

## Safety Equipment

## Design of Voltage Detectors

### Voltage Detectors

Voltage detectors according to IEC/EN 61243-1 (DIN VDE 0682 Part 411) are designed to verify safe isolation from supply voltage on all poles at the work location according to EN 50110-1 (DIN VDE 0105 Part 100).

Safe isolation from supply voltage must be verified on all poles at the work location or as close as possible to the work location by electrotechnically skilled or instructed persons only.

Voltage detectors must be tested for correct operation immediately before and after use. Correct operation of voltage detectors without self-testing element must be verified by contacting a part of the installation connected to operating voltage.

Verifying safe isolation from supply voltage using a voltage detector is considered live working.

Voltage detectors may only be used for the nominal voltages / nominal voltage ranges as indicated on the rating plate. The user may be at risk if they are used for voltages other than indicated on the rating plate (incorrect indication, electric shock, arcing).

Voltage detectors labelled with "For indoor use only" may only be used in indoor installations.

Voltage detectors labelled with "For use in wet weather conditions" may be used in all weather conditions (rain, snow, fog and dew).

Voltage detectors according to IEC/EN 61243-1 (DIN VDE 0682 Part 411) are only suitable to a limited extent for use in **factory assembled (type-tested) installations**. If space in installations is confined, flashover may occur when inserting the test prod into the installation. The user of the voltage detector or the operator of the switchgear installation must contact the manufacturer of the type-tested installation to find out whether the voltage detector may be used (please refer to the table on the next page: Application of voltage detectors in type-tested, factory assembled switchgear installations).

### Design of voltage detectors

Voltage detectors according to IEC/EN 61243-1 (DIN VDE 0682 Part 411) are **single-pole** devices designed to make contact with the part of the installation to be tested.

There are two **mechanically different designs** of voltage detectors: Complete and separate voltage detectors.

**Complete** voltage detectors (PHE III, PHE and PHG II) consist of an insulating stick, indicator and test prod and are tested as a complete unit.

**Separate** voltage detectors (PHE III indicator with test prod) must be attached to a suitably rated insulating stick.

Single-pole **voltage detectors** typically consist of a **handle**, **insulating element**, **indicator** and **test prod** with **contact electrode**.

The **insulating element** is the section of a voltage detector between the hand guard and the red ring. It ensures that the user maintains an adequate safety distance for safe operation.

The **test prod** (contact electrode extension) with contact electrode **above the red ring** allows to reach remote parts of the installation and to **eliminate** the influences of **interference fields**.

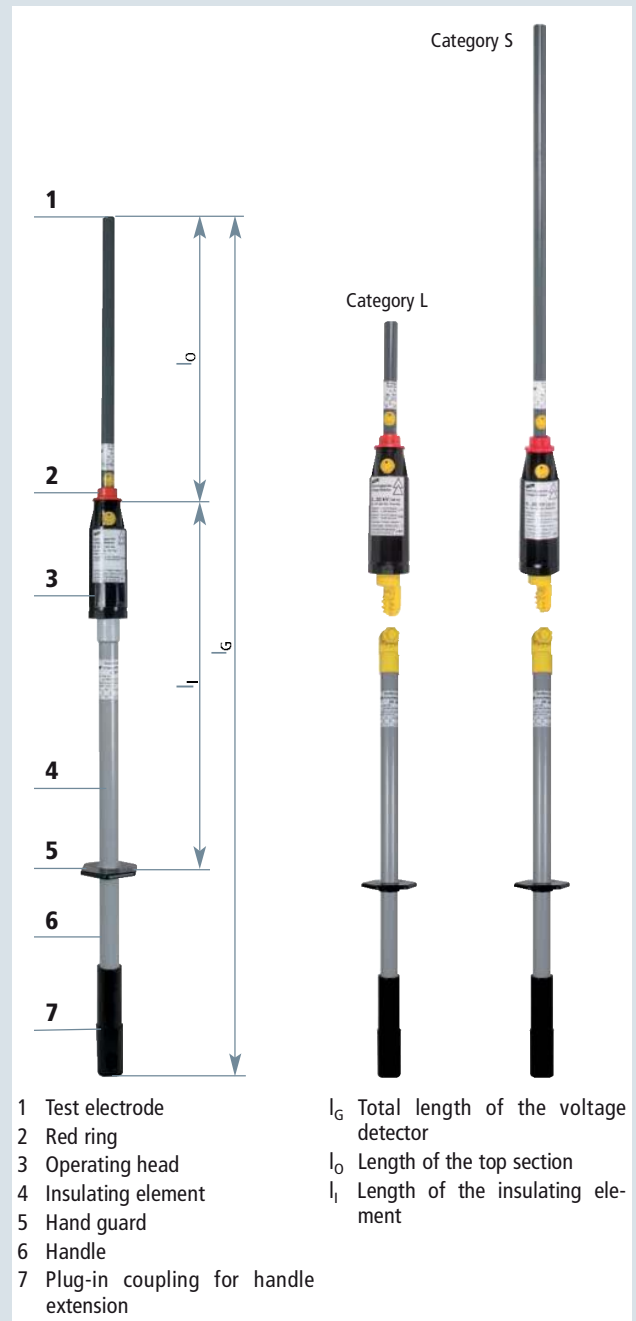
Voltage detectors are classified into two categories based on their behaviour in case of interference fields or their field of application. Voltage detectors of **category "L"** (line) with a short test prod (without contact electrode extension) are designed for use on overhead lines.

Voltage detector of **category "S"** (switchgear) with a long test prod (with contact electrode extension) are resistant to interference fields and are therefore used in switchgear installations. They are also suitable for overhead lines.

The **hand guard** provides a visible barrier between the handle and the insulating element and prevents the user from making contact with the insulating element.

The **red ring** indicates the end of the insulating element in the direction of the test electrode. This provides the user with a visible limit for contact with live parts in the installation. The **insulating element** between the red ring and the hand guard must not contact live parts, however, it may contact earthed parts.

The **test electrode** is the part of the voltage detector that is used to make contact with the part of the installation to be tested.



## Application of Voltage Detectors

Safety Equipment

### in type-tested, factory assembled switchgear installations

Voltage Detectors

Tests carried out in cooperation with switchgear manufacturers have proven the suitability of PHE, PHE III and PHG II voltage detectors (Category "S") for use in factory assembled switchgear installations

(e.g. in accordance with EN/IEC 62271-200 (DIN VDE 0670 or DIN VDE 0671 Part 200)).







Switchgear manufacturer	Type	Nominal voltages U <sub>N</sub>	Suitable voltage detectors
ABB	BA/BB systems, BAX systems, BD systems BC systems	10 ... 30 kV	PHE, PHE III and PHG II  PHE, PHE III and PHG II
ABB Calor Emag	ZE3/4, ZE7/8, ZK4/5, ZK8 L7.6, ZS1, ZS8 ZW1 Isopond	10 ... 30 kV  10 kV	PHE, PHE III and PHG II PHE and PHE III PHE, PHE III with test probe, Part No. 766 916
AREVA T&D			
AEG	GS, GSD, GSH, H, K, L	10 ... 20 kV	PHE, PHE III and PHG II
Concordia	PI, PIC, PID, PN 300, PN 500, PN 600,	10 ... 30 kV	PHE, PHE III and PHG II
Sprecher + Schuh	PU, PUADC, PUB, PUD, PUDC, SC, SCC, SCD, SCDC, RMB <sup>1)</sup>		
Sachsenwerk	A (HA, MA, SM), FK (A, B, C, E, F), PIX, R (D <sup>1)</sup> , L, LI, M <sup>1)</sup> , MI <sup>1)</sup> , W (AK, BA, BB, BD, DS), WK (A, B, C, D, E, F, M, T), WZ (K, R, RV)	6 ... 30 kV	PHE, PHE III and PHG II
Starkstromanlagen Dresden	D, WKC-D	10 kV	PHE, PHE III and PHG II
VEB Otto Buchwitz	BSIG, CSIM	20 kV	PHE, PHE III and PHG II
BELUK	BET2308, BET231, BK219, BK216, BMB2, BRS; Compact load-break switchgear installations	20 kV	PHE, PHE III and PHG II  PHE, PHE III
Driescher Moosburg	W12, W24, W36, WEL, F24 E2K, E3K, D12, D24; Compact load-break switchgear installations	12 ... 36 kV 12 ... 24 kV	PHE, PHE III und PHG II PHE, PHE III with great insertion depth (e.g. Part No. 767 731)
Driescher Wegberg	Mipak, Minor, Minex, RKL, ZLDT, TSL, TSLG, FL, SK400, BS600, HS24, LDTC	10 ... 20 kV	PHE, PHE III and PHG II or PHE III with test prod, Part No. 767 767 for type Mipak
Eaton Holec	HC, Unitole Magnefix MMS, SVS, Xiria	3 ... 24 kV 3 ... 15 kV 3 ... 24 kV	PHE and PHE III with electrode, Part No. 766 927 PHE and PHE III with electrode, Part No. 766 915 PHE and PHE III with electrode, Part No. 766 913 or 766 925
Eimers	EKS 10 N, ES 20 N, ES 10 N, EMS 12.190	10 ... 20 kV	PHE, PHE III and PHG II
ORMAZABAL (F & G)	HGKN, EA, MA, KE, EF, WA, K-HGK	10 ... 20 kV	PHE, PHE III and PHG II
Pfisterer	MAG	10 kV	PHE with test prod P2/10
Klöpffer	KMG	10 ... 20 kV	PHE, PHE III and PHG II
Krone	KH10, KHS10d, KHS10dp, KHS17I, KHS17II, KHS20, KHS30 KES10	10 ... 30 kV	PHE, PHE III and PHG II  PHE, PHE III with test probe, Part No. 766 916
Miebach	AS, HUK, TE, TSE, DSS, ASR	10 ... 20 kV	PHE, PHE III and PHG II
NATUS	NES, NESCON, NFwZ	3 ... 20 kV	PHE, PHE III and PHG II
Ritter	GT1, GT3	6 ... 30 kV	PHE, PHE III and PHG II
Senteg	AMS12	3 ... 10 kV	PHE, PHE III and PHG II
Siemens	8 BD, 8 CK	6 ... 30 kV	PHE, PHE III with modified contact electrode (on request)
The circuit breaker must be tripped before testing systems containing a circuit breaker	8 BK 20, 8 BJ 20, 8 BK 30, 8 AA 10	6 ... 20 kV	PHE, PHE III and PHG II
Wickmann	DZ switchgear cabinet	20 kV	PHE, PHE III and PHG II
Ziegler	AZ cells	10 ... 20 kV	PHE, PHE III and PHG II

