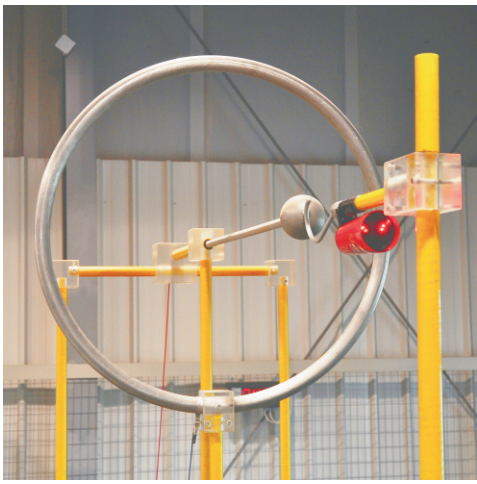
ROMIND T&G

Advanced Solutions and Technologies



SAFETY EQUIPMENT

ROMIND T&G

Advanced Solutions and Technologies

2013 years For your Safety

ROMIND T & G is a Romanian private company, whose main activity is designing, manufacturing and trading safety equipment. Our equipment is designed and manufactured in order to provide highest safety standards in works that involves electrical hazards or falling from height hazards.

With a wide range of products and benefiting from the rich experience acquired during the last 20 years, ROMIND has become a known national and international brand, in the work protection equipment area. Presently, the whole range of short-circuiting devices, insulating sticks and voltage detectors manufactured by ROMIND is used by electricians of the most important Romanian companies involved in production, transport and distribution of electricity (Electrica, ENEL, CEZ, E.On, Transelectrica, Hidroelectrica, Termoelectrica).

Our products are made in compliance with the European standards and are certified in terms of compliance by the Certification Body of the Romanian National Research & Development Institute on Occupational Safety.

We are continuously focused on the necessity to offer equipment which will ensure complete protection against risks and an increased ergonomic usage.

Always careful to the requirements of our customers, our Company has implemented an integrated system which takes into account both quality management and environmental and occupational health and safety management, the entire system being in compliance with the regulations of ISO 9001, ISO 14001 and OHSAS 18001 standards.

We would like to offer you the opportunity to be completely informed about our range of products and to find together solutions for a future cooperation.


RINA SIMTEX
ORGANISMUL DE CERTIFICARE
CERTIFICAT Nr. EMS-4002/R
S.C. ROMIND T&G S.R.L.
ISO 14001:2004 (SR EN ISO 14001:2005)


RINA SIMTEX
CERTIFICATION BODY
CERTIFICAT Nr. 27011/05/R
S.C. ROMIND T&G S.R.L.
ISO 9001:2008 (SR EN ISO 9001:2008)


RINA SIMTEX
CERTIFICATION BODY
CERTIFICAT Nr. OHS-1407
S.C. ROMIND T&G S.R.L.
BS OHSAS 18001:2007 (SR OHSAS 18001:2008)

- conformity marking issued by the Certification Body of the Romanian National Research & Development Institute on Occupational Safety

- European conformity marking

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) is a specialized clothing or equipment worn by employees for protection against health and safety hazards. PPE is designed to protect many parts of the body: eyes (eg goggles), head (eg helmets), face (eg face shields), hands (eg gloves), feet (eg boots) and ears.

This equipment can be worn in order to offer protection against:

– electrical risks by preventing direct or indirect contact with live conductors;
– mechanical risks acting as a protection shield of the body against elements that can cause injuries by falling, impact or touching;
– explosions caused by electrical arc.

Fuse handle with protective sleeve

Code: MMPS / 1 - MPR

The fuse handle with protective sleeve is a protective equipment designed for inserting and extracting of LV high rupture capacity (HRC) fuses.

This device can be used also to apply phase knives of the short-circuiting devices for LV panel boards and cabinets or insulating knives for fuse sockets.

The handle with protective sleeve is made of insulated and fireproof materials (bakelite and polycarbonate) and it can be used for handling all sizes HRC fuses (00...3).

Code	Sleeve	Color	Thickness	Test voltage
MMPS/1-MPR	Suede leather	Grey	2-2,5 mm	5000 V/1min.

Fuse handle with protective sleeve

Code: MMPS / 1 - MPR - L

The fuse handle with protective sleeve is a protective equipment designed for inserting and extracting of LV high rupture capacity (HRC) fuses.

This device can be used also to apply phase knives of the short-circuiting devices for LV panel boards and cabinets or insulating knives for fuse sockets.

The handle with protective sleeve is made of insulated and fireproof materials (bakelite and polycarbonate) and it can be used for handling all sizes HRC fuses (00...3).

Code	Sleeve	Color	Thickness	Test voltage
MMPS/1-MPR-L	Smooth impregnated leather	Red	1,5-2 mm	5000 V/1min.

Face shield against electrical arc flash

Code: A3

The face shield against electrical arc flash is a PPE for simultaneous protection of eyes, face and neck, against the injuries caused by the electrical arc flash:

- Impact at high speed and medium-energy of coarse particles or dusts;
- Thermal effects and non-ionizing radiation.

The face shield contains two components - a support for helmet and a protective screen, delivered dismantled. The components can be ordered separately.

CE EN 166 EN 170

Parameter	Value
Protective screen material	Polycarbonate
Flat dimensions (mm)	390 x 220
Thickness (mm)	1,5
Optical class	1
UV transmission factor	2-1,2
Mechanical protection	Medium energy – class B
Protection against arc flash	Yes
Weight (gr)	200

Dental Visor

Code: P 2140-0-00

Dental Visor is a PPE designed to protect the eyes and face of the dentists during their medical procedures. The screen visor provides extra protection against infections (caused by drops) and prevents injuries caused by splashes of small solid parts.
The support is a white plastic piece equipped with a lightweight transparent screen made of plastic (polycarbonate) and an elastic strip.

Meter Seal (with Stainless Steel Wire)

Code: RO.C-02

The meter seal prevents the unauthorized access and offers visible proofs of its violation (tampering). The RO.C-02 seal contains two plastic parts and a metallic wire which assure a safe sealing of the electricity, gas or water meters, petrol pumps or other types of counters. These seals can be easily installed, without any other instrument or tool.

The meter seals contains:
- A transparent body with two bent semicircular areas which prevent the extraction of the internal pivot and a marking zone;
- An colored internal pivot (spindle) with a rotating handle which assure the winding of wire and loop sealing achievement;
- A resistant multi-core stainless steel wire attached at the seal itself.

The seal has an one directional locking mechanism to prevent extraction the sealing wire from its body. In order to avoid the incorrect application of the seal and to allow the checking of application, the internal pivot of the seal has a breaking section which allows its self-breaking in two distinctive parts at the end of winding operation. After this event, the upper part of the pivot is completely independent, it can be rotated in any direction and the rotating handle can be snapped off.

The marking of the seal is specially customized for the customer and it contains the name or the logo of the customer's company, the sequential serial number of the seal (8 digits) and a bar-code (optional). This marking can be engraved (by laser) on the marking zone of the body and on the rotating handle of the pivot. A third marking (only the serial number) is placed on the upper part of the pivot.

The available colors of the internal pivot are yellow, red, blue, green, white, orange, black, brown, violet.
The body can be clear transparent or colored transparent.

Mechanical locks

Code: see table

The mechanical locks can be used against unauthorized access of persons to the transformer substations or cabinets. Through their shape, the locks assure a secure mechanical lock of the access doors or the lids of cabinets from electrical installations. The locks can be operated only by a special key. There are two version of mechanical locks: heavy duty type and light duty type.

Heavy duty mechanical locks can be used in areas where electrical installations are subject to vandalism. The materials used in their construction have very good mechanical properties.

The light duty version of locks have a shell made of galvanized steel sheet.
Each version of mechanical locks has two dimensions: the small one for the metallic lids of cabinets and the big one for the metallic doors from transformer substations.

From inside - by simultaneously pulling the two buttons;
From outside - by pushing forward the special key in the hole of the mechanical lock.

Heavy type - BIT 90 / BIF 65

Light type - BIF 85T / BIF 60T

Code	BIT 90 / BIT 85T	BIF 65 / BIF 60T
Recomanded use	Transformers substations	Cabinets
Ensuring a high protection standard	By using a special key	
Usage	From outside - by inserting a special key From inside - by pushing the buttons	
Locking elements dimensions (mm)	28 x 12	
Locking elements stroke (mm)	24	18
Dimensions (mm)	60 x 90 x 28 / 55 x 85 x 28	60 x 65 x 28 / 55 x 60 x 28

INSULATING EQUIPMENT & INSULATING STICKS

INSULATING EQUIPMENT

Insulated or insulating equipments are designed to prevent direct or indirect contact between energized elements or conductors from electrical installations and human body.

The contact between human body (a part of its) and an energized part or conductor can occur by direct touching or indirectly, through a conductive object (eg a non-insulated tool). In order to prevent such a situation - which can cause injuries by electric shock - the workers must use insulated / insulating equipment, special designed to avoid the electrical contact between worker's body and live elements. In order to interrupt the current path, an insulated equipment can be temporarly mounted in electric installations through covering the live conductors or other live metalic parts.

Another kind of insulated / insulating tools are especially designed for live working. In this situation, the conductive part of the equipment could get in contact with live elements, but the worker is protected because his hand get in contact only with the tool's handle, usually made of or covered with insulated materials.

INSULATING STICKS

The insulating sticks are protective devices designed to avoid the contact with energized conductive parts and to provide a minimum distance during maneuvers in indoor or outdoor electrical installations. If in the case of low voltage installations there isn't a minimum approach distance (only the direct contact with energized elements is forbidden), in medium and high voltage instalations the minimum approch distance (provided by national regulations) varies from 0,8 m to 3,7 m depending on the nominal voltage of the instalation and the type of installation. Nominal voltage of installation (Un) represents the operating voltage of the insulating sticks.

There are two types of insulating sticks (connectable or telescopic), manufactured from fiber glass tubes. Each sticks have at the working end a coupling system that allow the fixing of a protective device (eg voltage detector, anchoring hook, phase clamp of earthing device) or a piece that allows the connecting with an element of the instalation (special hook for switches).
There are two types of coupling systems: hexagonal (manufactured from plastic elements, fixed or folding) and bayonet (manufactured from metalic parts).

All the insulated sticks are provided with an element (usually a plastic ring) that defines the stick handle. During the use of the stick, the worker must keep his hands only on this handle.
The sticks are characterized by the following dimensional elements:

– Total length – measured between the two extremities;
– Useful length – measured from the extremity that contains the coupling system or maneuver part until the handle ring. This distance must be greater than the minimum approach distance.
– Handle length – measured from the handle ring to the other end of the stick (protection cork)

Depending on the domain of use, insulating sticks are manufactured according the EN 61230; EN 61235; EN 60855 rules. Insulating sticks can be used in indoor or outdoor installations, during dry weather. Only some models can be used on wet conditions.
The insulating sticks can be used for:

– mounting and removing of phase clamps of earthing devices;
– mounting and removing of insulating board;
– mounting and removing of anchoring hooks / devices;
– maneuvering of switches;
– maneuvering of live conductors;
– checking of presence/absence of voltage using voltage detectors;
– mounting of fault indicators on medium voltage overhead lines;
– rescuing an injured person or removing of various objects fallen on live conductors;

In order to allow the use of insulating sticks on different purposes, they can be provided with different adapters and accesories.

Insulating end caps

The insulating end-caps can be used in live working on low voltage electrical installations. These caps cover the bare ends of conductors in order to avoid an accidental contact or a shortcircuit between two phase conductors or between a phase conductor and the grounding conductor.

There are 5 sizes of end caps made of flexibile and insulating material. Their internal profile enables the mounting of each end-cap on different sizes of conductors.

CST

Parameter	Value
Maximum voltage (V, c.a.)	1.000
Test voltage (V/1min, c.a.)	5.250
Temperature range (^{0}C)	-25 ... +55
Relative humidity	100%

Size	Length (mm)	Conductor section min (mm^2)	Conductor section max (mm^2)
Size 0	45	1.5	6
Size 1	60	8	10
Size 2	80	16	50
Size 3	100	70	120
Size 4	120	150	240

Insulating sleeve

Code: P 2297-0-00

Insulating sleeves are protective devices used at works in low voltage switchboards. The sleeves are designed to be applied on HRC fuses in order to avoid an accidental electric contact.

The sleeves are made of polycarbonate, a material with good mechanical strength, with flexibility and good insulation properties. Their shape allows their attachment to HRC fuses, sizes 0…3.

Parameter	Value
Maximum operating voltage (V)	1000
Dielectric rigidity - Test voltage (V/3min)	5000
Dielectric rigidity - Withstand voltage (V)	10000
Thickness (mm)	1,5 ± 0,5
Temperature range (^{0}C)	-25...+55
Relative humidity	Up to 90 %
Weight (gr)	120

CST SR EN 61479

Insulating flexible cover

Code: see table

The insulating flexible cover is used in dry weather, during live works, for temporary insulation of the LV non-insulated overhead lines.
The insulating flexible cover can also be used:
- to cover the insulators of concrete or metallic poles;
- to cover the bus bars of LV panel boards and cabinets.

The insulating flexible covers are made of yellow plasticized PVC, with a high resistance to UV radiation. The covers can be delivered in various lengths, with plastic pliers.

