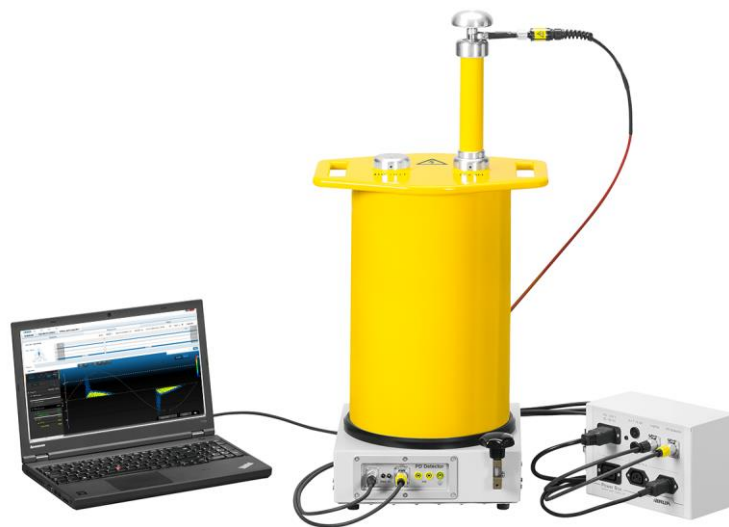


# Portable PD diagnostics system

## PD-TaD 80



The figure is illustrative

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# 1 ABOUT THIS MANUAL

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## 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 Applicable documents

This user manual applies in conjunction with the following documents:

- User manual for the BAUR software 4
- User manual for the VLF HV generator used
- User manual for the cable test van and applicable user manuals (when the PD-TaD 80 is integrated in the cable test van)

## 1.3 Structure of safety instructions

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

<p><b>Danger symbol</b></p> 	<p> <b>SIGNAL WORD</b></p> <hr/> <p><b>Type of danger and its source</b> Possible consequences of violation.</p> <p>▶ Measure to prevent the danger.</p>
---	---

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.

 <b>DANGER</b>	Will lead to severe injuries or death.
 <b>WARNING</b>	May lead to severe injuries or death.
 <b>CAUTION</b>	May lead to light to moderate injuries.
<b>NOTICE</b>	May lead to material damage.

### Danger symbols

	<b>General danger</b>
	<b>Risk of electric shock</b>

## 1.4 View Settings

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

## 1.5 Note on the screenshots and graphics used

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



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## 2 FOR YOUR SAFETY

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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 body<sup>1</sup> and operator<sup>2</sup> 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 Intended use

The PD-TaD 80 portable PD diagnostics system can be integrated in the cable test van or used as a standalone system in combination with a BAUR VLF HV generator for carrying out:

- Partial discharge testing and location
- VLF cable testing with parallel partial discharge testing
- Dissipation factor measurement

If the system is not used in accordance with this stipulation, safe operation cannot be guaranteed. The user is liable for any damage to persons and property resulting from incorrect operation!

Proper use also includes

- compliance with all instructions in this user manual, and all other applicable documents,
- compliance with the technical data and connection requirements given on the rating plate and in the user manual and any other applicable documents,
- compliance with the inspection and maintenance instructions for the system and its components.

### 2.2 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.

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

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

In addition, the operator must have:

- PD-TaD 80 integrated in the cable test van: Knowledge of the technical equipment and operation of the cable test van and the devices used  
PD-TaD 80 as a standalone system: Knowledge of the technical equipment and operation of the PD-TaD 80 and the respective VLF HV generator
- Knowledge of the testing and measurement procedures
- Knowledge of plant engineering (cable types, switchgear, etc.).

## 2.3 Avoiding dangers, taking safety measures

- ▶ When installing the test system and operating PD-TaD 80 observe the following rules and guidelines:
  - Accident prevention and environment protection rules applicable for your country
  - Safety instructions and regulations of the country where PD-TaD 80 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)

### **Only operate the system if it is in a technically safe condition.**

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.
- ▶ Only use the PD-TaD 80 for the intended VLF HV generators specified on the data sheet.  
Connecting the PD-TaD 80 to VLF HV generators with a higher output voltage can lead to flashovers.
- ▶ 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 facilities that are not tested and approved by BAUR could adversely affect the safety, function and features of the product.

### **Do not dismantle the HV coupling unit**

The housing of the HV coupling unit is sealed and gas-tight and may not be opened.

- ▶ Do not dismantle the HV coupling unit.
- ▶ Do not screw any components onto the HV coupling unit. Opening the housing can damage the device.

### **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.

### **Lifting and carrying the transport cases**

- ▶ To transport the transport cases containing the PD-TaD 80 and accessories, pull them along on their wheels.
- ▶ The transport cases and their contents weigh approx. 42.0 kg or 22.5 kg.  
Lifting or carrying the transport cases requires two people.

## **2.3.1 Dangers when working with high voltage**



During tests and measurements with the PD-TaD 80, dangerous - at times 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 PD-TaD 80 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.

	 <b>DANGER</b>
	<p><b>High electrical voltage</b></p> <p>Danger to life or risk of injury due to electric shock.</p> <ul style="list-style-type: none"><li>▶ 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.</li><li>▶ Connect the system as described in this user manual.</li><li>▶ Pay particular attention to ensuring the test object and system are earthed correctly.</li><li>▶ Observe the warning and safety signs on the system. Always check whether the warning signs are available and are legible.</li><li>▶ Never put the safety devices out of operation. It is forbidden to bypass the safety devices.</li><li>▶ Cordon off all metal parts in the area of the test object terminals (connection point and far end). Insulate and earth metal parts to avoid dangerous charges.</li></ul> <p>After a measurement or test - after switching off the device or system - the test object can still be live with dangerous voltage.</p> <ul style="list-style-type: none"><li>▶ Before removing the safety precautions, discharge, earth and short circuit all live parts.</li></ul>

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

### 2.3.2 Guaranteeing immediate measures in an emergency

The system may be operated only if a second person with visual and audio contact to the tester is present and is in the position to detect possible dangers and to act immediately and properly.

With an external emergency stop device (optional), it is possible to mount the trigger for the emergency stop outside the test system so that it may be reached quickly in an emergency.

## 2.4 Special personal protective equipment

Personal protective equipment based on the risk assessment for the relevant working conditions is part of the PD-TaD 80 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"> <li>▪ Safety footwear</li> </ul>
Protection against electrical hazards (arcing fault):	<ul style="list-style-type: none"> <li>▪ Certified safety clothing</li> <li>▪ Hard hat with visor</li> <li>▪ Insulating protective gloves</li> <li>▪ LV HRC fuse handle with sleeve</li> </ul>
Protection against noise:	<ul style="list-style-type: none"> <li>▪ Ear protection</li> </ul>
Protection against dangers from road traffic:	<ul style="list-style-type: none"> <li>▪ High visibility vest according to EN 471 (Protection class 2) or according to the applicable standards in your country for high visibility clothing for commercial use. <b>Important:</b> No high visibility vest during tasks with risk of arcs!</li> </ul>
Hand protection:	<ul style="list-style-type: none"> <li>▪ Safety gloves</li> </ul>

## 3 PRODUCT INFORMATION

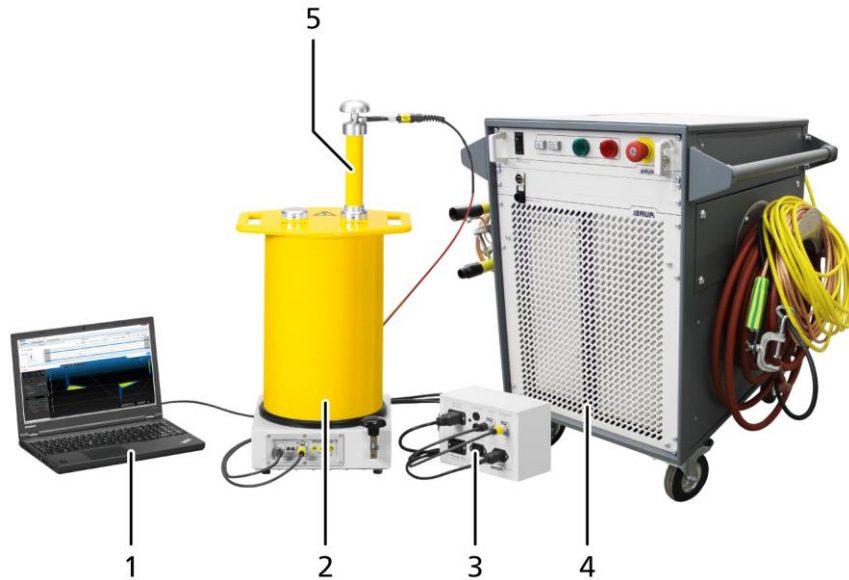
### 3.1 Available methods

Measurements using the following methods are possible with the PD-TaD 80:

Method	Description	Required VLF HV generator
Partial discharge testing	Is used to identify and locate PD activities in the cable insulation	PHG 70 / PHG 80 PHG 70 portable / PHG 80 portable / viola
VLF cable testing with parallel partial discharge testing	Is used for: <ul style="list-style-type: none"> <li>▪ VLF cable testing</li> <li>▪ Identify and locate PD activities in the cable insulation</li> </ul> <p>With this method, the cable testing and partial discharge testing are carried out simultaneously.</p>	PHG 70 / PHG 80 PHG 70 portable / PHG 80 portable / viola
Dissipation factor measurement	Is used for: <ul style="list-style-type: none"> <li>▪ Evaluation of the dielectric condition of the insulation</li> <li>▪ Indication of PD, water trees, humidity in joints, etc.</li> </ul>	PHG 70 TD / PHG 80 TD PHG 70 portable / PHG 80 portable / viola TD

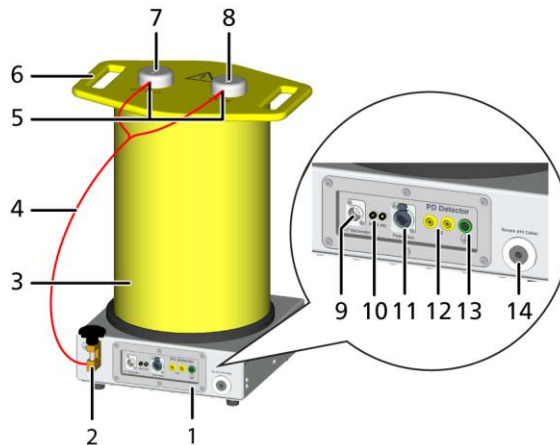
### 3.2 Full illustration of the PD-TaD and system components (PD-TaD 80 as a standalone system)


The illustration shows an example of a standalone system with a PHG portable VLF HV generator. Other standalone systems are similar.