<sup>1)</sup> Switchgear panels with integrated division into busbar or cable compartments require special guide adapters for the fixed isolating contacts.

## Safety Equipment

## Selection Guide

## Voltage Detectors

Device	Nominal Voltage $U_N$ / Frequency $f_N$	Application, Indication	Page	
PHE III and PHE III indicator with test prod	3 / 6 / 10 / 20 / 30 kV / 50 Hz 3...10 / 6...20 / 10...30 kV / 50 Hz 3...10 / 10...30 kV / 50 Hz, switchable 6...20 / 10...30 kV / 50 Hz, test set	For use in wet weather conditions For indoor and outdoor installations With self-testing element Visual and acoustic indicator	12 16	
PHE III (Kit)	20 kV / 50 Hz 60...110 und 60...132 kV / 50 Hz	Easy transport Fast battery replacement without additional tools	18	
PHE	3 / 6 / 10 / 20 / 30 kV / 50 Hz 3...10 / 6...20 / 15...30 kV / 50 Hz 3...10 / 6...20 / 15...30 kV / 50 Hz switchable	For use in wet weather conditions For indoor and outdoor installations With self-testing element Visual indicator Easy transport	24	
ASP	110...420 kV / 50 Hz	For use in wet weather conditions Non-contact voltage detector	26	
HSA 205	1...30 / 30...220 / 110...420 kV	For overhead lines and outdoor switching stations With self-testing element Visual and acoustic indicator		
PHG II	6 / 10 / 20 kV / 50 Hz	For indoor installations only Three LED indicator lights LEDs staggered at 120° allow for better visibility of the indication Passive voltage detector without batteries	28	
PHE/G	1...24 kV / d.c. voltage	For use in wet weather conditions For indoor and outdoor installations With self-testing element Visual indicator Easy transport Two-pole unit (one stick/two sticks)	29	
Storage Bags and Transport Cases		Sheet metal or plastic case Artificial leather or canvas bag	187	

## Maintenance tests

According to German regulations (BGV A3), voltage detectors have to be tested for compliance with the prescribed limits as stated in the Electrical Safety Rules. This test is performed in the high voltage test laboratory of DEHN + SÖHNE and includes

- measurement of the leakage current,
- test for clear indication,
- test for protection against bridging,
- visual inspection, manual tests and measurements.

This maintenance test is documented in a test report and on the device.

The test intervals depend on the operating conditions of the voltage detector, e.g. frequency of use, environmental conditions and transport. According to German regulations, however, it is advisable to carry out a maintenance test **at least every 6 years**.



## PHE III M12 Voltage Detector

Safety Equipment

Nominal voltages up to 30 kV / 50 Hz

Voltage Detectors



Safe verification of isolation from supply voltage

- Reliable indication
- Easy to use
- Cost-effective/space-saving transport



PHE III voltage detector with visual and acoustic indicator used for an indoor switchgear installation

### General Information:

Standard	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Complete
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations
Indication	Visual and acoustic
Self-testing element	Yes
Material (test electrode)	Copper alloy/gal Sn
Material (test prod)	Glass-fibre reinforced epoxy resin tube
Material (indicator)	Plastic, fully insulated
Material (insulating stick)	Glass-fibre reinforced polyester tube



Testing with integrated electrode



Testing with screwed-on V-shaped electrode



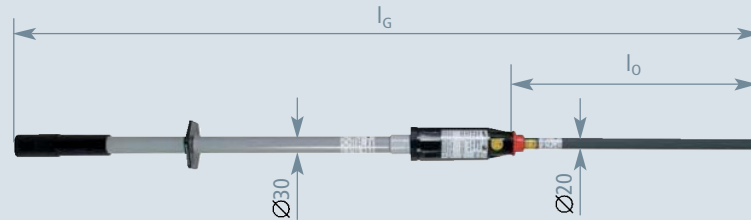
Plugging a HV STK extension handle into an IS PHE STK insulating stick

## Safety Equipment

## Voltage Detectors

## PHE III M12 Voltage Detector

Nominal Voltages up to 30 kV / 50 Hz



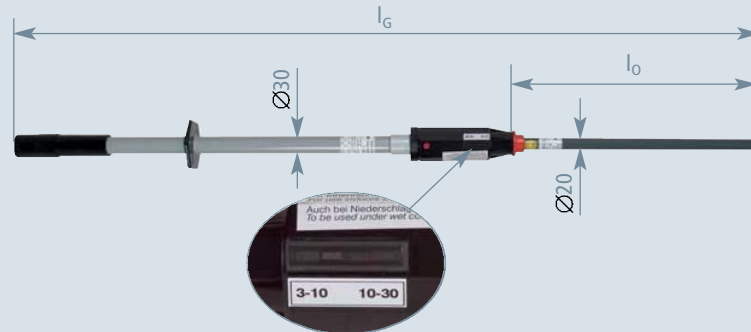
Category "S"

Type	PHE3 3 S	PHE3 6 S	PHE3 10 S	PHE3 20 S	PHE3 30 S
Part No.	767 703	767 706	767 710	767 720	767 730
Nominal voltage (U <sub>N</sub> )	3 kV	6 kV	10 kV	20 kV	30 kV
Total length (l <sub>G</sub> )	1080 mm	1080 mm	1080 mm	1230 mm	1415 mm
Insertion depth (l <sub>0</sub> )	285 mm	285 mm	285 mm	435 mm	620 mm

Type	PHE3 3 10 S	PHE3 6 20 S	PHE3 10 30 S
Part No.	767 711	767 721	767 731
Nominal voltage (U <sub>N</sub> )	3 ... 10 kV	6 ... 20 kV	10 ... 30 kV
Total length (l <sub>G</sub> )	1415 mm	1575 mm	1675 mm
Insertion depth (l <sub>0</sub> )	620 mm	780 mm	880 mm

## Nominal Voltage Ranges up to 30 kV / 50 Hz, switchable

The nominal voltage selector switch allows to switch between two nominal voltage ranges. For safety reasons, the voltage detector can only be switched on if the selector switch is switched to the most sensitive range of 3 kV to 10 kV. The switch snaps into the relevant position, thus providing protection against inadvertent switching. A magnetically operated, wear-resistant reed switch changes the switching position.

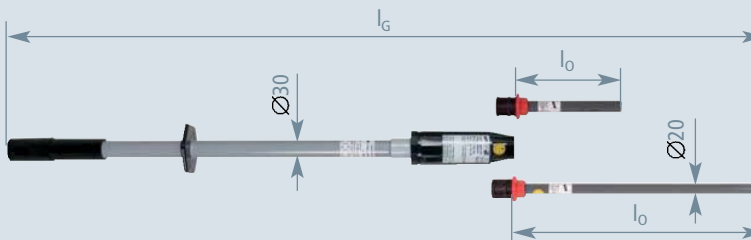


Category "S"

Type	PHE3 U 3 30 S
Part No.	767 733
Nominal voltage (U <sub>N</sub> )	3 ... 10 / 10 ... 30 kV
Total length (l <sub>G</sub> )	1675 mm
Insertion depth (l <sub>0</sub> )	880 mm

## Nominal Voltage Ranges up to 30 kV / 50 Hz, Test Set

The test set includes two test prods of different lengths which are labelled "S" (long test prod) and "L" (short test prod) on the rating plate.



Category "S" and "L"

Type	PHE3 6 20 SL	PHE3 10 30 SL
Part No.	767 740	767 750
Nominal voltage (U <sub>N</sub> )	6 ... 20 kV	10 ... 30 kV
Total length (l <sub>G</sub> )	1575 / 990 mm	1675 / 990 mm
Insertion depth (l <sub>0</sub> )	780 / 185 mm	880 / 185 mm

Voltage detectors for other nominal voltages and frequencies are available on request.



