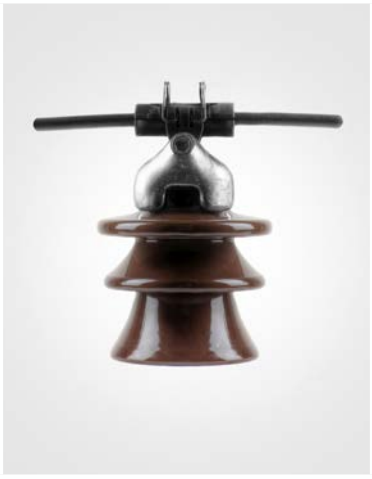
Katalog izdelkov
Product catalogue

IZOELEKTRO

Dejavnost

Predmet našega poslovanja je razvoj, proizvodnja in prodaja opreme za izgradnjo elektroenergetskih sistemov do 52 kV. Naši najpomembnejši proizvodi so:

- odvodniki prenapetosti,
- indikatorji stanja odvodnikov prenapetosti,
- natezni in podporni kompozitni izolatorji,
- sistemi izgradnje daljnovodov,
- spojna in obesna oprema,
- koncentrični material.

Poleg prodaje lastnih izdelkov dobavljamo vso ostalo opremo, ki jo kupci pri nas zahtevajo.

Visokonapetostni laboratorij

Imamo lasten visokonapetostni laboratorij, ki ga nenehno dograjujemo v skladu z najnovejšimi zahtevami standardov. Omogoča izvajanje večine preizkusov na srednjenapetostnih odvodnikih po standardu IEC 60099-4. Za potrebe razvoja in proizvodnje lahko preizkušamo izolatorje do 60 kV obratovalne napetosti. Meritve izvajamo tudi za zunanje naročnike.

Certifikati

Zavedamo se, da je za naše odjemalce najpomembnejša kakovost proizvodov. Od leta 2000 imamo v podjetju vzpostavljen in ustrezno vzdrževan sistem vodenja, ki izpolnjuje zahteve standarda ISO 9001. Leta 2007 pridobljen certifikat ISO 14001 pa potrjuje odgovorno načrtovanje novih proizvodov in ekološko ravnanje z okoljem.

Inovativnost

V naših proizvodih je vgrajenih sedem lastnih patentov, ki smo jih razvili v lastnem razvojno-raziskovalnem inštitutu. Prvi v svetu smo razvili, patentirali in leta 2004 pričeli s prodajo kompozitnih podpornih izolatorjev z izolacijsko glavo in inovativnim načinom pritrditve vodnika.

Novost

Najnovejši produkt je indikator stanja odvodnikov prenapetosti ISOP, ki prikazuje uporabnost odvodnikov prenapetosti v obratovanju.

Cilji

Naš cilj je razviti in prijaviti vsaj dva patenta letno in postati v svetu prepoznaven proizvajalec izdelkov z vgrajenimi lastnimi patenti.

Vizija

Nadaljnji razvoj je usmerjen v proizvodnjo srednjenapetostnih odvodnikov prenapetosti s silikonskim plaščem, kompozitnih podpornih izolatorjev z uporabo priključkov iz izolacijskega materiala in kompozitnih izolatorjev s kapacitivnim kazalnikom.

IZOELEKTRO - KORAK PRED ČASOM

Activity

The subject of our business is development, production and sale of power transport equipment intended for constructions of electro systems up to 52 kV. Our most important products are:

- *surge arresters,*
- *surge arresters' condition indicators,*
- *tension and post composite insulators,*
- *overhead power lines construction systems,*
- *junction and suspension equipment,*
- *connecting sleeves.*

Within the supply of own products we supply all other equipment that customers request from us.

High voltage laboratory

We have our own high voltage laboratory which is being continuously developed in line with the latest standard requirements. It allows performing most of the tests for medium voltage surge arresters according to standard IEC 60099-4. For the purposes of development and production we can test insulators up to 60 kV operating voltage. We also perform tests for customers.

Certificates

We are aware that the quality of products is most important for our customers. Since 2000 we have established and suitably maintained a system of guidance which fulfils the demands of standard ISO 9001. Certificate ISO 14001 gained year 2007 confirms responsible development of new products and eco-environmental management.

Innovativeness

In our products are embedded seven patents which were developed in our own Research and Development Institute. First in the world we have developed, patented and in 2004 began to sale post composite insulators with insulated top fitting and innovative method for attachment of wire conductor.

Innovation

The newest product is a surge arresters' condition indicator ISOP which shows the functionality of surge arresters in operation.

Goals

Our goal is to develop and apply at least two patents per year and to become a world recognized producer of products with its own patents installed.

Vision

Further development is focused on the production of medium voltage surge arresters with silicone coat and with an indication of leakage current, post line composite insulators with end fittings made of insulating material and composite insulators with a capacitive pointer.

IZOELEKTRO - AHEAD OF ITS TIME

Kazalo

Index

1. NN odvodniki prenapetosti

2. SN odvodniki prenapetosti

3. SN natezni kompozitni izolatorji

1. *LV surge arresters*

2. *MV surge arresters*

3. MV tension composite insulators

Kazalo

Index

Kazalo

Index

Seznam kratic

µs	– mikrosekunda
°C	– stopinj celzija
AD	– preskočna razdalja
AgL	– tip varovalke
Al	– aluminij
CD	– plazilna pot
d	– premer
D_{min}	– minimalna razdalja
DOPPS	– Društvo za opazovanje in preučevanje ptic
DV	– daljnovod
E	– električna poljska jakost
F_h	– horizontalna sila
F_v	– vertikalna sila
H	– višina
IEC	– Mednarodna komisija za elektrotehniko
I_{imp}	– impulzni odvodni tok
I_{max}	– maksimalni odvodni tok
I_n	– nazivni odvodni tok
IP	– stopnja zaščite
kg	– kilogram
kJ	– kilo joule
kV	– kilo volt
l	– dolžina
L	– faza
m	– meter
mA	– miliamper
mm	– milimeter
mm^2	– kvadratni milimeter
M_t	– torzijski moment
M_u	– upogibni moment
N	– newton
Nm	– newton meter
NN	– nizka napetost
ns	– nanosekunda
PA	– poliamid
PIV	– polizoliran vodnik
s	– sekunda
SCL	– nazivna upogibna sila
SN	– srednja napetost
ST	– jeklo
t	– čas
T	– temperatura
tA	– odzivni čas
U_c	– trajna obratovalna napetost
UL 94	– standard gorljivosti
U_{max}	– maksimalna napetost
U_p	– napetostni zaščitni nivo
U_r	– nazivna napetost
U_{res}	– preostala napetost
UV	– ultravijolična zaščita
v	– hitrost širjenja udarnega vala
V-0	– stopnja gorljivosti
W	– energijska absorpcija

List of abbreviations

µs	*– microsecond*
°C	*– degrees celsius*
AD	*– arcing distance*
AgL	*– type fuse*
Al	*– aluminium*
CD	*– creepage distance*
d	*– diameter*
D_{min}	*– minimum distance*
DOPPS	*– Association for the observation and study of birds*
PV	*– power line*
E	*– electric field strength*
F_h	*– horizontal load*
F_v	*– vertical load*
H	*– height*
IEC	*– International Electrotechnical Commimisson*
I_{imp}	*– discharge current*
I_{max}	*– maximal discharge current*
In	*– nominal discharge current*
IP	*– Ingress protection level*
kg	*– kilogram*
kJ	*– kilo joule*
kV	*– kilo volt*
l	*– length*
L	*– line*
m	*– meter*
mA	*– milliampere*
mm	*– millimetre*
mm^2	*– square millimetre*
M_t	*– Torque*
M_u	*– Cantilever strength*
N	*– newton*
Nm	*– newton metre*
LV	*– low voltage*
ns	*– nanosecond*
PA	*– polyamide*
CC	*– covered conductor*
s	*– second*
SCL	*– specified cantilever load*
MV	*– medium voltage*
ST	*– steel*
t	*– time*
T	*– temperature*
tA	*– response time*
U_c	*– continuous operating voltage*
UL 94	*– flammability standard*
U_{max}	*– maximum voltage*
Up	*– voltage protection level*
Ur	*– nominal voltage*
U_{res}	*– residual voltage*
UV	*– ultra-violet protection*
v	*– speed of shock wave*
V-0	*– burning rate*
W	*– energy absorption*

Beležke

Notes

1

NN odvodniki *prenapetosti*

LV surge arresters

1.1 NNO in MOSIPO splošno

Proizvod

NNO in MOSIPO so nizkonapetostni kovinsko oksidni odvodniki prenapetosti s silikonskim plaščem. Namenjeni so za vgradnjo v NN vode ali razdelilne omarice do 1 kV kot prva stopnja zaščite pred direktnim udarom strele.

Lastnosti

Odklopna naprava reagira:

- po določenem številu udarov, ko v normalnem obratovanju tok skozi odvodnik naraste nad 1 mA,
- v primeru atmosferske razelektritve (tok večji od 65 kA).

Po delovanju odklopne naprave je ozemljitveni vodnik vidno ločen. V tem primeru je potrebno zamenjati odvodnik prenapetosti.

Vgradnja

Mesto montaže odvodnikov prenapetosti NNO in MOSIPO določajo pravilniki in tehnični predpisi elektrodistribucij. Obvezno se vgradijo na:

- vse odcepe in konce nizkonapetostnih prostih vodov,
- medsebojni razdalji maksimalno do 1000 m,
- razdalji manjši od 500 m, kjer so nevihte pogostejše,
- vseh prehodih prostih vodov na kable in obratno.

Splošni podatki

- Odzivni čas **tA < 25 ns**
- Temperaturno območje **T = -60 °C ... +85 °C**
- Stopnja zaščite **IP 67**
- Plašč: **silikon LSR**
- Ozemljitveni vodnik: **H07V-K 6 mm²**
- Barva silikona: **siva**
- Testirani po standardu **IEC 61643-1**
- IEC razred: **II**

1.1 NNO and MOSIPO generally

Product

NNO and MOSIPO are low voltage metal oxide surge arresters with silicone coating. They are designed to be installed in LV power lines or in junction boxes up to 1 kV as the first level of protection against direct lightning strikes.

Characteristics

The disconnecting device reacts:

- *after a certain number of strokes, when in normal operation the current through the surge arrester increases over 1 mA,*
- *in case of atmospheric discharge (current bigger than 65 kA).*

After the disconnecting device has been active the earthing conductor is visibly separated. In this case it is necessary to replace the surge arrester.

Installation

The position for installing NNO and MOSIPO surge arresters is decided by directives and technical regulations of electrical distributors. They must be installed on:

- *all branches and ends of low voltage overhead power lines,*
- *maximum mutual distance up to 1000 m,*
- *distance smaller than 500 m, where storms occur more often,*
- *in all passages from free conductors to the cables and vice versa.*

General data

- *Response time **tA < 25 ns***
- *Temperature range **T = -60 °C ... +85 °C***
- *Ingress protection level **IP 67***
- *Coat: **silicone LSR***
- *Earthing conductor: **H07V-K 6 mm²***
- *Silicone colour: **grey***
- *Tested according to standard **IEC 61643-1***
- *IEC class: **II***

Prednosti pred konkurenco

NNO in MOSIPO odvodniki prenapetosti za zunanjo in notranjo montažo imajo:

- stopnjo zaščite IP 67,
- silikonski plašč,
- certifikat akreditiranega laboratorija.

Na zahtevo kupca izdelamo odvodnike prenapetosti NNO in MOSIPO:

- s poljubno dolžino ozemljitvenega vodnika,
- s poljubnim zaključkom ozemljitvenega vodnika,
- s poljubno barvo ozemljitvenega vodnika,
- kot tovarniški komplet po izbiri kupca,
- s trajno obratovalno napetostjo Uc do 1 kV po izbiri.

Competitive advantages

NNO and MOSIPO surge arresters for indoor and outdoor installation have:

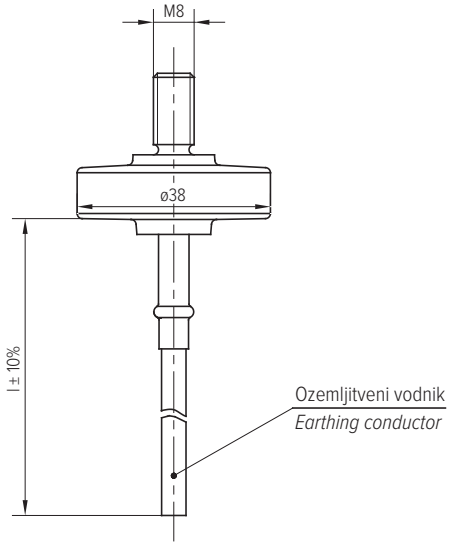
- *ingress protection level IP 67,*
- *silicone coating,*
- *certificate from an accredited laboratory.*

On our customer's request we produce surge arresters NNO and MOSIPO:

- *with any earthing conductor length,*
- *with any end fitting on earthing conductor,*
- *with any colour of earthing conductor,*
- *as a factory set by customer's choice,*
- *with continuous operating voltage Uc up to 1 kV optionally.*

1.2 NNO, I_n = 10 kA

1.2 NNO, I_n = 10 kA



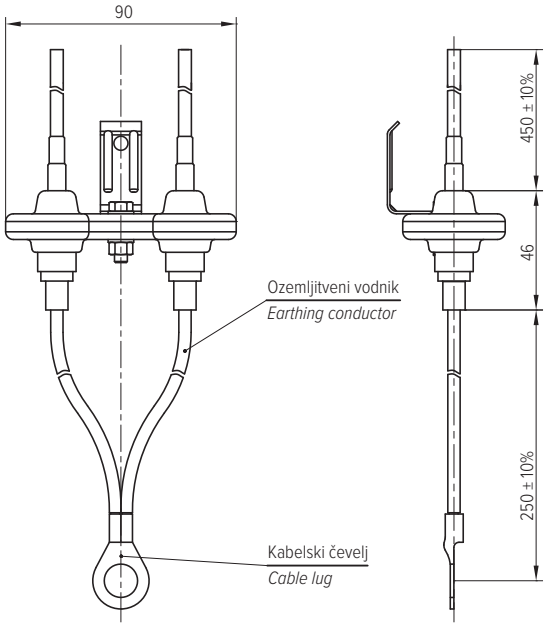
Naziv	NNO 10/275	NNO 10/440	*Name*
Koda (l = 0,5 m)	**20 60 50**	**20 60 60**	*Code (l = 0,5 m)*
Koda (l = 1,0 m)	**20 60 51**	**20 60 61**	*Code (l = 1,0 m)*
U_c (AC/DC)	275/350 V	440/585 V	*U_c (AC/DC)*
I_{max}	40 kA	40 kA	*I_{max}*
U_p	< 1,86 kV	< 2,24 kV	*U_p*
W	2450 J	3504 J	*W*

1.3 MOSIPO, I_n = 2x15 kA dvojni

1.3 MOSIPO, I_n = 2x15 kA double

Kabelski čevelj: Cu 16/12 mm

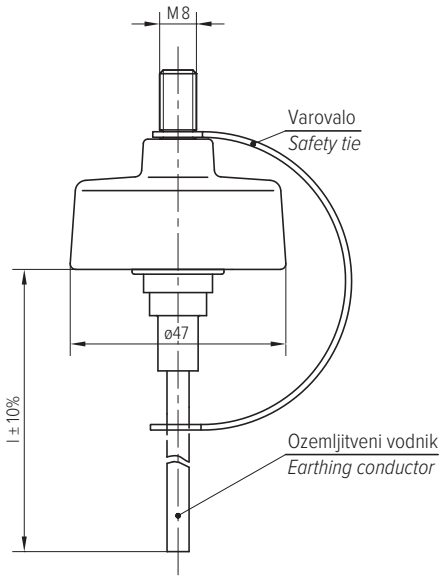
Cable lug: Cu 16/12 mm



Naziv	MOSIPO 15/275 x 2	MOSIPO 15/360 x 2	MOSIPO 15/440 x 2	*Name*
Koda	**20 66 33**	**20 66 13**	**20 66 42**	*Code*
U_c (AC/DC)	275/350 V	360/465 V	440/585 V	*U_c (AC/DC)*
I_{max}	40 kA	40 kA	40 kA	*I_{max}*
U_p	< 1,86 kV	< 2,0 kV	< 2,24 kV	*Up*
W	2450 J	3200 J	3504 J	*W*

1.4 MOSIPO, I_n = 10 kA z varovalom

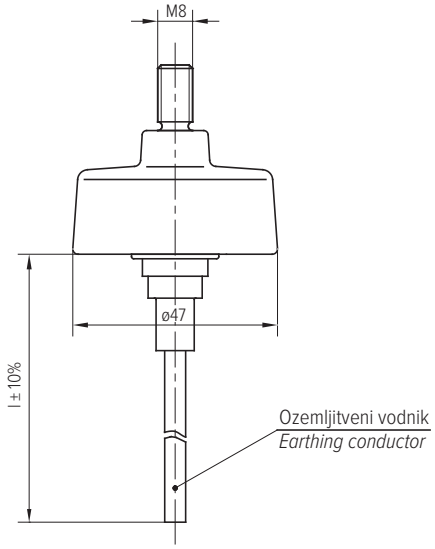
1.4 MOSIPO, I_n = 10 kA with safety tie



Naziv	MOSIPO 10/275	MOSIPO 10/440	*Name*
Koda (l = 0,5 m)	**20 60 11**	**20 60 21**	*Code (l = 0,5 m)*
Koda (l = 1,0 m)	**20 60 12**	**20 60 22**	*Code (l = 1,0 m)*
U_c (AC/DC)	275/350 V	440/585 V	*U_c (AC/DC)*
I_{max}	40 kA	40 kA	*I_{max}*
U_p	< 1,00 kV	< 1,80 kV	*U_p*
W	2450 J	3200 J	*W*

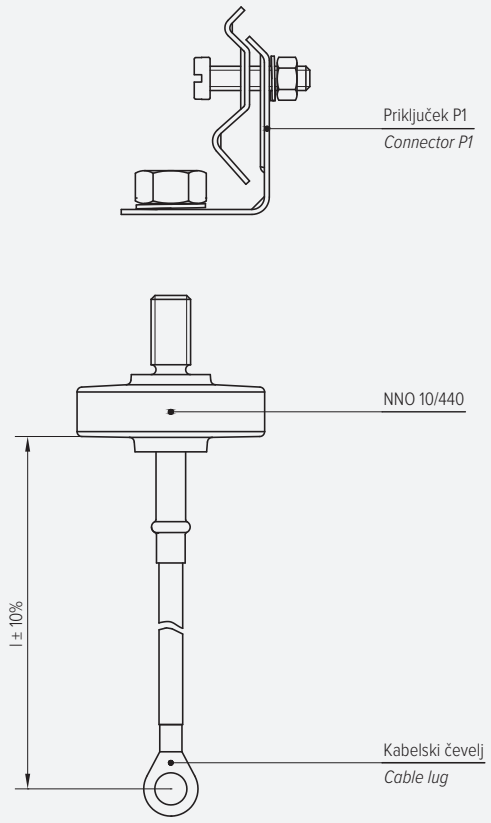
1.5 MOSIPO, I_n = 15 kA

1.5 MOSIPO, I_n = 15 kA



Naziv	MOSIPO 15/275	MOSIPO 15/440	MOSIPO 15/690	*Name*
Koda (l = 0,5 m)	**20 66 10**	**20 66 20**	**20 66 27**	*Code (l = 0,5 m)*
Koda (l = 1,0 m)	**20 66 11**	**20 66 21**	**20 66 32**	*Code (l = 1,0 m)*
U_c (AC/DC)	275/350 V	440/585 V	690/910 V	*U_c (AC/DC)*
I_{max}	40 kA	40 kA	40 kA	*I_{max}*
U_p	< 1,86 kV	< 2,24 kV	< 2,48 kV	*U_p*
W	2450 J	3200 J	3960 J	*W*

1.6 NNO in MOSIPO - primer naročila / *1.6 NNO and MOSIPO - order example*



Naziv: **NNO 10/440 - 1,0 m + KČ 6/8 + NN priključek P1**
Name: ***NNO 10/440 - 1,0 m + CL 6/8 + LV connector P1***

Razlaga naziva

NNO	- Tip NN odvodnika
10	- Nazivni odvodni tok I_n (kA)
440	- Trajna obratovalna napetost U_c (V)
1,0	- Dolžina ozemljitvenega vodnika
m	- Merska enota
KČ 6/8	- Oznaka zaključka ozemljitvenega vodnika
Priključek P1	- Priključek

Name explanation

NNO	*- Type of LV surge arrester*
10	*- Nominal discharge current I_n (kA)*
40	*- Continuous operating voltage U_c (V)*
1,0	*- Length of earthing conductor*
m	*- Measuring unit*
CL 6/8	*- Mark of end fitting of earthing conductor*
Connector P1	*- Connector*

Oznake na odvodniku

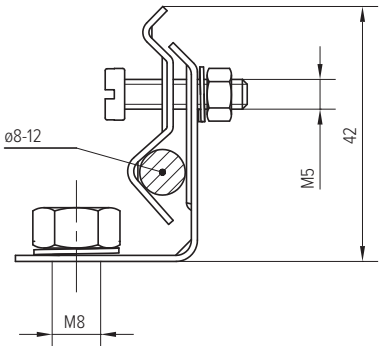
Izoelektro	- Proizvajalec
NNO	- Tip NN odvodnika
2/14	- Mesec in leto proizvodnje
I_n ...kA	- Nazivni odvodni tok
U_p ...kV	- Napetostni zaščitni nivo
U_c ...V	- Trajna obratovalna napetost
50/60 Hz	- Frekvenca
CE	- Skladnost s predpisi EU
T2	- IEC razred

Marks on surge arrester

Izoelektro	*- Manufacturer*
NNO	*- Type of LV surge arrester*
2/1	*- Month and year of production*
I_n ...kA	*- Nominal discharge current*
U_p ...kV	*- Voltage protection level*
U_c ...V	*- Continuous operating voltage*
50/60 Hz	*- Frequency*
CE	*- Compliance with EU legislation*
T2	*- IEC class*

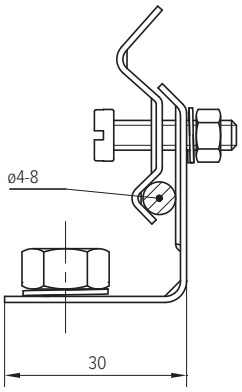
1.7 NN priključek P1

Namen: priključek za goli vodnik
Naziv: NN priključek P1
Koda: **20 66 01**



1.7 LV connector P1

Purpose: connector for bare conductor
Name: LV connector P1
*Code: **20 66 01***

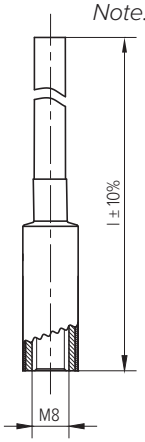


1.8 NN priključek P2

Namen: priključek za izoliran vodnik
Naziv: NN priključek P2 – 0,5 m; koda: **20 66 02**
Naziv: NN priključek P2 – 1,0 m; koda: **20 66 05**
Opomba: dolžina NN priključka P2 po izbiri

1.8 LV connector P2

Purpose: connector for covered conductor
*Name: LV connector P2 - 0,5 m; code: **20 66 02***
*Name: LV connector P2 - 1,0 m; code: **20 66 05***
Note: length of LV connector P2 by choice

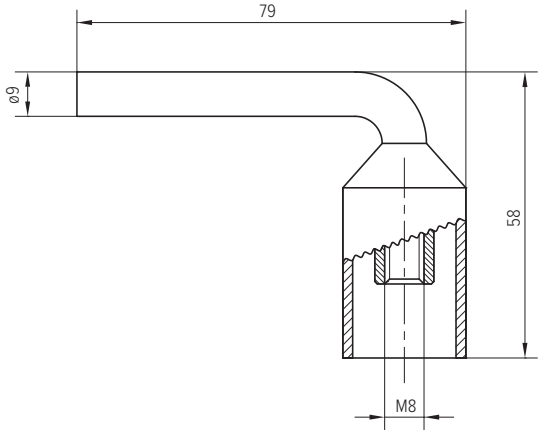


1.9 NN priključek P3

Namen: priključek za izoliran vodnik
Naziv: NN priključek P3
Koda: **20 66 03**

1.9 LV connector P3

Purpose: connector for covered conductor
Name: LV connector P3
*Code: **20 66 03***

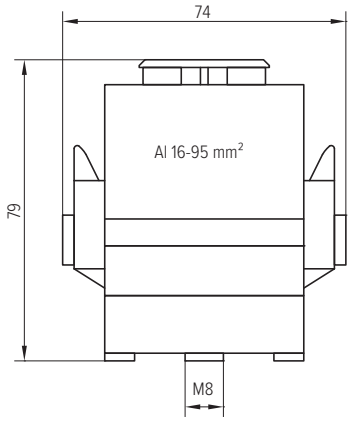


1.10 NN priključek P4

Namen: priključek za izoliran vodnik
Naziv: NN priključek P4
Koda: **20 66 09**

1.10 LV connector P4

Purpose: connector for covered conductor
Name: LV connector P4
*Code: **20 66 09***

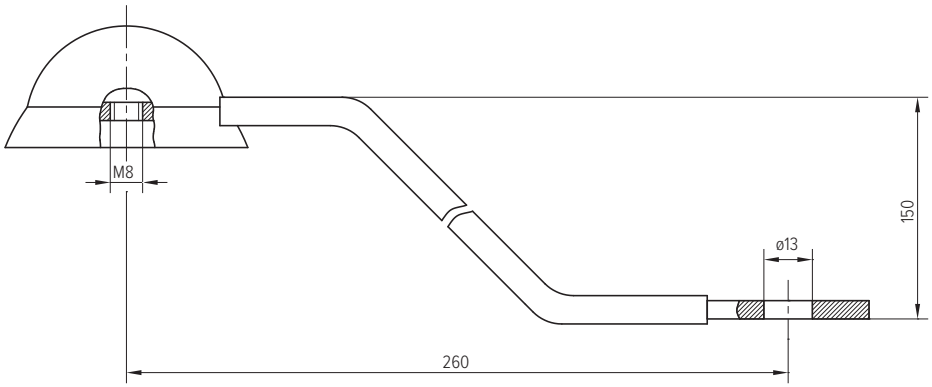


1.11 NN priključek P5

Namen: izolacijski priključek
Naziv: NN Priključek P5
Koda: **20 66 04**

1.11 LV connector P5

Purpose: insulated connector
Name: LV Connector P5
*Code: **20 66 04***

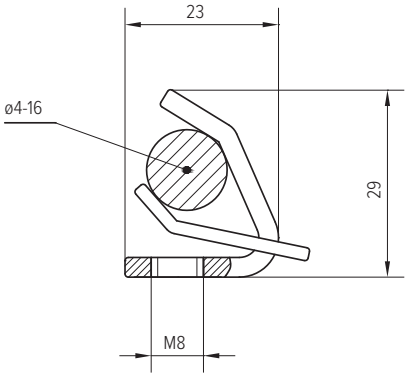


1.12 NN priključek P6

Namen: priključek za goli vodnik
Naziv: NN priključek P6
Koda: **20 66 08**

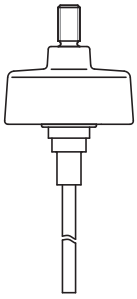
1.12 LV connector P6

Purpose: connector for bare conductor
Name: LV connector P6
*Code: **20 66 08***



1.13 MOSIPO + NN priključek P1

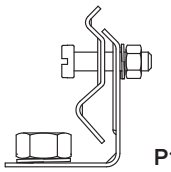
Naziv: MOSIPO 15/275 - 0,5 m + NN priključek P1;
koda: **20 66 15**
Naziv: MOSIPO 15/275 - 1,0 m + NN priključek P1;
koda: **20 66 19**
Naziv: MOSIPO 15/440 - 0,5 m + NN priključek P1;
koda: **20 66 23**
Naziv: MOSIPO 15/440 - 1,0 m + NN priključek P1;
koda: **20 66 34**



MOSIPO

1.13 MOSIPO + LV connector P1

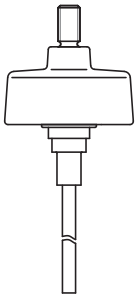
Name: MOSIPO 15/275 - 0,5 m + LV connector P1;
code: ***20 66 15***
Name: MOSIPO 15/275 - 1,0 m + LV connector P1;
code: ***20 66 19***
Name: MOSIPO 15/440 - 0,5 m + LV connector P1;
code: ***20 66 23***
Name: MOSIPO 15/440 - 1,0 m + LV connector P1;
code: ***20 66 34***



P1

1.14 MOSIPO + NN priključek P2

Naziv: MOSIPO 15/275 - 0,5 m + NN priključek P2 - 0,5 m;
koda: **20 66 12**
Naziv: MOSIPO 15/275 - 1,0 m + NN priključek P2 - 1,0 m;
koda: **20 66 26**
Naziv: MOSIPO 15/440 - 0,5 m + NN priključek P2 - 0,5 m;
koda: **20 66 22**
Naziv: MOSIPO 15/440 - 1,0 m + NN priključek P2 - 1,0 m;
koda: **20 66 30**



MOSIPO

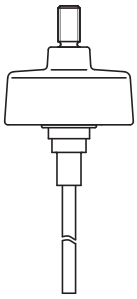
1.14 MOSIPO + LV connector P2

Name: MOSIPO 15/275 - 0,5 m + LV connector P2 - 0,5 m;
code: ***20 66 12***
Name: MOSIPO 15/275 - 1,0 m + LV connector P2 - 1,0 m;
code: ***20 66 26***
Name: MOSIPO 15/440 - 0,5 m + LV connector P2 - 0,5 m;
code: ***20 66 22***
Name: MOSIPO 15/440 - 1,0 m + LV connector P2 - 1,0 m;
code: ***20 66 30***

P2

1.15 MOSIPO + NN priključek P3

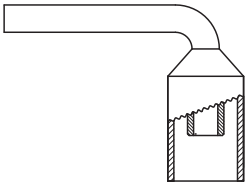
Naziv: MOSIPO 15/275 - 0,5 m + NN priključek P3;
koda: **20 66 17**
Naziv: MOSIPO 15/275 - 1,0 m + NN priključek P3;
koda: **20 66 16**
Naziv: MOSIPO 15/440 - 0,5 m + NN priključek P3;
koda: **20 66 18**
Naziv: MOSIPO 15/440 - 1,0 m + NN priključek P3;
koda: **20 66 24**



MOSIPO

1.15 MOSIPO + LV connector P3

Name: MOSIPO 15/275 - 0,5 m + LV connector P3;
code: ***20 66 17***
Name: MOSIPO 15/275 - 1,0 m + LV connector P3;
code: ***20 66 16***
Name: MOSIPO 15/440 - 0,5 m + LV connector P3;
code: ***20 66 18***
Name: MOSIPO 15/440 - 1,0 m + LV connector P3;
code: ***20 66 24***



P3

1.16 TY1 in TY1-F splošno

Proizvod

TY1 so kovinsko oksidni odvodniki prenapetosti v modularnem ohišju. TY1-F so kompaktni kovinsko oksidni odvodniki prenapetosti. Namenjeni so za vgradnjo v glavno razdelilno omarico kot prva stopnja zaščite pred direktnim udarom strele.

Lastnosti

Odklopna naprava reagira:

- po določenem številu udarov, ko v normalnem obratovanju tok skozi odvodnik naraste nad 1 mA,
- v primeru atmosferske razelektritve (tok večji od 100 kA).

Po delovanju odklopne naprave se vidno polje obarva rdeče. V tem primeru je potrebno pri TY1 zamenjati modul, pri TY1-F pa celoten odvodnik prenapetosti

Vgradnja

Mesto montaže TY1 in TY1-F odvodnikov prenapetosti določajo pravilniki in tehnični predpisi elektrodistribucij. Obvezno se vgradijo v razdelilne omare.

Splošni podatki

- Odzivni čas **tA < 25 ns**
- Predvarovalka (glavna > 100 A) **100 AgL**
- Temperaturno območje **T = -20 °C ... +80 °C**
- Stopnja zaščite **IP 20**
- Material ohišja **- termoplast V-0 (UL 94)**
- Možnost **daljinskega upravljanja**
- Montaža na klobučno letev 35 mm²
- Presek priključnega vodnika:
  - **enožilni 35 mm²,**
  - **večžilni 25 mm².**
- Testirani po standardu **IEC 61643-1**
- IEC razred: **I, II**

1.16 *TY1 and TY1-F generally*

Product

TY1 are metal oxide surge arresters in modular housing. TY1-F are compact metal oxide surge arresters. They are designed to be installed into the main junction box as the first level of protection against direct lightning strikes.

Characteristics

The disconnecting device reacts:

- *after a certain number of strokes, when in normal operation the current through the surge arrester increases over 1 mA,*
- *In case of an atmospheric discharge (current higher than 100 kA).*

After the disconnecting device has been active the visual field shows red colour. In this case it is necessary to replace the TY1 module or in case of TY1-F a complete surge arrester.

Installation

The position for installing TY1 and TY1-F surge arresters is determined by directives and technical regulations of electrical distributors. They must be installed into junction boxes.

General data

- *Response time **tA < 25 ns***
- *Backup fuse (if main > 100 A) **100 AgL***
- *Temperature range **T = -20 °C ... +80 °C***
- *Ingress protection level **IP 20***
- *Housing material **- thermoplastic V-0 (UL 94)***
- *Possibility of **remote control***
- *Mounting on top hat rail 35 mm²*
- *Cross-section of connection conductor:*
  - ***single-strand 35 mm²,***
  - ***multi-strand 25 mm².***
- *Tested according to standard **IEC 61643-1***
- *IEC class: **I, II***

Prednosti pred konkurenco

TY1-F odvodniki prenapetosti za notranjo montažo imajo vgrajeno predvarovalko. Zato vgradnja predvarovalke (glavna > 100 A): 100 AgL ni potrebna.

TY1 in TY1-F odvodniki prenapetosti za notranjo montažo imajo:

- certifikat akreditiranega laboratorija,
- visok odvodni tok,
- visoko stopnjo zaščite,
- ugodno ceno,
- zanesljivo delovanje.

Competitive advantages

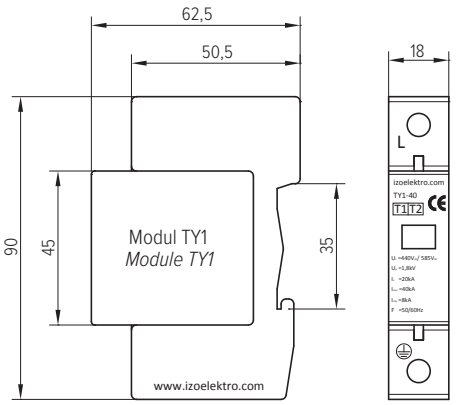
TY1-F surge arresters for indoor installation have an integrated backup fuse. Therefore the installation of a backup fuse (if main > 100 A): 100 AgL is not necessary.

TY1 and TY1-F surge arresters for indoor installation have :

- *a certificate issued by an accredited laboratory,*
- *high discharge current,*
- *high level of protection,*
- *favourable price,*
- *reliable performance.*

1.17 TY1 enopolni

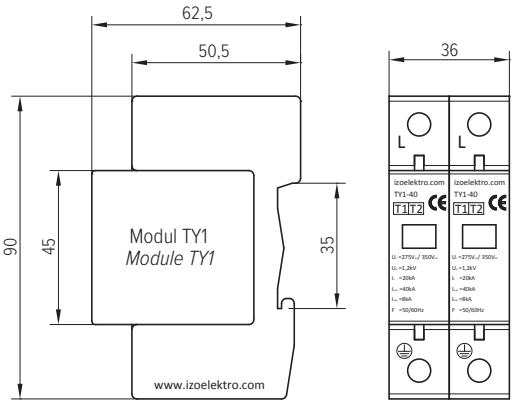
1.17 TY1 single pole



Naziv kompleta	Modul TY1	U_c	I_n	I_{imp}	I_{max}	U_p
Name of set	*Module TY1*	(V)	(kA)	(kA)	(kA)	(kV)
TY1-1-275-40	M1-275-40	275	20	8	40	< 1,2
TY1-1-320-40	M1-320-40	320	20	8	40	< 1,5
TY1-1-385-40	M1-385-40	385	20	8	40	< 1,8
TY1-1-440-40	M1-440-40	440	20	8	40	< 2,0
TY1-1-275-60	M1-275-60	275	30	10	60	< 1,5
TY1-1-320-60	M1-320-60	320	30	10	60	< 1,8
TY1-1-385-60	M1-385-60	385	30	10	60	< 2,0
TY1-1-440-60	M1-440-60	440	30	10	60	< 2,2
TY1-1-275-80	M1-275-80	275	40	12,5	80	< 2,0
TY1-1-320-80	M1-320-80	320	40	12,5	80	< 2,2
TY1-1-385-80	M1-385-80	385	40	12,5	80	< 2,4
TY1-1-440-80	M1-440-80	440	40	12,5	80	< 2,5
TY1-1-320-100	M1-320-100	320	50	20	100	< 2,8
TY1-1-385-100	M1-385-100	385	50	20	100	< 3,0
TY1-1-440-100	M1-440-100	440	50	20	100	< 3,2
TY1-1-320-140	M1-320-140	320	80	25	140	< 3,0
TY1-1-385-140	M1-385-140	385	80	25	140	< 3,3
TY1-1-440-140	M1-440-140	440	80	25	140	< 3,5

1.18 TY1 dvopolni

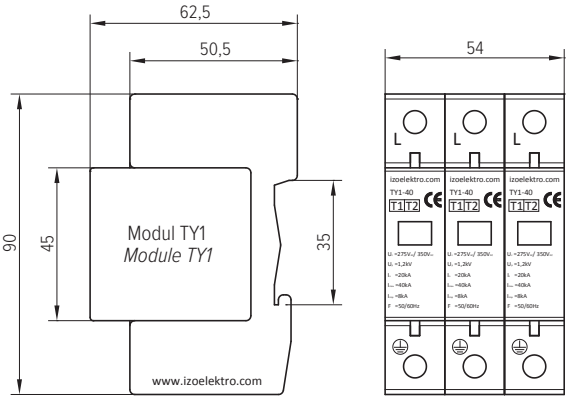
1.18 TY1 double pole



Naziv kompleta	Modul TY1	U_c	I_n	I_{imp}	I_{max}	U_p
Name of set	*Module TY1*	(V)	(kA)	(kA)	(kA)	(kV)
TY1-2-275-40	M2-275-40	275	20	8	40	< 1,2
TY1-2-320-40	M2-320-40	320	20	8	40	< 1,5
TY1-2-385-40	M2-385-40	385	20	8	40	< 1,8
TY1-2-440-40	M2-440-40	440	20	8	40	< 2,0
TY1-2-275-60	M2-275-60	275	30	10	60	< 1,5
TY1-2-320-60	M2-320-60	320	30	10	60	< 1,8
TY1-2-385-60	M2-385-60	385	30	10	60	< 2,0
TY1-2-440-60	M2-440-60	440	30	10	60	< 2,2
TY1-2-275-80	M2-275-80	275	40	12,5	80	< 2,0
TY1-2-320-80	M2-320-80	320	40	12,5	80	< 2,2
TY1-2-385-80	M2-385-80	385	40	12,5	80	< 2,4
TY1-2-440-80	M2-440-80	440	40	12,5	80	< 2,5
TY1-2-320-100	M2-320-100	320	50	20	100	< 2,8
TY1-2-385-100	M2-385-100	385	50	20	100	< 3,0
TY1-2-440-100	M2-440-100	440	50	20	100	< 3,2
TY1-2-320-140	M2-320-140	320	80	25	140	< 3,0
TY1-2-385-140	M2-385-140	385	80	25	140	< 3,3
TY1-2-440-140	M2-440-140	440	80	25	140	< 3,5

1.19 TY1 tripolni

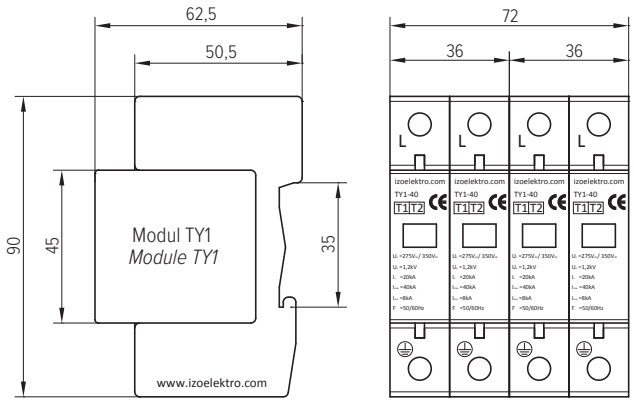
1.19 TY1 triple pole



Naziv kompleta	Modul TY1	U_c	I_n	I_{imp}	I_{max}	U_p
Name of set	*Module TY1*	(V)	(kA)	(kA)	(kA)	(kV)
TY1-3-275-40	M3-275-40	275	20	8	40	< 1,2
TY1-3-320-40	M3-320-40	320	20	8	40	< 1,5
TY1-3-385-40	M3-385-40	385	20	8	40	< 1,8
TY1-3-440-40	M3-440-40	440	20	8	40	< 2,0
TY1-3-275-60	M3-275-60	275	30	10	60	< 1,5
TY1-3-320-60	M3-320-60	320	30	10	60	< 1,8
TY1-3-385-60	M3-385-60	385	30	10	60	< 2,0
TY1-3-440-60	M3-440-60	440	30	10	60	< 2,2
TY1-3-275-80	M3-275-80	275	40	12,5	80	< 2,0
TY1-3-320-80	M3-320-80	320	40	12,5	80	< 2,2
TY1-3-385-80	M3-385-80	385	40	12,5	80	< 2,4
TY1-3-440-80	M3-440-80	440	40	12,5	80	< 2,5
TY1-3-320-100	M3-320-100	320	50	20	100	< 2,8
TY1-3-385-100	M3-385-100	385	50	20	100	< 3,0
TY1-3-440-100	M3-440-100	440	50	20	100	< 3,2
TY1-3-320-140	M3-320-140	320	80	25	140	< 3,0
TY1-3-385-140	M3-385-140	385	80	25	140	< 3,3
TY1-3-440-140	M3-440-140	440	80	25	140	< 3,5