No.	Element	Function
1	Laptop	The laptop with the BAUR software 4 installed on it forms the graphical interface for controlling the PD diagnostics system and evaluating the measurement results. The measurement results are displayed, analysed and archived in the BAUR Software.
2	PD-TaD 80	<p>The PD-TaD 80 comprises</p> <p><b>HV coupling unit (with integrated measurement impedance)</b></p> <p>Is used to couple out high-frequency PD pulses via a measurement impedance (in accordance with IEC 60270) and convert them into equivalent voltage signals</p> <p><b>PD measuring unit</b></p> <p>Is used to record and process the voltage signals from the HV coupling unit and measure partial discharges</p>
3	Power Box	<p>Is used for:</p> <ul style="list-style-type: none"> <li>▪ Power supply for all system components</li> <li>▪ Data transmission between the laptop and PD measurement unit</li> </ul>
4	VLF HV generator	Is used as VLF voltage source for the measurements
5	HF filter	Is used to minimise external influences on the measurement results

### 3.3 PD-TaD



No.	Designation on device	Element	Function
1	–	PD measuring unit	Is used for the measurement and location of partial discharges
2		Protective earthing connection	Is used to connect the protective earthing The earthing connection for the short-circuit cable is located on the side of the protective earthing connection.
3	–	HV coupling unit with integrated measurement impedance	Is used to couple out high-frequency PD pulses via a measurement impedance (in accordance with IEC 60270) and convert them into equivalent voltage signals
4	–	Short-circuit cable	Is used to short-circuit the HV ports <i>HV IN</i> and <i>HV OUT</i> and the protective earthing (for the transportation and storage of the PD-TaD)
5	–	Port for the short-circuit cable	Is used to connect the short-circuit cable to the HV ports <i>HV IN</i> and <i>HV OUT</i>  Two connection sockets are provided on each of the HV connectors for the short-circuit cable: on the top and on the side.
6	–	Handles	Are used to lift and carry the PD-TaD
7	<i>HV OUT</i>	HV output	Is used to connect the PD-TaD to the test object
8	<i>HV IN</i>	HV input	Is used to connect the PD-TaD to the VLF HV generator or the HV connection cable of the cable drum rack
9	<i>VLF Generator</i>	Port	Is used to connect the PD-TaD to the VLF HV generator or the connection box of the cable drum rack (for dissipation factor measurement)
10	<i>PWR</i>	LED	<ul style="list-style-type: none"> <li>▪ Does not come on: PD-TaD is not supplied with voltage.</li> <li>▪ Is on continuously: PD-TaD is supplied with voltage.</li> </ul>



No.	Designation on device	Element	Function
	<i>PD</i>	LED	<ul style="list-style-type: none"> <li>Does not come on: No measurement performed</li> <li>Flashing: PD events are being received. The LED lights up for half a second if a PD event occurs.</li> </ul>
11	<i>Power Box</i>	Port	Is used to connect the PD-TaD to the Power Box or the connection box of the cable drum rack using a PoE cable (for power supply and data transmission)
12	<i>VSE</i>	Ports	Are used to connect the VSE cable for the dissipation factor measurement (to detect and account for leakage current)
13		Protective earthing connection	Is used to connect the protective earthing
14	<i>Screen (HV Cable)</i>	Port	Is used to connect the screen of the HV connection cable

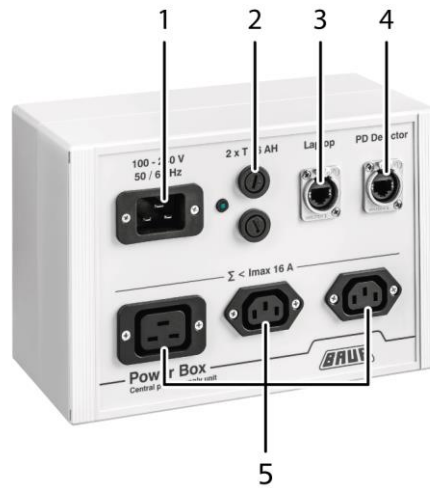
**Note:** When the PD-TaD 80 is used as a standalone system, the HV coupling unit is supplied in a sturdy transport case. The transport case is also used to protect the device against humidity and dirt during storage.



### 3.4 Power Box (PD-TaD 80 as a standalone system)

The Power Box acts as the power supply for all system components:

- PD-TaD 80
- VLF HV generator
- Laptop



No.	Element	Function
1	Mains voltage connection	Is used to connect the Power Box to the mains voltage When the mains voltage is connected, the LED next to the mains voltage connection lights up.
2	Device protection fuse	Used to protect the Power Box and connected system components Type: T 16 AH
3	Laptop port	Is used to connect the laptop The laptop is used for data transmission and is connected to the Power Box via the Ethernet cable (included in the standard delivery).
4	PD Detector port	Is used to connect the PD measuring unit of the PD-TaD 80 The PD measurement unit is connected to the Power Box via a PoE cable. The PoE cable is used for the power supply of the PD-TaD 80 and for data transmission.
5	Ports for system power supply	Are used to connect the VLF HV generator and the laptop to the power supply on the Power Box Max. current 16 A

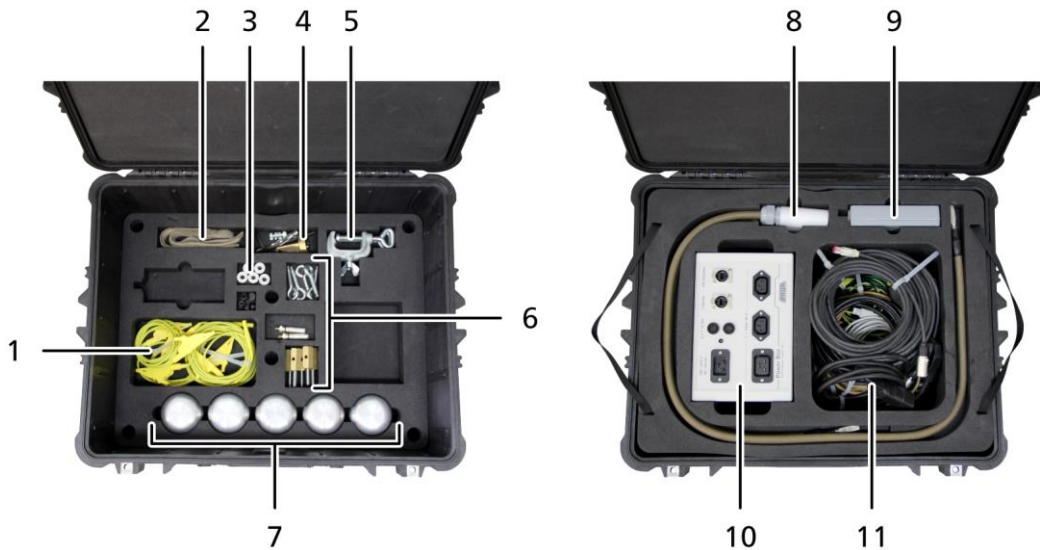
### 3.5 HF filter

The HF filter is used to minimise external influences on the measurement results. When the PD-TaD 80 is integrated in the cable test van, the HF filter is stored in drawers. When the PD-TaD 80 is used as a standalone system, the HF filter is supplied in the PD-TaD 80 transport case.



### 3.6 Connection set

When the PD-TaD 80 is integrated in the cable test van, the connection set is stored in drawers. When the PD-TaD 80 is used as a standalone system, the connection set is located in the transport case. The illustration shows an example of the connection set in the transport case.



No.	Element	Function
1	VSE cables	Are used for detecting leakage currents during a dissipation factor measurement
2	Guard rings (conductive Velcro strips)	Used for the measurement setup for the dissipation factor measurement for detecting leakage currents
3	Distance pieces for anti-corona hood	Are used for fitting anti-corona hoods of the anti-corona protection device
4	Connection piece for HF filter	Is used to connect the HV connection cable of the cable test van or VLF HV generator to the HF filter
5	HV connection terminal	Is used to connect the HV connection cable to the test object
6	Various fixtures and fittings	Used to lay and secure the connection cables

No.	Element	Function
7	Anti-corona hoods of the anti-corona protection device	Used to protect against corona discharges
8	HV connection cables, length 0.7 m and 1.2 m	Are used to connect the PD-TaD 80 to the test object
9	Calibrator CAL1B/CAL1E	Is used to calibrate the PD test circuit
10	Power Box (for standalone systems only)	Is used for: <ul style="list-style-type: none"> <li>▪ Power supply for the system components</li> <li>▪ Data transmission between the PD-TaD 80 and the laptop</li> </ul>
11	Connection cables	Are used to connect the system components and the power supply, and for data transmission between the system components  Further information: Chapter <i>Connection cables</i> (on page 22)

### 3.6.1 Calibrator

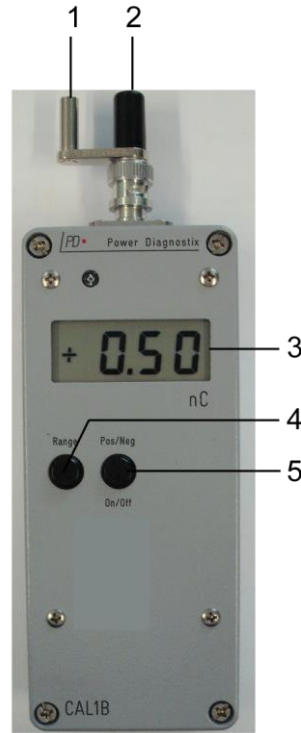
Before you can perform a partial discharge measurement, the test circuit must be calibrated to the following parameters:

- Charge (in nC)
- Cable length or speed of the PD pulses.

The delivered calibrator is connected to the test object for the calibration.



- ▶ For information on calibrating the PD measurement system, refer to the user manual for the BAUR software.









No.	Element	Function
1	Protective earthing port (metal port)	Is used to connect the protective earthing
2	Signal output (black port)	Is used for connection to the test object.
3	Display of selected charge in [nC]	
4	<i>Range</i>	Is used for setting the calibration charge Possible settings: <ul style="list-style-type: none"> <li>▪ CAL1B: 0.10, 0.20, 0.50, 1.00, 2.00, 5.00, 10.00 nC</li> <li>▪ CAL1E: 0.50, 1.00, 2.00, 5.00, 10.00, 20.00, 50.00 nC</li> </ul>
5	<i>Pos/Neg</i>	▶ Press briefly to set the polarity of the signal.
	<i>On/Off</i>	▶ To switch on, press briefly. ▶ To switch off, press for approx. 3 seconds.

- ▶ Note that the calibrator must be removed from the test circuit before switching on the high voltage source.

**Note:** After some time, the calibrator automatically switches off to extend the battery life. If you have not yet completed the calibration, switch on the calibrator.

### 3.6.2 Connection cables

#### PD-TaD 80 integrated in the cable test van

Figure	Cable	Length	Function
	Protective earthing cable Cross section: 16 mm <sup>2</sup>	1.5 m	Is used to connect the PD-TaD to the protective earth
	HV connection cables (2 pcs)	0.7 m / 1.2 m	Are used to connect the PD-TaD to the test object
	PoE cable (on hand cable drum)	50 m / 80 m	Is used for the supply of power to the PD-TaD and for data transmission
<b>For the PD testing:</b>			
	Calibrator connection cables		Used to connect the calibrator to the PD test circuit
<b>For the dissipation factor measurement:</b>			
	tan-δ cable (on hand cable drum)	50 m / 80 m	Is used for data transmission during dissipation factor measurements
	VSE cables with 2 connection clips (2 pcs)	1.5 m	Are used for the connection between the phases to be tested at the far end (on the protective ring) and the adjacent de-energised phase for the return of leakage currents
	VSE cables with Ø 4 mm connector and a connection clip (2 pcs)	3 m	Is used for connections at the near end: <ul style="list-style-type: none"> <li>▪ between PD-TaD and the phase to be tested (on the protective ring)</li> <li>▪ between PD-TaD and the adjacent de-energised phase for the return of leakage currents</li> </ul>

