timer enables testing time pre-selection of 1 to 30 minutes. After the end of the testing time, the discharge unit is automatically released.



#### Facts:

- Two continuously adjustable voltage ranges:  
0 – 5 kV and 0 – 25 kV DC (negative polarity)
- Maximum discharge energy of 5000 Ws  
(16  $\mu$ F/25 kV/interval of 20 min)
- In-built rechargeable battery of  
12 V 6.5 Ah – approx 30 minutes of operation
- Possibility of an external 12 V DC voltage source
- Testing time pre-selection - integrated timer  
of 1-30 min ( $\pm$  1 min)
- Automatic limit stop and triggering of the discharge  
unit for maximum safety
- Short-circuit-proof
- $\mu$ A-meter with 5-range switch  
1  $\mu$ A / 10  $\mu$ A / 100  $\mu$ A / 1 mA / 10 mA
- Minimum measureable current of 50 nA
- Voltage measurement directly at the high-voltage output
- Switch-on interlock of high voltage against unintended  
operation
- High-voltage plug with monitoring contact
- Recorder connection for current range  
(for earth-free entry) of 0 - 200 mV
- Weight 16.5 kg

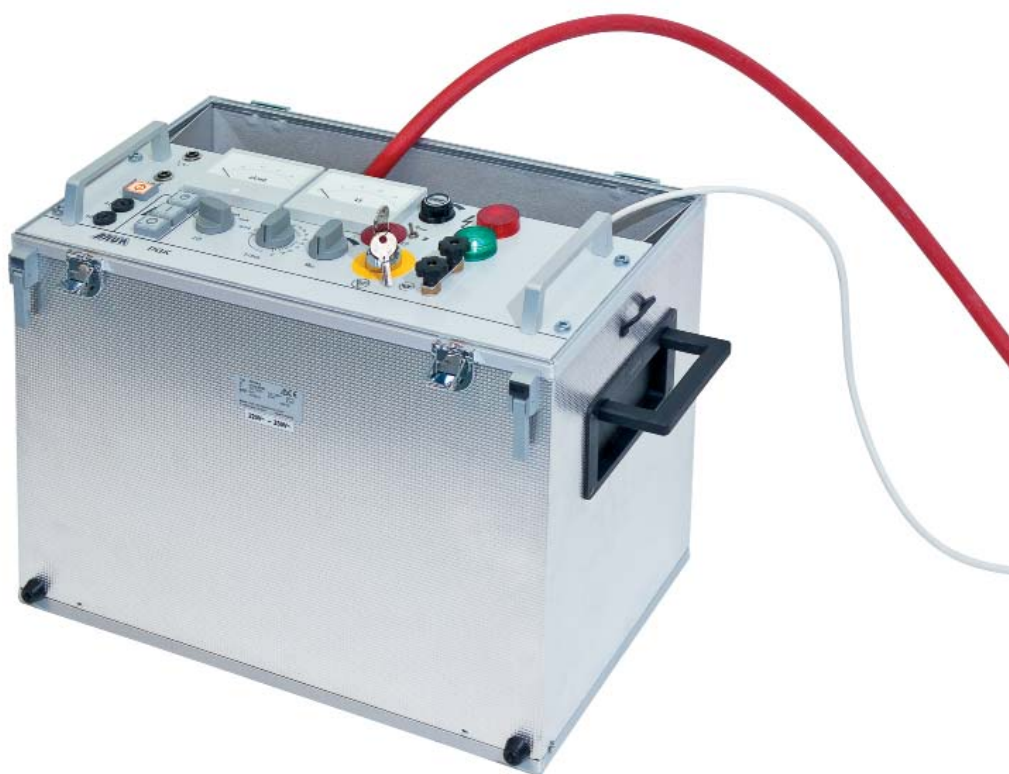
**Highest efficiency and cost-effectiveness with BAUR.**

Devices for DC voltage testing are a part of BAUR's product portfolio for decades. Their quality is legendary has been tested and accepted by leading power supply utilities world-wide. DC voltage testing is a simple and cost-effective possibility for

testing older paper cable systems. BAUR's PGK 25 is characterised by absolute reliability, user friendliness with very easy operations and long life expectancy.



