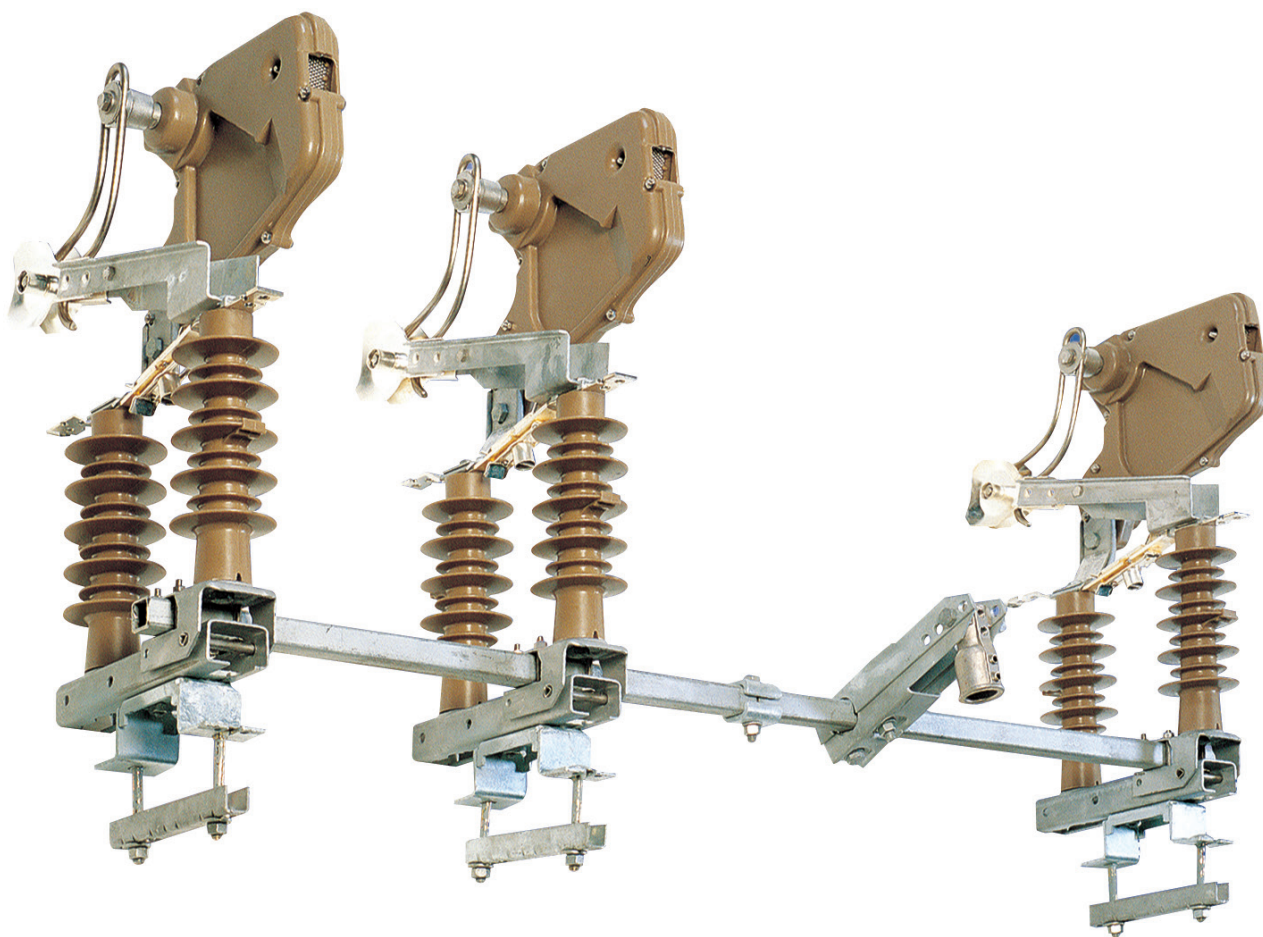

TECHNOLOGY REVIEW

NPS

Modular outdoor switch-disconnectors



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Introduction

The NPS design is based on many years of experience with installations around the world. With the NPS, ABB delivers reliable operation in all climatic conditions and configurations. In addition, the NPS can be either manually or remotely controlled, with the option of incorporation into automated networks as a sectionalizer. Thanks to its modular construction and important design features, the NPS is a key component in creating future smart grids.

NPS

- Current breaking solutions from 25 A – 630 A
- Manual or remote motor controlled configurations available
- Capability to install additional pole equipment for different distribution network needs

Features

- Mechanically stable structure to suit different climatic conditions
- Flexible mounting and installation options
- Modular NPS design minimizes on site assembly and installation time
- Wide range of breaking current parameters
- Compact packaging reduces transportation and storage costs
- Insulators available in porcelain, epoxy and silicon
- Special metal surface treatment – durable and resistant to high corrosion environments
- No oil used in breaking chambers – environmental protection and reduced maintenance
- Designed to be fitted with a wide range of optional modular accessories:
 - Earthing switches from both sides of main switch
 - Separate earthing switch solutions
 - Current transformers and surge arresters on same supporting structure

- 01 Wide range of operating mechanisms
- 02 Remote controlled NPS
- 03 Remote controlled NPS
- 04 Various breaking current solutions
- 05 Pole mounted transformer substations

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03—
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Technology review

NPS technology

The modular NPS design allows for a wide range of accessories for various applications for outdoor air-insulated switches. The NPS can be expanded and adapted to changing distribution network needs, even after installation.

— 01 Wide range of various equipment (third insulator, fuse bases, earthing switch from the rocking side, fuse base integrated with NPS, UEKE3A1 & UEKE3B1 – manual operating mechanism

— 02 Various types of insulators

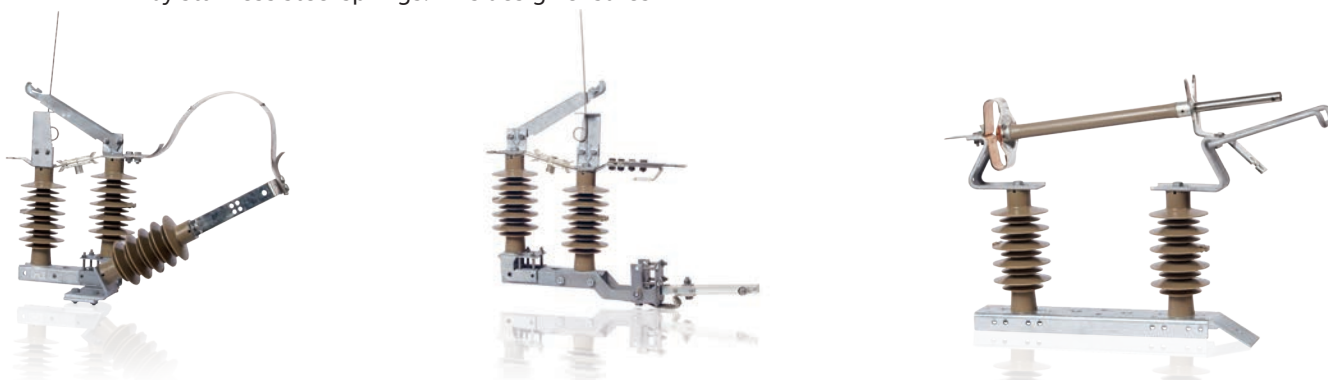
The NPS offers three types of insulators – porcelain, epoxy and silicone.

The epoxy and silicon insulators provide reduced weight, resistance to mechanical shock and good performance in heavy polluted areas. In order to heavily polluted achieve high creepage performance, the NPS offers a wide range of insulators. The NPS is provided with breaking whips as standard. If higher interrupting ratings are required, breaking chambers are provided.

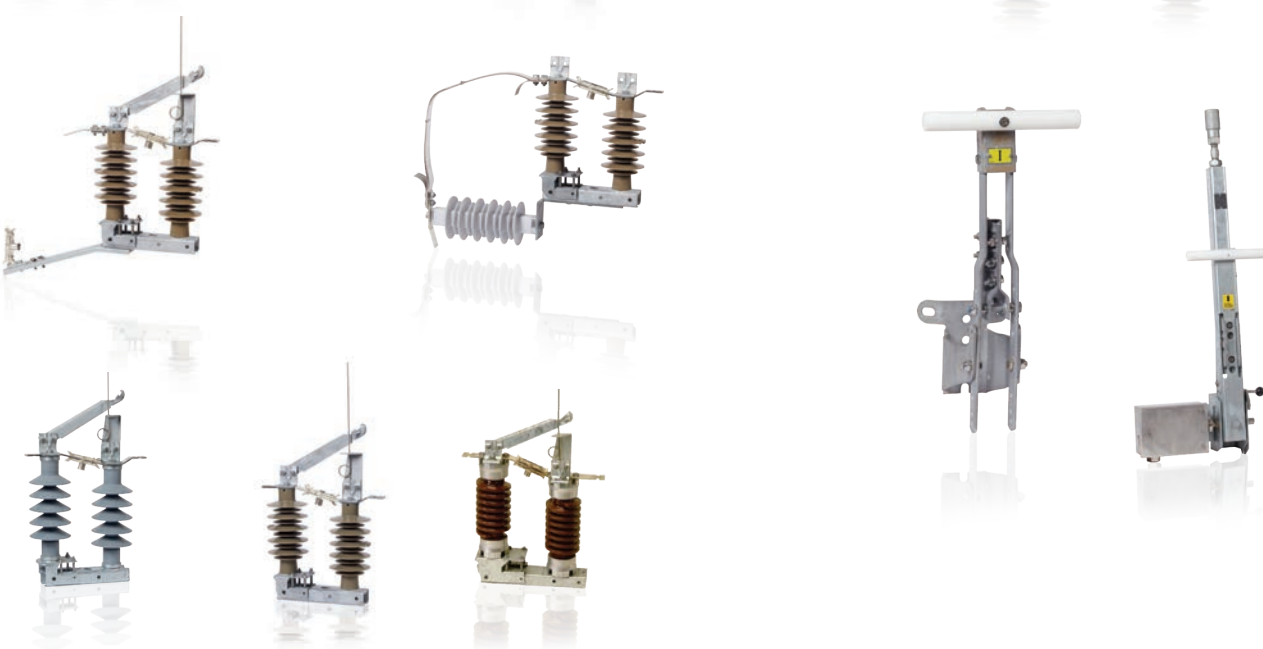
The main current carrying path is electrolytic copper, silver plated to ensure a suitably low level of contact resistance. The design of the main contacts consists of copper contact tips fixed by stainless steel springs. This design ensures

self positioning of the main contacts in the closed position. In addition, this design requires a lower amount of force for closing and opening the disconnecter. The short circuit withstand of the NPS is increased as a result of the effect of electrodynamic forces during short circuit current flow through the main current path. In addition, the tips may be reversed by 180° which extends the life of the contacts. This is a simple operation using ordinary pliers.

— 01



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01 Different rated
current breaking
versions

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02 Stainless or hot dip
zinc galvanized for high
anti-corrosion resistance

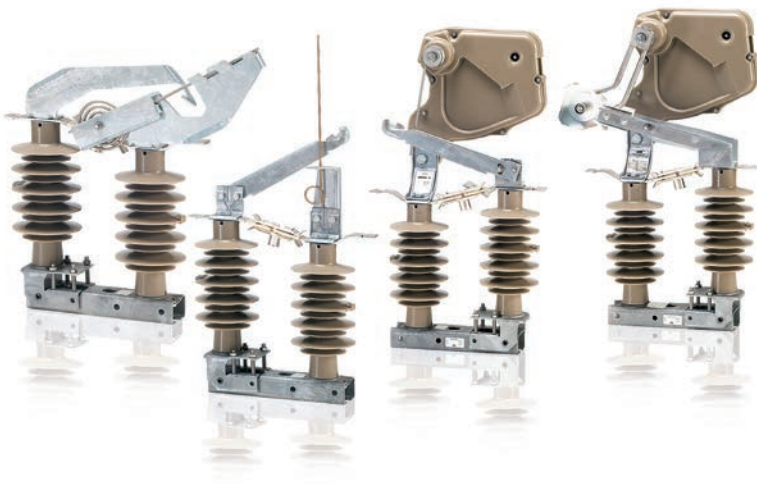
All steel components are hot dip galvanized according ISO1461 which provides a high level of corrosion resistance. All copper components are silver-plated with the exception of terminals, which are coated with tin to allow line terminals, aluminium and copper, to be connected to the NPS without degrading their performance. Flexible copper parts of the NPS are coated with tin, aluminium components are made of special aluminium alloy to ensure high resistance to extreme ambient conditions. For special customer requirements, acetal resin insulators are available for disconnectors rated up to 24 kV, or composite insulators for up to 36 kV used in connection rods between the operating mechanism and switch. All standardized fasteners are hot dip galvanized or stainless steel. This allows the NPS switch disconnector to provide long-term operation even in the harshest environments

Breaking chambers

There are four different rated current breaking versions used in the NPS. Using one of the four types of chambers it is possible to achieve significant values of breaking rated currents:

- Standard flexible breaking whips (NPAB1) for switching-off small currents (up to 25 A for 24 kV),
- Special (NPAK1) breaking whips for switching off higher currents (up to 50 A at 24 kV),
- Air type breaking chamber (NPAK4) with breaking capacity up to 250 A (24 kV),
- Air type breaking chamber (NPAK5) with breaking capacity up to 630 A (24 kV).

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01 Motor
operating mechanism
—
02 Motor operating
mechanism with REC615

Control cabinets

The NPS control cabinets are designed for remote control and local automation applications of NPS switch disconnectors and other similar types with up/down operating movement. Together with the ABB ARC600 or REC 615 monitoring and control units both simple applications such as remote open/close operations and more sophisticated auto sectionalizing schemes and measurements can be realized.

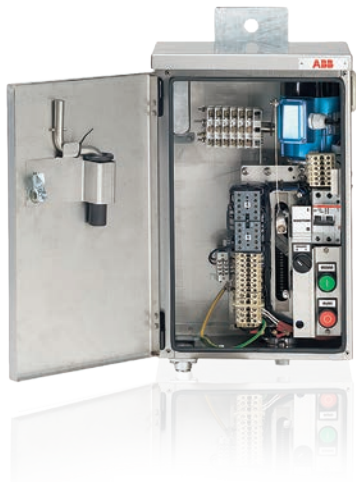
Basic function of ARC:

1. Controls: 1 or 3 (ARC600) drives
2. GPRS communication
3. Module of battery charging with temperature compensation, deep discharge protection, battery monitoring and testing
4. Motor overload protection

Basic functions of REC615:

1. Control: max five disconnector drives
2. Smart grid enabled IED supporting remote communication protocols
3. Comprehensive overcurrent and earth-fault protection
4. Frequency and voltage protection
5. Measurements including power quality
6. Rapid set-up and commissioning – standard configurations
7. Designed for IEC 61850
 - Supports binary and analog GOOSE messaging
8. Support for sensors
9. Single Line Diagram (SLD) in the HMI
10. An optional second fibre-optic or galvanic port on the communication module enables the creation of a self-healing Ethernet ring
11. Designed for remote control supporting:
 - IEC 60870-5-104
 - IEC 60870-5-101
 - Modbus®
 - DNP3

01



02



- 01 Control cabinet with ARC600
- 02 Control cabinet with REC615
- 03 Control unit ARC600 with GPRS communications
- 04 REC615 control unit

Control cabinets can also be used without the integrated motor mechanism. These can be used in applications such as master terminal for monitoring and controlling existing motor devices for indoor and outdoor switch disconnectors and other motor operated apparatus. It is also applicable for switching devices with an integrated actuator.

Control cabinet features:

- The product range includes master and slave units,
- Can be equipped with third party electronics/IED,
- Two different cabinet sizes,
- Terminals for installing different IED's.
- Cabinets available with different options for

- batteries, battery chargers etc.,
- Up/down tube operation of disconnectors,
- Stainless steel cabinet and mechanism,
- Dust tight (IP55) to ensure long lifetime of critical electrical components,
- High torque, choice of 1.2 sec or 3 sec operating time.
- Optimum materials used,
- Over 30 years experience,
- Operating voltages: 24, 48, 110, 220 VDC 110, 230 V AC.

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04



Technology review

Benefits

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01 Modular design and high quality materials makes it safe and easy during the installation

NPS can operate in all climatic conditions, and can be installed in a variety of different positions, with either manual or remote control.

Disconnectors equipped with electric drives can be used in system automation solutions for distribution networks using the remote control or auto-closing functions. In this case, in addition to the motor operating mechanism the NPS will also be equipped with the latest automation systems. So in this application, the NPS switch disconnectors will become an integral part of the development of Smart Grids.

Benefits

- Modular design:
- Allows for easy for installation reducing significantly reducing site time and costs and improving safety,
- Reduced transportation and storage size reduces associated costs,
- Easily upgradeable,
- Simple changing of current breaking devices, pole distances and manual to motor drive,

- Easy to accommodate various overhead line connections and operations – third insulator version, rocking terminals,
- Extended life cycle – reversible main current path parts,
- Capability to offer specific solutions/functions to suit local installation needs – both side earthing switches, current limiting fuses, surge arresters, instrument transformers.
- High quality materials and coating surface:
- Increased performance over the life of the switch,
- Terminals can be connected to both aluminium and copper lines without degradation in performance.
- Feeder Automation Solutions:
- Can be applied to remote control applications – optimizing overhead network,
- Can be applied to auto-reclosing applications – sectionalizer function,
- Failure detection and localization support functions,
- Communication with local Scada systems.