**PD-TaD 80 as a standalone system**













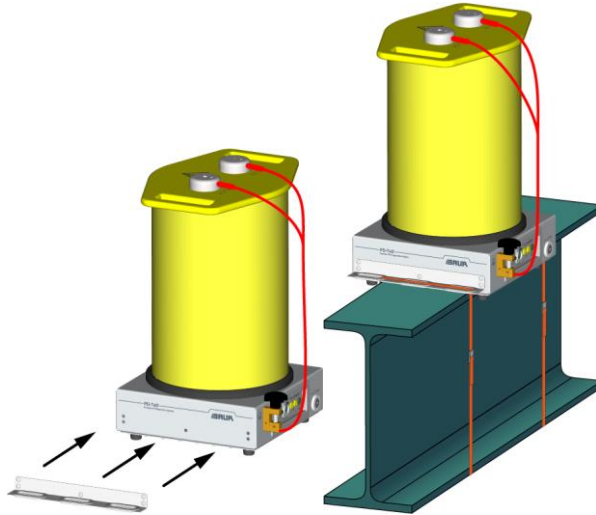
Figure	Cable	Length	Function
	Protective earthing cable Cross section: 16 mm <sup>2</sup>	1.5 m	Is used to connect the PD-TaD 80 to the protective earthing
	HV connection cables (2 pcs)	0.7 m / 1.2 m	Are used to connect the PD-TaD 80 to the test object
	Mains supply cord <ul style="list-style-type: none"> <li>▪ C19 – SCHUKO®</li> <li>▪ C19 – N5/15 (USA)</li> </ul>	2.5 m	Is used to connect the Power Box to the mains voltage (90 – 264 V, 47 – 63 Hz)
	Connection cable C5 – C14G	2.5 m	Is used for the power supply of the laptop via the Power Box
	Connection cable C13 – C14G	1.8 m	Not applicable here
	Connection cable C19 – C20G	2.5 m	Is used for the power supply of the VLF HV generator via the Power Box
	PoE cable	10 m	Is used for the power supply of the PD-TaD 80 and for data transmission
	Ethernet cable	3 m	Is used to transmit data between the PD-TaD 80 and the laptop via the Power Box
	USB cable 3.0 Plug A on A	3 m	Is used to connect the PHG portable VLF HV generator to the laptop or to remotely control the viola / viola TD VLF HV generator

Figure	Cable	Length	Function
<b>For the PD testing:</b>			
	Calibrator connection cables tan $\delta$ cable		Used to connect the calibrator to the PD test circuit
<b>For the dissipation factor measurement:</b>			
	tan $\delta$ cable	10 m	Is used for data transmission for dissipation factor measurements between the VLF HV generator and the PD-TaD 80
	VSE cables with 2 connection clips (2 pcs)	3 m	Are used to connect the PD-TaD 80 for the dissipation factor measurement for detecting leakage currents <ul style="list-style-type: none"> <li>▪ Connection between far end of protective ring and adjoining de-energised phase as return line</li> </ul>
	VSE cables with $\varnothing$ 4 mm connector and a connection clip (2 pcs)	1.5 m	Are used to connect the PD-TaD 80 for the dissipation factor measurement for detecting leakage currents <ul style="list-style-type: none"> <li>▪ Connection between PD-TaD 80 and near end of protective ring</li> <li>▪ Connection between PD-TaD 80 and adjoining de-energised phase as return line at near end</li> </ul>



### 3.7 Mounting bracket

The mounting bracket is used to mount the PD-TaD 80 on a cross beam or a similar supporting structure by means of tensioning straps. The mounting bracket is supplied in the PD-TaD 80 transport case.



### 3.8 Power supply


When the PD-TaD 80 is used as a standalone system, the power supply for the entire system incl. the PD-TaD 80, laptop and VLF HV generator is centralised via the Power Box.

The Power Box is fitted with two fuses for max. current 16 A (T 16 AH).

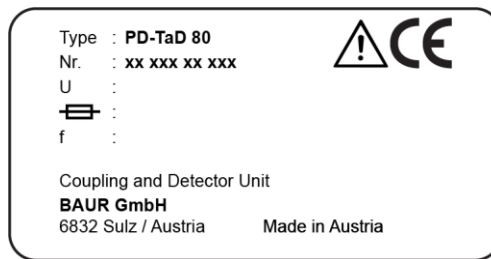
Device	Power supply
Power Box	90 – 264 V, 47 – 63 Hz
PD-TaD 80 (PD measuring unit)	Via Power Box
VLF HV generator	Via Power Box
Laptop	Via Power Box




### 3.9 Markings on the PD-TaD 80

#### Safety markings

Location and type	Explanation
On the HV coupling unit:	<b>Risk of electric shock</b>
	Once the measurements are complete, there may still be high voltage on the <i>HV IN</i> and <i>HV OUT</i> ports, which could cause serious injury as a result of an electric shock if touched.

#### Rating plate



Element	Description
Type	System designation
Nr.	Serial number
U	Not applicable here
	Not applicable here
f	Not applicable here
Coupling and Detector Unit	HV coupling unit with PD measuring unit
	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 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

PD-TaD 80	
HV coupling unit:	
Input voltage	57 kV <sub>rms</sub> / 80 kV <sub>peak</sub>
Capacitance of coupling capacitor	8 nF
PD measuring unit:	
Power supply and data transmission	Via Power Box (Power over Ethernet)
Signal gain	0 – 75 dB
Degree of protection	IP54
Dimensions (W x H x D)	Approx. 410 x 593 x 369 mm
incl. HF filter	Approx. 410 x 798 x 369 mm
Weight	Approx. 21 kg
incl. HF filter	Approx. 21.5 kg
Calibrator	
Electrical charge (pulses)	
CAL1B	0.1 / 0.2 / 0.5 / 1 / 2 / 5 / 10 nC
CAL1E	0.5 / 1 / 2 / 5 / 10 / 20 / 50 nC
Power supply	9 V block battery, DIN/IEC 6F22
Partial discharge location	
Theoretical measurement range	10 – 12,800 m (at v/2 = 80 m/μs)
Velocity of propagation	50 – 120 m/μs
Sampling rate	100 MSamples/s (10 ns)
PD measurement range	1 pC – 100 nC
Accuracy	Approx. 1% of cable length
Resolution	0.1 pC / 0.1 m
Dissipation factor measurement	
Automatic detection and compensation of leakage currents	integrated
For more details, see the data sheet for the respective VLF HV generator	
Power Box (PD-TaD 80 Standalone)	
Input voltage	90 – 264 V, 47 – 63 Hz
Power consumption	max. 3,500 VA
Max. current	16 A
PD-TaD 80 interface	Ethernet (PoE)
Dimensions (W x H x D)	160 x 120 x 240 mm
Weight	Approx. 1.7 kg
Laptop (PD-TaD 80 Standalone)	
Processor	Intel Core i5
Operating system	Windows 7 Ultimate 32-bit (or higher)
Working memory	At least 4 GB
Hard disk	At least 256 GB SSD
BAUR system software	
Multilingual user interface	in 23 languages
For more details, see the data sheet for BAUR system software	
General	
Ambient temperature (operational)	-10°C to +50°C
Storage temperature	-20°C to +60°C
Rel. humidity	Non-condensing
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
Transport case: Weight and dimensions (W x H x D)	
Transport case 1 with PD-TaD 80	Approx. 42 kg; 800 x 581 x 482 mm
Transport case 2 with accessories	approx. 22.5 kg; 627 x 497 x 303 mm

---

## 5 OPERATING THE PD-TAD 80

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### 5.1 Switching on the system

#### Prerequisite

All power supply cables are connected.

Further information:

- Chapter *Connecting the system for PD measurement* (on page 35)
- Chapter *Connecting the system for dissipation factor measurement* (on page 40)

#### PD-TaD 80 integrated in the cable test van



- ▶ Follow the user manual for the cable test van.
- 

#### PD-TaD 80 as a standalone system

When the PD-TaD 80 is used as a standalone system, the following steps must be performed to switch on the system:

- Connect the Power Box to the power supply.  
The PD measuring unit of the PD-TaD 80 will be switched on automatically.
- Switch on the VLF HV generator with the main switch on the control panel.  
The operating state of the system is indicated by red and green pilot lamps on the control panel of the VLF HV generator.
- Switch on the laptop and start the BAUR system software.

#### 5.1.1 Operating states

##### *Out of operation*

Prerequisites: All safety measures necessary before stepping into the test area have been met.

- All power supplies, signal and control electric circuits are switched off.

##### *Ready for operation*

Prerequisites: The safety measures of the *Out of operation* operating state that are necessary before stepping into the danger area are still in place.

- The power supplies for the signal and control current circuits of the switching devices are switched on.
- The test voltage supply is switched off and secured against accidental start.
- The green indicator light comes on.

**Ready to switch on**

Prerequisites: 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 comes on.

**In operation**

Prerequisites: All accesses to the test area are closed.

- One or more test voltage supplies are switched on.
- The red indicator light comes on.

## 5.2 Switching off the system following faults or in emergencies

- ▶ In the event of a fault or an emergency, immediately press the emergency off button. Pressing the emergency off button puts the system in the safe *Ready for operation* operating state.



- 
- ▶ Follow the user manual for the cable test van or the VLF HV generator.
- 

## 5.3 Managing measurements

Depending on the system configuration, measurements performed using the PD-TaD 80 are configured and managed via the BAUR system software or directly on the viola / viola TD VLF HV generator (standalone).







- 
- ▶ Follow the user manuals for the BAUR system software and the VLF HV generator.
-

## 6 CONNECTING THE SYSTEM

- ▶ 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

	 <b>WARNING</b>
	<p><b>High electric voltage through potential increase</b></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.</p> <p>Danger due to the potential increase is reduced when a protective earthing is connected properly.</p> <ul style="list-style-type: none"> <li>▶ Connect the protective earthing carefully. The protective earthing cable should be as short as possible and of low impedance.</li> </ul>

	 <b>WARNING</b>
<p><b>Danger due to electric voltage, flashovers at the connection point, or arcing fault on connection</b></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"> <li>▶ Use suitable personal protective equipment against electric shocks and arcing faults.</li> <li>▶ Observe the phase breaks.</li> <li>▶ Ensure that adjacent live parts are secured against accidental contact and flashovers with suitable covers (insulation mats, insulating safety plates).</li> <li>▶ You may touch the parts that were under voltage only if they are visibly earthed and short-circuited.</li> </ul>	

## 6.2 Lifting and carrying the transport cases

- ▶ To transport the transport cases containing the PD-TaD 80 and accessories, pull them along on their wheels.

To extend the telescopic handle of the transport case, release the locking mechanism (1) and extend the telescopic handle (2).



- ▶ The transport cases and their contents weigh approx. 42.0 kg or 22.5 kg. Lifting or carrying the transport cases requires two people.

## 6.3 Checks to perform before commissioning

1. Check all system components and mechanical connections for damage.
2. Check electrical connections and connection cables for damage.  
Use only undamaged connection cables.

## 6.4 Ensuring there is no voltage at the work place

Before connecting the test object follow the 5 safety rules:

1. Disconnect the test object.
2. Secure against re-connection.
3. Verify absence of operating voltage.
4. Provide protection against adjacent live parts.
5. Earth and short all phases.

**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 mm<sup>2</sup>**.

## 6.5 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.

## 6.6 Setting up the system

### PD-TaD 80 integrated in the cable test van

- ▶ Place the PD-TaD 80 as close to the test object as possible.



- ▶ Follow the user manual for the cable test van.

### PD-TaD 80 as a standalone system

- ▶ Place the PD-TaD 80 as close to the test object as possible.
- ▶ Select the place of installation for the VLF HV generator in such a way that
  - a stable base is guaranteed,
  - the VLF HV generator is accessible for making connections and for operation, and
  - sufficient safety distances are maintained. You must comply with EN 50110 for the operation of electrical installations (EU/EFTA countries) or the relevant standards applicable in your country.
- ▶ Set up the Power Box so that the PD-TaD 80, the VLF HV generator and the laptop can be connected to the Power Box.
- ▶ Set up the laptop so that you can work comfortably. You could place the laptop on a transport case, for example.



### 6.6.1 Securing the PD-TaD 80 to the cross beam

If the connection point is located on a pole for example, it may be necessary to attach the PD-TaD 80 to a cross beam or a comparable sub-structure.