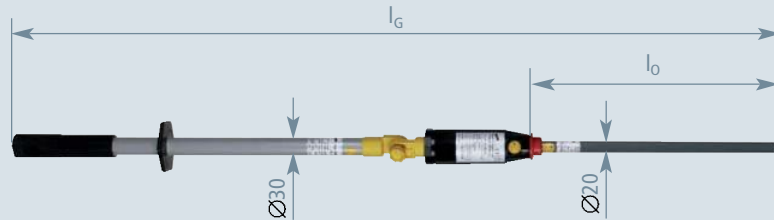


## Safety Equipment

## PHE III ZK Voltage Detector

## Voltage Detectors

Nominal Voltages up to 30 kV / 50 Hz



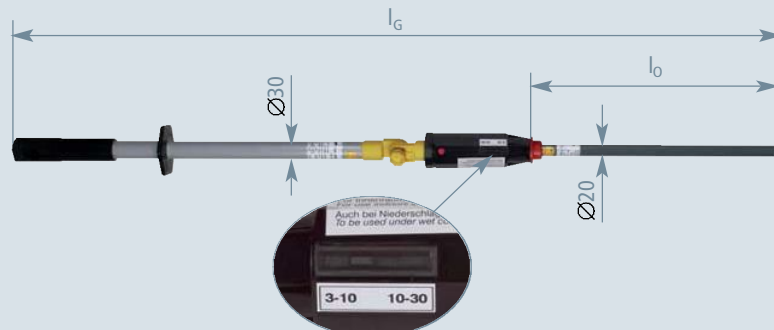
Category "S"

Type	PHE3 3 S ZK	PHE3 6 S ZK	PHE3 10 S ZK	PHE3 20 S ZK	PHE3 30 S ZK
Part No.	767 903	767 906	767 910	767 920	767 930
Nominal voltage (U <sub>N</sub> )	3 kV	6 kV	10 kV	20 kV	30 kV
Total length (l <sub>G</sub> )	1150 mm	1150 mm	1150 mm	1300 mm	1485 mm
Insertion depth (l <sub>O</sub> )	285 mm	285 mm	285 mm	435 mm	620 mm

Type	PHE3 3 10 S ZK	PHE3 6 20 S ZK	PHE3 10 30 S ZK
Part No.	767 941	767 951	767 961
Nominal voltage (U <sub>N</sub> )	3 ... 10 kV	6 ... 20 kV	10 ... 30 kV
Total length (l <sub>G</sub> )	1485 mm	1645 mm	1745 mm
Insertion depth (l <sub>O</sub> )	620 mm	780 mm	880 mm

## Nominal Voltage Ranges up to 30 kV / 50 Hz, switchable

The nominal voltage selector switch allows to switch between two nominal voltage ranges. For safety reasons, the voltage detector can only be switched on if the selector switch is switched to the most sensitive range of 3 kV to 10 kV. The switch snaps into the relevant position and provides protection against inadvertent switching. A magnetically operated, wear-resistant reed switch changes the switching position.

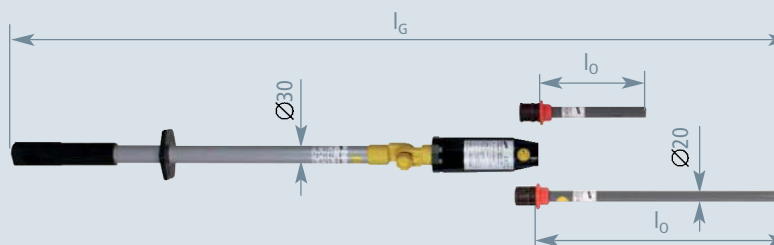


Category "S"

Type	PHE3 U 3 30 S ZK
Part No.	767 960
Nominal voltage (U <sub>N</sub> )	3 ... 10 / 10 ... 30 kV
Total length (l <sub>G</sub> )	1745 mm
Insertion depth (l <sub>O</sub> )	880 mm

## Nominal Voltage Ranges up to 30 kV / 50 Hz, Test Set

The test set includes two test prods of different lengths which are marked "S" (long test prod) and "L" (short test prod) on the rating plate.



Category "S" and "L"

Type	PHE3 6 20 SL ZK	PHE3 10 30 SL ZK
Part No.	767 940	767 950
Nominal voltage (U <sub>N</sub> )	6 ... 20 kV	10 ... 30 kV
Total length (l <sub>G</sub> )	1650 / 1050 mm	1750 / 1050 mm
Insertion depth (l <sub>O</sub> )	780 / 185 mm	880 / 185 mm

Voltage detectors for other nominal voltages and frequencies are available on request.

## PHE III ZK Indicator with Test Prod

Safety Equipment

Nominal voltages up to 30 kV / 50 Hz

Voltage Detectors



PHE III indicator with test prod, universal gear coupling and insulating stick

Safe verification of isolation from supply voltage

- Reliable indication with standby function
- Easy to use
- Cost-effective/space-saving transport



### General Information:

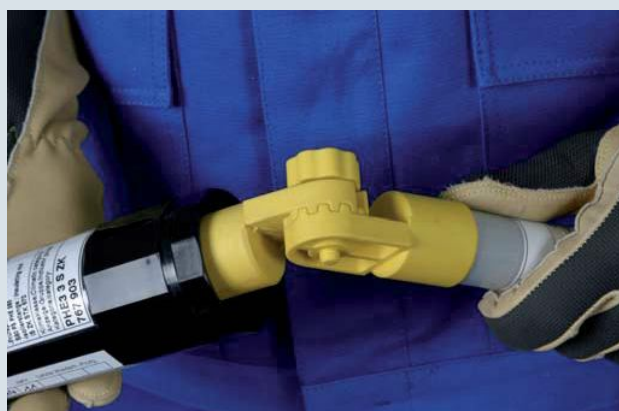
Standard (indicator with test prod)	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Standard (universal gear coupling)	EN/IEC 60832 (DIN VDE 0682 Part 211)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Separate
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations
Indication	Visual and acoustic
Self-testing element	Yes
Material (test electrode)	Copper alloy/gal Sn
Material (test prod)	Glass-fibre reinforced epoxy resin tube
Material (indicator)	Plastic, fully insulated

### Standby function

The PHE III indicator with test prod has a standby function that automatically activates the device as soon as contact with energised equipment is made (without previous self-test) and visually and acoustically indicates "voltage present". When making contact with de-energised equipment, the indicator is not activated.

### Attention

The PHE III indicator with test prod may only be used in combination with a suitably rated insulating stick from the same equipment range.



Universal gear coupling allows to adjust the angle of the voltage detector



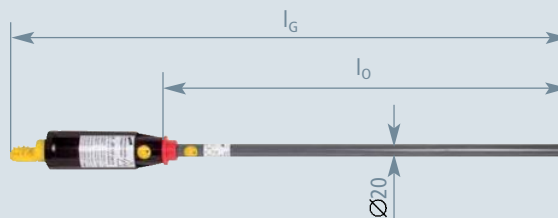
## Safety Equipment

## PHE III ZK Indicator with Test Prod

## Voltage Detectors

Nominal Voltage Ranges up to 30 kV / 50 Hz, Category "S"

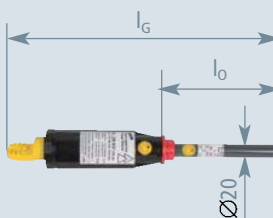
Category "S"



Type	PHE3 PK6 20 S SB ZK	PHE3 PK10 30 S SB ZK
Part No.	767 921	767 931
Nominal voltage ( $U_N$ )	6 ... 20 kV	10 ... 30 kV
Total length ( $l_G$ )	1010 mm	1110 mm
Insertion depth ( $l_o$ )	780 mm	880 mm

Nominal Voltage Ranges up to 30 kV / 50 Hz, Category "L"

Category "L"



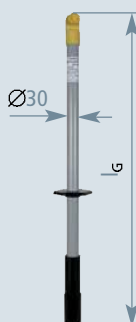
Type	PHE3 PK6 20 L SB ZK	PHE3 PK10 30 L SB ZK
Part No.	767 922	767 932
Nominal voltage ( $U_N$ )	6 ... 20 kV	10 ... 30 kV
Total length ( $l_G$ )	415 mm	415 mm
Insertion depth ( $l_o$ )	185 mm	185 mm

Voltage detectors for other nominal voltages and frequencies as well as indicators with permanent light and acoustic signal instead of flashing light and intermittent acoustic signal are available on request.