CST SR EN 61479

Code	Length (cm)	Weight (kg)	Number of plastic pliers	Thickness (mm)
TE - 150 - 0	150	1,4	4	2,5 ± 0,5
TE - 200 - 0	200	1,9	6	2,5 ± 0,5
TE - 250 - 0	250	2,4	6	2,5 ± 0,5
TE - 300 - 0	300	2,8	8	2,5 ± 0,5

Name of parameter	Valoare
Maximum nominal voltage (V)	1000
Dielectric rigidity - Test voltage (V/3min)	5000
Dielectric rigidity - Withstand voltage (V)	10000
Oil resistance	Category H
Very low temperature resistance (-40^{0}C)	Category C
Very high temperature resistance (+70^{0}C)	Category W

Separation pieces

The separation pieces are designed for live working on low voltage overhead lines with insulated conductors (twisted in bunch). These pieces are designed to allow and to facilitate the separation of the conductors from the bunch without damaging the insulation of conductors.

There are three types of separation pieces:
-The “Lever” allows the separation of the conductors from the bunch.
-The “Wedge” allows the separate positioning of each insulated conductor of the bunch;
-The “X spacer” allows the separate positioning of a single insulated conductor from the bunch;

X spacer Wedge Lever

Code	PD 090-0-00	PD 091-0-00	PD 092-0-00
Type	X spacer	Wedge	Lever
Dimensions (mm)	75 x 200 x 15	80 x 250 x 15	30 x 190 x 15
Weight (gr)	95	146	33

Insulating protective shutter

Code: PEAD - 20

The insulating protective shutter can be used on MV cabinets in order to prevent the accidental closing of the switches. The mounting is done by its positioning between the fixed part and the mobile part of an open switch. Depending to the positioning of the switches, this procedure is done with a connectable insulating stick PMU 20-1-B/ba or PMU 110-2-B/ba.

The shutter is made of plastic materials (PVC) and it has a removable support element, made of insulating fiberglass tube. At the head of this element, a foldable bayonet coupling system allows the shield positioning at different angles towards the stick axis.

Parameter	Value
Maximum usage voltage (kV AC)	20
Maximum test voltage U_{test}/3min (kV)	50
Dimensions (mm)	710 x 505 x 150
Temperature range (^{0}C)	- 25...+55
Weight (kg)	3,5

Insulating platform

Code: PE-500-P

The insulating platform is an auxiliary protective device used at different operations on indoor / outdoor electrical installations (on dry conditions). The platform is made of lightweight material (polypropylene) and can be easily carried to the working zone.

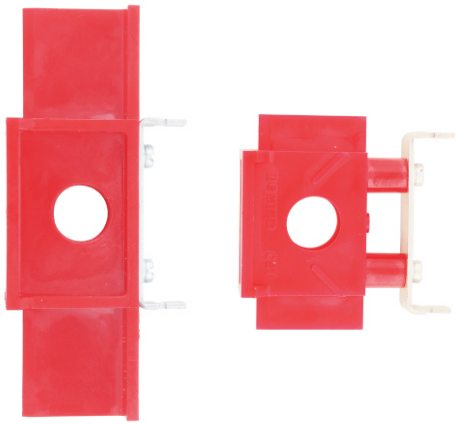
In order to avoid the sliding of the workers, the upper surface and the legs are profiled with striations.

Parameter	Value
Test voltage U_{test}(kV/1min.)	81
Leak current (mA)	max. 2
Dimensions (mm)	570 x 570 x 260
Active surface (mm)	500 x 500
Maximum load (kg)	150
Weight (kg)	4,1

Insulating knives for fuse sockets

The insulating knives can be mounted for temporary electrical separation in the HRC fuse sockets of the LV panel boards and cabinets.
The insulating knives allow the locking in OPEN position of the electrical circuits preventing accidental occurrence of voltage.

The insulating knives are made of red polycarbonate, in two types, according to the sizes of the HRC fuses socket and have a metallic piece that allows the connection with the fuse handle.



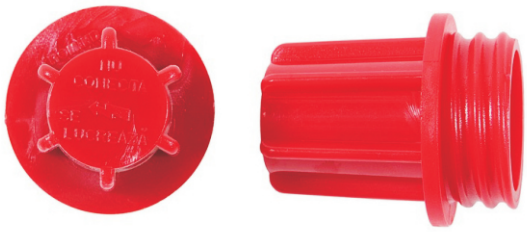
CST

Code	Size	Maximum operating voltage (V AC)	Test voltage (V AC/1min)	Temperature range (^{0}C)
P 2344-0-00	00	1000	5250	-25...+55
P 240-0-00	0, 1, 2, 3	1000	5250	-25...+55

Insulating plug for E27/E33 sockets

Insulating plugs can be mounted on E27 / E 33 sockets of the LV panel boards for electrical separation of the installation. By temporary replacement of fuses, the insulating plugs allow the locking in OPEN position of the electrical circuits preventing accidental occurrence of voltage.

Insulating plugs are made of red polycarbonate, in two types, according to the dimensions of the fuses socket.



CST

Code	Type		Maximum operating voltage (V AC)	Test voltage (V AC/1min)	Temperature range (^{0}C)
P 279000	25 A	E 27	1000	5250	-25...+55
P 280000	63 A	E 33	1000	5250	-25...+55

Connectable insulated sticks - PMU type

Code: see table

PMU insulating sticks contain from 1 up to 4 connectable modules. These sticks are designed to be used for almost all types of works in indoor and outdoor MV/HV installations, in dry conditions.
Recommended for:
- mounting phase clamps of the short-circuiting device on bus bars or round conductors in substations;
- mounting phase clamps of the short-circuiting device on MV/HV overhead lines.

PMU insulating sticks are equipped with an adjustable bayonet coupling system (fixed or articulated)

CST SR EN 61230 SR EN 61235

PMU-20-1-B/ba

PMU-20-1-B/baS

PMU-110-2-B/ba

PMU-220-3-B/ba

PMU-400-3-B/ba

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	No. modules	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PMU-20-1-B/ba	20	60	1	1,33	0,41	0,92	1,1
PMU-20-1-B/baS	20	60	1	1,72	0,8	0,92	1,3
PMU-110-2-B/ba	110	190	2	2,57	0,91	1,66	2,2
PMU-220-3-B/ba	220	380	3	3,81	1,11	2,70	3,4
PMU-400-4-B/ba	400	695	4	5,05	1,11	3,94	4,4

Connectable insulated sticks - PMP type (wet and dry conditions)

Code: see table

PMP insulating sticks contain from 2 up to 4 connectable modules. These sticks are designed to be used for almost all types of works in indoor and outdoor MV/HV installations, in wet and dry conditions.
Recommended for:
- mounting phase clamps of the short-circuiting device on bus bars or round conductors in substations;
- mounting phase clamps of the short-circuiting device on MV/HV overhead lines.
PMP insulating sticks are equipped with an adjustable bayonet coupling system (fixed or articulated).

CST SR EN 61230 SR EN 60855

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	No. modules	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PMP-110-2-B/ba	110	190	2	2,57	0,91	1,66	3,1
PMP-220-3-B/ba	220	380	3	3,81	1,11	0,92	4,6
PMP-400-4-B/ba	400	695	4	5,05	1,11	2,70	6,1

Tightening handle for phase clamps

Code: P249-0-00

The tightening handle can be used only in special conditions (due to lack of space), according to the internal user's safety rules for mounting of phase clamps on bus bars (MV installations).

The tightening handle is provided with a bayonet coupling system.
The tightening handle does not respect the minimum approach distance from the conductors of the installation.
The length of the tightening handle is 440 mm.

INSULATING STICKS

Operating insulating stick - PSU type (dry conditions)

Code: see table

PSU operating insulating sticks can be used to operate / open or close disconnecting switches or other electric equipment.

These sticks are provided with a metallic hook made of steel, protected against corrosion by zinc plating.

CST SR EN 61230 SR EN 61235

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	No. modules	Diameter of tube (mm)	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PSU - 20	20	60	1	Ø 38	1,23	0,41	0,82	1,2
PSU - 35	35	105	1	Ø 38	1,66	0,61	1,05	1,4

Operating insulating stick - PAE type (dry conditions)

Code: PAE - 35

PAE insulating stick contains two connectable modules, and can be used to operate / open or close disconnecting switches or other electric equipment.

These sticks are provided with a metallic hook made of steel, protected against corrosion by zinc plating.

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	No. modules	Diameter of tube (mm)	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PAE - 35	35	105	2	Ø 38	3,02	0,92	2,10	2,7

Operating insulating stick - PCU type (dry conditions)

Code: see table

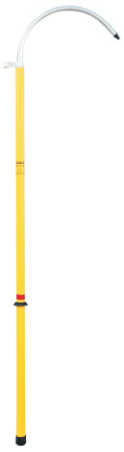
PCU operating insulating sticks can be used to handle live cables or other electric equipment.

These sticks are provided with a metallic hook made of steel, protected against corrosion by zinc plating.

SR EN 61230 SR EN 61235

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	Diameter of tube (mm)	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PCU - 20	20	60	Ø 38	1,36	0,41	0,95	1,3
PCU - 35	35	105	Ø 38	1,80	0,61	1,19	1,5

Rescue insulating stick (dry conditions)



Code: PSU - 35 - C

The rescue insulating sticks is equipped with a large metallic hook, used for:
- rescue by grabbing an injured person (electrocution, dizziness…) and bringing him back to a protected area;
- remove fallen objects from the live electrical conductors;

This stick has also a metallic coupling piece in order to allow the attachment of the voltage detector.

SR EN 61230 SR EN 61235

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	Diameter of tube (mm)	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Weight (kg)
PSU - 35 - C	35	105	Ø 38	1,91	0,61	1,30	2

Telescopic insulating sticks - PTU type - 1,5 / 2,2 meters

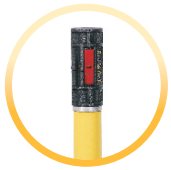
Code: see table

The telescopic insulating sticks PTU 20-35 F or R have a total length of up to 1,5 m and are made of two undetachable modules.

The telescopic insulating sticks PTU 20- 110 F or R have a total length of up to 2,2 m and are made of two undetachable modules.

The telescopic insulating sticks PTU 20-35 F are components of the discharging devices for capacitors.

These telescopic insulating sticks can be equipped with a fix (F) or foldable (R) coupling system.



SR EN 61230 SR EN 61235

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	Diameter of tube (mm)	Total length L_t (m)	Handle lenght L_m (m)	Useful length L_u (m)	Folded length (m)	Weight (kg)
PTU-20-35-F	20	60	Ø 42 / Ø 37	1,26	0,41	0,85	0,86	0,9
	35	105		1,46		1,05		
PTU-20-35-R	20	60	Ø 42 / Ø 37	1,32	0,41	0,91	0,92	0,96
	35	105		1,52		1,11		
PTU-20-110-F	20	60	Ø 42 / Ø 37	1,41	0,56	0,85	1,27	1,25
	110	190		2.13		1,57		
PTU-20-110-R	20	60	Ø 42 / Ø 37	1,47	0,56	0,91	1,33	1,31
	110	190		2,19		1,63		

Telescopic insulating sticks - PTU AS type - 6 / 9 m

Code: see table

The telescopic insulating stick PTU-AS-400-4-C type has a total length up to 6 m and is made of 4 undetachable modules.
The telescopic insulating stick PTU-AS-400-6-C type has a total length up to 9 m and is made of 6 undetachable modules.

The insulating sticks are equipped with a fixed hexagonal coupling system and at the other end of the stick there is mounted a foldable metallic foot in order to facilitate the stability of the stick on the ground. These types of insulating sticks can be used at operations both in substations and overhead lines, where the working height does not exceed the length of the insulating stick.

It is recommended the use of the telescopic insulating stick PTU-AS-400-6-C type in all types of ground works on medium voltage overhead lines. The insulating stick may be used to apply the phase clamps of the earthing devices, to check the absence of voltage or to make anchoring points using different types of anchoring devices.

CST SR EN 61230 SR EN 61235

Code	Operating voltage U_n (kV)	Test voltage U_{test} (kV)	Extended modules	Total length L_t (m)	Extended length L_{ext} (m)	Folded length (m)	Weigth (kg)
	35-110	190	4 (base)+1		3,35		
PTU-AS-400-4-C	220	380	4 (base)+1+2	6	4,66	2,05	3,2
	400	695	4 (base)+1+2+3		6		
	35-110	190	6 (base)+1		3,49		
PTU-AS-400-6-C	220	380	6 (base)+1+2	9,03	4,80	2,19	5,6
	400	695	6 (base)+1+2+3 6 (base)+1+2+3+4 6 (base)+1+2+3+4+5		6,15 7,55 9,03		

ADAPTERS FOR INSULATING STICKS

Hexagonal-bayonet fixed adaptor - AF E-C

Code: AF E-C

The hexagonal-bayonet fixed adaptor (AF E-C) allows the connection of any device equipped with connecting hexagonal rod of 12 mm (eg: voltage detector) with connectable multi-purpose insulating sticks (PMU and PMP type) equipped with bayonet coupling system.

CST SR EN 61230

Foldable hexagonal-bayonet adaptor - AR E-C

Code: AR E-C

The hexagonal-bayonet foldable adaptor (AR E-C) allows the connection of any device equipped with connecting hexagonal rod of 12 mm (eg: voltage detector) with connectable insulating sticks (PMU and PMP type) equipped with bayonet coupling system.
For example, this adaptor allows the connection between a PMU stick with a voltage detector at different angles: 0°, 30°, 60°, 90°.

CST SR EN 61230

Hook - CASC/C

Code: CASC/C

The CASC/C hook should be used with telescopic insulating sticks (PTU type) equipped with hexagonal coupling system. This hook can be used for the removal of fallen objects on live conductors or in their proximity.