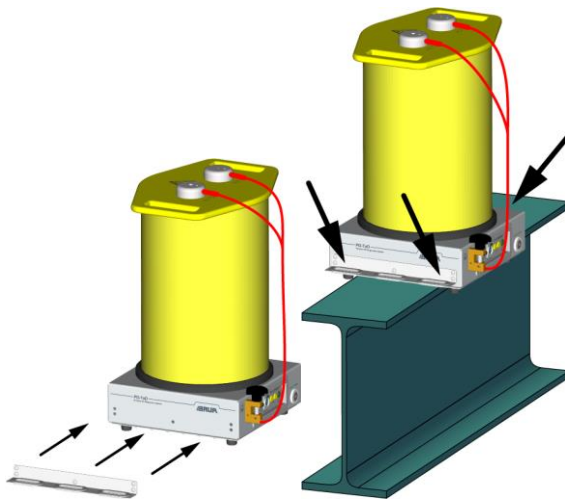
#### Prerequisite



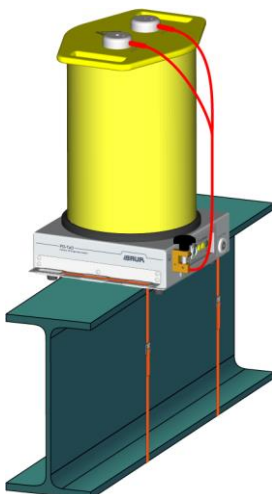
Offset screwdriver for Torx® screws, size TX 25 / 67 x 25 mm

#### Procedure

The following illustration demonstrates an example for attaching the PD-TaD 80 to a cross beam.



1. Loosen and remove the 5 screws on the underside of the PD-TaD 80.
2. Screw the mounting bracket to the PD-TaD 80 using the 5 screws (see Fig.).
3. Repeat steps 1 to 2 on the opposite side of the PD-TaD 80.
4. Place the PD-TaD 80 on the cross beam.
5. Guide the tension belts through the recesses located on both sides of the mounting brackets and fasten the PD-TaD 80 on both sides with the tension belts.
6. Tighten the tension belts and check the stability of the PD-TaD 80.  
Ensure that the tension lock is located below the device.



**Note:** The tension belts are not included in the PD-TaD 80 standard delivery.

## 6.7 Points to note during connection

The following factors are crucial for precise measurement results:

- Short connections
- Protective earthing cable should be a flat copper strip (standard delivery)
- Maximum possible distance between the connection cables and the adjacent system components not to be tested
- Keep the HV coupling unit of the PD-TaD 80 and the terminations clean and dry
- No current loops in the power supply

## 6.8 Use of the anti-corona protection

To achieve measurement results that are as precise as possible, we recommend using the anti-corona protection device. Corona discharges on sharp edges in a test setup may cause a high noise level. The anti-corona hoods included within the standard delivery protect sharp-edged parts in order to prevent corona discharges affecting the measurement result.

## 6.9 Earth system

**Note:**All the necessary connection cables and connecting elements are included in the standard delivery.

1. A 16 mm<sup>2</sup> protective earthing cable is included in the standard delivery of the PD-TaD 80. Use this cable to connect the protective earthing connection of the PD-TaD 80 to the station earth (directly on the test object screen).  
**Important:** To keep the antenna effect to a minimum and thus prevent interference, the protective earthing cable must be a flat copper strip which is kept as short as possible.
2. PD-TaD 80 integrated in the cable test van: Earth the cable test van. Follow the instructions in the user manual for the cable test van.  
PD-TaD 80 as a standalone system: Earth the VLF HV generator. Follow the user manual for the VLF HV generator in question.
3. A short-circuit cable is secured to the earthing terminal on the PD-TaD 80. Connect this short-circuit cable to the *HV IN* and *HV OUT* ports.
4. If you are using a VLF HV generator with a 50 m long HV connection cable, connect the screen (operational earthing) of the HV connection cable to the *Screen (HV Cable)* port of the PD-TaD 80.

## 6.10 Connecting the system for PD measurement

### 6.10.1 Connecting the PD-TaD in the cable test van

#### Prerequisites

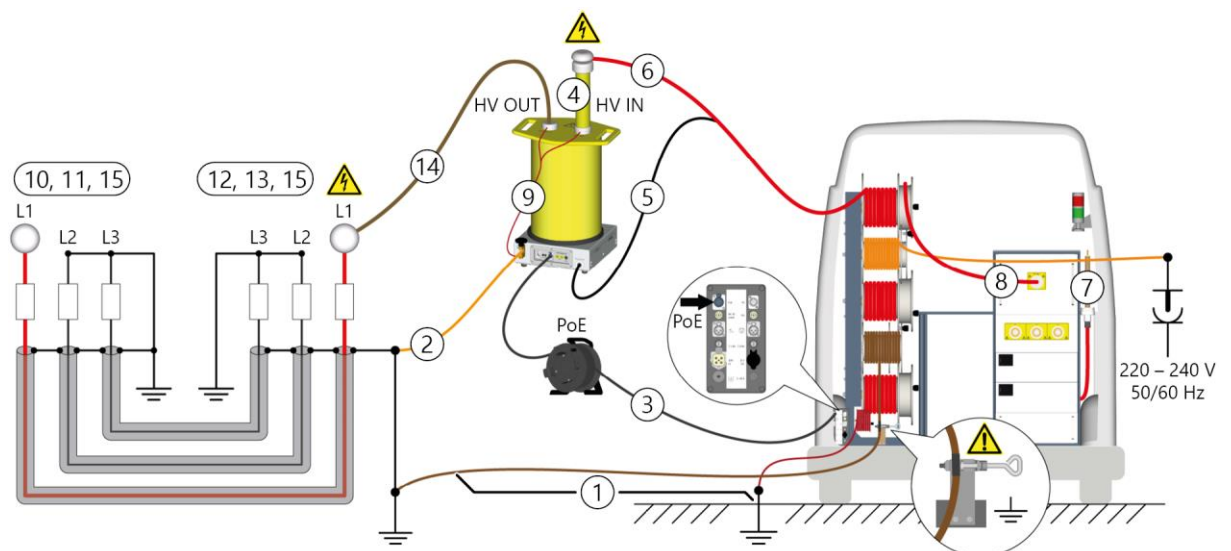
- The workplace must be de-energised, earthed and short-circuited.  
Further information: Chapter *Ensuring there is no voltage at the work place* (on page 32)
- The connection points and far end are prepared for the measurement tasks.  
Further information: Chapter *Preparing the test object terminals* (on page 32)
- HV coupling unit of PD-TaD and the cable terminations of the test object are clean and dry.  
Further information: Chapter *Cleaning the PD-TaD 80 and system components* (on page 60)

#### Required equipment

- PD-TaD incl. connection cables
- HF filter
- PoE cable on hand cable drum
- Anti-corona protection

**Note:**All the necessary connection cables and connecting elements are included in the standard delivery.

#### Procedure



**Important:**

- ▶ To keep the connection cable between the PD-TaD and the test object short, place the PD-TaD as close as possible to the test object.

To avoid interference due to partial discharge at the connection point, make sure the PD-TaD is placed a sufficient distance away from metal and live parts.

If the connection point is higher up, put the PD-TaD on a substructure. Further information: Chapter *Securing the PD-TaD 80 to the cross beam* (on page 33)

- ▶ Keep all connections as short as possible.
- ▶ Lay out the connection cables in such a way that no loops are created.

The numbering in the table gives the sequence of steps for connecting the test object.

No.	Cable	Step
1	Protective and auxiliary earthing cables of the cable test van (on cable drum rack)	Earth the cable test van. Further information: Additional manual for systems with diagnostics functions
2	Protective earthing cable of PD-TaD 80 (flat copper strip)	Connect the PD-TaD 80 to the station earth (close to the test object cable screen). Further information: Chapter <i>Earth system</i> (on page 34)
<b>In the cable test van on the connection box of the cable drum rack:</b>		
–	–	If present, connect the external emergency off unit to the connection box of the cable drum rack (⚡ port).  If you are not using an external emergency off unit, ensure that a jumper plug is inserted into the ⚡ port on the connection box of the cable drum rack.
3	PoE cable on hand cable drum	Connect the PoE cable: <ul style="list-style-type: none"> <li>▪ to the connection box (<i>PoE</i> port) and</li> <li>▪ to PD-TaD (<i>Power Box</i> port).</li> </ul> This is used for power supply and data transmission at the same time.
<b>At the PD-TaD 80:</b>		
4	–	Connect the HF filter to the <i>HV IN</i> port. Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)
5	HV connection cable of the cable test van (on cable drum rack)	Connect the screen of the HV connection cable to the <i>Screen (HV Cable)</i> port.
6	See above	Connect the HV connection cable to the HF filter on the <i>HV IN</i> port.
<b>In the cable test van:</b>		
7	–	For titron® systems only:  If the connecting plug is inserted in the HV connection socket of the DU 80 discharge unit, unplug it and hang it in the holder.

No.	Cable	Step
8	HV connection cable of the cable test van (on cable drum rack)	Connect the HV connection cable to the DU 80 discharge unit.
–	–	Guide all connected cables through the cable outlet of the rear door and close the rear door.
<b>At the PD-TaD 80:</b>		
9	Short-circuit cable of PD-TaD 80	On the PD-TaD 80, remove the short-circuit cable from ports <i>HV IN</i> and <i>HV OUT</i> .
<b>At the far end of the test object:</b>		
10	–	Clean the cable termination of the phase to be tested carefully.
11	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.
<b>At the near end of the test object:</b>		
12	–	Clean the cable termination of the phase to be tested carefully.
13	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.
14	HV connection cable of PD-TaD 80	Connect the PD-TaD 80 ( <i>HV OUT</i> port) to the phase to be tested. To do this, select the shorter of the two supplied HV connection cables. Place the HV connection cable as far away as possible from the adjacent live and earthed parts.
<b>At the near and far end of the test object:</b>		
15	–	Remove the earthing and short-circuit connection from the phase to be tested.  Make sure that the phases not being tested are earthed and short-circuited.

## 6.10.2 Connecting the system to the PHG 70/80 portable VLF HV generator

### Prerequisites

- The workplace must be de-energised, earthed and short-circuited.  
Further information: Chapter *Ensuring there is no voltage at the work place* (on page 32)
- The connection points and far end are prepared for the measurement tasks.  
Further information: Chapter *Preparing the test object terminals* (on page 32)
- HV coupling unit of PD-TaD and the cable terminations of the test object are clean and dry.  
Further information: Chapter *Cleaning the PD-TaD 80 and system components* (on page 60)

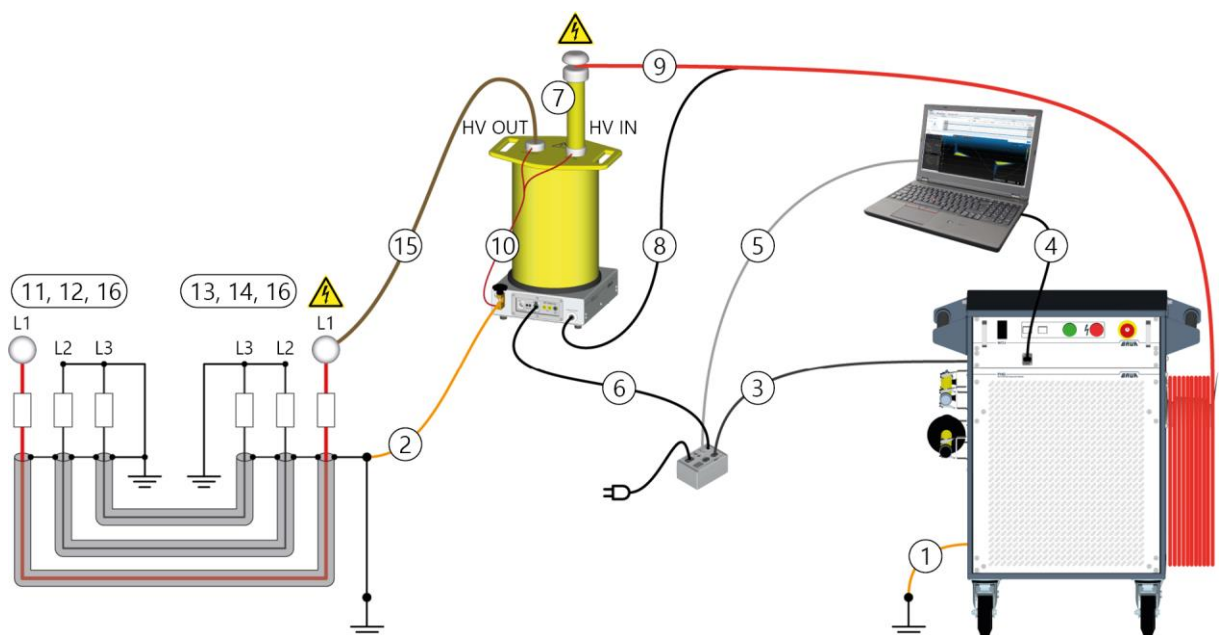
## Required equipment

- PD-TaD incl. connection cables
- HF filter
- PoE cable
- Laptop incl. Ethernet and USB cable
- Anti-corona protection

**Note:**All the necessary connection cables and connecting elements are included in the standard delivery.

## Procedure

The illustration shows an example of a standalone system with a PHG portable VLF HV generator and an HV connection cable with screen. The standalone system is connected to a different VLF HV generator or an HV connection cable without screen in the same way.