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01



Technology review

Examples of pole installation

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01 One pole horizontal
installation (wooden pole)

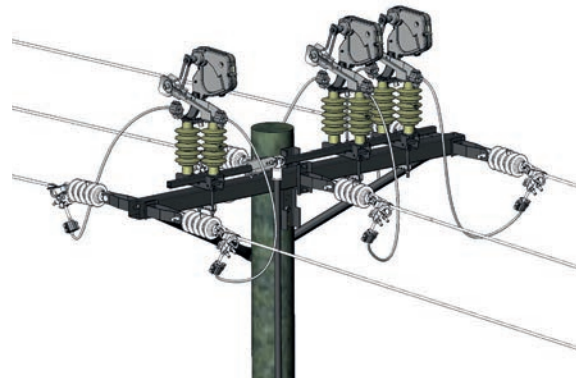
—
02 One pole horizontal
installation (concrete
rectangular pole)

—
03 One pole horizon-
tal installation steel
pole structure

—
04 One pole vertical
installation (con-
crete circular pole)

—
05 Two pole horizontal
installation (wooden
pole)

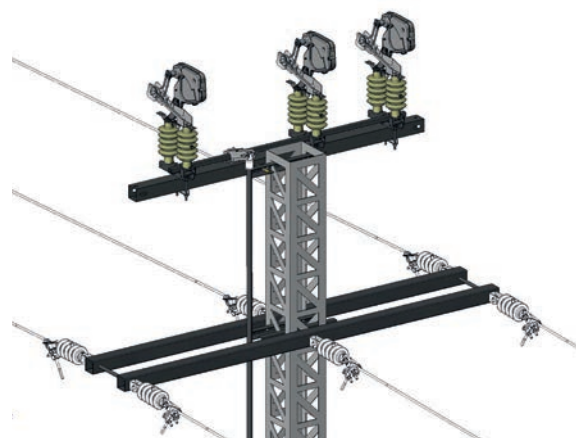
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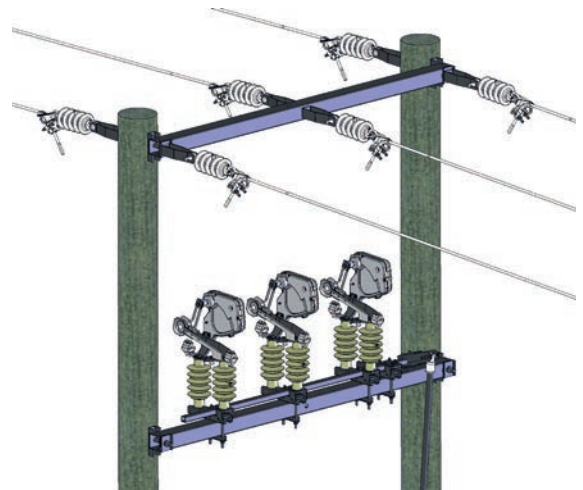
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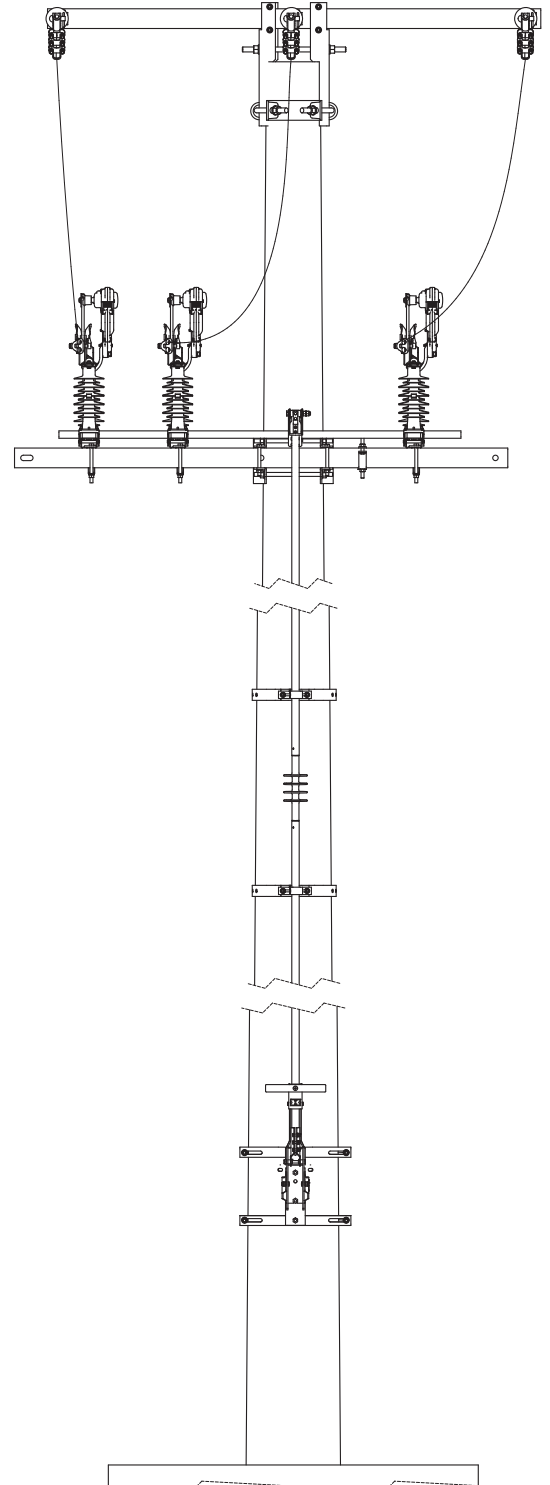
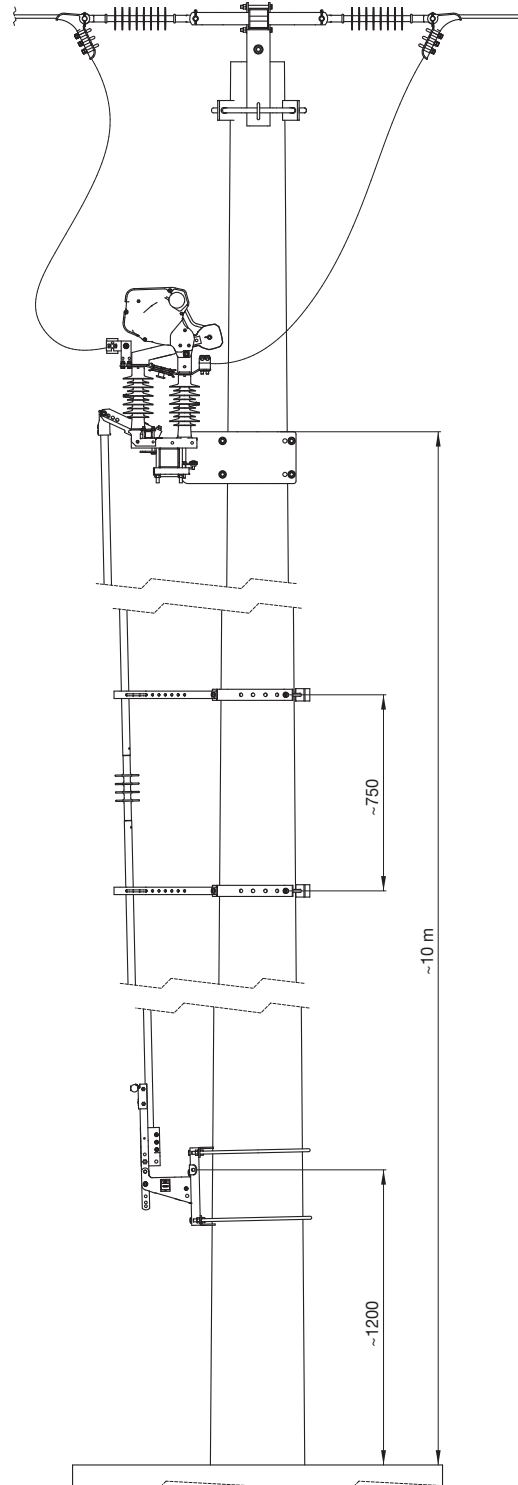


Technology review

Examples of pole installation

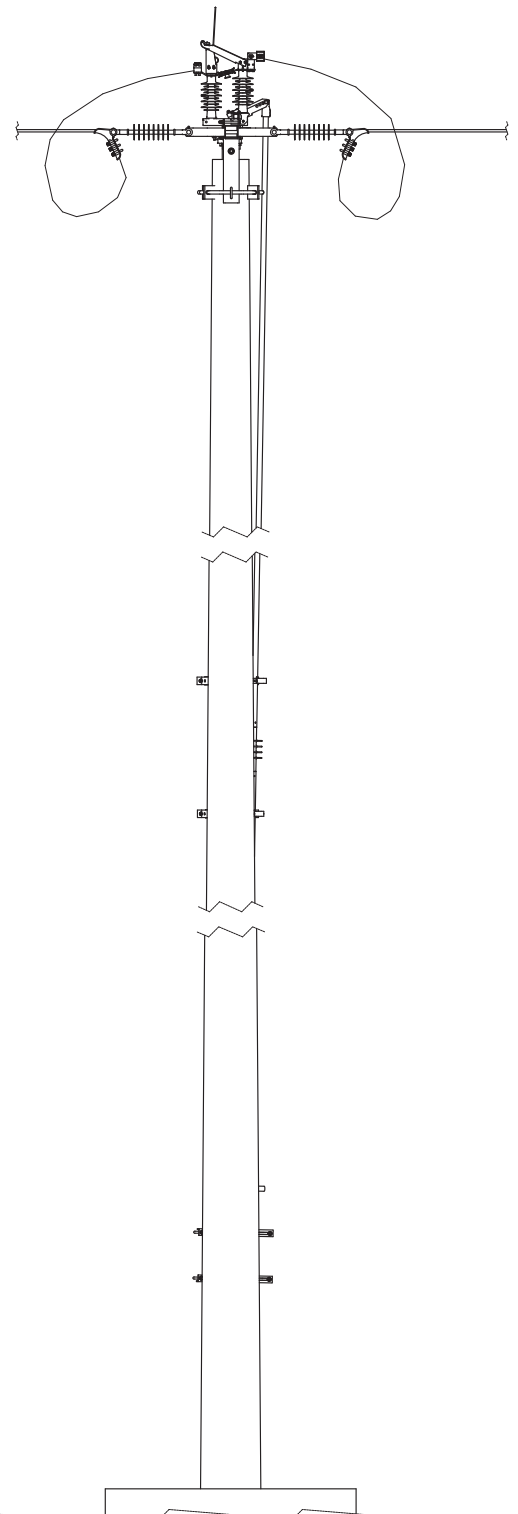
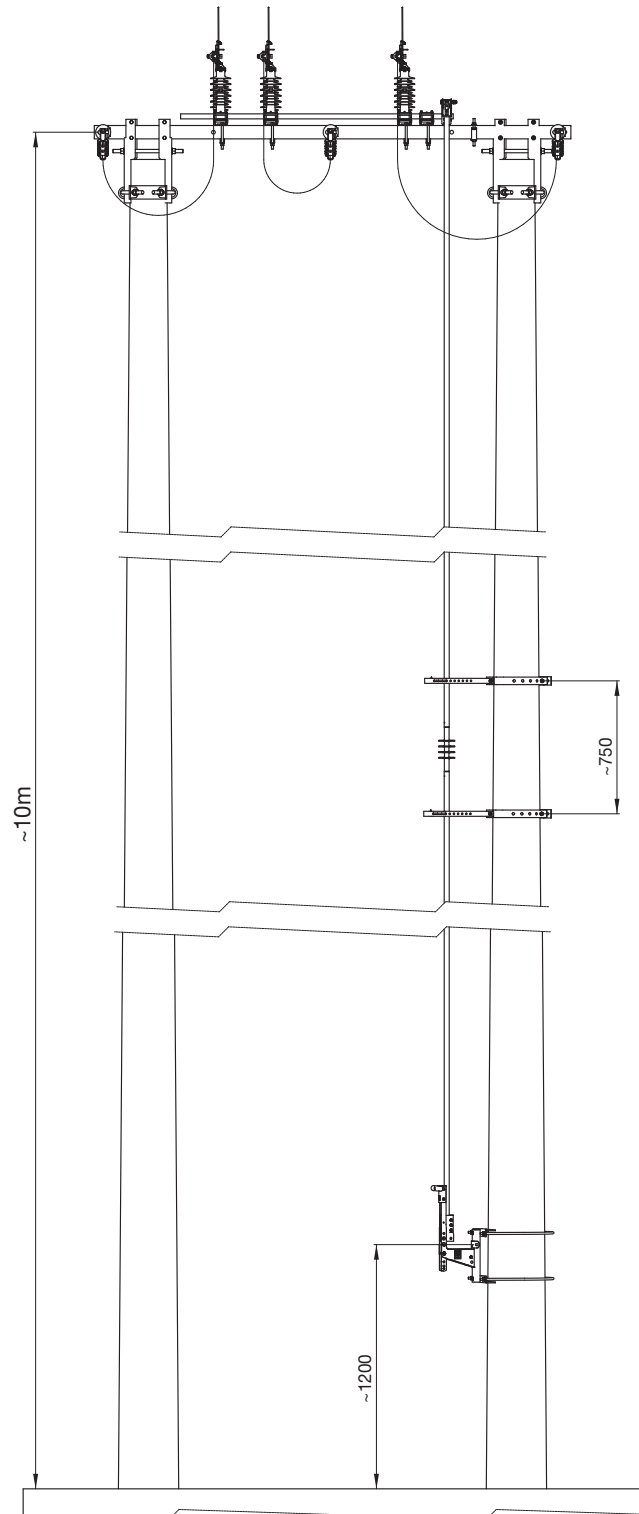
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01 Single pole
installation below
the line with manual
drive, horizontal
installation.

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01



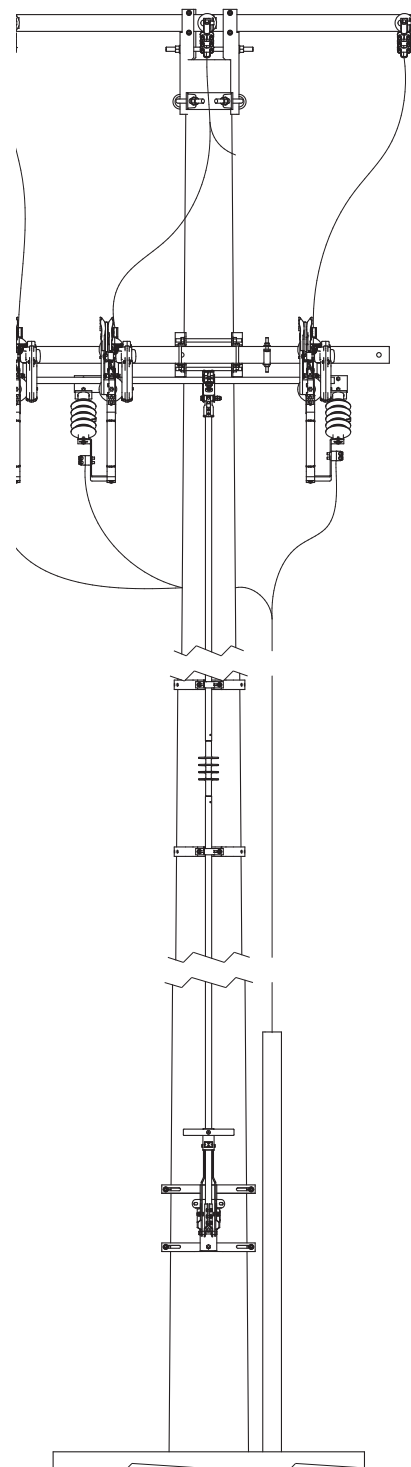
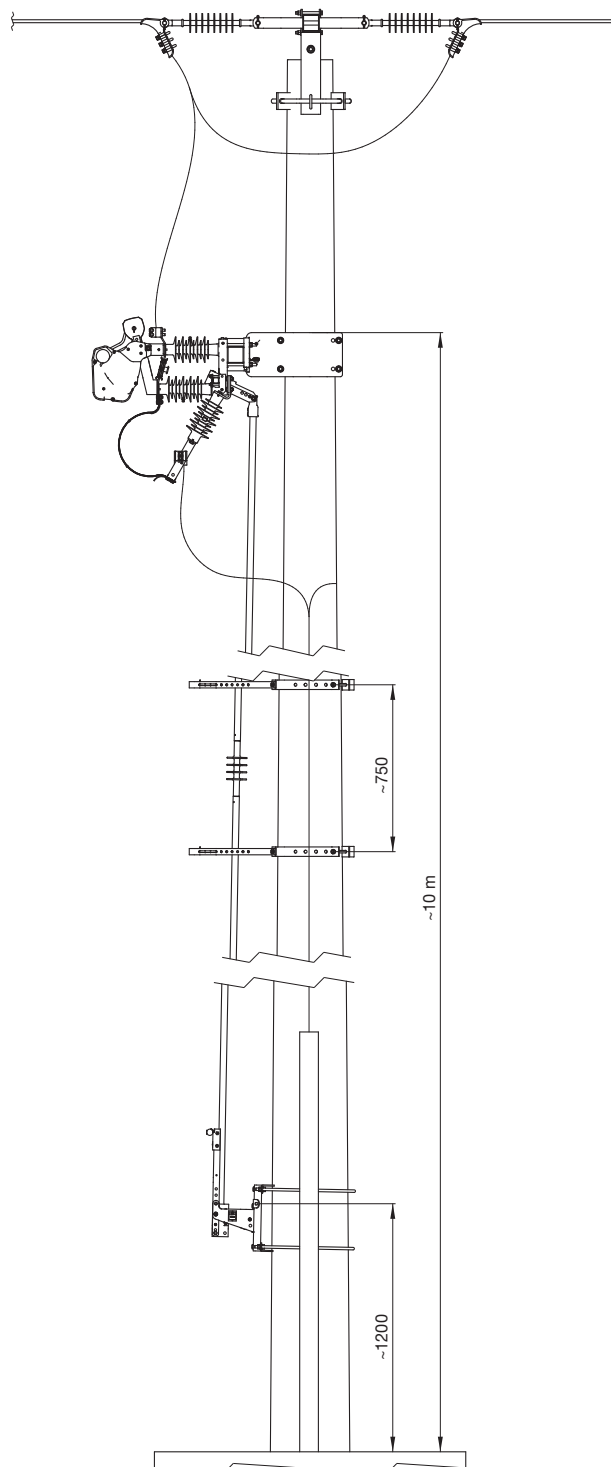
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02 Double pole
installation in
line with manual
drive, horizontal
installation.

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02



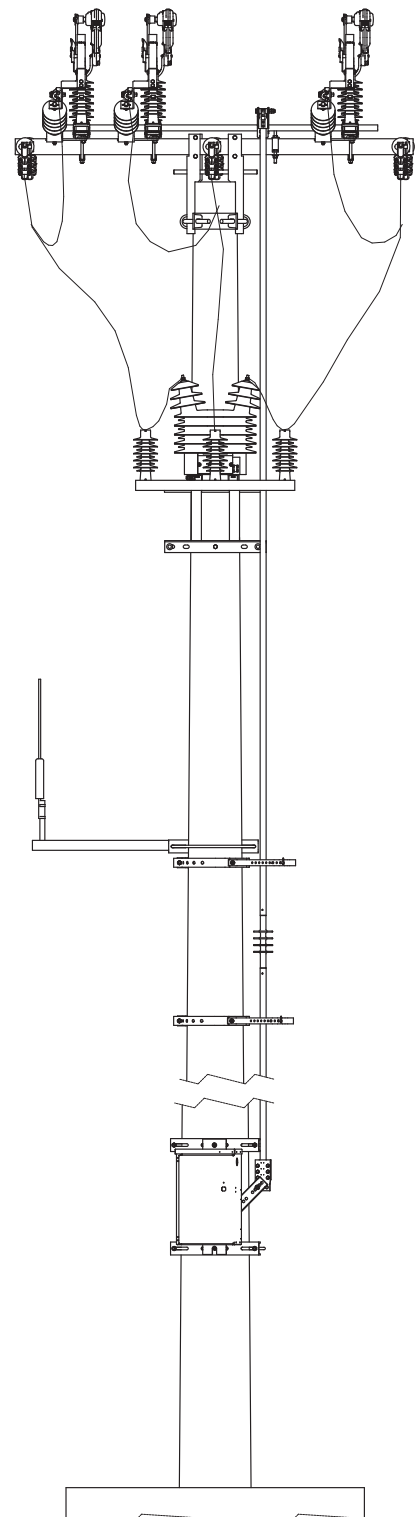
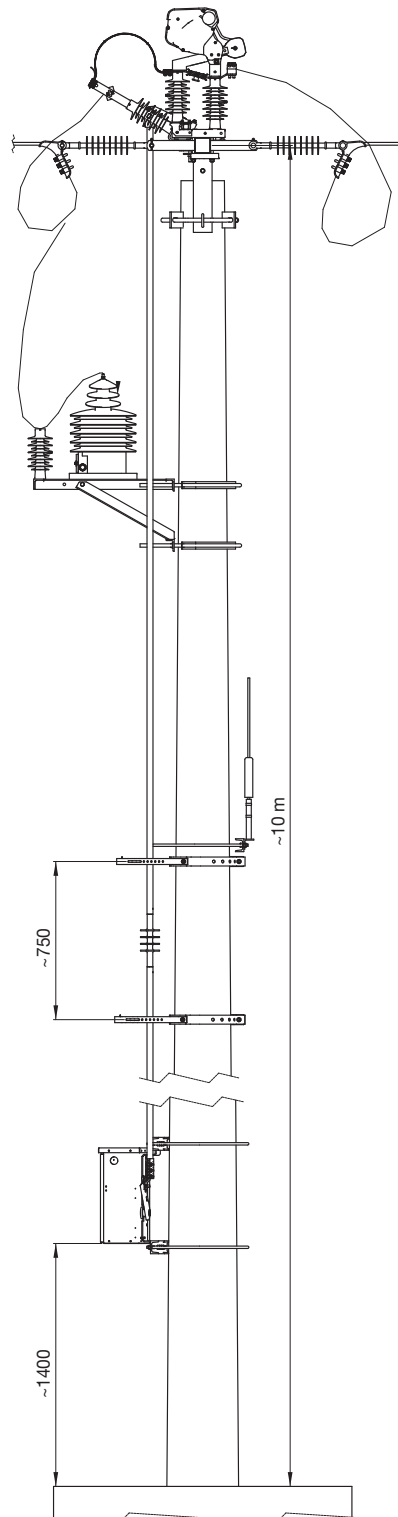
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01 Single pole
installation below
the line with manual
drive, vertical
installation.