CST SR EN 61230

ADAPTERS FOR INSULATING STICKS

Hexagon-bayonet articulated adaptor - ACMIT/C

Code: ACMIT/C

The hexagon-bayonet articulated adaptor ACMIT/C can be used with the telescopic insulating sticks (PTU type), provided with a hexagonal coupling system and allows the coupling of the phase clamps of the earthing devices provided with bayonet system.
At the ACMIT/C adaptor, the bayonet coupling system can be blocked in fixed position (when the fixing nut is screwed and presses upon the coupling piece) or in articulated position (when the fixing nut is completely unscrewed), allowing a rotation of the bayonet coupling piece with 5°- 6° around its axis.

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Hexagon-hexagon foldable adaptor - AR C-C

Code: AR C-C

The hexagon-hexagon foldable adaptor AR C-C can be used with the telescopic insulating sticks (PTU type), provided with a fixed hexagonal coupling system and allows the positioning of the voltage detector or another equipment in a plan that contains the axis of the stick under an angle of 0°, 30°, 60°, 90°.

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Adaptor for Crochevit hook - ACAI/C

Code: ACAI/C

The ACAI/C adaptor is an equipment used with the telescopic insulating sticks (PTU type) provided with a hexagonal coupling system and allows the connection between the stick and the Crochevit anchoring hook.

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ADAPTERS FOR INSULATING STICKS

Hexagonal adapter - AC/DTTU-Tv

Code: AC/DTTU-Tv

The AC/DTTU-Tv adapter allows the coupling of the stick of DTTU-Tv detector with a telescopic insulating stick (PTU type) provided with a fixed hexagonal coupling system.

Special pliers for handling the MV fuses

Code: P2324-0-00

This device can be used on a connectable insulating stick (PMU) for applying or removing the MV fuses (with a diameter between 35 mm and 90 mm). By rotating of the pole, the "jaws" of the pliers can firmly hold or release the fuse.

Bayonet adapter - AB/DTTU-Tv

Code: AB/DTTU-Tv

The AB/DTTU-Tv adapter allows the coupling of the stick of DTTU-Tv detector with a connectable insulating stick (PMU type) provided with a articulated bayonet coupling system

VOLTAGE DETECTORS

Voltage detectors and indication/warning devices for voltage presence are electronic devices used as a protective equipment against electrical risks.

The voltage detectors are used to check the presence/absence of voltage in all types of electrical installations. The presence of voltage is double-signaled, both optical and acoustical. The voltage detectors are manufactured according EN 61243 standard and they are always on stand by for checking of voltage presence.

The voltage indicators or the warning devices for voltage presence are protective devices which can be fixed in indoor MV instalations. These products assure the voltage detection, the warning of the personnel against the accidental entrance beyond the mobile fence or the blocking of the access in hazardous areas.

LV Testers

Code: EazyVolt
EazyVolt Plus

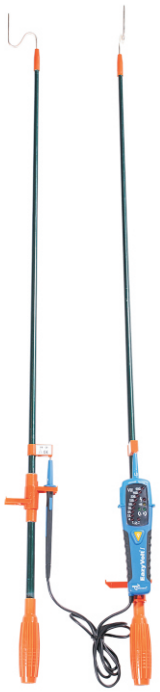
The EazyVolt testers are reliable automatic voltage testers up to 750 V, with the following functions:
- Measuring AC Voltage;
- Measuring DC Voltage;
- Resistance (only EazyVolt Plus);
- Frequency (only EazyVolt Plus);
- Phase detection;
- Continuity and diode;
- Phase rotation;
- RCD test by phase- earth (once charged);
- Self-test by switch.

Features:
- Fully automatic;
- Flashlight / torch by ultra bright LED;
- 3 Phase rotation by 2 probes;
- Selectable probe tips 2...4 mm.;
- Dual display for VAC and Hz (only for EazyVolt Plus);
- Water proof (IP65);
- Fail safe (no battery for VAC / DC measurement);
- Schuko compliant (19 mm);
- 1-hand operation by IP2X;

CE EN 61243-3 EN 61010-1

	EazyVolt	EazyVolt Plus
Operating voltage	12...750 V AC/DC	12...750 V AC (± 1.3 % + 5d) 12...750 V DC (± 1.0 % + 2d)
Resolution	LED: 12, 24, 50, 120, 230, 400, 750 V	LCD: 1 V
Frequency (Hz)	45 - 65	
Voltage detection	Automatic	
Acoustic signal	50 V AC / 120 V DC	
Operation time (s)	30	
Single pole phase test	YES 100…750V AC / 45…65 Hz	
Rotary field indication	YES	
Continuity	< 200KΩ	< 200Ω
Resistance	NO	YES 0...2KΩ
Power supply	2 x 1,5 V IEC LR03, AAA size	
Operating temperature (°C)	-10....+55	
Drop proof (m)	1	
IP Protection	IP 65	
Dimensions (mm)	239 x 68 x 29	
Weight including batteries (kg)	0,220	0,235

Contact probes for LV testers



Code: PA 01

The contact probes for LV testers PA 01 are designed for remote checking the of the presence/absence of voltage on LV overhead lines.
The contact probes are made of insulating tubes, provided with contact electrodes and handle. Through their shape, the contact electrodes allow the hanging of the contact poles on LV overhead lines and the permanent contact during the working period, as long as no voltage is present.

Parameter	Value
Operating voltage (V)	1000
Test Voltage (V/1min)	6000
Operating temperatures (°C)	-25...+55
Length (mm)	1165
Handle diameter (mm)	30
IP protection	IP 20
Weight (kg)	0,3

Voltage detectors for electrical public transport

Code: DTTU-Tb - trolley
DTTU-Tv - tramway

The voltage detectors DTTU-Tb and DTTU-Tv are designed to check and signalize the presence of voltage through direct contact with the conductors of indoor and outdoor electrical installations for urban transport (trolley/tramway) (825 V DC).

Before each use, a self-test must be performed by pressing the test button (confirming that the battery and the electronic circuits are in good condition).

After validation of self-test, the voltage detector is brought close to the conductors until the detector's electrode gets in direct contact with the conductor. In the presence of DC voltage, the detector lights up a red LED – for reverse polarity – or green LED – for normal polarity - (visible in high ambient lighting conditions) and releases acoustic signals (higher than 69 dB (A)). In the presence of AC voltage, the detector lights up both red and green LEDs.

The DTTU-Tb detector contains two insulating sticks (including the electronic circuits) in order to get in contact with the trolley's contact lines. Also this detector can be used in cabinets (injection points).

The DTTU-Tv detector contains a single insulating stick (including the electronic circuits) in order to get in contact with the tram's contact line connected through an insulated conductor (8 m length) with pliers for the contact with the rail.

DTTU-Tb

DTTU-Tv

Parameter	Value
Operational voltage (V DC)	1000
Threshold voltage (V DC)	130 ± 20
Test voltage (V/1min)	6000
Power supply	9 V battery type 6LR61
Temperature range - operation (^{o}C)	-25 ...+55
Temperature range - long term storage (^{o}C)	-10...+45
IP Protection	IP 20
Weight DTTU Tb / DTTU Tv (kg)	1,35 / 1,19

Voltage detectors for MV installations - DTCIER type

Code: DTCIER 6-20 kV
DTCIER/P 6-35 kV

The voltage detectors are designed to check and signalize the presence of voltage through direct contact with MV conductors. These detectors can be used during wet (only DTCIER/P 6-35 kV) or dry weather, in indoor and outdoor installations.

After validation of self-test, the voltage detector is attached to an appropriate insulating stick. This assembly is brought close to the MV conductors until the detector's electrode gets in direct contact with the conductor. In the presence of voltage, the detector lights up 4 red indicator LEDs (visible in high ambient lighting conditions) and releases acoustic signals (higher than 90 dB (A)).

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DTCIER 6-20 kV

DTCIER/P 6-35 kV

Type	DTCIER 6-20 kV	DTCIER/P 6-35 kV
Operational voltage (kV)	6 - 20	6 - 35
Temperature range - operation and storage (^{0}C)	-25 ...+55	-25 ...+55
Temperature range - long-term storage (^{0}C)	-10...+45	-10...+45
Power supply	Alkaline battery 9V, 6LR61 type	Alkaline battery 9V, 6LR61 type
Dimensions - without contact electrode (mm)	Ø 78 x 150	Ø 78 x 150
Dimensions - with contact electrode (mm)	Ø 78 x 225	Ø 78 x 225
Weight including battery (kg)	0,370	0,370
Operational in wet conditions	NO	YES

Voltage detectors for HV installations - DTCIER type

Code: DTCIER/P 110 kV
DTCIER/P 220-400 kV

The voltage detectors DTCIER/P 110 kV are designed to check and signalize the presence of voltage through direct contact with HV conductors. These detectors can be used during wet and dry weather, in indoor and outdoor installations.

After validation of self-test, the voltage detector is attached to an appropriate insulating stick. This assembly is brought close to the HV conductors until the detector's electrode gets in direct contact with the conductor. In the presence of voltage, the detector lights up 4 red indicator LEDs (visible in high ambient lighting conditions) and releases acoustic signals (higher than 90 dB (A)).

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DTCIER/P 110 kV

DTCIER/P 220-400 kV

Type	DTCIER/P 110 kV	DTCIER/P 220-400 kV
Operational voltage (kV)	110	220 - 400
Temperature range - operation and storage (^{0}C)	-25 ...+55	-25 ...+55
Temperature range - long-term storage (^{0}C)	-10...+45	-10...+45
Power supply	Alkaline battery 9V, 6LR61 type	Alkaline battery 9V, 6LR61 type
Dimensions - without contact electrode (mm)	Ø 78 x 165	Ø 78 x 165
Dimensions - with contact electrode (mm)	Ø 78 x 380	Ø 78 x 380
Weight including battery (kg)	0,530	0,530
Operational in wet conditions	YES	YES

Warning device for voltage presence - DAPT 6-35 kV

Code: DAPT 6-35 kV

DAPT 6-35kV warning device for voltage presence is designed to detect and signalize the presence of voltage in MV indoor switchgears in order to prevent the accidental or unauthorized access beyond the mobile fences of the electrical installation. This device should be mounted on the outside frame of the door. The permanent magnet (which assures the control of the device functioning) should be fixed on the door. While the door is closed, its position should be in front of marked zone of the detecting device.

As long as the conductors (bus bars) from inside are energized and the door is open, the device will warn the personnel about the existence of a hazardous area by optical and acoustical signals. Closing of the door will stop the warnings.

Depending to the configuration of installation, the detecting antenna can be fixed to the device's terminal or can be replaced by a special long antenna (up to 2,5 meters).

Components:
- Detecting device;
- Antenna;
- Permanent magnet;
- Special long antenna (optional).

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Parameter	Value
Operation voltage (kV)	6 - 35
Acoustical signal (dB)	min.67
Optical signal for voltage presence	Red LED, intermitent
Optical signal for external power source	Green LED, continuous
Optical signal for internal battery	Yellow LED, continuous
Selftesting button	Yes
Temperature range - operation and storage (^{0}C)	-15 ...+45
Temperature range - long term storage (^{0}C)	-20...+50
Internal power supply - alkaline battery	9 V Type 6LR61
External power supply	11...15V/max. 0,5A
IP Protection	IP 20
Dimensions (mm)	195 x 72 x 28
Weight - with battery (kg)	0,2

Warning device for voltage presence with blocking system - DAPT/BA 6-35 kV

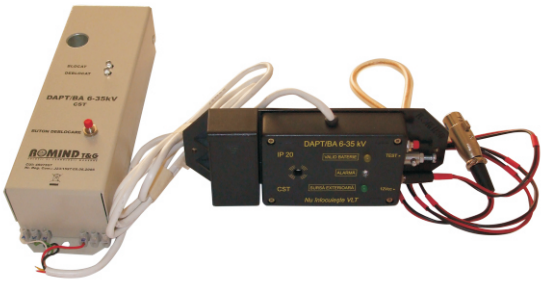
Code: DAPT/BA 6-35 kV

DAPT/BA 6-35 kV is the upgraded version of DAPT 6-35 device, with an additional function for blocking the accidental or unauthorized access beyond the mobile fences of the electrical installation.

Similar with DAPT 6-35 kV device, this version of product detects the presence of tension on indoor MV scwitchgears. Through its electromagnetic locking system (ELS), the device blocks the opening of the door as long as the conductors (bus bars) from inside are energized.

Opening of the door can be done by pushing the “UNBLOCKING” button from ELS only while the bars are not energized. The locking mechanism will be deactivate and the door can be deliberately opened through a special key not later that 15 seconds after the button has been pushed. Only in this way the personnel can enter beyond the mobile fences of installation.

If the door is not opened, the locking mechanism will be automatically reactivated and the access will be denied. Thus the risk to allow an accidentally access due to a mistake of usage is avoided. Also, the closing of the door will generate the blocking of the locking mechanism in maximum 15 seconds.



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Components:
- DAPT Detecting device;
- Electromagnetic locking system (ELS)
- Antenna;
- Permanent magnet;
- Special key;
- Special long antenna (optional).

Parameter	Value
Operation voltage (kV)	6 - 35
Acoustical signal (dB)	min.67
Optical signal for voltage presence	Red LED, intermitent
Optical signal for external power source	Green LED, continuous
Optical signal for internal battery	Yellow LED, continuous
Optical signal from ELS	Red LED = Locked Green LED = Unlocked
Temperature range - operation and storage (^{0}C)	-15 ...+45
Temperature range - long term storage (^{0}C)	-20...+50
Selftesting button	Yes
Internal power supply - alkaline battery	9 V Tip 6LR61
External power supply	11...15V/max. 0,5A
IP Protection	IP 20
DAPT detecting device - dimensions (mm)	195 x 72 x 28
ELS - dimensions (mm)	238 x 85 x 51
Weight (kg)	1,2

Signaling device for voltage presence - DIPT 6-35 kV

Code: DIPT 6-35 kV

The signalizing device DIPT 6-35 kV is designed to detect and signalize the presence of tension on the bus bars from MV indoor switchgears in order to prevent the accidental or unauthorized access beyond the mobile fences of the electrical installation.