### Important:

- ▶ To keep the connection cable between the PD-TaD and the test object short, place the PD-TaD as close as possible to the test object.  
To avoid interference due to partial discharge at the connection point, make sure the PD-TaD is placed a sufficient distance away from metal and live parts.  
If the connection point is higher up, put the PD-TaD on a substructure. Further information: Chapter *Securing the PD-TaD 80 to the cross beam* (on page 33)
- ▶ Keep all connections as short as possible.
- ▶ Lay out the connection cables in such a way that no loops are created.

The numbering in the table gives the sequence of steps for connecting the test object.

No.	Cable	Step
1	Protective earthing cable of the VLF HV generator	Earth the VLF HV generator. Further information: User manual for the respective VLF HV generator
2	Protective earthing cable of PD-TaD 80 (flat copper strip)	Connect the PD-TaD 80 to the station earth (close to the test object cable screen). Further information: Chapter <i>Earth system</i> (on page 34)
<b>On the VLF HV generator:</b>		
–	–	If present, connect the external emergency off unit to the VLF HV generator (⚡ port).  If you are not using an external emergency off unit, ensure that a jumper plug is inserted into the ⚡ port on the VLF HV generator.
3	Connection cable C19 – C20G	Connect the VLF HV generator (mains supply) to the Power Box (port depends on the connection cable).
<b>On the laptop:</b>		
4	USB cable	Use the USB cable to connect the laptop to the VLF HV generator.
5	Ethernet cable	Use the supplied Ethernet cable to connect the laptop to the Power Box ( <i>Laptop</i> port).
–	–	If you do not want to run the laptop off its battery, connect the laptop to the Power Box to establish a power supply. To do so, use the connection cable with the C14G plug.
<b>At the PD-TaD 80:</b>		
6	PoE cable	Connect the PoE cable: <ul style="list-style-type: none"> <li>▪ to the Power Box (<i>PD Detector</i> port) and</li> <li>▪ to PD-TaD 80 (<i>Power Box</i> port)</li> </ul> This is used for power supply and data transmission at the same time.
7	–	Connect the HF filter to the <i>HV IN</i> port. Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)
8	HV connection cable of the VLF HV generator	Connect the screen of the HV connection cable to the <i>Screen (HV Cable)</i> port.
9	See above	Connect the HV connection cable to the HF filter at the <i>HV IN</i> port. Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)
10	Short-circuit cable of PD-TaD 80	On the PD-TaD 80, remove the short-circuit cable from ports <i>HV IN</i> and <i>HV OUT</i> .
<b>At the far end of the test object:</b>		
11	–	Clean the cable termination of the phase to be tested carefully.
12	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.

No.	Cable	Step
<b>At the near end of the test object:</b>		
13	–	Clean the cable termination of the phase to be tested carefully.
14	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.
15	HV connection cable of PD-TaD 80	Connect the PD-TaD 80 ( <i>HV OUT</i> port) to the phase to be tested. To do this, select the shorter of the two supplied HV connection cables. Place the HV connection cable as far away as possible from the adjacent live and earthed parts.
<b>At the near and far end of the test object:</b>		
16	–	Remove the earthing and short-circuit connection from the phase to be tested. Make sure that the phases not being tested are earthed and short-circuited.

## 6.11 Connecting the system for dissipation factor measurement

### 6.11.1 Connecting the PD-TaD in the cable test van

#### Prerequisites

- The workplace must be de-energised, earthed and short-circuited.  
Further information: Chapter *Ensuring there is no voltage at the work place* (on page 32)
- The connection points and far end are prepared for the measurement tasks.  
Further information: Chapter *Preparing the test object terminals* (on page 32)
- HV coupling unit of PD-TaD and the cable terminations of the test object are clean and dry.  
Further information: Chapter *Cleaning the PD-TaD 80 and system components* (on page 60)

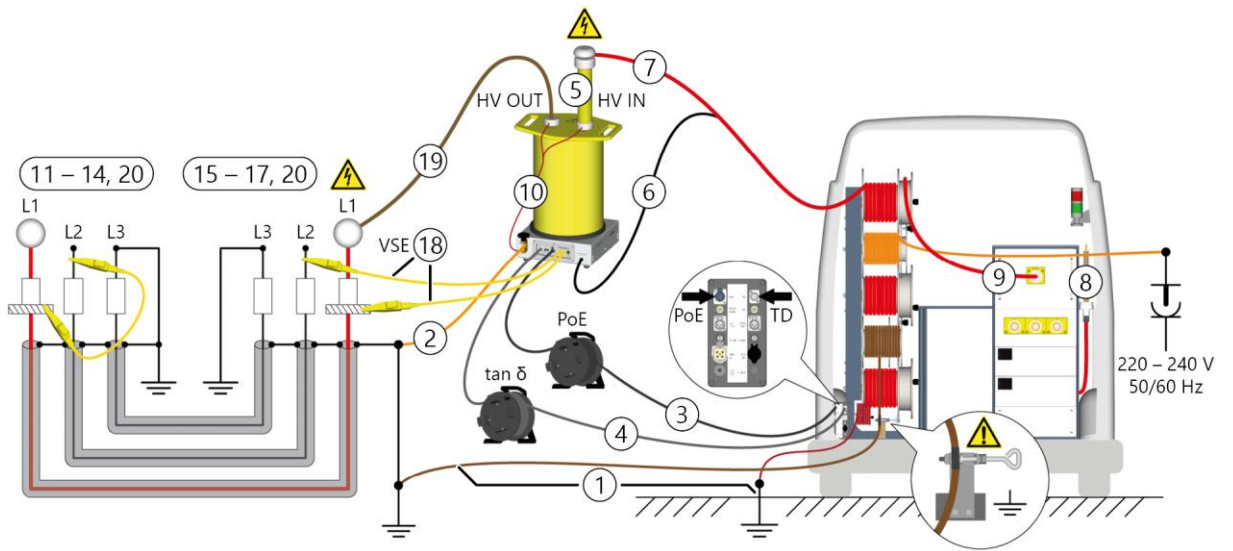
#### Required equipment

- PD-TaD incl. connection cables
- HF filter
- PoE cable on hand cable drum
- tan- $\delta$  cable on hand cable drum
- VSE cable
- Protective rings (conductive hook and loop fastener tape)
- Anti-corona protection

**Note:** All the necessary connection cables and connecting elements are included in the standard delivery.



**Procedure**



**Important:**

- ▶ To keep the connection cable between the PD-TaD and the test object short, place the PD-TaD as close as possible to the test object.  
To avoid interference due to partial discharge at the connection point, make sure the PD-TaD is placed a sufficient distance away from metal and live parts.  
If the connection point is higher up, put the PD-TaD on a substructure. Further information: Chapter *Securing the PD-TaD 80 to the cross beam* (on page 33)
- ▶ Keep all connections as short as possible.
- ▶ Lay out the connection cables in such a way that no loops are created.

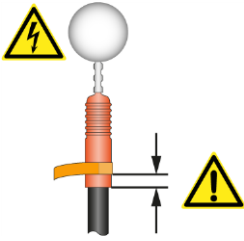
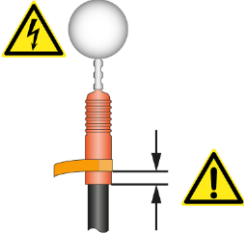
The numbering in the table gives the sequence of steps for connecting the test object.

No.	Cable	Step
1	Protective and auxiliary earthing cables of the cable test van (on cable drum rack)	Earth the cable test van. Further information: Additional manual for systems with diagnostics functions
2	Protective earthing cable of PD-TaD 80 (flat copper strip)	Connect the PD-TaD 80 to the station earth (close to the test object cable screen). Further information: Chapter <i>Earth system</i> (on page 34)

**In the cable test van on the connection box of the cable drum rack:**

- - If present, connect the external emergency off unit to the connection box of the cable drum rack (⚡ port).  
If you are not using an external emergency off unit, ensure that a jumper plug is inserted into the ⚡ port on the connection box of the cable drum rack.

No.	Cable	Step
3	PoE cable on hand cable drum	<p>Connect the PoE cable:</p> <ul style="list-style-type: none"> <li>▪ to the connection box (<i>PoE</i> port) and</li> <li>▪ to PD-TaD (<i>Power Box</i> port).</li> </ul> <p>This is used for power supply and data transmission at the same time.</p>
4	tan- $\delta$ cable on hand cable drum	<p>Connect the tan-<math>\delta</math> cable:</p> <ul style="list-style-type: none"> <li>▪ to the connection box (<i>TD</i> port) and</li> <li>▪ to the PD-TaD (<i>VLF Generator</i> port).</li> </ul>
<b>At the PD-TaD 80:</b>		
5	–	<p>Connect the HF filter to the <i>HV IN</i> port.</p> <p>Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)</p>
6	HV connection cable of the cable test van (on cable drum rack)	Connect the screen of the HV connection cable to the <i>Screen (HV Cable)</i> port.
7	See above	Connect the HV connection cable to the HF filter on the <i>HV IN</i> port.
<b>In the cable test van:</b>		
8	–	<p>For titron® systems only:</p> <p>If the connecting plug is inserted in the HV connection socket of the DU 80 discharge unit, unplug it and hang it in the holder.</p>
9	HV connection cable of the cable test van (on cable drum rack)	Connect the HV connection cable to the DU 80 discharge unit.
–	–	Guide all connected cables through the cable outlet of the rear door and close the rear door.
<b>At the PD-TaD 80:</b>		
10	Short-circuit cable of PD-TaD 80	On the PD-TaD 80, remove the short-circuit cable from ports <i>HV IN</i> and <i>HV OUT</i> .
<b>At the far end of the test object:</b>		
11	–	Clean the cable termination of the phase to be tested carefully.
12	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.