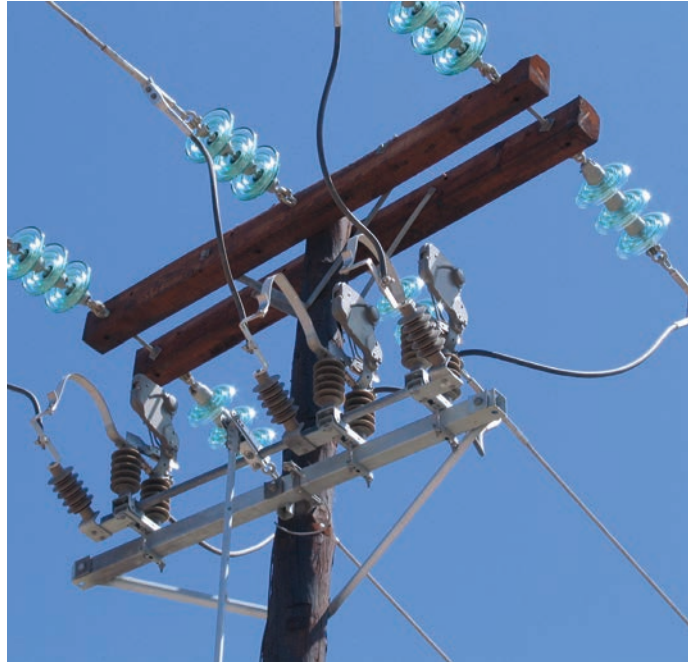
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02 Single pole instal-
lation in line with
electrical drive and
remote control, hor-
izontal installation.

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02





Technology review

Basic installation guidance

—
01 Horizontal installation – main current path in horizontal position

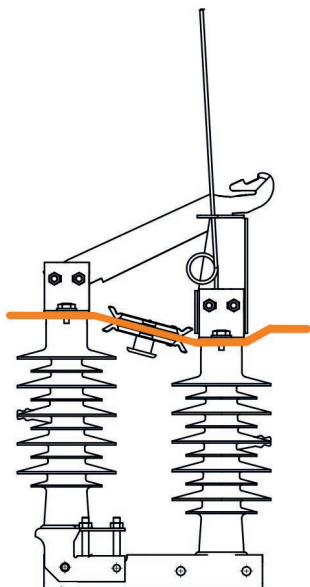
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02 Vertical installation – main current path in vertical position

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03 The correct way to install the switch with chamber NPAK4 or NPAK5 – horizontal installation

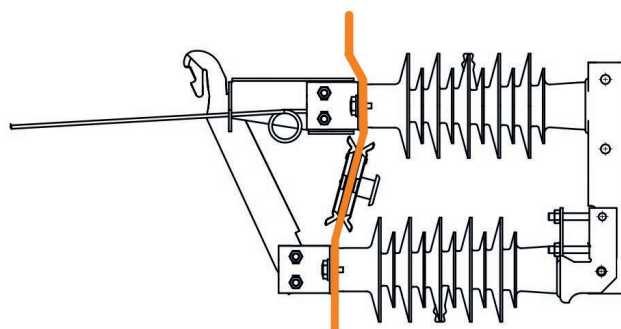
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04 The correct way to install the switch with chamber NPAK4 or NPAK5 – vertical installation

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05 The incorrect way to install the switch with chamber NPAK4 or NPAK5

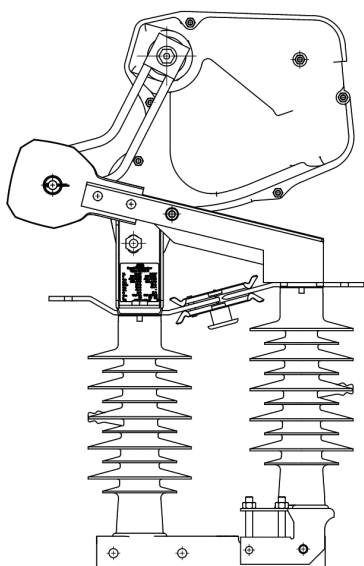
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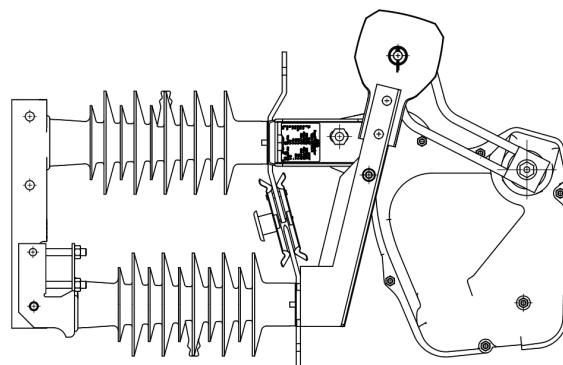
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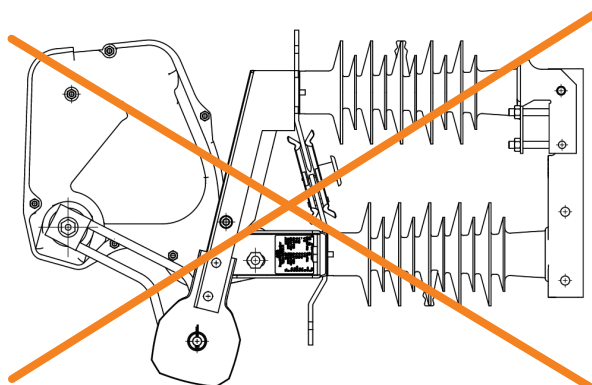
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Technology review

Site installation and packing

— 01 NPS site installation

— 02 NPS switch's modules packed in one carton box

— 03 18 NPS disconnecter sets on one pallet

— 04 8 NPS switch disconnector sets on one pallet

— 05 NPS 24kV standard modules packing. Separate package for oversized parts – up to 30 sets on one pallet (crossarm, shaft, rods)

All standard ordered NPS switches will be delivered in modules. Assembly of modules in one complete apparatus is customer responsibility. This job could be easily done during site installation. Usually it is two man job on lift platform, crank is not required.

Depending on the equipment, on one EURO pallet up to 18 NPS 24 kV could be delivered. Separate package for oversized cross-arms, shafts and rods. For special demand, NPS switch could be preassembled on the cross-arm. Please contact factory for details

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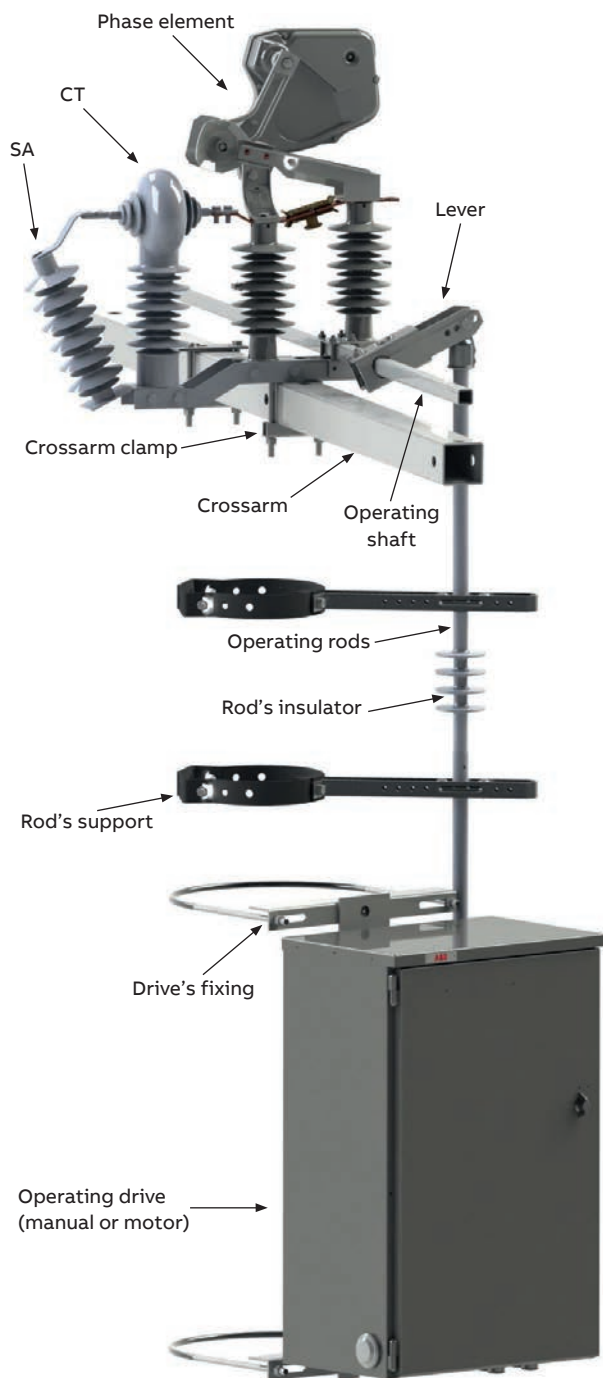


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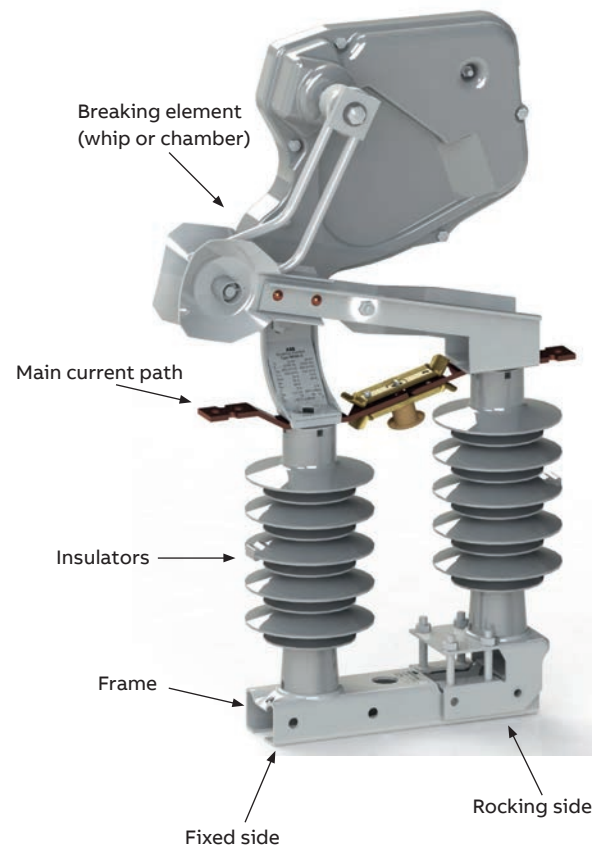


Technology review

Main components



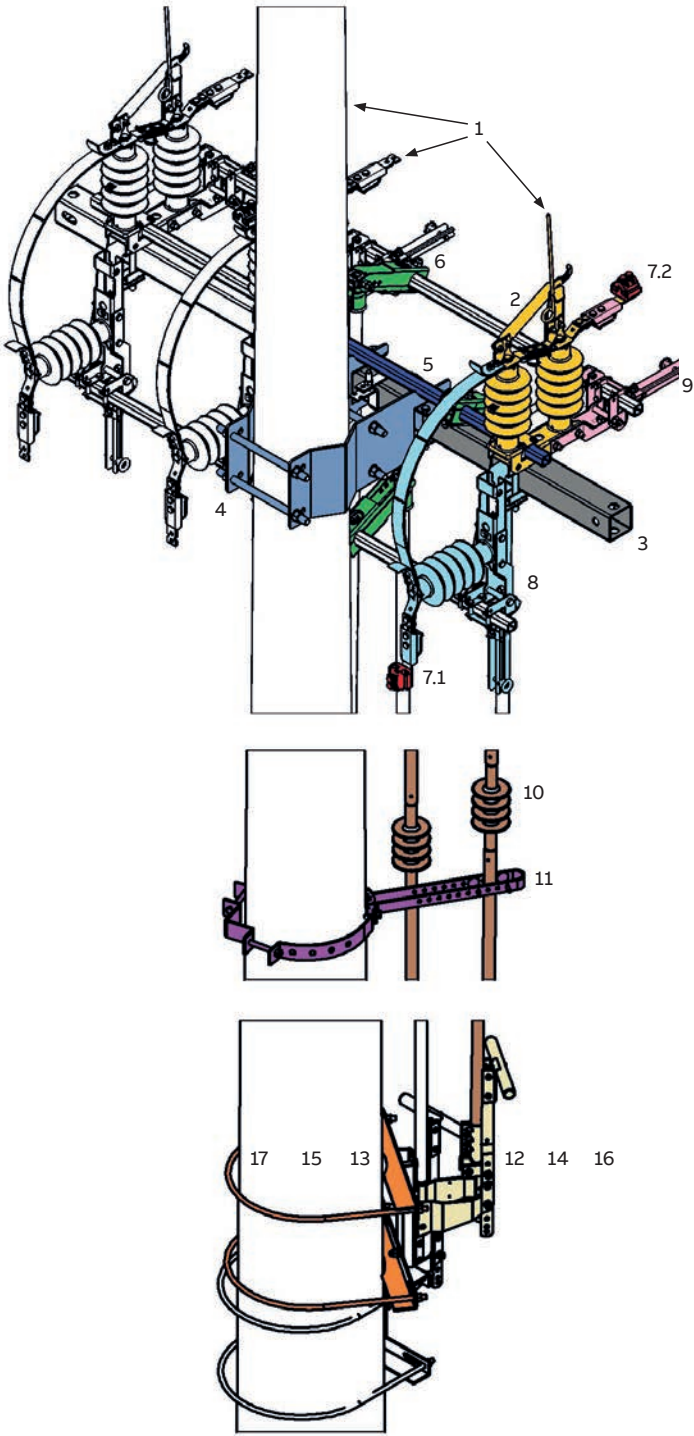
Phase element's components:



Ordering guide

Ordering code's visualization

Field description	Selection code field no:	Your selection:
Number of phases	1	
Type of phase elements:	2	
Crossarm and phase element fixing equipment:	3	
Crossarm fixing to the pole/ poles equipment:	4	
Main shaft length:	5	
Operating Lever type:	6	
Line clamps:	7	
Rocking side equipment:	8	
Fixed side equipment:	9	
Type of rods and rod's insulator:	10	
Rods supports:	11	
Operating device for switch:	12	
Switch operating device's fixing:	13	
Operating device for earthing switch from the fixed side:	14	
Earthing switch operating device's fixing – fixed side:	15	
Operating device for earthing switch from the rocking side:	16	
Earthing switch operating device's fixing – rocking side:	16	



Ordering code's fast selection table

Few pages later you will find detailed description of each functionality together with drawings.

Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Your selection:																	
1. Number of phases:	1																1 phase
	2																2 phase
	3																3 phase
		B1	24kV, off-load disconnecter, epoxy insulators, 755 mm creepage; type NPS24B1-WWJ2														
	B2	24kV, 25A on-load disconnecter, epoxy insulators, 755 mm creepage; type NPS24B1-J2															
	B3	24kV, 50A on-load disconnecter, epoxy insulators, 755 mm creepage; type NPS24B1-K1J2															
	B4	24kV, 250A on-load disconnecter, epoxy insulators, 755 mm creepage; type NPS24B1-K4J2															
	B5	24kV, 630A on-load disconnecter, epoxy insulators, 755 mm creepage; type NPS24B1-K5J2															
	A1	24kV, off-load disconnecter, porcelain insulators, 620 mm creepage; type NPS24A2-J2															
	A2	24kV, 25A on-load disconnecter, porcelain insulators, 620 mm creepage; type NPS24A2-J2 +NPAB1															
	A4	24kV, 250A on-load disconnecter, porcelain insulators, 620 mm creepage; NPS24A2-K4J2															
	A5	24kV, 630A on-load disconnecter, porcelain insulators, 620 mm creepage; NPS24A2-K5J2															
	C1	24kV, off-load disconnecter, silicon insulators, 760 mm creepage; type NPS24A2-J3															
	C2	24kV, 25A on-load disconnecter, silicon insulators, 760 mm creepage; type NPS24A2-J3 +NPAB1															
	C3	24kV, 50A on-load disconnecter, silicon insulators, 760 mm creepage; type NPS24A2-K1J3															
	C5	24kV, 630A on-load disconnecter, silicon insulators, 760 mm creepage; type NPS24A2-K5J3															
	D1	36kV, off-load disconnecter, porcelain insulators, 900 mm creepage; type NPS36A1															
	D2	36kV, 16A on-load disconnecter, porcelain insulators, 900 mm creepage; type NPS36A2															
	E1	36kV, off-load disconnecter, silicon insulators, 1205 mm creepage; type NPS36A1-J2															
	E2	36kV, 16A on-load disconnecter, silicon insulators, 1205 mm creepage; type NPS36A2-J2															
	F1	36kV, off-load disconnecter, silicon insulators, 1365 mm creepage; NPS36A1-J3															
	F2	36kV, 16A on-load disconnecter, silicon insulators, 1365 mm creepage; NPS36A2-J3															
	G1	24kV, off-load disconnecter, HCEP insulators, 755 mm creepage; type NPS24B1-WWJ2H															
	G2	24kV, 25A on-load disconnecter, HCEP insulators, 755 mm creepage; type NPS24B1-J2H															
	G3	24kV, 50A on-load disconnecter, HCEP insulators, 755 mm creepage; type NPS24B1-K1J2H															
	G4	24kV, 250A on-load disconnecter, HCEP insulators, 755 mm creepage; type NPS24B1-K4J2H															
	G5	24kV, 630A on-load disconnecter, HCEP insulators, 755 mm creepage; type NPS24B1-K5J2H															
2. Type of phase elements:		-	without crossarm and phase element fixing														
		A	set of 2 m standard crossarm for 24 kV switch														
		B	set of 2 m crossarm wooden pole for 24 kV switch														
		C	set of 2,85 m crossarm for 36 kV switch														
3. Crossarm and phase element fixing equipment:		K	only phase element fixing max 100x100 mm quantity suitable of number of phases														
		L	only phase element fixing max 130x100 mm quantity suitable of number of phases														
		-	without fixing – single pole														
		=	without fixing – double pole														
4. Crossarm fixing to the pole/poles equipment:		A	single circular concrete pole up to fi300 mm; type NPAZM31														
		C	single square concrete pole 290x290; type NPAZM38														
		D	lattice tower with crossarm 2 m; type NPAM19														
		E	lattice tower with crossarm 2,85 m; type NPAM19/E2														
		F	single wooden pole; type OJUPZK9														
		G	single circular concrete pole -top mounting; type NPAZM40														
		M	double circular concrete poles up to fi300 mm; type 2 x NPAZM31														
		O	double square concrete poles 290x290; type 2 x NPAZM38														
		P	between 2 wooden poles; type OJUPZK8/2														
		R	double circular concrete pole -top mounting														
Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Your selection:																	

Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Your selection:																	
5. Main shaft length:					-												without shaft
					1												1630 mm shaft,
					2												600 mm shaft
					3												2000 mm shaft
					5												1830 mm shaft
					6												2320 mm shaft
6. Operating Lever type:					-												without lever
					A												fast installation lever; type NPAZL2
					B												standard lever; type NPAZL2/E1
					C												fast installation lever; type NPAZL1
					D												hook stick drive;type UEKE5A; you don't need rods
					E												Lever for rotary mechanism; type NPAZL43
7. Line clamps:																	clamps rocking side:
					0_												without clamps
					1_												aluminium wire cross-section 2 x 16-70 mm2; type OJU-ZLL3
					2_												aluminium wire cross-section 2 x 16-120 mm2; type OJU-ZLL2
					3_												aluminium wire cross-section 2 x 50-240 mm2; type OJU-ZLL4
					4_												copper wire cross-section 1 x 16-120 mm2; type OJU-ZLL1
																	clamps fixed side:
					_0												without clamps
					_1												aluminium wire cross-section 2 x 16-70 mm2; type OJU-ZLL3
					_2												aluminium wire cross-section 2 x 16-120 mm2; type OJU-ZLL2
					_3												aluminium wire cross-section 2 x 50-240 mm2; type OJU-ZLL4
					_4												copper wire cross-section 1 x 16-120 mm2; type OJU-ZLL1
8. Rocking side equipment:									-								without accessories
									A								automatic earthing switch
									B								automatic earthing switch with self aligning terminal
									C								automatic earthing switch with third insulator
									D								automatic earthing switch with distribution transformer's connection max100 A
									E								3- position switch with earthing; NPAE7
									F								3- position switch with earthing with self aligning terminal
									G								3- position switch with earthing with third insulator
									H								independent earthing switch from rocking side
									I								third insulator for cable connection 630 A; type NPAC7
									J								Set for Surge Arrester in place of third insulator NPAC7
									K								distribution transformer's connection max 100 A; type NPAC5
									L								self-aligning terminal standard; type OJUPZL9
									M								self-aligning terminal for direct connection of copper wires; type OJUPZL9ag
									N								standard third insulator
									O								set for current transformer
									P								set for current transformer and surge arrester
9. Fixed side equipment:									-								without accessories
									A								independent earthing switch from fixed side
									B								third insulator for cable connection; type NPAC7
									C								Set for Surge Arrester in place of third insulator NPAC7
									D								Set for surge arrester mounting; type NPAP5
									E								set for current transformer
									F								set fo current transformer and surge arrester
									G								Fuse base; type NPAF7
								H								Connection of insulated cable, dropping bar set; type NPAC2	
Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Your selection:																	

Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Your selection:																		
10. Type of rods and rod's insulator:										-__	without rods							
										A__	1x3 m, installation height approximately 4,5 m							
										B__	1x4 m, installation height approximately 5,5 m							
										C__	2x3 m, installation height approximately 7,5 m							
										D__	2x4 m, installation height approximately 9,5 m							
										E__	3x3 m, installation height approximately 10,5 m							
										F__	2x4 m +3 m, installation height approximately 12,5 m							
										G__	3x4 m, installation height approximately 13,5 m							
										rod's insulator or rod connector:								
										-_-	without rod's insulator, only metal connection							
										1	standard rod's insulator, suitable for all types; NPSZJ30							
										quantity of sets:								
										__0	0 sets							
										__1	1 set, only switch disconnecter							
										__2	2 sets, switch disconnecter + earthing switch							
									__3	3 sets, switch disconnecter + 2 earthing switches								
									__4	4 sets								
									__5	5 sets								
11. Rods supports:										without rod supports				-_				
										for wooden pole NPAZL9				A_				
										for circular or rectangular concrete pole NPAZL19/E3				E_				
										NPAM20/E1				F_				
	X quantity of rod support (recommended 1 rod support for 1 rod)													_XX				
12. Operating device for switch:										without operating device				-				
										standard two-hand manual operating device; type UEKE3A1				1				
										two-hand manual operating device with fast rod's adjustment; type UEKE3B1				2				
										two-hand manual operating device with 6NO/NC auxiliary switch UEKE2/1				3				
										rotary manual operating device: type UEKE7A1				4				
									motor operating device; type UEMC50- please specify separately, refer to UEMC50 catalogue				5					
13. Switch operating device's fixing:										without fixing				-				
										for manual drive, circular concrete pole (up to fi 400 mm)				A				
										for manual drive, circular concrete pole (fi 400-550 mm)				B				
										for manual drive, square pole max 300x300				C				
										for manual drive, square pole max 680x670				D				
										for manual drive, lattice tower; type NPAM21/E2				E				
										for UEMC50 circular concrete pole (up to fi 400 mm)				M				
										for UEMC50 circular concrete pole (fi 400-550 mm)				N				
										for UEMC50 square concrete pole 300x300				O				
										for UEMC50 square concrete pole 680x500				P				
									for UEMC50, lattice tower; type NPAM21/E1				R					
14. Operating device for earthing switch from the fixed side:										wooden pole fixing				Q				
										without operating device				-				
										standard two-hand manual operating device; type UEKE3A1				1				
										two-hand manual operating device with fast rod's adjustment; type UEKE3B1				2				
										two-hand manual operating device with 6NO/NC auxiliary switch UEKE2/1				3				
15. Earthing switch operating device's fixing - fixed side:										without fixing				-				
										for manual drive, circular concrete pole (up to fi 400 mm)				A				
										for manual drive, circular concrete pole (fi 400-550 mm)				B				
										for manual drive, square pole max 300x300				C				
										for manual drive, square pole max 680x670				D				
										for manual drive, lattice tower; type NPAM21/E2				E				
									wooden pole fixing				Q					
Your selection:																		
Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	

Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Your selection:																			
16. Operating device for earthing switch from the rocking side:											without operating device				-				
											standard two-hand manual operating device; type UEKE3A1				1				
											two-hand manual operating device with fast rod's adjustment; type UEKE3B1				2				
											two-hand manual operating device with 6NO/NC auxiliary switch UEKE2/1				3				
															without fixing				-
											for manual drive, circular concrete pole (up to fi 400 mm)				A				
											for manual drive, circular concrete pole (fi 400-550 mm)				B				
17. Earthing switch operating device's fixing - rocking side:											for manual drive, square pole max 300x300				C				
											for manual drive, square pole max 680x670				D				
											for manual drive, lattice tower; type NPAM21/E2				E				
															wooden pole fixing				Q
Field no:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Your selection:																			

Ordering guide

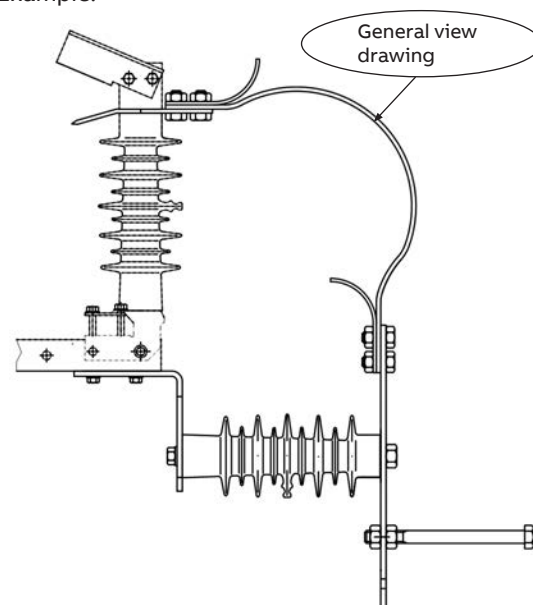
Ordering code's help

Below you will find detailed description of possible selections in every field of ordering code.

General rules:

- Aim of 17 fields ordering code is to configure complete switch,
- Ordering numbers are for ordering loose equipment or spare parts,
- For each field you can select only one alternative,
- Some alternatives could be selected only if particular conditions are met,
- In order to not complicate this document, not all exclusions between fields are described. Please ask your local ABB representative for interactive configurator, where all exclusions/interlocks between fields are implemented,
- Configure your switch field by field, always starting from the first field. Especially using interactive configurator, where after selecting option in field X, in subsequent fields infeasible options are hidden.

Example:



Flexible dropper set alternative 'I' in field 8 could be selected only for 24 kV switches with epoxy, porcelain or silicon insulators. (field no 2, selections 'A', 'B', 'C')

Flexible dropper set.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A_																
B_							I									

Below each alternative, ordering numbers of particular equipment could be found. For ordering complete switch please use ordering code.

These ordering numbers are useful in case spare parts are needed or existing installation have to be upgraded. These numbers are always related to single phase (for 3-phase switch you have to order 3x...).

Short description	Type designation	Single phase ordering number
Description	Type	Ordering number
Flexible dropper set with epoxy insulator 24 kV	NPAC7 + NPSZJ21	1YMNNPAC70M1001
Flexible dropper set with porcelain insulator 24 kV	NPAC7 + NPSZJ2	1YMNNPAC70M2001
Flexible dropper set with silicon insulator 24 kV	NPAC7 + NPSZJ31	1YMNNPAC70M3001

Ordering guide

Detailed description of ordering code

Field 1. Number of phases

Select number of switch's phases:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1																Single phase switch
2																Two phase switch ganged operated
3																Three phase switch ganged operated

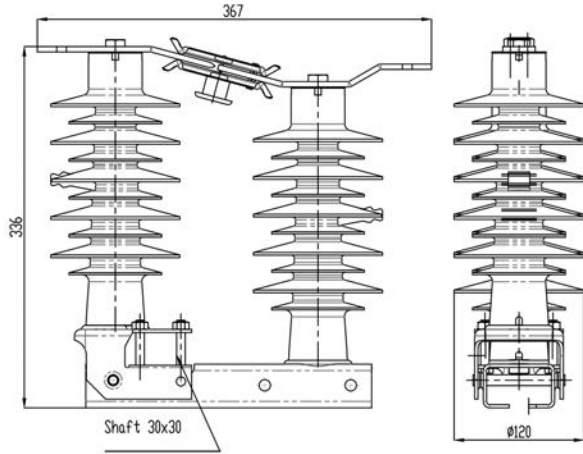
Field 2. Type of phase elements

24kV with epoxy insulators (Hydrofobic cycloelifatic epoxy resin insulators are optional).

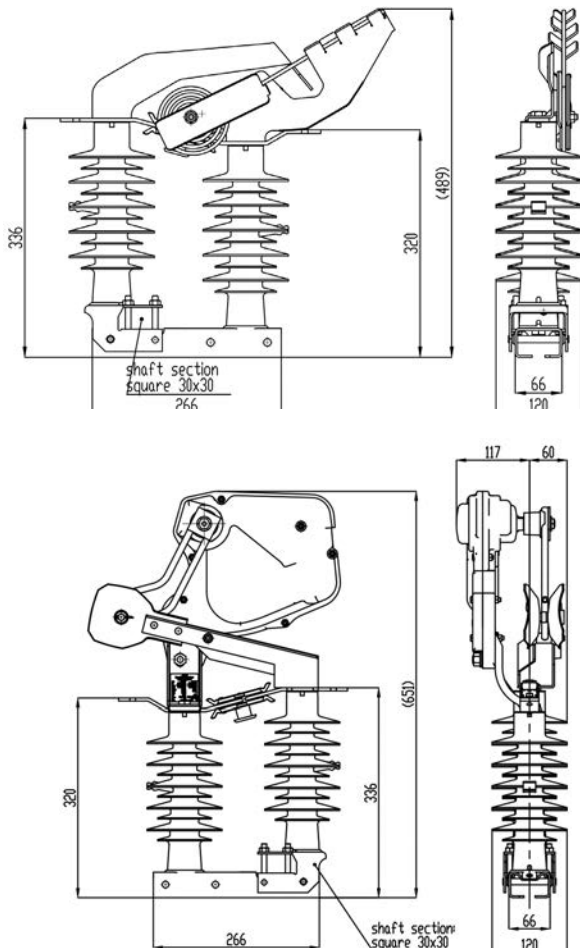
Phase element's type:	NPS24B1-WWJ2 (NPS24B1-WWJ2H)	NPS24B1-J2 (NPS24B1-J2H)	NPS24B1-K1J2 (NPS24B1-K1J2H)	NPS24B1-K4J2 (NPS24B1-K4J2H) [NPS24B1-K4SJ2] [NPS24B1-K4SJ2H]	NPS24B1-K5J2 (NPS24B1-K5J2H)
Insulators				epoxy resin 755 mm creepage distance (HCEP resin 755 mm creepage distance)	
Rated voltage				24 kV	
Rated power frequency withstand voltage:					
– to earth and between phases		55 kV		50 kV	
– across isolating distance		75 kV		60 kV	
Rated lightning impulse withstand voltage:					
– to earth and between phases			125 kV		
– across isolating distance			145 kV		
Rated normal current			630 A		
Rated mainly active load breaking current/ no. of cycles	-	25 A/100CO	50 A/30CO	250 A/100CO [125 A/ 100 CO]	400 A/100CO 630 A /10 CO
Cable-charging rated breaking current /no. of cycles	-	15 A/10CO	20 A/10CO	10 A/20CO	10 A/20CO
Line rated breaking current /no. of cycles	-	15 A/10CO	20 A/10CO	10 A/20CO	10 A/20CO
Rated short circuit withstand current (1s)/peak			16 kA/40 kA		
Mechanical endurance	2000 C/O	2000 C/O (300C/O for whip)		2000 C/O	

Parameters are related only to phase elements

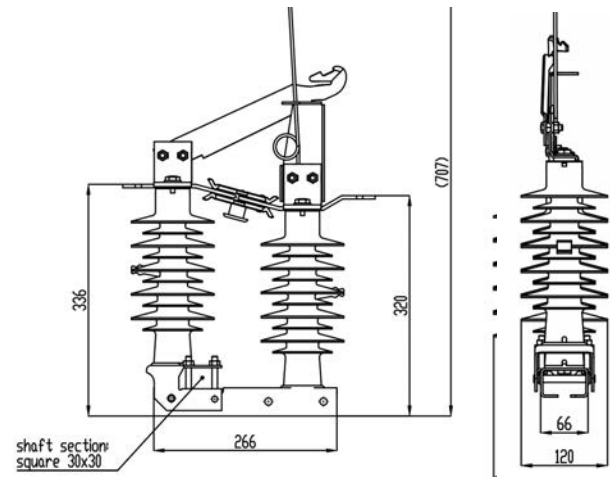
Description		Type	Ordering number
24 kV disconnecter		NPS24B1-WWJ2	1YMN000007M0002
24 kV disconnecter HCEP		NPS24B1-WWJ2H	1YMN000007M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	B1		
	G1		



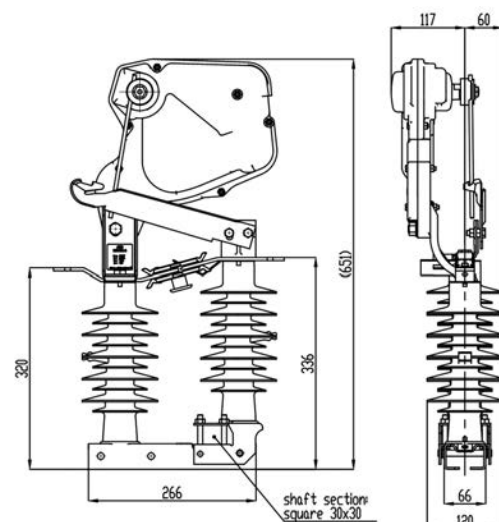
Description		Type	Ordering number
24 kV switch disconnecter 50 A		NPS24B1-K1J2	1YMN000008M0002
24 kV switch disconnecter 50 A HCEP		NPS24B1-K1J2H	1YMN000008M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	B3		
	G3		



Description		Type	Ordering number
24 kV switch disconnecter 25 A		NPS24B1-J2	1YMN000004M0002
24 kV switch disconnecter 25 A HCEP		NPS24B1-J2H	1YMN000004M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	B2		
	G2		



Description		Type	Ordering number
24 kV switch disconnecter 250 A		NPS24B1-K4J2	1YMN000003M0003
24 kV switch disconnecter 250 A HCEP		NPS24B1-K4J2H	1YMN000003M0001
24 kV switch disconnecter 125 A		NPS24B1-K4SJ2	1YMN000003M0004
24 kV switch disconnecter 125 A HCEP		NPS24B1-K4SJ2H	1YMN000003M0002
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	B4		
	G4		



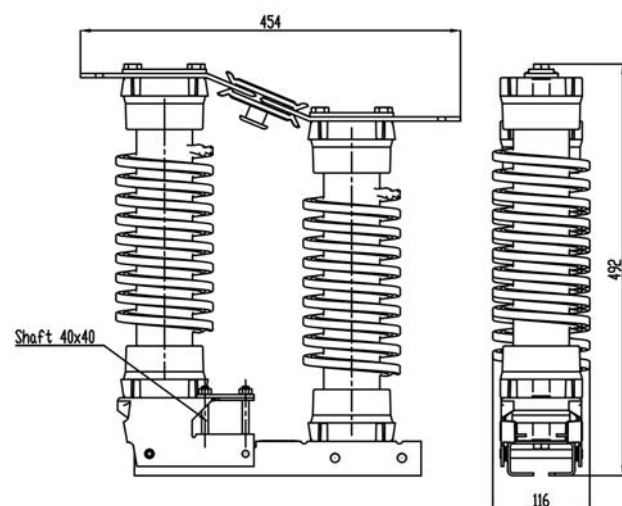
Description		Type	Ordering number
24 kV switch disconnecter 630 A		NPS24B1-K5J2	1YMN000001M0002
24 kV switch disconnecter 630 A HCEP		NPS24B1-K5J2H	1YMN000001M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	B4		
	G4		