This device has no power source and it can be easily mounted on the bus bars with an insulating stick. DIPT 6-35kV device should be permanently mounted on the bus bars and as long as the bars are energized, the device will issue flashing red optical signals.

Parameter	Value
Nominal voltage of the installation (kV)	6 ÷ 35
Signaling frequency (s)	⩽12
Nominal voltage frequency of the installation (Hz)	50Hz
Temperature range (^{0}C)	-10 ... + 45
Storage temperature range (^{0}C)	-20 ... + 50
Optical signaling	7 red LEDs
Power supply	Without internal power source - direct supply from the bus bar
Thickness of the bus bar on which the device can be mounted (mm)	max. 28
Dimensions (mm)	80 x 110 x 50
Weight (kg)	0,26

EARTHING AND SHORT-CIRCUITING DEVICES

The mounting of a short-circuiting device / earthing device on the electrical conductors is the main protective method against electrical risks, through a delimitation of a safe and protected working area. The short-circuiting device / earthing device is an equipment which connects parts of the electric circuit with the ground. This device must be applied in the following sequence of operations:

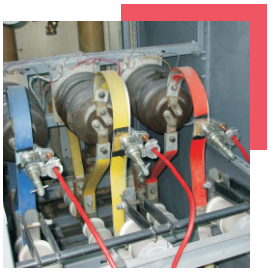
– tightening of the earthing clamp to the grounding plate or to the earthing rod (initially inserted in the ground)
– checking (using a adequate voltage detector) the absence of voltage on the conductors which will be connected to the ground.
– mounting and tightening of the phase clamps, which achieves the correct connection between the phase conductors and the ground.

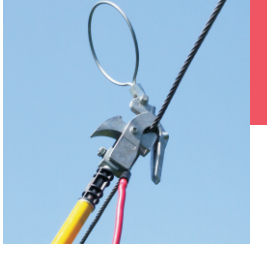
Usually, the mounting of phase clamps must be accomplished by using insulating sticks / poles / handles especially designed for this operation, adapted to the characteristics of installation.
The removing of the shortcircuiting device must be accomplished in reverse order to its mounting.

The short-circuiting devices are manufactured according the standard EN 61230 and they can be used in indoor or outdoor electrical instalations (eg LV/MV/HV overhead lines, LV panel boards, LV/MV cabinets, HV/MV transformer substations).

The cables of the short-circuiting device / earthing device are manufactured from very flexibile multi-core copper wire, class VI /EN 60228 covered by an insulating layer, directly extruded on the copper wire. These cables should fulfill the norms of EN 61138 standard.

The phase clamps and the earthing clamps are designed and manufactured in a large variety of shapes in order to be easily fitted to different types of conductors. These clamps must have very good mechanical properties to withstand a incident caused by the accidental occurence of power.





Earthing and short-circuiting device for LV overhead lines with insulated conductors

Code: Msp - T - 1 - nxS_s/0,7 - S_p/l_p - F/p

The earthing and short-circuiting device for LV overhead lines with insulated conductors is provided with coupling plugs (having the function of phase clamps), which can be connected to voltage connectors COT10-95A (already fixed on the insulated conductors) through the bayonet coupling system.
The coupling plugs and the socket plugs are protected by insulating sleeves.

The earthing and short-circuiting device is composed from the following items:

Short-circuiting subassembly:
- phase clamps "n" - 4 ... 7 pieces;
- short-circuiting cables - 3 ... 6 pieces;
- socket plug - 1 piece.

Earthing subassembly:
- coupling plug - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

Earthing rod - 1 piece (only at request).

The earthing and short-circuiting device can be delivered in transport bag/box.

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Parameter	Value	
Nominal operational voltage Un (kV)	max. 1	
Short-circuiting S_s and earthing S_p cable cross-section (mm^2)	16	25
Nominal short-circuiting current for t=1s I_{sc} (kA)	4	6
Peak current for t = 0,02s I_{sd} (kA)	10	15
Testing short-circuiting current for t = 1s (kA)	4,6	6,9
Testing peak current for t = 0,02s (kA)	11,5	17,25
Peak factor	2,5	
Short-circuiting cables length l_s (m)	0,7	
Earthing cable length l_p (m)	max. 15	
Number of coupling plugs at the insulated conductors	max. 7	
Type of connectors on which it can be applied the coupling plug	COT 10 - 95 A	

Earthing and short-circuiting device for LV overhead lines with non-insulated conductors

Code: Msp - 1 - nxS_f /l_f - S_p /l_p - O/p

The earthing and short-circuiting device for LV overhead lines with non-insulated conductors is equipped with self-tightening phase clamps (manufactured by casting from aluminum alloy). The body of the clamp is assembled in with the insulating stick, made from polyester resin reinforced with fiberglass (GRP), at the ending being mounted a handle. In the handle of the insulating stick can be mounted, by screwing up, an extension stick.

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The short-circuiting device is composed from the following items:

Short-circuiting subassembly:
- phase clamps "n" = 4 ... 7 pieces;
- short-circuiting cables - 3 ... 6 pieces;
- socket coupling - 1 piece.

Earthing subassembly:
- plug type coupling - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;
- insulating extension stick - 1 piece.
- earthing rod - 1 piece (only at request).

The earthing and short-circuiting device is delivered in transport bag/box

Parameter	Value	
Nominal operational voltage Un (kV)	max. 1	
Short-circuiting S_f and earthing S_p cable cross-section (mm^2)	16	25
Nominal current of short-circuiting for t=1s Isc (kA)	4	6
Peak current for t = 0,02s I_{sd} (kA)	8	12
Testing short-circuiting current for t = 1s (kA)	4,6	6,9
Testing peak current for t = 0,02s (kA)	9,2	13,8
Peak factor	2	
Short-circuiting cables length l_f (m)	max. 1	
Earthing cable length l_p (m)	max. 15	
Number of phase clamps (n)	max. 7	
Protection length of insulating stick (m)	0,35	
Total protection length of insulating stick, using the extension (m)	0,84	
Conductor diameter on which the phase clamp can be applied (mm)	5 - 16	
Section of the conductor on which it can be applied the phase clamp (mm^2)	25 - 120	

Universal earthing and short-circuiting device for LV overhead lines

Code: Msp - 1 - nxS_f /l_f - S_p /l_p - OF/p

The universal short-circuiting and earthing device can be used for all kinds of LV overhead lines (from Romania). The short-circuiting subassemblies are provided with self-tightening phase clamps for non-insulated conductor, with coupling plugs for voltage connectors type COT 10-95 A mounted on insulated conductors .

The earthing and short-circuiting device contains the following components:
- short-circuiting subassembly for non-insulated overhead lines;
- short-circuiting subassembly for insulated overhead lines;
- earthing subassembly;
- earthing rod- 1 piece (only at request).

The earthing and short-circuiting device can be delivered in transport bag/box.

CST Enel SR EN 61230

Parameter	Value	
Nominal operational voltage Un (kV)	max. 1	
Short-circuiting S_f and earthing S_p cable cross-section (mm^2)	16	25
Nominal short-circuiting current for t=1s I_{sc} (kA)	4	6
Peak current for t = 0,02s I_{sd} (kA)	8	12
Testing short-circuiting current for t = 1s (kA)	4,6	6,9
Testing peak current for t = 0,02s (kA)	9,2	13,8
Peak factor	2	
Short-circuiting cables length l_f (m) - subassembly for LV non-insulated overhead lines	max. 1	
Short-circuiting cables length l_f (m) - subassembly for LV insulated overhead lines	0,7	
Earthing cable length l_p (m)	max. 15	
Number of phase clamps for overhead lines	max. 7	
Protection length of the insulating stick (m)	0,35	
Total protection length of the insulating stick, using the extesion (m)	0,84	
Conductor diameter on which the phase clamp can be applied (mm)	5 ... 16	
Section of the conductor on which it can be applied the phase clamp (mm^2)	25 ... 120	
Type of connectors on which it can be applied the short-circuiting device	COT 10-95 A	

Earthing and short-circuiting device for LV panel boards

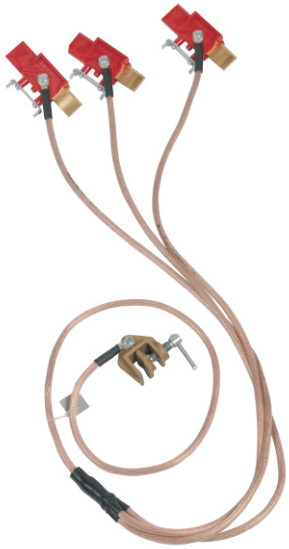
Code: Msp - 1 - nxS_f/l_f - S_p/l_p - B/p
Msp - 1 - nxS_f/l_f - S_p/l_p - B00/p

The short-circuiting device for LV panel boards and cabinets contains phase knives adapted to the sizes of HRC fuses sockets. The small phase knife can be fitted on fuse sockets size 00, and the large one can be fitted on sockets size 0 up to 3. These phase knives must be handled with an insulating device (see fuses handles, page 4).

The single-phased short-circuiting device contains:
- phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The three-phased short-circuiting device contains:
- phase clamps - 3 pieces;
- phase cables - 3 pieces;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The short-circuiting device is delivered in a transport bag/box



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Parameter		Value		
Nominal operational voltage Un (kV)		max. 1		
Short-circuiting S_f and earthing S_p cable cross-section (mm^2)		16	25	35
Nominal short-circuiting current for t=1s I_{sc} (kA)	Short-circuiting device for fuse sockets sizes 0; 1; 2; 3	3,5	6	8
Nominal short-circuiting current for t=1s I_{sc} (kA)	Short-circuiting device for fuse sockets sizes 00	4	-	-
Peak current for t = 0,02s I_{sd} (kA)	Short-circuiting device for fuse sockets sizes 0; 1; 2; 3	8,75	15	20
Peak current for t = 0,02s I_{sd} (kA)	Short-circuiting device for fuse sockets sizes 00	10	-	-
Testing short-circuiting current for t = 1s (kA)	Short-circuiting device for fuse sockets sizes 0; 1; 2; 3	4	6,9	9,2
Testing short-circuiting current for t = 1s (kA)	Short-circuiting device for fuse sockets sizes 00	4,6	-	-
Testing peak current for t = 0,02s (kA)	Short-circuiting device for fuse sockets sizes 0; 1; 2; 3	10	17,25	23
Testing peak current for t = 0,02s (kA)	Short-circuiting device for fuse sockets sizes 00	11,5	-	-
Peak factor		2,5		
Short-circuiting cables length l_f (m) - three-phased short-circuiting device		max. 1,2		
Earthing cable length l_p (m) - three-phased short-circuiting device		max. 5,5		
Earthing cable length l_p (m) - single-phased short-circuiting device		max. 6,7		

Voltage connector COT 10-95

Code: COT 10-95 A

The voltage connectors are permanently mounted on LV insulated overhead lines and they can be applied directly to the live insulated conductors. Through their correct montage on the conductor, the insulation and the anticorrosive protection of the line are not damaged. The voltage connector contains an insulating piercing clamp type SL 11.118 (Ensto) and an insulated subassembly which allows the connection with the phase plug of the short-circuiting device.

The voltage connector contains two subassembly:
- Piercing clamp - SL 11.118 - 1 piece;
- Insulated subassembly - 1 piece.

CST SR EN 61230

Parameter	Value
Nominal operational voltage Un (kV)	max. 1
Section of the insulated conductors S_c (mm^2)	10; 16; 25; 35; 50; 50 Ol+Al; 70; 95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	6
Peak current for t = 0,02s I_{sd} (kA)	15
Testing short-circuiting current for t = 1s (kA)	6,9
Testing peak current for t = 0,02s (kA)	17,25
Peak factor	2,5
Dielectric rigidity of the case (kV/1min)	9
Case type	Waterproof and ventilated
Case material	High density polyethylene (PEHD)
Contact elements material	Aluminium alloy
Tightening elements material	Stainless steel
Tightening methods	With torque wrench
Tightening torque value	26Nm
Protection against corrosion and oxides (Al/Cu contact)	Contact element: tinning and neutral vaseline with dropping point at 120°C. Tightening elements: stainless steel
Compensation measures for the leaking at cold of the aluminium conductor	Two elastic elements from stainless steel that assure a tightening torque constant in time
Minimum instalation temperature (°C)	-20
Temperature range (°C)	-25...+55

Shunt for LV overhead lines, with non-insulated conductors

Code: Msp - 1 - 2x25/l_f - O

The shunt for LV overhead lines is used in live works (repairs, maintenance, etc.) in areas where is mandatory for the current to consumer not to be interrupted.

The device is provided with two self-tightening phase clamps, manufactured from aluminum alloy. The clamp body is fixed in the insulating rod, provided with a handle.

Optionally, the shunt can be delivered with one or two extension rods.