## Accessory for PHE III ZK Indicator with Test Prod

## Insulating Stick with universal Gear Coupling

Type	IS ZK STK 670
Part No.	766 368
Nominal voltage ( $U_N$ )	Up to 36 kV
Total length ( $l_G$ )	670 mm
Material	Glass-fibre reinforced polyester tube

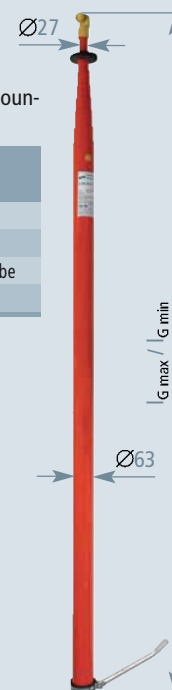


## Accessory for PHE III ZK Indicator with Test Prod

## Telescopic Insulating Stick

With scale for measuring the ground clearance, mounted support included

Type	ISMTN 36 ZK 10600
Part No.	766 037
Nominal voltage ( $U_N$ )	Up to 36 kV
Total length ( $l_{G \max} / l_{G \min}$ )	10,600 / 1750 mm
Material	Glass-fibre reinforced epoxy resin tube
End fitting	Non-slip plastic cap

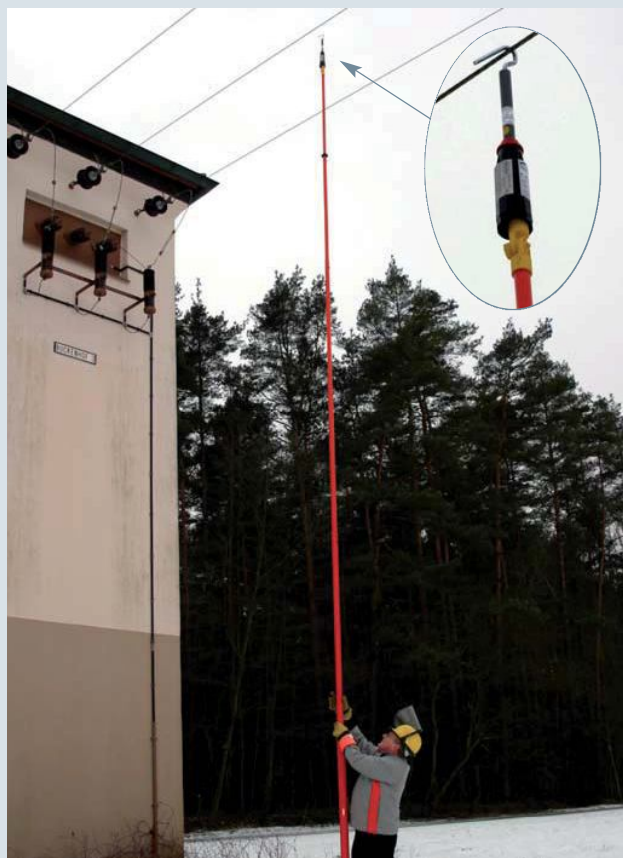


## PHE III ZK Voltage Detector Kit

Safety Equipment

Nominal voltage 20 kV / 50 Hz

Voltage Detectors



PHE III voltage detector with telescopic insulating stick

### Safe verification of isolation from supply voltage

- Reliable indication
- Easy to use
- Multi-purpose kit
- Cost-effective/space-saving transport



#### General Information:

Standard (indicator with test prod)	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Standard (universal gear coupling)	EN/IEC 60832 (DIN VDE 0682 Part 211)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Complete
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations
Type	Telescopic insulating stick (10.6 m)
Indication	Visual and acoustic
Self-testing element	Yes
Material (test electrode)	Copper alloy/gal Sn
Material (test prod)	Glass-fibre reinforced epoxy resin tube
Material (indicator)	Plastic, fully insulated
Material (insulating stick)	Glass-fibre reinforced polyester tube
Material (telescopic insulating stick)	Glass-fibre reinforced epoxy resin tube
End fitting (insulating stick)	Plug-in coupling for extending the handle
End fitting (telescopic insulating stick)	Non-slip plastic cap

#### Kit includes:

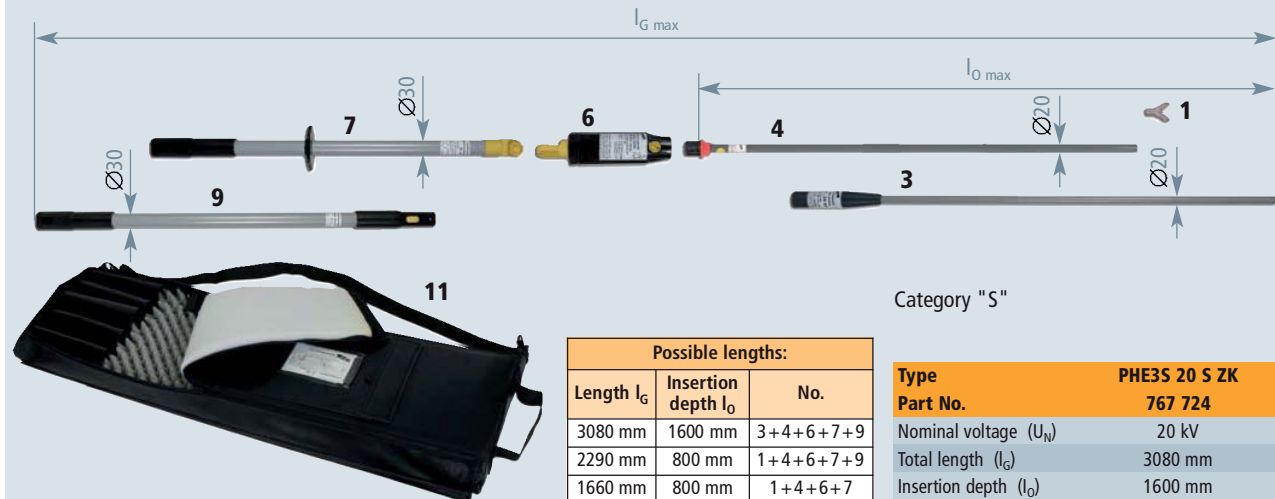
Pos. No.	Part No.	Pos. No.	Part No.
<b>1</b>	766 927	<b>8</b>	766 037
<b>2</b>	766 923	<b>9</b>	766 335
<b>3</b>	766 960	<b>10</b>	766 049
<b>4</b>	767 763	<b>11</b>	767 996
<b>5</b>	767 766	<b>12</b>	766 036
<b>6</b>	767 722	<b>13</b>	766 039
<b>7</b>	766 368		
For more detailed information on these products, see Accessory chapter			

## Safety Equipment

## Voltage Detectors

## PHE III ZK Voltage Detector Kit

Nominal Voltage 20 kV / 50 Hz, Category "S"



Nominal Voltage 20 kV / 50 Hz, Category "L"



Voltage detectors for other nominal voltages and frequencies as well as indicators with permanent light and acoustic signal instead of flashing light and intermittent acoustic signal are available on request.

**PHE III M12 / ZK Voltage Detector Kit**

Safety Equipment

Nominal voltage 10 ... 132 kV / 50 Hz

Voltage Detectors



PHE III voltage detector used on a 110 kV outdoor station

**General Information:**

Standard	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Complete
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations
Indication	Visual and acoustic
Self-testing element	Yes
Material (test electrode)	Copper alloy/gal Sn
Material (test prod)	Glass-fibre reinforced epoxy resin tube
Material (indicator)	Plastic, fully insulated
Material (insulating stick)	Glass-fibre reinforced polyester tube

**Safe verification of isolation from supply voltage**

- Reliable indication
- Easy to use
- Multi-purpose kit
- Cost-effective/space-saving transport

**Kit includes:**

Pos. No.	Part No.	Pos. No.	Part No.
<b>1</b>	766 924	<b>13</b>	767 965
<b>2</b>	766 923	<b>14</b>	766 352
<b>3</b>	767 771	<b>15</b>	766 359
<b>4</b>	767 772	<b>16</b>	766 358
<b>5</b>	767 764	<b>17</b>	766 114
<b>6</b>	767 972	<b>18</b>	766 115
<b>7</b>	767 974	<b>19</b>	766 128
<b>8</b>	767 734	<b>20</b>	766 120
<b>9</b>	767 726	<b>21</b>	766 889
<b>10</b>	767 732	<b>22</b>	766 996
<b>11</b>	767 735	<b>23</b>	766 998
<b>12</b>	767 963		

For more detailed information on these products,  
see Accessory chapter

## Safety Equipment

## PHE III M12 / ZK Voltage Detector Kit

## Voltage Detectors

Nominal Voltage Range 30 ... 60 kV / 50 Hz, Category "S"

Category "S"

Kit includes:		
Type	Part No.	No.
PHE3 30 60 S	767 971	1+3+6+17+20+21
KLT 133 34 10	766 996	22

Type	PHE3S 30 60 S
Part No.	767 970
Nominal voltage ( $U_N$ )	30 ... 60 kV
Total length ( $l_G$ )	2530 mm
Insertion depth ( $l_O$ )	880 mm

Nominal Voltage Range 30 ... 60 kV / 50 Hz, Category "L"

Category "L"

Kit includes:		
Type	Part No.	No.
PHE3 30 60 L	767 973	2+4+7+17+20+21
KLT 133 34 10	766 996	22

Type	PHE3S 30 60 L
Part No.	767 975
Nominal voltage ( $U_N$ )	30 ... 60 kV
Total length ( $l_G$ )	2030 mm
Insertion depth ( $l_O$ )	380 mm

Nominal Voltage Range 60 ... 110 kV / 50 Hz, Category "S"

Category "S"

Kit includes:		
Type	Part No.	No.
PHE3 60 110 S	767 990	1+3+8+18+20+21
KKL PHE3 60 110	766 998	23

Type	PHE3S2 60 110 S
Part No.	767 980
Nominal voltage ( $U_N$ )	60 ... 110 kV
Total length ( $l_G$ )	2980 mm
Insertion depth ( $l_O$ )	880 mm