24 kV with porcelain insulators

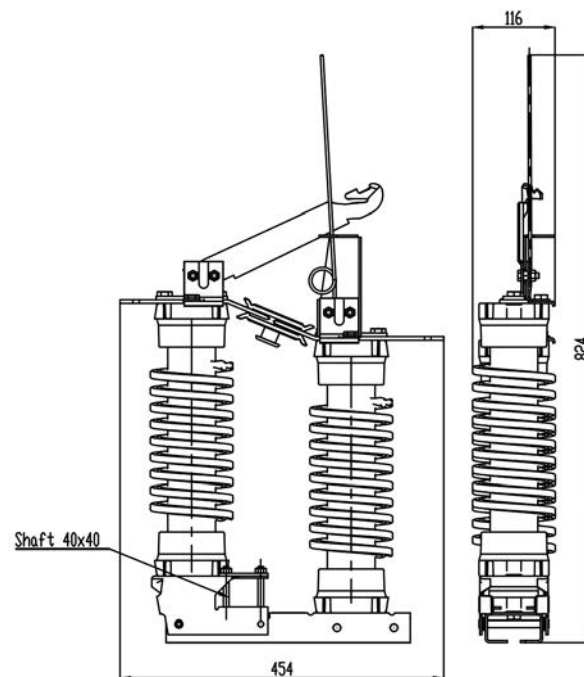
Phase element's type:	NPS24A2-J2	NPS24A2-J2 + NPAB1	NPS24A2-K4J2	NPS24A2-K5J2
Insulators	Brown porcelain 620 mm creepage distance			
Rated voltage	24 kV			
Rated power frequency withstand voltage:				
– to earth and between phases	60 kV			
– across isolating distance	75 kV			
Rated lightning impulse withstand voltage:				
– to earth and between phases	150 kV			
– across isolating distance	165 kV			
Rated normal current	630 A			
Rated mainly active load breaking current/ no. of cycles	-	25 A/100CO	250 A/100CO	400 A/100CO 630 A/10CO
Cable-charging rated breaking current /no. of cycles	-	15 A/10CO	10 A/20CO	10 A/20CO
Line rated breaking current /no. of cycles	-	15 A/10CO	10 A/20CO	10 A/20CO
Rated short circuit withstand current (1s)/peak	20 kA/50 kA			
Mechanical endurance	2000 C/O	2000 C/O (300C/O for whip)		2000 C/O

Parameters are related only to phase elements

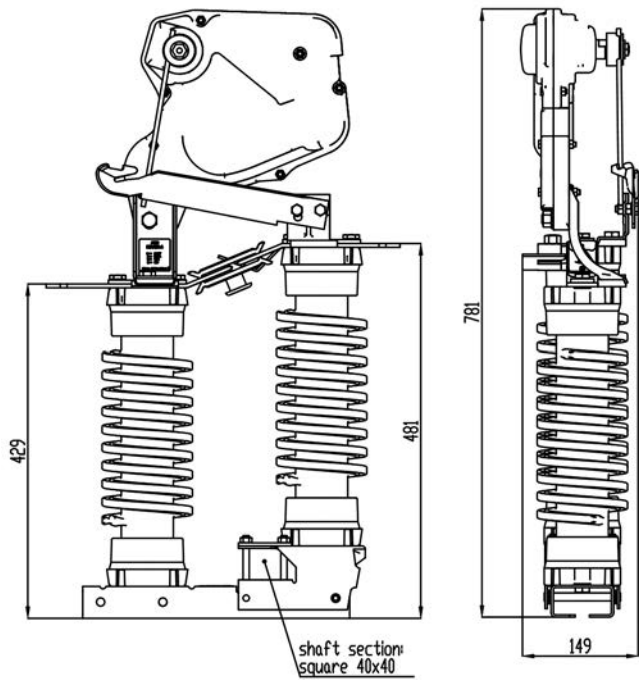
Description	Type	Ordering number
24 kV disconnector	NPS24A2-J2	1YMN000048M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A1		



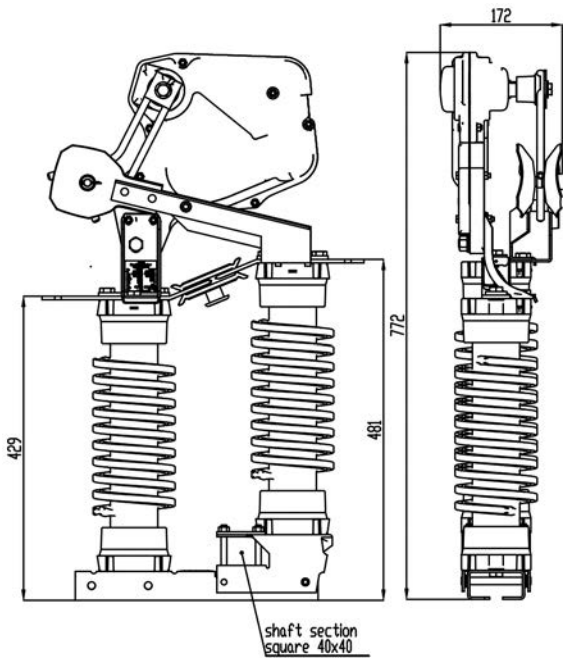
Description	Type	Ordering number
24 kV switch disconnector 25 A	NPS24A2-J2 + NPAB1	1YMN000050M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A2		



Description									Type				Ordering number				
24 kV switch disconnecter 250 A									NPS24A2-K4J2				1YMN000052M0001				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
A4																	



Description										Type				Ordering number			
24 kV switch disconnecter 630 A										NPS24A2-K5J2				1YMN000054M0001			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
A5																	

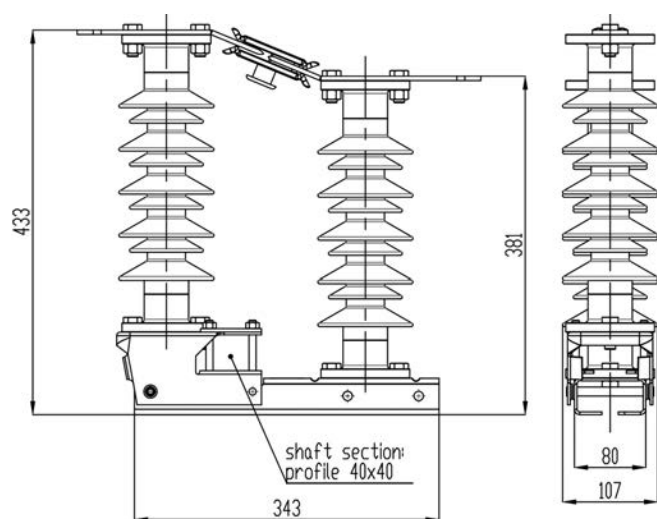


24 kV with silicon insulators

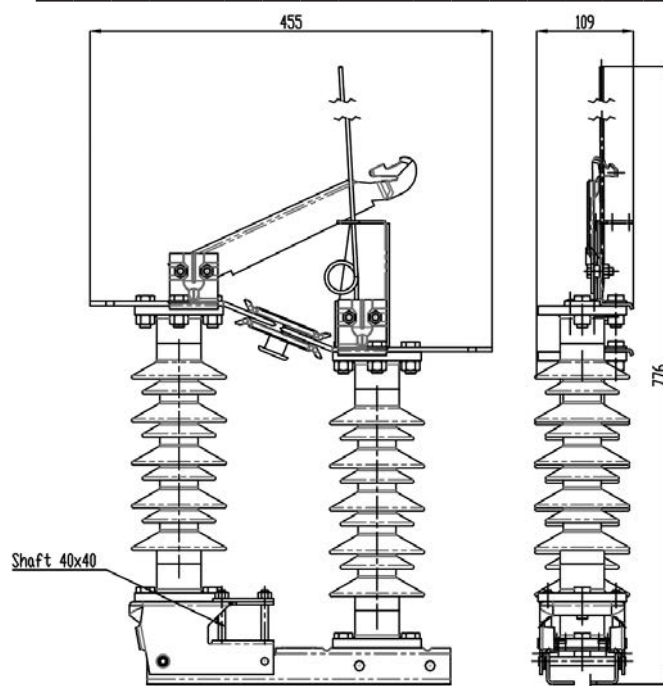
Phase element's type:	NPS24A2-J3	NPS24A2-J3 + NPAB1	NPS24A2-K1J3	NPS24A2-K5J3
Insulators	silikon rubber 760 mm creepage distance			
Rated voltage	25,8 kV			
Rated power frequency withstand voltage:				
– to earth and between phases	60 kV			
– across isolating distance	75 kV			
Rated lightning impulse withstand voltage:				
– to earth and between phases	150 kV			
– across isolating distance	165 kV			
Rated normal current	630 A			
Rated mainly active load breaking current/ no. of cycles	-	25 A/100CO	50 A/30CO	400 A/100CO 630 A/10CO
Cable-charging rated breaking current /no. of cycles	-	16 A/10CO	16 A/10CO	16 A/10CO
Line rated breaking current /no. of cycles	-	16 A/10CO	16 A/10CO	16 A/10CO
Rated short circuit withstand current (1s)/peak	25 kA/63,5 kA			
Mechanical endurance	2000 C/O	2000 C/O (300C/O for whip)	2000 C/O	

Parameters are related only to phase elements

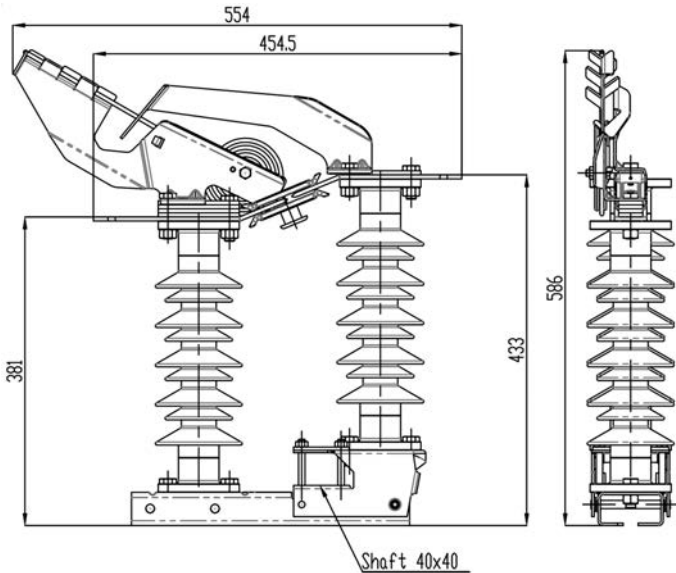
Description	Type	Ordering number
24 kV disconnecter	NPS24A2-J3	1YMN000018M0028
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
C1		



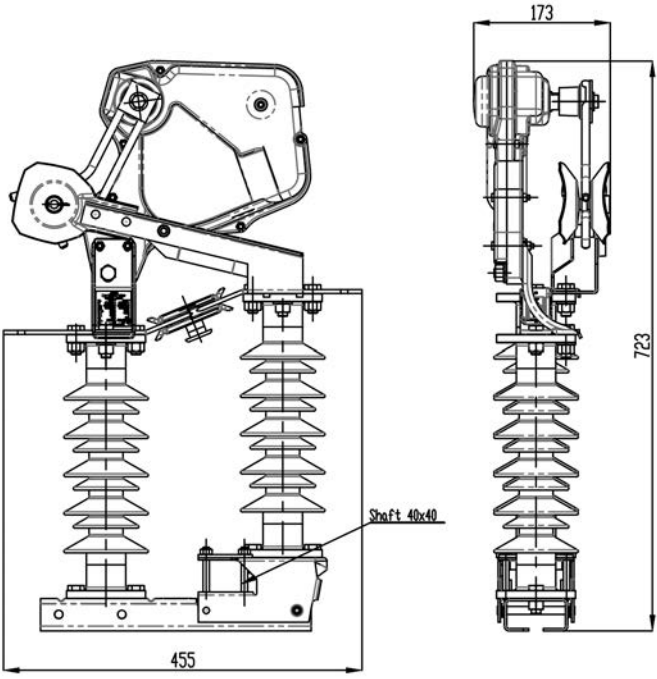
Description	Type	Ordering number
24 kV switch disconnecter 25 A	NPS24A2-J3 + NPAB1	1YMN000057M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
C2		



Description																	Type	Ordering number
24 kV switch disconnecter 50 A																	NPS24A2-K1J3	2RFA015471M0001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	C3	



Description																	Type	Ordering number
24 kV switch disconnecter 630 A																	NPS24A2-K5J3	1YMN000061M0001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	C5	



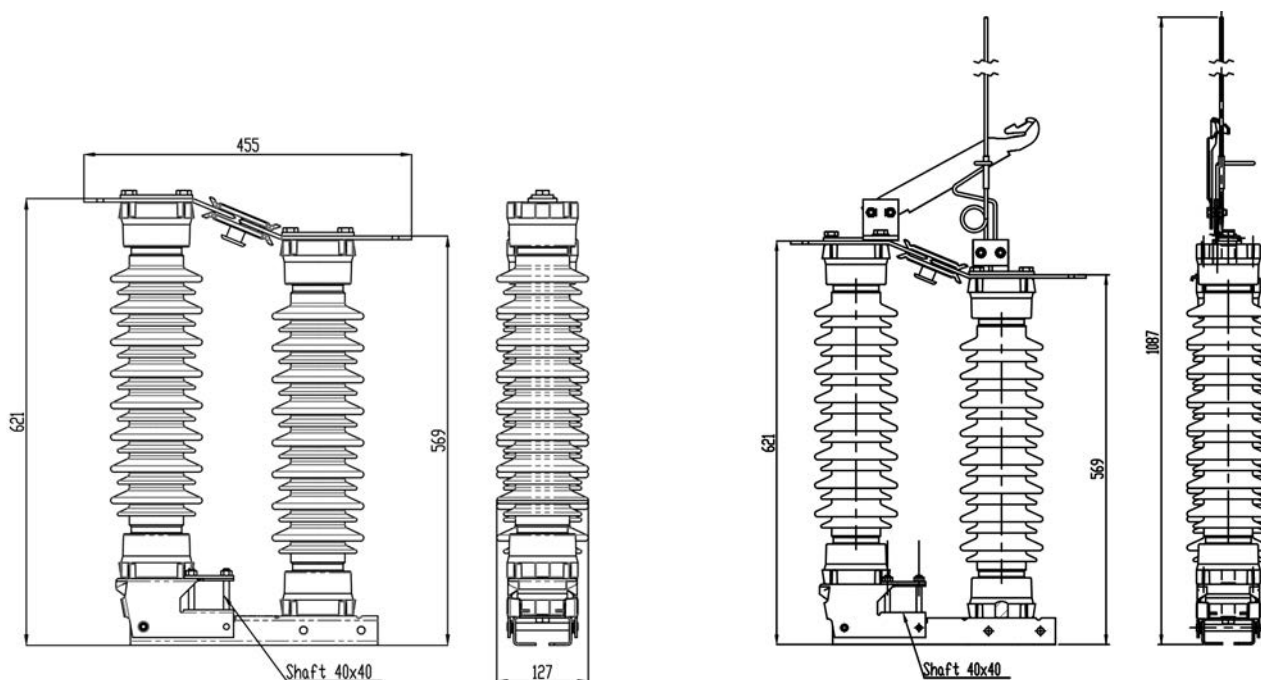
36 kV with porcelain or silicon insulators

Phase element's type:	NPS36A1	NPS36A2	NPS36A1-J2	NPS36A2-J2	NPS36A1-J3	NPS36A2-J3
Insulators	Brown porcelain 900 mm creepage distance		silikon rubber 1205 mm creepage distance		silikon rubber 1365 mm creepage distance	
Rated voltage	36 kV				38 kV	
Rated power frequency withstand voltage:						
– to earth and between phases	80 kV				80 kV	
– across isolating distance	88 kV				90 kV	
Rated lightning impulse withstand voltage:						
– to earth and between phases			200 kV			
– across isolating distance			220 kV			
Rated normal current			630 A			
Rated mainly active load breaking current/ no. of cycles	-	16 A/100CO	-	16 A/100CO	-	16 A/100CO
Cable-charging rated breaking current /no. of cycles	-	10 A/10CO	-	10 A/10CO	-	10 A/10CO
Line rated breaking current /no. of cycles	-	10 A/10CO	-	10 A/10CO	-	10 A/10CO
Rated short circuit withstand current (1s)/peak	21 kA / 52 kA				16 kA / 40 kA	
Mechanical endurance	2000 C/O	2000 C/O (300C/O for whip)	2000 C/O	2000 C/O (300C/O for whip)	2000 C/O	2000 C/O (300C/O for whip)

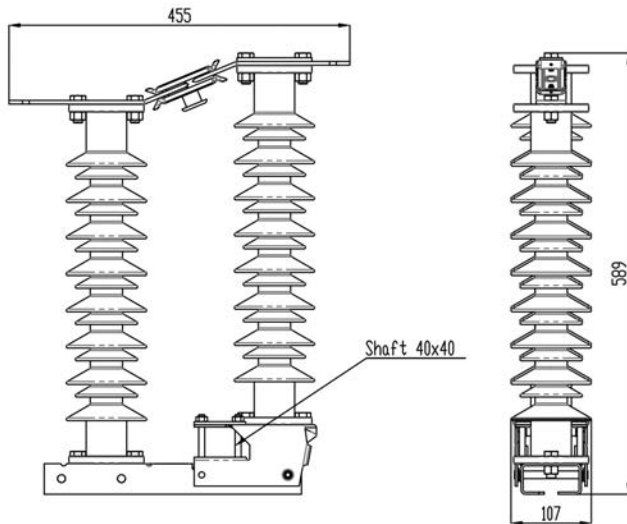
Parameters are related only to phase elements

Description	Type	Ordering number
36 kV disconnector	NPS36A1	1YMNNPS36AM1001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
D1		

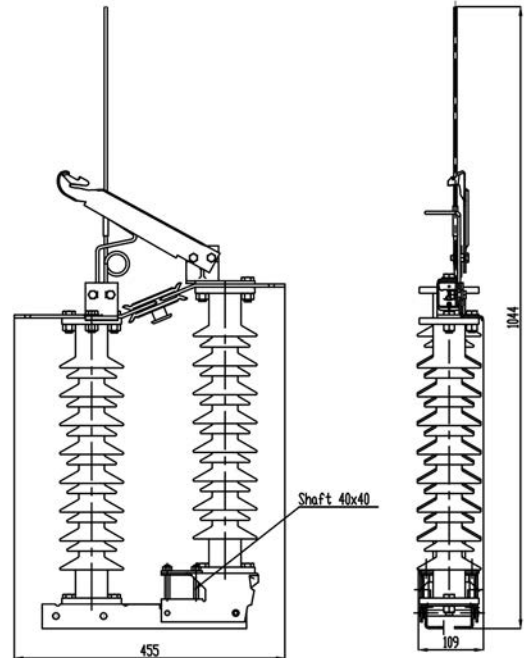
Description	Type	Ordering number
36 kV switch disconnector 16 A	NPS36A2	1YMNNPS36AM2001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
D2		