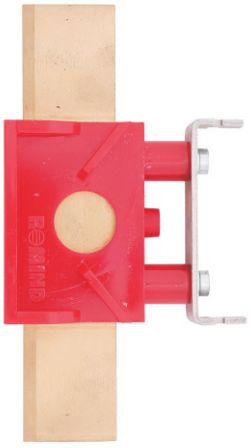
Parameter	Value
Nominal operational voltage Un (kV)	max. 1
Cable section (mm^2)	25
Permanent current I (A)	100
Cable length l_f (m)	on request
Conductor diameter* (mm)	5 - 16
Conductor section* (mm^2)	25 - 120

* on which the phase clamp can be applied

Connecting knife for fuse sockets

Code: P 2282-0-00

The connecting knife can be used on LV installations in order to complete the circuits in the separation points. The connecting knife can be fitted in HRC fuses sockets - size 0, 1, 2 and 3 using a fuse handle.



Parameter	Value
Nominal current (A)	250
Weight (kg)	0,32

Single-phased earthing device for bus bars – classic clamp (“C”)

Code: Msp - C - S_p/l_p - P/p

The single-phased earthing device is equipped with a classic phase clamp (type “C”) which can be fixed on bus bars in indoor substations. The “C” classic clamp contains a moulded body made of alluminium alloy and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phase earthing device contains:
- classic phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The earthing device is delivered in sets of three pieces in a transport bag/box.

CST SR EN 61230

Parameter	Value						
Earthing cable section S_p(mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd}(kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Earthing cable length l_p(m)	max. 8,5						
Thickness of the buss bar on which the phase clamp can be applied (mm)	max. 40						

Single-phased earthing device for bus bars – automatic clamp (”CA”)

Code: Msp - CA - S_p/l_p - P/p

The single-phased earthing device is equipped with an automatic phase clamp (type “CA”) which can be fixed on bus bars in indoor substations. The “CA” automatic clamp contains a moulded body made of alluminium alloy, a special trigger mechanism and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phased earthing device contains:
- automatic phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The earthing device is delivered in sets of three pieces in a transport bag/box.

CST Enel SR EN 61230

Parameter	Value						
Earthing cable section S_p (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing shortcircuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Earthing cable length l_p (m)	max. 8,5						
Thickness of the bus bar on which the phase clamp can be applied (mm)	max. 37						

Single-phased earthing device for spherical pieces – fast automatic clamp (”CAR”)

Code: Msp - CAR - S_p/l_p - S

The single-phased earthing device is equipped with a fast automatic phase clamp (type “CAR”) which can be fixed on spherical pieces (diameter 30mm) permanently mounted on bus bars. The “CAR” automatic clamp contains an extruded body made of alluminium alloy and fast tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phased earthing device contains:
- fast automatic phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The earthing device is delivered in sets of three pieces in a transport bag/box.

CST Enel SR EN 61230

Parameter	Value						
Earthing cable section S_p (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Earthing cable length l_p (m)	max. 9,5						
Diameter of the spherical pieces (mm)	30						

Three-phased short-circuiting device for bus bars - classic clamp (”C”)

Code: Msp - C - 3xS_f/I_f - S_p/I_p - P/p

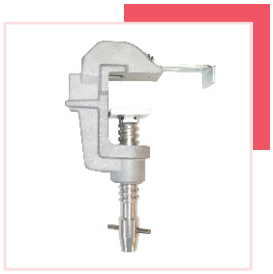
The three-phased short-circuiting device is equipped with three classic phase clamps (type “C”) which can be fixed on bus bars in indoor substations. The “C” classic clamp contains a moulded body made of alluminium alloy and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The three-phased short-circuiting device contains:
- classic phase clamps - 3 pieces;
- phase cables - 3 pieces;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The short-circuiting device is delivered in a transport bag/box

CST SR EN 61230

Parameter	Value						
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Short-circuiting cable length l_f (m)	max. 1,5						
Earthing cable length l_p (m)	max. 7						
Thickness of the bus bar on which the clamp can be applied (mm)	max. 40						



Three-phased short-circuiting device for bus bars – automatic clamp (”CA”)

Code: Msp - CA - 3xS_f/l_f - S_p/l_p - P/p

The three-phased short-circuiting device is equipped with three automatic phase clamps (type “CA”) which can be fixed on bus bars in indoor substations. The “CA” automatic clamp contains a moulded body made of alluminium alloy, a special trigger mechanism and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The three-phased short-circuiting device contains:
- automatic phase clamps - 3 pieces;
- phase cables - 3 pieces;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The short-circuiting device is delivered in a transport bag/box.

CST Enel SR EN 61230

Parameter	Value						
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Short-circuiting cable length l_f (m)	max. 1,5						
Earthing cable length l_p (m)	max. 7						
Thickness of the bus bar on which the clamp can be applied (mm)	max. 37						

Three-phased short-circuiting device for bus bars – automatic extruded clamp (”CAE”)

Code: Msp - CAE - 3xS_f/l_f - S_p/l_p - P/p

The three-phased short-circuiting device is equipped with three automatic phase clamps (type “CAE”) which can be fixed on bus bars in indoor substations. The “CAE” automatic clamp contains an extruded body made of alluminium alloy, a special trigger mechanism and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The three-phased short-circuiting device contains:
- automatic extruded phase clamps - 3 pieces;
- phase cables - 3 pieces;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The short-circuiting device is delivered in a transport bag/box.

CST SR EN 61230

Parameter	Value						
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Short-circuiting cable length l_f (m)	max. 1,5						
Earthing cable length l_p (m)	max. 7						
Thickness of the bus bar on which the clamp can be applied (mm)	max. 36						

Three-phased short-circuiting device for spherical pieces - fast automatic clamp ("CAR")

Code: Msp - CAR - 3xS_f /l_f - Sp/l_p- S

The three-phased earthing device is equipped with three fast automatic phase clamps (type "CAR") which can be fixed on spherical pieces (diameter 30mm) permanently mounted on bus bars. The "CAR" automatic clamp contains an extruded body made of alluminium alloy and a fast tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The three-phased short-circuiting device contains:
- fast automatic phase clamps - 3 pieces;
- phase cables - 3 pieces;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The short-circuiting device is delivered in a transport bag/box.

CST Enel SR EN 61230

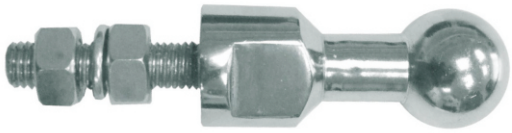
Parameter	Value						
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Short-circuiting cable length l_f (m)	max. 2,5						
Earthing cable length l_p (m)	max. 7						
Diameter of the spherical pieces (mm)	30						

Spherical pieces for bus bars

Code: P 2180-0-00 M x L

The spherical pieces should be permanently mounted on the bus bars, on MV indoor installations. This system allows ergonomical mounting conditions of the fast-automatic phase clamps (CAR) of the short-circuiting devices. Usually, the spherical pieces are mounted by replacing an existing bolt or screw used in assembling of bars.

The fasteners choice is made by the customer according the characteristics of the conductors (bus bars). The spherical piece is made of copper in order to assure a proper electrical conductivity between the bus bar and the phase clamp of the short-circuiting device. Each spherical piece is provided with a bolt, a flat washer, a split-lock (Grower) washer and two hexagonal nuts.



CST SR EN 61230

Parameter	Value
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	75
Dimension of the screw	M12; M14; M16
Free length of the screw - upon request (mm)	30; 40; 50; 60; 70; 80
Type of phase clamp that can be applied to the spherical piece	Fast automatic clamp (CAR)

Three-phased short-circuiting device for MV overhead lines – application from the ground – self-locking phase clamp

Code: Msp - AS - 3x35/10 - O/p

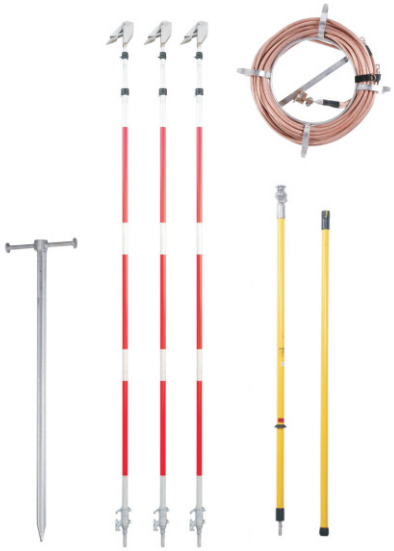
The three-phased short-circuiting device provided with self-locking phase clamps can be applied from the ground on the MV overhead lines, up to a height of 10,5 meters.

The phase clamp has a simple and efficient self-locking system, its tightening on the conductors being insured by the weight of "copper earthing cable - telescopic stick" assembly. The phase clamp is permanently fixed on the top on the telescopic stick. The main parts of the phase clamp are made of moulded alluminium alloy. The telescopic stick is done from three alluminium pipes. The short-circuiting device contains also a special connectable insulating stick (from 2 modules) provided with a special coupling system with the terminal rods of telescopic sticks.

The checking of voltage presence on the overhead lines can be done using a voltage detector DTCIER/P 6-35 kV mounted to the special coupling piece from the top of the insulating stick. In this operation, the electrode of the detector is replaced by the "phase clamp – telescopic stick" assembly.

The three-phased short-circuiting device contains:
- telescopic metallic stick with self-locking clamp - 3 pieces;
- connectable insulating stick (two modules) - 1 piece;
- metallic drum for the transportation of the cables - 1 piece;
- earthing cables 10m x 35mm^2 -3 pieces;
- manual earthing clamp - 1 piece;
- earthing rod - 1 piece;

The short-circuiting device is delivered in a transport bag.



CST SR EN 61230 SR EN 61235

Parameter	Value
Nominal operational voltage U_n (kV)	max. 35
Section/length of the earthing cable (mm^2/m)	35 / 10
Nominal short-circuiting current for t = 1s I_{sc} (kA)	8
Nominal peak currrent for t = 0,02s I_{sd} (kA)	20
Testing short-circuiting current for t = 1s (kA)	9,2
Testing peak current for t = 0,02s (kA)	23
Nominal peak factor	2,5
Length of the telescopic stick: folded/extended	2,45 / 6,35
Total length of the insulating stick (m)	3,42
Conductor diameter on which the clamp can be applied (mm)	4÷22

Three-phased short-circuiting device for MV overhead lines - application from the ground - automatic self-locking phase clamp (”CAA”)

Code: Msp - CAA - AS - 3xS_p/l_p- O/p

The three-phased short-circuiting device equipped with automatic self-locking phase clamps (CAA) can be applied from the ground on the MV lines at heights below 9 meters.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's provided with a threaded steel piece to attach the mounting adapter and a steel ring for dismounting. These phase clamps can be applied on conductors, one by one, with an insulating telescopic stick (maximum length 9 meters, code: PTU-AS-400kV-6-C). The mounting adapter and the dismounting hook have a hexagonal rod in order to be attached to the hexagonal coupling system from the top of the telescopic insulating stick.

The application and the fixation of the phase clamp is done through the vertical extend of the insulating stick followed by pulling the clamp downward over the overhead conductor. The removal of the phase clamp is done by hooking and pulling downward of the steel ring using the dismounting hook fixed in the hexagonal coupling system of the telescopic insulating stick.

Pay attention! It's recommended the sections of the cables do not exceed 50mm² (due to heavy weight of the cables).

The three-phased short-circuiting device contains:
- automatic self-locking phase clamps (CAA) - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cables - 3 pieces;
- earthing rod - 1 piece;
- dismounting hook - 1 piece;
- mounting adapter - 1 piece.

The short-circuiting device is delivered in a transport bag/box.

CST Enel SR EN 61230

Parameter	Value				
Earthing cable section S_p (mm^2)	16	25	35	50	70
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46
Nominal peak factor	2,5				
Length of the earthing cable l_p(m)	max. 15				
Conductor diameter on which the clamp can be applied (mm)	6÷32				

Three-phased short-circuiting device for MV overhead lines – application from the ground or from the pole – automatic self-locking clamp (”CAA”)

Code: Msp - CAA - U - 2xS_f /l_f - S_p/l_p - O/p

The three-phased short-circuiting device equipped with automatic self-locking phase clamps (CAA) can be applied from the ground on the MV overhead lines at heights below 9 meters or from the pole. This device contains two subassemblies: the first one for earthing and the second one for short-circuiting of the MV phase conductors.

The application of the device should be done respecting following operations:

1. First time, the earthing subassembly should be applied in order to get the connection of a phase conductor to the ground.
2. After that, the short-circuiting subassembly should be mounted starting by the phase conductor connected to the ground.

If the mounting is done from the ground, an telescopic insulating stick (maximum length 9 meters, code: PTU-AS-400kV-6-C) and an ACMIT/C adaptor should be used. The clamps dispenser and the removal fork have a bayonet rod in order to be attached to the ACMIT/C adaptor initially fixed on the top of the stick.
If the mounting is done from the pole, a connectable insulating stick (type PMU 20-1 B/baS) should be used. The clamps dispenser and the removal fork can be directly fixed with the bayonet coupling system of the stick.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's provided with a coupling piece for attaching to the clamps dispenser and a steel ring for dismounting.

The mounting of the phase clamp is done by pulling the clamp downward over the overhead conductor. The removal of the phase clamp is done by hooking and pulling downward of the steel ring through the removal fork, fixed on the top of the insulating stick.

CST SR EN 61230

The short-circuiting subassembly contains
- phase clamps - 3 pieces;
- short-circuiting cables - 2 pieces;
- clamps disspenser - 1 piece;
- removal fork - 1 piece.

The earthing subassembly contains:
- phase clamps - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;
- earthing rod - 1 piece.

The short-circuiting device is delivered in a transport bag/box.