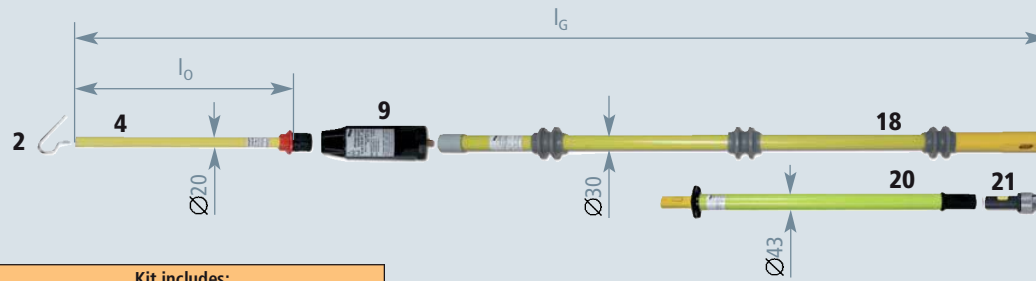


**PHE III M12 / ZK Voltage Detector Kit**

Safety Equipment

Nominal Voltage Range 60 ... 110 kV / 50 Hz, Category "L"

Voltage Detectors

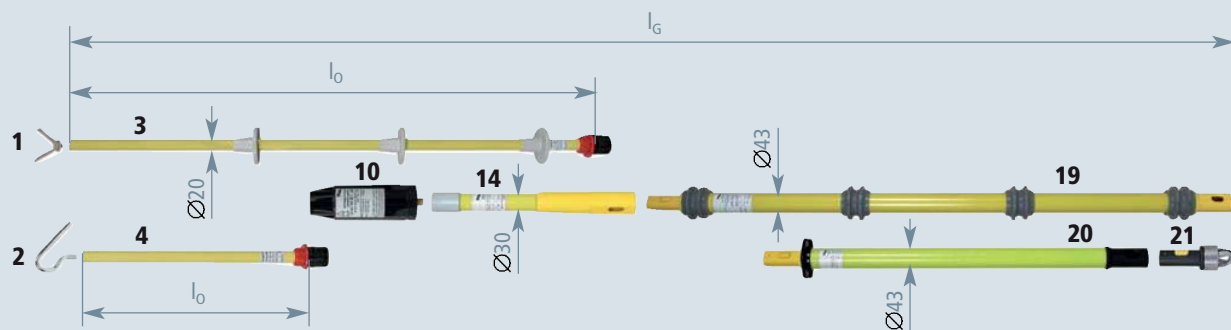


Kit includes:		
Type	Part No.	No.
PHE3 60 110 L	767 991	2+4+9+18+20+21
KKL PHE3 60 110	766 998	23

Category "L"



Type	PHE3S2 60 110 L
Part No.	767 981
Nominal voltage ( $U_N$ )	60 ... 110 kV
Total length ( $l_G$ )	2540 mm
Insertion depth ( $l_0$ )	380 mm

**Nominal Voltage Range 60 ... 132 kV / 50 Hz, Category "S / L"**

Kit includes:		
Type	Part No.	No.
PHE3 60 132 SL	767 992	1+3+2+4+10+14+19+20+21
KLT 133 34 10	766 996	22

The test set includes two test prods of different lengths which are labelled "S" (long test prod) and "L" (short test prod) on the rating plate.

Category "S" and "L"



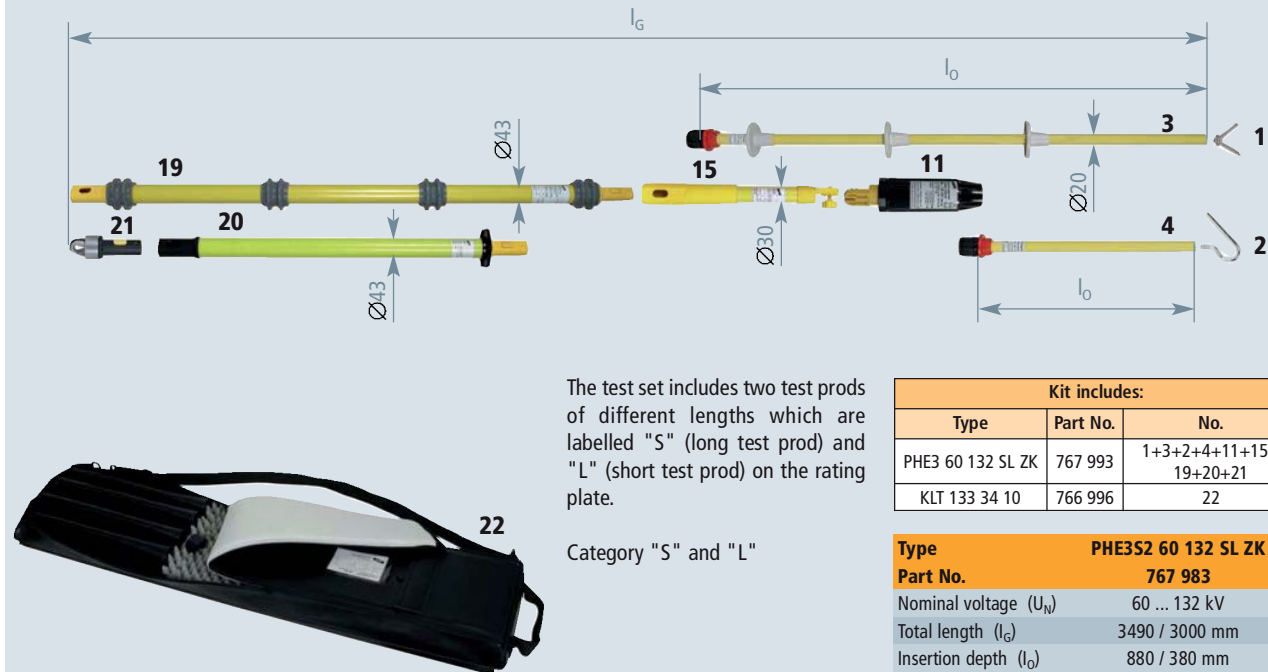
Type	PHE3S2 60 132 SL
Part No.	767 982
Nominal voltage ( $U_N$ )	60 ... 132 kV
Total length ( $l_G$ )	3440 / 2950 mm
Insertion depth ( $l_0$ )	880 / 380 mm

## Safety Equipment

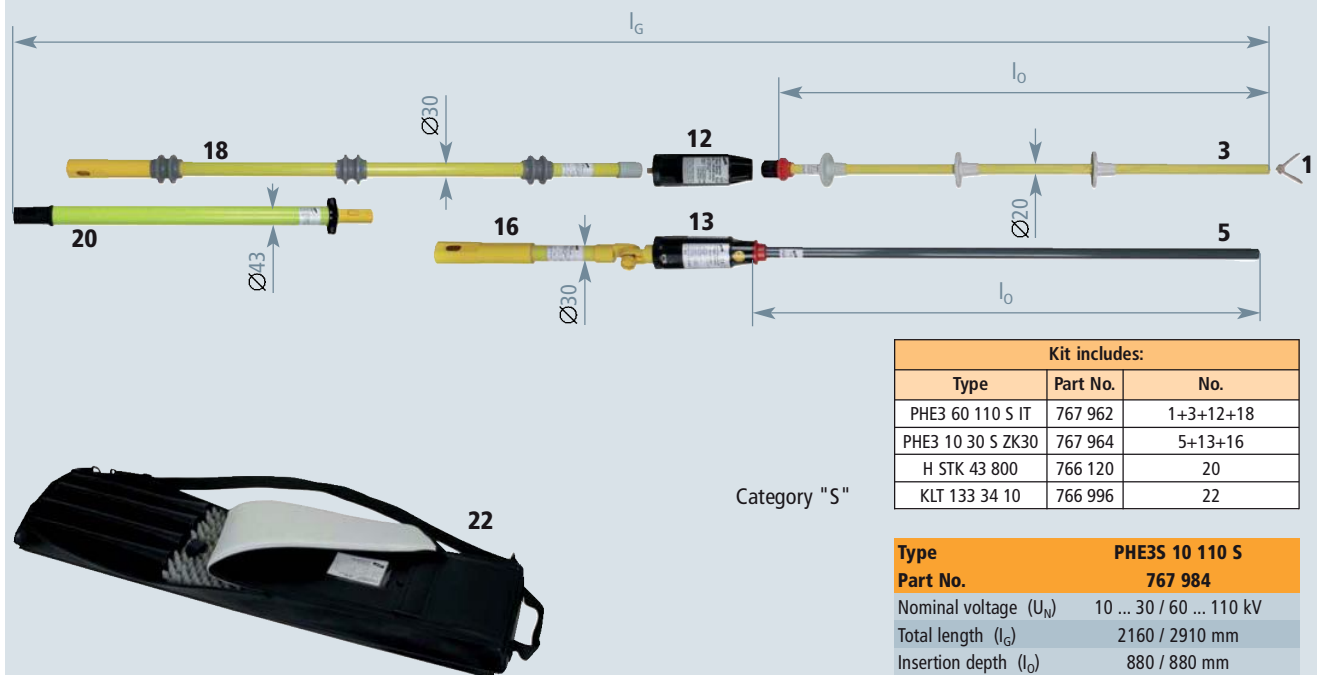
## PHE III M12 / ZK Voltage Detector Kit

## Voltage Detectors

Nominal Voltage Range 60 ... 132 kV / 50 Hz with Gear Coupling, Category "S / L"



Nominal Voltage Range 10 ... 30 kV / 50 Hz and 60 ... 110 kV / 50 Hz, Category "S"



Voltage detectors for other nominal voltages and frequencies as well as indicators with permanent light and continuous acoustic signal instead of flashing light and intermittent acoustic signal are available on request.