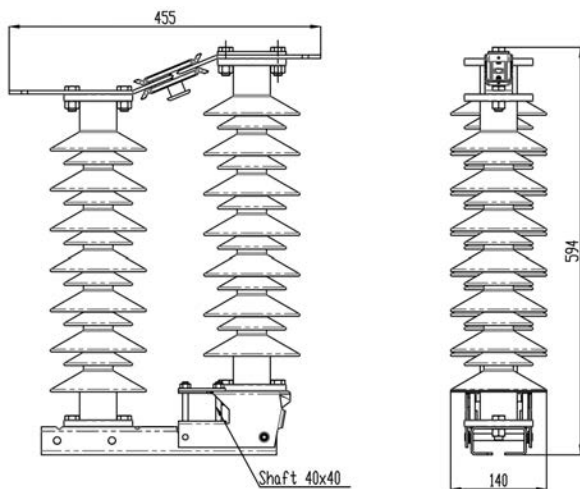
Description		Type	Ordering number
36 kV disconnecter		NPS36A1-J2	1YMN000006M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	E1		



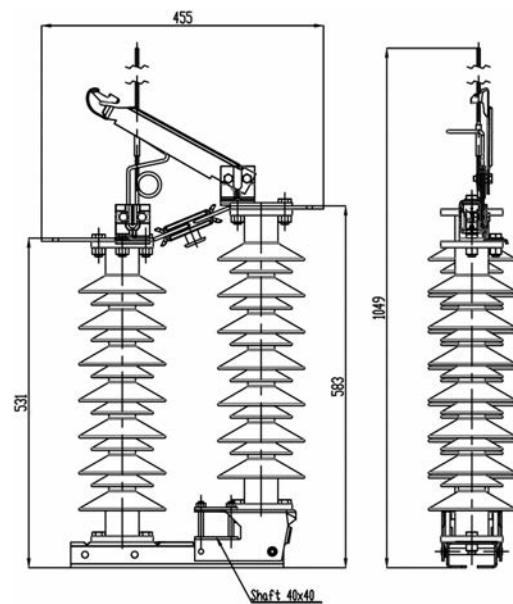
Description		Type	Ordering number
36 kV switch disconnecter 16 A		NPS36A2-J2	1YMN000005M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	E2		



Description		Type	Ordering number
36 kV disconnecter		NPS36A1-J3	1YMN000038M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	F1		



Description		Type	Ordering number
36 kV switch disconnecter 16 A		NPS36A2-J3	1YMN000039M0001
1	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	F2		

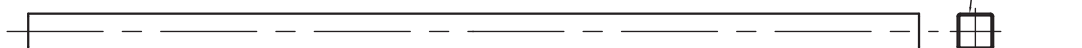


Field 3. Crossarm and phase element fixing equipment

Description	Type	Ordering number
-------------	------	-----------------

2 m standard crossarm without holes for 24 kV switch – 2RFA016209M0001

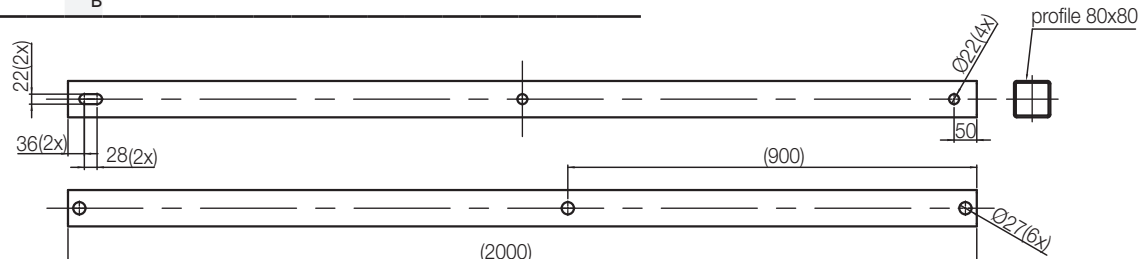
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
		A														



Description	Type	Ordering number
-------------	------	-----------------

2 m crossarm wooden pole for 24 kV switch NPTRN1T6/S46792 1YMNNPTRN1MT6S1

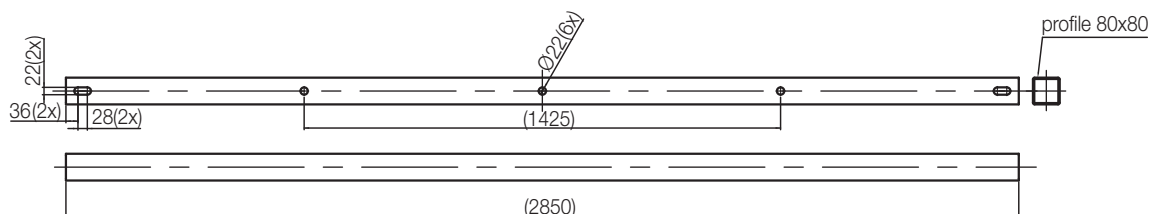
1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
		B													



Description	Type	Ordering number
-------------	------	-----------------

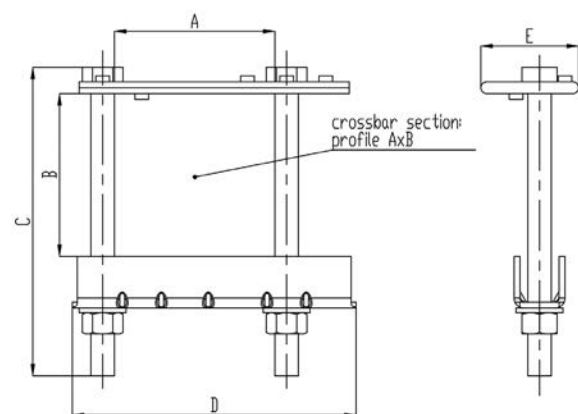
2,85 m crossarm for 36 kV switch J401464 1YMNJ40146M4001

1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
		C													



NPAM1 is included in A,B,C selection – field [3] of Smart Code

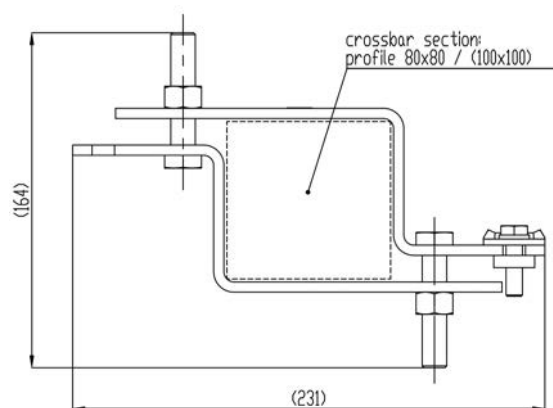
Max dim. AxB	Dim. C	Dim. D	Type	Ordering number (1pc- one phase)	Smart code field [3]
100x100	158	145	NPAM 1	1YMNNPAM10M0001	K
100x130	188	145	NPAM 2	1YMNNPAM20M0001	L



Phase element fixing equipment

NPTMS8 is included in A,B,C selection – field [3] of Smart Code

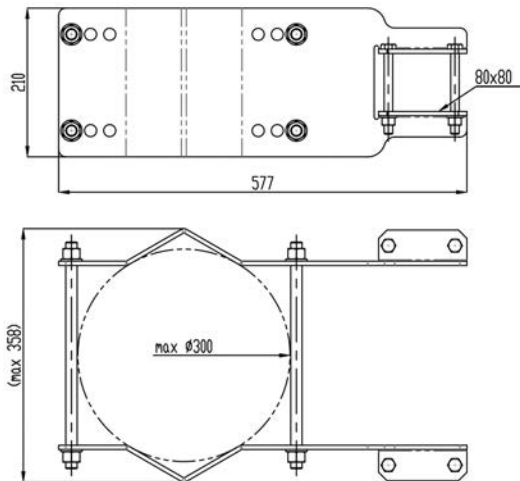
Description	Type	Ordering number
Earthing clamp for crossarm 16-63 mm ² Cu	NPTMS8	1YMNNPTMS8M0001



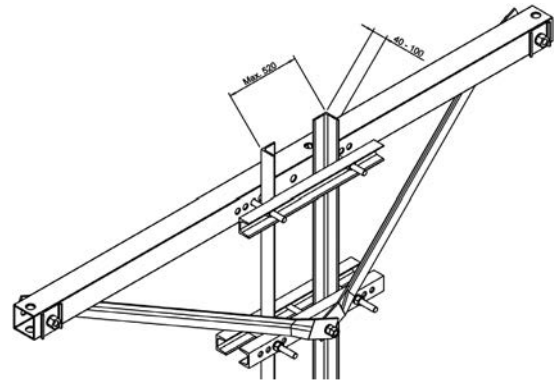
Earthing clamp for crossarm 16-63 mm² Cu

Field 4. Crossarm's fixing to the pole/poles

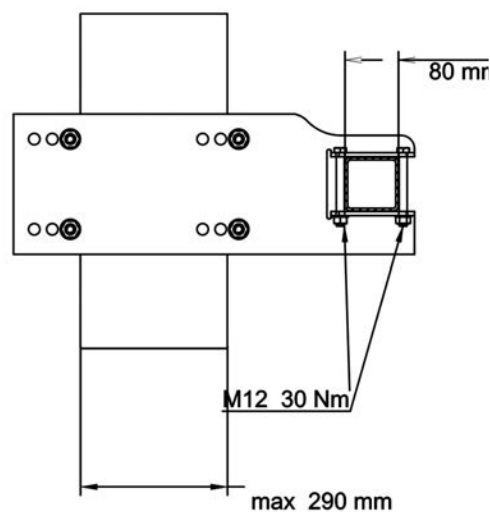
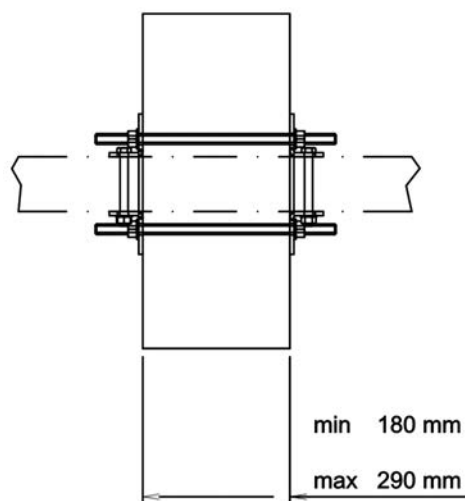
Description	Type	Ordering number
Crossarm fixing to concrete circular pole (single or double), usually below line	NPAZM31 1YMNNPAZM3M1101	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	A – Single pole installation (1xNPAZM31) M – Double pole installation (2xNPAZM31)	



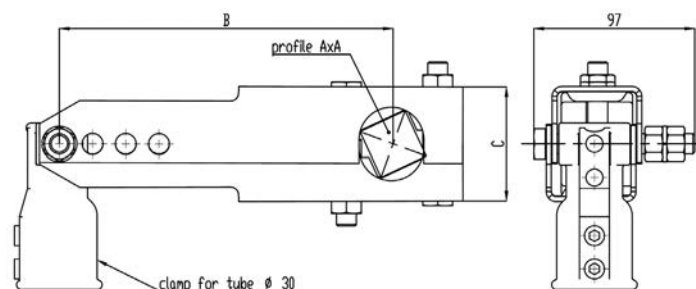
Description	Type	Ordering number
Crossarm fixing to lattice tower – 2 m crossarm included	NPAM19 1YMNNPAM19M0001	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	D	



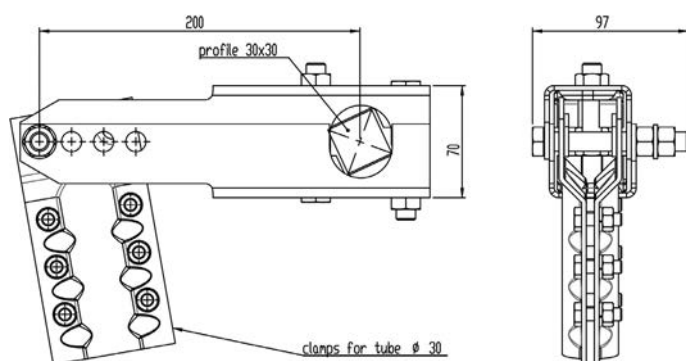
Description	Type	Ordering number
Crossarm fixing to concrete rectangular pole (single or double), usually below line	NPAZM38 1YMNNPAZM3M8001	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	C – Single pole installation (1xNPAZM38) O – Double pole installation (2xNPAZM38)	



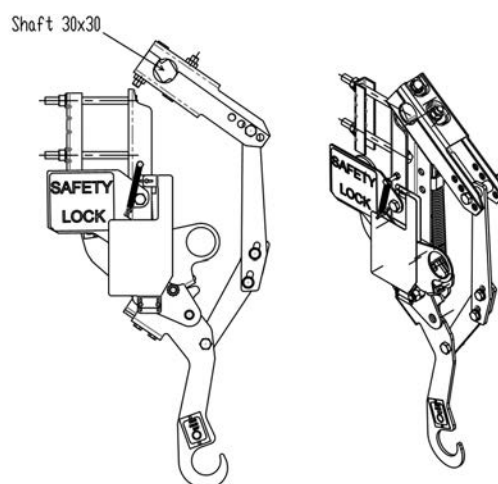
Description						Shaft AxA [mm]	Dim.B [mm]	Dim.C [mm]	Type	Ordering number:	Smart code field [6]						
operating lever silicon or porcelain insulators						40x40	300	90	NPAZL1	1YMNNPAZL1M0002	C						
operating lever epoxy insulators						30x30	200	65	NPAZL2	1YMNNPAZL2M0001	A						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
					A												
					C												



Description										Type				Ordering number			
economy lever										NPAZL2/E1				1YMNNPAZL2ME101			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
					B												



Description										Type		Ordering number						
hook stick drive										UEKE5A1		1YMNUKEKE5AM1001						
										UEKE5A2		1YMNUKEKE5AM2001						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
					D													



Description										Type		Ordering number				
lever for rotary mechanism										NPAZL43		1YMNNPAZL4M3001				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
					E											

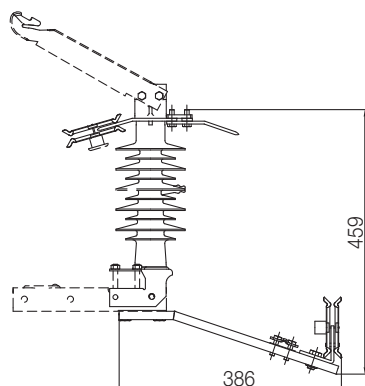
Application: For connecting incoming and outgoing lines to the switch. Selection depends on the material of line and cross section.

The technical drawing shows two views of the B7000-2 connector. The top view is a front elevation showing a U-shaped component with two circular ports. Dimensions indicate a maximum height of 42 mm from the base to the top of the U-shape, and a maximum width of 20 mm between the centers of the two ports. The bottom view is a side elevation showing the profile of the component. It has a total width of 36 mm and a height of 42 mm. Two circular features are visible on the side face.

Technical drawing of a metal fitting. The top view shows a circular base with a central threaded hole and two side holes. The side view shows a cylindrical body with a flange at the top and a threaded section at the bottom. The dimensions are: 200mm diameter, 45mm height, and 60mm width.

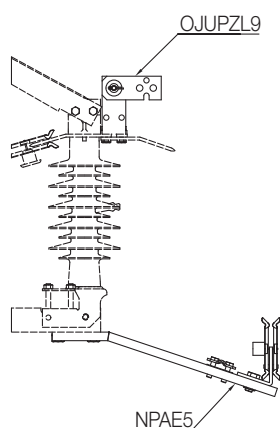
Field 8. Rocking side equipment:

Description	Type	Ordering number
Automatic earthing switch 24 kV:	NPAE5	1YMNNPAE50M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
B_	A	



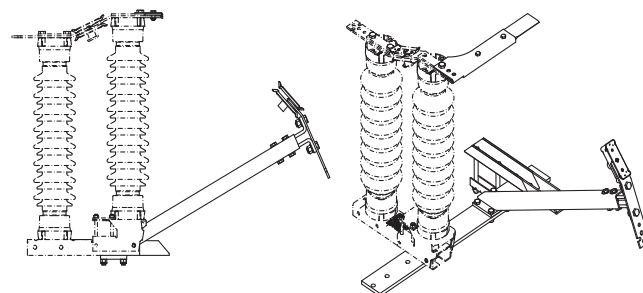
Automatic earthing switch.
Application: For 24 kV switch with epoxy insulators. Automatic earthing of rocking side.
2 positions of apparatus:
– Closed
– Open – Earthed

Description	Type	Ordering number
Automatic earthing switch 24 kV:	NPAE5	1YMNNPAE50M0001
Tinned connecting terminal:	OJUPZL9	1YMNOJUPZLM9001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
B_	B	



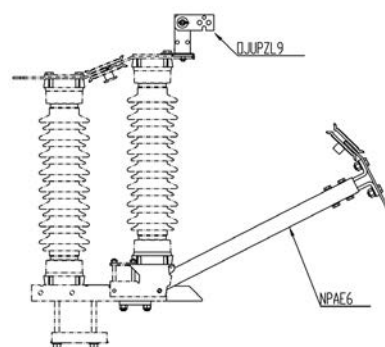
Automatic earthing switch with self-aligning terminal.
Application: For 24 kV switch with epoxy insulators. Automatic earthing of rocking side, combined with self-aligning terminals, when third insulator is not used. Up to 100 mm² cross section of wire.
2 positions of apparatus:
– Closed
– Open – Earthed

Description	Type	Ordering number
Automatic earthing switch 36 kV with porcelain insulators:	NPAE6	1YMN000082M0001
Automatic earthing switch 36 kV with silicon insulators:	NPAE6.2	1YMN000082M0002
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
D_ E_ F_	A	



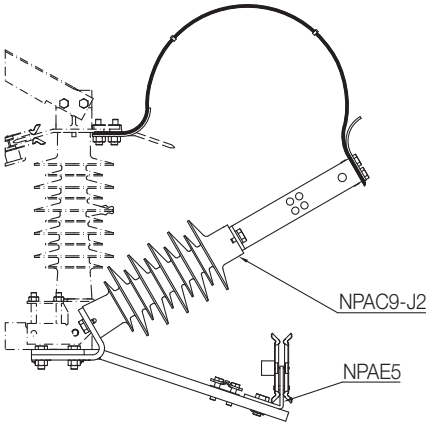
Automatic earthing switch.
Application: For 36 kV switch with porcelain or silicon insulators. Automatic earthing of rocking side.
2 positions of apparatus:
– Closed
– Open – Earthed

Description	Type	Ordering number
Automatic earthing switch 36 kV with porcelain insulators:	NPAE6	1YMN000082M0001
Automatic earthing switch 36 kV with silicon insulators:	NPAE6.2	1YMN000082M0002
Tinned connecting terminal:	OJUPZL9	1YMNOJUPZLM9001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
D_ E_ F_	C	



Automatic earthing switch with self-aligning terminal.
Application: For 36 kV switch with epoxy insulators. Automatic earthing of rocking side, combined with self-aligning terminals, when third insulator is not used. Up to 100 mm² cross section of wire.
2 positions of apparatus:
– Closed
– Open – Earthed

Description										Type		Ordering number				
Automatic earthing switch:										NPAE5		1YMNNPAE50M0001				
Third insulator set:										NPAC9-J2		1YMNNPAC9-MJ211				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B_							C									



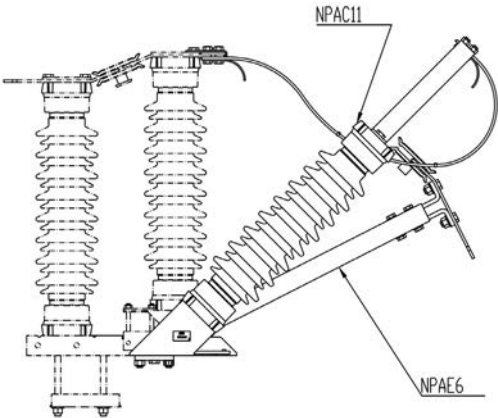
Automatic earthing switch with supporting insulator.