No.	Cable	Step
13	Protective ring (conductive hook and loop fastener tape)	<p>Attach a protective ring to the cable termination of the phase to be tested – directly over the screen.</p> <p><b>Important:</b> Ensure that the protective ring does not come into contact with the screen.</p> 
14	VSE cables with 2 connection clips (yellow)	<p>Use the VSE cable to short-circuit the protective ring to a de-energised phase on which no measurement is to be taken.</p> <p>The de-energised phase is used as a return circuit for leakage currents from the far end.</p>
<b>At the near end of the test object:</b>		
15	–	Clean the cable termination of the phase to be tested carefully.
16	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.
17	Protective ring (conductive hook and loop fastener tape)	<p>Attach a protective ring to the cable termination of the phase to be tested – directly over the screen.</p> <p><b>Important:</b> Ensure that the protective ring does not come into contact with the screen.</p> 
18	VSE cables with Ø 4 mm connector and a connection clip (yellow, 2x)	<p>Connect a VSE cable to each of the VSE ports on the PD-TaD 80.</p> <p>From the VSE ports connect a VSE cable to:</p> <ul style="list-style-type: none"> <li>the protective ring of the phase to be tested.</li> <li>the de-energised phase that is used as a return circuit for leakage currents from the far end.</li> </ul>
19	HV connection cable of PD-TaD 80	<p>Connect the PD-TaD 80 (HV OUT port) to the phase to be tested.</p> <p>To do this, select the shorter of the two supplied HV connection cables.</p> <p>Place the HV connection cable as far away as possible from the adjacent live and earthed parts.</p>

No.	Cable	Step
<b>At the near and far end of the test object:</b>		
20	–	<p>Remove the earthing and the short-circuit connection:</p> <ul style="list-style-type: none"> <li>▪ on the phase to be tested.</li> <li>▪ on the de-energised phase that is used as a return circuit for leakage currents from the far end</li> </ul> <p>Ensure that the phases that are not used for the measurement are earthed and shorted.</p>

### 6.11.2 Connecting the system to the PHG 70/80 portable VLF HV generator

#### Prerequisites

- The workplace must be de-energised, earthed and short-circuited.  
Further information: Chapter *Ensuring there is no voltage at the work place* (on page 32)
- The connection points and far end are prepared for the measurement tasks.  
Further information: Chapter *Preparing the test object terminals* (on page 32)
- HV coupling unit of PD-TaD and the cable terminations of the test object are clean and dry.  
Further information: Chapter *Cleaning the PD-TaD 80 and system components* (on page 60)

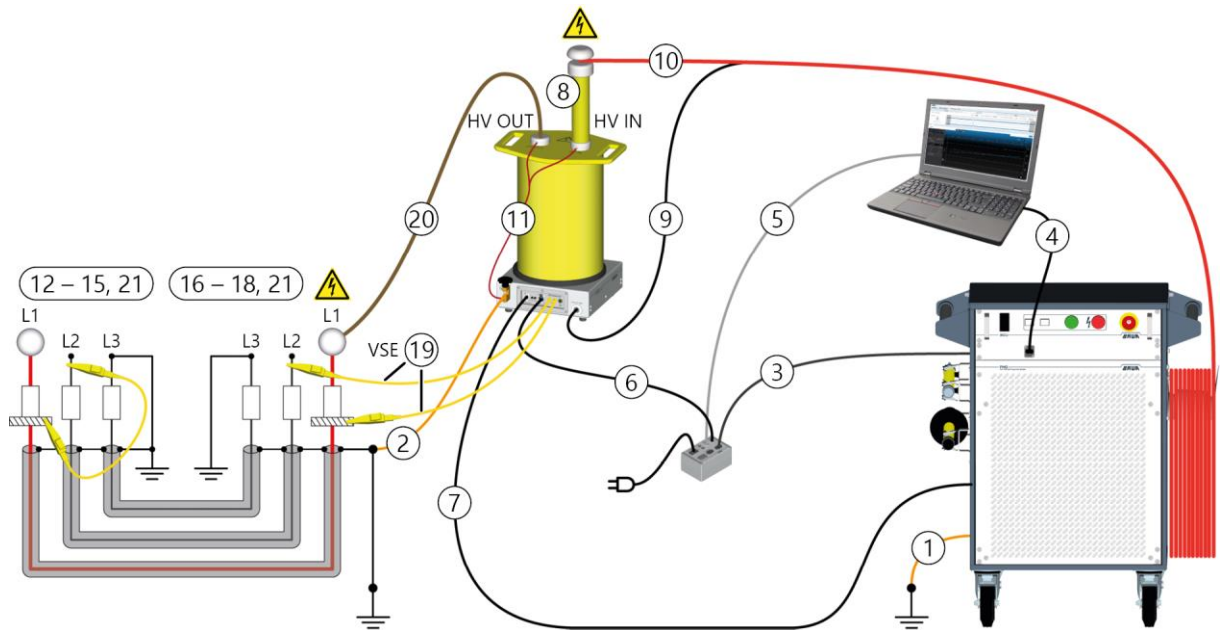
#### Required equipment

- PD-TaD incl. connection cables
- HF filter
- PoE cable
- tan- $\delta$  cable
- VSE cable
- Protective rings (conductive hook and loop fastener tape)
- Laptop incl. Ethernet and USB cable
- Anti-corona protection

**Note:** All the necessary connection cables and connecting elements are included in the standard delivery.

#### Procedure

The illustration shows an example of a standalone system with a PHG portable VLF HV generator and an HV connection cable with screen. The standalone system is connected to a different VLF HV generator or an HV connection cable without screen in the same way.



**Important:**

- ▶ To keep the connection cable between the PD-TaD and the test object short, place the PD-TaD as close as possible to the test object.  
To avoid interference due to partial discharge at the connection point, make sure the PD-TaD is placed a sufficient distance away from metal and live parts.  
If the connection point is higher up, put the PD-TaD on a substructure. Further information: Chapter *Securing the PD-TaD 80 to the cross beam* (on page 33)
- ▶ Keep all connections as short as possible.
- ▶ Lay out the connection cables in such a way that no loops are created.

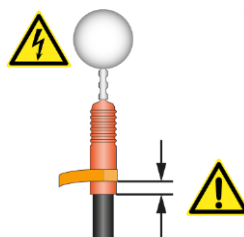
The numbering in the table gives the sequence of steps for connecting the test object.

No.	Cable	Step
1	Protective earthing cable of the VLF HV generator	Earth the VLF HV generator. Further information: User manual for the respective VLF HV generator
2	Protective earthing cable of PD-TaD 80 (flat copper strip)	Connect the PD-TaD 80 to the station earth (close to the test object cable screen). Further information: Chapter <i>Earth system</i> (on page 34)

**On the VLF HV generator:**

–	–	If present, connect the external emergency off unit to the VLF HV generator (⚡ port). If you are not using an external emergency off unit, ensure that a jumper plug is inserted into the ⚡ port on the VLF HV generator.
3	Connection cable C19 – C20G	Connect the VLF HV generator (mains supply) to the Power Box (port depends on the connection cable).

No.	Cable	Step
<b>On the laptop:</b>		
4	USB cable	Use the USB cable to connect the laptop to the VLF HV generator.
5	Ethernet cable	Use the supplied Ethernet cable to connect the laptop to the Power Box ( <i>Laptop</i> port).
–	–	If you do not want to run the laptop off its battery, connect the laptop to the Power Box to establish a power supply. To do so, use the connection cable with the C14G plug.
<b>At the PD-TaD 80:</b>		
6	PoE cable	<p>Connect the PoE cable:</p> <ul style="list-style-type: none"> <li>▪ to the Power Box (<i>PD Detector</i> port) and</li> <li>▪ to PD-TaD 80 (<i>Power Box</i> port)</li> </ul> <p>This is used for power supply and data transmission at the same time.</p>
7	tan δ cable	<p>Connect the tan δ cable:</p> <ul style="list-style-type: none"> <li>▪ to the VLF HV generator (<i>PD Detector</i> port) and</li> <li>▪ to PD-TaD 80 (<i>VLF Generator</i> port).</li> </ul>
8	–	<p>Connect the HF filter to the <i>HV IN</i> port.</p> <p>Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)</p>
9	HV connection cable of the VLF HV generator	Connect the screen of the HV connection cable to the <i>Screen (HV Cable)</i> port.
10	See above	<p>Connect the HV connection cable to the HF filter at the <i>HV IN</i> port.</p> <p>Further information: Chapter <i>Connecting the HF filter to the PD-TaD 80</i> (on page 48)</p>
11	Short-circuit cable of PD-TaD 80	On the PD-TaD 80, remove the short-circuit cable from ports <i>HV IN</i> and <i>HV OUT</i> .
<b>At the far end of the test object:</b>		
12	–	Clean the cable termination of the phase to be tested carefully.
13	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.
14	Protective ring (conductive hook and loop fastener tape)	<p>Attach a protective ring to the cable termination of the phase to be tested – directly over the screen.</p> <p><b>Important:</b> Ensure that the protective ring does not come into contact with the screen.</p>

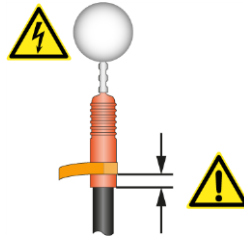


No.	Cable	Step
15	VSE cables with 2 connection clips (yellow)	Use the VSE cable to short-circuit the protective ring to a de-energised phase on which no measurement is to be taken.  The de-energised phase is used as a return circuit for leakage currents from the far end.

**At the near end of the test object:**

16	–	Clean the cable termination of the phase to be tested carefully.
17	–	Attach the anti-corona hoods of the anti-corona protection device to the cable termination of the phase to be tested.

18	Protective ring (conductive hook and loop fastener tape)	Attach a protective ring to the cable termination of the phase to be tested – directly over the screen.  <b>Important:</b> Ensure that the protective ring does not come into contact with the screen.
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19	VSE cables with Ø 4 mm connector and a connection clip (yellow, 2x)	Connect a VSE cable to each of the VSE ports on the PD-TaD 80.  From the VSE ports connect a VSE cable to: <ul style="list-style-type: none"> <li>▪ the protective ring of the phase to be tested.</li> <li>▪ the de-energised phase that is used as a return circuit for leakage currents from the far end.</li> </ul>
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20	HV connection cable of PD-TaD 80	Connect the PD-TaD 80 (HV OUT port) to the phase to be tested.  To do this, select the shorter of the two supplied HV connection cables.  Place the HV connection cable as far away as possible from the adjacent live and earthed parts.
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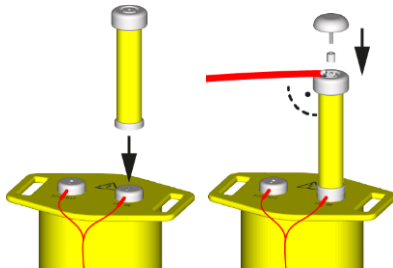
**At the near and far end of the test object:**

21	–	Remove the earthing and the short-circuit connection: <ul style="list-style-type: none"> <li>▪ on the phase to be tested.</li> <li>▪ on the de-energised phase that is used as a return circuit for leakage currents from the far end</li> </ul> Ensure that the phases that are not used for the measurement are earthed and shorted.
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## 6.12 Connecting the HF filter to the PD-TaD 80

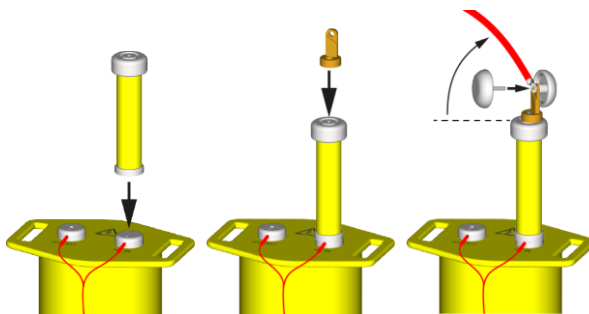
The HF filter is used to minimise external influences on the measurement results. We recommend using the HF filter for all PD tests.

### 6.12.1 Connecting the HF filter without a connection piece



1. Screw the HF filter onto the *HV IN* connection of the PD-TaD 80.
  2. Remove the HV connection clip from the HV connection cable.
  3. With a threaded bolt and distance piece, screw the cable lug of the HV connection cable and an anti-corona hood onto the HF filter.
- Ensure that the HV connection cable leads away at a right angle to the HF filter.