## PHE Voltage Detector

Safety Equipment

Nominal voltages up to 30 kV / 50 Hz

Voltage Detectors



PHE voltage detector with visual indication

Easy and safe testing

- Reliable indication
- Easy to use



### General Information:

Standard	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Complete
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations
Indication	Visual
Self-testing element	Yes
Material (test electrode)	Copper alloy/gal Sn
Material (test prod)	Glass-fibre reinforced epoxy resin tube
Material (indicator)	Plastic, fully insulated
Material (insulating stick)	Glass-fibre reinforced polyester tube



Before testing the installation for safe isolation from supply voltage, the voltage detector must be tested for correct operation. When pressing the "TEST" button, the red indicator light flashes.



As soon as the button is released, the green indicator light lights up. The test for correct operation was successful and the voltage detector is operational.

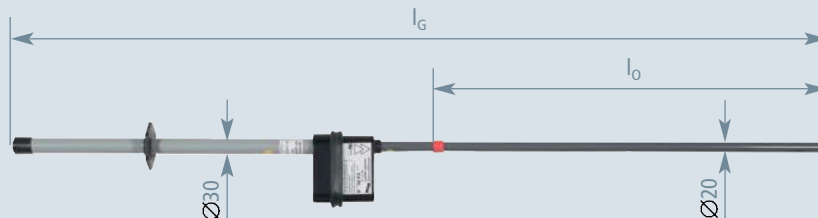
## Safety Equipment

## PHE Voltage Detector

## Voltage Detectors

Nominal Voltages up to 30 kV / 50 Hz

Category "S"



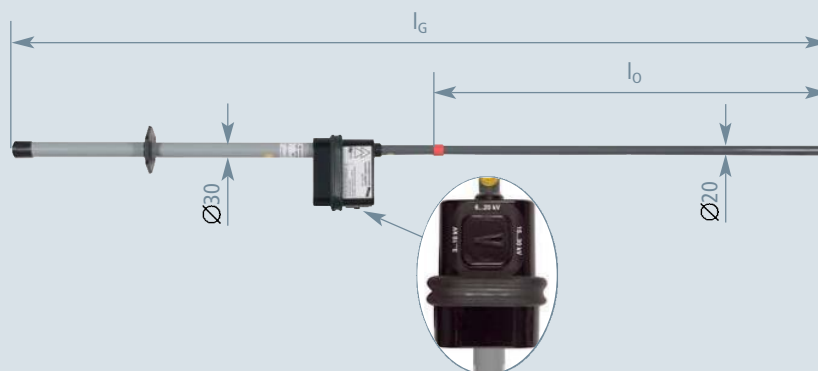
Type	PHE 3 S	PHE 6 S	PHE 10 S	PHE 20 S	PHE 30 S
Part No.	767 403	767 406	767 418	767 428	767 438
Nominal voltage (U <sub>N</sub> )	3 kV	6 kV	10 kV	20 kV	30 kV
Total length (l <sub>G</sub> )	1115 mm	1115 mm	1115 mm	1300 mm	1460 mm
Insertion depth (l <sub>0</sub> )	320 mm	320 mm	320 mm	505 mm	670 mm

Type	PHE 3 10 S	PHE 6 20 S	PHE 15 30 S
Part No.	767 410	767 420	767 430
Nominal voltage (U <sub>N</sub> )	3 ... 10 kV	6 ... 20 kV	15 ... 30 kV
Total length (l <sub>G</sub> )	1375 mm	1565 mm	1565 mm
Insertion depth (l <sub>0</sub> )	580 mm	770 mm	770 mm

## Nominal Voltage Ranges up to 30 kV / 50 Hz, switchable

The nominal voltage selector switch allows to switch between three voltage ranges. For safety reasons, the voltage detector can only be switched on if the selector switch is switched to the most sensitive range of 3 kV to 10 kV. The switch snaps into the relevant position and provides protection against inadvertent switching. A magnetically operated, wear-resistant reed switch changes the switching position.

Kategorie "S"



Type	PHE U 3 30 S
Part No.	767 433
Nominal voltage (U <sub>N</sub> )	3 ... 10 / 6 ... 20 / 15 ... 30 kV
Total length (l <sub>G</sub> )	1565 mm
Insertion depth (l <sub>0</sub> )	770 mm

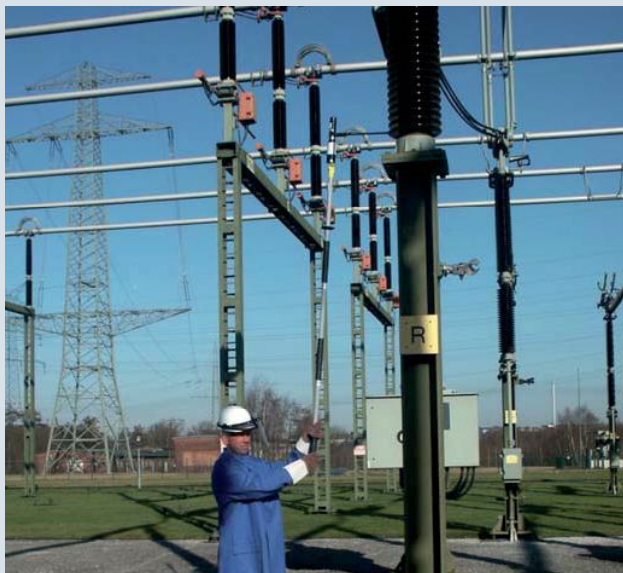
Voltage detectors for other nominal voltages and frequencies are available on request.

## ASP Non-Contact Voltage Detector

Nominal voltage range 110 ... 420 kV / 50 Hz

Safety Equipment

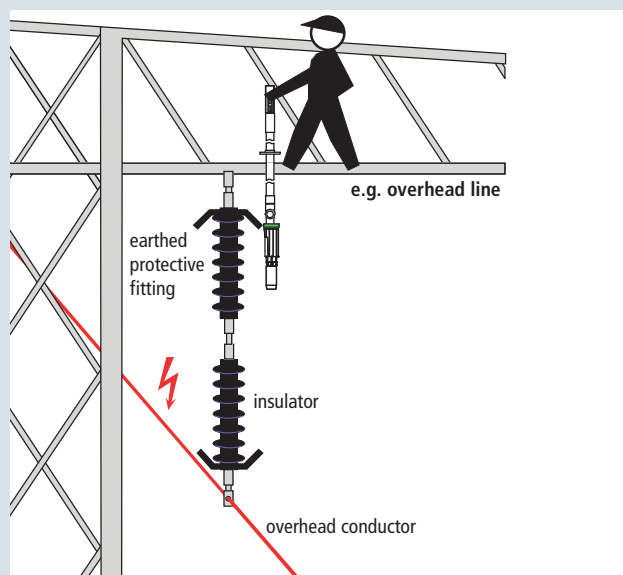
Voltage Detectors



ASP non-contact voltage detector used in an outdoor switching station

### General Information:

Temperature range	– 25 °C ... + 55 °C
Use	Suitable for use in wet weather conditions
For	Overhead lines and outdoor switching stations
Indication	Visual and acoustic
Self-testing element	Yes
Design	With universal gear coupling for adjusting the angle of the indicator with test prod
Material (indicator)	Plastic, fully insulated (black)
Material (electric field sensor)	Plastic (black)
Material (insulating stick)	Glass-fibre reinforced polyester tube



### Use for overhead lines

The green ring on the ASP non-contact voltage detector with category "L" electric field sensor is used to make contact with the last earthed protective fitting in such a way that the electric field sensor points in the direction of the overhead conductor fixed at the other end of the insulator.

### Easy and safe testing

- Easy-to-use due to compact design
- Cost-effective/space-saving transport



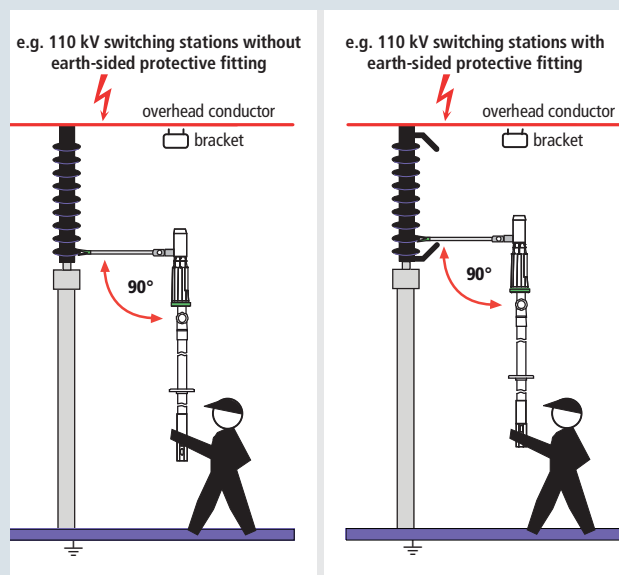
### Kit includes:

Pos. No.	Part No.	Pos. No.	Part No.
1	767 576	5	767 593
2	767 577	6	766 369
3	767 591	7	767 574
4	767 592	8	767 996

For more detailed information on these products, see Accessory chapter

### Category "S" and "L"

Devices of category "S" may only be used in outdoor switching stations, devices of category "L" for overhead lines only. Devices of category "S" / "L" may be used both for outdoor switching stations and overhead lines.