Application: For 24 kV switch with epoxy insulators, Automatic earthing of rocking side, combined with third insulator. Recommended for cross section of wires > 100 mm². Cable head connection for vertical installation of switch.

2 positions of apparatus:

- Closed
- Open – Earthed

Description								Type	Ordering number									
Automatic earthing switch 36 kV with porcelain insulators:								NPAE6	1YMN000082M0001									
Automatic earthing switch 36 kV with silicon insulators:								NPAE6.2	1YMN000082M0002									
Third insulator set for porcelain insulators								NPAC11	1YMNNPAC11M0001									
Third insulator set for silicon insulators 1205 mm								NPAC11-J2	1YMNNPAC11MJ202									
Third insulator set for silicon insulators 1365 mm creepage:								NPAC11-J3	1YMNNPAC11M-J31									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
D_ E_ F_							C											



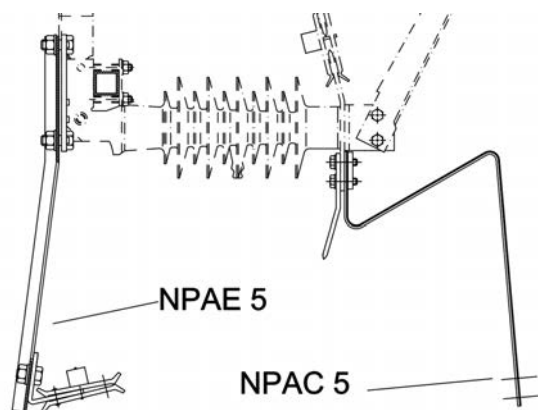
Automatic earthing switch with supporting insulator.

Application: For 36 kV switch with porcelain or silicon insulators. Automatic earthing of rocking side, combined with third insulator. Recommended for cross section of wires > 100 mm². Cable head connection for vertical installation of switch.

2 positions of apparatus:

- Closed
- Open – Earthed

Description	Type	Ordering number
Automatic earthing switch 24 kV:	NPAE5 1YMNNPAE50M0001	
Distribution transformer's connection:	NPAC5 1YMNNPAC50M0001	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
B_	D	

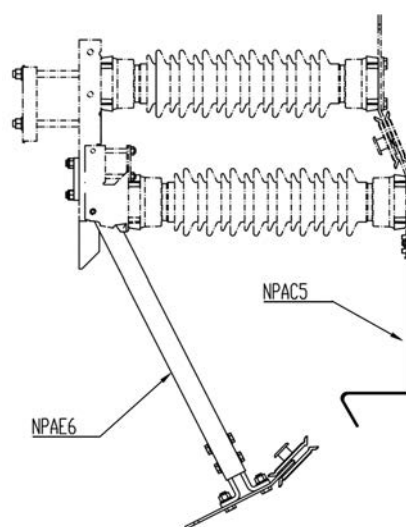


Distribution transformer's connection with automatic earthing switch
Application: For 24 kV switch with epoxy insulators. Automatic earthing of rocking side combined with cost effective movable connection for distribution transformer where current is <100 A. Only for vertical installation of switch.

2 positions of apparatus:

- Closed
- Open – Earthed

Description	Type	Ordering number
Automatic earthing switch 36 kV with porcelain insulators:	NPAE6 1YMN000082M0001	
Automatic earthing switch 36 kV with silicon insulators:	NPAE6.2 1YMN000082M0002	
Third insulator set for porcelain insulators	NPAC11 1YMNNPAC11M0001	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
D_	D	
E_		
F_		



Distribution transformer's connection with automatic earthing switch

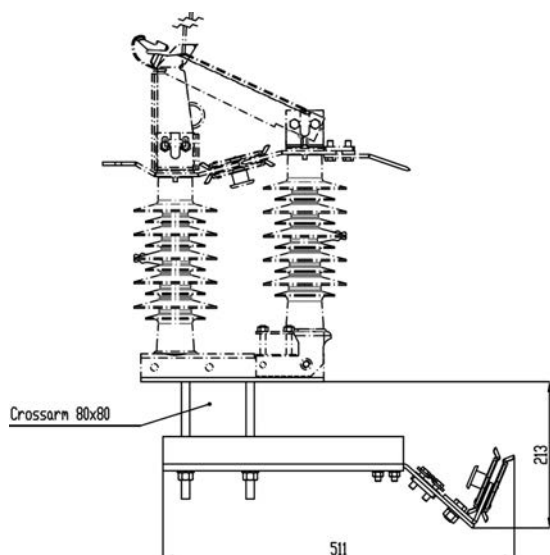
Application: For 36 kV switch with porcelain and silicon insulators.

Automatic earthing of rocking side combined with cost effective movable connection for distribution transformer where current is <100 A. Only for vertical installation of switch.

2 positions of apparatus:

- Closed
- Open – Earthed

Description								Type				Ordering number						
Earthing switch 24 kV for 3-position switch:								NPAE7 1YMNNPAE70M0001										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
	B1																	
	B2						E											
	B4																	



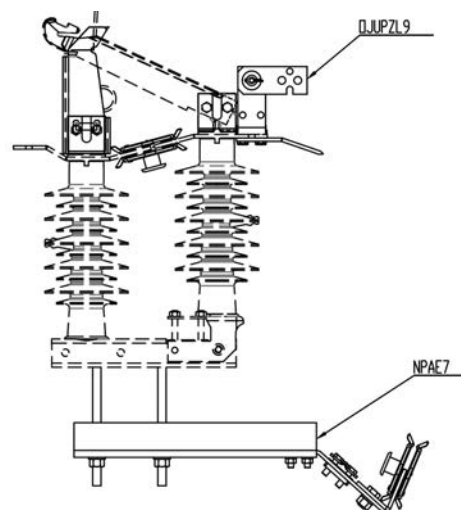
Earthing switch 24 kV for 3-position switch.

Application: For 24 kV switch with epoxy insulators where one mechanism for switch and earthing switch is demanded. Operation only by rotary mechanism UEKE7A1. Only horizontal installation.

3 positions of apparatus:

- Closed
- Open
- Earthed

Description								Type	Ordering number								
Earthing switch 24 kV for 3-position switch:								NPAE7	1YMNNPAE70M0001								
Tinned connecting terminal:								OJUPZL9	1YMNOJUPZLM9001								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
B1							F										
B2																	
B4																	



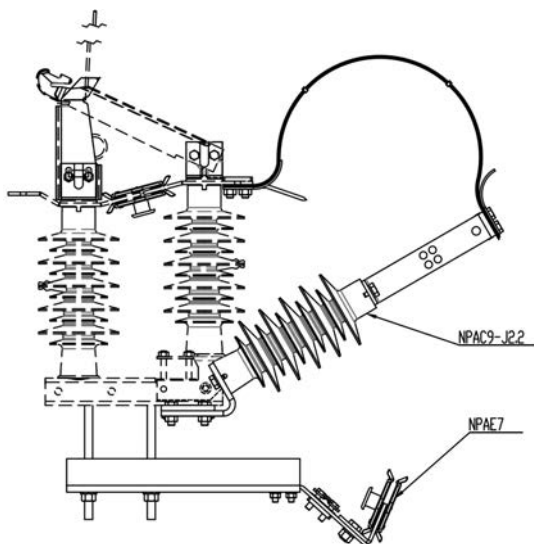
Earthing switch 24 kV for 3-position switch with self-aligning terminal.

Application: For 24 kV switch with epoxy insulators where one mechanism for switch and earthing switch is demanded, combined with self-aligning terminals, when third insulator is not used. Up to 100 mm² cross section of wire. Operation only by rotary mechanism UEKE7A1. Only horizontal installation.

3 positions of apparatus:

- Closed
- Open
- Earthed

Description																	Type	Ordering number
Earthing switch 24 kV for 3-position switch:																	NPAE7	1YMNNPAE70M0001
Third insulator set:																	NPAC9-J2.2	1YMNNPAC9-MJ212
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
	B1																	
	B2						G											
	B4																	



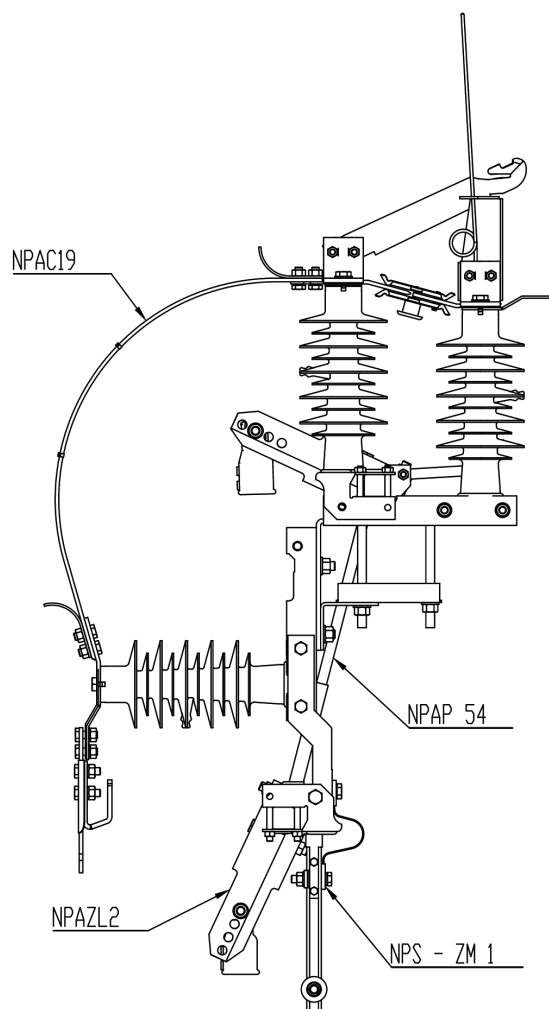
Earthing switch operated by the same mechanism as switch with supporting insulator.

Application: For 24 kV switch with epoxy insulators where one mechanism for switch and earthing switch is demanded, combined with third insulator. Recommended for cross section of wires $>100 \text{ mm}^2$. Operation only by rotary mechanism UEKE7A1. Only horizontal installation.

3 positions of apparatus:

- Closed
- Open
- Earthed

Description							Type	Ordering number									
Independent earthing switch:							NPS-ZM1	1YMNNPS-ZMM1001									
Supporting insulator for earthing switch							NPAC19	1YMNNPAC19M0001									
Earthing switch interlock							NPAP54	1YMNNPAP54M0001									
Operating lever							NPAZL2	1YMNNPAZL2M0001									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
B							H										

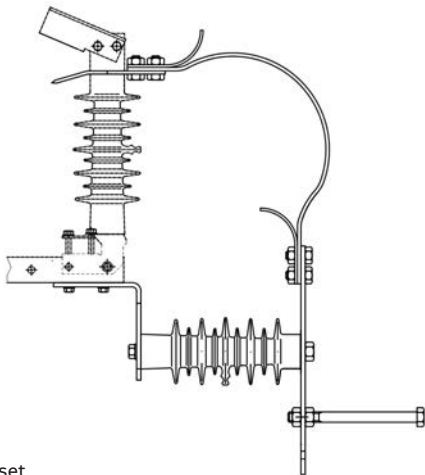


Earthing switch operated by the independent mechanism.

Application: For 24 kV switch with epoxy insulators.

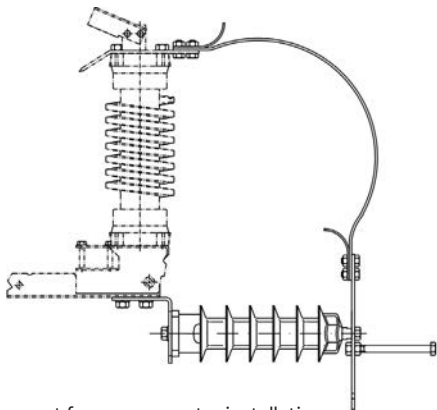
Shaft selection – see point 5.

Description								Type	Ordering number									
Flexible dropper set with epoxy insulator 24 kV								NPAC7 + NPSZJ21	1YMNNPAC70M1001									
Flexible dropper set with porcelain insulator 24 kV								NPAC7 + NPSZJ2	1YMNNPAC70M2001									
Flexible dropper set with silicon insulator 24 kV								NPAC7 + NPSZJ31	1YMNNPAC70M3001									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
A_							I											
B_																		
C_																		



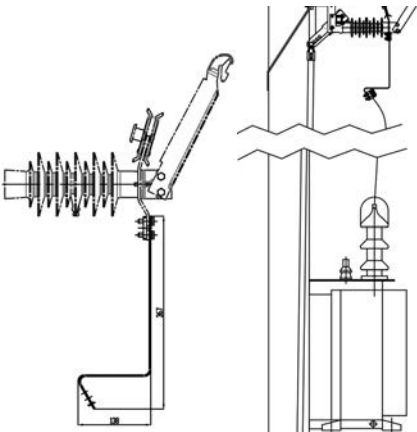
Flexible dropper set.
Application: Cable head connection for horizontal installation of switch.
Earthing bolt included.
Insulator ordered separately.

Flexible dropper set for surge arrester installation 24 kV							NPAC7 1YMNNPAC70M0001										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
	A_						J										
	B_																
	C_																



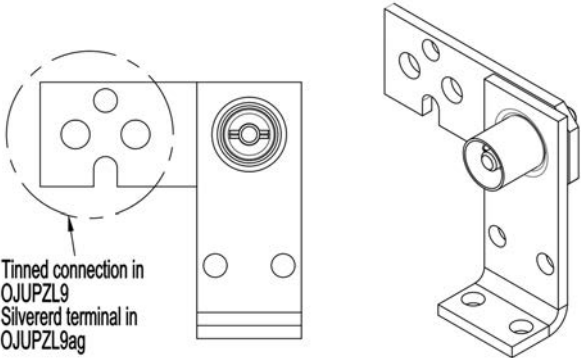
Flexible dropper set for surge arrester installation.
Application: Cable head connection for horizontal installation of switch with surge arrester. Earthing bolt included. Surge arrester ordered separately.

Distribution transformer's connection							NPAC5 1YMNNPAC50M0001										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
							K										



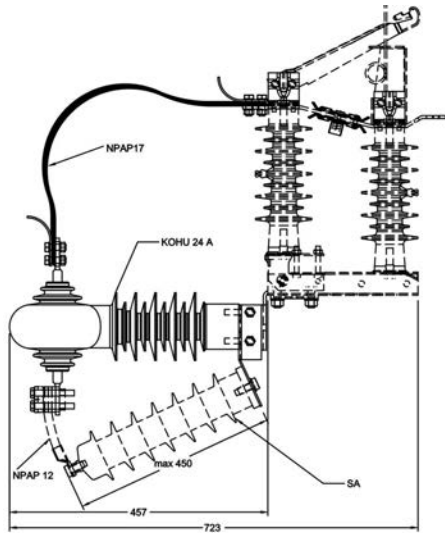
Distribution transformer's connection
Application: Cost effective movable connection for distribution transformer where current is <100 A. Only for vertical installation of switch.

Self-aligning terminal with tinned connecting terminal							OJUPZL9 1YMNOJUPZLM9001										L
Self-aligning terminal with silvered connecting terminal							OJUPZL9ag 1YMNOJUPZLM9AG1										M
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
							L										
							M										



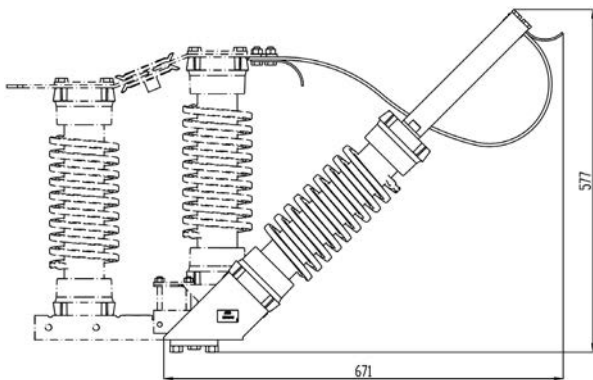
Self-aligning terminal.
Application: rocking insulator side, when third insulator is not used. Up to 100 mm² cross section of wire.

Set for CT installation	NPAP17 1YMNNPAP17M0001																
Connecting cable CT- SA:	NPAP12 1YMNNPAP12M0001																
Current transformer	KOHU24																
	please specify separately																
Surge arrester	-																
	please specify separately																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
A_							O										- Current transformer
B_							P										- Current transformer with surge
C_																	arrester



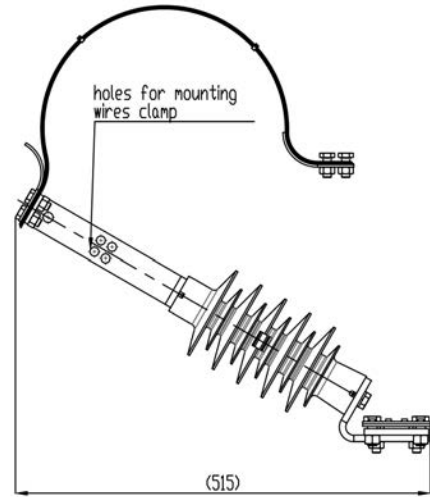
Current transformer or Current transformer with surge arrester
Application: Current measurement of downward line or cable head.
– Line clamps selection – see point 7.

Third insulator set with porcelain insulators 24 kV	NPAC1-J2 1YMNNPAC1-MJ201																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
A_							N										



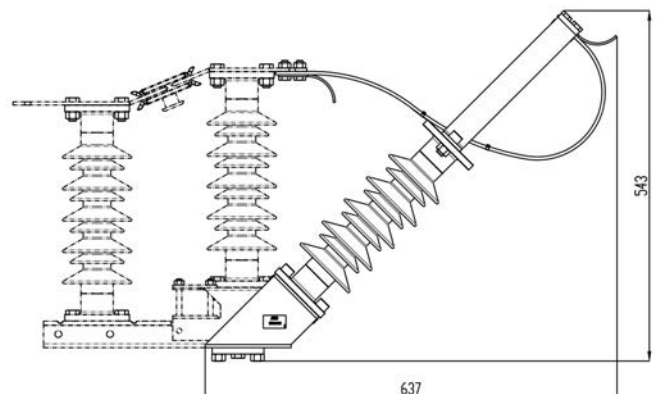
Third insulator set for 24 kV switch with porcelain insulators
Application: rocking insulator side, recommended for cross section of wires $>100 \text{ mm}^2$. Cable head connection for vertical installation of switch.

