



**Earthing and Short Circuiting
Equipment Using Lances as a Short-
Circuiting Device - Lance Earthing**



ARCUS ELEKTROTECHNIK
ALOIS SCHIFFMANN GMBH

Earthing and short circuiting devices with restricted guidance using lances as a short circuiting device - Lance earthing, are called "Earthing lances" in this text.

Standards

Earthing lances are in accordance to DIN EN 61219 and VDE 0683 part 200 of January 1995 and are based on IEC 1219.

Tests

3-polar electric tests have been carried out at the accredited institutes KEMA in Arnheim, FGH in Mannheim and IPH in Berlin. To a certain extent these tests were the basis for the present standard.

Positive results were reached up to:

$$I_{tm} = 200 \text{ kA}, I_t = I_r = 80 \text{ kA at } t_t = t_r = 0.5 \text{ s and}$$

$$I_{tm} = 158 \text{ kA}, I_t = I_r = 63 \text{ kA at } t_t = t_r = 1.0 \text{ s}$$

Features

Earthing lances

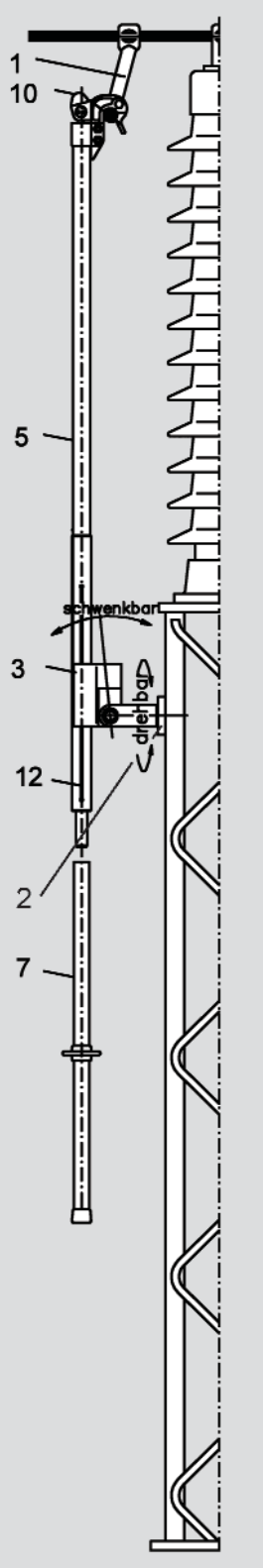
- are rated for use on outside high voltage switchgear 110 kV to 400 kV,
- are not considered as earthing switches as they do not make capacity,
- are only for application as earthing and short circuiting device in disconnected switchgear sections after the absence of voltage has been verified,
- are designed for short-term use as portable earthing and short circuiting device,
- have a restricted guidance through the sleeve of the earth fixed point, opposite to portable earthing and short circuiting devices. The earthing lance is already earthed when it is slid into the sleeve of the earth fixed point,
- are easy to transport and should be stored indoors.

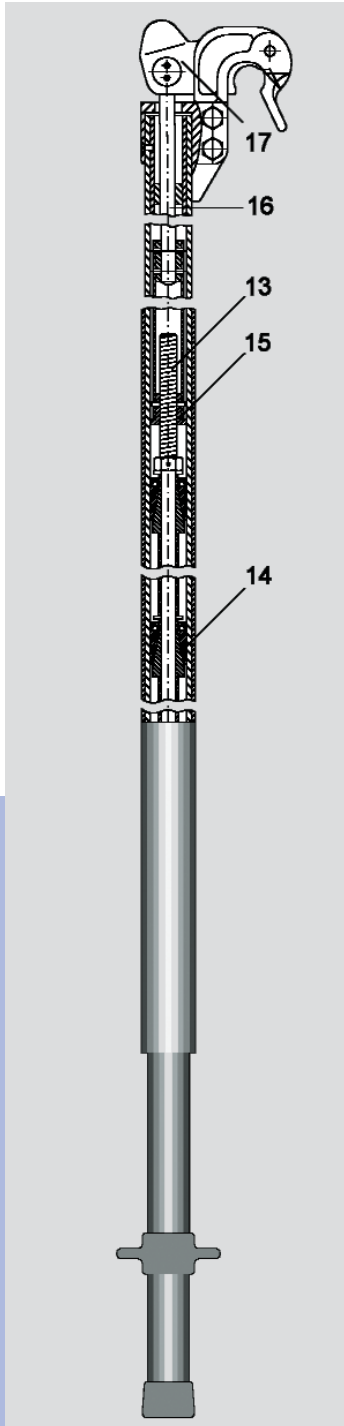
Design / Material

An earthing lance system consists of:

(1) Phase fixed point, (5) earthing lance with (7) earth rod, (3) earth fixed point

The phase fixed point is made of high tensile AISi alloy. Conductive parts of the earthing lance are made of anticorrosive aluminium alloy and all parts of the interior mechanic are of stainless steel and copper alloy. Glassfibre-reinforced polyester tube is used for the earth rod (7). The earth fixed point (3) is provided with an earth sleeve of aluminium alloy (19) with two slide rings of stainless steel (20) and it is firmly connected to the bolt flange (2). The bolt flange (2) is provided with a tin plated copper alloy bolt and the installation plate is made of hot-dip galvanized steel.