### Use in outdoor switching stations

The green marking on the arm of the ASP non-contact voltage detector with category "S" electric field sensor is used to make contact with the lowest insulator plate at a right angle. If a protective fitting is located on the earth side, contact is made at the next possible insulator plate above the protective fitting.

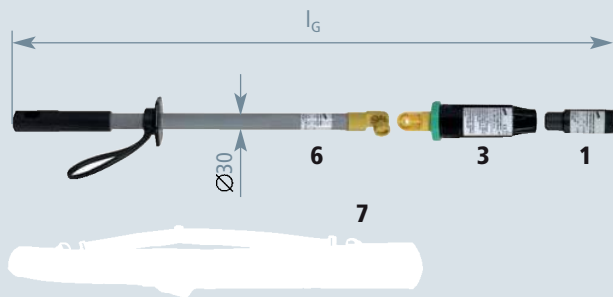


## Safety Equipment

## ASP Non-Contact Voltage Detector

## Voltage Detectors

## ASP Non-Contact Voltage Detector Kit, Category "L"

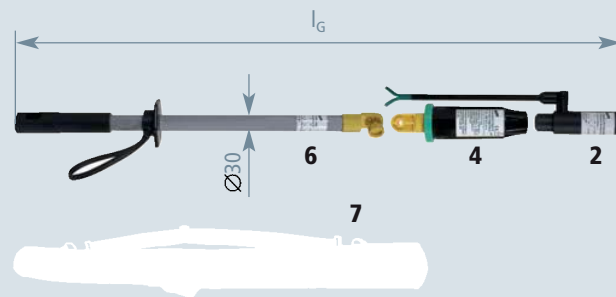


For overhead lines in accordance  
with E DIN VDE 0682-417  
Category "L"

Kit includes:		
Type	Part No.	No.
ASP 110 420 L	767 581	1+3+6
KLT 104 9	767 574	7

Type	ASP 110 420 L
Part No.	767 571
Nominal voltage ( $U_N$ )	110 ... 420 kV
Total length ( $l_G$ )	960 mm

## ASP Non-Contact Voltage Detector Kit, Category "S"



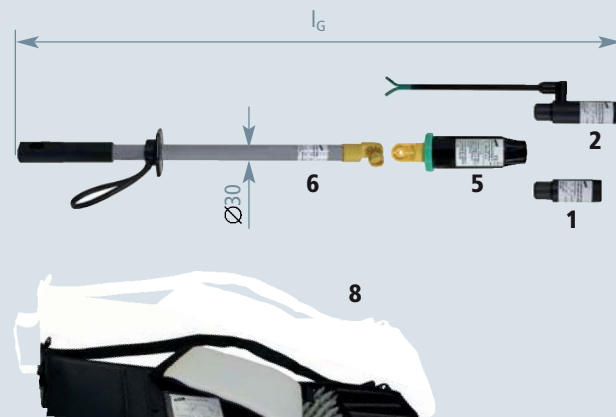
For outdoor switching stations  
Category "S"

Kit includes:		
Type	Part No.	No.
ASP 110 420 S	767 582	2+4+6
KLT 104 9	767 574	7

Type	ASP 110 420 S
Part No.	767 572
Nominal voltage ( $U_N$ )	110 ... 420 kV
Total length ( $l_G$ )	1000 mm

## ASP Non-Contact Voltage Detector

## ASP Non-Contact Voltage Detector Kit, Category "S / L"



For overhead lines and outdoor  
switching stations  
Category "L" and "S"

Kit includes:		
Type	Part No.	No.
ASP 110 420 S L	767 583	1+2+5+6
KLT 101 30 10	767 996	8

Type	ASP 110 420 S L
Part No.	767 573
Nominal voltage ( $U_N$ )	110 ... 420 kV
Total length ( $l_G$ )	1000 mm

*Voltage detectors for other nominal voltages and frequencies as well as indicators with permanent light and continuous acoustic signal instead of flashing light and intermittent acoustic signal are available on request.*

## HSA 205 High-Voltage Indicator

Safety Equipment

Nominal voltage range 1 ... 420 kV / 50 Hz

Voltage Detectors



HSA 205 non-contact voltage detector with insulating cap used on a switchgear installation

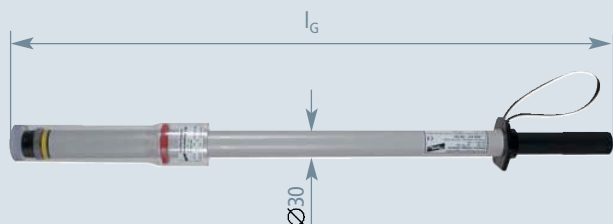
### General Information:

Temperature range	– 25 °C ... + 55 °C, climatic category N
Use	Suitable for use in wet weather conditions
Indication	Visual and acoustic
Self-testing element	Yes
Material (insulating stick)	Glass-fibre reinforced polyester tube

- For contactless verification of safe isolation from supply voltage on switchgear installations and high-voltage overhead lines
- Wide nominal voltage range
- Storage bag included



Minimum distances A according to nominal voltage:		
Selected voltage range	Nominal voltage acc. to DIN VDE 0105 Part 1	Min. safety distance A
Red 1 ... 30 kV	1 up to 6 kV	90 mm indoor installations
	6 up to 10 kV	120 mm indoor installations
	1 up to 10 kV	150 mm outdoor installations
	10 up to 20 kV	220 mm indoor and outdoor installations
	20 up to 30 kV	320 mm indoor and outdoor installations
White 30 ... 220 kV	30 up to 45 kV	480 mm indoor and outdoor installations
	45 up to 60 kV	630 mm indoor and outdoor installations
	60 up to 110 kV	1100 mm indoor and outdoor installations
Yellow 110 ... 420 kV	110 up to 220 kV	2100 mm indoor and outdoor installations
	220 up to 420 kV	2900/3400 mm indoor and outdoor installations

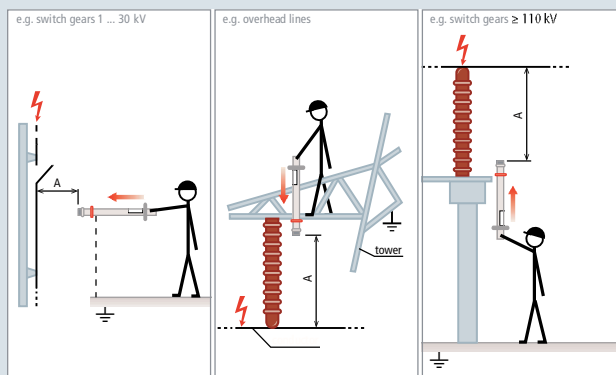


With insulating cap and plug-in coupling as end fitting for extending the handle

Type	HSA205 U 1 420 STK
Part No.	767 552
Nominal voltage range ( $U_N$ )	1 ... 30 / 30 ... 220 / 110 ... 420 V
Frequency	50 Hz
Total length ( $l_G$ )	950 mm

HSA 205 non-contact voltage detectors with Lithium batteries for other nominal voltages and frequencies are available on request.

ATTENTION: These HSA 205 non-contact voltage detectors may not be sold in Germany!



### Application notes

The operating head of HSA 205 non-contact voltage detectors is fitted with a yellow switching ring, which is used to set the required nominal voltage range, either 1 to 30 kV, 30 to 220 kV or 110 to 420 kV.

Provided that the insulating tube and cap of the non-contact voltage detector is in a dry and clean condition, the minimum distance A can be reduced for nominal voltages up to 30 kV.

If these conditions cannot be ensured, the minimum distance A must be maintained!

## Safety Equipment

## Voltage Detectors

## PHG II Voltage Detector

Nominal voltages up to 20 kV / 50 Hz

## Easy and safe testing

- Cost-effective
- Reliable indication



PHG II voltage detector used in a type-tested switchgear installation

## Test for correct operation

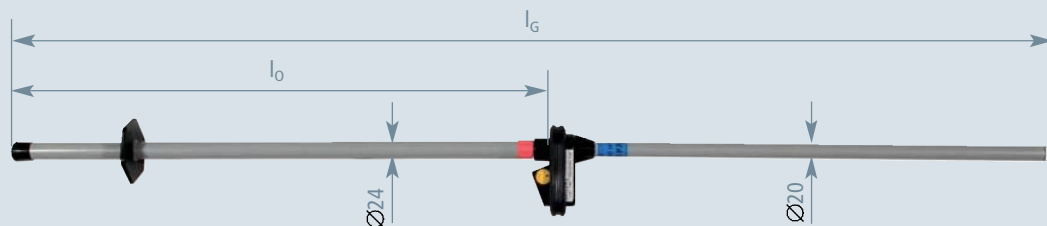
EN 50110-1 (DIN VDE 0105 Part 100) requires that voltage detectors are tested for correct operation directly before and after they are used. Voltage detectors without self-testing element must be tested for correct operation by attaching them to parts of the installation connected to operating voltage.

A fork-shaped electrode is situated on the test prod of the voltage detector.