1.20 TY1 štiripolni

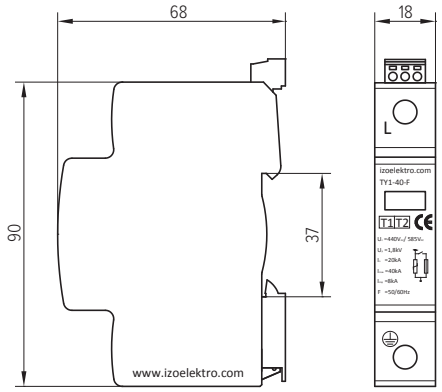
1.20 TY1 quadruple pole



Naziv kompleta	Modul TY1	U_c	I_n	I_{imp}	I_{max}	U_p
Name of set	*Module TY1*	(V)	(kA)	(kA)	(kA)	(kV)
TY1-4-275-40	M4-275-40	275	20	8	40	< 1,2
TY1-4-320-40	M4-320-40	320	20	8	40	< 1,5
TY1-4-385-40	M4-385-40	385	20	8	40	< 1,8
TY1-4-440-40	M4-440-40	440	20	8	40	< 2,0
TY1-4-275-60	M4-275-60	275	30	10	60	< 1,5
TY1-4-320-60	M4-320-60	320	30	10	60	< 1,8
TY1-4-385-60	M4-385-60	385	30	10	60	< 2,0
TY1-4-440-60	M4-440-60	440	30	10	60	< 2,2
TY1-4-275-80	M4-275-80	275	40	12,5	80	< 2,0
TY1-4-320-80	M4-320-80	320	40	12,5	80	< 2,2
TY1-4-385-80	M4-385-80	385	40	12,5	80	< 2,4
TY1-4-440-80	M4-440-80	440	40	12,5	80	< 2,5
TY1-4-320-100	M4-320-100	320	50	20	100	< 2,8
TY1-4-385-100	M4-385-100	385	50	20	100	< 3,0
TY1-4-440-100	M4-440-100	440	50	20	100	< 3,2
TY1-4-320-140	M4-320-140	320	80	25	140	< 3,0
TY1-4-385-140	M4-385-140	385	80	25	140	< 3,3
TY1-4-440-140	M4-440-140	440	80	25	140	< 3,5

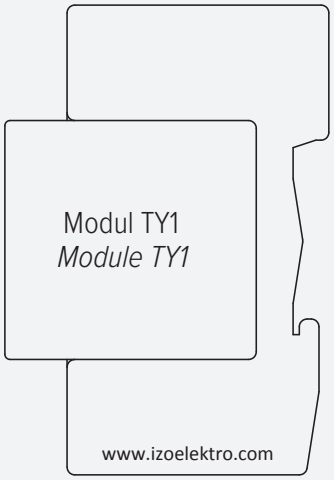
1.21 TY1-F enopolni

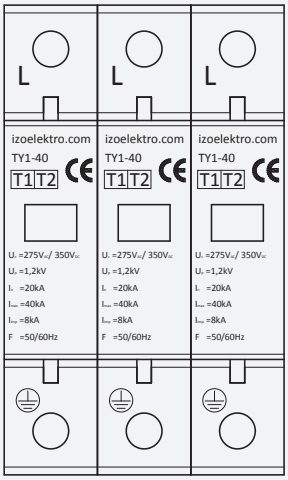
1.21 TY1-F single pole



Naziv kompleta *Name of set*	U_c (V)	I_n (kA)	I_{imp} (kA)	I_{max} (kA)	U_p (kV)
TY1-F-1-275-40	275	20	8	40	< 1,2
TY1-F-1-320-40	320	20	8	40	< 1,5
TY1-F-1-385-40	385	20	8	40	< 1,8
TY1-F-1-440-40	440	20	8	40	< 2,0
TY1-F-1-275-60	275	30	10	60	< 1,5
TY1-F-1-320-60	320	30	10	60	< 1,8
TY1-F-1-385-60	385	30	10	60	< 2,0
TY1-F-1-440-60	440	30	10	60	< 2,2
TY1-F-1-275-80	275	40	12,5	80	< 2,0
TY1-F-1-320-80	320	40	12,5	80	< 2,2
TY1-F-1-385-80	385	40	12,5	80	< 2,4
TY1-F-1-440-80	440	40	12,5	80	< 2,5
TY1-F-1-320-100	320	50	20	100	< 2,8
TY1-F-1-385-100	385	50	20	100	< 3,0
TY1-F-1-440-100	440	50	20	100	< 3,2
TY1-F-1-320-140	320	80	25	140	< 3,0
TY1-F-1-385-140	385	80	25	140	< 3,3
TY1-F-1-440-140	440	80	25	140	< 3,5

1.22 TY1 in TY1-F - primer naročila / *1.22 TY1 and TY1-F - order example*





Naziv/*Name*: **TY1-3-275-40**

Razlaga naziva

TY1	- Tip NN odvodnika
3	- Število polov
275	- Trajna obratovalna napetost U_c (V)
40	- Nazivni odvodni tok I_n (kA)

Name explanation

TY1	*- Type of LV surge arrester*
3	*- Number of poles*
275	*- Continuous operating voltage U_c (V)*
40	*- Nominal discharge current I_n (kA)*

Oznake na odvodniku

L	- Faza
Izoelektro	- Proizvajalec
TY1-40	- Tip in nazivni odvodni tok
T1 T2	- IEC razred
CE	- Skladnost s predpisi EU
U_p ...kV	- Napetostni zaščitni nivo
U_c ...V	- Trajna obratovalna napetost
I_n ...kA	- Nazivni odvodni tok
I_{max} ...kA	- Maksimalni odvodni tok
I_{imp} ...kA	- Impulzivni odvodni tok
$F_{50/60}$ ...Hz	- Frekvenca

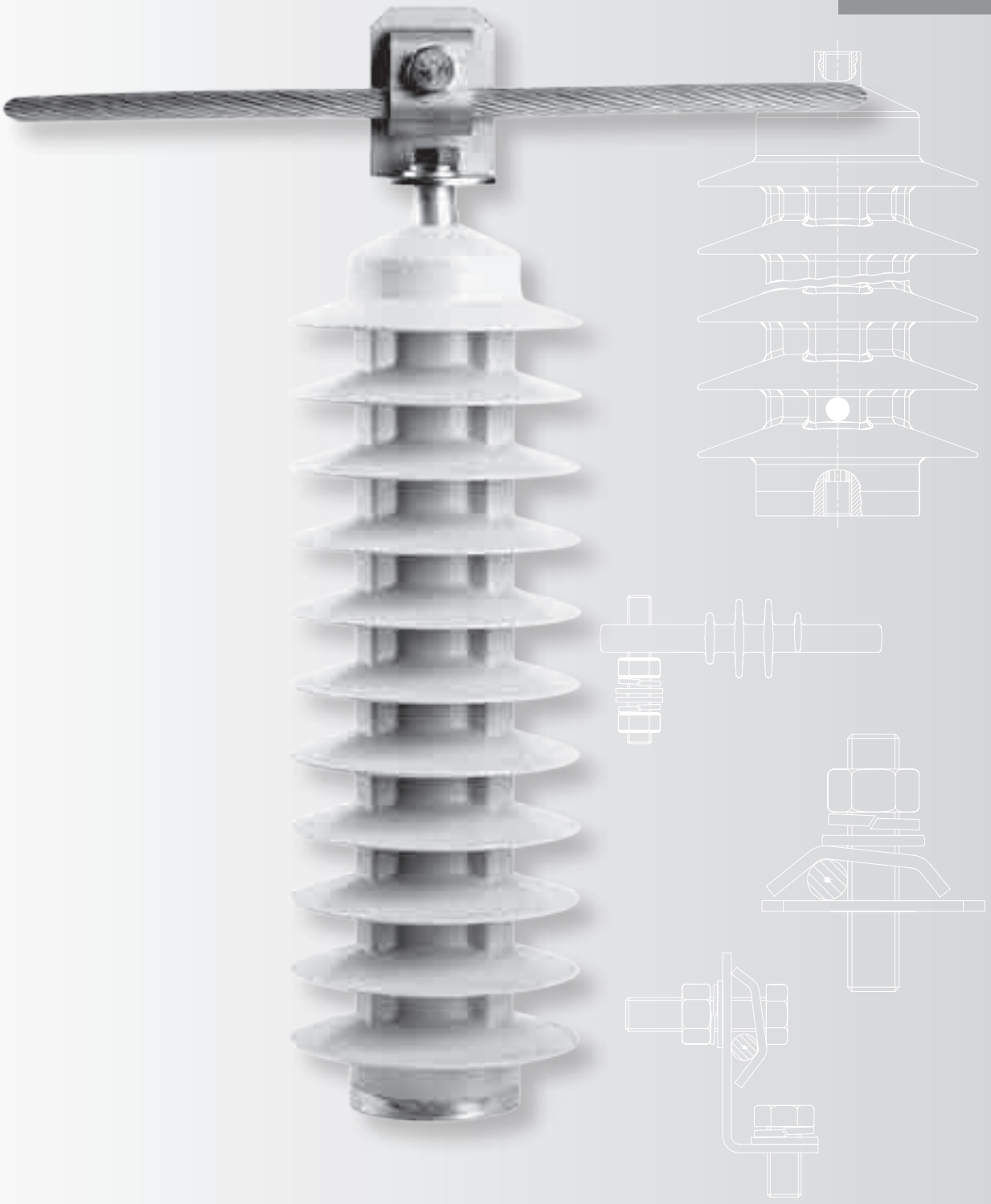
Marks on surge arrester

L	*- Line*
Izoelektro	*- Manufacturer*
TY1-40	*- Type and nominal discharge current*
T1 T2	*- IEC class*
CE	*- Compliance with EU legislation*
U_p ...kV	*- Voltage protection level*
U_c ...V	*- Continuous operating voltage*
I_n ...kA	*- Nominal discharge current*
I_{max} ...kA	*- Maximal discharge current*
I_{imp} ...kA	*- Impulse discharge current*
$F_{50/60}$ ...Hz	*- Frequency*

Beležke

Notes

2



SN odvodniki *prenapetosti*

MV surge arresters

2.1 SNO in 2SS15N splošno

Proizvod

SNO in 2SS15N so srednjenapetostni kovinsko oksidni odvodniki prenapetosti s silikonskim plaščem. Namenjeni so za vgradnjo v SN omrežje do 52 kV kot zaščita pred direktnim udarom strele.

Lastnosti

Vrhunsko kvaliteto jim zagotavlja:

- zmogljiv varistorski blok,
- toga konstrukcija,
- plašč odporen na UV sevanje in kemične vplive,
- vgrajen material obstojen na vremenske vplive in staranje,
- varistorski blok, neposredno zaliti s silikonom.

Vgradnja

Mesto montaže odvodnikov prenapetosti SNO in 2SS15N, določajo pravilniki in tehnični predpisi elektrodistribucij.

Odvodnike SNO in 2SS15N prenapetosti vgrajujemo:

- zunaj in znotraj,
- pri zaščiti elektroenergetskih naprav,
- za zaščito kompenzacijskih naprav,
- na železnicah.

Splošni podatki

- Temperaturno območje okolja **T = -60 °C ... +85 °C**
- Plašč: **silikon LSR**
- Barva silikona: **siva**
- Priključni navoj: **M12x20 mm**
- Testirani po standardih **IEC 60099-4 in EC 60099-5**
- IEC razred: **I**

2.1 *SNO and 2SS15N generally*

Product

SNO and 2SS15N are medium voltage metal oxide surge arresters with silicone coating. They are designed to be installed in MV power networks up to 52 kV as protection against direct lighting strikes.

Characteristics

Their top quality is ensured by:

- *top quality varistor block,*
- *rigid construction,*
- *resistance to UV radiation and chemical influences,*
- *built-in material is resistant to weathering and ageing,*
- *varistors are directly enclosed by silicone.*

Installation

The position for installing SNO and 2SS15N surge arresters is decided by directives and technical regulations of electrical distributors.

Surge arresters SNO and 2SS15N are used for:

- *indoor and outdoor installation,*
- *protection of electric devices,*
- *protection of compensation devices,*
- *the railways.*

General data

- *Ambient temperature range **T = -60 °C ... +85 °C***
- *Coat: **silicone LSR***
- *Silicone colour: **grey***
- *Connection thread: **M12x20 mm***
- *Tested according to standards **IEC 60099-4 and IEC 60099-5***
- *IEC class: **I***

Prednosti pred konkurenco

SNO in 2SS15N odvodniki prenapetosti za zunanjo in notranjo montažo imajo:

- certifikat akreditiranega laboratorija,
- varistorje neposredno zalite s silikonom,
- togo konstrukcija ohišja,
- nizko preostalo napetost,
- visoko energetsko absorpcijo,
- odlične mehanske lastnosti,
- uporabo brez vzdrževanja v obratovanju,
- 100% končno kontrolo v lastnem laboratoriju,
- veliko število različnih priključkov.

Na zahtevo kupca izdelamo in dobavimo odvodnike prenapetosti SNO in 2SS15N:

- kot tovarniški komplet po izbiri kupca,
- s trajno obratovalno napetostjo U_c do 1 do 44 kV po izbiri.

Competitive advantages

SNO and 2SS15N surge arresters for indoor and outdoor installation have:

- *a certificate from an accredited laboratory,*
- *varistors directly encased by silicone,*
- *a rigid housing construction,*
- *low residual voltage,*
- *high energy absorption,*
- *excellent mechanical properties,*
- *a maintenance-free operation,*
- *100% final inspection in our own laboratory,*
- *a large number of different connectors.*

At buyer's request we produce and deliver surge arresters SNO and 2SS15N:

- *as a factory set by buyer's choice,*
- *with continuous operating voltage U_c from 1 to 44 kV by choice.*

Izračun napetosti odvodnikov prenapetosti

1. Podatki omrežja distributerja

- U_m – maksimalna napetost
- t – čas trajanja kratkega stika
- k_z – faktor zemeljskega stika
  k_z = 1,40 – neposredno ozemljeno
  k_z = 1,40 – 1,7 z malim uporom
  k_z = 1,73 – 1,8 z izolirano nevtralno točko

2. Podatki odvodnikov tipov SNO in 2SS15N

- k_0 = 0,8
- k_t = faktor trajne obratovalne napetosti za časno prenapetost.

Calculation of voltage of surge arresters

1. Data of electric network

- *U_m – maximum voltage*
- *t – short circuit duration time*
- *k_z – factor of earthing*
  k_z = 1,40 – directly earthed
  k_z = 1,40 – 1,7 with little resistance
  k_z = 1,73 – 1,8 with a neutral insulated spot

2. Data for surge arresters types SNO and 2SS15N

- *k_0 = 0,8*
- *k_t = factor of permanent operating voltage for temporary over voltage duration time.*

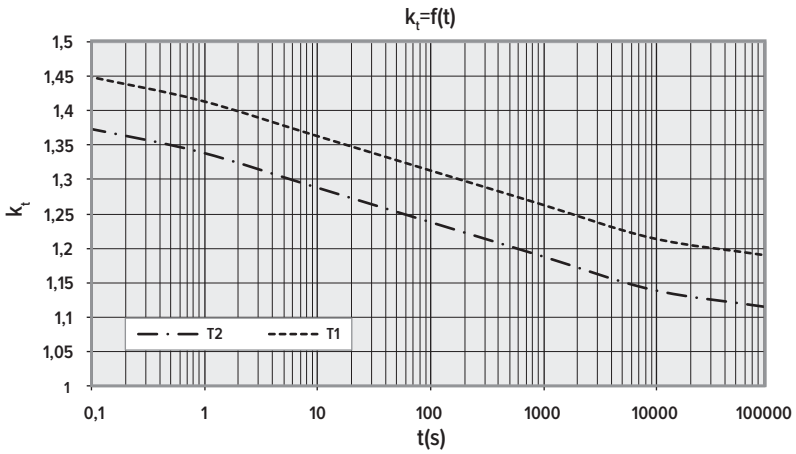
2.2 SNO in 2SS15N izbor in parametri.

2.2 *SNO and 2SS15N calculation and parameters*

Karakteristike

Legenda:
Krivulja T1:
brez predhodne energije

Krivulja T2:
100 k_A, 4/10 µs
predhodna energija



Characteristics

Legend:
Curve T1:
without prior energy

Curve T2:
100 k_A, 4/10 µs
prior energy

3. Izračun

- Trajna obratovalna napetost sistema:

$$U_{cs} = \frac{U_m}{\sqrt{3}} \text{ [kV]}$$

- Predhodna obratovalna napetost odvodnika:

$$U_{c1} = \frac{U_{cs}}{k_0} \text{ [kV]}$$

- Najvišja pričakovana časna prenapetost odvodnika:

$$U_t = k_z \frac{U_m}{\sqrt{3}} \text{ [kV]}$$

- Trajna obratovalna napetost odvodnika:

$$U_{c2} = \frac{U_t}{k_t} \text{ [kV]}$$

Ustrezen odvodnik prenapetosti izberemo iz tabel s podatki, na podlagi višje izračunane vrednosti med U_{C1} in U_{C2} tako, da izberemo prvo višjo trajno obratovalno napetost U_C, ki je podana v tabeli.

3. Calculation

- *Continuous operating voltage of system:*

$$U_{cs} = \frac{U_m}{\sqrt{3}} \text{ [kV]}$$

- *Preliminary operating voltage of surge arrester:*

$$U_{c1} = \frac{U_{cs}}{k_0} \text{ [kV]}$$

- *Highest expected transient over voltage of surge arrester:*

$$U_t = k_z \frac{U_m}{\sqrt{3}} \text{ [kV]}$$

- *Continuous operating voltage of surge arrester:*

$$U_{c2} = \frac{U_t}{k_t} \text{ [kV]}$$

We choose a suitable surge arrester from tables with data based on higher calculated value between U_{C1} and U_{C2} so, that we choose the first higher value of permanent operating voltage U_C specified in the table.

Izračun zaščitne razdalje

1. Podatki omrežja distributerja

Stopnja zaščite naprav na daljnovodih je odvisna od razdalje med ščiteno napravo in odvodnikom. Prenapetostni odvodnik ščiti v določeni razdalji od mesta, kjer je montiran.

Za izračun so potrebni najmanj naslednji podatki:

- l_z – zaščitna razdalja odvodnika
- U_z – zdržna udarna napetost izolacije opreme.
- U_{res} – maksimalna vrednost preostale napetosti za določen tip odvodnika
- v – hitrost širjenja udarnega vala po električnih vodih
  v = 300 m/µs – nadzemni vod
  v = 150 m/µs – kabel
- S – pričakovana strmina prenapetostnega udara strele
  S = 1550 kV/µs – leseni drogovi
  S = 800 kV/µs – ozemljene konzole

2. Izračun

Poenostavljena formula za izračun zaščitne razdalje:

$$l_z = \frac{U_z - U_{res}}{2S} v$$

Po pravilu naj bo odvodnik prenapetosti priključen čim bliže ščiteni napravi.

Shielding distance

1. Data of electric network

The level of protection for devices on power lines is dependent from the distance between the protected device and the surge arrester. The surge arrester protects in a certain distance from the spot where it is mounted.

At least next data is necessary for the calculation:

- l_z – *shielding distance of the surge arrester*
- U_z – *allowed trigger voltage of insulating equipment.*
- U_{res} – *maximum value of redidual voltage for the chosen type of surge arresters*
- *v* – *speed of shock wave spreading through electric power lines*
  v = 300 m/µs – overhead line
  v = 150 m/µs – cable
- *S* – *anticipated steepness of over voltage lightning stroke*
  S = 1550 kV/µs – wooden poles
  S = 800 kV/µs – earthed brackets

2. Calculation

Simplified formula for calculating the shielding distance:

$$l_z = \frac{U_z - U_{res}}{2S} v$$

By the rules the surge arrester should be mounted as near as possible to the device it protects.

Parametri odvodnikov prenapetosti

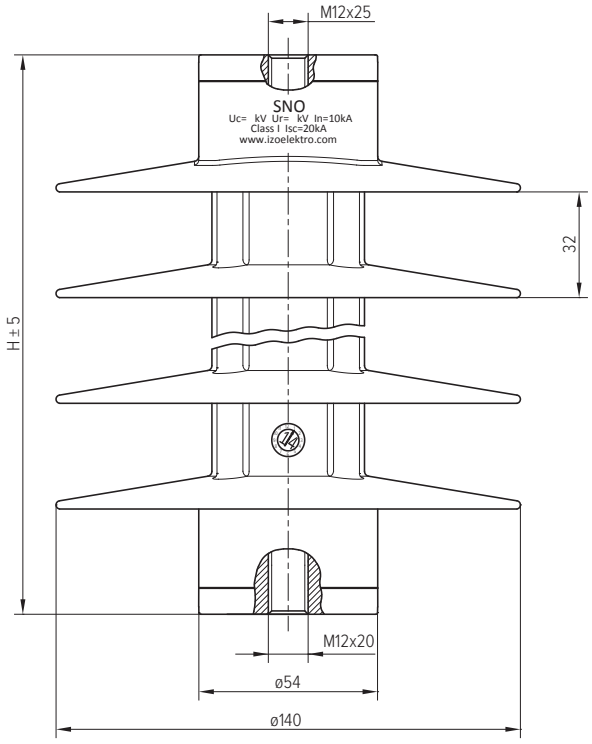
Nazivna napetost (U_r)	3,7 – 55 kV
Trajna obratovalna napetost (U_c)	3 – 44 kV
Nazivni odvodni tok (8/20) (I_n)	10 kA
Visok impulzni tok (4/10)	100 kA
Tok dolgega vala	250 A
Zdržni kratkostični tok	20 kA
Sposobnost energijske absorpcije (dolgi val)	2,8 kJ/kVU_c
Sposobnost energijske absorpcije (impulzni tok)	4,8 kJ/kVU_c
Upogibni moment (M_u)	250 Nm
Torzijski moment (M_t)	80 Nm
Vertikalna sila (F_v)	625 N

Surge arresters' parameters

Nominal voltage (U_r)	*3,7 – 55 kV*
Continuous operating voltage (U_c)	*3 – 44 kV*
Nominal discharge current (8/20) (I_n)	*10 kA*
High impulse current (4/10)	*100 kA*
Long–duration current	*250 A*
Short–circuit current	*20 kA*
Energy absorption capability (long duration)	*2,8 kJ/kVU_c*
Energy absorption capability (impulse current)	*4,8 kJ/kVU_c*
Cantilever strength (M_u)	*250 Nm*
Tensional strength (M_t)	*80 Nm*
Vertical load (F_v)	*625 N*

2.3 SNO - oblika RP

2.3 SNO - shape RP

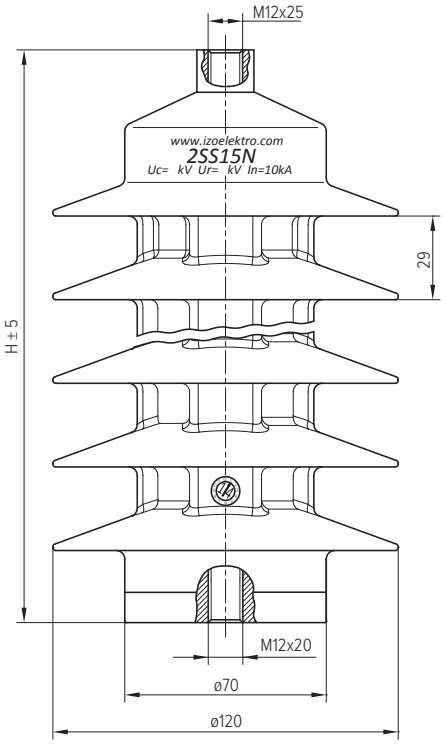


Koda *Code*	U_c (kV)	U_r (kV)	U_{res} (kV)	CD (mm)	AD (mm)	A (mm)	B (mm)	H (mm)
10 40 00	4	5,00	13	343	154	80	100	136
10 60 00	6	7,50	22			100	120	
10 80 00	8	10,00	31			120	140	
11 00 00	10	12,50	35	453	186	140	160	168
11 20 00	12	15,00	39			160	180	
11 40 00	14	17,50	47	563	218	180	200	200
11 60 00	16	20,00	51			200	220	
11 80 00	18	22,50	60	674	250	220	240	232
12 00 00	20	25,00	64			240	260	
12 20 00	22	27,50	72	784	282	270	300	263
12 40 00	24	30,00	76			300	320	
12 60 00	26	32,50	85	894	314	320	340	295
12 80 00	28	35,00	88			340	360	
13 00 00	30	37,50	97	1004	345	360	380	327
13 20 00	32	40,00	101			380	400	
13 40 00	34	42,50	110	1114	377	400	420	359
13 60 00	36	45,00	114			420	440	
13 80 00	38	47,50	124	1234	409	440	460	391
14 00 00	40	50,00	130			450	470	
14 20 00	42	52,50	138			460	480	
14 40 00	44	55,00	143			470	490	

U_{res} - preostala napetost pri 10kA (8/20 µs)
CD - plazilna pot
AD - preskočna razdalja
A - minimalna razdalja do stene
B - minimalna razdalja med fazami

U_{res} - residual voltage at 10kA (8/20 µs)
CD - creepage distance
AD - arcing distance
A - minimum distance to wall
B - minimum distance between phases

2.4 **2SS15N - oblika R** *2.4* ***2SS15N - shape R***

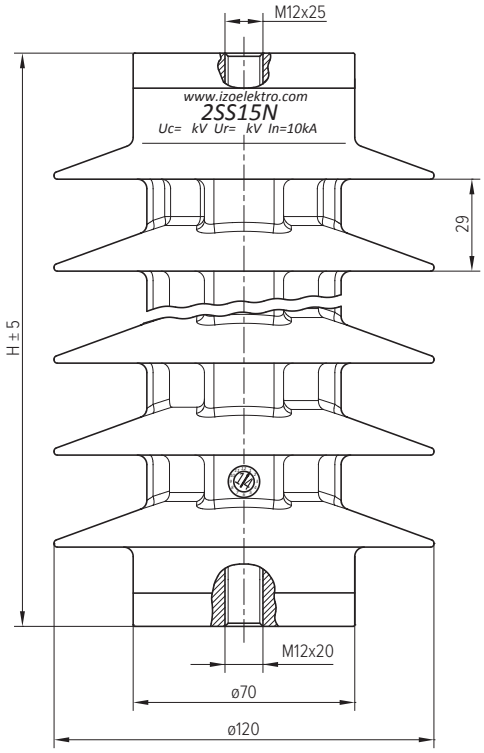


Koda *Code*	U_c (kV)	U_r (kV)	U_{res} (kV)	CD (mm)	AD (mm)	A (mm)	B (mm)	H (mm)
21 48 01	3	3,75	9	360	139	60	90	147
21 48 02	4	5,00	13			80	100	
21 48 03	6	7,50	22			100	120	
21 48 04	8	10,00	31	520	185	120	140	193
21 48 05	10	12,50	35			140	160	
21 48 06	12	15,00	39			160	180	
21 48 07	14	17,50	47	600	235	180	200	243
21 48 08	16	20,00	51			200	220	
21 48 09	18	22,50	60			220	240	
21 48 10	20	25,00	64	680	262	240	260	270
21 48 11	21	26,25	68			260	280	
21 48 12	22	27,50	72			270	300	
21 48 22	24	30,00	76			320	320	
21 48 13	24	30,00	76	760	309	320	320	317
21 48 14	26	32,50	85			340	340	
21 48 15	28	35,00	88			360	360	
21 48 16	30	37,50	97	1000	362	295	380	370
21 48 17	32	40,00	101			380	400	
21 48 23	36	45,00	114			420	440	
21 48 18	34	42,50	110	1080	396	400	420	404
21 48 24	35	43,75	113			410	430	
21 48 19	36	45,00	114			420	440	
21 48 26	40,5	50,60	132			450	470	

U_{res} - preostala napetost pri 10kA (8/20 µs)
CD - plazilna pot
AD - preskočna razdalja
A - minimalna razdalja do stene
B - minimalna razdalja med fazami

U_{res} - residual voltage at 10kA (8/20 µs)
CD - creepage distance
AD - arcing distance
A - minimum distance to wall
B - minimum distance between phases

2.5 **2SS15N - oblika RP** *2.5* ***2SS15N - shape RP***

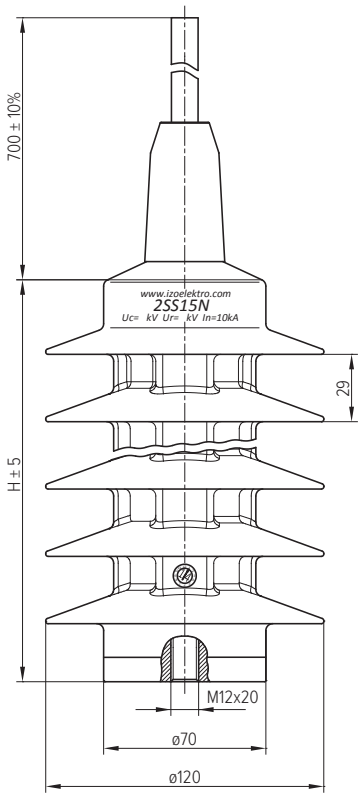


Koda *Code*	U_c (kV)	U_r (kV)	U_{res} (kV)	CD (mm)	AD (mm)	A (mm)	B (mm)	H (mm)
21 58 01	3	3,75	9	262	139	60	90	129
21 58 02	4	5,00	13			408	100	
21 58 03	6	7,50	22			508	120	
21 58 04	8	10,00	31	408	188	120	140	175
21 58 05	10	12,50	35			683	160	
21 58 06	12	15,00	39			887	180	
21 58 07	14	17,50	47	508	233	180	200	225
21 58 08	16	20,00	51			200	220	
21 58 09	18	22,50	60			220	240	
21 58 10	20	25,00	64	586	261	240	260	252
21 58 11	21	26,25	68			260	280	
21 58 12	22	27,50	72			270	300	
21 58 20	24	30,00	76			320	320	
21 58 13	24	30,00	76	683	304	320	320	299
21 58 14	26	32,50	85			340	340	
21 58 15	28	35,00	88			360	360	
21 58 16	30	37,50	97	887	364	295	380	352
21 58 17	32	40,00	101			380	400	
21 58 21	36	45,00	114			420	440	
21 58 18	34	42,50	110	971	396	400	420	386
21 58 24	35	43,75	113			410	430	
21 58 19	36	45,00	114			420	440	
21 58 26	40,5	50,60	132			450	470	

U_{res} - preostala napetost pri 10kA (8/20 µs)
CD - plazilna pot
AD - preskočna razdalja
A - minimalna razdalja do stene
B - minimalna razdalja med fazami

U_{res} - residual voltage at 10kA (8/20 µs)
CD - creepage distance
AD - arcing distance
A - minimum distance to wall
B - minimum distance between phases

2.6 **2SS15N - oblika RO** *2.6 **2SS15N - shape RO***



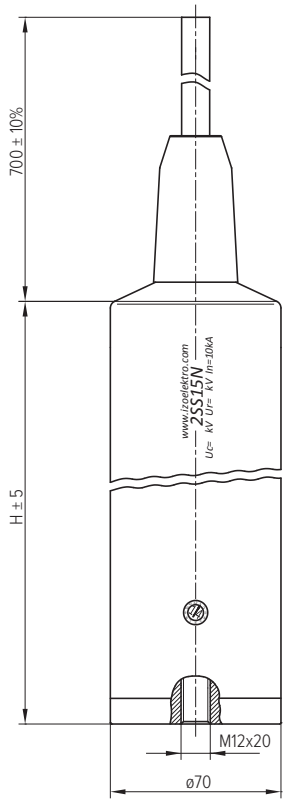
Koda *Code*	U_c (kV)	U_r (kV)	U_{res} (kV)	CD (mm)	AD (mm)	A (mm)	B (mm)	H (mm)
21 49 01	3	3,75	9	491	257	60	90	129
21 49 02	4	5,00	13			80	100	
21 49 03	6	7,50	22			100	120	
21 49 04	8	10,00	31	651	303	120	140	175
21 49 05	10	12,50	35			140	160	
21 49 06	12	15,00	39			160	180	
21 49 07	14	17,50	47	731	353	180	200	225
21 49 08	16	20,00	51			200	220	
21 49 09	18	22,50	60			220	240	
21 49 10	20	25,00	64	811	380	240	260	252
21 49 11	21	26,25	68			260	280	
21 49 12	22	27,50	72			270	300	
21 49 20	24	30,00	76			320	320	
21 49 13	24	30,00	76	891	427	320	320	299
21 49 14	26	32,50	85			340	340	
21 49 15	28	35,00	88			360	360	
21 49 16	30	37,50	97	1131	480	295	380	352
21 49 17	32	40,00	101			380	400	
21 49 21	36	45,00	114			420	440	
21 49 18	34	42,50	110	1211	517	400	420	386
21 49 24	35	43,75	113			410	430	
21 49 19	36	45,00	114			420	440	
21 49 26	40,5	50,60	132			450	470	

U_{res} - preostala napetost pri 10kA (8/20 µs)
CD - plazilna pot
AD - preskočna razdalja
A - minimalna razdalja do stene
B - minimalna razdalja med fazami

U_{res} - residual voltage at 10kA (8/20 µs)
CD - creepage distance
AD - arcing distance
A - minimum distance to wall
B - minimum distance between phases

2.7 2SS15N - oblika NO

2.7 2SS15N - shape NO



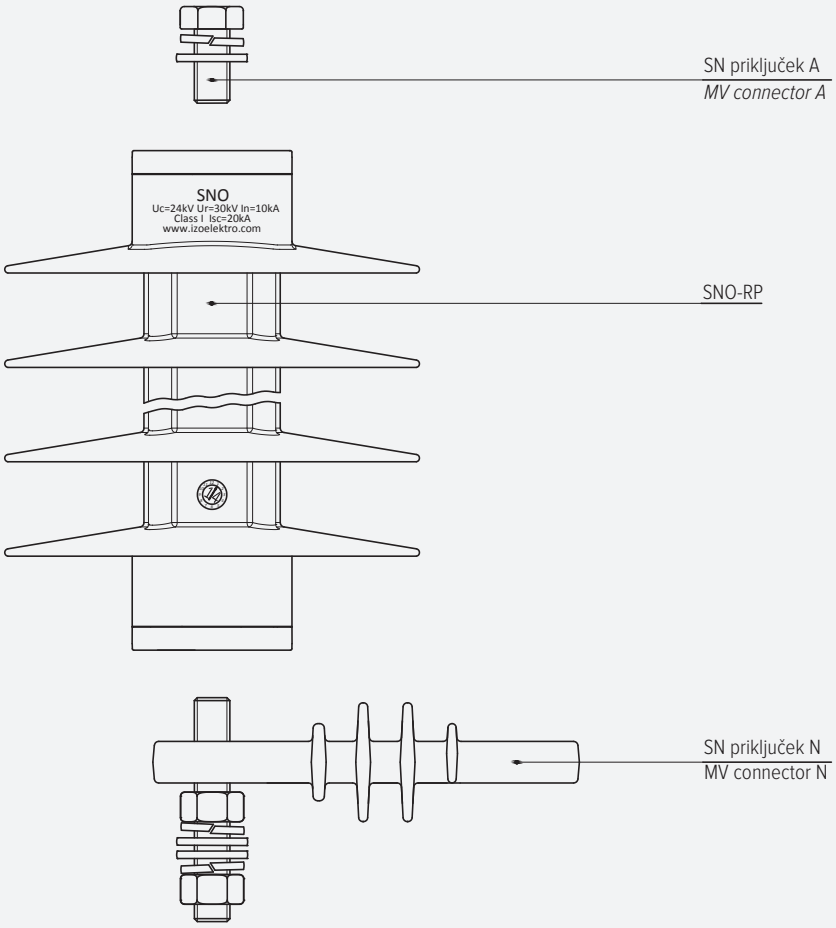
Koda *Code*	U_c (kV)	U_r (kV)	U_{res} (kV)	CD (mm)	AD (mm)	A (mm)	B (mm)	H (mm)
21 59 01	3	3,75	9	243	215	60	90	129
21 59 02	4	5,00	13			408	100	
21 59 03	6	7,50	22			508	120	
21 59 04	8	10,00	31	289	271	120	140	175
21 59 05	10	12,50	35			683	160	
21 59 06	12	15,00	39			887	180	
21 59 07	14	17,50	47	339	321	180	200	225
21 59 08	16	20,00	51			200	220	
21 59 09	18	22,50	60			220	240	
21 59 10	20	25,00	64	366	348	240	260	252
21 59 11	21	26,25	68			260	280	
21 59 12	22	27,50	72			270	300	
21 59 20	24	30,00	76			320	320	
21 59 13	24	30,00	76	413	395	320	320	299
21 59 14	26	32,50	85			340	340	
21 59 15	28	35,00	88			360	360	
21 59 16	30	37,50	97	466	418	295	380	352
21 59 17	32	40,00	101			380	400	
21 59 21	36	45,00	114			420	440	
21 59 18	34	42,50	110	500	482	400	420	386
21 59 24	35	43,75	113			410	430	
21 59 19	36	45,00	114			420	440	
21 59 26	40,5	50,60	132			450	470	

U_{res} - preostala napetost pri 10kA (8/20 µs)
CD - plazilna pot
AD - preskočna razdalja
A - minimalna razdalja do stene
B - minimalna razdalja med fazami

U_{res} - residual voltage at 10kA (8/20 µs)
CD - creepage distance
AD - arcing distance
A - minimum distance to wall
B - minimum distance between phases

2.8 SNO in 2SS15N - primer naročila

2.8 SNO and 2SS15N - order example



Naziv/*Name*: **SNO-RP 24 kV AN**

Razlaga naziva

SNO	- tip SN odvodnika prenapetosti
RP	- oblika SN odvodnika prenapetosti
24	- trajna obratovalna napetost (Uc)
kV	- merska enota
AN	- oznaki SN priključkov

Name explanation

SNO	*- type of MV surge arrester*
RP	*- shape MV surge arrester*
24	*- continuous operating voltage (Uc)*
kV	*- measuring unit*
AN	*- marks of MV connectors*

Oznake na odvodniku

Izoelektro	- proizvajalec
SNO	- tip SN odvodnika prenapetosti
2/14	- mesec in leto proizvodnje
U_c ...V	- trajna obratovalna napetost
U_R ...kV	- nazivna napetost
I_n ...kA	- nazivni odvodni tok
I_{sc} ...kA	- kratkostični tok
Class I	- IEC razred

Marks on surge arrester

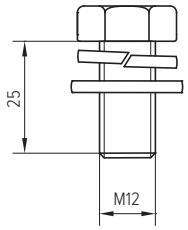
Izoelektro	*- manufacturer*
SNO	*- type of MV surge arrester*
2/14	*- month and year of production*
U_c ...V	*- continuous operating voltage*
U_R ...kV	*- nominal voltage*
I_n ...kA	*- nominal discharge current*
I_{sc} ...kA	*- short-circuit current*
Class I	*- IEC class*