High power, light weight.  
**BAUR's high voltage testing devices PGK 50 and PGK 80.**



#### Most important benefits

- DC testing of low and medium-voltage cables up to 50/80 kV
- Measurement of insulation resistance
- Easy portable for on-site use
- Compact and extremely robust construction
- 12V rechargeable battery mode and mains operation

**Small, light and high-performance.**

**DC voltage testing with BAUR's PGK 50 and PGK 80.**

Paper-mass cables are practically not installed in industrialised nations due to their environmental impact. Maintenance of oil-insulated cable systems and their potential life expectancy of 50 or even 100 years however still justifies the need for testing devices for this cable type. BAUR's PGK 50 and PGK 80 cable testing devices are especially handy in respect to their test voltage up to 50kV and 80kV. They are single-part devices and are optimal for field use due to their small dimensions, practical case with carry handles and shoulder straps.



#### Facts:

- Continuously adjustable output voltage up to 50/80kV DC negative
- Maximum discharge energy of 8000 Ws (interval of 15 min)
- Voltage measurement at the HV-output, display accuracy of +/- 2.5 %
- Timer of 1-30 min
- Sensitive current measurement in 6 ranges of 1  $\mu$ A / 10  $\mu$ A / 100  $\mu$ A; 1 mA / 10 mA / 100 mA
- Minimum measurable current up to 20nA
- Higher short-circuit current up to 25mA
- Safety control unit in accordance with VDE 0104
- Travelling wave protection
- Connection possibility for electrical door contact, emergency-stop switch and external signal lamps
- Connection possibility for Y/t recorder for recording current flow
- Weight 25kg

**Highest efficiency and cost-effectiveness with BAUR.**

Although DC voltage testing is an old technology in developed power markets, it is by no means dispensable. On the contrary, it is used over hundreds of thousands of kilometers in existing cable networks. These networks will still exist until the end of

this century. Their maintenance is an economic necessity and means the maximisation of returns on investment for the cable network operators. Reasons enough for BAUR to provide power companies with excellent and guaranteed testing technology.



The standard for quality with highest voltages.  
**BAUR's high voltage testing devices PGK HB.**



#### Most important benefits

- Testing of medium and high voltage cables
- DC voltage testing up to 260 kV output voltage with positive or negative polarity
- AC voltage testing - up to 190 kV for switching systems, busbars and machines
- User friendly 2-part design
- Robust and long-lasting

**Since many years world-wide in use.  
AC and DC testing with BAUR's PGK HB.**

There are hardly any other longer-lasting, more robust and cost-effective testing devices than the two-piece high-voltage testing devices of the PGK HB series. They generate stepless adjustable DC test voltages with positive or negative polarity or optionally network frequencies. In the operating parts, there are displays for current and voltage, the safety control unit and a variable voltage transformer. The high voltage part contains an oil-insulated high-voltage transformer, and, according to the mode of operation either a rectifier bar (DC) or a resistance rod (AC). The polarity of the DC test voltage is changed by rotating the rectifier in the high-voltage part.



**Facts:**

- Absolute maintenance-free design
- Stepless adjustable output voltage
- Safety control unit in accordance with VDE 0104
- Short-circuit proofed due to internal current limit
- Two continuously adjustable voltage ranges with a 1:3 ratio
- 3 decated current ranges
- Thermal overcurrent switch-off
- Different power options (see table on page 26)

**Highest efficiency and cost-effectiveness with BAUR.**

Devices for DC voltage testing enable the inexpensive test of medium- and high-voltage electrical equipment. Their quality is unsurpassed and has been tested and recognised by leading energy supply utilities world-wide. Their life time stable

construction and easy operation make BAUR's testing devices of the PGK HB series an indispensable part testing equipment for many customers.



Technical data	PGK		
Type	output voltage	Output current	
		For max. output voltage	Short-circuit current
PGK 25	0 - 25 kV DC	1 mA DC	3 mA DC
PGK 50	0 - 50 kV DC	2 mA DC	25 mA DC
PGK 80	0 - 80 kV DC	0,8 mA DC	20 mA DC
PGK 70 HB	0 - 70 kV DC	3 mA DC	12 mA DC
	0 - 55 kV AC rms	7 mA AC	20 mA AC
PGK 70/2,5 HB	0 - 70 kV DC	20 mA DC	84 mA DC
	0 - 55 kV AC rms	50 mA AC	117 mA AC
PGK 110 HB	0 - 110 kV DC	5 mA DC	17 mA DC
	0 - 80 kV AC rms	14 mA AC	30 mA AC
PGK 110/5 HB	0 - 110 kV DC	22 mA DC	104 mA DC
	0 - 80 kV AC rms	66 mA AC	137 mA AC
PGK 150 HB	0 - 150 kV DC	4 mA DC	20 mA DC
	0 - 110 kV AC rms	9 mA AC	23 mA AC
PGK 150/5 HB	0 - 150 kV DC	18 mA DC	77 mA DC
	0 - 110 kV AC rms	50 mA AC	108 mA AC
PGK 260 HB	0 - 260 kV DC	4 mA DC	20 mA DC
	0-190kV AC rms	9mA AC	20mA AC