Function

Inside the earthing lance a threaded spindle (13) is equipped with spreading cones (14).

Also the earthing lance contains a threaded sleeve (15) with a pulling rod (16) which is connected to the closing jaw (17) of the clamp head (10).

In the section of the spreading wedges the lower part of the earth lance tube (12) is slotted in longitudinal direction for a safe contact to the earth sleeve.

In order to contact the earthing lance to phase and earth fixed point the earth rod (which is connected to the threaded spindle) is rotated clockwise.

Through this rotation the spreading wedges and the threaded spindle are moving towards each other.

The slotted tube section extends and causes a rigid connection to the earth sleeve.

At the same time the locking jaw of the clamp head presses against the strap of the phase fixed point.

This way a safe and short circuiting proof contact is made between earth and phase fixed point.

Handling

It is possible for one person to operate the earthing lance safely even under difficult conditions.

First the clamp head of the earthing lance is introduced into the earth sleeve. This way the weight of the earthing lance is already shifted to the earth sleeve. At the same time an electric connection to the earthed switchgear section is made.

By means of the earth rod the earthing lance is slid through the earthing sleeve and moved into the direction of the phase fixed point by a turning movement, together with the turnable earth fixed point.

The head of the earthing lance is clamped to the strap of the face fixed point. Now the weight of the earthing lance is carried by the phase fixed point.

The earth rod is tightened in a clockwise rotation and this way contacts the earthing lance to the phase and earth fixed points.

Advantages

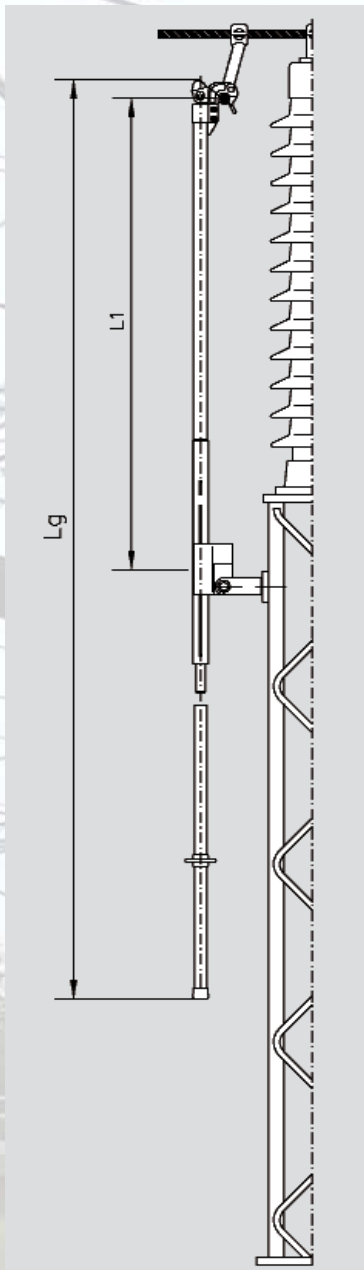
Earthing lances are specially suitable in case:

- of a high short circuit current when large lead cross sections were required on portable earthing and short circuiting devices,
- parallel earthing and short circuiting with several single phase earthing devices is time-consuming, complicated and not recommendable in case of narrow space in the switchgear,
- handling of earthing and short circuiting with flexible leads is unsafe due to conductor height and/or distances,
- motor earthing devices are not required or not considered for economical reasons,
- the potential danger caused by banging earth leads during a short circuit can be reduced,
- narrow space in the switchgear limits the mobility due to live neighbouring switchgear sections.