## General Information:

Standard	EN/IEC 61243-1 (DIN VDE 0682 Part 411)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Design	Complete
Use	Not suitable for use in wet weather conditions
For	Indoor installations
Indication	Visual, 3 LEDs
Type	Passive voltage detector without batteries
Material (test electrode)	Cu/gal Sn
Material (test prod)	Glass-fibre reinforced polyester tube
Material (indicator)	Plastic
Material (insulating stick)	Glass-fibre reinforced polyester tube

Nominal voltages up to 20 kV / 50 Hz



Category "S"

Type	PHG2 6	PHG2 10	PHG2 20
Part No.	766 706	766 710	766 720
Nominal voltage ( $U_N$ )	6 kV	10 kV	20 kV
Total length ( $l_G$ )	1425 mm	1425 mm	1425 mm
Insertion depth ( $l_0$ )	720 mm	720 mm	720 mm

Voltage detectors for special switchgear installations are available on request.

## PHE/G d.c. Voltage Detector

Safety Equipment

Nominal voltage up to 24 kV d.c.

Voltage Detectors



PHE/G II d.c. voltage detector for d.c. links (ICE power car)

### Safe verification of isolation from supply voltage

- For use in direct voltage systems (electrified rail networks, d.c. links)
- Reliable indication
- Easy to use due to compact design
- User-friendly



#### General Information:

Standard	Based on EN/IEC 61243-2 (DIN VDE 0682 Part 412)
Temperature range	– 25 °C ... + 55 °C, climatic category N
Use	Suitable for use in wet weather conditions
For	Indoor and outdoor installations, for example d.c. voltage systems (electrified rail networks, d.c. links)
Indication	Visual
Self-testing element	Yes
Material (test prod)	Glass-fibre reinforced polyester tube
Material (indicator)	Plastic, fully insulated
Material (insulating stick)	Glass-fibre reinforced polyester tube
Material (earthing/ connecting cable)	Copper cable, highly flexible

The test prod of d.c. voltage detectors is colour-coded according to the polarity of the test prod:

positive pole – red;  
negative pole – blue.



The two-pole PHE/G II d.c. voltage detector is specifically designed for d.c. links in electric locomotives. Due to the confined space in electric locomotives, it has a total length of only 800 mm. The voltage detector is supplied with a nominal voltage  $U_N = 3 \text{ kV}$  and a response voltage  $U_r = 120 \text{ V}$  (Part No. 767 602 / SN7216).

Voltage detectors for other nominal voltages are available on request.



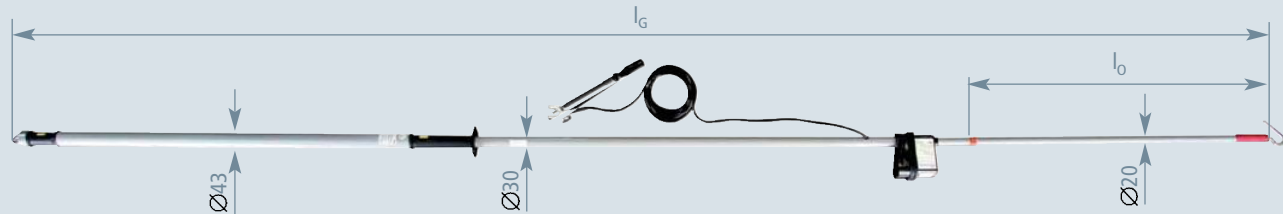
Earth clamp with adjustable handle and magnet

## Safety Equipment

## PHE/G d.c. Voltage Detector

## Voltage Detectors

## PHE/G I for Overhead Contact Lines, positive Pole

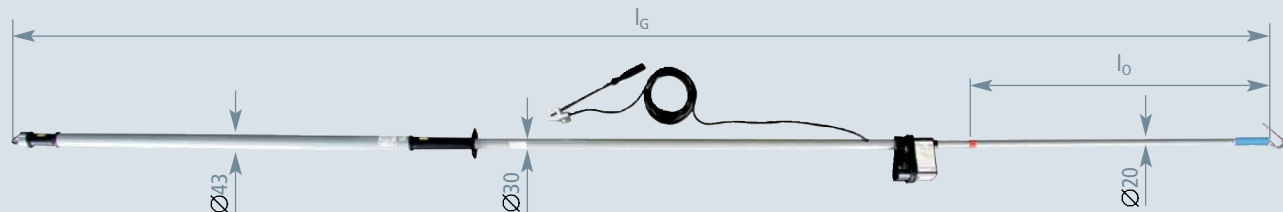


One stick (four elements)

- For direct voltage systems with earthed negative pole
- For nominal voltages up to **24 kV d.c.**
- Positive pole: Indicator with test prod
- Negative pole: Earth clamp
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG1.FD P SN7...
Part No.	767 650
Length (earthing cable)	6000 mm
Total length ( $l_G$ )	4120 mm
Insertion depth ( $l_0$ )	1020 mm

## PHE/G I for Overhead Contact Lines, negative Pole

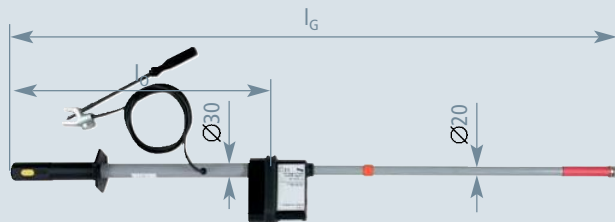


One stick (four elements)

- For direct voltage systems with earthed positive pole
- For nominal voltages up to **24 kV d.c.**
- Negative pole: Indicator with test prod
- Positive pole: Earth clamp
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG1.FD M SN7...
Part No.	767 655
Length (earthing cable)	6000 mm
Total length ( $l_G$ )	4120 mm
Insertion depth ( $l_0$ )	1020 mm

## PHE/G I for Switchgear Installations, positive Pole

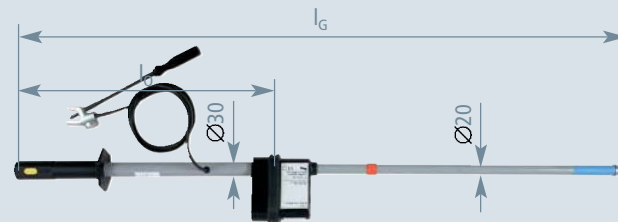


One stick

- For direct voltage systems with earthed negative pole
- For nominal voltages up to **24 kV d.c.**
- Positive pole: Indicator with test prod
- Negative pole: Earth clamp
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG1.S P SN7...
Part No.	767 660
Length (earthing cable)	2000 mm
Total length ( $l_G$ )	1260 mm
Insertion depth ( $l_0$ )	530 mm

## PHE/G I for Switchgear Installations, negative Pole



One stick

- For direct voltage systems with earthed positive pole
- For nominal voltages up to **24 kV d.c.**
- Negative pole: Indicator with test prod
- Positive pole: Earth clamp
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG1.S M SN7...
Part No.	767 665
Length (earthing cable)	2000 mm
Total length ( $l_G$ )	1260 mm
Insertion depth ( $l_0$ )	530 mm

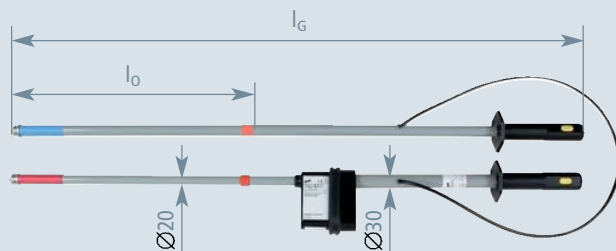


## PHE/G d.c. Voltage Detector

Safety Equipment

Voltage Detectors

### PHE/G II for Switchgear Installations and d.c. Links up to 24 kV d.c.

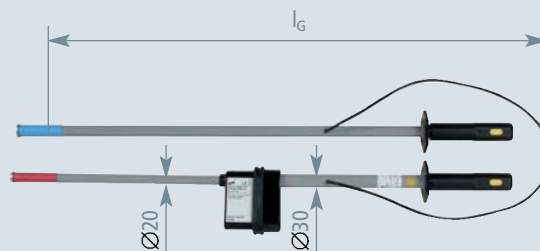


Two sticks

- For unearthed direct voltage systems
- For nominal voltages up to **24 kV d.c.**
- For d.c. links
- Positive pole: Indicator with test prod
- Negative pole: Insulating stick
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG2.P SN7...
Part No.	767 670
Length (connecting cable)	1250 mm
Total length ( $l_G$ )	1250 mm
Insertion depth ( $l_0$ )	540 mm

### PHE/G II for Switchgear Installations and d.c. Links up to 7.5 kV d.c.



Two sticks

- For unearthed direct voltage systems
- For nominal voltages up to **7.5 kV d.c.**
- For d.c. links (e.g. electric locomotive;  $U_A \leq 120 \text{ V}$ ,  $l_G = 800 \text{ mm}$ )
- Positive pole: Indicator with test prod
- Negative pole: Insulating stick
- Response voltage  $U_t = 0.5 \times U_N$
- **Nominal voltage ( $U_N$ ) to be specified at order!**

Type	PHEG2 P SN7...
Part No.	767 602
Length (connecting cable)	1200 mm
Total length ( $l_G$ )	1075 mm

Other lengths and response values ( $U_t$ ) are available on request.