2.9 SN priključek A

Opis: vijačni priključek za kabelski čevelj
Koda: **21 47 01**

2.9 MV connector A

Description: screw connector for cable lug
*Code: **21 47 01***

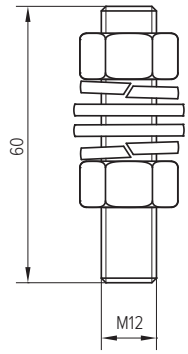


2.10 SN priključek B

Opis: vijačni priključek za kabelski čevelj
Koda: **21 47 02**

2.10 MV connector B

Description: screw connector for cable lug
*Code: **21 47 02***

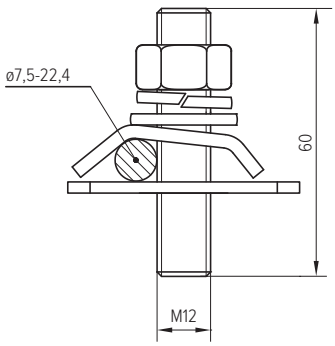


2.11 SN priključek C

Opis: vijačni priključek za AlFe ø7,5-22,4 mm
Koda: **21 47 03**

2.11 MV connector C

Description: connector for AlFe ø7,5-22,4 mm
*Code: **21 47 03***

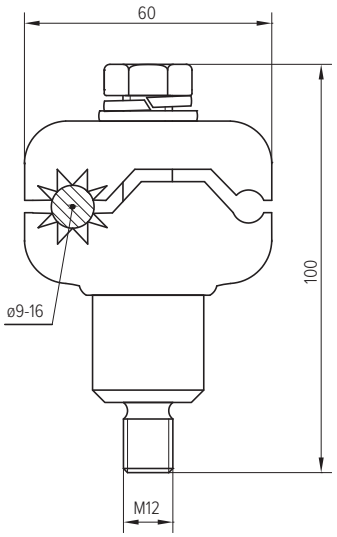


2.12 **SN priključek D**

Opis: vijačni priključek za PIV ø9-16 mm
Koda: **21 47 04**

2.12 ***MV connector D***

Description: screw connector for CC ø9-16 mm
Code: ***21 47 04***

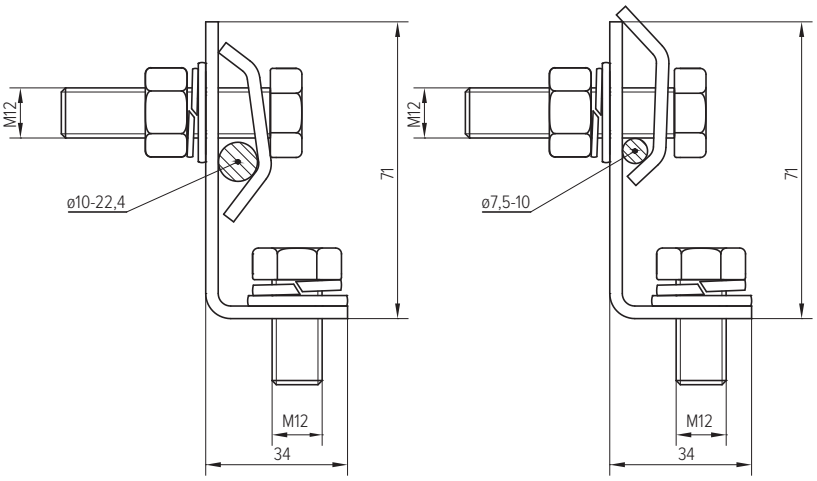


2.13 **SN priključek E**

Opis: vijačni priključek za AlFe ø7,5-22,4 mm
Koda: **21 47 05**

2.13 ***MV connector E***

Description: screw connector for AlFe ø7,5-22,4 mm
Code: ***21 47 05***

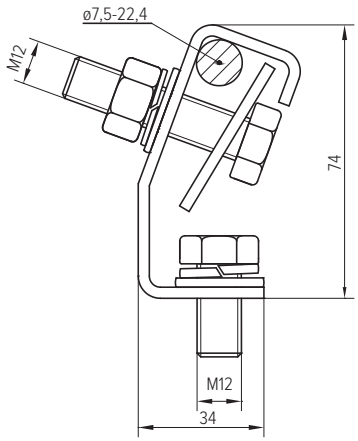


2.14 **SN priključek F**

Opis: vijačni priključek za AlFe ø7,5-22,4 mm
Koda: **21 47 06**

2.14 ***MV connector F***

Description: screw connector for AlFe ø7,5-22,4 mm
Code: ***21 47 06***

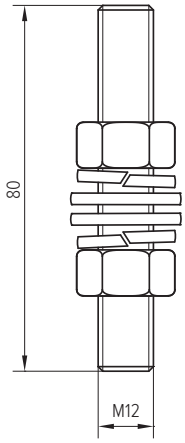


2.15 SN priključek G

Opis: vijačni priključek za kabelski čevelj
Koda: **21 47 07**

2.15 MV connector G

Description: screw connector for cable lug
*Code: **21 47 07***

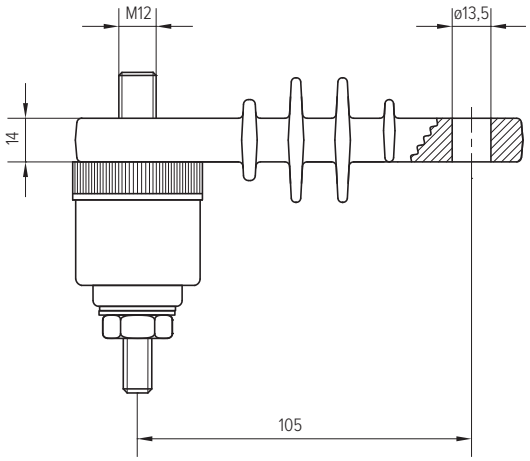


2.16 SN priključek L

Opis: nosilec izolacijski z odklopno napravo
Koda: **21 47 22**

2.16 MV connector L

Description: insulative bracket with disconnector
*Code: **21 47 22***

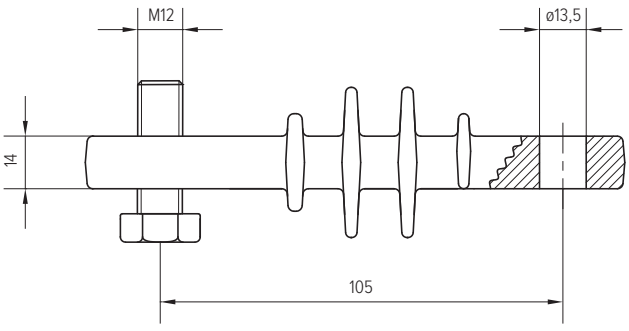


2.17 SN priključek M

Opis: nosilec izolacijski z vijakom M12x25
Koda: **21 47 23**

2.17 MV connector M

Description: insulative bracket with screw M12x25
*Code: **21 47 23***

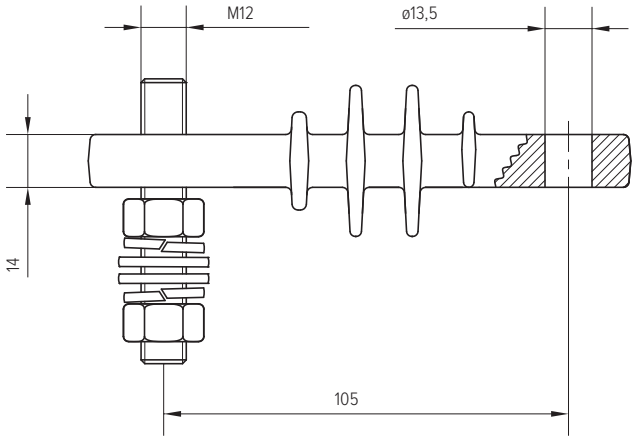


2.18 **SN priključek N**

Opis: nosilec izolacijski z vijakom M12x80
Koda: **21 47 24**

2.18 ***MV connector N***

Description: insulative bracket with screw M12x80
Code: ***21 47 24***

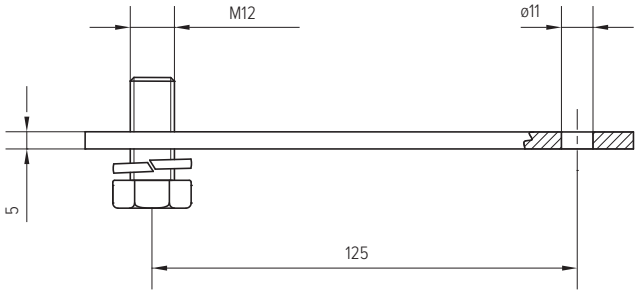


2.19 **SN priključek O**

Opis: nosilec jeklen z vijakom M12x25
Koda: **21 47 25**

2.19 ***MV connector O***

Description: steel bracket with screw M12x25
Code: ***21 47 25***

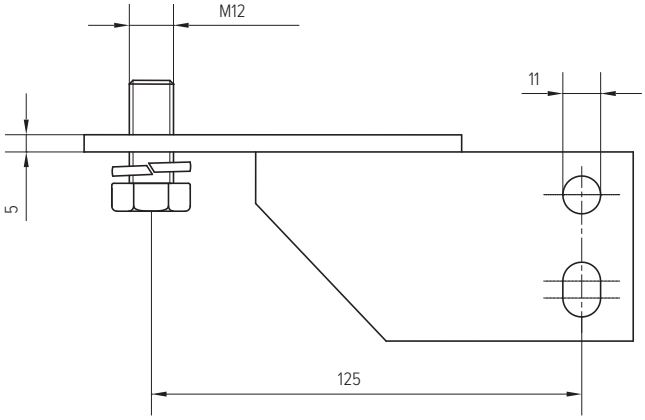


2.20 **SN priključek P**

Opis: nosilec jeklen 90° z vijakom M12x25
Koda: **21 47 26**

2.20 ***MV connector P***

Description: steel bracket 90° with screw M12x25
Code: ***21 47 26***

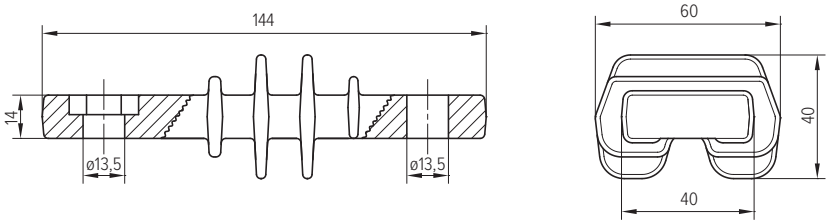


2.21 SN nosilec R - izolacijski

Opis: izolacijski nosilec
Material: poliamid PA6
Koda: **21 47 30**

2.21 MV bracket R - insulated

Description: insulative bracket
Material: polyamide PA6
*Code: **21 47 30***

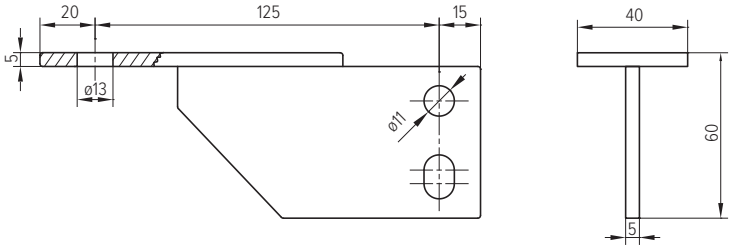


2.22 Nosilec S - jeklen

Opis: nosilec jeklen 90°
Koda: **21 48 31**

2.22 MV bracket S - steel

Description: steel bracket 90°
*Code: **21 48 31***

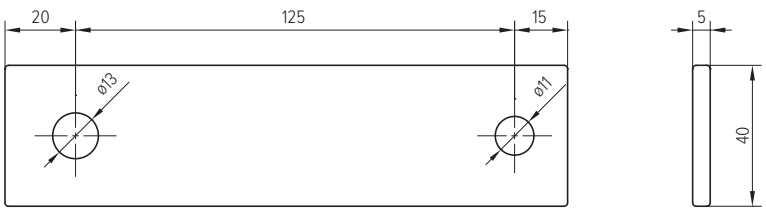


2.23 SN nosilec T - jeklen

Opis: nosilec jeklen
Koda: **21 48 32**

2.23 MV bracket T - steel

Description: steel bracket
*Code: **21 48 32***



2.24 SN indikatorja stanja - splošno

Proizvod

ON in **ISOP** sta indikatorja stanja SN odvodnikov prenapetosti. Med obratovanjem nadzorujeta delovanje in določata uporabnost vgrajenih odvodnikov.

Lastnosti

ON

je odklopna naprava. Reagira pri tokovni preobremenitvi. Ozemljitveni vodnik odvodnika prenapetosti, pritrjen na odklopno napravo, se po reagiranju oddvoji od odklopne naprave. V tem primeru je potrebno zamenjati odvodnik prenapetosti in odklopno napravo.

ISOP

je indikator stanja odvodnika prenapetosti. Indikator brez daljinske komande ne potrebuje zunanjega napajanja. ISOP reagira pri:

- trajno previsokem uhajavem toku,
- atmosferskih praznjenjih nad 100 kA.

Po delovanju ISOP brez daljinske komande je potrebno indikator stanja zamenjati. Okvara odvodnika je vidna tako, da se zelena površina indikatorja obarva rdeče. Daljinsko voden indikator stanja ISOP upravljamo iz centra vodenja.

Vgradnja

ON

pritrdimo na prosto viseči odvodnik prenapetosti ali odvodnik prenapetosti pritrjen na izolacijsko konzolo.

ISOP

je namenjen za zunanjo in notranjo montažo. Indikator okvare pritrdimo na ustrezni višini tako, da čelno stran indikatorja namestimo v vidno polje.

Splošni podatki

- Stopnja zaščite: **IP 65**
- Material ohišja: **termoplast V-0 (UL 94)**
- Temperaturno območje okolja **T = -40 °C ... +85 °C**
- Indikacija: **vizualna ali daljinska**

2.24 MV condition indicators - generally

Product

***ON** and **ISOP** are indicators of MV surge arresters condition. During operation they monitor functionality and determine usability of installed surge arresters.*

Characteristics

ON

is a disconnecting device. It reacts at current overload. Surge arrester's earthing conductor, which is attached to ON, sunders from the device after functioning. In this case both surge arrester and the disconnecting device need to be replaced.

ISOP

is a condition indicator for surge arresters. Indicator without remote command does not need an external power source. ISOP reacts at:

- *to high leakage current,*
- *atmospheric discharges over 100 kA.*

After ISOP without remote command functions the device needs to be replaced. Defect on surge arrester is shown when green surface on device colours red. Remotely controlled condition indicator ISOP is managed from a command centre.

Installation

ON

is fitted to a freely hanging surge arrester or to a surge arrester fixed to an insulating bracket.

ISOP

is applicable for outdoor and indoor installation. Condition indicator needs to be placed on an adequate height with front side visible.

General data

- *Ingress protection level: **IP 65***
- *Housing material: **thermoplastic V-0 (UL 94)***
- *Ambient temperature range **T = -40 °C ... +85 °C***
- *Indication: **visual or remote***

Prednosti pred konkurenco

ISOP indikatorj stanja se odlikuje zaradi:

- ugotavljanja okvare pri obratovalni napetosti,
- enostavne montaža in zanesljivosti delovanja,
- obratovanja brez vzdrževanja,
- vidnega delovanja pri mehanski napravi, nad 50 m s prostim očesom,
- možnosti nastavitve občutljivosti pri večjih serijah,
- zmanjševanja izgubnega toka,
- možnosti uporabe za zunanjo in notranjo montažo,
- vizualne ali daljinske indikacije.

Competitive advantages

ISOP condition indicator have:

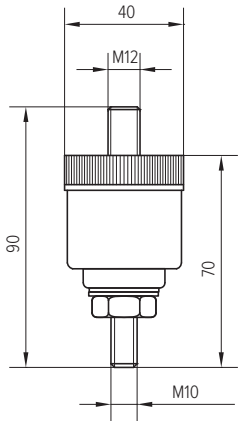
- *indication of faults at operating voltage,*
- *simple installation and reliable functioning,*
- *free maintenance,*
- *visible functioning of mechanical device with the naked eye over 50 m,*
- *the possibility of operating settings for larger batches,*
- *operation reliability,*
- *applicability for outdoor and indoor mounting,*
- *visual or remote indication.*

2.25 SN odklopna naprava ON

Namen: odklopi uničen odvodnik prenapetosti
Koda: **21 47 21**

2.25 MV disconnecting device ON

Purpose: disconnects a destroyed surge arrester
*Code: **21 47 21***

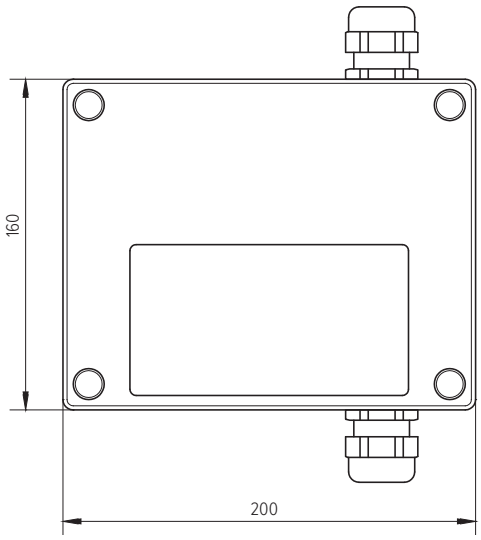


2.26 SN indikator stanja ISOP

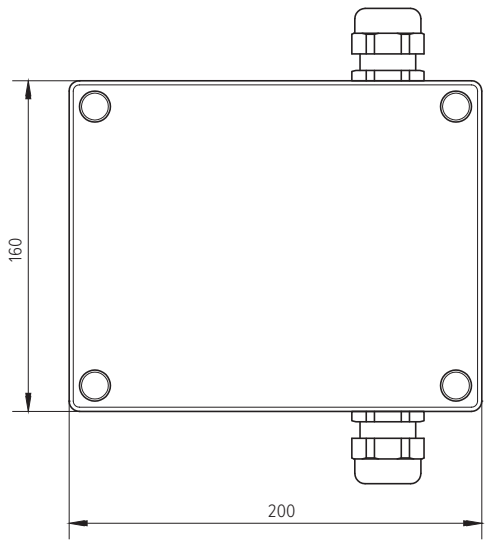
Naziv: ISOP B; koda **90 00 01**; upravljanje: ročno
Naziv: ISOP R; koda **90 00 02**; upravljanje: daljinsko
Premer ozemljitvenega vodnika: 2,5 do 15 mm

2.26 MV condition indicator ISOP

*Name: ISOP B; code: **90 00 01**; control: manually*
*Name: ISOP R; code: **90 00 02**; control: remotely*
Earthing conductor diameter: 2,5 to 15 mm



ISOB B



ISOB R

Oznake na indikatorju stanja ISOP

Izoelektro	- proizvajalec
ISOP	- tip
2/14	- leto in mesec proizvodnje
CE	- skladnost s predpisi EU

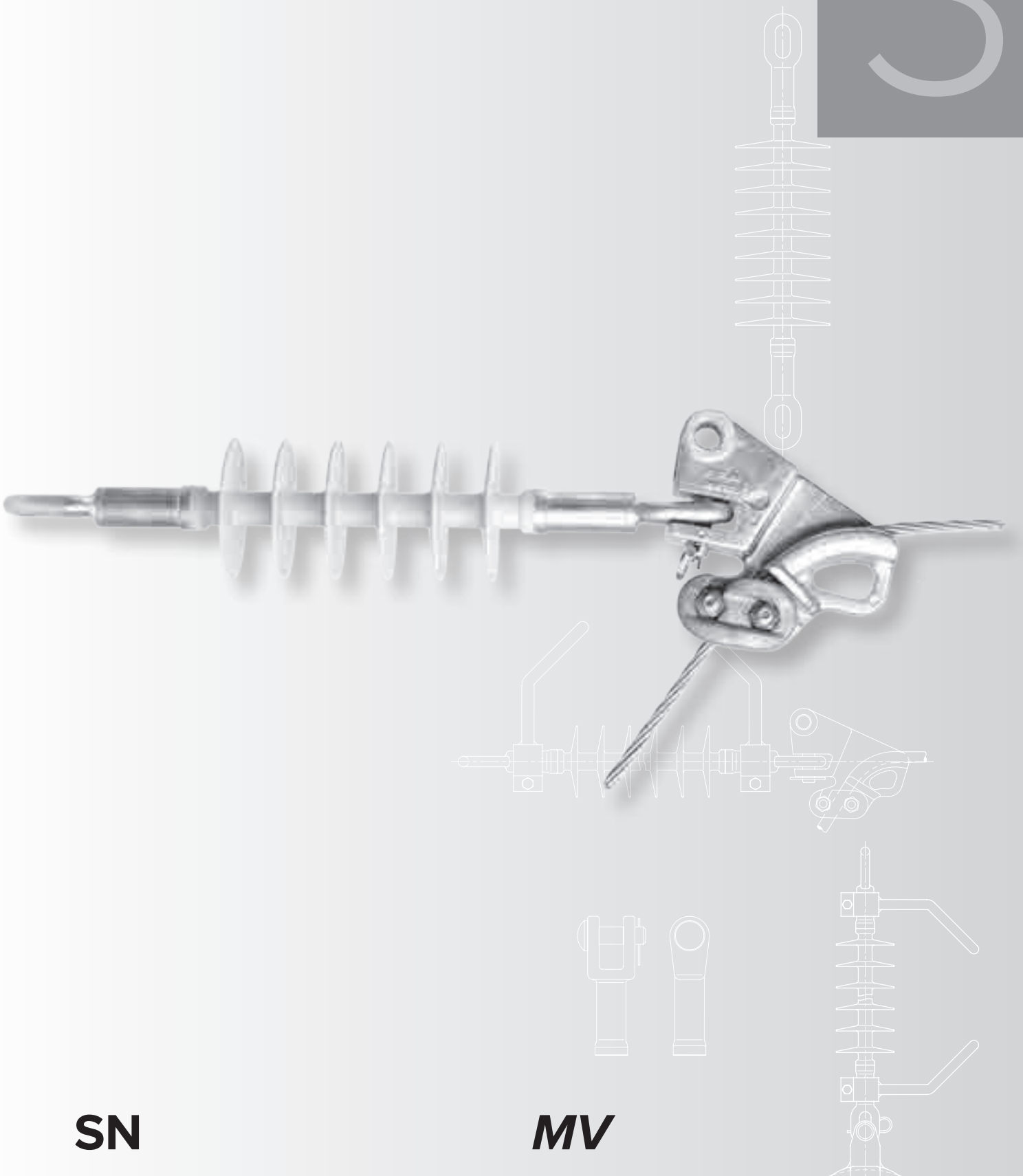
Marks on status indicator ISOP

Izoelektro	*- manufacturer*
ISOP	*- name*
2/14	*- year and month of production*
CE	*- compliance with EU legislation*

Beležke

Notes

3



SN
natezni/nosilni izolatorji

MV
tension/suspension insulators

SN natezni izolatorji

MV tension insulators

3.1 NKI splošno

Proizvod

NKI so natezni/nosilni kompozitni izolatorji s silikonskim plaščem. Namenjeni so za vgradnjo v nadzemne električne vode do nazivne napetosti 52 kV.

Lastnosti

Natezni/nosilni kompozitni izolatorji NKI so:

- odporni na UV sevanje in kemične vplive,
- obstojni na vremenske vplive in staranje,
- oplaščeni s silikonom brez dodatkov,
- primerni za agresivna okolja (industrija, morska obala in puščavsko podnebje),
- uporabni kot natezni ali viseči,
- neobčutljivi na udarce.

Vgradnja

Mesto montaže nateznih kompozitnih izolatorjev NKI določajo pravilniki in tehnični predpisi elektrodistribucij. Vgrajujejo se v novogradnje, rekonstrukcije in pri vzdrževanju. Ne glede na druge že vgrajene izolatorje v daljnovodih, novo vgrajeni NKI izolatorji ne vplivajo na spremembo koordinacije izolacije.

Splošni podatki

- Nazivna mehanska sila (**SML**): **90 kN**
- Rutinski test (**RTL**): **63 kN**
- Maksimalni torzijski moment: **50 Nm**
- Temperaturno območje okolja **T = -60 °C ... +85 °C**
- Plašč: **silikon LSR**
- Barva silikona: **siva**
- Material priključkov: **jeklo ST 52,3**
- Površinska zščita: **cink**
- Odstopanje po dolžini: **±10 mm**
- Testirani po standardu: **IEC 61109, IEC/TS 60815, IEC 62217, IEC 61466**

3.1 NKI generally

Product

NKI are tension/suspension composite insulators coated with two component liquid silicone rubber. They are designed to be installed in overhead power lines with voltage up to 52 kV.

Characteristics

Tension/suspension composite insulators NKI are:

- *resistant to UV radiation and chemical influences,*
- *resistant to weathering and aging,*
- *coated with silicone without additives,*
- *suitable for aggressive environments (industry, seaside and desert climate),*
- *usable as tension or suspension,*
- *insensitive to impacts.*

Installation

The position for installing tension composite insulators NKI is decided by directives and technical regulations of electrical distributors. They are being installed in new constructions, reconstructions and at maintenance. Newly installed NKI insulators have no impact on any change of insulation coordination regardless to previous installed insulators in overhead power lines.

General data

- *Specified mechanical load (**SML**): **90 kN***
- *Routine test load (**RTL**): **63 kN***
- *Maximum torsion load: **50 Nm***
- *Ambient temperature range **T = -60 °C ... +85 °C***
- *Coat: **silicone LSR***
- *Silicone colour: **grey***
- *Material of connections: **steel ST 52,3***
- *Sourface protection: **zinc***
- *Tolerance in length: **±10 mm***
- *Tested according to standard: **IEC 61109, IEC/TS 60815, IEC 62217, IEC 61466***

Prednosti pred konkurenco

NKI natezne kompozitne izolatorje za zunanjo in notranjo montažo odlikujejo:

- certifikat akreditiranega laboratorija,
- silikonski plašč je izdelan iz dvokomponentnega silikona brez dodatkov,
- primerni za agresivna okolja,
- verige izdelane iz NKI izolatorjev in našega spojnega materiala so kratke in lahke,
- nazivna natezna sila SML 90 kN,
- 100% rutinski test RTL,
- veliko število tipskih priključkov izdelanih po IEC standardu,
- izdelava s priključki na zahtevo kupca.

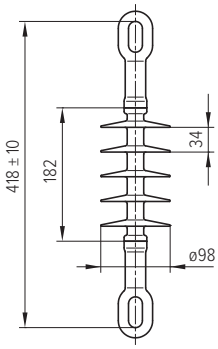
Competitive advantages

NKI tension composite insulators for indoor and outdoor installation virtues:

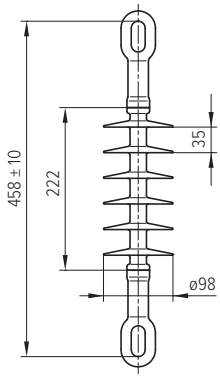
- *a certificate issued by an accredited laboratory,*
- *silicone coating is made of a two component silicone without additives,*
- *suitable also for aggressive environments,*
- *chains made from NKI insulators and our connecting material are short and lightweight,*
- *specified tension load SML 90 kN,*
- *100% routine test RTL,*
- *a large number of standard end fittings manufactured according to IEC standard,*
- *production with end fittings on customer's request.*

3.2 NKI uho-uho

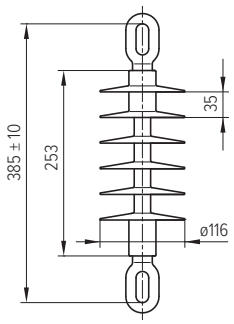
3.2 *NKI eye-eye*



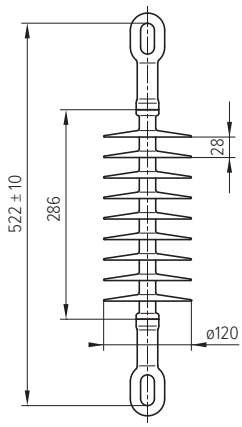
NKI N/UU



NKI L/UU



NKI M/UU

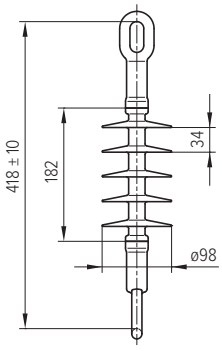


NKI X/UU

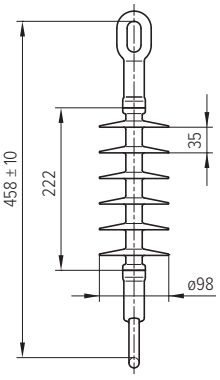
Naziv	NKI N/UU	NKI L/UU	NKI M/UU	NKI X/UU	*Name*
Koda	**80 70 55**	**80 70 57**	**80 71 00**	**80 70 59**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,0 kg	1,1 kg	1,1 kg	1,3 kg	*Mass*

3.3 NKI uho-uho 90°

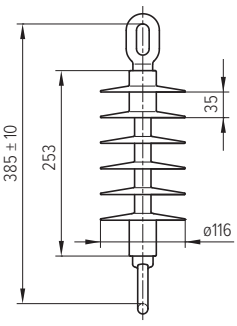
3.3 *NKI eye-eye 90°*



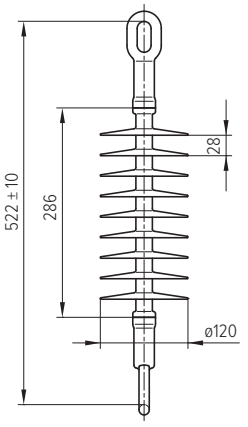
NKI N/UU 90°



NKI L/UU 90°



NKI M/UU 90°

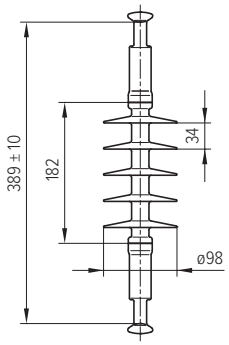


NKI X/UU 90°

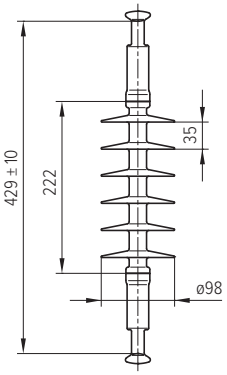
Naziv	NKI N/UU 90°	NKI L/UU 90°	NKI M/UU 90°	NKI X/UU 90°	*Name*
Koda	**80 70 56**	**80 70 58**	**80 71 11**	**80 70 84**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,0 kg	1,1 kg	1,1 kg	1,3 kg	*Mass*

3.4 NKI batič-batič

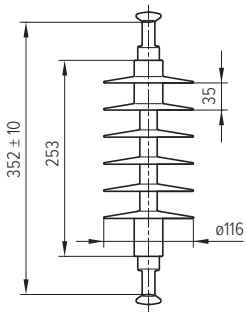
3.4 NKI ball-ball



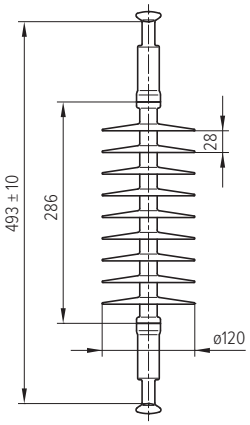
NKI N/BB



NKI L/BB



NKI M/BB

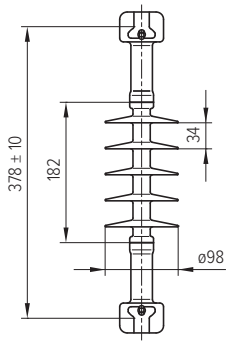


NKI X/BB

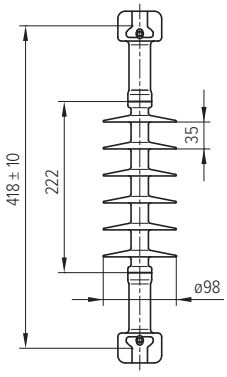
Naziv	NKI N/BB	NKI L/BB	NKI M/BB	NKI X/BB	*Name*
Koda	**80 70 60**	**80 70 61**	**80 71 12**	**80 70 87**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	0,9 kg	1,0 kg	1,0	1,2 kg	*Mass*

3.5 NKI ponvica-ponvica

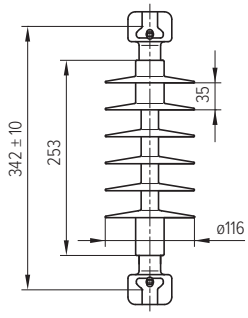
3.5 NKI socket-socket



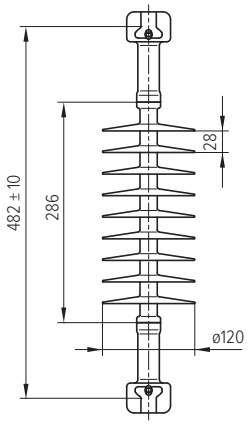
NKI N/PP



NKI L/PP



NKI M/PP

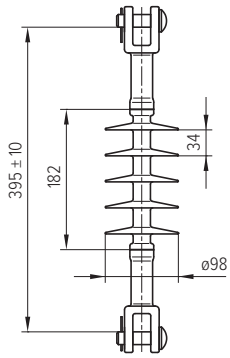


NKI X/PP

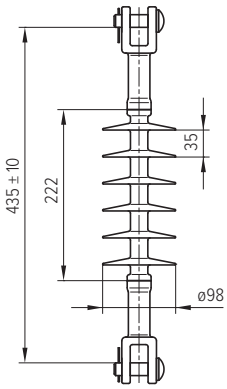
Naziv	NKI N/PP	NKI L/PP	NKI M/PP	NKI X/PP	*Name*
Koda	**80 70 62**	**80 70 63**	**80 71 13**	**80 70 88**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,7 kg	1,8 kg	1,8 kg	2,0 kg	*Mass*

3.6 NKI vilica-vilica

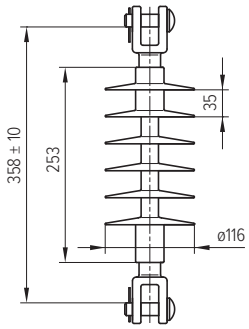
3.6 *NKI clevis-clevis*



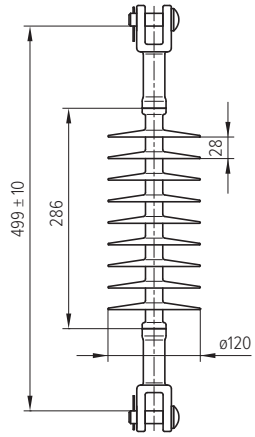
NKI N/VV



NKI L/VV



NKI M/VV

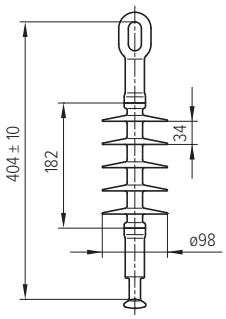


NKI X/VV

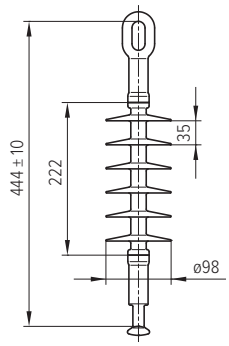
Naziv	NKI N/VV	NKI L/VV	NKI M/VV	NKI X/VV	*Name*
Koda	**80 70 64**	**80 70 65**	**80 71 14**	**80 70 85**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,2 kg	1,3 kg	1,3 kg	1,5 kg	*Mass*

3.7 NKI uho-batič

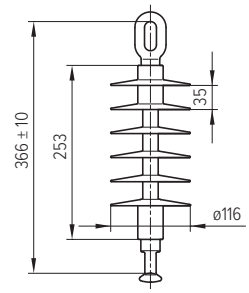
3.7 *NKI eye-ball*



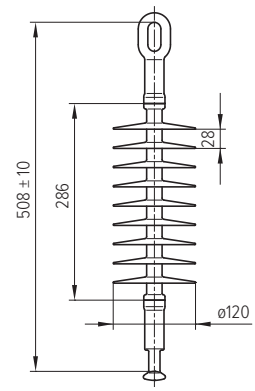
NKI N/UB



NKI L/UB



NKI M/UB

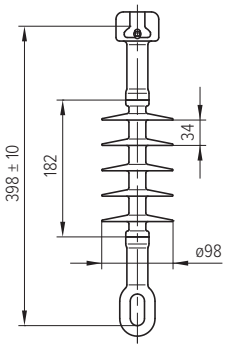


NKI X/UB

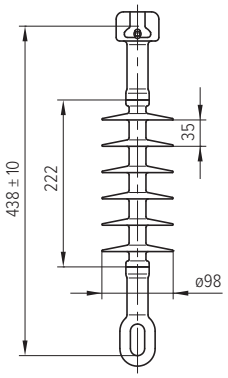
Naziv	NKI N/UB	NKI L/UB	NKI M/UB	NKI X/UB	*Name*
Koda	**80 70 66**	**80 70 67**	**80 71 15**	**80 70 90**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,0 kg	1,1 kg	1,1 kg	1,3 kg	*Mass*

3.8 NKI ponvica-uho

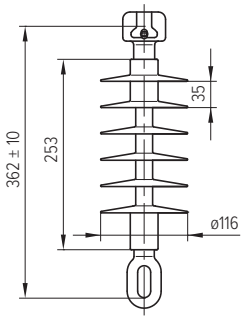
3.8 NKI socket-eye



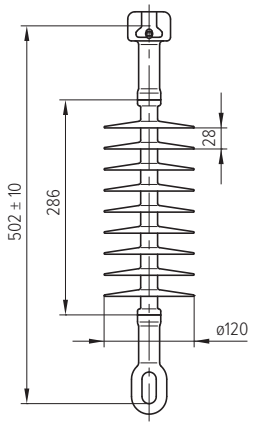
NKI N/PU



NKI L/PU



NKI M/PU

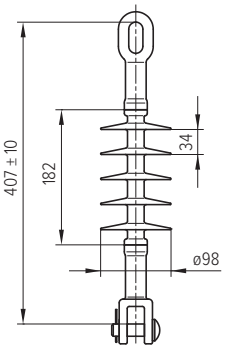


NKI X/PU

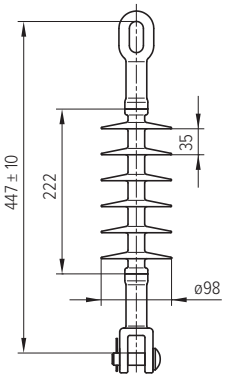
Naziv	NKI N/PU	NKI L/PU	NKI M/PU	NKI X/PU	*Name*
Koda	**80 70 68**	**80 70 69**	**80 71 16**	**80 70 89**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,4 kg	1,5 kg	1,5 kg	1,7 kg	*Mass*

3.9 NKI uho-vilica

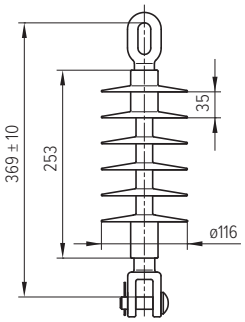
3.9 NKI eye-clevis



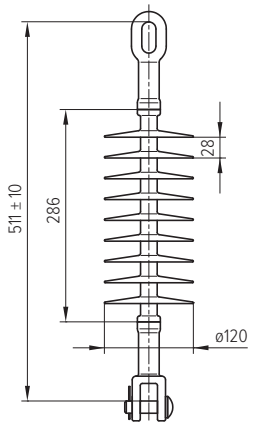
NKI N/UV



NKI L/UV



NKI M/UV

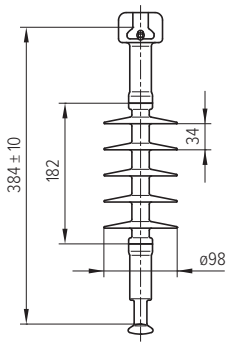


NKI X/UV

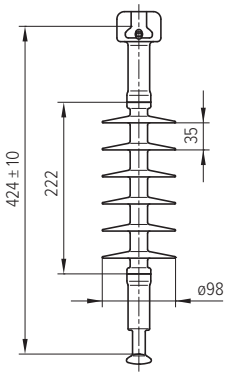
Naziv	NKI N/UV	NKI L/UV	NKI M/UV	NKI X/UV	*Name*
Koda	**80 70 70**	**80 70 71**	**80 71 17**	**80 70 91**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,1 kg	1,2 kg	1,2 kg	1,4 kg	*Mass*

3.10 NKI ponvica-batič

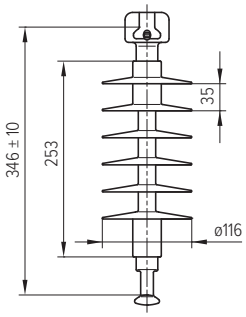
3.10 *NKI socket-ball*



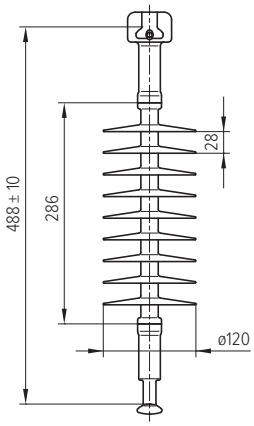
NKI N/PB



NKI L/PB



NKI M/PB

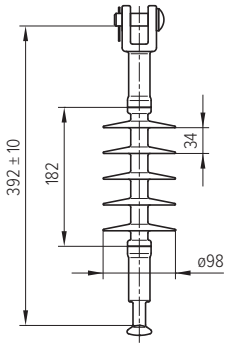


NKI X/PB

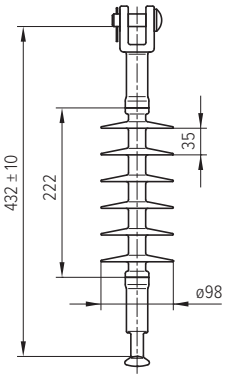
Naziv	NKI N/PB	NKI L/PB	NKI M/PB	NKI X/PB	*Name*
Koda	**80 70 72**	**80 70 73**	**80 71 18**	**80 70 92**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,4 kg	1,5 kg	1,5 kg	1,7 kg	*Mass*

3.11 NKI vilica-batič

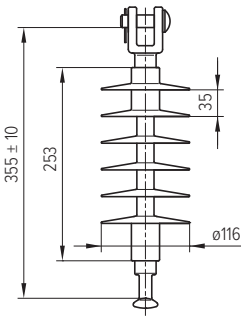
3.11 *NKI clevis-ball*



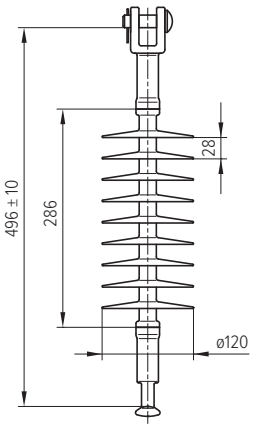
NKI N/VB



NKI L/VB



NKI M/VB

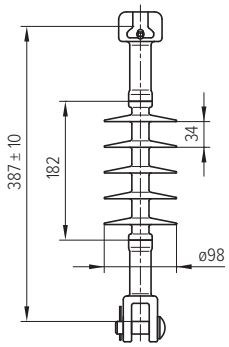


NKI X/VB

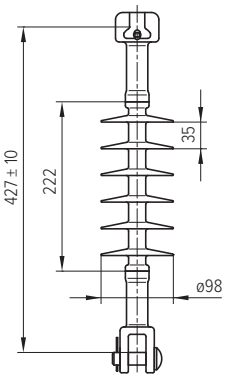
Naziv	NKI N/VB	NKI L/VB	NKI M/VB	NKI X/VB	*Name*
Koda	**80 70 74**	**80 70 75**	**80 71 19**	**80 70 93**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,1 kg	1,2 kg	1,2 kg	1,4 kg	*Mass*

