

SAFETY EQUIPMENT

VOLTAGE DETECTORS

Voltage detectors according to IEC/EN 61243-1 (DIN VDE 0682 Part 411) are designed to verify safe isolation from supply voltages at work locations according to DIN VDE 0105 Part 100.

Safe isolation from supply voltages must be verified on all poles and as close to the work location as possible. This verification may only be performed by a qualified electrician or an electrotechnically instructed person.

Voltage detectors have to be tested for correct operation, immediately before and after use. For voltage detectors that do not have a self-testing element, the correct operation must be proven by testing the voltage detector on parts of the installation connected to supply voltage.

Verifying safe isolation from supply voltages with a voltage detector is considered as live working.

Voltage detectors may only be used for the nominal voltages / nominal voltage ranges as indicated on the rating plate. The operator may be at risk if the voltage detector is used at higher or lower voltages than indicated on the rating plate (incorrect indication, electric shock and electrical arcing).

Voltage detectors marked "For indoor use only", may be used indoors only.

Voltage detectors marked "For use in indoor and outdoor installations and for use in wet weather conditions" may be used for indoor and outdoor installations in all weather conditions (rain, snow, fog and dew).

Restrictions apply to the use of voltage detectors according to IEC/EN 61243-1 (DIN VDE 0682 Part 411) in factory assembled (type-tested) installations. Due to reduced insulation distances, electric flashover may occur when inserting the test prod into the installation. The user of the voltage detector or the operator of the switchgear installation should consult the manufacturer of the type-tested installation before using the voltage detector.

(Refer to Page 12 Table: Application of Voltage Detectors in type-tested factory assembled switchgear installations)

Design of a voltage detector

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

There are **two mechanically different types** of voltage detectors, i.e. complete or separate voltage detectors.

Complete voltage detectors (PHE III, PHE and PHG II) consist of an insulating rod, indicator and test prod, which have to be tested as a complete device.

Separate voltage detectors (PHE III electronic indicator) must be attached to a suitably rated insulating rod before use.

The basic design of single-pole **voltage detectors** consists of a **handle**, **insulating part**, **indicator** and **test prod** with **contact electrode**.

The **insulating part** is the section of the voltage detector between the handguard and red ring. This part provides an adequate safety distance and safe isolation from the supply voltage.

The **test prod** (extension for the contact electrode) with contact electrode consists of the part **above the red ring**. This part allows the user to reach remote parts of the installation and **eliminates** the influences of **interference fields**.

Voltage detectors are classified into two categories based on the requirements for performance against the influences of interference voltages or the desired application.

Voltage detector **category "L"** with a short test prod (no extension for the contact electrode) is designed for use on overhead lines.

Voltage detector **category "S"** with a long test prod (with extension for the contact electrode) eliminates the influences of interference fields.