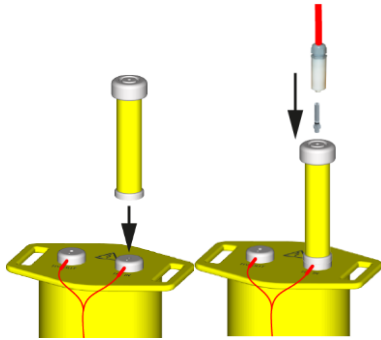
### 6.12.2 Connecting the HF filter with a connection piece



1. Screw the HF filter onto the *HV IN* connection of the PD-TaD 80.
  2. Fit the connection piece on the HF filter and screw it on tight.
  3. Remove the HV connection clip from the HV connection cable.
  4. Attach the cable lug of the HV connection cable and an anti-corona hood to the connection piece.
- The connection piece has a groove to guide the cable lug so that the HV connection cable is led upwards at an angle of at least 30° to the HF filter.
5. Attach a second anti-corona hood and screw it on tight.



### 6.12.3 Connection with an HV connection cable with MC plug



1. Screw the HF filter onto the *HV IN* connection of the PD-TaD 80.
2. Screw the threaded pin (included in the standard delivery) to the HF filter.
3. Insert the MC plug-and-socket connection of the HV connection cable onto the threaded pin and screw it on tight.

## 6.13 Connecting the system to the supply voltage

### PD-TaD 80 integrated in the cable test van

- ▶ Connect the cable test van to the supply voltage. Follow the instructions in the user manual for the cable test van.  
The *PWR* and *PD* LEDs on the PD-TaD 80 light up.

### PD-TaD 80 as a standalone system

#### **NOTICE**

#### **Too high or too low mains voltage**

A low mains voltage adversely affects the function of the system, a high mains voltage can cause damage.

- ▶ Ensure that the supply voltage matches the specifications on the rating plate.

1. Measure the mains voltage with a voltmeter.
2. Compare the mains voltage with the specifications on the rating plate.
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. Check whether the PD-TaD 80, VLF HV generator and, if the case may be, the laptop are connected to the Power Box to receive a power supply.
5. Connect the Power Box to the mains voltage.  
The green LED on the Power Box and the LEDs *PWR* and *PD* on the PD-TaD 80 light up.

## 6.14 Securing the test area

1. Mark out the path for pedestrians.
2. Protect the test lead (connection cable), e.g. with cable bridges or rubber mats. The cables must be protected against damage and there must be no danger of people tripping.
3. If the connection creates a hazard for the testing personnel and pedestrians, mark them.
4. The area around the test structure (test area) must be demarcated from workplaces and traffic in such a way that
  - *except for the tester, no other person can remain in the test area,*
  - *except for the tester, no other person can access the test area,*
  - *persons standing outside the boundary cannot reach the operating elements of the test system located inside the boundary. (EN 50191)*

The minimum height of individual boundaries must be 1 m.

5. If the system is cordoned off from general areas only with ropes, chains or bars, the entire test structure must be monitored during the test in compliance with EN 50191. If the test structure includes several local test areas, security guards must be appointed for each test area. But it is important that the testing personnel and the security guards understand each other well.
6. Mark the test area and terminals clearly. It must be very obvious that a cable test is in progress.
7. Make sure that unauthorised persons cannot access the local mains stations.

## 7 PREPARING A MEASUREMENT

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### 7.1 Switching on the system and starting the BAUR software

1. Switch on the system.

Further information: User manual for the cable test van or the VLF HV generator

The system status changes to the *Ready for operation* operating state.

2. The PD measuring unit of the PD-TaD 80 will be switched on automatically when it is supplied with voltage. Wait until all the LEDs on the PD-TaD 80 display the ready for operation status.

- *PWR* – green
- *PD* – orange



3. Start the BAUR software 4.

The Dashboard opens.



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- ▶ For information on performing the diagnostics methods, refer to the user manuals for the BAUR software 4.
- 

### 7.2 Selecting a cable route and entering cable data



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- ▶ For information on selecting or entering cable data, refer to the user manual for the BAUR software 4.
-

## 8 PARTIAL DISCHARGE MEASUREMENT

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- ▶ For information on calibrating the PD test circuit and performing PD testing, refer to the user manual for the BAUR software 4.
  - ▶ For information on operating the cable test van or VLF HV generator, refer to the user manual for the cable test van or the respective VLF HV generator.
-

## 9 CABLE TESTING AND DISSIPATION FACTOR MEASUREMENT

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With the BAUR software 4, you can use any of the following testing and diagnostics methods depending on the system configuration:

- Cable testing
- Dissipation factor measurement



- ▶ For information on performing and evaluating the testing and diagnostics methods, refer to the user manual for the BAUR software 4.
- 

If you have a viola TD VLF HV generator (standalone), you can create and use templates for dissipation factor measurement on the VLF HV generator.



- ▶ For information on performing and evaluating the dissipation factor measurement with the viola TD VLF HV generator (standalone), refer to the user manuals for the VLF HV generator.
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## 10 VLF CABLE TESTING WITH PARALLEL PARTIAL DISCHARGE TESTING

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Whereas VLF cable testing shows whether a cable can withstand a load over a specified test duration, PD testing identifies and locates the PD activities of the cable insulation.

The simultaneous performance of VLF cable testing and PD testing can reduce the test time for cables that are in good condition.

1. Connect the test object for PD testing.  
Further information: Chapter *Connecting the system for PD measurement* (on page 35)
2. Calibrate the PD test circuit.
3. Start VLF cable testing.
4. Configure and start PD testing in the BAUR software.
5. Monitor the trend of the PD measurement results during testing.



- ▶ Information on calibrating the PD test circuit as well as performing PD testing and VLF cable testing is given in the user manual for the BAUR software 4.
  - ▶ Information on operating the cable test van or VLF HV generator is given in the user manual for the cable test van or the respective VLF HV generator.
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## 11 EVALUATION OF PARTIAL DISCHARGE TESTING



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- ▶ For information on evaluating the PD measurement results, refer to the user manual for the BAUR software 4.
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## 12 DISCHARGING AND EARTHING THE TEST OBJECT

On completion of cable testing or measurement the test object still carries a dangerous voltage.

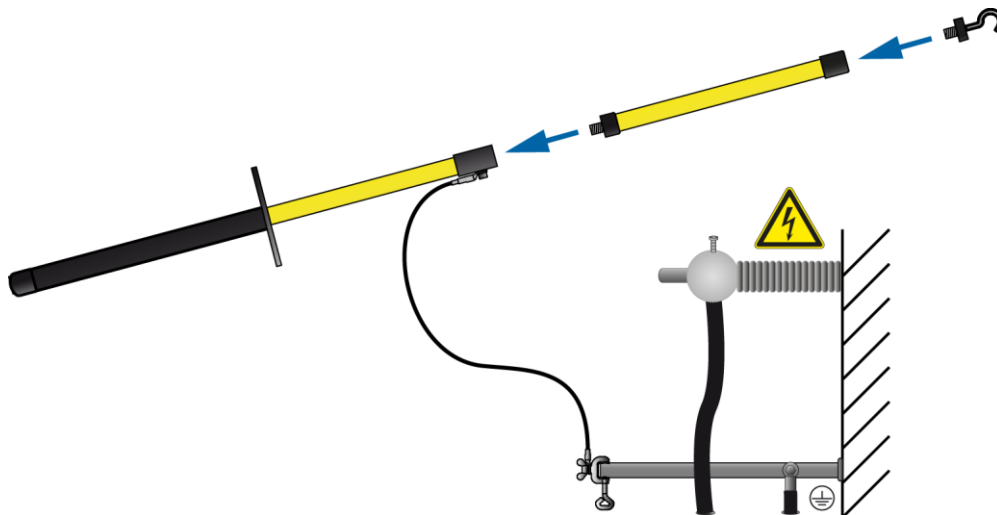
	 <b>DANGER</b>
	<p><b>Dangerous voltage in test object.</b></p> <p>Danger of electric shock or risk of injury</p> <ul style="list-style-type: none"><li>▶ <b>Before touching, discharge, earth and short-circuit:</b> The test object at the connection point and at the far end.</li><li>▶ You may touch the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



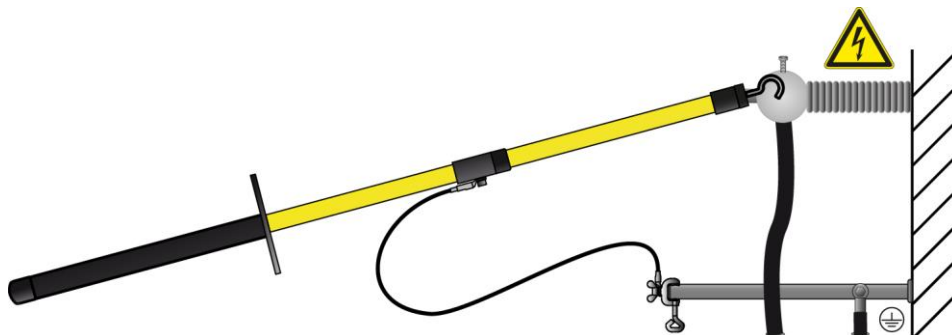
## 12.1 Discharging

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

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.

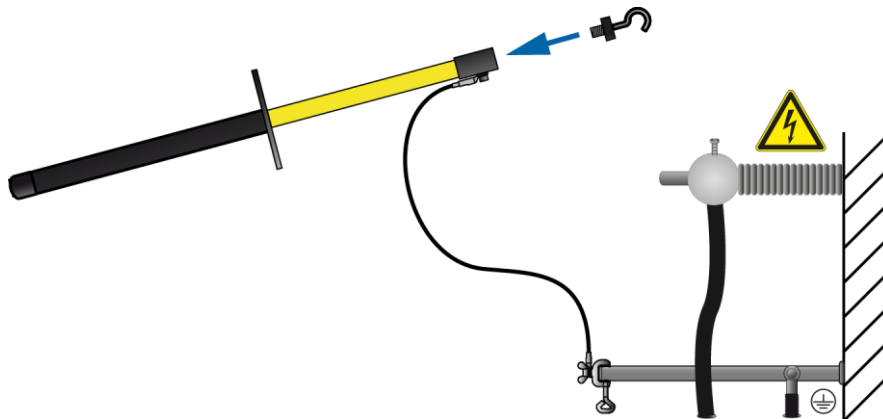


4. Observe the minimum discharge period in accordance with the capacitance of the test object.

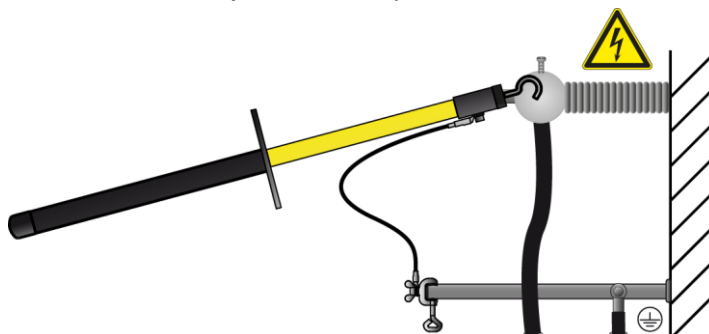
## 12.2 Earthing

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

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.

## 13 PUTTING THE TESTING SYSTEM OUT OF OPERATION

	 <b>WARNING</b>
	<p><b>High electrical voltage</b></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"> <li>▶ Disconnect the earth connections as the last connection of the test setup.</li> <li>▶ Never disconnect the earth connections as long as power and other periphery connections are still connected.</li> </ul>

### **NOTICE**

Damage to devices due to improper use.

- ▶ Do not switch off the device under load.
- ▶ Before switching off the device, put it in the *Ready for operation* operating state.

1. Switch off the system. Follow the instructions in the user manual for the cable test van or the respective VLF HV generator.
2. Disconnect the system completely from the mains voltage.
3. Disconnect the HV connection cables.
4. Establish a short-circuit connection between the HV ports *HV IN* and *HV OUT* and the protective earthing connection on the PD-TaD 80. Insert the short-circuit cable into the side sockets on the HV ports *HV IN* and *HV OUT* so that the short-circuit cable plugs are not pulled out during transportation.
5. Finally, disconnect the earth cable last.
6. If the cables are dirty, clean them and store them in the designated place.
7. If necessary, remove the cordoning.
8. 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.
9. Remove the barriers and marking of the test area.