3.12 NKI ponvica-vilica

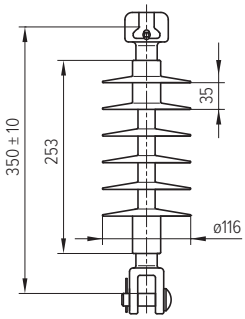
3.12 *NKI socket-clevis*



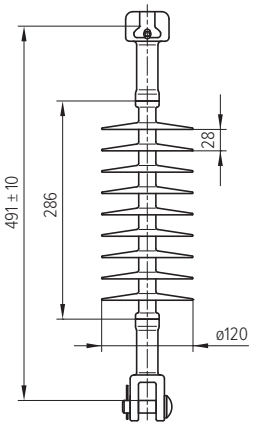
NKI N/PV



NKI L/PV



NKI M/PV

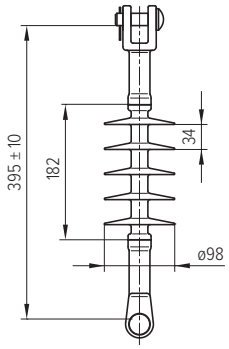


NKI X/PV

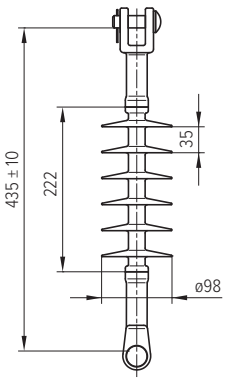
Naziv	NKI N/PV	NKI L/PV	NKI M/PV	NKI X/PV	*Name*
Koda	**80 70 76**	**80 70 77**	**80 71 20**	**80 70 94**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,7 kg	1,8 kg	1,8 kg	2,0 kg	*Mass*

3.13 NKI vilica-vilica 90°

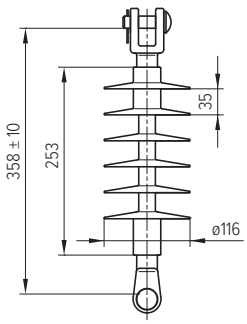
3.13 *NKI clevis-clevis 90°*



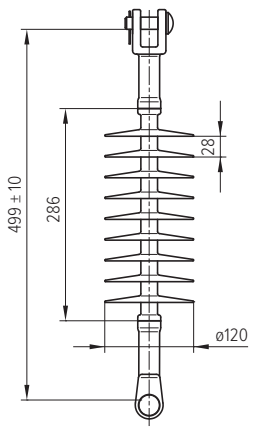
NKI N/VV 90°



NKI L/VV 90°



NKI M/VV 90°

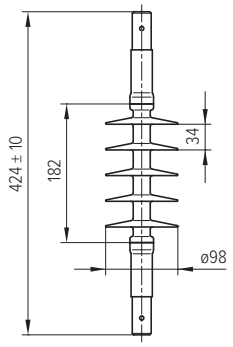


NKI X/VV 90°

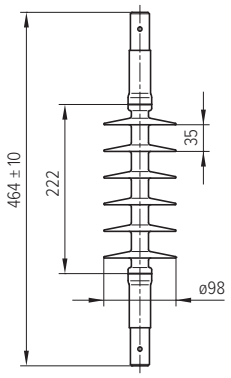
Naziv	NKI N/VV 90°	NKI L/VV 90°	NKI M/VV 90°	NKI X/VV 90°	*Name*
Koda	**80 70 78**	**80 70 79**	**80 71 21**	**80 70 86**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,2 kg	1,3 kg	1,3 kg	1,5 kg	*Mass*

3.14 NKI pogon-pogon

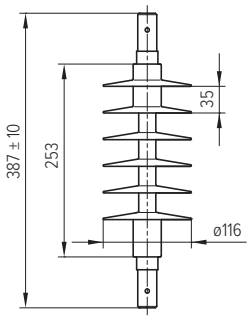
3.14 NKI rod-rod



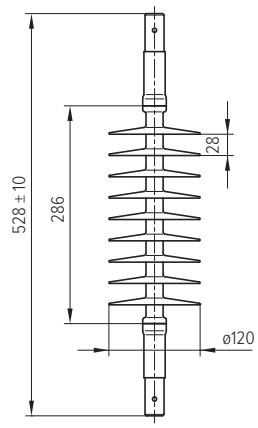
NKI N/II



NKI L/II



NKI M/II

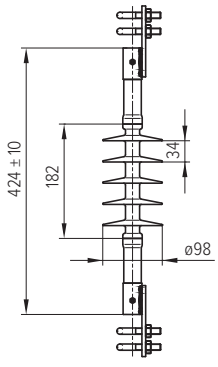


NKI X/II

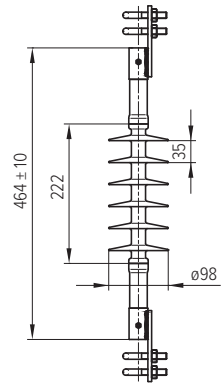
Naziv	NKI N/II	NKI L/II	NKI M/II	NKI X/II	*Name*
Koda	**80 70 80**	**80 70 81**	**80 71 22**	**80 70 95**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,1 kg	1,2 kg	1,2 kg	1,4 kg	*Mass*

3.15 NKI pogon ¾″-pogon ¾″

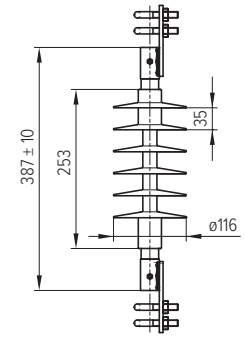
3.15 NKI rod ¾″-rod ¾″



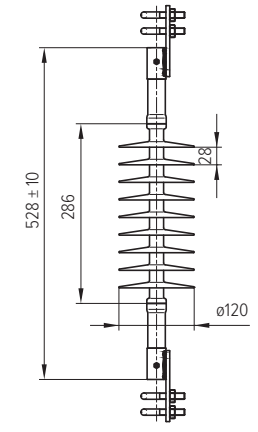
NKI N/II ¾“



NKI L/II ¾“



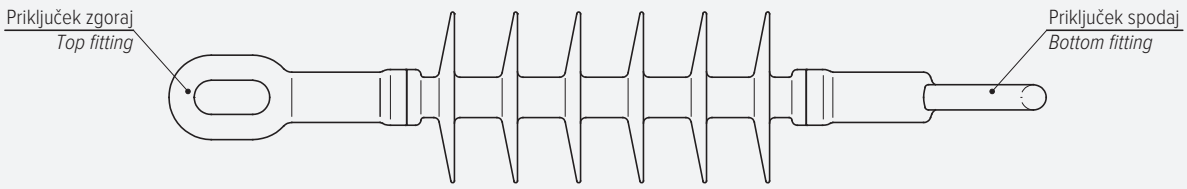
NKI M/II ¾“



NKI X/II ¾“

Naziv	NKI N/II ¾“	NKI L/II ¾“	NKI M/II ¾“	NKI X/II ¾“	*Name*
Koda	**80 70 83**	**80 70 96**	**80 71 23**	**80 70 97**	*Code*
Nazivna obratovalna napetost	24 kV	36 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	520 mm	650 mm	793 mm	1120 mm	*Creepage distance*
Preskočna razdalja	230 mm	270 mm	290 mm	335 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	175 kV	176 kV	223 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	60 kV	75 kV	91 kV	106 kV	*Wet power frequency withstand voltage*
Masa	2,3 kg	2,4 kg	2,4 kg	2,6 kg	*Mass*

NKI izolatorji - primer naročila *3.16 NKI insulators - order example*



Naziv/ *Name*: **NKI L/UU 90°**

Razlaga naziva

NKI	- Tip
L, N, M, X	- Oblika plašča
U, U90°, V, B, P, Y, O, I, I¾″	- Oblika priključka zgoraj
U 90°, U, V, B, P, Y, O, I, I¾″	- Oblika priključka spodaj

Name explanation

NKI	*- Type*
L, N, M, X	*- Shape of coating*
U, U90°, V, B, P, Y, O, I, I¾″	*- Shape of top end fitting*
U 90°, U, V, B, P, Y, O, I, I¾″	*- Shape of bottom end fitting*

Oznake na ozolatorju

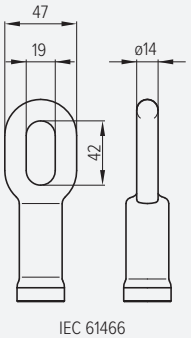
Izoelektro	- proizvajalec
NKI	- Tip SN kompozitnega izolatorja
2/14	- Mesec in leto proizvodnje
90 kN	- Nazivna mehanska sila (SML)

Marks on insulator

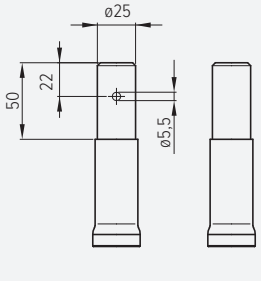
Izoelektro	*- manufacturer*
NKI	*- Type of MV composite insulator*
2/14	*- Month and year of production*
90 kN	*- Specified mechanical load (SML)*

Oblike priključkov

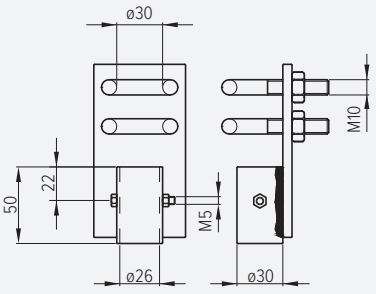
Shapes of end fittings



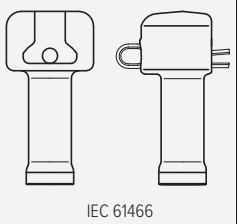
U



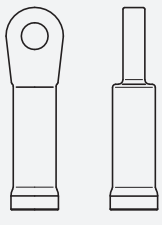
I



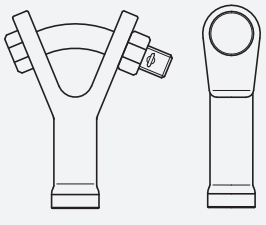
I 3/4"



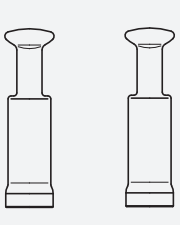
P



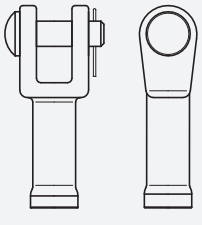
O



Y



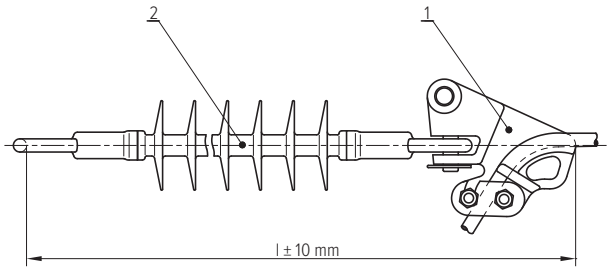
B



V

3.17 NKI enojna zatezna veriga

Opomba: SZ-U sponka (poz. 1) omogoča vpetje v dveh ravninah



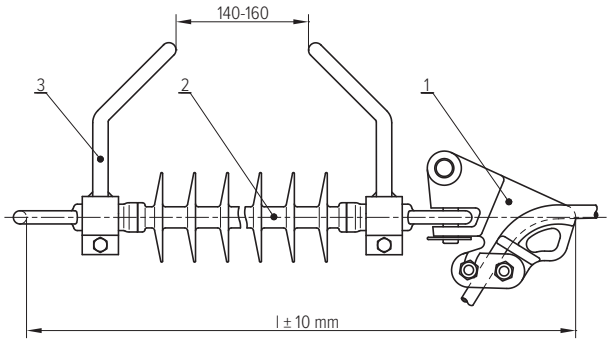
3.17 NKI single tension string

Note: SZ-U clamp (pos. 1) allows fastening into two planes

Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
EZ-01 N/UU	**90 70 55**	590	1	1	**80 60 03**	1,1
			2	1	**80 70 55**	1,0
EZ-01 L/UU	**90 70 57**	630	1	1	**80 60 03**	1,1
			2	1	**80 70 57**	1,1
EZ-01 M/UU	**90 71 00**	557	1	1	**80 60 03**	1,1
			2	1	**80 71 00**	1,1
EZ-01 X/UU	**90 70 59**	686	1	1	**80 60 03**	1,1
			2	1	**80 70 59**	1,3

3.18 NKI enojna zatezna veriga z iskriščem

Opomba: SZ-U sponka (poz. 1) omogoča vpetje v dveh ravninah



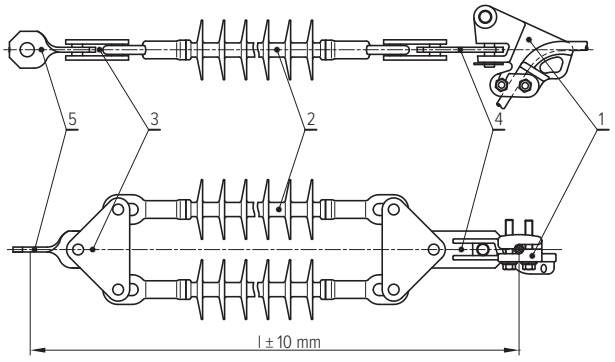
3.18 NKI single tension string with arcing horn

Note: SZ-U clamp (pos. 1) allows fastening into two planes

Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
EZI-01 N/UU	**91 70 55**	590	1	1	**80 60 03**	1,1
			2	1	**80 70 55**	1,0
			3	2	**80 70 54**	0,3
EZI-01 L/UU	**91 70 57**	630	1	1	**80 60 03**	1,1
			2	1	**80 70 57**	1,1
			3	2	**80 70 54**	0,3
EZI-01 M/UU	**91 71 00**	557	1	1	**80 60 03**	1,1
			2	1	**80 71 00**	1,1
			3	2	**80 70 54**	0,3
EZI-01 X/UU	**91 70 59**	686	1	1	**80 60 03**	1,1
			2	1	**80 70 59**	1,3
			3	2	**80 70 54**	0,3

3.19 NKI dvojna zatezna veriga

Opomba: SZ-U sponka (poz. 1) omogoča vpetje v dveh ravninah

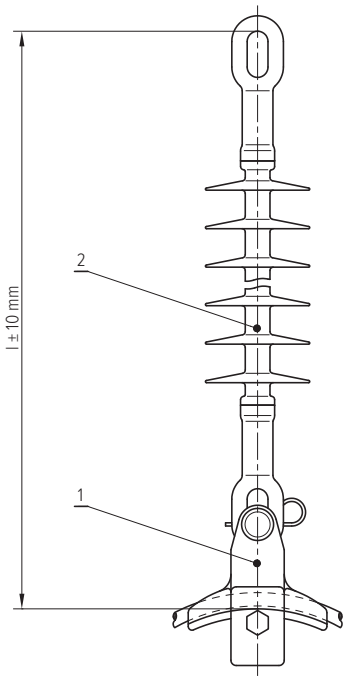


3.19 NKI double tension string

Note: SZ-U clamp (pos. 1) allows fastening into two planes

Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
DZ-01 N/UU	**95 70 55**	872	1	1	**80 60 03**	1,1
			2	2	**80 70 55**	1,0
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
			5	1	**80 60 31**	0,5
DZ-01 L/UU	**95 70 57**	912	1	1	**80 60 03**	1,1
			2	2	**80 70 57**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
			5	1	**80 60 31**	0,5
DZ-01 M/UU	**95 71 00**	839	1	1	**80 60 03**	1,1
			2	2	**80 71 00**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
			5	1	**80 60 31**	0,5
DZ-01 X/UU	**95 70 59**	968	1	1	**80 60 03**	1,1
			2	2	**80 70 59**	1,3
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
			5	1	**80 60 31**	0,5

3.20 NKI enojna nosilna veriga

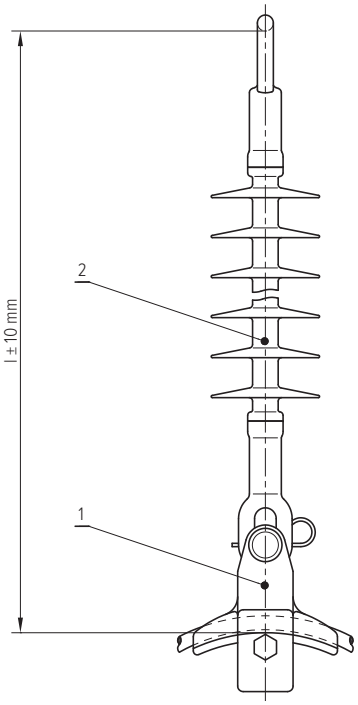


3.20 NKI single suspension string

Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
EN-01 N/UU	**92 70 55**	511	1	1	**80 60 04**	0,7
			2	1	**80 70 55**	1,0
EN-01 L/UU	**92 70 57**	551	1	1	**80 60 04**	0,7
			2	1	**80 70 57**	1,1
EN-01 M/UU	**92 71 00**	478	1	1	**80 60 04**	0,7
			2	1	**80 71 00**	1,1
EN-01 X/UU	**92 70 59**	607	1	1	**80 60 04**	0,7
			2	1	**80 70 59**	1,3

3.21 NKI enojna nosilna veriga 90°

3.21 *NKI single suspension string 90°*



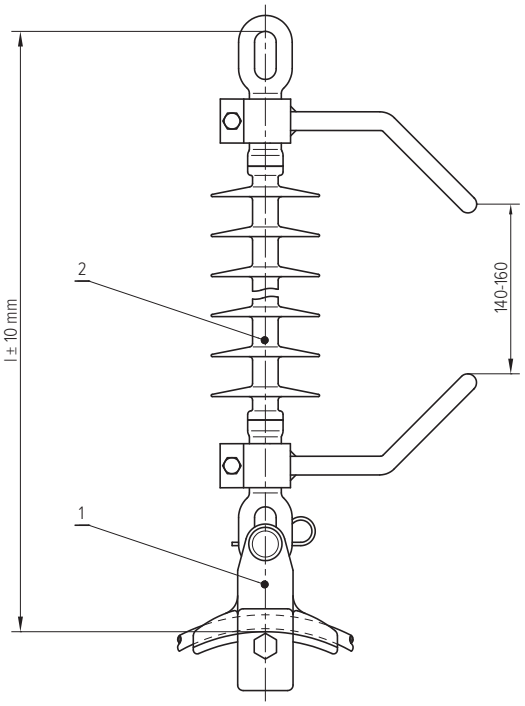
Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
EN-02 N/UU	**92 70 56**	511	1	1	**80 60 04**	0,7
			2	1	**80 70 56**	1,0
EN-02 L/UU	**92 70 58**	551	1	1	**80 60 04**	0,7
			2	1	**80 70 58**	1,1
EN-02 M/UU	**92 71 11**	478	1	1	**80 60 04**	0,7
			2	1	**80 71 11**	1,1
EN-02 X/UU	**92 70 84**	607	1	1	**80 60 04**	0,7
			2	1	**80 70 84**	1,3

3.22 NKI enojna nosilna veriga z iskriščem

3.22 *NKI single suspension string with arcing horn*

Opomba: uporaba za polizolirane vodnike (PIV)

Note: use with covered conductors (CC)



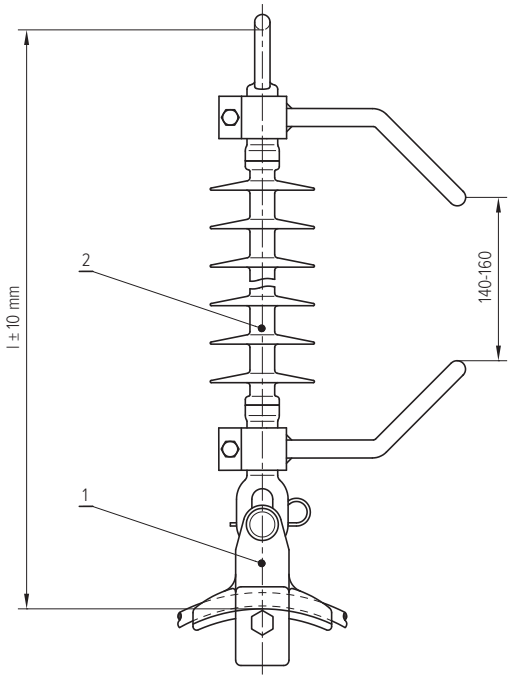
Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
ENI-01 N/UU	**93 70 55**	511	1	1	**80 60 04**	0,7
			2	1	**80 70 55**	1,0
			3	2	**80 70 54**	0,3
ENI-01 L/UU	**93 70 57**	551	1	1	**80 60 04**	0,7
			2	1	**80 70 57**	1,1
			3	2	**80 70 54**	0,3
ENI-01 M/UU	**93 71 00**	478	1	1	**80 60 04**	0,7
			2	1	**80 71 00**	1,1
			3	2	**80 70 54**	0,3
ENI-01 X/UU	**93 70 59**	607	1	1	**80 60 04**	0,7
			2	1	**80 70 59**	1,2
			3	2	**80 70 54**	0,3

3.23 NKI enojna nosilna veriga 90° z iskriščem

3.23 NKI single suspension string 90° with arcing horn

Opomba: uporaba za polizolirane vodnike (PIV)

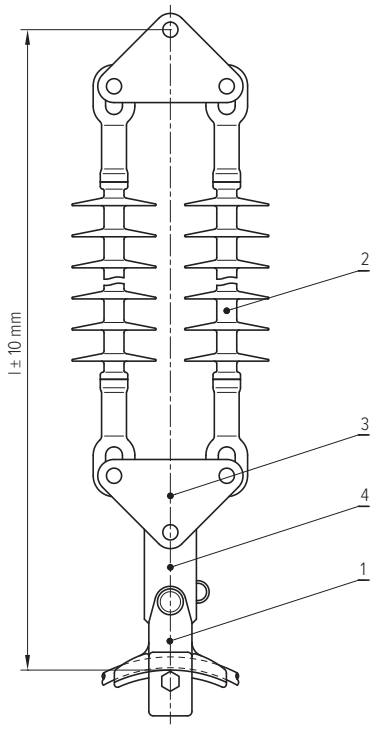
Note: use with covered conductors (CC)



Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
ENI-02 N/UU	**93 70 56**	511	1	1	**80 60 04**	0,7
			2	1	**80 70 56**	1,0
			3	2	**80 70 54**	0,3
ENI-02 L/UU	**93 70 58**	551	1	1	**80 60 04**	0,7
			2	1	**80 70 58**	1,1
			3	2	**80 70 54**	0,3
ENI-02 M/UU	**93 71 11**	478	1	1	**80 60 04**	0,7
			2	1	**80 71 11**	1,1
			3	2	**80 70 54**	0,3
ENI-02 X/UU	**93 70 84**	607	1	1	**80 60 04**	0,7
			2	1	**80 70 84**	1,3
			3	2	**80 70 54**	0,3

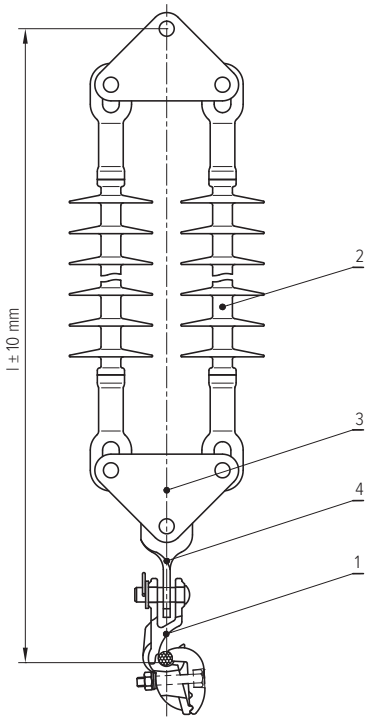
3.24 NKI dvojna nosilna veriga

3.24 NKI double suspension string



Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
DN-01 N/UU	**94 70 55**	710	1	1	**80 60 04**	0,7
			2	2	**80 70 55**	1,0
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
DN-01 L/UU	**94 70 58**	750	1	1	**80 60 04**	0,7
			2	2	**80 70 57**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
DN-01 M/UU	**94 71 00**	677	1	1	**80 60 04**	0,7
			2	2	**80 71 00**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5
DN-01 X/UU	**94 70 57**	806	1	1	**80 60 04**	0,7
			2	2	**80 70 59**	1,3
			3	2	**43 29 408**	1,6
			4	1	**80 60 30**	0,5

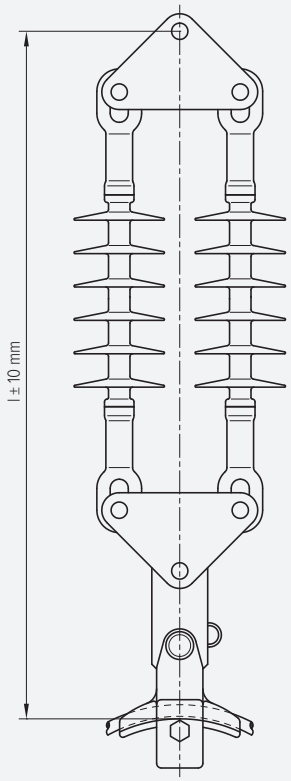
3.25 **NKI dvojna nosilna veriga 90°** *3.25 **NKI double suspension string 90°***



Naziv *Name*	Koda *Code*	l (mm)	Poz. *Pos.*	Kos *Pcs*	Koda *Code*	Masa *Mass* (kg)
DN-02 N/UU	**94 70 56**	710	1	1	**80 60 04**	0,7
			2	2	**80 70 55**	1,0
			3	2	**43 29 408**	1,6
			4	1	**80 86 31**	0,5
DN-02 L/UU	**94 70 59**	750	1	1	**80 60 04**	0,7
			2	2	**80 70 57**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 86 31**	0,5
DN-02 M/UU	**94 71 11**	677	1	1	**80 60 04**	0,7
			2	2	**80 71 00**	1,1
			3	2	**43 29 408**	1,6
			4	1	**80 86 31**	0,5
DN-02 X/UU	**94 70 60**	806	1	1	**80 60 04**	0,7
			2	2	**80 70 59**	1,3
			3	2	**43 29 408**	1,6
			4	1	**80 86 31**	0,5

3.26 NKI izolatorska veriga - primer naročila 1

3.26 NKI insulator string - order example 1



Naziv/ *Name*: **DN-02 L/UU**

Razlaga naziva

DN	- tip izolatorske verige
02	- zaključek verige
L/UU	- tip NKI izolatorja

Name explanation

DN	*- type of insulator string*
02	*- string ending*
L/UU	*- type of NKI insulator*

Tipi izolatorskih verig

EZ	- enojna zatezna
EZI	- enojna zatezna z iskriščem
DZ	- dvojna zatezna
EN	- enojna nosilna
ENI	- enojna nosilna z iskriščem
DN	- dvojna nosilna

Types of insulator strings

EZ	*- single tension*
EZI	*- single tension with arcing horn*
DZ	*- double tension*
EN	*- single suspension*
ENI	*- single suspension with arcing horn*
DN	*- double suspension*

Zaključek verige

01	- ravni zaključek
02	- 90° zaključek

String ending

01	*- straight ending*
02	*- 90° ending*

Tip NKI izolatorja v verigi

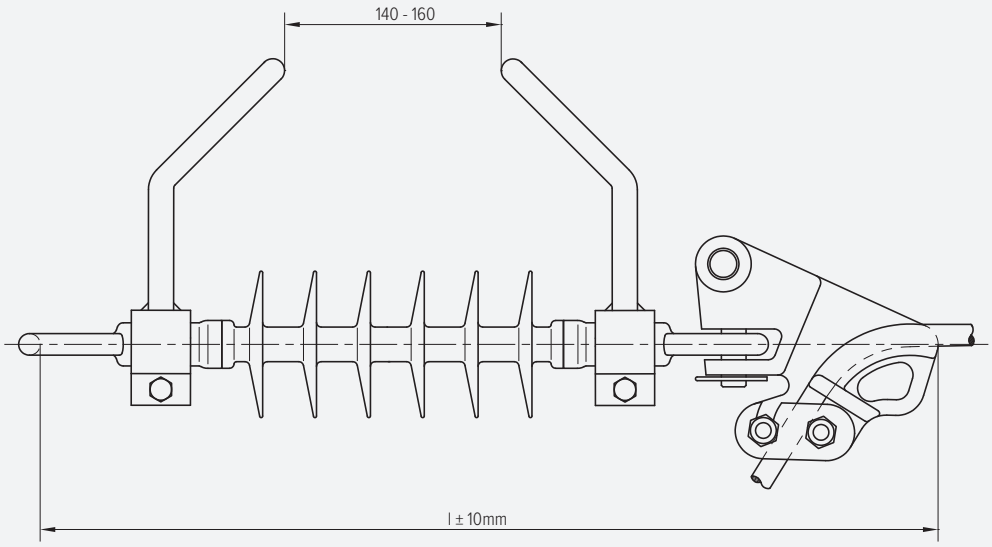
L/UU	- uporabljen je naziv nateznega kompozitnega izolatorja brez oznake NKI

Type of NKI insulator in string

L/UU	*- use the name of the tension composite insulator without the mark NKI.*

3.27 NKI izolatorska veriga - primer naročila 2

3.27 *NKI insulator string - order example 2*



Naziv/ *Name*: **EZI-01 N/UU**

Razlaga naziva

EZI	- tip izolatorske verige
01	- zaključek verige
N/UU	- tip NKI izolatorja v verigi

Name explanation

EZI	*- type of insulator string*
01	*- string ending*
N/UU	*- type of NKI insulator in string*

Tipi izolatorskih verig

EZ	- enojna zatezna
EZI	- enojna zatezna z iskriščem
DZ	- dvojna zatezna
EN	- enojna nosilna
ENI	- enojna nosilna z iskriščem
DN	- dvojna nosilna

Types of insulator strings

EZ	*- single tension*
EZI	*- single tension with arcing horn*
DZ	*- double tension*
EN	*- single suspension*
ENI	*- single suspension with arcing horn*
DN	*- double suspension*

Zaključek verige

01	- ravni zaključek
02	- 90° zaključek

String ending

01	*- straight ending*
02	*- 90° ending*

Tip NKI izolatorja v verigi

N/UU	- uporabljen je naziv nateznega kompozitnega izolatorja brez oznake NKI

Type of NKI insulator in string

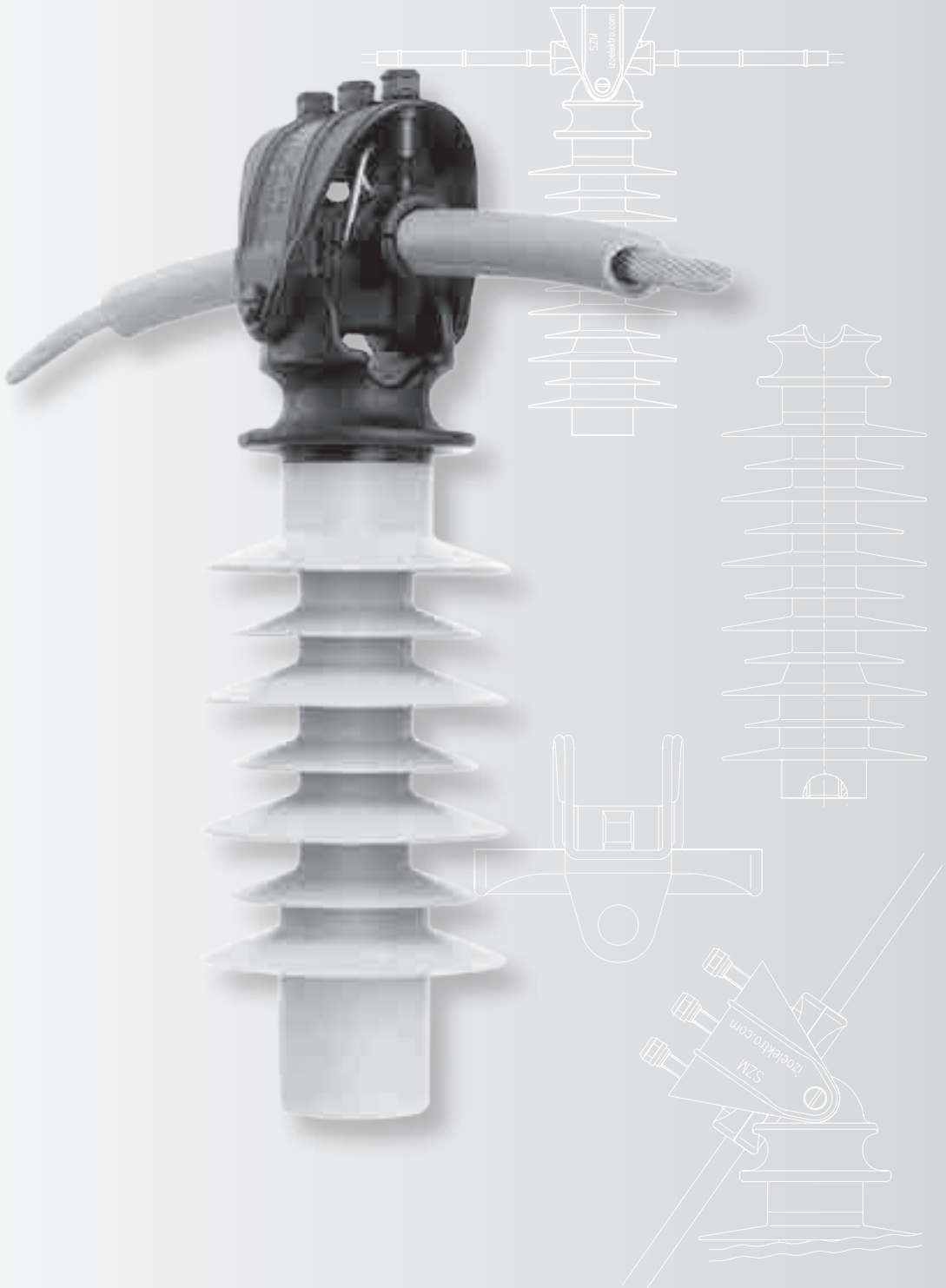
N/UU	*- use the name of the tension composite insulator without the mark NKI.*

Beležke

Notes

IZOELEKTRO

4



SN podporni *izolatorji*

MV post insulators

4.1 SN podporni izolatorji splošno

Proizvod

PKI so podporni kompozitni izolatorji s silikonskim plaščem. Namenjeni so za vgradnjo v nadzemne električne vode do nazivne napetosti 52 kV.

Lastnosti

Podporni kompozitni izolatorji PKI so:

- odporni na UV sevanje in kemične vplive,
- obstojni na vremenske vplive in staranje,
- oplaščeni s silikonom brez dodatkov,
- primerni za agresivna okolja (industrija, morska obala in puščavsko podnebje),
- uporabni za daljnovode in naprave,
- neobčutljivi na udarce.

Vgradnja

Mesto montaže podpornih kompozitnih izolatorjev PKI določajo pravilniki in tehnični predpisi elektrodistribucij. Vgrajujejo se v novogradnje, rekonstrukcije in pri vzdrževanju. Prigrajena vzmetna sponka z ustreznim jahačem zagotavlja tovarniško nastavljeno vertikalno in horizontalno izvlečno silo. Ne glede na druge že vgrajene izolatorje v daljnovodih, novo vgrajeni PKI izolatorji ne vplivajo na spremembo koordinacije izolacije.

Splošni podatki

- Največja prelomna sila (**MDCL**): **15 kN**
- Rutinski test (**RTL**): **10 kN**
- Temperaturno območje okolja **T = -60 °C ... +85 °C**
- Plašč: **silikon LSR**
- Barva silikona: **siva**
- Material zgornjega priključka: **PA6, UV stabiliziran**
- Material jeklenih priključkov: **ST 52,3**
- Navoj priključka spodaj: **M20 ali M24**
- Debelina nanosa cinka: **≥ 70 µm**
- Odstopanje po dolžini: **±5 mm**
- Testirani po standardih: **IEC 62217, IEC 61952, IEC 60437**

Prednosti pred konkurenco

PKI podporne kompozitne izolatorje za zunanjo in notranjo montažo odlikujejo:

- certifikat akreditiranega laboratorija,
- inovativnost. Izolator tip PKI z zgornjim priključkom iz izolacijskega materiala je rezultat strokovnih raziskav naših raziskovalcev (objavljeno v svetovno priznani reviji IEEE Transactions on Power Delivery, 2009), našega patenta in praktičnih izkušenj uporabnikov naših izdelkov. Odpravlja pomanjkljivosti izolatorjev s kovinskim zgornjim priključkom in kovinskimi vezicami,
- način pritrjevanja vodnika na izolator,
- majhna teža,
- enostavna montaža,
- izdelava s priključki na zahtevo kupca.

4.1 MV post insulators

Product

PKI are post composite insulators with silicone coating. They are designed to be installed on overhead power lines with rated voltages up to 52 kV.

Characteristic

Post composite insulators PKI are:

- *resistant to UV radiation and chemical influences,*
- *resistant to weathering and aging,*
- *coated with silicone without additives,*
- *suitable for aggressive environments (industry, seaside and desert climate),*
- *usable for overhead power lines and devices,*
- *insensitive to impacts.*

Installation

The position for installing post composite insulators PKI is decided by directives and technical regulations of electrical distributors. They are being installed in new constructions, reconstructions and at maintenance. The fitted spring clamp provides factory-set vertical and horizontal pull-out force by using the appropriate cover. Newly installed PKI insulators have no impact on any change of insulation coordination regardless to previous installed insulators in overhead power lines.

General data

- *Maximum design cantilever load (**MDCL**): **15 kN***
- *Routine test load (**RTL**): **10 kN***
- *Ambient temperature range **T = -60 °C ... +85 °C***
- *Coat: **silicone LSR***
- *Silicone colour: **grey***
- *Material of top fitting: **PA6, UV stabilized***
- *Material of steel end fitting: **ST 52,3***
- *Connector thread on bottom: **M20 or M24***
- *Layer of zinc: **≥ 70 µm***
- *Tolerance in length: **±5 mm***
- *Tested according to standards: **IEC 62217, IEC 61952, IEC 60437***

Competitive advantages

PKI post composite insulators for indoor and outdoor installation virtues:

- *a certificate issued by an accredited laboratory,*
- *innovativeness. Insulator type PKI with the upper fitting made of insulating material is the result of expert studies of our researchers (published in the world-renowned journal IEEE Transactions on Power Delivery, 2009), our patent and practical experiences by users of our products. It eliminates deficiencies of insulators with metal top and metal cable ties,*
- *method of affixing a conductor onto an insulator*
- *lightweight,*
- *easy installation,*
- *production with fittings on customer's request.*

4.2 PKI inovacija

Izkušnje uporabnikov in termovizijski posnetki daljnovodov dokazujejo, da v času življenjske dobe prihaja do parcialnih razelektritev, kadar je goli ali pol izoliran vodnik vpet v kovinsko pritrdišče.
Študija porazdelitve električne poljske jakosti na zgornjem kovinskem priključku kompozitnega podpornega izolatorja potrjuje, da obstaja velika verjetnost, da bo zaradi previsoke električne poljske jakosti ob dolgotrajni uporabi izolatorjev z zgornjim kovinskim priključkom prišlo do prežiga na mestu spodnjega roba zgornjega priključka izolatorja ali do odžiga vodnika na mestu pritrditve.
Teoretične raziskave so pokazale, da se v obratovanju vzdolž izolatorja vzpostavi električno polje, ki ni homogeno, temveč je odvisno od lastnosti materialov in geometrije. To vpliva na dielektrične obremenitve izolatorja, ki so odvisne od oblike prevodnih delov in rastejo z velikostjo napetosti U oziroma električnega polja E.

4.2 *PKI innovation*

Experiences of users and thermovision snaps of power lines are proving that in the lifespan partial discharges occur when a bare conductor or a covered conductor is fastened to a metal anchorage.
The study of distribution of electric field strength on metal top end fitting of composite post insulators confirms high probability of too high electric field strength (at prolonged usage of insulators with top end metal fitting). It will come to burns at the lower end point of the top end fitting or the conductor will burn off from the fixation place.
Some theoretical research showed that while in operation a non-homogenous electric field that depends on material characteristics and insulator geometry is established along the insulator. This affects the dielectric loads of the insulator that depend upon the shape of conducting parts and increase with the heights of voltage U or electric field E.

Diagram električne poljske jakosti

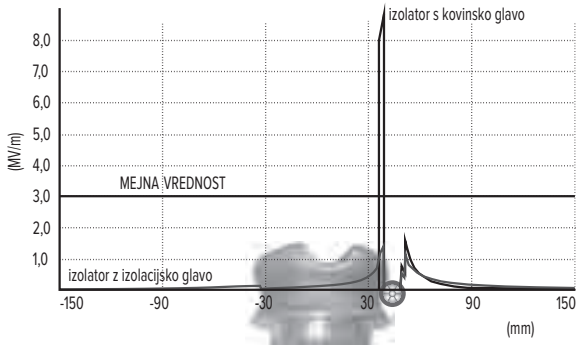
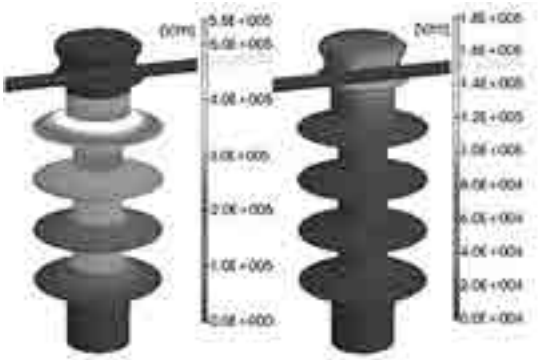


Diagram of electric field strength

Izolacijski zgornji priključek
Izolator tip PKI PA z zgornjim priključkom iz izolacijskega materiala je rezultat strokovnih raziskav in praktičnih izkušenj uporabnikov naših izdelkov. Odpravlja pomanjkljivosti izolatorjev s kovinskim zgornjim priključkom. Zgornji priključek je izdelan iz poliamida PA6 z dodatkom steklenih vlaken, kar mu zagotavlja ustrezne mehanske lastnosti, časovno stabilnost, odpornost na atmosferske vplive in UV svetlobo. Je značilne črne barve. Ta material že več kot štirinajst let uspešno uporabljamo v naši nihajni sponki.