Parameter	Value		
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2
Testing peak current for t = 0,02s (kA)	11,5	17,25	23
Nominal peak factor		2,5	
Short-circuiting cable length l_f (m)		max. 4	
Earthing cable length l_p (m)		max. 15	
Conductor diameter on which the clamp can be applied (mm)		6 - 32	

Three-phased short-circuiting device for MV overhead lines - application from the pole with mounting adaptor - automatic self-locking clamp (”CAA”)

Code: Msp - CAA - AST - 3xS_f /l_f - S_p/l_p - O/p - CR

The three-phased earthing device equipped with automatic self-locking phase clamps (CAA) can be applied from the pole on the MV overhead lines.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's provided with a threaded piece to attach the mounting adaptor and a steel ring for dismounting. These phase clamps can be applied / removed on / from conductors, one by one, using a connectable insulating stick (code: PMU-20-1-B/baS). The mounting adaptor and the dismounting hook have a bayonet rod in order to be attached to the bayonet coupling system from the top of the stick.

The mounting of the phase clamp is done by pulling the clamp downward over the overhead conductor. After the mounting of each phase clamp, the insulating stick with the mounting adaptor should by detached by unscrewing.

The removal of the phase clamp is done by hooking and pulling downward of the steel ring using the dismounting hook fixed in the bayonet coupling system of the insulating stick.

The three-phased short-circuiting device contains:
- automatic self-locking phase clamp (CAA) - 3 pieces;
- short-circuiting cables - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cable - 1 piece;
- earthing rod - 1 piece;
- dismounting hook - 1 piece;
- mounting adaptor - 1 piece.

The short-circuiting device is delivered in a transport bag/box.

CST SR EN 61230

Parameter	Value					
Earthing S_p and short-circuiting $S_f$cable sections (mm^2)	16	25	35	50	70	95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16	18
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40	45
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	20,7
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	51,75
Nominal peak factor	2,5					
Short-circuiting cable length l_f (m)	max. 2,5					
Earthing cable length l_p (m)	max. 15					
Conductor diameter on which the clamp can be applied (mm)	6÷32					

Three-phased short-circuiting device for MV overhead lines - application from the pole with clamp dispenser - automatic self-locking clamp (”CAA”)

Code: Msp - CAA - AST - 3xS_f /l_f - S_p/l_p - O/p

The three-phased short-circuiting device equipped with automatic self-locking phase clamps (CAA) can be applied from the pole on the MV overhead lines.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's provided with a special piece to attach the clamps dispenser and a steel ring for dismounting. These phase clamps can be applied / removed on / from conductors with a connectable insulating stick (code: PMU-20-1-B/baS). The clamps dispenser and the dismounting hook have a bayonet rod in order to be attached to the bayonet coupling system from the top of the stick.

The clamps dispenser should by fixed on the top of the stick. After that, the phase clamps should be attached to the clamps dispenser. The mounting of the phase clamp is done by pulling the clamp downward over the overhead conductor. After the mounting of each phase clamp, the insulating stick with the clamps dispenser should by detached by pulling. The removal of the phase clamp is done by hooking and pulling downward of the steel ring using the dismounting hook fixed in the bayonet coupling system of the insulating stick.

Enel SR EN 61230

The three-phased short-circuiting device contains:
- automatic self-locking phase clamp (CAA) - 3 pieces;
- short-circuiting cables - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cable - 1 piece;
- earthing rod - 1 piece;
- dismounting hook - 1 piece;
- clamp dispenser - 1 piece.

The short-circuiting device is delivered in a transport bag/box.

Parameter	Value					
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16	18
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40	45
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	20,7
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	51,75
Nominal peak factor	2,5					
Short-circuiting cable length l_f (m)	max. 2,5					
Earthing cable length l_p (m)	max. 15					
Conductor diameter on which the clamp can be applied (mm)	6÷32					

Three-phased short-circuiting device for MV overhead lines - application from the pole - automatic self-locking clamp with insulating stick (”CAA”)

Code: Msp - CAA - AST - 3xSf/lf - Sp/lp - O/p - E

The three-phased short-circuiting device equipped with automatic self-locking phase clamps (CAA) fixed on insulating sticks can be applied from the pole on the MV overhead lines.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's fixed on an insulating stick made of fiberglass tube.

The mounting of the phase clamp is done by pulling the clamp downward over the overhead conductor. The removal of the phase clamp is done by pushing and vertical rotation of the insulating stick.

The three-phased short-circuiting device contains:
- automatic self-locking phase clamp (CAA) - with insulating stick - 3 pieces;
- short-circuiting cables - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cable - 1 piece;
- earthing rod - 1 piece;

The short-circuiting device is delivered in a metallic box (1830 x 300 x 160 mm).

CST Enel SR EN 61230 SR EN 61235

Parameter	Value					
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16	18
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40	45
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	20,7
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	51,75
Nominal peak factor	2,5					
Short-circuiting cable length l_f (m)	max. 2,5					
Earthing cable length l_p (m)	max. 15					
Conductor diameter on which the clamp can be applied (mm)	6÷32					
Insulated stick -Total length L_t / Useful length L_u (m)	1,6 / 0,8					

Three-phased short-circuiting device for MV overhead lines - application from the pole - automatic self-locking clamp with insulating telescopic stick ("CAA")

Code: Msp - CAA - AST - 3xS_f /l_f - S_p/l_p - O/p - T

The three-phased short-circuiting device equipped with automatic self-locking phase clamps (CAA) fixed on telescopic insulating sticks can be applied from the pole on the MV overhead lines.

The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's fixed on an telescopic insulating stick made of fiberglass tubes.

The mounting of the phase clamp is done by pulling the clamp downward over the overhead conductor. The removal of the phase clamp is done by pushing and vertical rotation of the insulating stick.

The three-phased short-circuiting device contains:
- automatic self-locking phase clamp (CAA) - with telescopic insulating stick - 3 pieces;
- short-circuiting cables - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cable - 1 piece;
- earthing rod - 1 piece;

The short-circuiting device is delivered in a metalic box (1030 x 300 x 160 mm).

CST SR EN 61230 SR EN 61235

Parameter	Value					
Nominal operational Voltage Un (kV)	max. 35					
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16	18
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40	45
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	20,7
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	51,75
Nominal peak factor	2,5					
Short-circuiting cable length l_f (m)	max. 2,5					
Earthing cable length l_p (m)	max. 15					
Conductor diameter on which the clamp can be applied (mm)	6÷32					
Insulated stick -Total length L_t / Useful length L_u (m)/ Folded length L_c	1,55 / 1,14 / 0,95					

Single-phased earthing device for round conductors – classic clamp (“Cr”)

Code: Msp - Cr - S_p/I_p - O

The single-phased earthing device is equipped with a classic phase clamp (type “Cr”) which can be fixed on round conductors in HV/MV substations. The “Cr” classic clamp contains an extruded body made of alluminium alloy and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phase earthing device contains the following components;
- classic phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece;

The earthing device equipped with cables with 120mm^2 sections and lengths greater than 9,5m is provided only with earthing lug (without earthing clamp)

The earthing device is delivered in sets of three pieces in a transport bag/box.

CST SR EN 61230

Parameter	Value						
Earthing cable section S_p (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing short-circuiting current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Maximum length of the earthing cable I_p (m)	17,5	17,5	17,5	17,5	17,5	10	10
Peak factor	2,5						
Conductor diameter on which the clamp can be applied (mm)	17 ÷ 32						

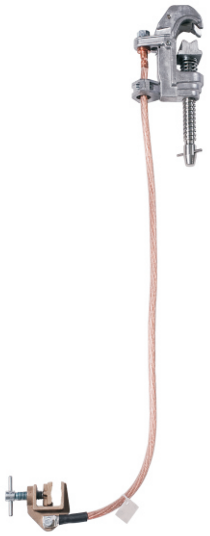
Single-phased earthing device for round conductors – automatic clamp (“CA”)

Code: Msp - CA - S_p/l_p - O/p

The single-phased earthing device is equipped with an automatic phase clamp (type “CA”) which can be fixed on round conductors in HV/MV substations. The “CA” automatic clamp contains a moulded body made of alluminium alloy, a special trigger mechanism and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phased short-circuiting device contains:
- automatic phase clamp - 1 piece;
- earthing cable- 1 piece;
- earthing clamp - 1 piece.

The earthing device is delivered in sets of three pieces in a transport bag/box.



CST Enel SR EN 61230

Parameter	Value						
Earthing cable section S_p (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing shortcircuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Length of the earthing cable l_p (m)	max. 8						
Conductor diameter on which the clamp can be applied (mm)	17 ÷ 32						

Single-phased earthing device for round conductors – automatic clamp (“CAEr”)

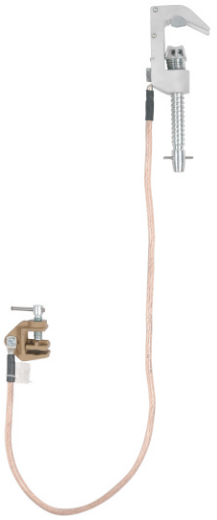
Code: Msp - CAEr - S_p/l_p - O

The single-phased earthing device is equipped with an automatic phase clamp (type “CAEr”) which can be fixed on round conductors in HV/MV substations. The “CAEr” automatic clamp contains an extruded body made of alluminium alloy, a special trigger mechanism and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks.

The single-phased short-circuiting device contains:
- automatic extruded phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp - 1 piece.

The short-circuiting device equipped with cables with 120mm^2 sections and lengths greater than 9,5m is provided only with earthing lug (without earthing clamp)

The earthing device is delivered in sets of three pieces in a transport bag/box.



CST SR EN 61230

Parameter	Value						
Earthing cable section S_p (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40	50	75
Testing sort-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Maximum length of the earthing cable l_p (m)	17,5	17,5	17,5	17,5	17,5	10	10
Peak factor	2,5						
Conductor diameter on which the clamp can be applied (mm)	17 ÷ 32						

Single-phased earthing device for the railway contact line

Code: Msp - CrTf - S_p/l_p - Fc/ps

The earthing device equipped with classic clamp for the railway installations (CrTf type) and manual earthing clamp for the rail is used on the tramrails or railways.

The classic clamp for the railway installations (CrTf type) contains an extruded body made of alluminium alloy and a tightening screw with a bayonet terminal for coupling with PMU insulating sticks. At the top, the classic clamp is provided with an electrode to discharge the contact power line of the induced residual capacitive charge from the neighboring installations.

The manual earthing clamp for the rail has a body made of copper-aluminum alloy and can be fixed under the rail, leaving the path free.

Components:
- classic phase clamp - 1 piece;
- earthing cable - 1 piece;
- manual earthing clamp for the rail - 1 piece.

The earthing device is delivered in a transport bag/box.

CST SR EN 61230

Parameter	Value				
Section of earthing clamp S_p (mm^2)	16	25	35	50	70
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16
Peak current for t = 0,02s I_{sd} (kA)	8,75	15	20	30	40
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46
Power factor	2,5				
Maxim length of earthing cable l_p (m)	max. 16				
Diameter of conductor on which can be applied the phase clamp (mm)	5 ÷ 32				
Type of rails	40, 49, 60, R65				

"Tr" fixed point

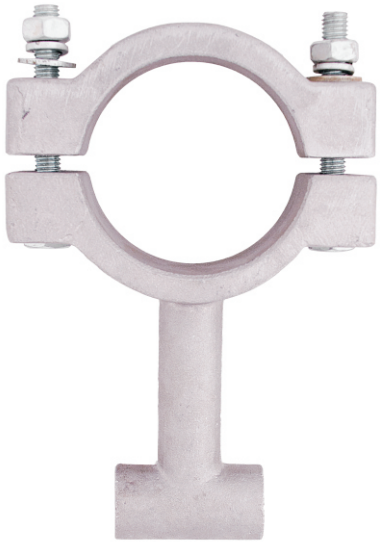
The "Tr" fixed point has a "T" shape and is permanently mounted on a large range of flexible round conductors in order to improve the montage conditions of the phase clamps and to mark the place of the installation for earthing devices.

CST SR EN 61230

Parameter	Value
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	75
Testing short-circuiting current for t = 1s (kA)	34,5
Testing peak current for t = 0,02s (kA)	86,25
Nominal peak factor	2,5
Range of nominal diameters of the flexibile conductors ØD (mm)	19 - 36
Range of sections of the flexibile conductors (mm^2)	185 - 680

"T" fixed point

The "T" fixed point is permanently mounted on a rigid round conductors in order to improve the montage conditions of the phase clamps and to mark the place of the installation for earthing devices. There are two sizes of "T" fixed point.



SR EN 61230

Parameter	Value
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30
Nominal peak currrent for t = 0,02s I_{sd} (kA)	75
Nominal diameters of the rigid conductors ØD (mm)	55; 80

Single-phased earthing device for HV overhead lines - automatic self-locking clamp ("CAA")

Code: Msp CAA - S_p/l_p- O/p

The single-phased earthing device equipped with automatic self-locking clamp (CAA) can be applied on the HV overhead lines. The automatic self-locking phase clamp (CAA) is made of moulded aluminium alloy and it's provided with a threaded coupling piece and a steel ring for dismounting.

Before the mounting, the special adaptor must be fixed in the bayonet coupling system of the stick then the phase clamp must be attached to this adaptor (please see the picture).

The mounting of the phase clamp is done by pushing of the clamp downward on the overhead conductor. The removal of the phase clamp from the overhead lines is done by hooking and pulling the steel ring the phase clamp upward through the special adaptor fixed in the insulating stick.

For this procedure it's recommended to use connectable insulating sticks PMU-Un-n-B/ba (page 13).

Usually, this kind of earthing device is provided with special earthing clamp with scraping system for painted metallic poles (in order to remove the paint and oxides layers).