## 14 MAINTENANCE

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### 14.1 Special maintenance instructions

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

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

- ▶ Never take apart the device. This can lead to device damages. Inside the device there are no components that could be serviced or repaired by the user.
- ▶ Maintenance tasks must be carried out only by personnel trained and authorised by BAUR

**NOTICE**

The housing of the HV coupling unit is locked gas-proof and may not be opened.

- ▶ Do not dismantle the HV coupling unit.
- ▶ Do not screw any components onto the HV coupling unit. Opening the housing can damage the device.

### 14.2 Cleaning the PD-TaD 80 and system components

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

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



- Mild detergent for cleaning the surfaces of the device
- Lint-free cleaning cloth

- ▶ Keep the connectors and the surface of the HV coupling unit (PD-TaD 80) clean and 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.

## 14.3 Replacing the device protection fuses in the Power Box

### Prerequisites

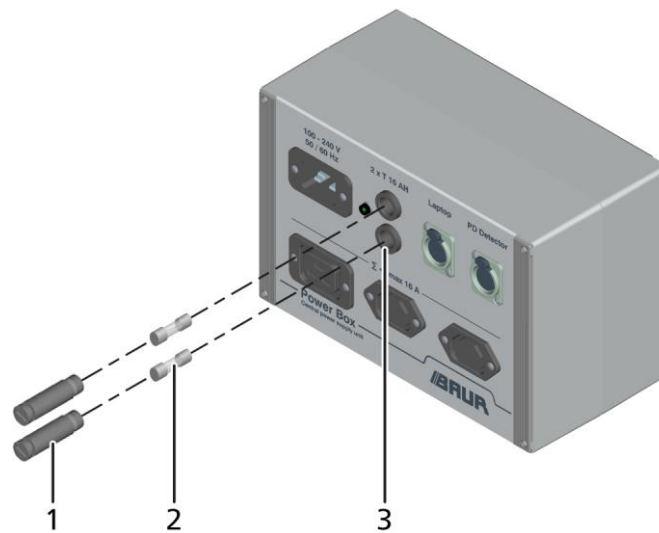


Flat-blade screwdriver, size 1.2 x 6.5 mm



Device protection fuses: 2 x T 16 AH (250 V / 16 A time lag), rated breaking capacity 1500 A (H)

### Procedure



- |   |                |
|---|----------------|
| 1 | Fuse cartridge |
| 2 | Fuse           |
| 3 | Groove         |

1. Unscrew the fuse cartridge (1) out of the groove (3).
2. Replace the fuse (2).
3. Screw the fuse cartridge (1) back into the groove (3).

## 14.4 Replacing the calibrator battery

### NOTICE

#### Material damage may be caused by the wrong polarity of the battery

Wrong polarity of the battery can damage the electronics.

- ▶ When inserting batteries, pay attention to the polarity of the battery.

### Prerequisites



Phillips screwdriver (size 2)



Battery type: 9 V block battery, DIN/IEC 6F22

### Procedure

1. Switch off the calibrator with the On/Off switch.
2. Loosen the screws in the corners on the front side of the housing and open the calibrator housing.



3. Remove the old batteries.
4. Insert new batteries.
5. Close the calibrator housing and screw it tight.
6. Dispose of the old batteries in compliance with the local regulations.

## 14.5 Accessories and spare parts

- ▶ Only use accessories and original spare parts recommended by BAUR.
- ▶ Only use the supplied connection cables or cable of the same specification.  
PoE cable: If it is necessary to replace the PoE cable for connecting the Power Box and the PD-TaD 80, use a standard commercially available Ethernet cable of category 5.
- ▶ Order accessories and spare parts from your nearest BAUR representative (<http://www.baur.eu/baur-worldwide>).

## 15 FAULTS AND CORRECTIVE MEASURES

### NOTICE

#### Damage to device due to improper handling

The user is liable for damages caused due to repairs.

- ▶ Never take apart the device. This can lead to device damages. Inside the device there are no components that could be serviced or repaired by the user.
- ▶ Repairs must be carried out only by personnel trained and authorised by BAUR

### 15.1 Malfunction and error messages

When a fault or an error message occurs, proceed as follows:

1. Check the supply voltage, the connection cables and earth cable.
2. Check whether the fuses are working:
  - PD-TaD 80 integrated in the cable test van: at the mains and safety control unit or the mains supply unit  
Further information: User manual for the cable test van
  - PD-TaD 80 as a standalone system: in the Power Box  
Further information: Chapter *Power Box (PD-TaD 80 as a standalone system)* (on page 18)
3. Check whether the system is in the required operating state.
4. Restart the PC or laptop.  
Start the BAUR system software and check whether the fault continues to occur.
5. If the fault occurs again, write down the error text and the procedure that caused the error to occur.
6. Put the system out of operation and mark it accordingly.
7. Contact your nearest BAUR representative (<http://www.baur.eu/baur-worldwide>).



Further information on error messages can be found:

- in the user manuals for the BAUR system software
- in the user manual for the cable test van or the VLF HV generator

## 16 TRANSPORTATION AND STORAGE

### 16.1 Transportation

During transportation or if you are sending the PD-TaD 80 system components to BAUR GmbH, a BAUR representative or to the technical service for repairs, observe the following:

*NOTICE!* Damage to device due to improper transportation.

- ▶ PD-TaD 80 integrated in the cable test van: Store the PD-TaD 80 system components safely and securely in the cable test van. Loose and bulky objects can damage or destroy the connection cables and devices.  
PD-TaD 80 as a standalone system: When transporting the PD-TaD 80 system components, always use the transport cases provided for this purpose.
- ▶ During transportation, comply with the ambient conditions specified in the technical data of the product. The technical data is given in the corresponding section of this user manual.
- ▶ To prevent the short-circuit cable plug from being pulled out during transportation, ensure that the short-circuit cable is inserted into the HV connectors *HV IN* and *HV OUT* in the side.
- ▶ Protect all PD-TaD 80 system components against strong vibrations.
- ▶ Protect all PD-TaD 80 system components against moisture.
- ▶ To transport the transport cases containing the PD-TaD 80 and accessories, pull them along on their wheels.

To extend the telescopic handle of the transport case, release the locking mechanism (1) and extend the telescopic handle (2).



- ▶ The transport cases and their contents weigh approx. 42.0 kg or 22.5 kg. Lifting or carrying the transport cases requires two people.



## 16.2 Storage

- ▶ PD-TaD 80 integrated in the cable test van: Store the PD-TaD 80 system components in the drawers provided for this purpose and keep the drawers closed.  
PD-TaD 80 as a standalone system: Store the system components in the transport cases provided for this purpose with the lids closed.
- ▶ During storage, comply with the ambient conditions specified in the technical data of the product. Information on the technical data is given in the corresponding section of this user manual.
- ▶ Protect the system and components from humidity.
- ▶ Protect the system against unauthorised access.

# 17 WARRANTY AND AFTER SALES

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## Warranty

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

## After Sales

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



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## 18 DISPOSAL

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

System components do not belong in the domestic waste.

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

## 19 DELIVERY SCOPE AND OPTIONS

### PD-TaD 80 integrated in cable test van, incl.

- HV coupling unit with integrated PD measuring unit
- HF filter, mounting bracket
- Power Box (integrated in cable test van)
- Vehicle mounts
- CAL1B or CAL1E calibrator
- Connection set incl. connection cable and adapter (stored in drawers)
- User manuals
- Windows 7 Ultimate on USB drive

#### Options

- Phase-resolved PD presentation
- CAL1B or CAL1E calibrator
- Vehicle mount
- Dissipation factor measurement in combination with PHG TD or viola TD

#### HV sources

(not included in the standard delivery of PD-TaD 80)

- PHG 70 BAUR VLF test system
- PHG 80 BAUR VLF test system
- viola BAUR VLF tester
- PHG 70 TD BAUR VLF test and diagnostics system
- PHG 80 TD BAUR VLF test and diagnostics system
- viola TD BAUR VLF tester and diagnostics device

### PD-TaD 80 Standalone, incl.

- |  |                  |
|--|------------------|
| ▪ HV coupling unit with integrated PD measuring unit | Transport case 1 |
| ▪ HF filter, mounting bracket                        |                  |
| <hr/>  |                  |
| ▪ Power Box  |                  |
| ▪ CAL1B or CAL1E calibrator                          |                  |
| ▪ Connection set incl. connection cable and adapter  | Transport case 2 |
| ▪ User manuals                                       |                  |
| <hr/>  |                  |
| ▪ Laptop incl. carrying bag                          |                  |
| ▪ BAUR system software 3.x (installed on a laptop)   |                  |
| ▪ Windows 7 Ultimate on USB drive                    |                  |

#### Options

- Phase-resolved PD presentation
- CAL1B or CAL1E calibrator
- Dissipation factor measurement in combination with PHG portable or viola TD

#### HV sources

(not included in the standard delivery of PD-TaD 80)

- PHG 70 portable BAUR VLF test system
- PHG 80 portable BAUR VLF test system
- viola BAUR VLF tester
- viola TD BAUR VLF tester and diagnostics device

## 20 DECLARATION OF CONFORMITY

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We



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

declare, under our sole responsibility, that the BAUR product

### **BAUR Portable PD diagnostics system PD-TaD 80 with Power Box**

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

- Low Voltage Directive 2014/35/EC  
EN 61010-1:2010  
EN 61010-2-030:2010  
EN 50191:2010
- EMC Directive 2014/30/EU  
EN 55011:2009 + A1:2010  
EN 61000-3-2:2014  
EN 61000-4-2:2009  
EN 61000-4-4:2012  
EN 61000-4-5:2014  
EN 61000-4-11:2004
- Environmental testing  
EN 60068-2-ff

Signed: Dr. Markus Baur, CEO

Sulz, 05.11.2018

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## 21 GLOSSARY

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### A

#### **Anti-corona protection**

Anti-corona hoods are used to protect against corona discharges at the terminations

### C

#### **Change of the dissipation factor between successive steps**

Change of the dissipation factor between pre-defined successive voltage steps (Designation on the display:  $\Delta TD$ )

#### **Connection point (near end)**

The connection point or the near end represents the end point of the test object to which the PD-TaD 80 is connected.

### D

#### **Dissipation factor, dielectric dissipation factor**

Abbreviation:  $\tan \delta$

Tangent of the dissipation angle - amount of the ratio between the ideal capacitive current and the real total current. The difference between these two values is determined by the ohmic dissipation current and various different polarisation mechanisms.

The greater the dissipation angle is, the higher the dielectric dissipation is.

### F

#### **Far end**

The far end represents the end point of the test object opposite the connection point.

### N

#### **Near end (connection point)**

The connection point or the near end represents the end point of the test object to which the PD-TaD 80 is connected.

### P

#### **Partial discharge (PD)**

Electrical discharge that only partially bridges the insulation between conductors (see International Electrical Dictionary of IEC).

#### **Partial discharge measurement**

The PD test identifies and pinpoints PD activities in the cable insulation.

**Power over Ethernet (PoE)**

*Power over Ethernet (PoE)* is a process by which network-enabled devices can be supplied with power via the Ethernet cable.

**S****Stability of the dissipation factor**

Change of the dissipation factor over time for a constant test voltage (Designation on the display: SDTD).

The stability of the dissipation factor is determined on the basis of the standard deviation of the dissipation factor during a voltage step.

**System**

All of the technical components that are connected to one another and related to one another and which are regarded as a single unit with regard to their function.

**V****VLF cable testing with parallel PD test**

This method combines the statements of a PD test and VLF cable testing.

While the cable test shows whether a cable can withstand a load (e.g.  $2x U_0$ ) over a specified test time, the PD test identifies and locates the PD activities in the cable insulation.

The simultaneous performance of VLF cable testing and the PD test reduces the test time for cables that are in good condition.

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