Insulative top
The insulator type PKI PA with top end fitting made of insulating material is a result of professional research and of practical experiences of our products users. It eliminates deficiencies of insulators with metal top end fittings. The top end fitting is made of polyamide PA6 with the addition of glass fibres which assure suitable mechanical characteristics, lifetime stability, resistance to atmospheric influences and UV light. It is characteristically black coloured. We have already been successfully using this material in our spring clamp for more than fourteen years.

Porazdelitev električne poljske jakosti

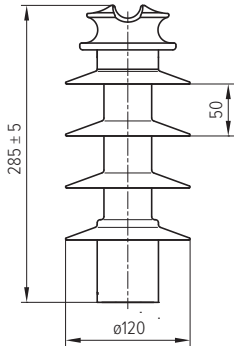


Allocation of electric field strength

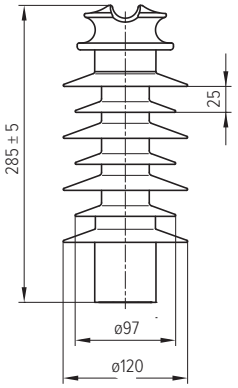
Kovinska glava
Metal head

PA izolacijska glava
PA insulation head

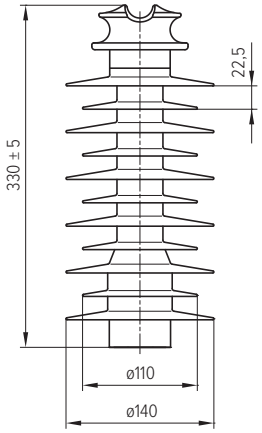
4.3 PKI brez sponke *4.3 PKI without a clamp*



PKI NO



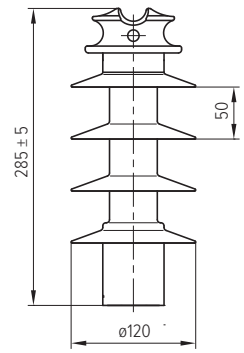
PKI LO



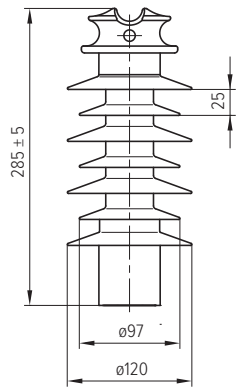
PKI XO

Naziv	PKI NO	PKI LO	PKI XO	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	543 mm	670 mm	1150 mm	*Creepage distance*
Preskočna razdalja	275 mm	275 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,7 kg	1,8 kg	2,1 kg	*Mass*

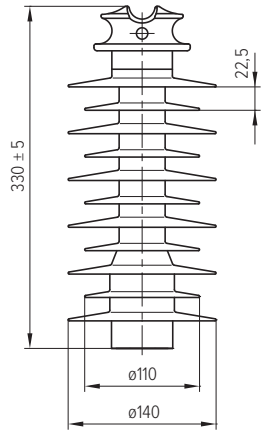
4.4 PKI z luknjo *4.4 PKI with a hole*



PKI NH



PKI LH

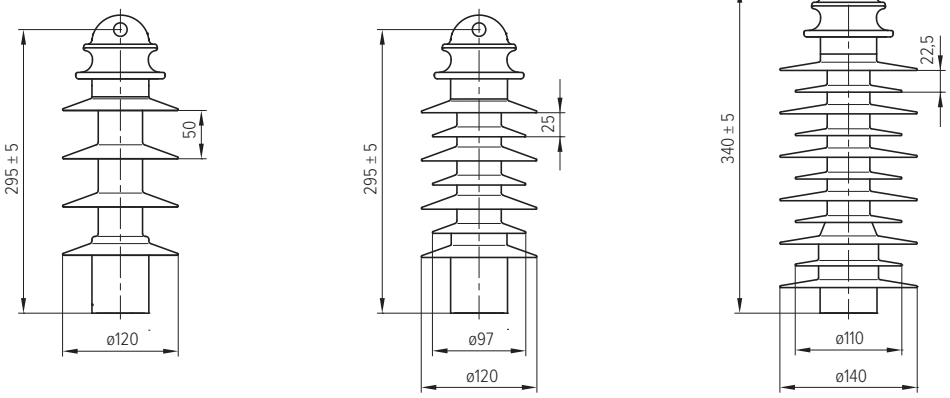


PKI XH

Naziv	PKI NH	PKI LH	PKI XH	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	543 mm	670 mm	1150 mm	*Creepage distance*
Preskočna razdalja	275 mm	275 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,65 kg	1,75 kg	2,05 kg	*Mass*

4.5 PKI z nastavkom

4.5 PKI with an adapter



PKI ND **PKI LD** **PKI XD**

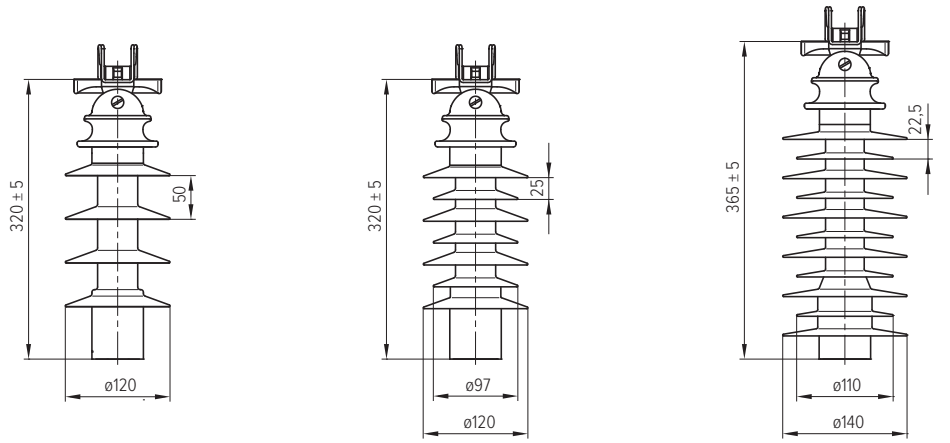
Naziv	PKI ND	PKI LD	PKI XD	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	570 mm	697 mm	1177 mm	*Creepage distance*
Preskočna razdalja	319 mm	319 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	1,9 kg	2,0 kg	2,3 kg	*Mass*

4.6 PKI z vzmetno sponko

Horizontalna izvlečna sila vodnika (F_h): 1,2 kN
Vertikalna izvlečna sila vodnika (F_v): 2,8 kN

4.6 PKI with spring clamp

Horizontal pull-out force of conductor (F_h): 1,2 kN
Vertical pull-out force of conductor (F_v): 2,8 kN



PKI NS **PKI LS** **PKI XS**

Naziv	PKI NS	PKI LS	PKI XS	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	691 mm	803 mm	1190 mm	*Creepage distance*
Preskočna razdalja	319 mm	319 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	2,0 kg	2,1 kg	2,4 kg	*Mass*

4.7 PKI z oslabljeno vzmetno sponko

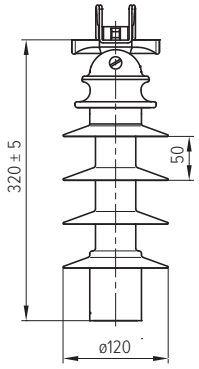
Horizontalna izvlečna sila vodnika (F_h): 1,2 kN
Vertikalna izvlečna sila vodnika (F_v): 2,8 kN

4.7 PKI with weakened spring clamp

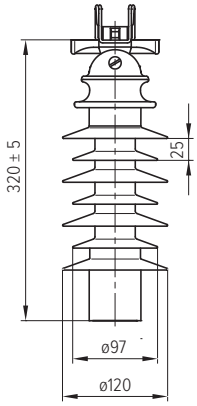
Horizontal pull-out force of conductor (F_h): 1,2 kN
Vertical pull-out force of conductor (F_v): 2,8 kN

Uporaba pri varni montaži skozi gozd

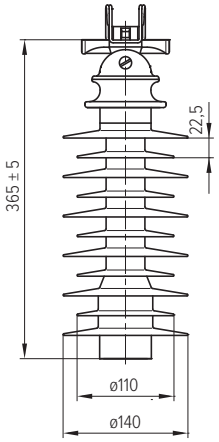
Use at safe installation through the woods



PKI NV



PKI LV



PKI XV

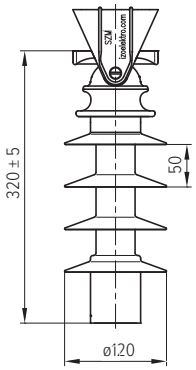
Naziv	PKI NV	PKI LV	PKI XV	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	691 mm	803 mm	1190 mm	*Creepage distance*
Preskočna razdalja	319 mm	319 mm	375 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	2,0 kg	2,1 kg	2,4 kg	*Mass*

4.8 PKI s kapo

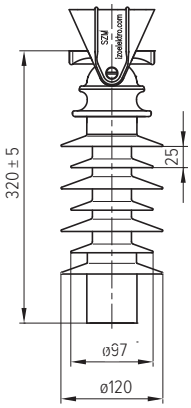
Horizontalna izvlečna sila vodnika (F_h): 1,2 kN
Vertikalna izvlečna sila vodnika (F_v): 4,8 kN

4.8 PKI with a hat

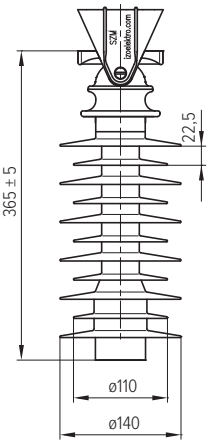
Horizontal pull-out force of conductor (F_h): 1,2 kN
Vertical pull-out force of conductor (F_v): 4,8 kN



PKI NZ



PKI LZ



PKI XZ

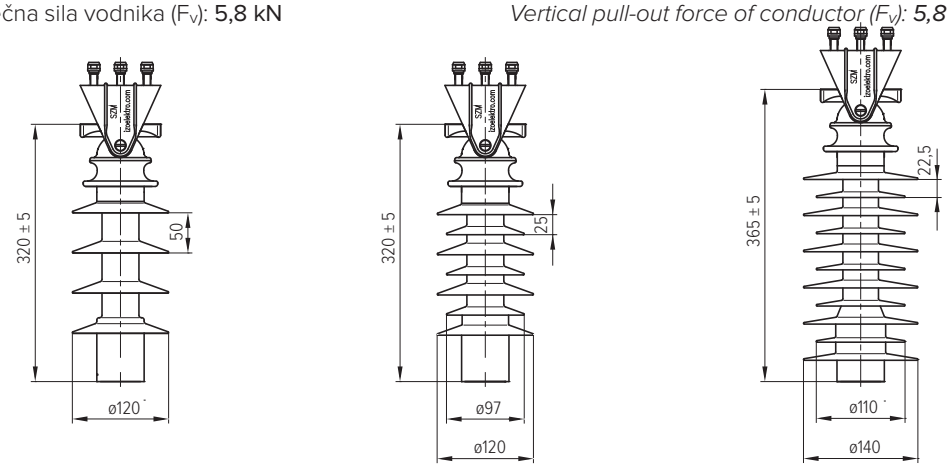
Naziv	PKI NZ	PKI LZ	PKI XZ	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	691 mm	803 mm	1190 mm	*Creepage distance*
Preskočna razdalja	319 mm	319 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	2,05 kg	2,15 kg	2,45 kg	*Mass*

4.9 PKI s kapo vijačno

Horizontalna izvlečna sila vodnika (F_h): 5,6 kN
Vertikalna izvlečna sila vodnika (F_v): 5,8 kN

4.9 PKI with a hat with screws

Horizontal pull-out force of conductor (F_h): 5,6 kN
Vertical pull-out force of conductor (F_v): 5,8 kN



PKI NM **PKI LM** **PKI XM**

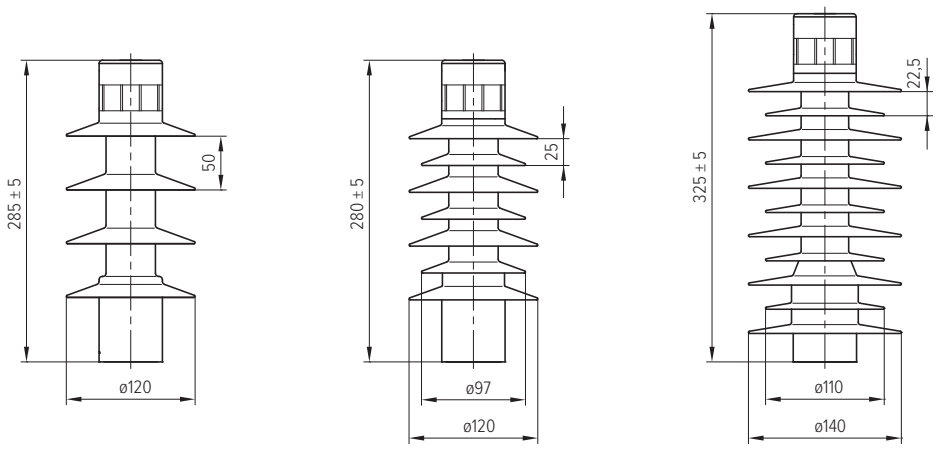
Naziv	PKI NM	PKI LM	PKI XM	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	691 mm	803 mm	1190 mm	*Creepage distance*
Preskočna razdalja	319 mm	319 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	190 kV	192 kV	230 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	90 kV	93 kV	106 kV	*Wet power frequency withstand voltage*
Masa	2,1 kg	2,2 kg	2,5 kg	*Mass*

4.10 PKIL za ločilnik

Opomba: obliko in material priključkov izdelamo po zahtevi kupca

4.10 PKIL for switcher

Note: we make the shape and the material of connectors on customer's request



PKIL N **PKIL L** **PKIL X**

Naziv	PKIL N	PKIL L	PKIL X	*Name*
Nazivna obratovalna napetost	24 kV	36 kV	52 kV	*Nominal operating voltage*
Plazilna pot	493 mm	620 mm	1125 mm	*Creepage distance*
Preskočna razdalja	275 mm	275 mm	330 mm	*Arcing distance*
Vzdržna atm. udarna nap. v suhem	155 kV	170 kV	210 kV	*Dry lighting impulse withstand voltage*
Vzdržna izmenična nap. v mokrem	70 kV	75 kV	100 kV	*Wet power frequency withstand voltage*
Masa	2,0 kg	2,1 kg	2,4 kg	*Mass*

4.11 PKI nagib in odkloni vodnika

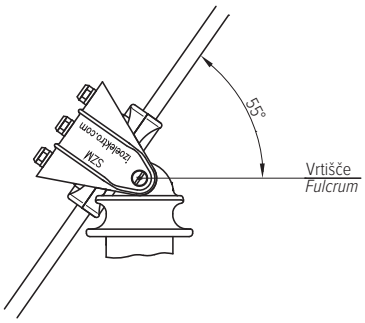
Opomba: podani so maksimalni nagibi in odkloni vodnika v glavi vseh PKI izolatorjev

4.11 PKI inclination and declination of conductor

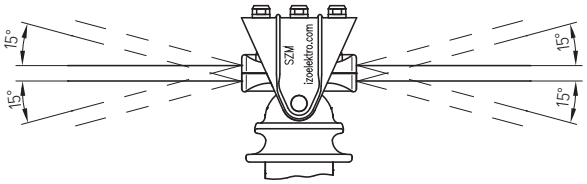
Note: the data in the table is for the maximum inclinations and declinations of conductors on the PKI insulator's head

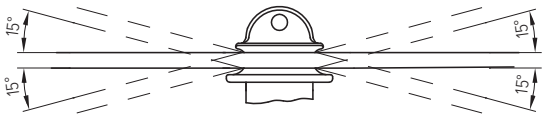
PKI izolatorji ***PKI insulators***	**Odklon vertikalno** (A) ***Declination vertical*** (A)	**Odklon horizontalno** (B) ***Declination horizontal*** (B)
PKI NO, PKI NH, PKI ND	15°	30°
PKI NS, PKI NSV, PKI NZ,	15°	15°
PKI NM	55°	15°

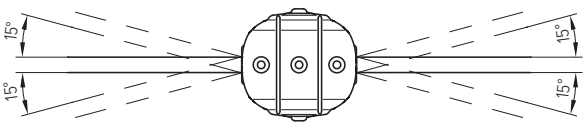
PKI (S,V,Z,M)

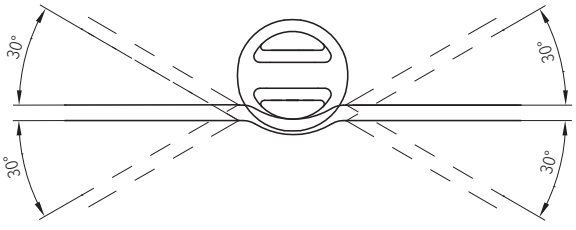


PKI (O,H,D)









4.12 PKI zaščita za ptice splošno

Proizvod
PKI z oznako "Z" ali "M" so podporni kompozitni izolatorji, ki skupaj s silikonskim plaščem SILP in vezicami predstavljajo zaščito za ptice. Vgrajujemo jih v nadzemne električne vode do nazivne napetosti 52 kV.

Lastnosti
Podporni kompozitni izolatorji PKI z oznako "Z" imajo prigrajeno kapo za zaščito delov kompozitnega izolatorja, ki so pod napetostjo. Silikonski plašč SILP, montiran na vodniku na vsaki strani izolatorja, izolira goli vodnik pritrjen na izolator. Vezice onemogočajo odmik silikonskega plašča SILP od izolatorja.

Vgradnja
Mesto montaže sistema zaščite za ptice določajo pravilniki in tehnični predpisi elektrodistribucij. Priporočamo vgradnjo na oporiščih, kjer pogosto prihaja do zemeljskih stikov zaradi:
- večjih ptic,
- preskakovanja glodalcev na oporiščih.

V našem podjetju smo skupaj z uporabniki razvili sistem za vgradnjo tipskih zaščitnih elementov. Video vgradnje sistema je dostopen na www.izoelektro.com. Za izvedbo sistema "zaščite za ptice" je potrebno uporabiti:
- izolatorje PKI z oznako "Z" ali "M",
- SN silikonski plašč SILP,
- kabelske vezice, UV-stabilizirane.

Naročanje
Izberete kateri koli podporni kompozitni izolator PKI z oznako "Z" ali "M", priporočeno število metrov silikonskega plašča SILP in ustrezno število UV vezic. Primer garniture za en izolator je podan v točki 4.13 PKI zaščita za ptice.

4.12 PKI protection for birds generally

Product
PKI with mark "Z" or "M" are post composite insulators which provide protection for birds together with the silicone coat SILP and cable ties. They are designed to be installed on overhead power lines with rated voltages up to 52 kV.

Characteristic
Post composite insulators PKI with mark "Z" have a fitted hat for protecting those parts of a composite insulator which are under voltage. The silicon coat SILP mounted on the conductor insulates the bare conductor attached to the insulator on each side of the insulator. The cable ties prevent the silicone coat SILP from deviating from the insulator.

Installation
The position for installing the system of birds' protection is decided by directives and technical regulations of electrical distributors. We recommend installation on overhead power lines wherever earth faults often occur because of:
- *larger birds,*
- *rodents jumping on poles.*

Together with users we created a system for installing standard protective elements. The video of installation of the system is available at www.izoelektro.com. For implementing the system "protection for birds" it is necessary to use:
- *insulators PKI with mark "Z" or "M",*
- *MV silicone coat SILP,*
- *cable ties, UV-stabilized.*

Ordering
Choose any post composite insulator PKI with mark "Z" or "M", the recommended quantity of silicone coat SILP and a suitable number of UV cable ties. Example for a single set insulator is given in section 4.13 PKI protection for birds.

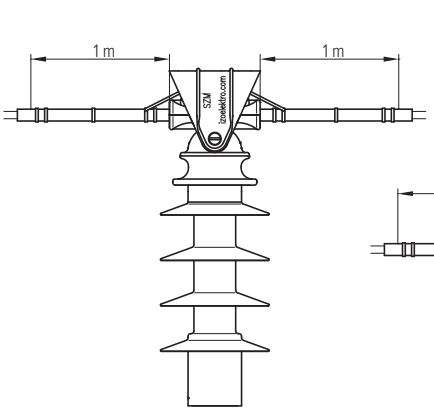
Prednosti pred konkurenco

- Vsa stojna mesta z že vgrajenimi izolatorji PKI z oznako "S" imajo možnost enostavne dogradnje sistema.
- Zagotavlja 100% zaščito na oporiščih.
- Zaščita za ptice je obstojna pri ekstremnih vremenskih pogojih.

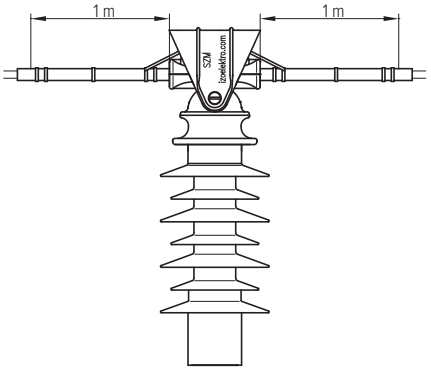
Competitive advantages

- *All poles with installed insulators PKI with mark "S" have the simple system upgrading option.*
- *Provides 100% protection on bases.*
- *Protection for birds is persistent in extreme weather conditions.*

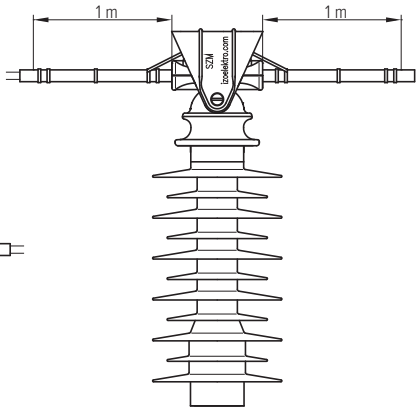
4.13 PKI zaščita za ptice - garnitura *4.13 PKI protection for birds - set*



PKI NZ



PKI LZ



PKI XZ

Garnitura	**Količina** *Quantity*	*Set*
PKI NZ ali PKI LZ ali PKI XZ	1 kos/pcs	*PKI NZ or PKI LZ or PKI XZ*
+ Vezica 140x4,8 črna, UV-stabilizirana	10 kos/pcs	*+ Cable tie 140x4,8 black, UV-stabilized*
+ Vezica 250x4,8 črna, UV-stabilizirana	1 kos/pcs	*+ Cable tie 250x4,8 black, UV-stabilized*
+ SN silikonski plašč SILP 70/35	2 m	*+ MV silicone coat SILP 70/35*
+ Kapa SZM/0	1 kos/pcs	+ Hat SZM/0

4.14 PKI varna montaža skozi gozd splošno

Proizvod

PKI izolatorji z oznako "V" so namenski podporni kompozitni izolatorji s silikonskim plaščem in z oslabljeno vzmetno sponko. Namenjeni so za varno montažo skozi gozd. Vgrajujemo jih v nadzemne električne vode do nazivne napetosti 52 kV.

Lastnosti

Podporni kompozitni izolatorji imajo oslabljeno telo sponke zaradi lažje porušitve pri izrednih vremenskih razmerah.

Vgradnja

Mesto montaže namenskih podpornih kompozitnih izolatorjev PKI določajo pravilniki in tehnični predpisi elektrodistribucij. Na daljnovodih, kjer trasa poteka skozi gozd, pogosto prihaja do prekinitev napajanja zaradi:

- izrednih vremenskih razmer,
- podiranja dreves,
- lomljenja vej,
- otresanja snega in žleda.

V najhujših primerih prihaja do porušitve DV. Dejstvo je, da pri teh porušitvah v večini primerov ostane vodnik nepretrgan. Zaradi tega smo v našem podjetju skupaj z uporabniki in strokovnimi sodelavci izvedli študijo o varni izgradnji DV skozi gozd ter raziskave podkrepili s preskusom v naravi (video na www.izoelektro.com). Za izvedbo varne montaže skozi gozd so uporabljeni:

- izolatorji PKI z oslabljenim telesom sponke,
- kavelj in
- varnostni lok vodnika.

Izračun in naročanje

Premer loka in dimenzije kavlja je potrebno določiti z izračunom. Za izvedbo "varne montaže skozi gozd" zahtevajte ponudbo na osnovi trasnega načrta in preseka vodnika.

Splošni podatki

- Največja prelomna sila (**MDCL**): **15 kN**
- Rutinski test (**RTL**): **10 kN**
- Temperaturno območje okolja **T = -60 °C ... +85 °C**
- Plašč: **silikon LSR**
- Barva silikona: **siva**
- Material zgornjega priključka: **PA6, UV stabiliziran**
- Material jeklenih priključkov: **ST 52,3**
- Debelina nanosa cinka: ≥ **70 µm**

Prednosti pred konkurenco

- Sistem varne montaže z izolatorji PKI z oznako "V" odlikuje varnost zgrajenega DV.
- Varuje stojna mesta DV pred porušitvijo pri padcu dreves na vodnike.
- Sistem je rezultat strokovnih raziskav naših raziskovalcev skupaj z uporabniki in strokovnimi sodelavci instituta EIMV, Ljubljana.

4.14 PKI safe installation through the woods generally

Product

PKI insulators with mark "V" are purposed post composite insulators with silicone coating and a weakened spring clamp shuttle. Their purpose is for a safe installation through the forest. They are designed to be installed on overhead power lines with rated voltages up to 52 kV.

Characteristic

Post composite insulators have a weakened spring clamp shuttle for easier collapsing in extreme weather conditions.

Installation

The position for installing purposed post composite insulators PKI is decided by directives and technical regulations of electrical distributors. On power lines passing through the woods often comes to interruptions of power supply due to:

- *extreme weather conditions,*
- *falling trees,*
- *breaking branches,*
- *shaking-off snow and ice.*

In the worst-cases the collapse of the power line occurs. The fact is that at these collapses in most cases the conductor remains unbroken. For this reason our company conducted a study together with users and technical staff on safe installation of PL through the woods. The research was reinforced by a test in nature (video on www.izoelektro.com). To implement safe installation through the woods use:

- *insulators PKI with weakened spring clamp shuttle,*
- *hook and*
- *conductor safety arc.*

Calculation and ordering

Conductor safety arc diameter and hook size should be determined by a calculation. To implement "safe installation through the woods" request a quotation based on power line route plan and the conductor cross-section.

General data

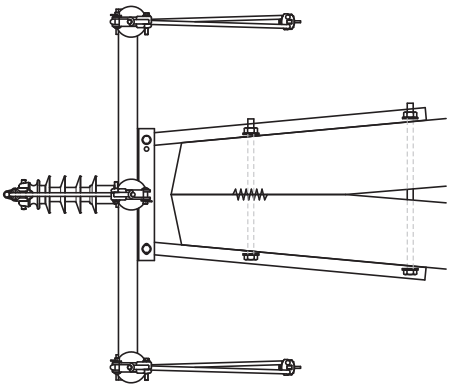
- *Maximum design cantilever load (**MDCL**): **15 kN***
- *Routine test load (**RTL**): **10 kN***
- *Ambient temperature range **T = -60 °C ... +85 °C***
- *Coating: **silicone LSR***
- *Silicone colour: **grey***
- *Material of top fitting: **PA6, UV stabilized***
- *Material of steel end fitting: **ST 52,3***
- *Layer of zinc: ≥ **70 µm***

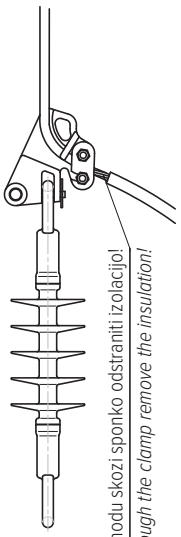
Competitive advantages

- *The safety of a built PL is distinguished by the system for safe installation using insulators with the mark "V".*
- *It protects the poles from breaking when trees fall on conductors.*
- *The system is a result of professional research made by our researchers together with users and technical staff from Institute EIMV, Ljubljana.*

4.15 PKI varna montaža skozi gozd - primer

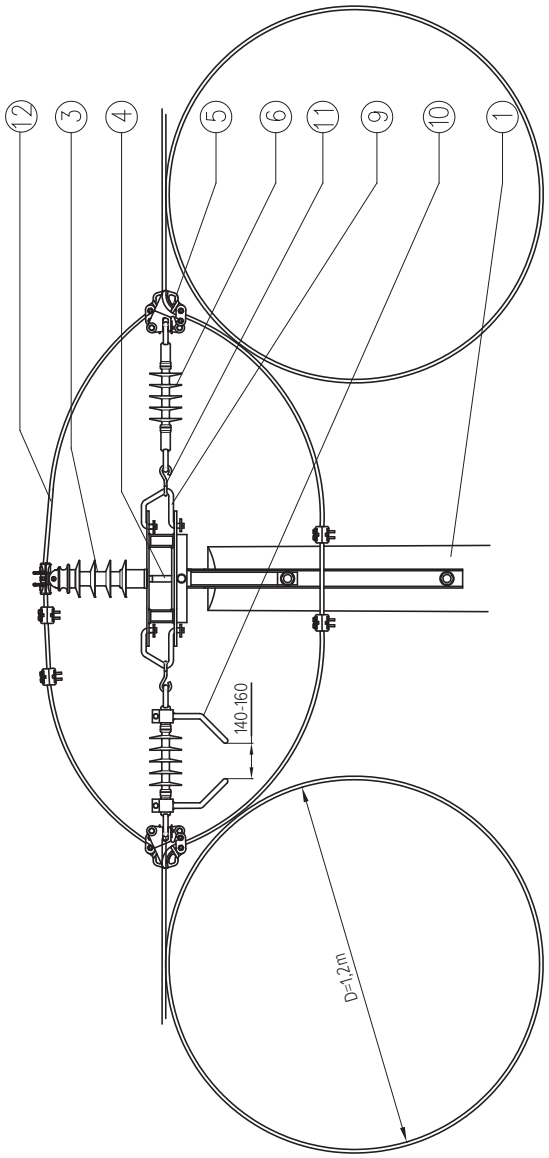
4.15 PKI safe assembly through the woods - example

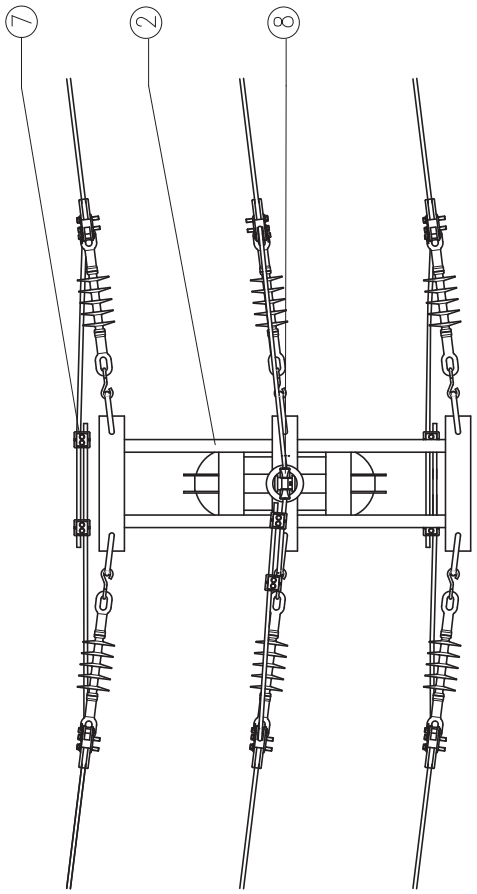




Pri prehodu skozi sponko odstraniti izolacijo!

When cossing trough the clamp remove the insulation!





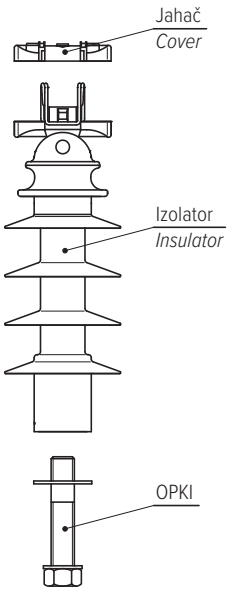
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	Pole
2	Nosilna konzola - komplet	1	2	Suspension crossarm brace - set
3	Izolator PKI	1	3	Insulator PKI
4	Opornica OPKI	1	4	Pin OPKI
5	Sponka zatezna SZ-U	6	5	Tension clamp SZ-U
6	Natezni kompozitni izolator NKI	6	6	Tension composite insulator NKI
7	Sponka tokovna	3	7	Current clamp
8	Jahač	1	8	Jahač
9	Streme OS 80	6	9	Shackle OS 80
10	Rogljič NKI / Arcing horn NKI	6	10	Arcing horn NKI
11	Kljuka zasukana / Hook turned 90°	6	11	Hook turned 90°

4.16 PKI izolatorji garniture

Opomba: na željo kupca izdelamo garniture po zahtevi.

4.16 PKI insulators sets

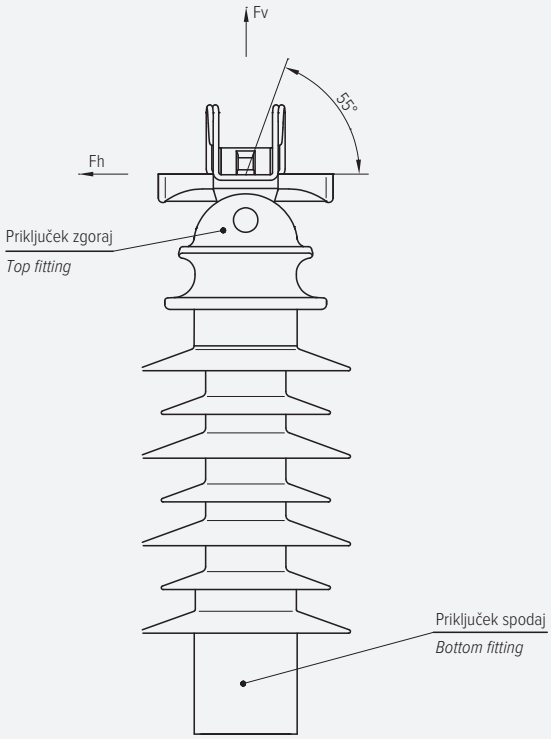
Note: we produce sets on customer's request.



Garnitura	Količina *Quatity*	Set
Izolator PKI NS M24	1 kos/pcs	*Insulator PKI NS M24*
+ Jahač 35-AlFe	1 kos/pcs	*+ Cover 35-AlFe*
+ OPKI M24/M24x120	1 kos/pcs	*+ OPKI M24/M24x120*
Izolator PKI NS M24	1 kos/pcs	*Insulator PKI NS M24*
+ Jahač 50-AlFe	1 kos/pcs	*+ Cover 50-AlFe*
+ OPKI M24/M24x120	1 kos/pcs	*+ OPKI M24/M24x120*
Izolator PKI NS M24	1 kos/pcs	*Insulator PKI NS M24*
+ Jahač 70-AlFe	1 kos/pcs	*+ Cover 70-AlFe*
+ OPKI M24/M24X120	1 kos/pcs	*+ OPKI M24/M24x120*

4.17 PKI izolatorji - primer naročila

4.17 PKI insulators - order example



Naziv/*Name*: **PKI LS M24**

Razlaga naziva

PKI	- Tip SN kompozitnega izolatorja
L, N, X	- Plazilna pot
S, O, H, D, Z M	- Oblika priključka zgoraj
M24, M20	- Navoj priključka spodaj

Name explanation

PKI	*- Type of MV composite insulator*
L, N, X	*- Creepage distance*
S, O, H, D, Z M	*- Shape of top end fitting*
M24, M20	*- Connector thread on bottom end fitting*

Oznake na kompozitnem izolatorju

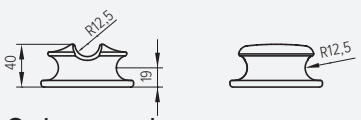
Izoelektro	- Proizvajalec
PKI	- Tip SN kompozitnega izolatorja
2/14	- Mesec in leto proizvodnje
15 kN	- Nazivna upogibna sila (STL)

Marks on composite insulator

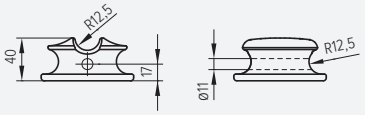
Izoelektro	*- Manufacturer*
PKI	*- Type of MV composite insulator*
2/14	*- Month and year of production*
15 kN	*- Specified tensile load (STL)*

Priključki zgoraj

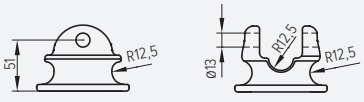
Top fittings



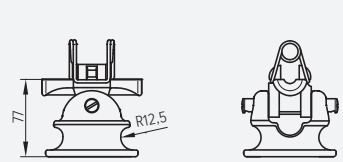
O - brez sponke
O - without a clamp



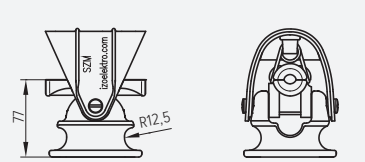
H - brez sponke, z luknjo
H - without a clamp, with a hole



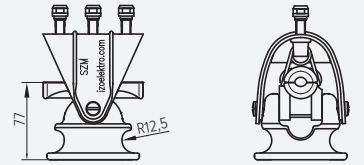
D - nastavek
D - adapter



S - sponka vzmetna
S - spring clamp



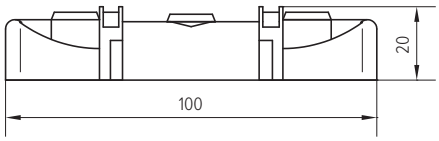
Z - sponka vzmetna s kapo
Z - spring clamp with a hat



M - sponka vijačna
M - screw clamp

4.18 PA jahači

Uporaba: obvezno vgraditi pri PKI izolatorjih “S“, “Z“ in “M“



4.18 PA covers

Usage: required to install PKI insulators “S“, “Z“ and “M“

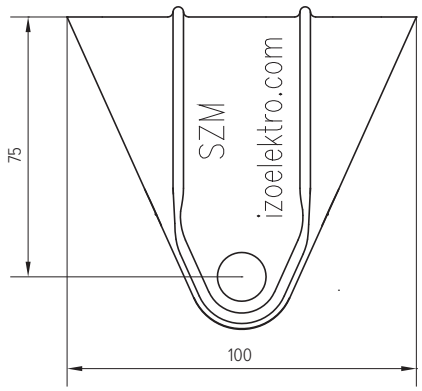
Naziv	Koda	*Name*	*Code*
Jahač 35 PIV	**11 12 08**	*Cover 35 CC*	***11 12 08***
Jahač 70 PIV	**11 12 07**	*Cover 70 CC*	***11 12 07***
Jahač 99 PIV	**11 12 12**	*Cover 99 CC*	***11 12 12***
Jahač 35 AlFe	**11 12 09**	*Cover 35 AlFe*	***11 12 09***
Jahač 50 AlFe	**11 12 10**	*Cover 50 AlFe*	***11 12 10***
Jahač 70 AlFe	**11 12 08**	*Cover 70 AlFe*	***11 12 08***
Jahač 95 AlFe	**11 12 11**	*Cover 95 AlFe*	***11 12 11***
Jahač 120 AlFe	**11 12 12**	*Cover 120 AlFe*	***11 12 12***

4.19 PA kapa SZM/0

Uporaba: nadgradnja za PKI izolatorje “S“
Koda: **40 10 29**

4.19 PA cap SZM/0

Usage: an upgrade for PKI insulators “S“
*Code: **40 10 29***

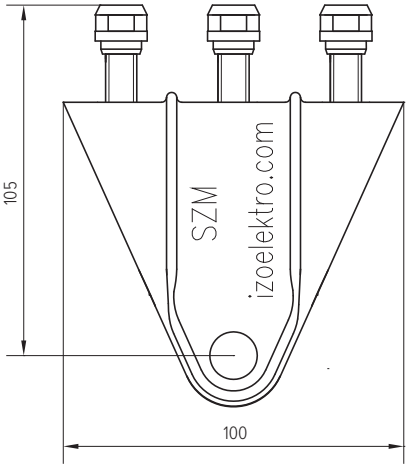


4.20 PA kapa z vijaki

Uporaba: pri montaži PKI izolatorjev na strmini
*Koda: **40 10 31***

4.20 PA cap with screw

Usage: at installation of PKI insulators on a slope
*Code: **40 10 31***

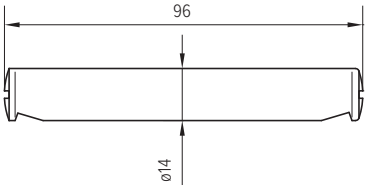


4.21 **PA sornik**

Uporaba: pri zamenjavi PA telesa sponke v glavi PKI izolatorjev
Koda: **40 10 32**

*4.21 **PA bolt***

Usage: at the replacement of PA clamp in top fitting of PKI insulators
*Code: **40 10 32***