The single-phased earthing device contains:
- automatic phase clamp - 1 piece;
- earthing cable - 1 piece;
- earthing clamp (scraping or normal) - 1 piece;
- special adaptor - 1 piece/ 1 set.

We recommend the use of scraping earthing clamps with this type of earthing device because they provide a better cleaning of the application surface of paint and oxides.
The earthing device is delivered in sets of three pieces in a transport bag/box.

CST SR EN 61230

Parameter	Value					
Earthing cable section S_p (mm^2)	16	25	35	50	70	95
Nominal short-circuiting current for t = 1s I_{sc} (kA)	4	6	8	12	16	18
Nominal peak currrent for t = 0,02s I_{sd} (kA)	10	15	20	30	40	45
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	20,7
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	51,75
Nominal peak factor	2,5					
Maximum length of the earthing cable l_p (m)	max. 17,5					
Conductor diameter on which the clamp can be applied (mm)	6÷32					

Three-phased short-circuiting device for the terminals of electrical motors (0,4kV or 6kV)

Code: Msp - M - 3xS_f /l_f - S_p/l_p - S/p

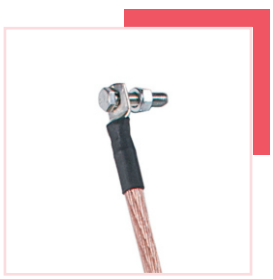
The three-phased short-circuiting device can be fixed to the terminals of electrical motors. The ends of phase cables of the device are provided with lugs which can be easily fixed to the terminals of the motors. A set of fasteners (screw, nut, split-lock washer) is attached to each copper terminal.

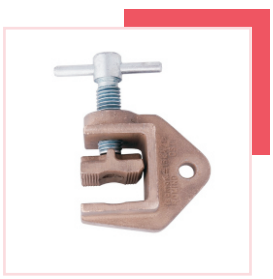
The three-phased short-circuiting device contains:
- phase lug - 3 pieces;
- phase cable - 3 pieces;
- manual earthing clamp - 1 piece;
- earthing cable - 1 piece;
- assembly parts (hexagonal screw, split-lock washer, nut) - 3 sets

The short-circuiting device is delivered in a transport bag/box.

CST SR EN 61230

Parameter	Value						
Earthing S_p and short-circuiting S_f cable sections (mm^2)	16	25	35	50	70	95	120
Nominal short-circuiting current for t = 1s I_{sc} (kA)	3,5	6	8	12	16	20	30
Nominal peak currrent for t = 0,02s I_{sd}(kA)	8,75	15	20	30	40	50	75
Testing short-circuiting current for t = 1s (kA)	4,6	6,9	9,2	13,8	18,4	23	34,5
Testing peak current for t = 0,02s (kA)	11,5	17,25	23	34,5	46	57,5	86,25
Peak factor	2,5						
Short-circuiting cable length l_f (m)	max. 2,5						
Earthing cable length l_p(m)	max. 7						
Preferential dimension of the assembly elements	M8	M8	M10	M10	M10	M12	M12
Optional dimensions of the assembly elements (mm)	M10	M10	M8 M12	M8 M12	M8 M12	M10 M16	M10 M16





Discharching device for capacitors

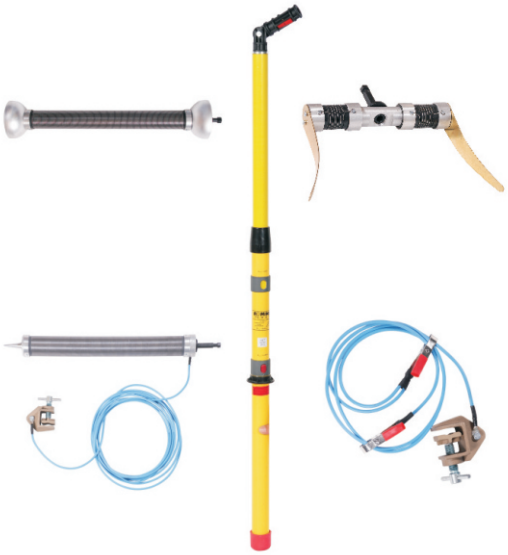
Code: DDCMT - 24 kV

DDCMT discharging device can be used in electrical installations with nominal voltage not higher than 24kV for the neutralization of residual electric charges from various equipment as:

- Medium voltage compensation capacitors and batteries of capacitors;
- Electrical motors powered by AC voltage;
- Miscellaneous equipment, after a high voltage periodical test.

This device contains following components:

- Telescopic insulating stick (PTU 20-35-R) - 1 piece;
- Discharging resistance for battery of capacitors (RB) - 1 piece;
- Discharging resistance for compensation capacitors (RC) - 1 piece;
- Discharging resistance after HV test (RIP) - 1 piece;
- Earthing device (CP) for RIP resistance - 1 piece;
- Earthing and short-circuiting device (SC) - 1 piece.



Parameter	Value
Nominal operational voltage (kV)	24
Useful length / total length stick PTU 20-35-R (m)	1,11 / 1,52
Discharging resistance for battery of capacitors (RB) (Ω)	50
Discharging resistance for compensation capacitors (RC) (Ω)	2,5
Discharging resistance after HV test (RIP) (Ω)	75
Length of the earthing cable (CP) (m)	6
Length of the earthing and short-circuiting device (SC) (m)	1,5

Discharging resistance for battery of capacitors (RB)

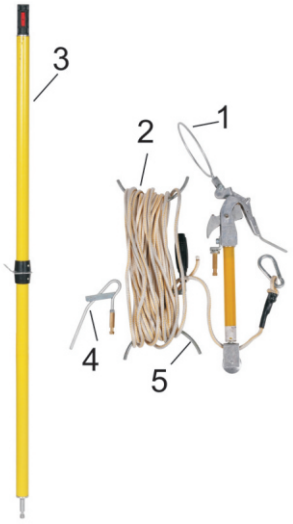
Discharging resistance for compensation capacitors (RC)

Discharging resistance after HV test (RIP)

Earthing and short-circuiting device (SC)

Special device for lifting from the ground of phase clamps of MV short-circuiting devices

Code: P 2322-0-00



The special device for lifting from the ground of phase clamps of MV three-phased short-circuiting devices is designed to improve the mounting / dismounting conditions. This device must be operated by two workers.

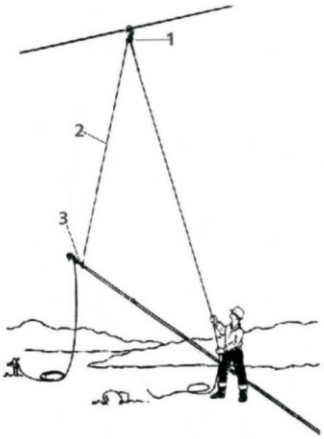
Lifting from the ground of the phase clamp, followed by its mounting on the overhead conductor can be a difficult operation due to the heavy weight of the assembly "earthing device + insulating stick" and due to the height of the mounting point (9 meters or more). To facilitate this procedure, a lifting clamp (1) (similar with a phase clamp) fitted with an insulating tube and a pulley should be placed on the highest overhead conductor. The lifting clamp has a lifting rope (2). The lifting operation should be performed with the lifting clamp fixed in a telescopic insulating stick PTU-AS-400-6-C.

Each phase clamp of earthing device should be fixed in the insulating extension (3). This extension is fixed in the coupling system of telescopic insulating stick PTU-AS-400-6-C.

By pulling the lifting rope, the phase clamp, fixed in the telescopic stick, can be more easy lifted to the overhead conductor and its positioning will be more precise. Also the dismounting of the phase clamps will be performed more easily because the worker can be focused to the handling of the stick, not to sustain the heavy weight of the assembly. For removal of the clamps from the line, a dismounting hook (fixed on the top of the stick) must be used.

Components:
1. Lifting clamp with pulley and insulating tube - 1 piece;
2. Lifting rope - 1 piece;
3. Insulating extension – 1 piece;
4. Dismounting hook – 1 piece;
5. Rope support - 1 piece.

Parameter	Value
Maximum height of MV overhead line (m)	11
Lifting rope length (m)	30
Weight (kg)	2,8



Earthing rods

The earthing rods are components of earthing devices for LV / MV overhead lines. They are made of steel profiles, protected by hot dip galvanizing against corosion.

The standard earthing rod has a hexagonal profile (code P2312-0-00).

The "T" profile earthing rod (code P2163-0-00) is a component of MV earthing device with self-locking phase clamps.

The drilling earthing rod (code P2379-0-00) can be operate without any other tool (hammer or something similar). It can be buried by twisting the rod.

Earthing rod P2312-0-00

Earthing rod P2163-0-00

Earthing rod P2358-0-00

Earthing rod P2379-0-00

Code	P 2312-0-00	P 2163-0-00	P 2358-0-00	P 2379-0-00
Length (mm)	1150	1200	1200	1200
Type	Hexagon 18	"T" profile	"T" profile	"Drill" type
Weight (kg)	3,0	4,6	3,8	7,2

Device for the extraction of earthing rods from the ground

Code: P 2342-0-00

The device for the extraction of earthing rods from the ground is designed to facilitate this difficult operation. This device can be used for all types of earthing rods (hexagonal or “T” profile).

Using this device:
- it's avoided the deformation of earthing rods due the powerful strikes;
- it's avoided the damaging of protective zinc layer.
- worker's effort is reduced;
- operational time is decreased;

This device has two components:
- ground support plate;
- extraction mechanism with rod handle;

All the components are made of steel hot dip galvanized against corrosion.

Parameter	Value
Dimensions (mm)	150 x 150 x 1200
Weight (kg)	4,3

Storage bracket

Code: P2323-0-00

The storage bracket can be used in indoor electrical stations for storage the earthing devices and insulating stick. The bracket should be fixed to an internal wall using two dowels.

Phase clamps for bus bars

SR EN 61230

The phase clamps for bus bars are manufactured in several types depending on the:
- value of the nominal short-circuiting current;
- operating mode: classic or automatic;
- body type: moulded or extruded.

All the clamps are provided with a tightening screw with a bayonet type coupling system.

There are four types of phase clamps for bus bars:
- Classic moulded clamp - C
- Automatic moulded clamp - CA
- Automatic extruded clamp - CAE
- Fast automatic clamp for spherical pieces - CAR

Classic moulded clamp - C

Automatic moulded clamp - CA

Automatic extruded clamp - CAE

Fast automatic clamp for spherical pieces - CAR

Type	Classic moulded clamp (C)	Automatic moulded clamp (CA)	Automatic extruded clamp (CAE)	Fast automatic clamp for spherical piece (CAR)
Code	P 231-0-00C	P 235-0-00	P 2247-0-00	P 2178-0-00
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30	30	30	30
Peak current for t = 0,02s I_{sd} (kA)	75	75	75	75
Testing short-circuiting current for t = 1s (kA)	34,5	34,5	34,5	34,5
Testing peak current for t = 0,02s (kA)	86,25	86,25	86,25	86,25
Peak factor	2,5	2,5	2,5	2,5
Dimensions (mm)	97 x 170 x 52	94 x 188 x 52	75 x 180 x 50	90 x 170 x 50
Thickness of the bus bar on which it's applied (mm)	max. 40	max. 37	max. 36	Ø 30
Length of the phase and earthing cable l_f (m)	8,5	8,5	8,5	9,5
Weight (kg)	0,57	0,83	0,89	0,87

Phase clamps for round conductors

SR EN 61230

The phase clamps for round conductors are manufactured in several types depending on the:
- value of the nominal short-circuiting current;
- operating mode: classic or automatic;
- body type: moulded or extruded.

All the clamps are provided with a tightening screw with a bayonet type coupling system.

There are three types of phase clamps for round conductors:
- Automatic moulded clamp (CA);
- Classic extruded clamp (Cr);
- Automatic extruded clamp (CAEr).

Automatic moulded clamp (CA)

Classic extruded clamp (Cr)

Automatic extruded clamp (CAEr)

Type	Automatic moulded clamp (CA)	Classic extruded clamp (Cr)	Automatic extruded clamp (CAEr)
Code	P 236-0-00	P 2179-0-00	P 2256-0-00
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30	30	30
Peak current for t = 0,02s I_{sd} (kA)	75	75	75
Testing short-circuiting current for t = 1s (kA)	34,5	34,5	34,5
Testing peak current for t = 0,02s (kA)	86,25	86,25	86,25
Peak factor	2,5	2,5	2,5
Dimensions (mm)	120 x 200 x 62	90 x 160 x 50	90 x 180 x 56
Conductor diameter on which it's applied (mm)	Ø 18 ÷ Ø 32	Ø 17 ÷ Ø 32	Ø 17 ÷ Ø 32
Length of the earthing cable l_p (m)	8	10	10
Weight (kg)	1,24	0,87	0,94

Phase clamps for MV/HV overhead lines

SR EN 61230

Phase clamps for medium/high voltage overhead lines are manufactured in two types, with specific adaptations to the use conditions. The main parts of the clamp are made of aluminium alloy.

Phase clamps for medium/high voltage overhead lines are manufactured in several types:
- for MV overhead lines - self-locking clamp;
- for MV overhead lines - automatic self-locking clamp (CAA) for clamps dispenser;
- for MV overhead lines - automatic self-locking clamp (CAA) for mounting adaptor;
- for HV overhead lines - automatic self-locking clamp (CAA) for special adaptor.