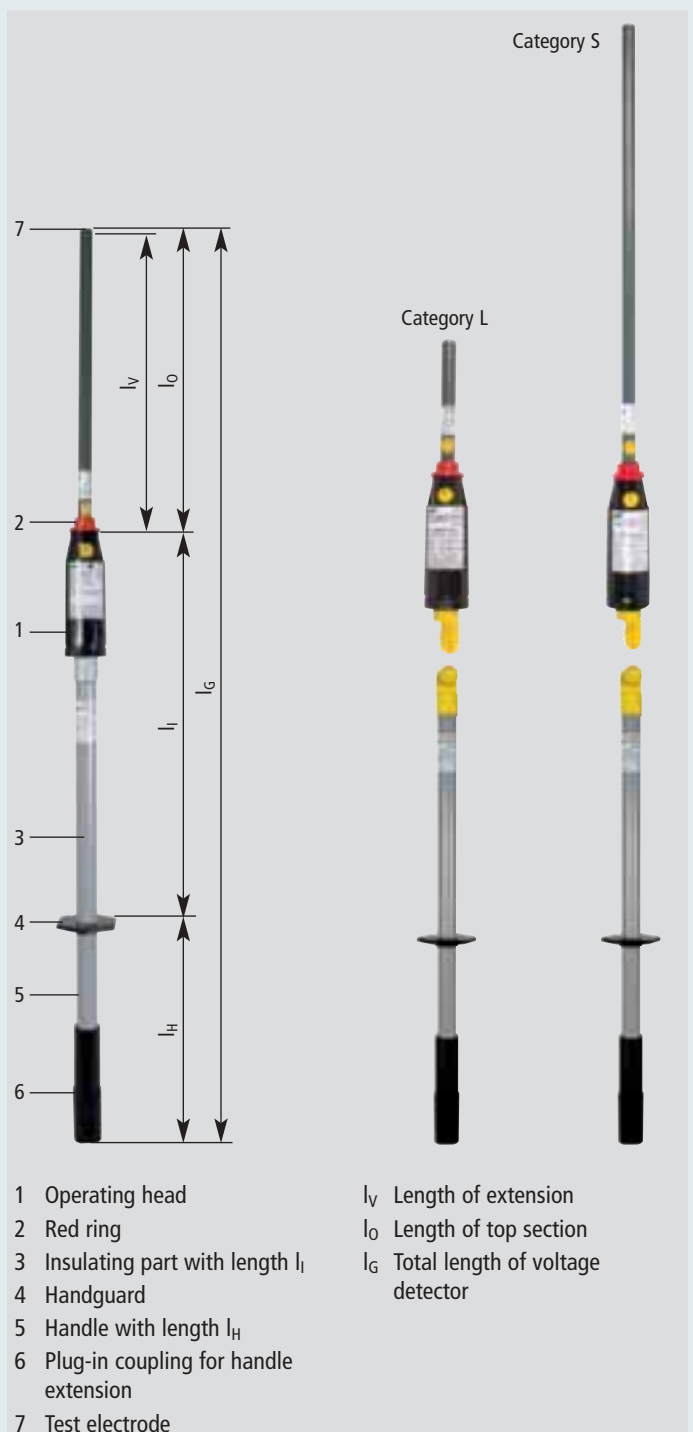
Design of Voltage Detectors

Even though this design is for use in switchgear installations, it may also be used on overhead lines.

The **handguard** provides a visible barrier between the handle and the insulating part and prevents the user from making contact with the insulating part.

The **red ring** indicates the end of the insulating part in the direction of the test electrode. It represents a visible limit and indicates which of the equipment may make contact with energised components in the installation. The insulating part is located between the red ring and the handguard may not make contact with energised components but contact with earthed components is allowed.

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



Application of Voltage Detectors

SAFETY EQUIPMENT

in type-tested, factory assembled switchgear installations

VOLTAGE DETECTORS

The applicability of our voltage detectors types PHE, PHE III and PHG II (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)) has been proven in tests performed in cooperation with switchgear manufacturers.

Switchgear manufacturer	Type	Nominal voltages U _N	Suitable voltage detectors
ABB	BA/BB systems, BAX systems, BD systems	10 ... 30 kV	PHE, PHE III and PHG II
	BC systems		PHE, PHE III and PHG II
ABB Calor Emag	ZE3/4, ZE7/8, ZK4/5, ZK8 L7.6, ZS1, ZS8	10 ... 30 kV	PHE, PHE III and PHG II
	ZW1		PHE and PHE III
	Isopond	10 kV	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 Sprecher + Schuh	PI, PIC, PID, PN 300, PN 500, PN 600, PU, PUADC, PUB, PUD, PUDC, SC, SCC, SCD, SCDC, RMB ¹⁾	10 ... 30 kV	PHE, PHE III and PHG II
Sachsenwerk	A (HA, MA, SM), FK (A, B, C, E, F), PIX, R (D ¹⁾ , L, LI, M ¹⁾ , M ¹¹⁾ , 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;	20 kV	PHE, PHE III and PHG II
	Compact load-break switchgear installations		PHE, PHE III
Driescher Moosburg	W12, W24, W36, WEL, F24	12 ... 36 kV	PHE, PHE III and PHG II
	E2K, E3K, D12, D24;	12 ... 24 kV	PHE, PHE III with great insertion depth (e.g. Part No. 767 731)
	Compact load-break switchgear installations		
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	3 ... 24 kV	PHE and PHE III with electrode, Part No. 766 927
	Magnefix	3 ... 15 kV	PHE and PHE III with electrode, Part No. 766 915
	MMS, SVS, Xiria	3 ... 24 kV	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	10 ... 30 kV	PHE, PHE III and PHG II
	KES10		PHE, PHE III with test prod, 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 Before testing systems with a circuit breaker, the circuit- breaker has to be moved out	8 BD, 8 CK	6 ... 30 kV	PHE, PHE III with modified contact electrode (on request)
	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

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