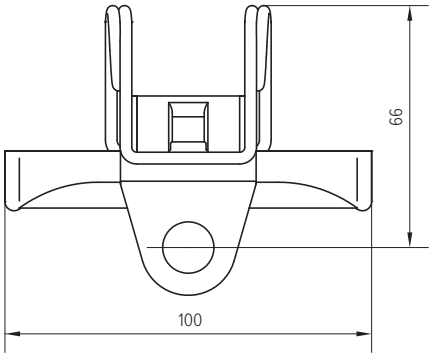


4.22 **PA telo sponke z vzmetjo**

Uporaba: v glavi PKI izolatorjev “S“, “Z“ in “M“
Koda: **11 10 01**

*4.22 **PA body of spring clamp***

Usage: in top fitting of PKI insulators “S“, “Z“ and “M“
*Code: **11 10 01***

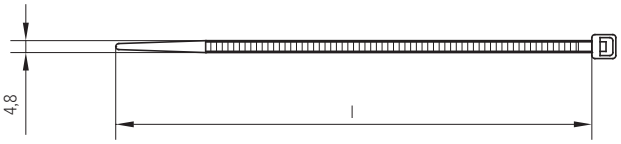


4.23 **PA vezica**

Uporaba: za pritrditev SN silikonskega plašča SILP 70/35
Koda: **40 10 36; l=140 mm**
Koda: **40 10 39; l=250 mm**

*4.23 **PA cable tie***

Usage: for affixing SN silicone coat SILP 70/35
*Code: **40 10 36; l=140 mm***
*Code: **40 10 39; l=250 mm***

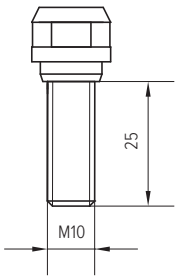


4.24 **PA vijak**

Uporaba: pri PKI izolatorju “M”
Koda: **40 10 38**

*4.24 **PA screw***

Usage: at PKI insulator “M”
*Code: **40 10 38***

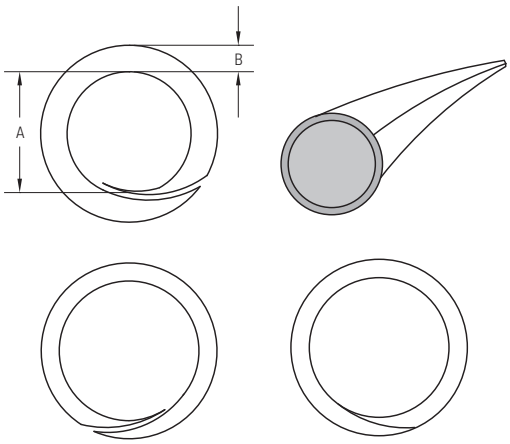


4.25 **SN silikonski plašč SILP**

Uporaba: pri zaščiti za ptice
Koda: **40 10 34**

*4.25 **MV silicone coat SILP***

Usage: for birds’ protection set
*Code: **40 10 34***

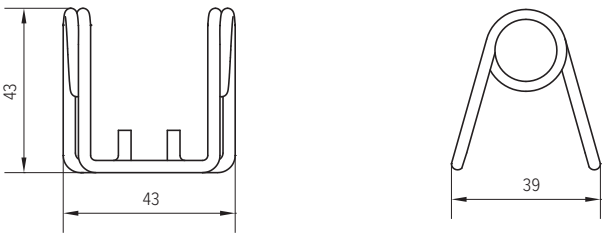


4.26 **SN vzmet**

Uporaba: pri PA telo sponke
Koda: **12 10 01**

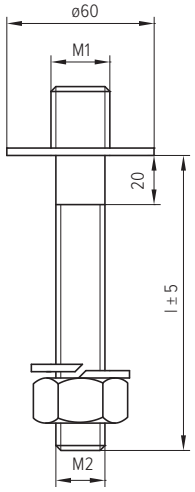
*4.26 **MV spring***

Usage: for PA body of spring clamp
*Code: **12 10 01***



4.27 **OPKI oporniki**

Uporaba: za pritrditev PKI izolatorja na konzolo
Opomba: obliko in dimenzije izdelamo na zahtevo kupca



4.27 OPKI pins

Usage: for installing PKI insulator on the bracket
Note: the shape and dimensions can be produced by customer request

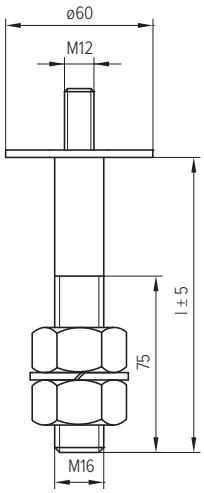
Naziv ***Name***	**Koda** ***Code***	**M1**	**M2**	**l** (mm)
OPKI M20/M20x120	**10 00 461**	20	20	120
OPKI M20/M20x170	**10 00 462**	24	20	170
OPKI M24/M20x170	**10 00 467**	20	20	170
OPKI M24/M24x80	**10 00 459**	24	24	80
OPKI M24/M24x120	**10 00 463**	24	24	120
OPKI M24/M24x170	**10 00 464**	24	24	170

4.28 **OPKIL opornik za ločilnik**

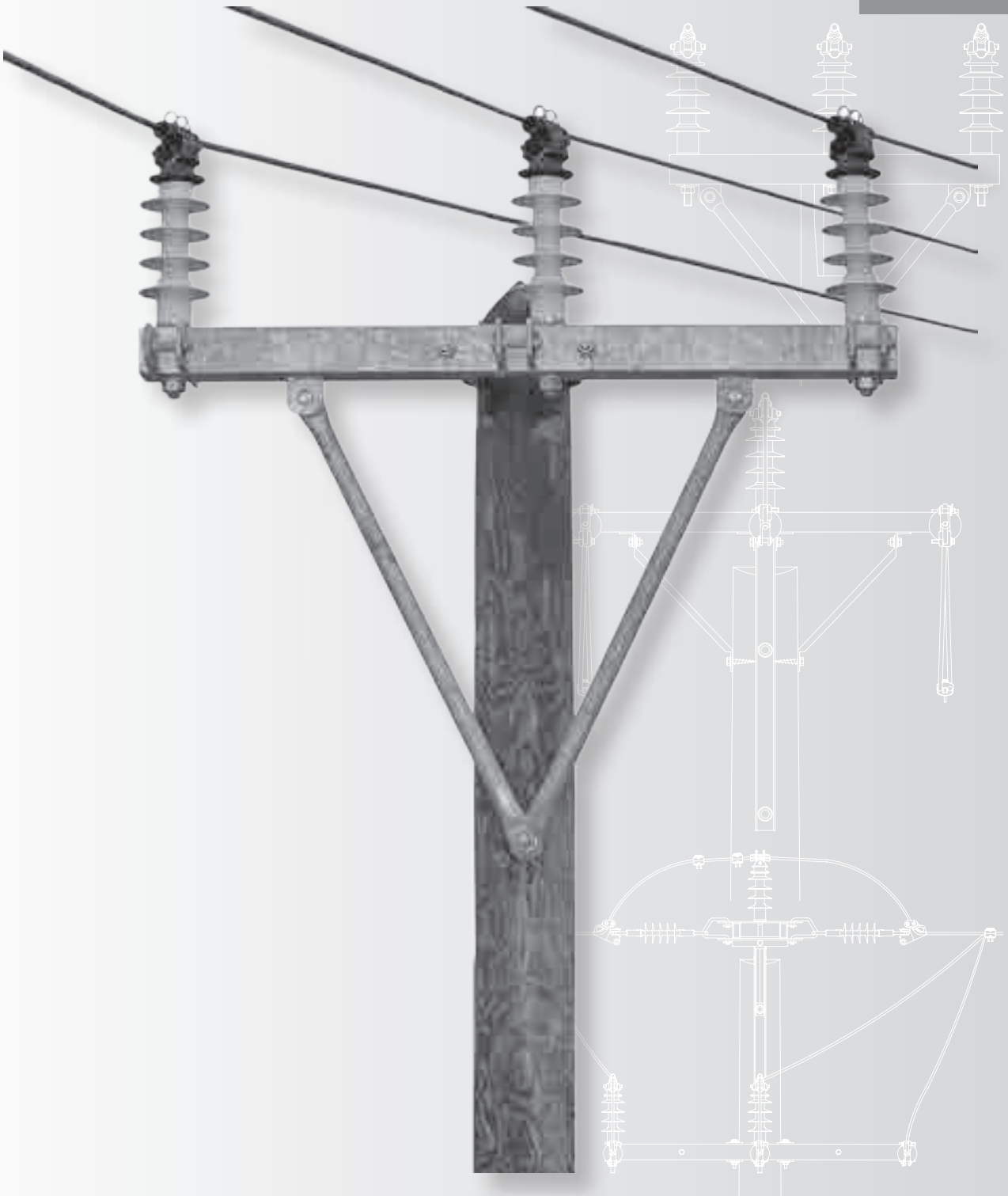
Uporaba: za zamenjavo keramičnih izolatorjev s PKIL izolatorji na ločilnih stikalih
Koda: **10 00 469**

4.28 OPKIL pin for switcher

Usage: for the replacement of ceramic insulators with PKIL insulators on disconnecting switches
*Code: **10 00 469***



5

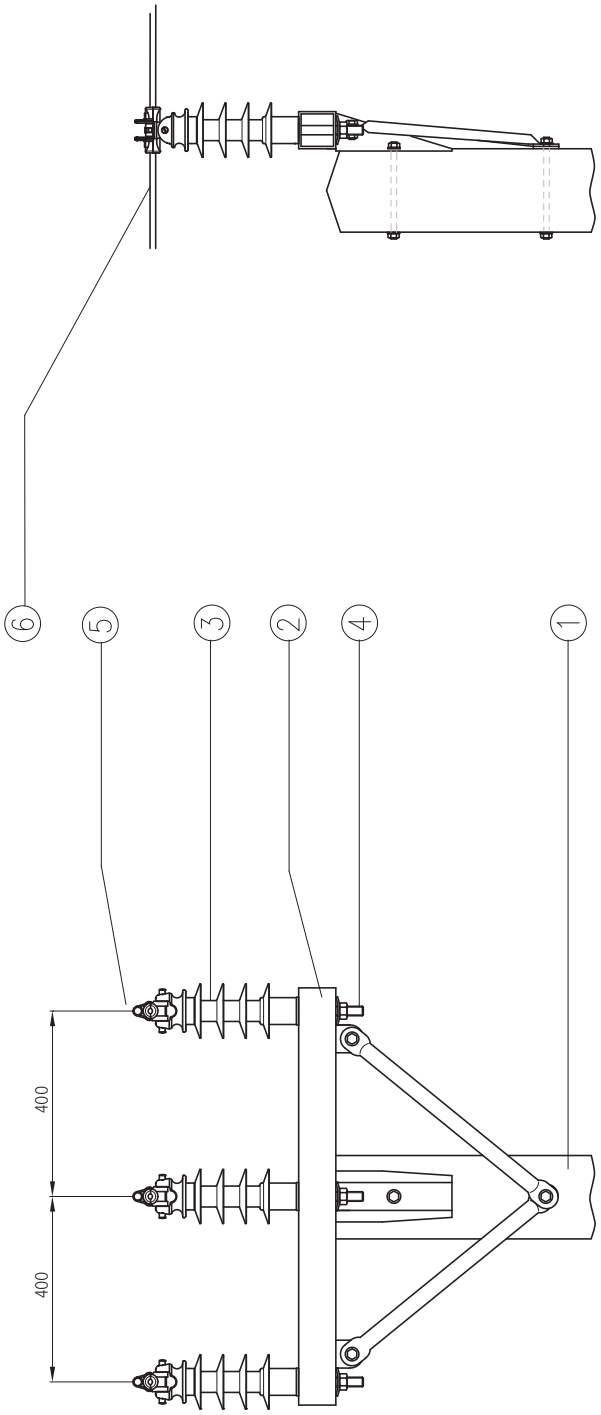


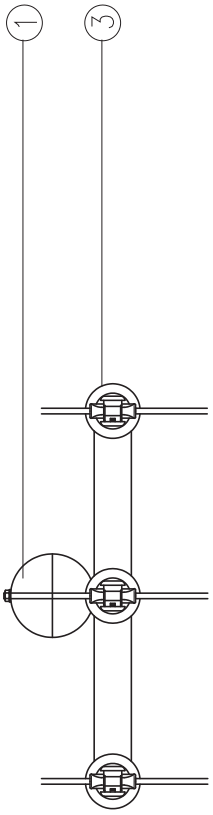
SN konzole
za PIV vodnike

MV brackets
for CC conductors

5.1 KNP 400s na nosilnem drogu

5.1 KNP 400s on a suspension pole



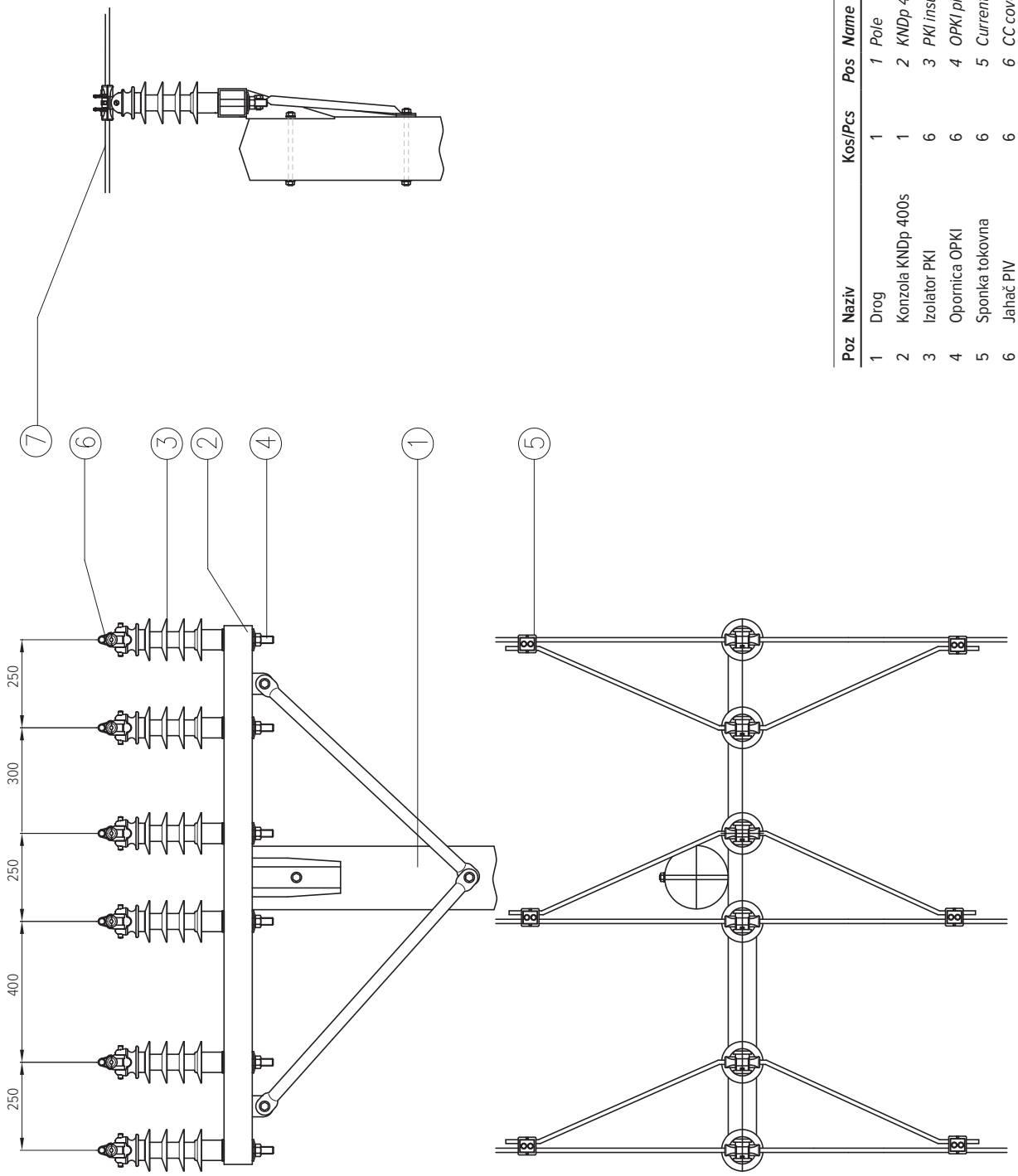


Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	Pole
2	KNP 400s konzola	1	2	KNP 400s bracket
3	PKI izolator	3	3	PKI insulator
4	OPKI opornica	3	4	OPKI pin
5	PIV-CC jahač	3	5	CC cover
6	PIV-CC vodnik	1	6	CC conductor

5.2 KNDp 400s na nosilnem drogu

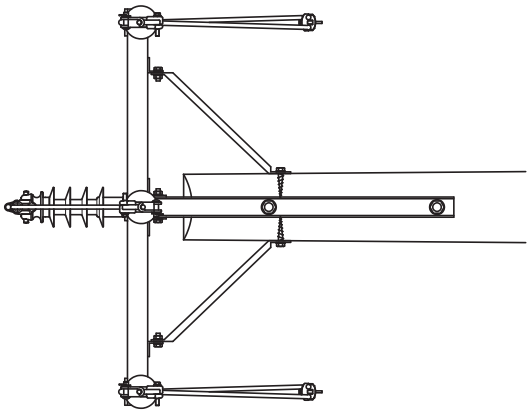
5.2 *KNDp 400s on a suspension pole*

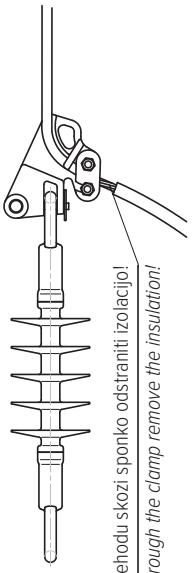
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	Pole
2	Konzola KNDp 400s	1	2	KNDp 400s bracket
3	Izolator PKI	6	3	PKI insulator
4	Opornica OPKI	6	4	OPKI pin
5	Sponka tokovna	6	5	Current clamp
6	Jahač PIV	6	6	CC cover
7	Vodnik PIV	1	7	CC conductor



5.3 KRV 550 na razbremenilnem ali končnem drogu

5.3 KRV 550 on a reinforced or 'dead-end' pole

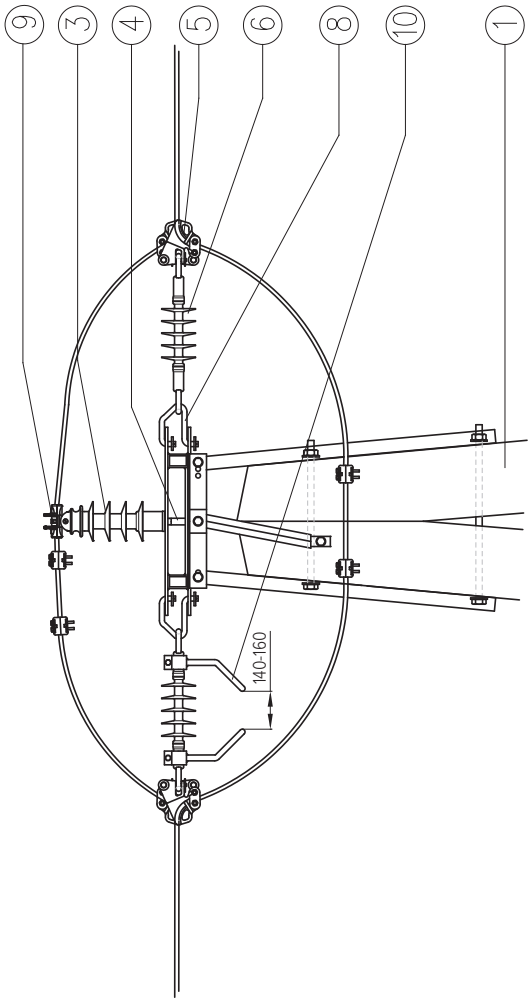


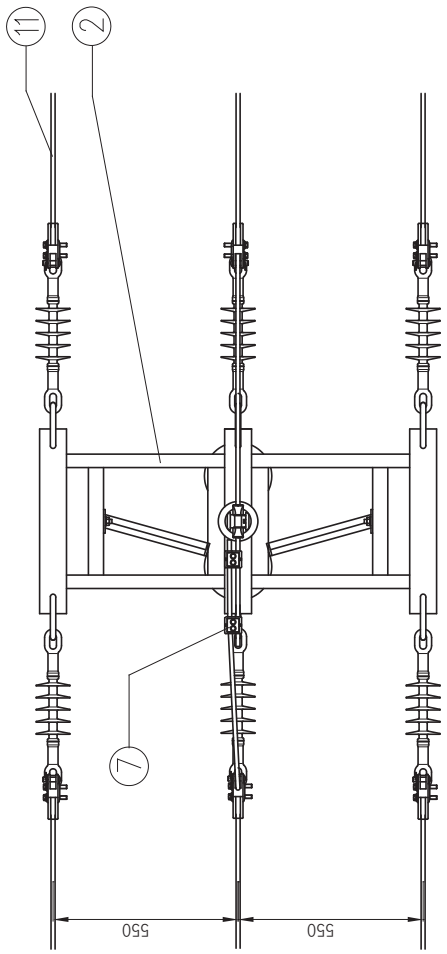


Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

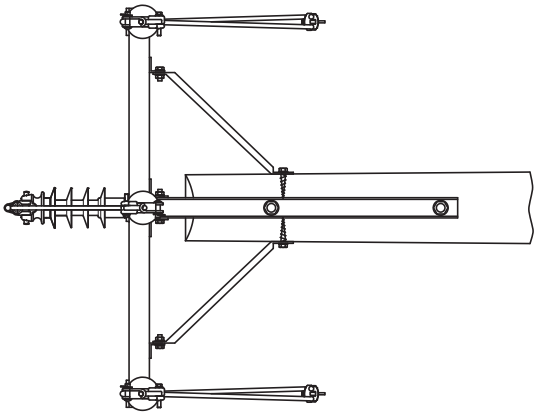
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	*1*	*Pole*
2	KRV 550 konzola	1	*2*	*KRV 550 bracket*
3	PKI izolator	1	*3*	*PKI insulator*
4	OPKI opornica	1	*4*	*OPKI pin*
5	SZ-U sponka	6	*5*	*SZ-U clamp*
6	NKI izolator	6	*6*	*NKI insulator*
7	Sponka tokovna	6	*7*	*Current clamp*
8	G streme OS 80	6	*8*	*G shackle OS 80*
9	PIV jahač	1	*9*	*CC cover*
10	NKI rogljič	6	*10*	*NKI arcing horn*
11	PIV vodnik	1	*11*	*CC conductor*

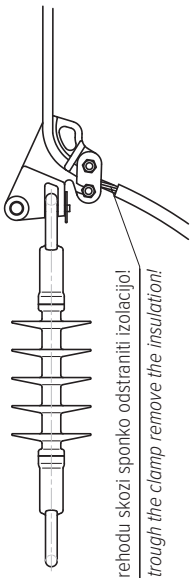




5.4 KRV 750 na razbremenilnem ali končnem 'A' drogu

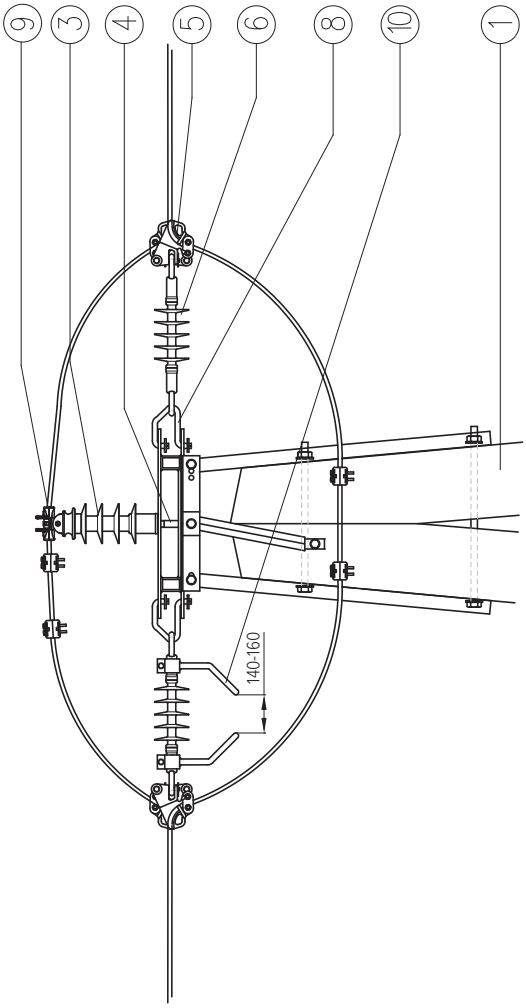
5.4 *KRV 750 on a reinforced or 'dead-end' 'A' pole*

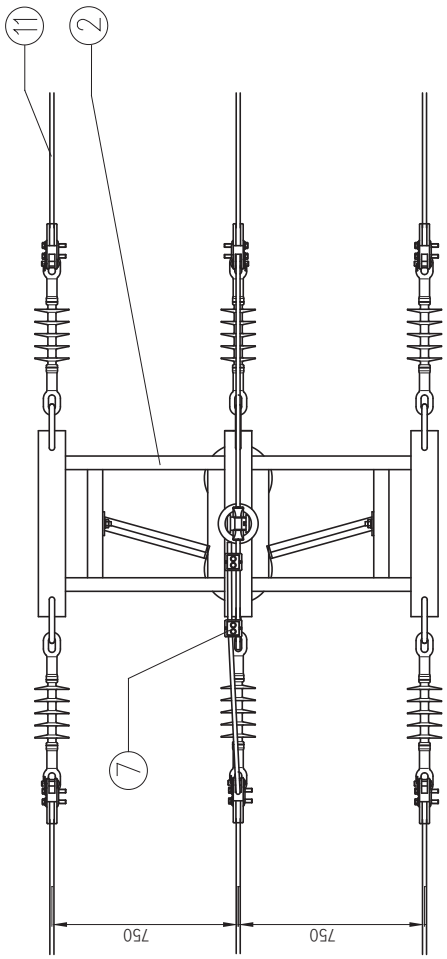




Pri prehodu skozi sponko odstraniti izolacijo!
When crossing trough the clamp remove the insulation!

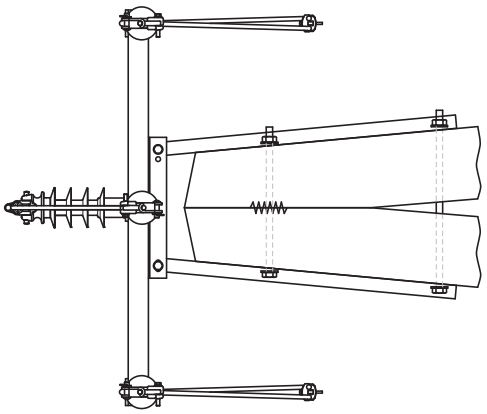
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	Pole
2	KRV 750 konzola	1	2	KRV 750 bracket
3	PKI izolator	1	3	PKI insulator
4	OPKI Opornica	1	4	OPKI pin
5	SZ-U sponka	6	5	SZ-U clamp
6	NKI izolator	6	6	NKI insulator
7	Sponka tokovna	6	7	Current clamp
8	G streme OS 80	6	8	G shackle OS 80
9	PIV jahač	1	9	CC cover
10	NKI Rogljič	6	10	NKI arcing horn
11	PIV vodnik	1	11	CC conductor

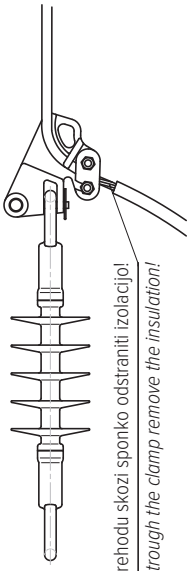




5.5 KKV 550 na kotnem 'A' drogu

5.5 *KKV 550 on an angular 'A' pole*

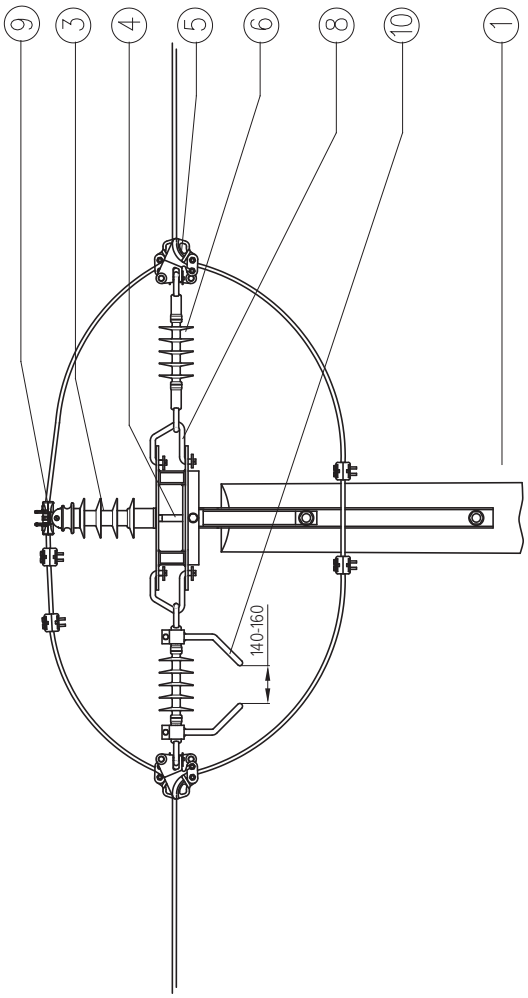


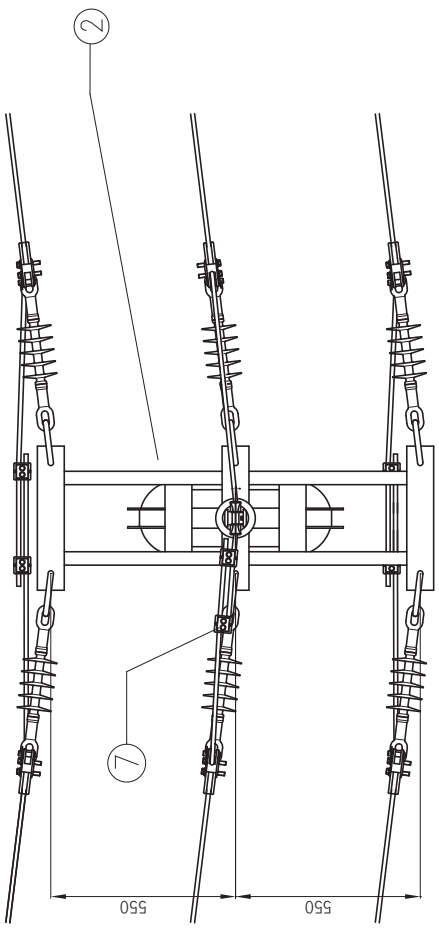


Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

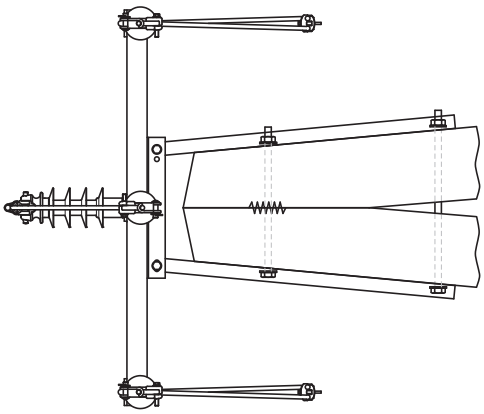
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	*1*	*Pole*
2	KKV 550 konzola	1	*2*	*KKV 550 bracket*
3	PKI izolator	1	*3*	*PKI insulator*
4	OPKI Opornica	1	*4*	*OPKI pin*
5	SZ-U Sponka	6	*5*	*SZ-U clamp*
6	NKI Izolator	6	*6*	*NKI insulator*
7	Sponka tokovna	6	*7*	*Current clamp*
8	G Streme OS 80	6	*8*	*G shackle OS 80*
9	PIV jahač	1	*9*	*CC cover*
10	NKI rogljič	6	*10*	*NKI arcing horn*
11	PIV vodnik	1	*11*	*CC conductor*

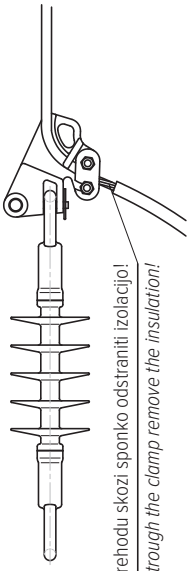




5.6 KKV 750 na kotnem 'A' drogu

5.6 *KKV 750 on an angular 'A' pole*

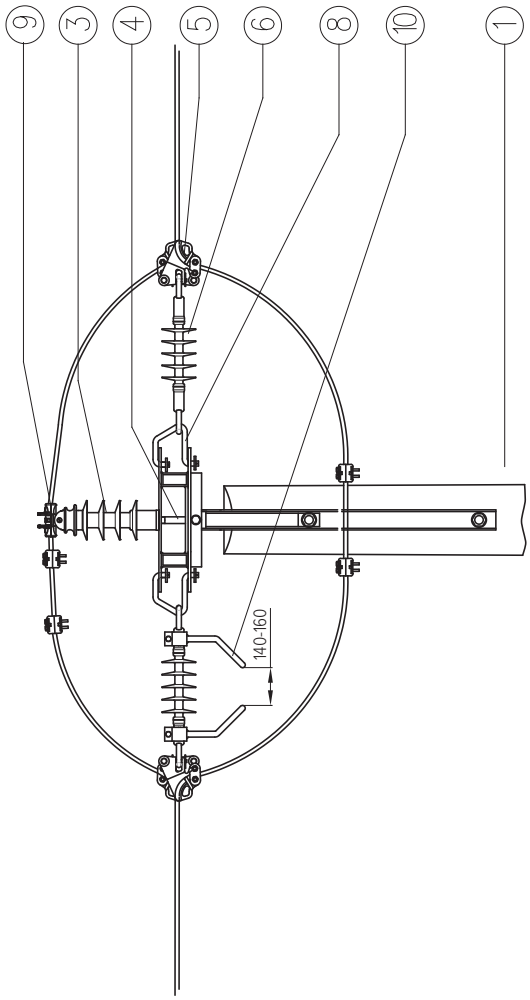


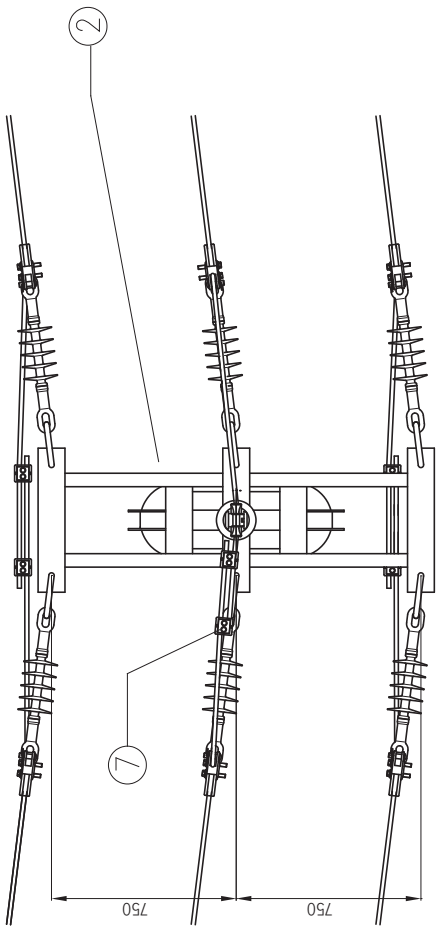


Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

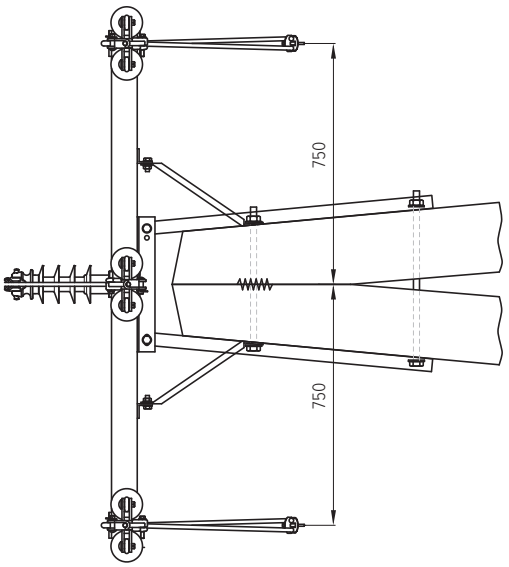
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	Pole
2	KKV 750 konzola	1	2	KKV 750 bracket
3	PKI izolator	1	3	PKI insulator
4	OPKI opornica	1	4	OPKI pin
5	SZ-U sponka	6	5	SZ-U clamp
6	NKI izolator	6	6	NKI insulator
7	Sponka tokovna	6	7	Current clamp
8	G streme OS 80	6	8	G shackle OS 80
9	PIV jahač	1	9	CC cover
10	NKI rogljič	6	10	NKI arcing horn
11	PIV vodnik	1	11	CC conductor

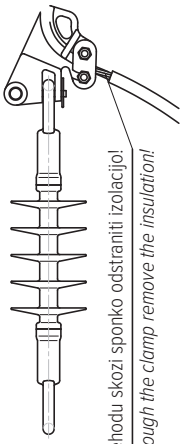




5.7 KKV 750 z dvojnimi izolatorji na kotnem 'A' drogu

5.7 *KKV 750 with double insulators on an angular 'A' pole*

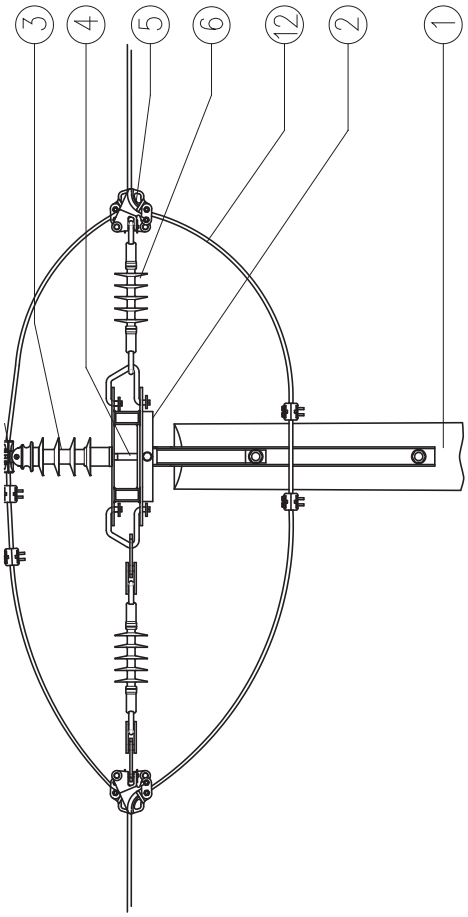


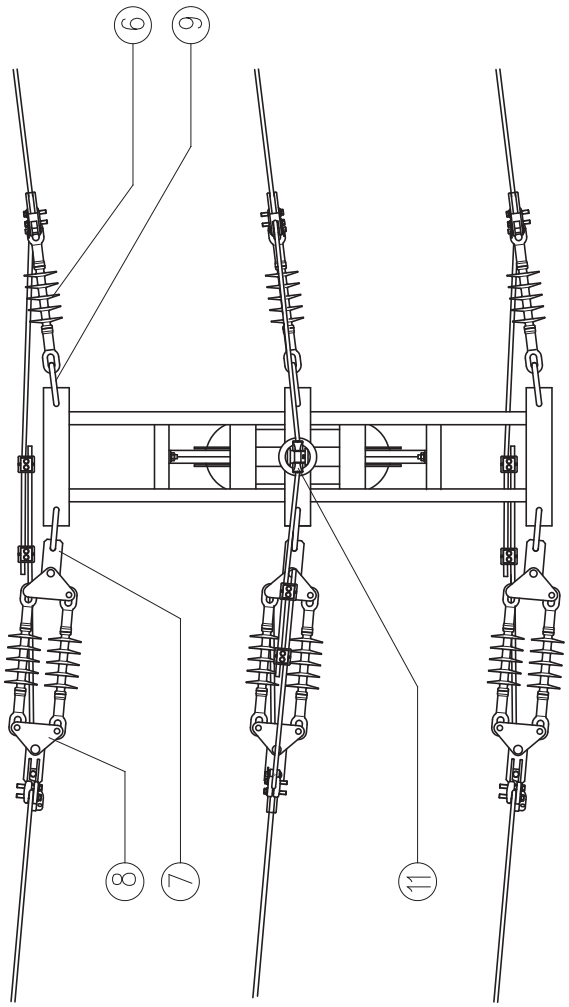


Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

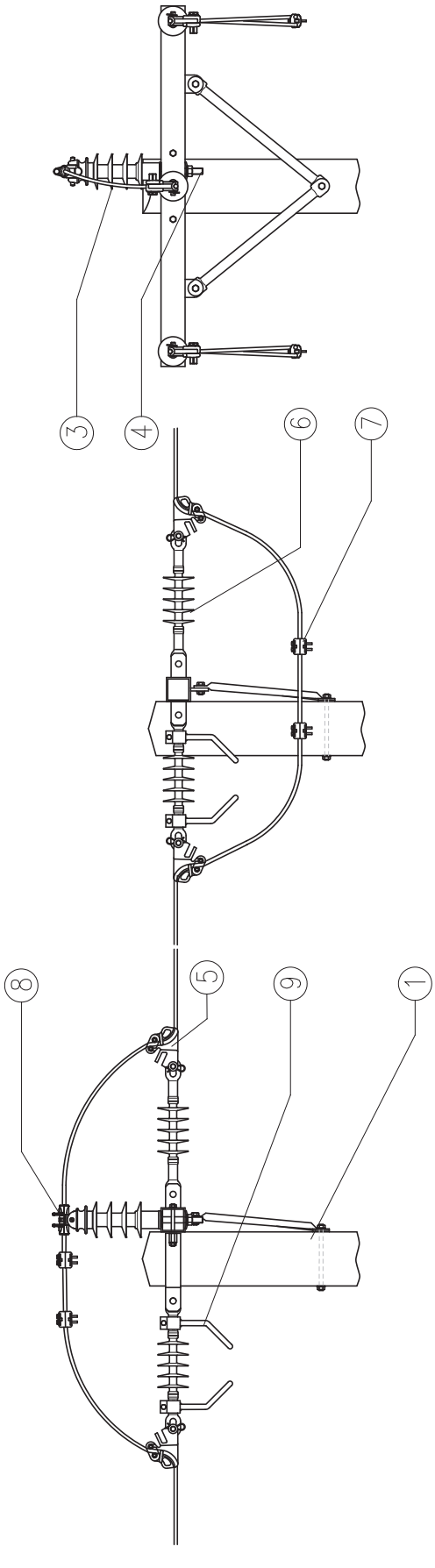
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	*1*	*Pole*
2	KKV 750 konzola	1	*2*	*KKV 750 bracket*
3	PKI izolator	1	*3*	*PKI insulator*
4	OPKI opornica	1	*4*	*OPKI pin*
5	SZ-U sponka	6	*5*	*SZ-U clamp*
6	NKI izolator	9	*6*	*NKI insulator*
7	Distančnik - ravni	6	*7*	*Extension link - flat*
8	Distančnik dvojni	6	*8*	*Double yoke*
9	G Streme OS 80	1	*9*	*G shackle OS 80*
10	Sponka tokovna	6	*10*	*Current clamp*
11	PIV jahač	1	*11*	*CC cover*
12	PIV vodnik	1	*12*	*CC conductor*

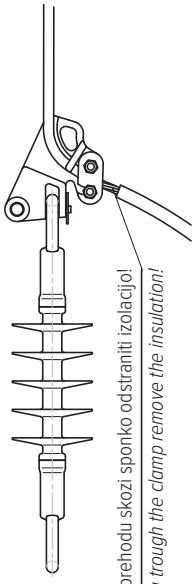




5.8 KZV 550 na nosilnem drogu

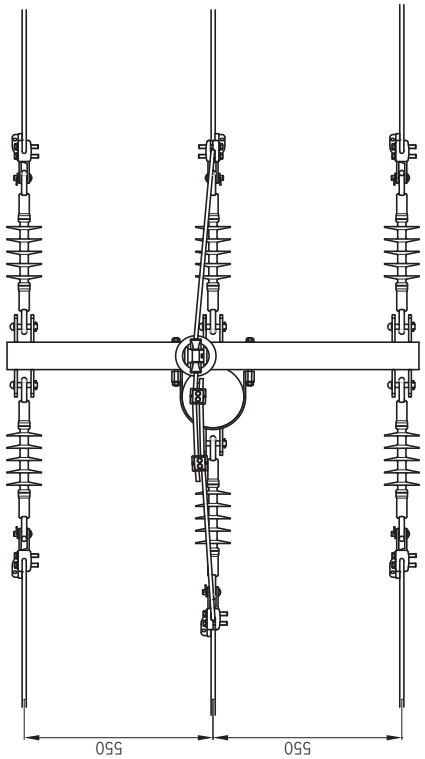
5.8 *KZV 550 on a suspension pole*





Pri prehodu skozi sponko odstraniti izolacijo!
When crossing trough the clamp remove the insulation!