Self-locking clamp (for MV overhead lines)

Automatic self-locking clamp (CAA) for clamps dispenser (for MV overhead lines)

Automatic self-locking clamp (CAA) for mounting adaptor (for MV overhead lines)

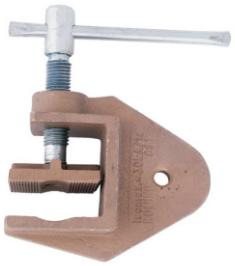
Automatic self-locking clamp (CAA) for special adaptor (for HV overhead lines)

Type	Self-locking clamp (for LEA MT)	Automatic self-locking clamp (CAA)
Code	P 265-4-00	P 2155-1-00x
Nominal short-circuiting current for t = 1s I_{sc} (kA)	8	16
Peak current for t = 0,02s I_{sd} (kA)	20	40
Testing short-circuiting current for t = 1s (kA)	9,2	18,4
Testing peak current for t = 0,02s (kA)	23	46
Peak factor	2,5	
Dimensions (mm)	130 x 100 x 75	116 x 164 x 46
Conductor diameter which it's applied (mm)	Ø 4 - Ø 22	Ø 6 - Ø 32
Length of the earthing/short-circuiting cable $l_{p/f}$ (m)	10	17,5
Weight (kg)	0,5	0,5

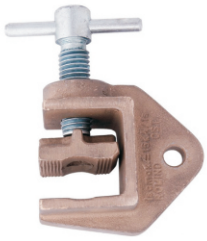
Earthing clamps

SR EN 61230

The manual earthing clamps are manufactured in two sizes (normal/reduced), depending on the value of the nominal short-circuiting current.
The body and the tightening plate are made of moulded copper-alluminium alloy.
The tightening screw is made of galvanized steel.



Normal type
CLPN-30



Reduced type
CLPR-16

Earthing clamp	Normal type CLPN-30	Reduced type CLPR-16
Nominal short-circuiting current for t = 1s I_{sc} (kA)	30	16
Peak current for t = 0,02s I_{sd} (kA)	75	40
Testing short-circuiting current for t = 1s (kA)	34,5	18,4
Testing peak current for t = 0,02s (kA)	86,25	46
Peak factor	2,5	
Dimensions (mm)	105 x 127 x 50	70 x 83 x 40
Thickness of the earthing bar on which it's applied (mm)	30	20
Length of the earthing/short-circuiting cable $l_{p/f}$ (m)	max. 17,5	
Weight (kg)	1,09	0,48

Earthing clamps with scraping plate

SR EN 61230

The manual earthing clamps with scrapping plate are manufactured in two sizes (normal/reduced), depending on the value of the nominal short-circuiting current.

By mounting the earthing clamp with scraping plate removes the oxides layers, impurities and protective paint from painted metallic surfaces of poles or earthing bars. This way an appropriate contact resistance is obtained.

The earthing clamps body is made of moulded cooper-aluminum alloy.
The scraping plate and the tightening screw are made of galvanized steel.

Earthing clamp with scraping plate P2277-0-00

Earthing clamp with scraping plate P2366-0-00

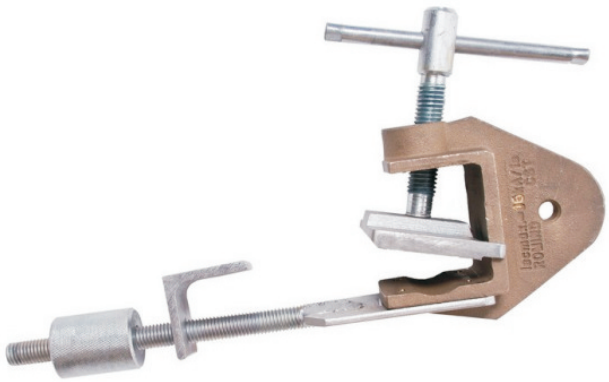
Earthing clamp with scraping plate	Normal type P 2277-0-00	Reduced type P 2366-0-00
Rated short circuit current t=1s I_{sc}(kA)	16	12
Rated peak short circuit current t=0,02s I_{sd} (kA)	40	30
Testing short-circuiting current t=1s (kA)	16	13,8
Testing peak current t=0,02s (kA)	40	34,5
Peak factor	2,5	
Dimensions (mm)	105 x 145 x 50	70 x 95 x 40
Thickness of the earthing bar on which it's applied (mm)	17	11
Length of the earthing and short-circuiting cable l_p (m)	max. 17,5	
Weight (kg)	1,25	0,6

Earthing clamp - for rails

SR EN 61230

The earthing clamp for rails use is designed so that it allows it's mounting on the base of the rail.

The body of the clamp is made of moulded aluminium-copper alloy.
The tightening plates and the screws are made of galvanized steel.



Type	Earthing clamp for rails
Nominal short-circuiting current for t = 1s I_{sc} (kA)	16
Peak current for t = 0,02s I_{sd} (kA)	40
Testing short-circuiting current for t = 1s (kA)	18,4
Testing peak current for t = 0,02s (kA)	46
Peak factor	2,5
Dimensions (mm)	285 x 150 x 50
Type of rails on which it's applied	40; 49; 60; R65
Length of the earthing/short-circuiting cable $l_{p/f}$ (m)	max. 16
Weight (kg)	1,6

Specification for short-circuiting and earthing systems

1. Type of electrical installation:

a) Overhead electric lines: - low voltage: - uninsulated conductors ☐
- insulated conductors ☐
- medium voltage ☐
- high voltage ☐

b) Electrical stations: - indoor: - medium voltage ☐
- high voltage ☐
- outdoor: - medium voltage ☐
- high voltage ☐

c) LV Panels or distribution boxes (HRC fuses) ☐

2. Type of conductors:

a) Bus bars ☐

b) Round bars or multi-wire conductors ☐

c) Special pieces: - spherical piece for bus bars ☐
- "T" piece for round bars or multi-wire conductors ☐

3. Characteristics of the electrical installation:

a) Nominal operational voltage: ..... kV

b) Nominal short-circuiting current for t = 1sec.: ..... kA

c) Diameter or section of the conductors : min. ..... mm/mm^2
max. ..... mm/mm^2

d) Dimensions of the bus bars: - thickness min. ..... m - width min. ..... mm
max. ..... mm max. ..... mm

e) Dimensions of the earthing bars: - thickness min. ..... mm
max. ..... mm

4. Short-circuiting device configuration:

a) Number of the phase clamps: …. pcs.

b) Type of phase clamp :

- classic ☐
- automatic ☐ - body: - moulded ☐
  - extruded ☐

c) Type of earthing clamp: - normal ☐
- with scraping plate ☐

d) The way the short-circuiting device is mounted (MV overhead lines):

- application from the ground ☐
- application from the pole ☐
- application from the ground or pole ☐

e) Length of the short-circuiting cables: …… m

f) Length of the earthing cable: …… m

g) Options for the earthing cable: - with earthing lug ☐
- with earthing clamp ☐

5. Accessories for the short-circuiting device:

a) Earthing rod ☐

b) Insulating stick ☐

c) Voltage detector ☐

PROTECTIVE EQUIPMENT AGAINST FALLING

During an activity performed at a dangerous height (more than 2m from the ground level or from a reference base*), where the risk of falling is present, the personnel must be equipped with special personal protective equipment. The lack of an appropriate equipment, not usage or incorrect usage of it, the usage of an out of order or eroded equipment are well known causes of the occurence of an accident with falling from height.
*reference base – a place where protective measures have been taken and risk of falling is disposed

By „personal protective equipment against falling" we define the total amount of elements and components mounted in a certain succesion with the purpose of preventing or avoiding a falling from height.

ANCHORING DEVICES

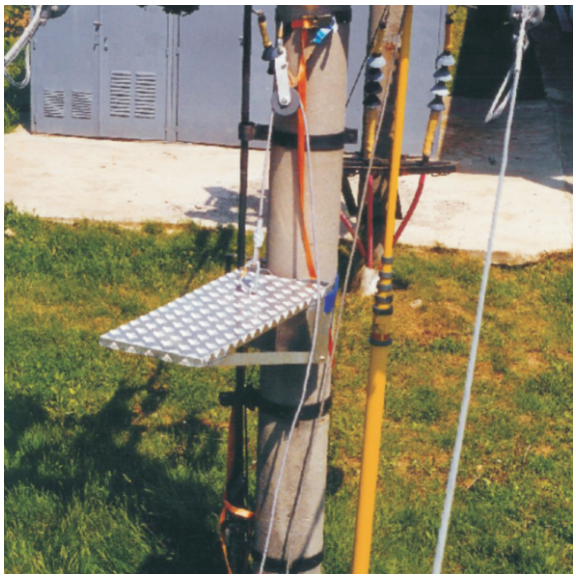
The anchoring devices are components of the protection systems against falling from height. Using these devices, it's achieved an anchoring spot for a safety rope or for a retractable fall arrester.

Platform for working on pole with lifting accessories

Code: PLI 900

The platform for working on pole can be used for maintenance or service operations on:
- Poles for LV / MV overhead lines;
- Urban transport system poles;
- Railways poles;
- Other types of poles;

This platform can be mounted on round section poles or poles with rectangular shape. It can be fixed on wood poles or concrete poles.



PLI 900 platform contains following components:
- Working platform;
- Fixing system with strap and protective sleeve;
- Self-blocking pulley;
- Static rope for lifting Ø10 mm / L = 24 m
- Automatic carabiners (2 pcs).

Parameter	Value
The perimeter of the rectangular section of the poles on which the platform can be mounted (mm)	690 ÷ 1820
The diameter of the poles on which the platform can be mounted (mm)	220 ÷ 580
Dimensions (mm)	965 x 365 x 300
Maximum load (daN)	120
Maximum load of the self-blocking pulley (daN)	30
Total weight (with fixing and pulling accessories) (kg)	14,7
Platform weight (without fixing and pulling accessories) (kg)	10,9

Anchoring hooks

Code: see table

The anchoring hooks are components of protective systems against falling from the height. These hooks can be applied on metallic consoles of the overhead lines poles. A safety rope with fall arrester should be fixed to the eyelet of the anchoring hook. The hanging of this assembly to the console of the pole creates an adequate protective system for workers climbed to the pole.

The anchoring hooks are made of galvanized steel. The hooks can be applied to the console of the pole using a telescopic insulating stick.

CA 150 hook is provided with a special fork which allows the mounting and the dismounting of the hook. In this case, during the work, the insulating stick can be detached to the hook and it can be used to other operations (checking the presence of tension; mounting of earthing device). The detachment of the CA 150 hook from the pole can be done only with the special fork fixed on the top of the stick.

CA 152A or B hooks have a hexagonal rod for fixing in the coupling system of the stick. After the fixing of the hooks on the console, the insulating stick cannot be detached from the hook.

To prevent an involuntary detachment of the CA 152A hook from the pole, the insulating stick should be tied to the pole.
CA 152B hook has a lever in order to prevent an involuntary detachment of the system from the pole. For detachment, the lever should be operating from the ground, by pulling the cord.

CE SR EN 795

CA 150

CA 152 A

CA 152 B

Code	CA 150	CA 152 A	CA 152 B
Maximum load (daN)	120	120	120
Mimimum static breaking force (daN)	1000	1000	1000
Hook span (mm)	150 ± 3	152 ± 3	152 ± 3
Cord length (m)	-	-	10
Cord diameter (m)	-	-	Ø4
Dimensions (mm)	400 x 460	263 x 473	263 x 473
Weight (kg)	2	2	2,1

Anchoring device with cable loop

Code: P 2269-0-00

The anchoring device with cable loop is a component of protective systems against falling from the height. This device can be used on the poles without consoles of the LV/MV overhead lines. A safety rope with fall arrester should be fixed to the eyelet of the cable loop. The hanging of this assembly on the top of the pole creates an adequate protective system for workers climbed to the pole.

One of the cable loop ends is fixed to the circumference of the ring; the other end has an eyelet for attachment the safety rope (using a carabiner).

The anchoring device with cable loop can be applied on the top of the pole using a telescopic insulating stick.

The anchoring device with cable loop contains following components:
- Cable loop made of steel;
- Hexagonal adaptor with plastic ring;
- Cord for enlarging the loop (in order to allow the anchoring system removal from the pole).

CE SR EN 795

Parameter	Value
Maximum load (daN)	120
Mimimum static breaking force of the loop (daN)	1000
Maximum diameter of the pole in the anchoring area (mm)	360
Weight (kg)	0,6

Anchoring device for poles with concrete console

Code: DA 400

SR EN 795

DA400 anchoring device for poles with concrete console is a component of protective systems against falling from the height. This device can be used only for the poles with concrete console of the LV/MV overhead lines. A safety rope with fall arrester should be fixed to the eyelet of the device. The hanging of this system on the concrete console creates an adequate protective system for workers climbed to the pole.

The anchoring device can be applied on the concrete console using a telescopic insulating stick.

The anchoring beam of the device can be set horizontally using a slim cord. The device has a hexagonal rod for fixing in the coupling system of insulating stick. The hanging of the DA 400 anchoring device is done through the vertical extension of the insulating stick. For passing of the device through the socket of concrete console, the anchoring beam is vertical. After the passing of the device through the socket, the cord must be pulled so that the anchoring beam will be in horizontal position allowing its positioning on the console. For removal of the anchoring system, the insulating stick should be initially lifted so that the beam to be vertically positioned, and after that - by vertical folding of the insulating stick - the anchoring device is descended to ground level.

DA 400 anchoring device contains following components:
- Anchoring beam with limiters and eyelet;
- Foldable hexagonal rod;
- Operating cord.

Parameter	Value
Maximum load (daN)	120
Mimimum static breaking force (daN)	1000
Distance between the lateral limiters (mm)	400
Dimensions (mm)	460 x 218 x 56
Weight (kg)	0,990

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