Technical data	frida	viola
Current supply	110 ... 240 V, 50 / 60 Hz	110 ... 240 V, 50 / 60 Hz
Max. Input power	300 VA	1500 VA
Form of voltage	VLF truesinus®, VLF square wave, DC	VLF truesinus®, VLF square wave, DC
Max. output voltage	VLF truesinus®: 23 kV <sub>eff</sub> (33 kV peak)	VLF truesinus®, 40 kV <sub>eff</sub> (57 kV peak)
	VLF square wave: 30 kV	VLF square wave: 60 kV
	DC +/- 30 kV	DC +/- 60 kV
Frequency range	0,01 ... 0,1 Hz	0,01 ... 0,1 Hz
Max. Capacitive load	5 µF	10 µF
Modular design	one-part	two-part
Protection class	Splash water and	Splash water and
	dust protected, IP 54	dust protected, IP 54
Conforming to CE	yes	yes

Test system	PHG 70	PHG 80
Power supply	230V (50/60 Hz), (200...264 V)	230 V (50/60 Hz), (200...264 V)
Option	115 V (50/60 Hz), (100...140 V)	115 V (50/60 Hz), (100...140 V)
Max. output voltage	truesinus®: 38 kV <sub>rms</sub> / 0.1 Hz (54 kV peak)	truesinus®: 57kV <sub>rms</sub> / 0.1 Hz (81 kV peak)
	Square wave: 57 kV / 0.1 Hz	Square wave: 80 kV / 0.1 Hz
	DC-: 70 kV / DC+: 70 kV	DC-: 80 kV / DC+: 80 kV
Max. capacitive load		
with 0.1 Hz, 57 kV rms	-	1.2 µF
with 0.1 Hz, 38 kV rms	3 µF	3 µF
with 0.1 Hz, 18 kV rms	8 µF	8 µF
Max. load with reduced frequency	20 µF	20 µF
Programmable voltage types	truesinus®, square wave with defined slew rate; DC-, DC+	truesinus®, square wave with defined slew rate; DC-, DC+
Test sequences as per standard	10	10
Freely-programmable test sequences	10	10
Pre-selectable test frequency	0.01 Hz ... 1 Hz truesinus®	0.01 Hz ... 1 Hz truesinus®
Dissipation factor measurement TD		
Voltage range	1 - 38 kV <sub>rms</sub> (54 kV peak)	1 - 57 kV <sub>rms</sub> (81 kV peak)
Load range	≥ 10 nF (500 pF, option)	≥ 10 nF (500 pF, option)
Measuring range	0.1 x 10 <sup>-3</sup> to 1000 x 10 <sup>-3</sup>	0.1 x 10 <sup>-3</sup> to 1000 x 10 <sup>-3</sup>
Resolution	1 x 10 <sup>-5</sup>	1 x 10 <sup>-5</sup>
Accuracy	+/- 1% from measured value	+/- 1% from measured value
	+/- 1 x 10 <sup>-4</sup>	+/- 1 x 10 <sup>-4</sup>
Software	BAUR Software, MS Windows	BAUR Software, MS Windows
Display	15.1" TFT	15.1" TFT
Partial discharge with source location of PD		
Voltage range	1 - 38 kV <sub>rms</sub> (54 kV peak)	1 - 57 kV <sub>rms</sub> (81 kV peak)
Cable length range	10 – 12,800 m (max. 160 µs)	10 – 12,800 m (max. 160 µs)
Velocity of propagation	50 - 120 m/µs	50 - 120 m/µs
Sampling rate	10 ns (100 Msamples)	1 ns (100 Msamples)
PD detection limit	20 pC	20 pC
Accuracy of location	1% of the cable length	1% of the cable length
Resolution	+/- 0.1 pC; +/- 0.1m	+/- 0.1 pC; +/- 0.1m
Software	BAUR Software, MS Windows	BAUR Software, MS Windows
Display	15.1" TFT	15.1" TFT





**ENSURING THE FLOW.**

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