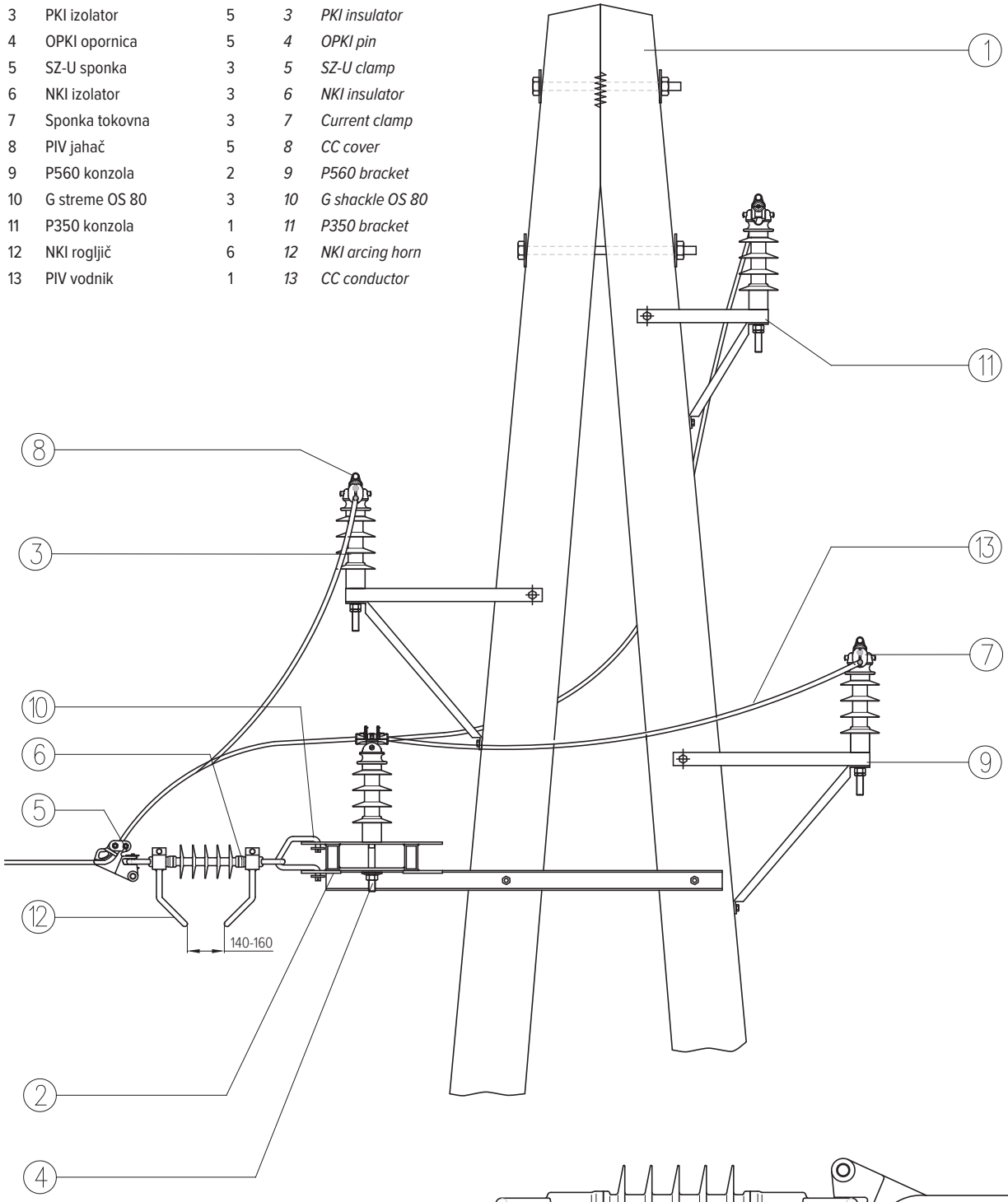
Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	*1*	*Pole*
2	KZV 550 konzola	1	*2*	*KZV 550 bracket*
3	PKI izolator	1	*3*	*PKI insulator*
4	OPKI opornica	1	*4*	*OPKI pin*
5	SZ-U sponka	6	*5*	*SZ-U clamp*
6	NKI izolator	6	*6*	*NKI insulator*
7	Sponka tokovna	6	*7*	*Current clamp*
8	PIV jahač	1	*8*	*CC cover*
9	Roglјič	3	*9*	*Arcing horn*
10	PIV vodnik	1	*10*	*CC conductor*
11	PIV jahač	1	*11*	*CC cover*
12	PIV vodnik	1	*12*	*CC conductor*

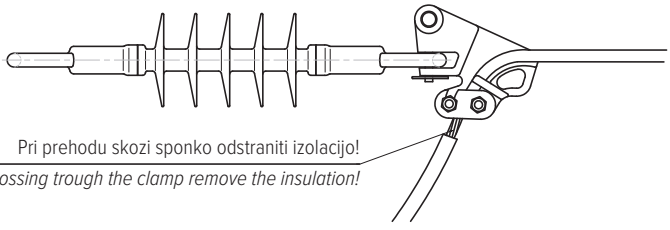


5.9 ONA KKVo 550, glavni vod AlFe, odcep PIV

5.9 *ONA KKVo 550, main line AlFe, branch CC*

Poz	Naziv	Kos/*Pcs*	*Pos*	*Name*
1	Drog	1	*1*	*Pole*
2	KKVo 550 konzola	1	*2*	*KKVo 550 bracket*
3	PKI izolator	5	*3*	*PKI insulator*
4	OPKI opornica	5	*4*	*OPKI pin*
5	SZ-U sponka	3	*5*	*SZ-U clamp*
6	NKI izolator	3	*6*	*NKI insulator*
7	Sponka tokovna	3	*7*	*Current clamp*
8	PIV jahač	5	*8*	*CC cover*
9	P560 konzola	2	*9*	*P560 bracket*
10	G streme OS 80	3	*10*	*G shackle OS 80*
11	P350 konzola	1	*11*	*P350 bracket*
12	NKI rogljič	6	*12*	*NKI arcing horn*
13	PIV vodnik	1	*13*	*CC conductor*





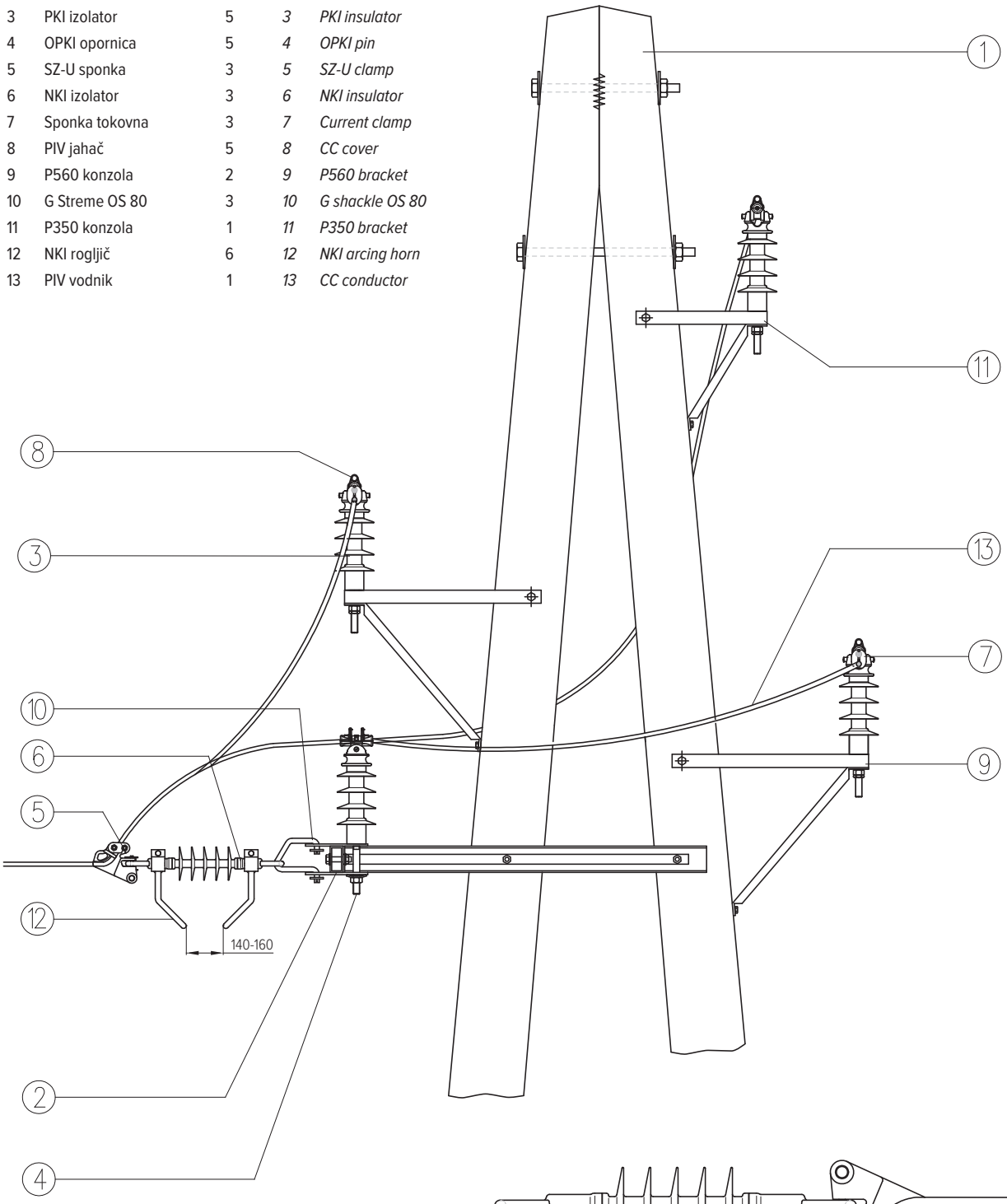
Pri prehodu skozi sponko odstraniti izolacijo!

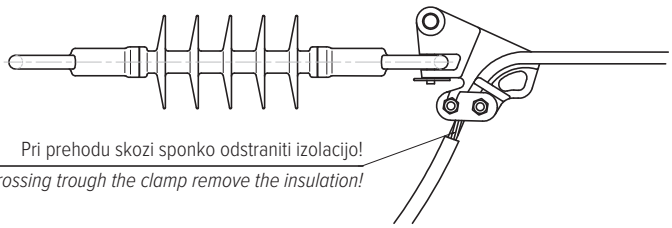
When crossing trough the clamp remove the insulation!

5.10 ONA KOV 500, glavni vod AlFe, odcep PIV

5.10 *ONA KOV 500, main line AlFe, branch CC*

Poz	Naziv	Kos/*Pcs*	*Pos*	*Name*
1	Drog	1	*1*	*Pole*
2	KOV 500 konzola	1	*2*	*KOV 500 bracket*
3	PKI izolator	5	*3*	*PKI insulator*
4	OPKI opornica	5	*4*	*OPKI pin*
5	SZ-U sponka	3	*5*	*SZ-U clamp*
6	NKI izolator	3	*6*	*NKI insulator*
7	Sponka tokovna	3	*7*	*Current clamp*
8	PIV jahač	5	*8*	*CC cover*
9	P560 konzola	2	*9*	*P560 bracket*
10	G Streme OS 80	3	*10*	*G shackle OS 80*
11	P350 konzola	1	*11*	*P350 bracket*
12	NKI rogljič	6	*12*	*NKI arcing horn*
13	PIV vodnik	1	*13*	*CC conductor*





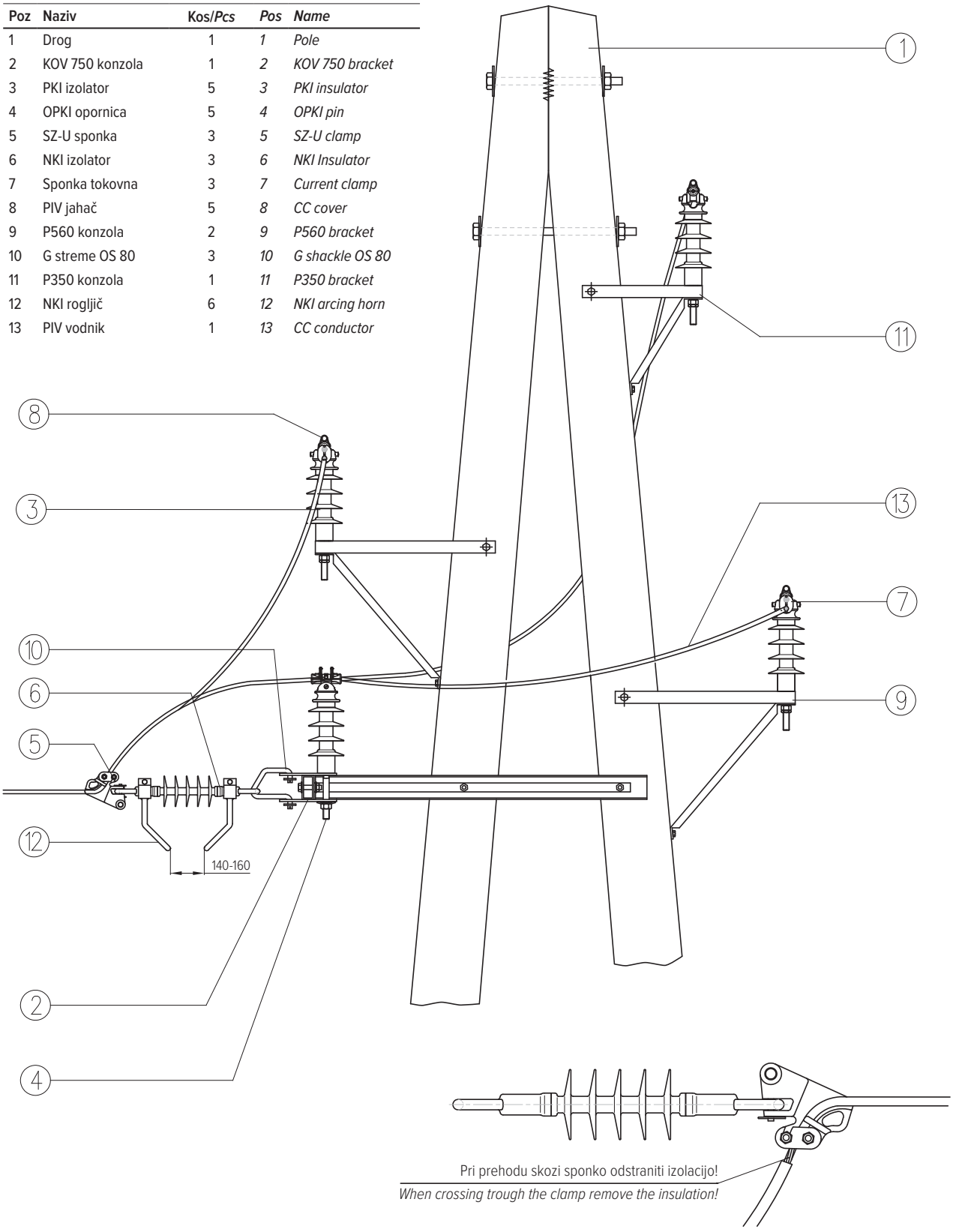
Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

5.11 ONA KOV 750, glavni vod AlFe, odcep PIV

5.11 KOV 750, main line AlFe, branch CC

Poz	Naziv	Kos/*Pcs*	*Pos*	*Name*
1	Drog	1	*1*	*Pole*
2	KOV 750 konzola	1	*2*	*KOV 750 bracket*
3	PKI izolator	5	*3*	*PKI insulator*
4	OPKI opornica	5	*4*	*OPKI pin*
5	SZ-U sponka	3	*5*	*SZ-U clamp*
6	NKI izolator	3	*6*	*NKI Insulator*
7	Sponka tokovna	3	*7*	*Current clamp*
8	PIV jahač	5	*8*	*CC cover*
9	P560 konzola	2	*9*	*P560 bracket*
10	G streme OS 80	3	*10*	*G shackle OS 80*
11	P350 konzola	1	*11*	*P350 bracket*
12	NKI rogljič	6	*12*	*NKI arcing horn*
13	PIV vodnik	1	*13*	*CC conductor*

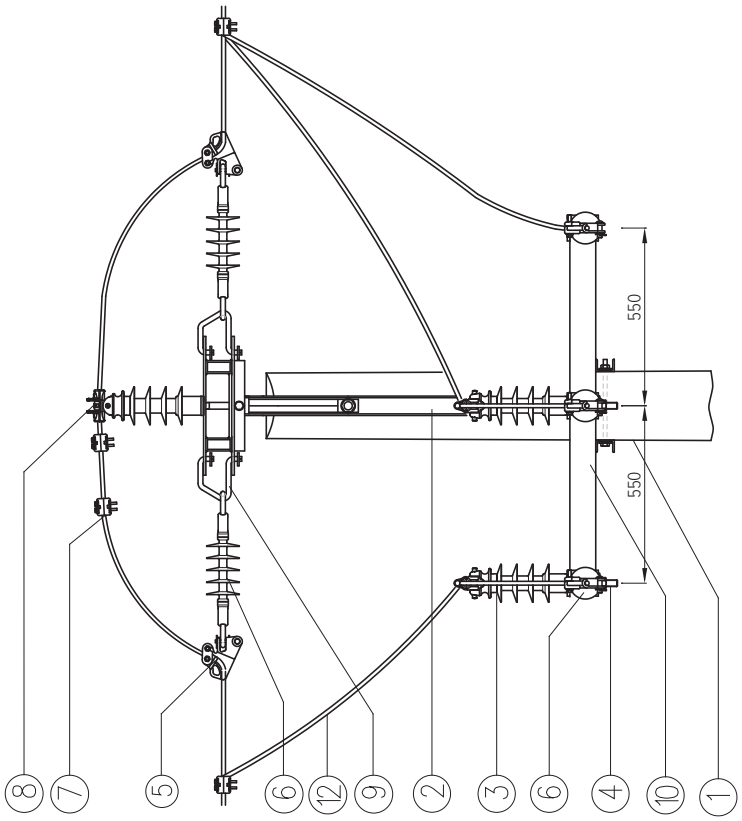


Pri prehodu skozi sponko odstraniti izolacijo!

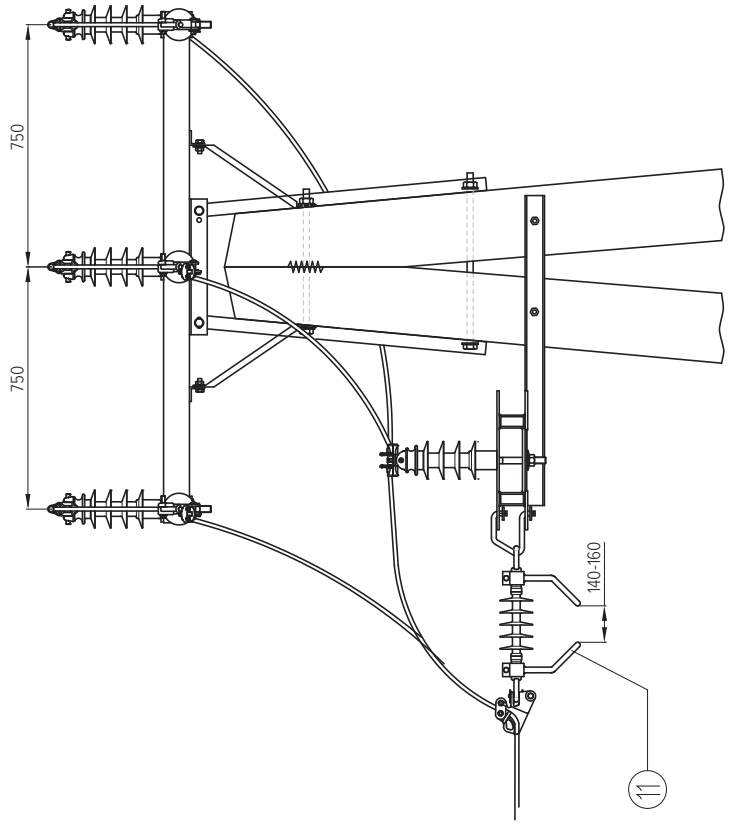
When crossing trough the clamp remove the insulation!

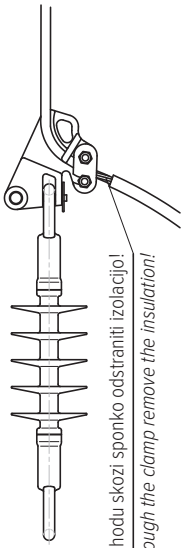
5.12 OKA KKVo 550, glavni vod in odcep PIV

5.12 *OKA KKVo 550, main line and branch PIV*



Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	*Pole*
2	KKV 750 konzola	1	2	*KKV 750 bracket*
3	PKI izolator	5	3	*PKI insulator*
4	OPKI opornica	5	4	*OPKI pin*
5	SZ-U sponka	9	5	*SZ-U clamp*
6	NKI izolator	9	6	*NKI insulator*
7	Sponka tokovna	6	7	*Current clamp*
8	PIV jahač	5	8	*CC cover*
9	G streme OS 80	9	9	*G shackle OS 80*
10	KKVo 550 konzola	1	10	*KKVo 550 bracket*
11	NKI rogljič	6	11	*NKI arcing horn*
12	PIV vodnik	1	12	*CC conductor*



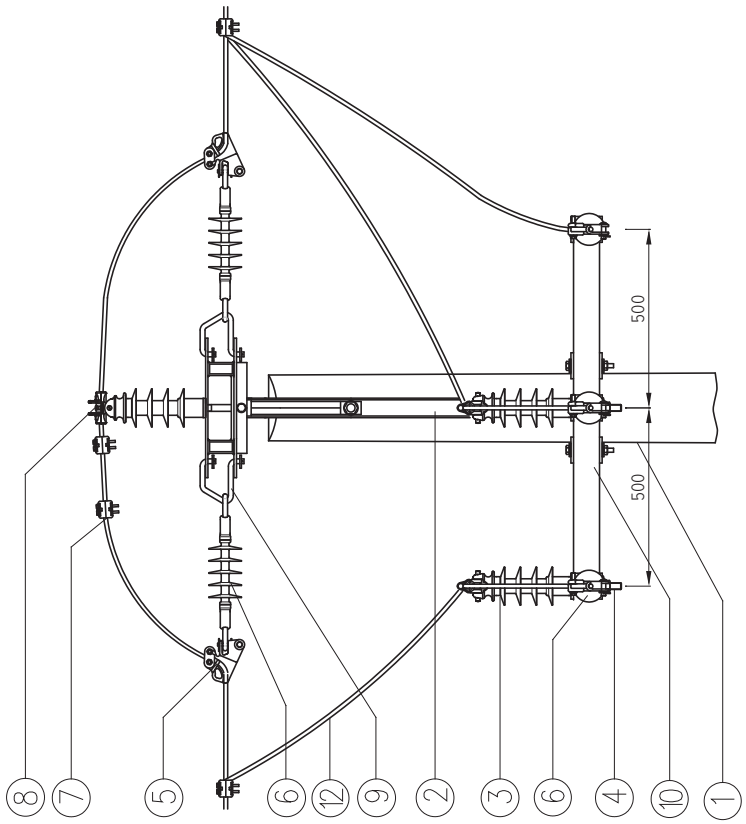


Pri prehodu skozi sponko odstraniti izolacijo!

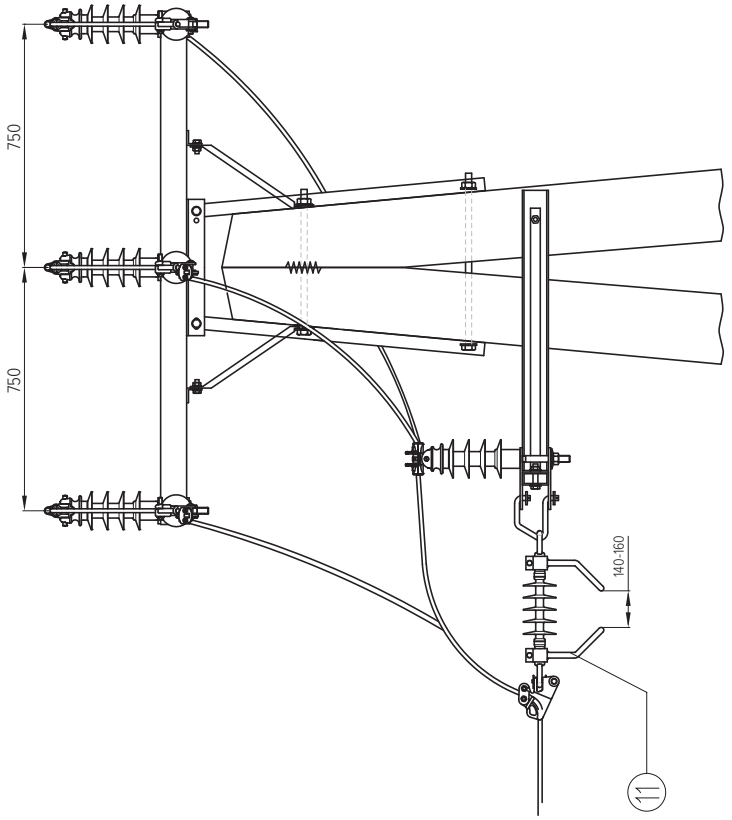
When crossing trough the clamp remove the insulation!

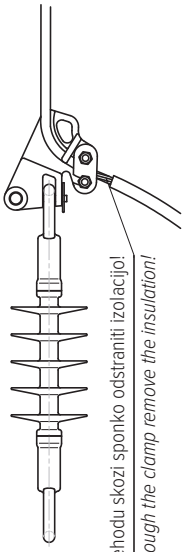
5.13 OKA KOV 500, glavni vod in odcep PIV

5.13 OKA KOV 500, main line and branch PIV



Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	1	*Pole*
2	KKV 750 konzola	1	2	*KKV 750 bracket*
3	PKI izolator	5	3	*PKI insulator*
4	OPKI opornica	5	4	*OPKI pin*
5	SZ-U sponka	9	5	*SZ-U clamp*
6	NKI izolator	9	6	*NKI insulator*
7	Sponka tokovna	6	7	*Current clamp*
8	PIV jahač	5	8	*CC cover*
9	G streme OS 80	9	9	*G shackle OS 80*
10	KOV 500 konzola	1	10	*KOV 500 bracket*
11	NKI rogljič	6	11	*NKI arcing horn*
12	PIV vodnik	1	12	*CC conductor*



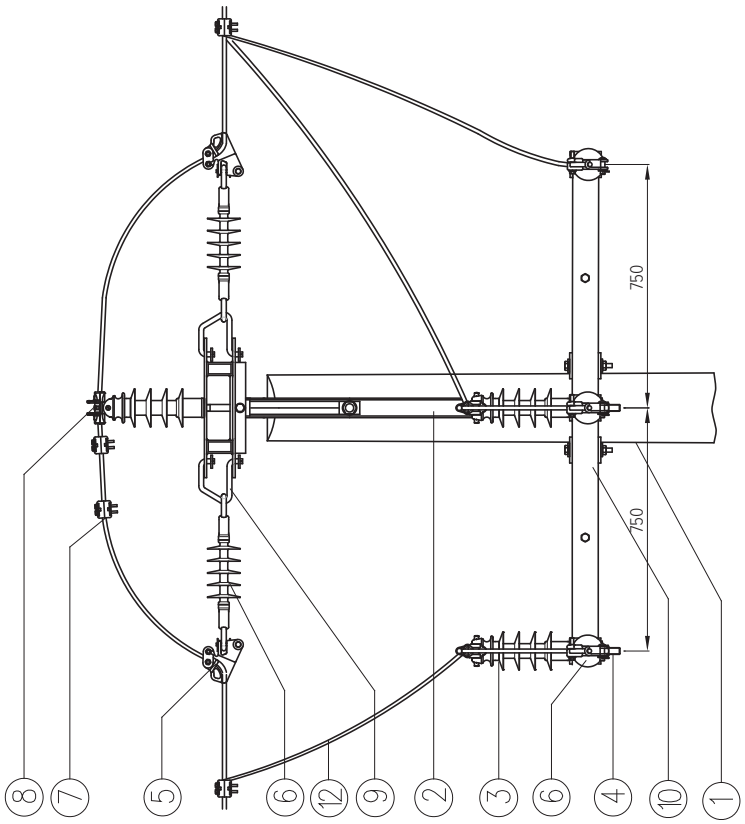


Pri prehodu skozi sponko odstraniti izolacijo!

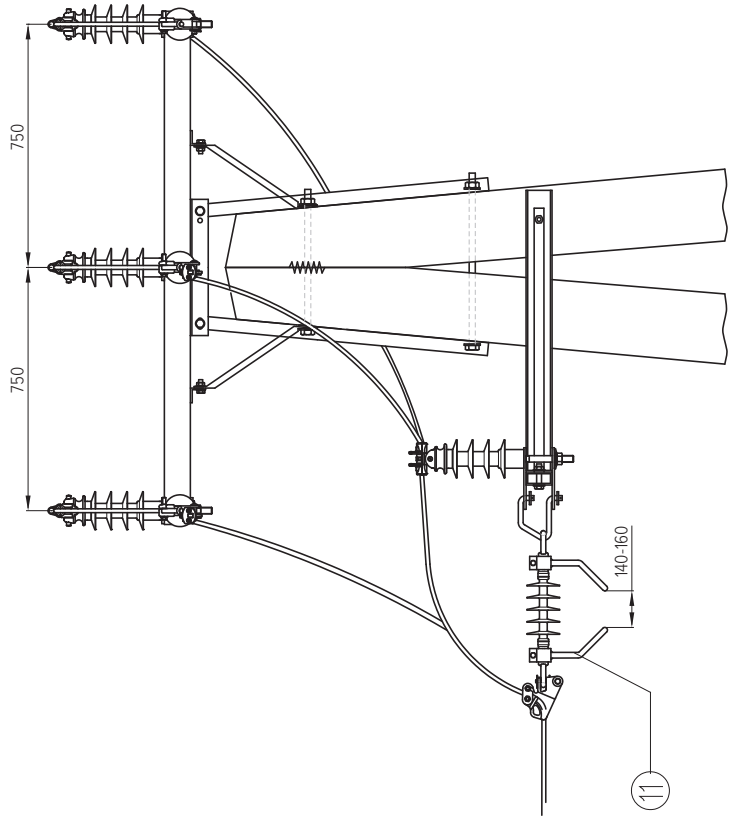
When crossing trough the clamp remove the insulation!

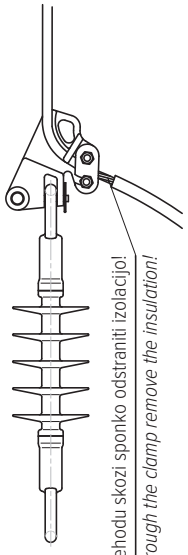
5.14 OKA KOV 750, glavni vod in odcep PIV

5.14 OKA KOV 750, main line and branch PIV



Poz	Naziv	Kos/Pcs	Pos	Name
1	Drog	1	*1*	*Pole*
2	KKV 750 konzola	1	*2*	*KKV 750 bracket*
3	PKI izolator	5	*3*	*PKI insulator*
4	OPKI opornica	5	*4*	*OPKI pin*
5	SZ-U sponka	9	*5*	*SZ-U clamp*
6	NKI izolator	9	*6*	*NKI insulator*
7	Sponka tokovna	6	*7*	*Current clamp*
8	PIV jahač	5	*8*	*CC cover*
9	G streme OS 80	9	*9*	*G shackle OS 80*
10	KOV 750 konzola	1	*10*	*KOV 750 bracket*
11	NKI rogljič	6	*11*	*NKI arcing horn*
12	PIV vodnik	1	*12*	*CC conductor*





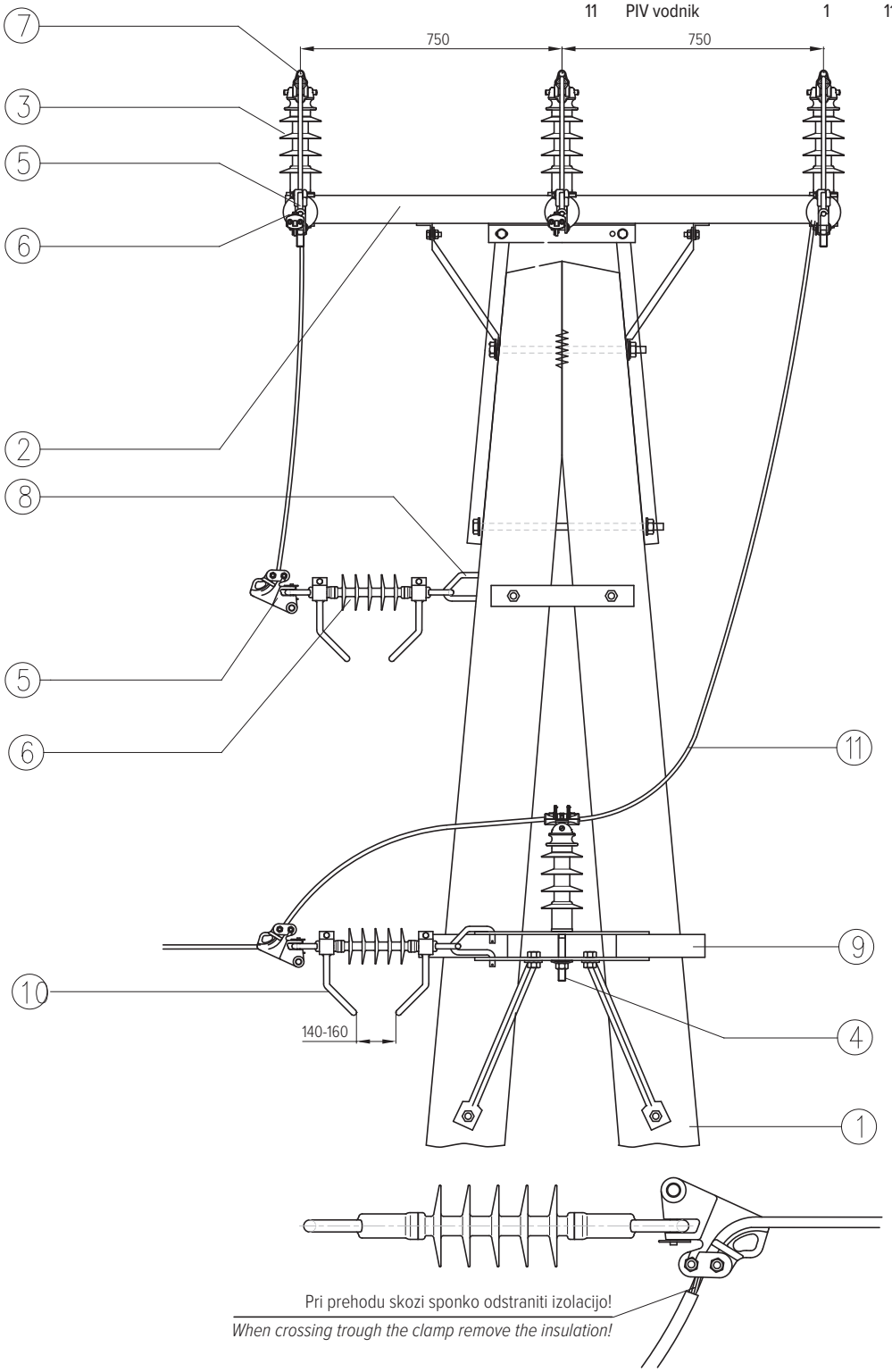
Pri prehodu skozi sponko odstraniti izolacijo!

When crossing trough the clamp remove the insulation!