LENGTHS OF EARTHING LANCES

Un [kV]	Lg [mm] total length	L1 [mm] earth/phase fixed point	I _r [kA] at t _r 0.5 s	I _r [kA] at t _r 1.0 s	Type No.
110	2900	1650	63	44.5	618 136 ¹⁾
220	4100	2500	80	63	618 137 ¹⁾
380	6100	4200	80	63	618 138 ¹⁾
110-380	switchgear specific		80	63	618 141

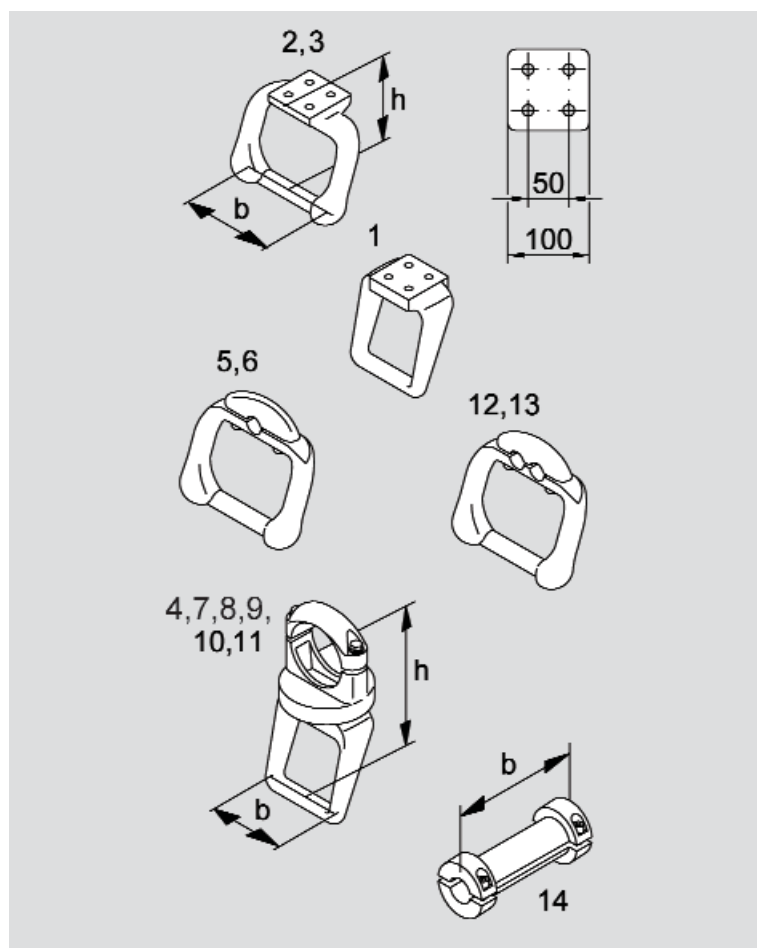
1) Also available with earth rod extension.



PHASE FIXED POINTS (SELECTION)

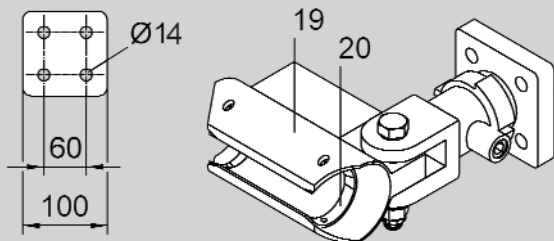
Pict.	Description	Dimension WxH [mm]	Type No.
1	Connection plate 4x holes $\varnothing 14$	160x180	515 200
2	Connection plate 4x holes $\varnothing 14$	240x195	515 185
3	Connection plate 4x holes $\varnothing 14$	240x130	515 227
4	Round up to $\varnothing 32$, strap transverse to conductor	160x185	515 202
5	Round up to $\varnothing 45$, strap transverse to conductor	230x180	515 188
6	Round 50 up to $\varnothing 80$, strap transverse to conductor	230x205	515 184
7	Round 60 up to $\varnothing 95$, transverse or parallel	160x240	515 205
8	Round 100 up to $\varnothing 120$, transverse or parallel	160x280	515 207
9	Round 100 up to $\varnothing 120$, transverse or parallel	230x320	515 195
10	Round $\varnothing 160$, strap transverse to conductor	230x290	515 182
11	Round 200 up to $\varnothing 250$, transverse or parallel	230x365	515 190
12	Round 2x $\varnothing 32$, 45 distance, transverse	230x180	515 180
13	Round 2x $\varnothing 32$, 100 distance, transverse	230x180	515 183
14	Round $\varnothing 22.5$	160x52	515 209

Additional measures may need to be provided on site to prevent partial discharges.



EARTH FIXED POINT

Description	Type No.
Earth fixed point for fixed installation to earthed switchgear parts, with adjustable turning limitation to the right or left to 70 ° or as fixed type, advantageous in narrow switchgear sections.	618 135



Type No. 618 135

Phone
General
+49 (0) 89 / 4 36 04 - 0

Fax
General
+49 (0) 89 4 31 68 88

Fax
Sales Department
+49 (0) 89 4 36 04 - 73

Internet
www.ARCUS-Schiffmann.com
info@ARCUS-Schiffmann.com

Seat of the company
Truderinger Str. 199
D-81673 Munich