5.15 OKA KKV 750, glavni vod PIV, odcep AlFe

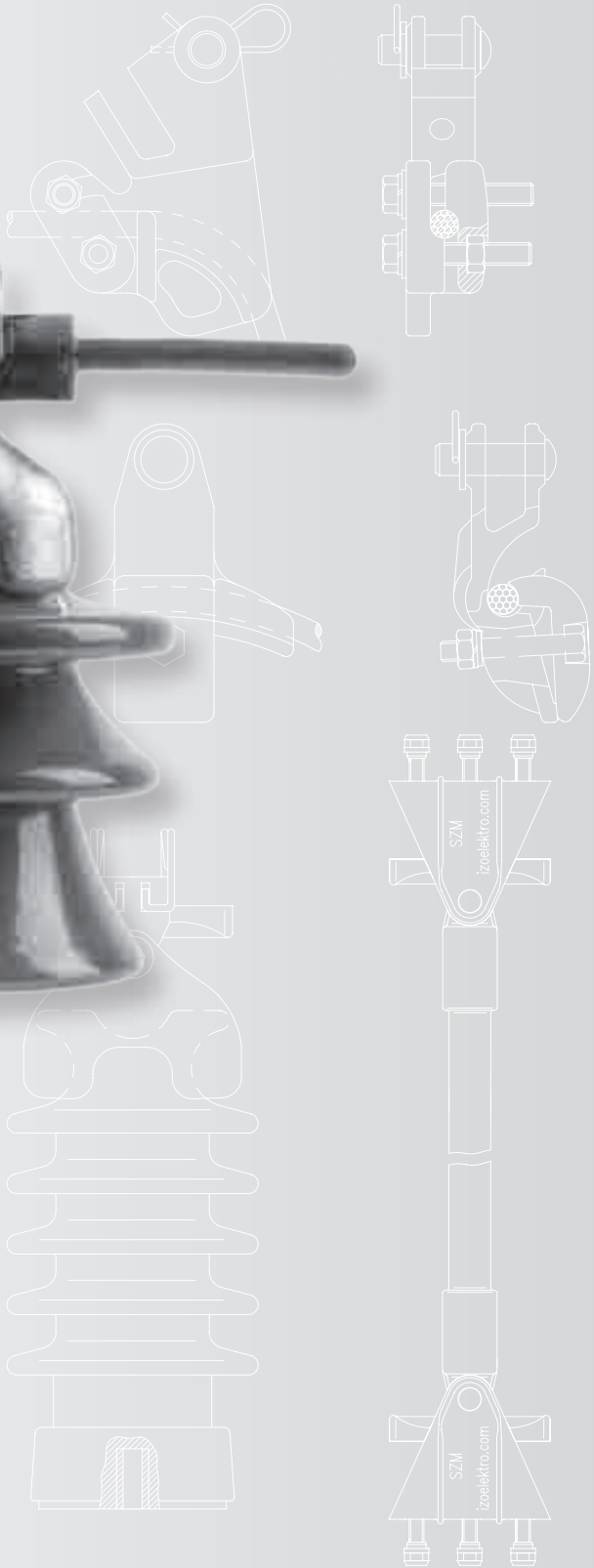
5.15 *OKA KKV 750, main line CC, branch AlFe*

Poz	Naziv	Kos/*Pcs*	*Pos*	*Name*
1	Drog	1	1	*Pole*
2	KKV 750 konzola	1	2	*KKV 750 bracket*
3	PKI izolator	4	3	*PKI insulator*
4	OPKI opornica	4	4	*OPKI pin*
5	SZ-U sponka	9	5	*SZ-U clamp*
6	NKI izolator	9	6	*NKI insulator*
7	PIV jahač	4	7	*CC cover*
8	G streme OS 80	3	8	*G shackle OS 80*
9	P800 konzola	2	9	*P800 bracket*
10	NKI rogljič	6	10	*NKI arcing horn*
11	PIV vodnik	1	11	*CC conductor*



IZOELEKTRO

6



DV pribor

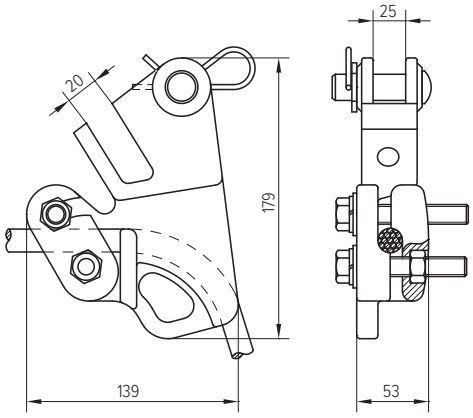
PL accessories

6.1 SZ-U sponka zatezna univerzalna

Moment: 45 Nm
Premer vodnika AlFe: 6,8-14,0 mm
Koda: **80 60 03**

6.1 *SZ-U universal tension clamp*

Torque: 45 Nm
Conductor diameter AlFe: 6,8-14,0 mm
*Code: **80 60 03***

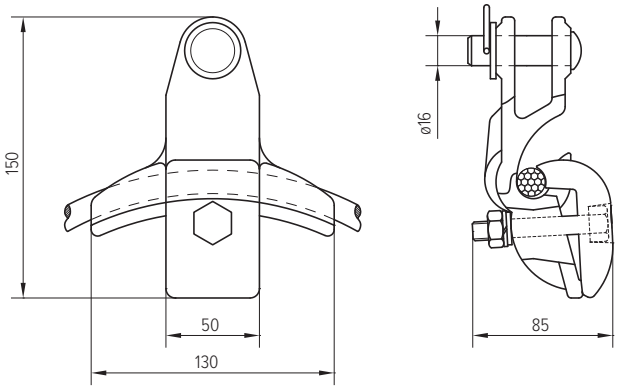


6.2 SN-U sponka nosilna univerzalna

Moment: 45 Nm
Premer vodnika AlFe: 6,8-14,0 mm
Koda: **80 60 04**

6.2 *SN-U universal suspension clamp*

Torque: 45 Nm
Conductor diameter AlFe: 6,8-14,0 mm
*Code: **80 60 04***

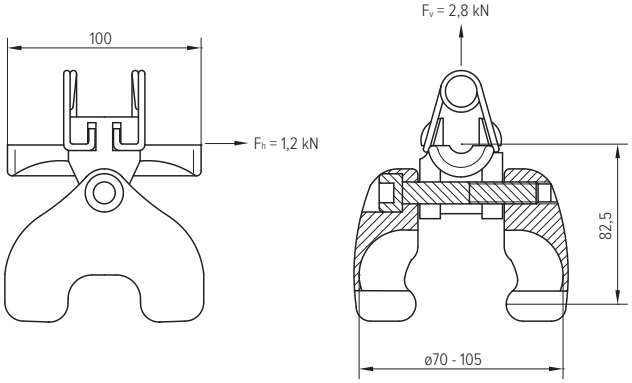


6.3 VS 20 sponka vzmetna

Moment: 35 Nm
Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 70°
Koda: **10 10 01**

6.3 *VS 20 spring clamp*

Torque: 35 Nm
Conductor diameter AlFe: 6,8-18,8 mm
Conductor inclination: 70°
*Code: **10 10 01***

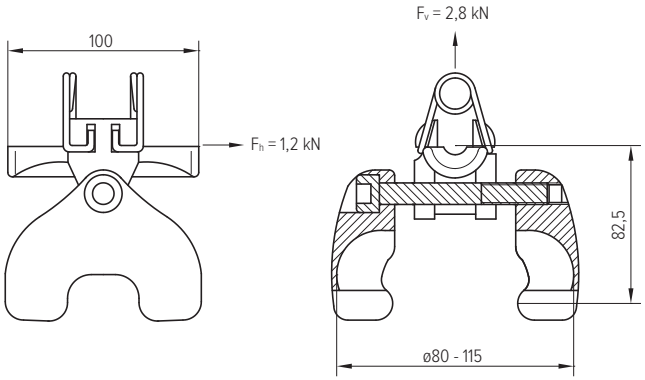


6.4 VS 25 sponka vzmetna

Moment: 25 Nm
Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 70°
Koda: **10 10 02**

6.4 *VS 25 spring clamp*

Torque: 25 Nm
Conductor diameter AlFe: 6,8-18,8 mm
Inclination conductor: 70°
*Code: **10 10 02***

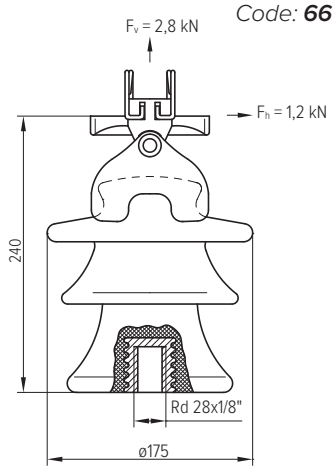


6.5 VS SER b-20 sponka vzmetna z izolatorjem

Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 55°
Koda: **66 33 038**

6.5 *VS SER b-20 spring clamp with insulator*

Conductor diameter AlFe: 6,8-18,8 mm
Conductor inclination: 55°
*Code: **66 33 038***

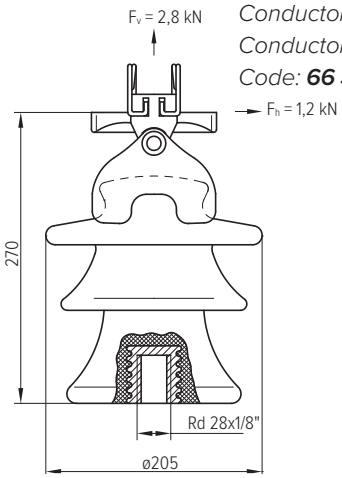


6.6 VS SER b-25 sponka vzmetna z izolatorjem

Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 55°
Koda: **66 33 039**

6.6 *VS SER b-25 spring clamp with insulator*

Conductor diameter AlFe: 6,8-18,8 mm
Conductor inclination: 55°
*Code: **66 33 039***

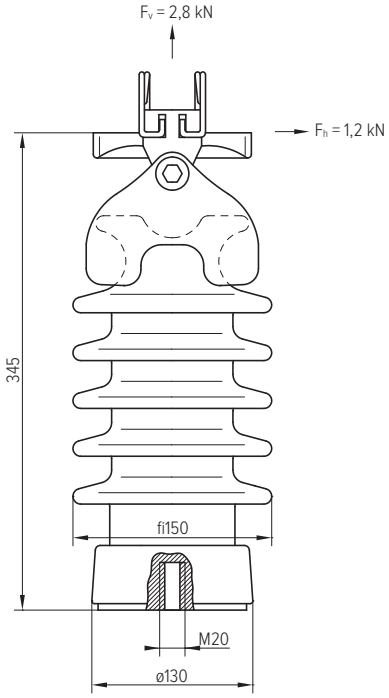


6.7 VS R 125 N sponka vzmetna z izolatorjem

Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 55°
Koda: **40 21 005**

6.7 *VS R 125 N spring clamp with insulator*

Conductor diameter AlFe: 6,8-18,8 mm
Inclination conductor: 55°
*Code: **40 21 005***

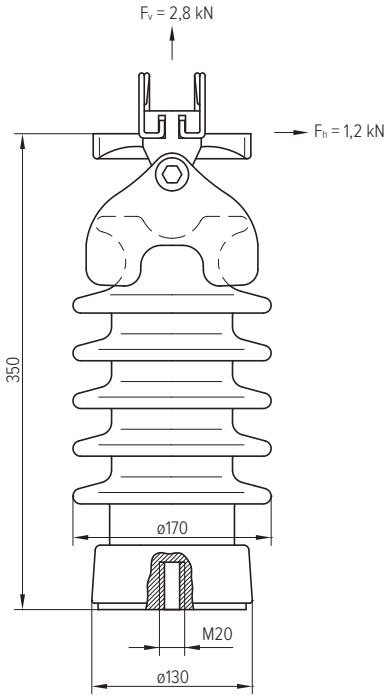


6.8 VS R 125 L sponka vzmetna z izolatorjem

Premer vodnika AlFe: 6,8-18,8 mm
Nagib vodnika: 55°
Koda: 40 21 006

6.8 *VS R 125 L spring clamp with insulator*

Conductor diameter AlFe: 6,8-18,8 mm
Conductor inclination: 55°
*Code: **40 21 006***



6.9 DSI S distančnik izolacijski z vzmetno sponko

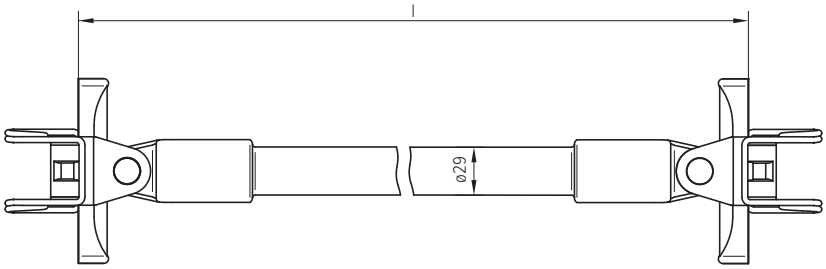
Izvedba: z vzmetno sponko
l (mm): 0400 - 4100
Koda: **24 xxxx** *

* xxxx = dolžina (l) v mm

6.9 *DSI S insulating spacer with spring clamp*

Version: with spring clamp
l (mm): 0400 - 4100
*Code: **24 xxxx** **

** xxxx = length (l) in mm*



6.10 DSI M distančnik izolacijski z vijačno sponko

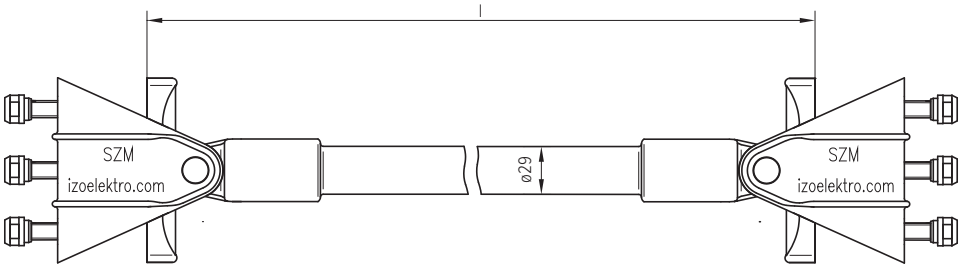
Izvedba: z vijačno sponko
l (mm): 0400 - 4100
Koda: **25 xxxx** *

* xxxx = dolžina (l) v mm

6.10 *DSI M insulating spacer with screw clamp*

Version: with screw clamp
l (mm): 0400 - 4100
*Code: **25 xxxx** **

** xxxx = length (l) in mm*

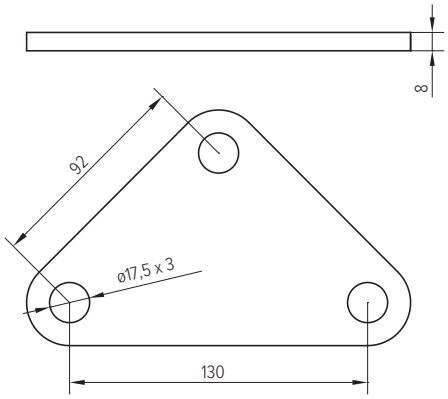


6.11 **Distančnik jeklen**

Minimalna prelomna sila: **90 kN**
Koda: **43 29 407**

6.11 ***Steel yoke***

Minimal breaking force: ***90 kN***
Code: ***43 29 407***

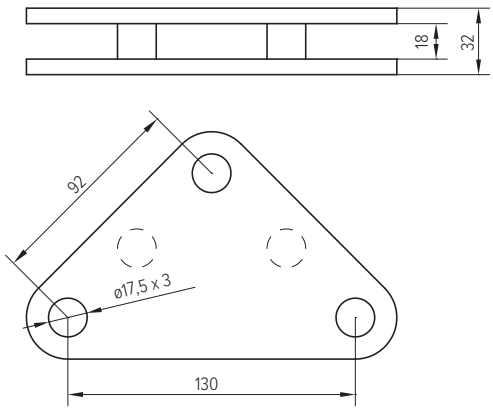


6.12 **Distančnik jeklen dvojni**

Minimalna prelomna sila: **90 kN**
Koda: **43 29 408**

6.12 ***Steel yoke double***

Minimal breaking force: ***90 kN***
Code: ***43 29 408***

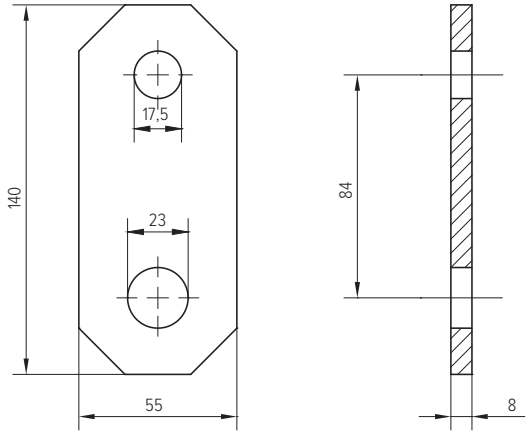


6.13 **Podaljšek jeklen**

Minimalna prelomna sila: **90 kN**
Koda: **80 60 30**

6.13 ***Steel extension link***

Minimal breaking force: ***90 kN***
Code: ***80 60 30***

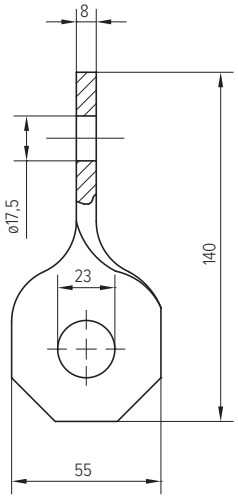


6.14 **Podaljšek jeklen 90°**

Minimalna prelomna sila: 90 kN
Koda: **80 60 31**

6.14 ***Steel extension link 90°***

Minimal breaking strength: 90 kN
*Code: **80 60 31***

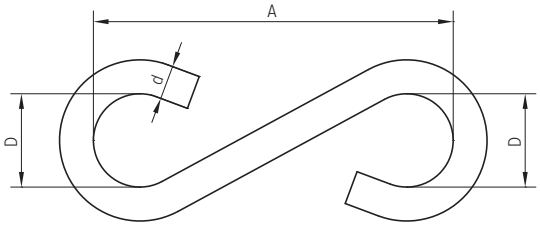


6.15 **S - kavelj**

Naziv: S - kavelj 4 kN, dimenzije (mm) A=85, D=22, d=8
Naziv: S - kavelj 6 kN, dimenzije (mm) A=80, D=22, d=10

6.15 ***S - hook***

Name: S - hook 4 kN, dimension (mm) A=85, D=22, d=8
Name: S - hook 6 kN, dimension (mm) A=80, D=22, d=10

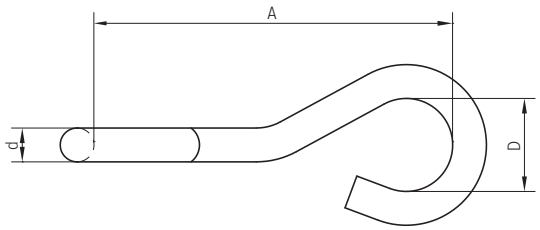


6.16 **S - kavelj 90°**

Naziv: S - kavelj 90° 4 kN, dimenzije (mm) A=85, D=22, d=8
Naziv: S - kavelj 90° 6 kN, dimenzije (mm) A=80, D=22, d=10

6.16 ***S - hook 90°***

Name: S - hook 90° 4 kN, dimension (mm) A=85, D=22, d=8
Name: S - hook 90° 6 kN, dimension (mm) A=80, D=22, d=10

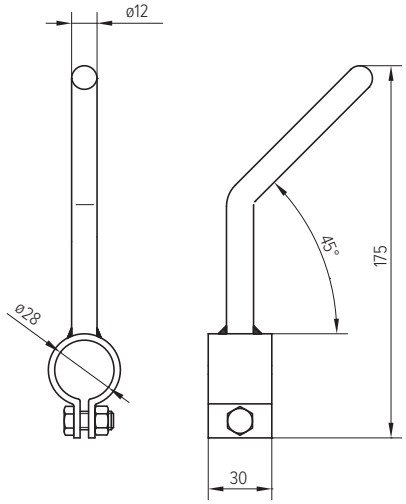


6.17 **Rogljič NKI**

Moment: 16 Nm
Koda: **80 70 54**

6.17 ***Arcing horn NKI***

Torqe: 16 Nm
*Code: **80 70 54***

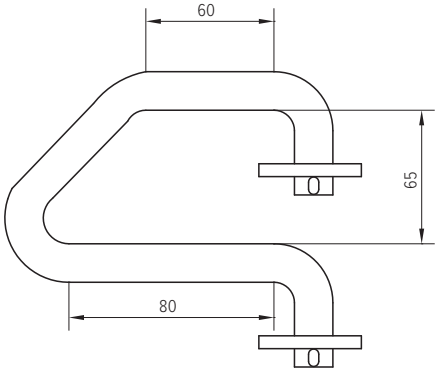


6.18 **G streme OS 65**

Minimalna prelomna sila: 90 kN
Koda: **20 150**

6.18 ***G shackle OS 65***

Minimal breaking force: 90 kN
*Code: **20 150***

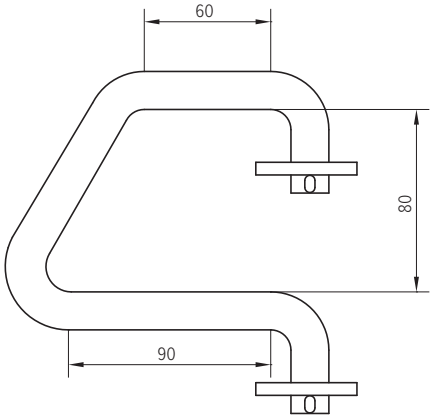


6.19 **G streme OS 80**

Minimalna prelomna sila: 90 kN
Koda: **20 151**

6.19 ***G shackle OS 80***

Minimal breaking force: 90 kN
*Code: **20 151***

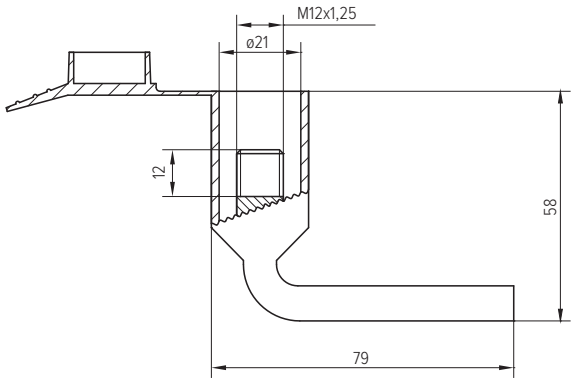


6.20 **Vijak ozemljitveni**

Naziv: Vijak ozemljitveni – rumen; koda: **70 76 01**
Naziv: Vijak ozemljitveni – črn; koda: **70 76 02**
Material: CuZn, PA6
Moment: 8 Nm

6.20 ***Earthing screw***

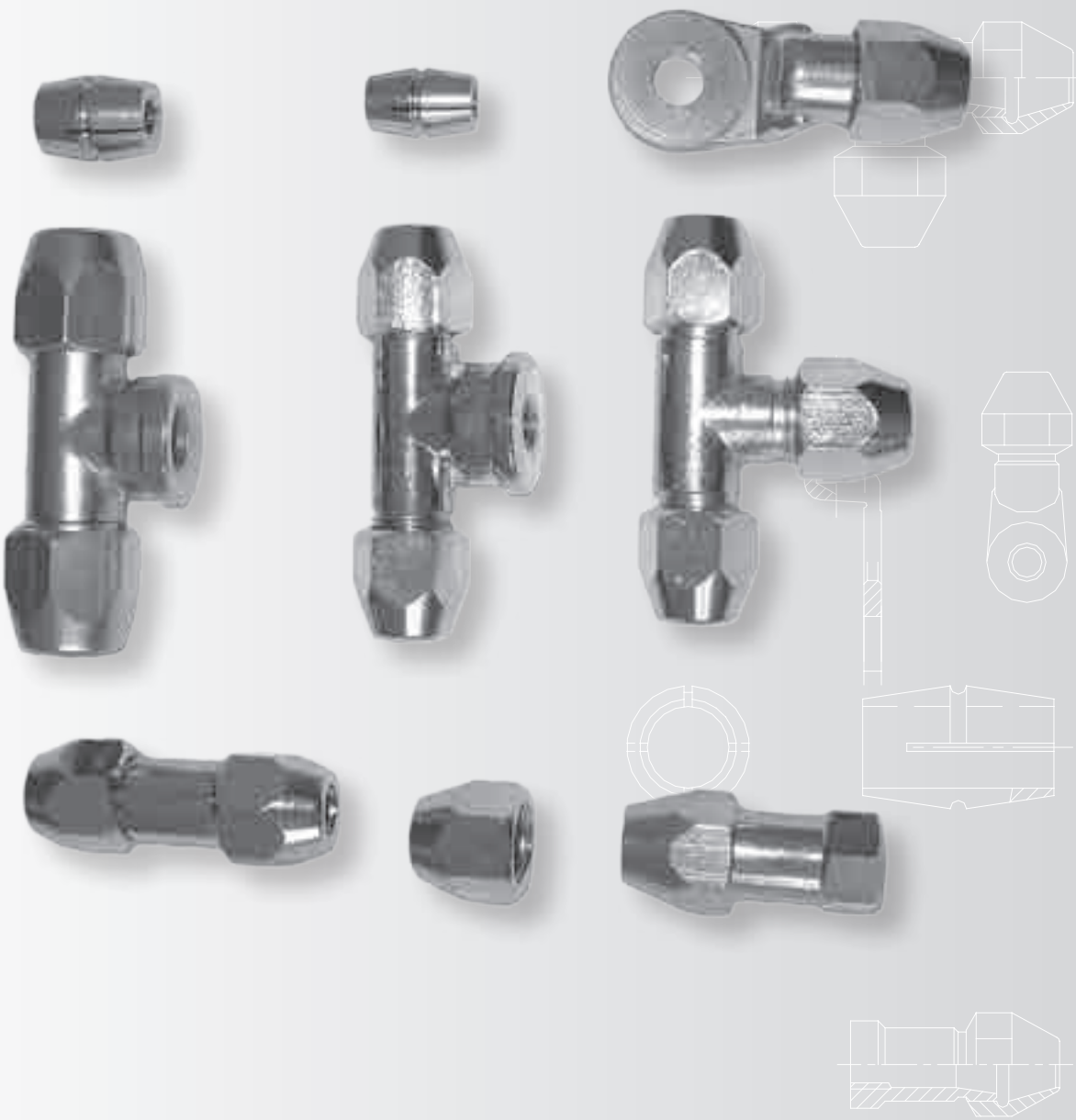
Name: Earthing screw – yellow; code: ***70 76 01***
Name: Earthing screw – black; code: ***70 76 02***
Material: CuZn, PA6
Torque: 8 Nm



Beležke

Notes

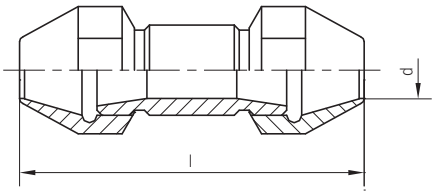
7



SN koncentrični material *MV connecting sleeves*

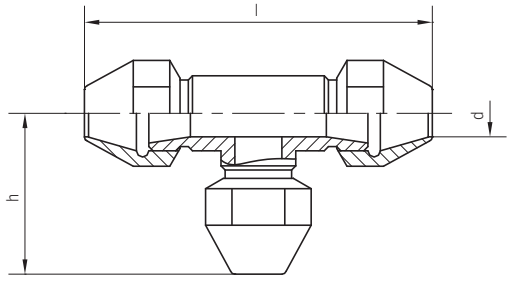
SN koncentrični material *MV connecting sleeves*

7.1 R sponka ravna z dvojnim konusom *7.1 R double conoid flat clamp*



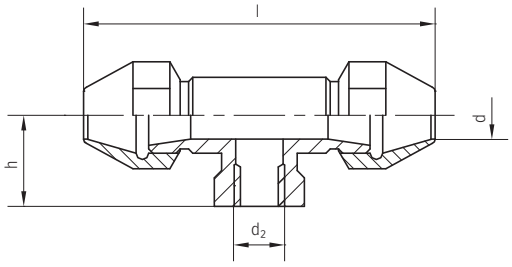
Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	d (mm)	l (mm)
ø 7 - 10	**42 40 00**	R10	11,3	70
ø 7 - 13	**42 40 01**	R13	14,2	88
ø 10 - 16	**42 40 02**	R16	16,6	102
ø 16 - 20	**42 40 03**	R20	20,5	120

7.2 T sponka odcepna z dvojnim konusom *7.2 T double conoid branch clamp*



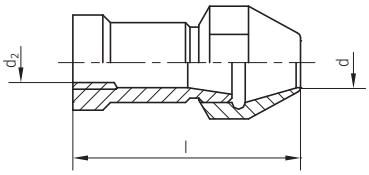
Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	h (mm)	d (mm)	l (mm)
ø 7 - 10	**42 41 00**	T10	41	11,3	82
ø 7 - 13	**42 41 01**	T13	47	14,2	93
ø 10 - 16	**42 41 02**	T16	60	16,6	118
ø 16 - 20	**42 41 03**	T20	69	20,5	137

7.3 Td sponka odcepna s konusom *7.3 Td conoid branch clamp*



Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	h (mm)	d (mm)	d_2 (mm)	l (mm)
ø 7 - 10	**42 43 00**	Td10	25	11,3	M12	85
ø 7 - 13	**42 43 01**	Td13	25	14,2	M16	95
ø 10 - 16	**42 43 02**	Td16	30	16,6	M20	121
ø 16 - 20	**42 43 03**	Td20	30	20,5	M24	140

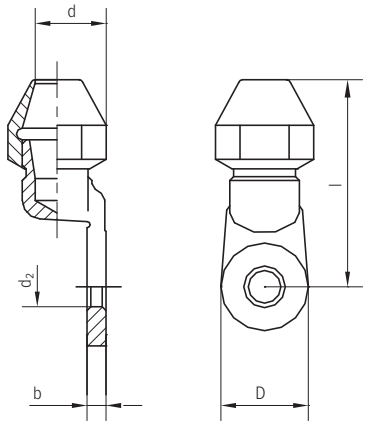
7.4 Rp priključek ravni



7.4 *Rp flat fitting*

Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	h (mm)	d (mm)	d_2 (mm)
ø 7 - 10	**42 42 00**	Rp10	55	11,3	M12
ø 7 - 13	**42 42 01**	Rp13	64	14,2	M16
ø 10 - 16	**42 42 02**	Rp16	74	16,6	M20
ø 16 - 20	**42 42 03**	Rp20	80	20,5	M24

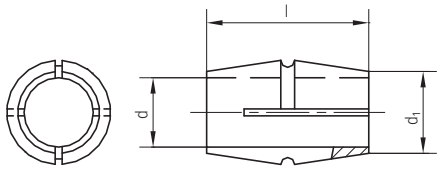
7.5 P priključek ploščat



7.5 *P plane fitting*

Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	D (mm)	d (mm)	d_2 (mm)	l (mm)
ø 7 - 10	**42 44 00**	P10	30	11,3	13	55
ø 7 - 13	**42 44 01**	P13	33	14,2	17	64
ø 10 - 16	**42 44 02**	P16	36	16,6	21	74
ø 16 - ø20	**42 44 03**	P20	39	20,5	25	80

7.6 V konus

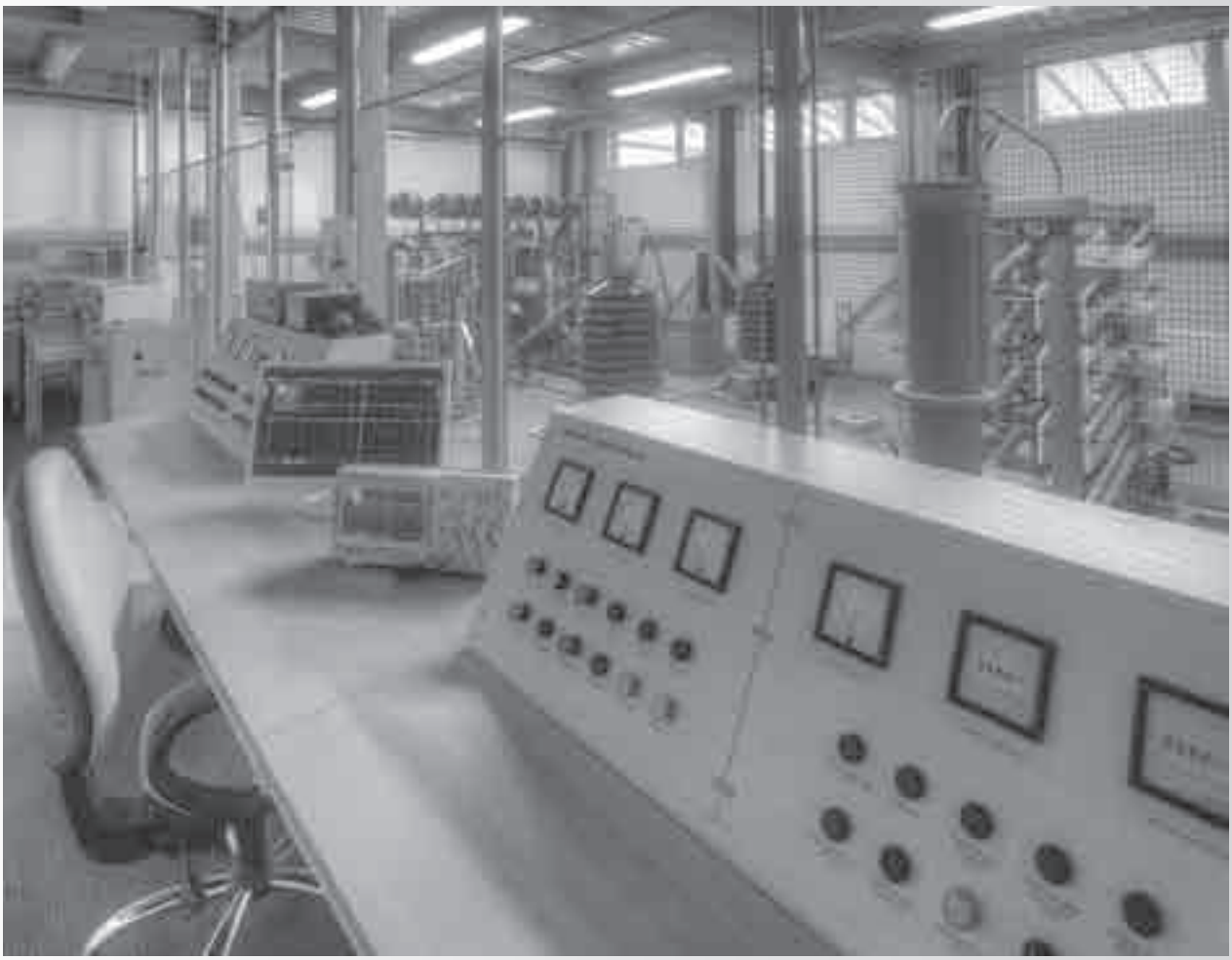


7.6 *V cone*

Priključek *Connector* (mm)	Koda *Code*	Tip *Type*	d (mm)	l (mm)	d_1 (mm)
ø 7 - 10	**42 54 01**	V1007	7	23,5	11,8
ø 7 - 10	**42 54 02**	V1008	8	23,5	11,8
ø 7 - 10	**42 54 03**	V1009	10	23,5	11,8
ø 7 - 13	**42 55 01**	V1307	7	26	15,1
ø 7 - 13	**42 55 02**	V1308	8	26	15,1
ø 7 - 13	**42 55 04**	V1310	10	26	15,1
ø 7 - 13	**42 55 06**	V1312	12	26	15,1
ø 7 - 13	**42 55 07**	V1313	13	26	15,1
ø 10 - 16	**42 56 01**	V1610	10	34	18
ø 10 - 16	**42 56 04**	V1613	13	34	18
ø 10 - 16	**42 56 05**	V1614	14	34	18
ø 10 - 16	**42 56 07**	V1616	16	34	18

Beležke

Notes



VN laboratorij

HV laboratory

VN laboratorij

HV laboratory

8.1 Splošno

Obratovanje

V podjetju imamo laboratorij, opremljen z napravami za opravljanje električnih in mehanskih meritev. V glavnem je namenjen lastnim potrebam za izvajanje preskusov od razvoja do validacije izdelka. Vršimo tudi usluge za podjetja, raziskovalne institucije in izobraževalne ustanove. Na osnovi dobljenih rezultatov naši strokovnjaki izdajajo preskusna poročila in strokovna mnenja. Natančnost meritev in verodostojnost podatkov zagotavljamo z rednim umerjanjem instrumentov s strani akreditirane institucije.

Področje dela

Laboratorij je namenjen preskušanju SN prenapetostnih odvodnikov in izolatorjev do 60 kV obratovalne napetosti.

Pri prenapetostnih odvodnikih se meritve izvajajo na blokih do 6 kV. Uporabljajo se močni tokovni impulzi različnih oblik, kakor jih določata standarda IEC 60099-4 in IEC 61643.

Preskusi izolatorjev se izvajajo z izmenično napetostjo do višine 220 kV in z udarno napetostjo oblike vala 1,2/50 µs do višine 500 kV.

8.2 Tehnične zmogljivosti

Generator izmenične napetosti

Maksimalna amplituda trajne izmenične napetosti: 220 kV

Z generatorjem tvorimo trajno izmenično napetost, ki se pri izolatorjih uporablja za določanje zdržne napetosti v mokrem v skladu s standardi IEC 61109, IEC 61952 in IEC 60383.
Pri odvodnikih prenapetosti generator izmenične napetosti uporabljamo za meritev referenčne napetosti v skladu s standardi IEC 60099-4 in IEC 61643. Uporabljamo ga tudi za meritev ohmske komponente uhajavega toka odvodnikov prenapetosti.

Napetostni udarni generator

Maksimalna amplituda udarne napetosti 1,2/50 µs: 500 kV
S tem generatorjem tvorimo atmosfersko udarno napetost, ki služi za preskušanje izolatorjev v skladu s standardi IEC 61109, IEC 61952, IEC 60383 in preskušanje odvodnikov prenapetosti v skladu s standardom IEC 60099-4.

8.1 Generally

Operation

In the company, we have a laboratory equipped with devices for performing electrical and mechanical measurements. We use the laboratory mostly for our own needs to perform various tests from the early phase of development to the final validation of a product. We also perform services for other companies, research institutes, and educational institutions. On bases of the results they get, our experts issue test reports and expert opinions. We assure accuracy of measurements and credibility of data with regular calibration of instruments from an accredited institution.

Fields of application

The laboratory is designed for testing SN surge arresters and insulators up to 60 kV of the operating voltage.

Surge arresters are tested on the blocks up to 6 kV. High current pulses of different shapes are used for testing, as defined by standards IEC 60099-4 and IEC 61643.

Insulators are tested using power frequency voltage up to 220 kV and the lightning impulse voltage with wave shape 1,2/50 µs up to 500 kV.

8.2 Technical efficiencies

Power frequency voltage generator

Peak value of the power-frequency voltage: 220 kV

Generator forms a continuous power frequency voltage which is used to define a wet power frequency withstand voltage at insulators in accordance with standards IEC 61109, IEC 61952 and IEC 60383.
The same generator is used to define a reference voltage of surge arresters in accordance with IEC 60099-4 and IEC 61643. It is also used to measure a resistive component of the leakage current of surge arresters.

Lightning impulse voltage generator

Peak value of lightning impulse 1,2/50 µs: 500 kV
With this generator, a lightning impulse voltage can be generated to test the insulators in accordance with standards IEC 61109, IEC 61952 and IEC 60383 and to test surge arresters in accordance with standard IEC 60099-4.

Tokovni udarni generator
Maksimalna amplituda udarnega toka:
- 10/350 µs 50 kA
- 8/20 µs 50 kA
- 4/10 µs 100 kA
- 2 ms 1000 A

Oblike udarnih tokov
Standardne:
- 4/10 µs
- 8/20 µs
- 10/350 µs
- dolgega trajanja 1 ms
- dolgega trajanja 2 ms

Nestandardne:
- od 4/10 do 30/60 µs
- od 250 do 2000 µs

Generator uporabljamo za delovne preskuse v skladu s standardoma IEC 60099-4 in IEC 61643.

Lightning current impulse generator
Peak value of the lightning impulse current:
- *10/350 µs 50 kA*
- *8/20 µs 50 kA*
- *4/10 µs 100 kA*
- *2 ms 1000 A*

Current impulses generated
Standard:
- *4/10 µs*
- *8/20 µs*
- *10/350 µs*
- *long duration current 1 ms*
- *long duration current 2 ms*

Nonstandard:
- *from 4/10 µs to 30/60 µs*
- *from 250 µs to 2000 µs*

The generator is used for operating duty tests in accordance with standards IEC 60099-4 and IEC 61643.

8.3 Preskusni protokoli

NN odvodniki prenapetosti
Standard IEC 61643-1
- 7.5.2 Meritve preostale napetosti z impulznim tokom 8/20 µs
- 7.6 Delovni preskus
- 7.7.2 Preskus termične stabilnosti
- 7.9.8 Dielektrična vzdržnost

SN odvodniki prenapetosti
Standard IEC 60099-4
- 8.2 Preskus vzdržnosti izolacije
- 8.3 Preskusi preostale napetosti
- 8.4 Preskus s tokom dolgega trajanja
- 8.5 Delovni preskus
- 8.5.2 Preskus pospešenega staranja
- 9.1 Rutinski preizkus

Standard IEC 60099-5
- 6.3 Meritev ohmske komponente uhajavega toka

Natezni kompozitni izolatorji
Standard IEC 61109
- 6.1 Vzdržna atm. udarna napetost v suhem
- 6.2 Vzdržna izmenična napetost v mokrem
- 6.4 Mehanski preskusi

Podporni kompozitni izolatorji
Standard IEC 61952
- 7.2.2 Vzdržna atm. udarna napetost v suhem
- 7.2.3 Vzdržna izmenična napetost v mokrem
- 7.3 Mehanski preskusi

8.3 *Test protocols*

LV surge arresters
Standard IEC 61643-1
- *7.5.2 Measuring of the residual voltage with 8/20 µs current impulses*
- *7.6 Operating duty test*
- *7.7.2 Test of thermal stability of SPDs*
- *7.9.8 Dielectric withstand*

MV surge arresters
Standard IEC 60099-4
- *8.2 Insulation withstand test on the arrester housing*
- *8.3 Residual voltage tests*
- *8.4 Long-duration current impulse withstand test*
- *8.5 Operating duty test*
- *8.5.2 Accelerated ageing test*
- *9.1 Routine testing*

Standard IEC 60099-5
- *6.3 Measurement of the resistive leakage current*

Tension composite insulators
Standard IEC 61109
- *6.1 Dry lightning impulse withstand voltage test*
- *6.2 Wet power frequency voltage test*
- *6.4 Mechanical load-time tests*

Line post composite insulators
Standard IEC 61952
- *7.2.2 Dry lightning impulse withstand voltage test*
- *7.2.3 Wet power frequency voltage test*
- *7.3 Mechanical tests*

Beležke

Notes

IZOELEKTRO

Naziv podjetja	**IzoElektro d.o.o., proizvodnja in trgovina**	*Name of company*
Skrajšan naziv	**IzoElektro d.o.o.**	*Shortened name*
Datum registracije	**25. 01. 1999**	*Date of registration*
Pravnoorganizacijska oblika	**Družba z omejeno odgovornostjo / *Limited liability company***	*Legal form*
Matična številka	**1366009**	*Registration number*
Davčna številka	**SI 56506635**	*VAT number*
Tekoči račun	**SI56 0451 5000 0204 790 Nova KBM d.d., Maribor**	*IBAN*
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ISO 9001 Q-262

ISO 14001 E-238

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