Third insulator set with epoxy insulators 24 kV	NPAC9-J2 1YMNNPAC9-MJ211																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
B_							N										



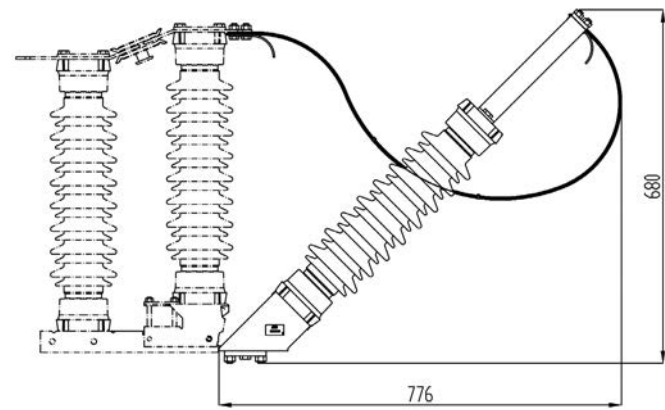
Third insulator set for 24 kV switch with epoxy insulators
Application: rocking insulator side, recommended for cross section of wires $>100 \text{ mm}^2$. Cable head connection for vertical installation of switch.

Third insulator set with silicon insulators 24 kV	NPAC1-J3 1YMNNPAC1-MJ301																
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
C_						N											



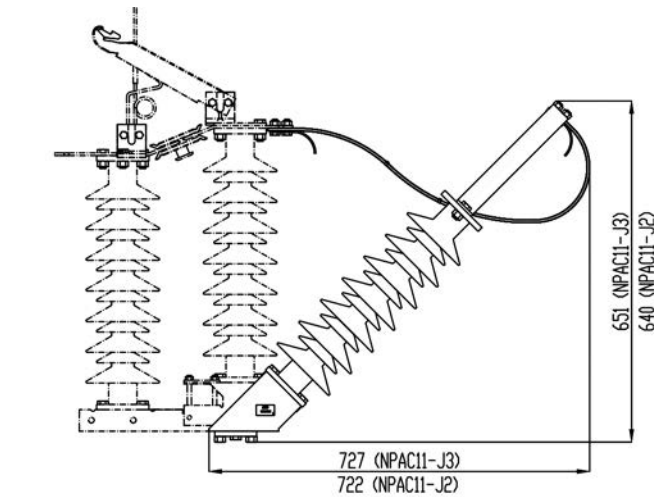
Third insulator set for 24 kV switch with silicon insulators
Application: rocking insulator side, recommended for cross section of wires $>100 \text{ mm}^2$. Cable head connection for vertical installation of switch.

Description																	Type	Ordering number
Third insulator set with porcelain insulators 36 kV																	NPAC11	1YMNNPAC11M0001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
D_							N											



Third insulator set for 36 kV switch with porcelain insulators
Application: rocking insulator side, recommended for cross section of wires >100 mm². Cable head connection for vertical installation of switch.

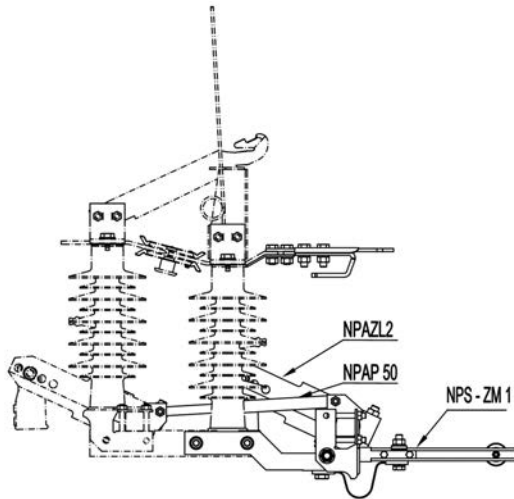
Description																	Type	Ordering number
Third insulator set with silicon insulators 1205 mm creepage 36 kV.																	NPAC11-J2	1YMNNPAC11MJ202
Third insulator set with silicon insulators 1365 mm creepage 36 kV.																	NPAC11-J3	1YMNNPAC11M-J31
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
E_							N											
F_																		



Third insulator set for 36 kV switch with silicon insulators
Application: rocking insulator side, recommended for cross section of wires >100 mm². Cable head connection for vertical installation of switch.

Field 9. Fixed side equipment:

Description	Type	Ordering number
Independent earthing switch	NPS-ZM1	1YMNNPS-ZMM1001
Earthing switch interlock	NPAP50	1YMNNPAP50M0001
Operating lever	NPAZL2	1YMNNPAZL2M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
B_	A	

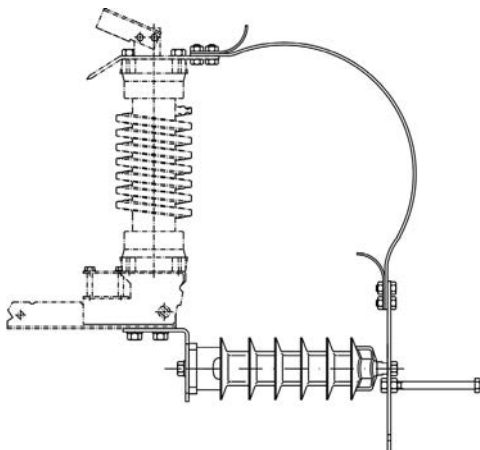


Earthing switch operated by the independent mechanism.

Application: For 24 kV switch with epoxy insulators

Shaft selection – see point 5

Description	Type	Ordering number
Flexible dropper set for surge arrester installation 24 kV	NPAC7	1YMNNPAC70M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A_		
B_	C	
C_		

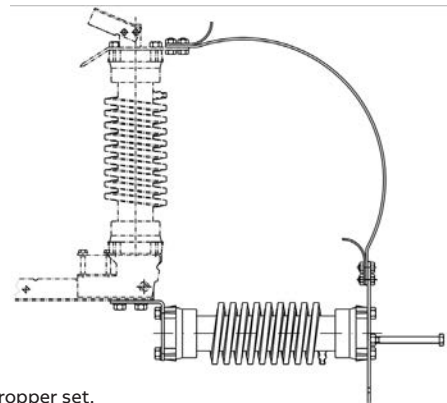


Flexible dropper set for surge arrester installation.

Application: For 24 kV switch. Cable head connection for horizontal installation of switch with surge arrester. Earthing bolt included.

– Surge arrester please specify separately.

Description	Type	Ordering number
Flexible dropper set with epoxy insulator 24 kV	NPAC7 + NPSZJ21	1YMNNPAC70M1001
Flexible dropper set with porcelain insulator 24 kV	NPAC7 + NPSZJ2	1YMNNPAC70M2001
Flexible dropper set with silicon insulator 24 kV	NPAC7 + NPSZJ31	1YMNNPAC70M3001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A_		
B_	B	
C_		

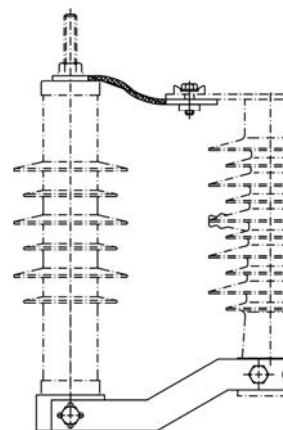


Flexible dropper set.

Application: For 24 kV switch. Cable head connection for horizontal installation of switch. Earthing bolt included.

Insulator ordered separately.

Description	Type	Ordering number
Surge arrester installation set.	NPAP5	1YMNNPAP5/M1001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A_		
B_	D	
C_		

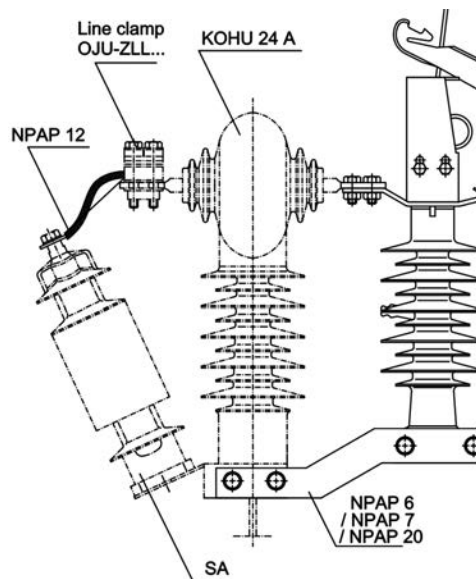


Surge arrester installation set.

Application: For 24 kV switch.

– Surge arrester please specify separately.

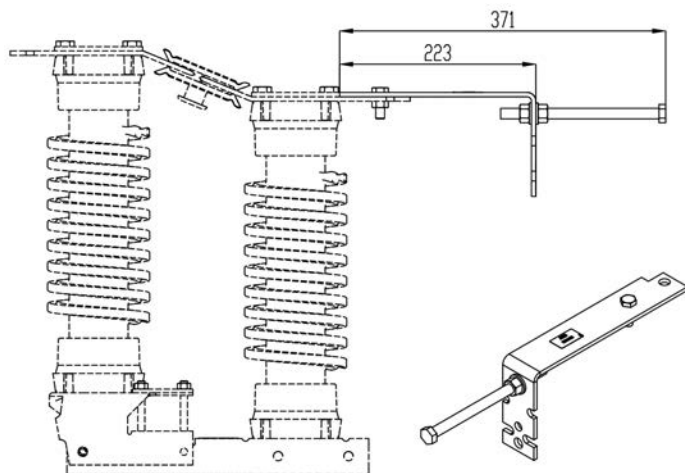
Description	Type	Ordering number
Set for CT installation, switch with epoxy insulators	NPAP6	1YMNNPAP60M0001
Set for CT installation, switch with porcelain insulators	NPAP7	1YMNNPAP70M0001
Set for CT installation, switch with silicon insulators	NPAP20	1YMNNPAP20M0001
Connecting cable CT- SA	NPAP12	1YMNNPAP12M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
A_		
B_		
C_		
	E	
	F	



Current transformer or Current transformer with surge arrester

Application: For 24 kV switch, current measurement function.

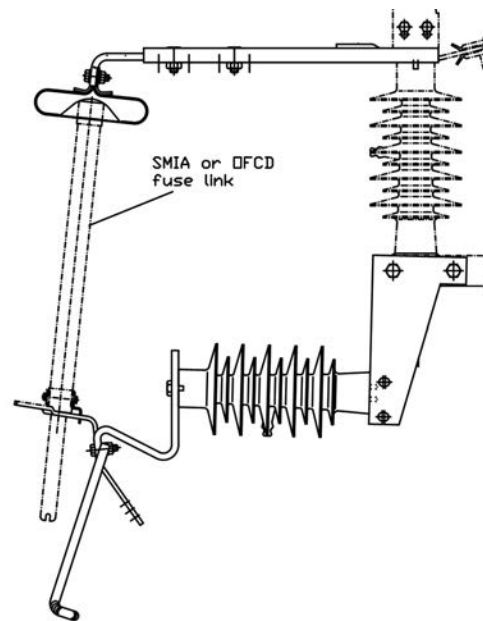
- CT type KOHU24 please specify separately.
- Surge arrester please specify separately.
- Line clamps selection – see point 7.



Dropping bar set

Application: Dropping bar set for connection of insulated cable. Earthing bolt included.

Description	Type	Ordering number
Fuse base	NPAF7	1YMNNPAF7-MJ201
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
B_		G



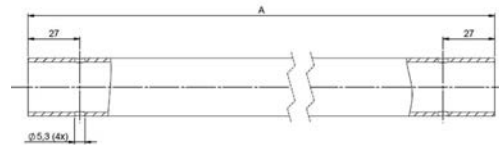
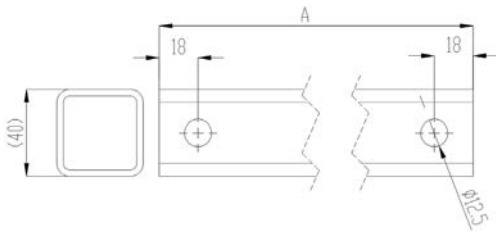
Fuse base.

Application: For 24 kV switch with epoxy insulators. Fuse base for OFCD or SMIA type fuse links. Fuse link not included

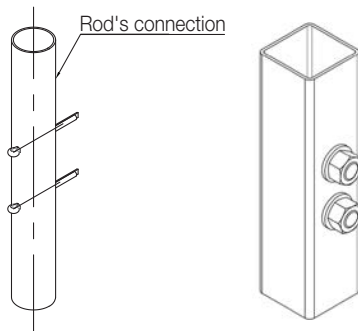
Description	Type	Ordering number
Dropping bar set	NPAC2	1YMNNPAC20M0001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17		
	H	

Field 10. Connecting rods:

Application					Dim. A [m]		φ [mm]		BxB [mm]		Type				Ordering number:		
Reciprocal drive					3		30		-		Rod 3 m				1YMNNPTOT3MT101		
Reciprocal drive					4		30		-		Rod 4 m				1YMNNPTOT3MT2S1		
Rotary drive					3		-		40x40		Rod 3 m				2RFA016290M0001		
Rotary drive					4		-		40x40		Rod 4 m				2RFA016073M0001		
field [10]					A		B		C		D		E		F		G
Type of rods					3 m		4 m		2x3 m		2x4 m		3x3 m		2x4 m+3 m		3x4 m
Length of rods [m]					3 m		4 m		6 m		8 m		9 m		11 m		12 m
Height of switch installation [m]					4,5 m		5,5 m		7,5 m		9,5 m		10,5 m		12,5 m		13,5 m
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
									A-G								



Description	Type	Ordering number														
Rod connection for reciprocal (up-down) operating drive	NPTOT3103T1	1YMNNPTOT3M1031														
Rod connection for rotary operating drive		2RFA016076M0001														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
--																



Rod connection

Application: To connect two operating rods together. Insulation is not provided.

Description										Type		Ordering number				
Silicon rod insulator										NPSZJ30		1YMNNPSZJ3M0002				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
										1						



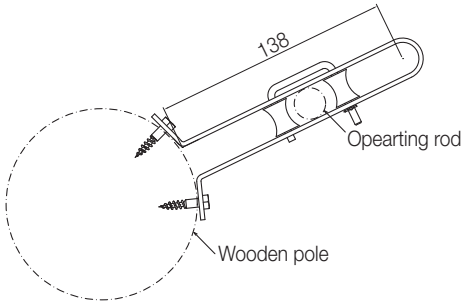
Rod insulator

Application: Standard silicon rod insulator. For switches up to 36 kV operated by reciprocal drive. To connect two operating rods together. Insulation is provided. Creepage distance 355 mm. One rod insulator for one set of rods.

Field 11. Rod's supports:

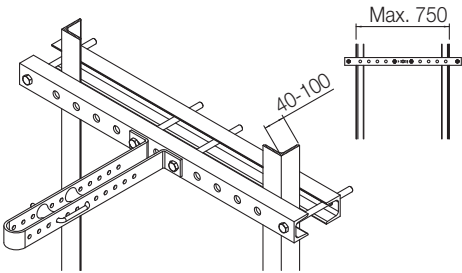
Application: For supporting operating rods in reciprocal drive. Preventing distortion of rods during operation. Minimum one rod's support for every operating rod. during operation. Minimum one rod's support for every operating rod.

Description																	Type	Ordering number
Rod's support for wooden pole																	NPAZL9	1YMNNPAZL9M0001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	A_	



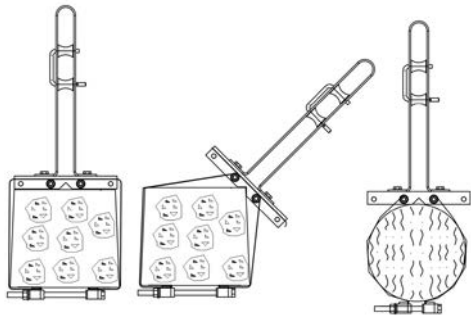
Rod's support for wooden pole
Application: Wooden pole. Fixed to the pole by two wood screws.

Description																	Type	Ordering number
Rod's support for lattice tower																	NPAM20/E1	1YMNNPAM20M/E11
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	F_	



Rod's support for lattice tower
Application: Steel lattice tower. Fixed to the pole by steel clamps and screws (see drawing).

Description																	Type	Ordering number
Rod's support for circular or rectangular pole																	NPAZL19/E3	2RFA016304M0001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	E_	

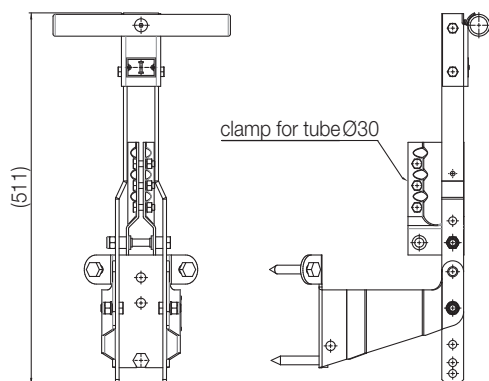


Rod's support for circular or rectangular pole
Application: Concrete or steel pole. Fixed to the pole by 2 m steel band (see drawing). Up to 500 mm diameter of pole.

Field 12. Operating drives:

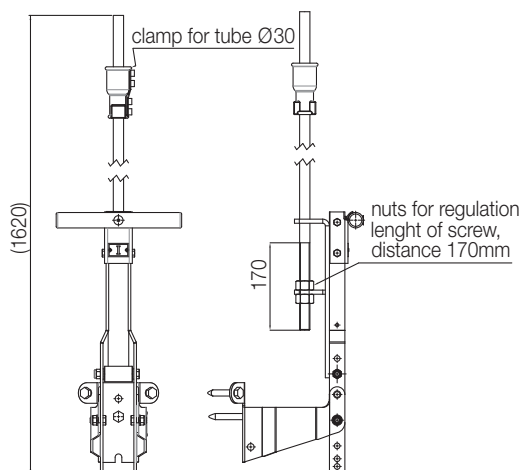
Application: For operation of the switch from the ground level.

Description																	Type	Ordering number
Manual operating drive																	UEKE3A1	1YMNUEKE3AM1001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
																	1	

**Manual operating drive**

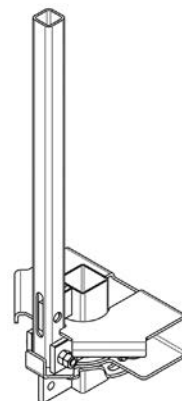
Application: Basic 2-position reciprocal drive for all switches. Two hand operation. Insulated handle. Padlocking in OPEN and CLOSED positions. Suitable for switch or earthing switch.

Description																	Type	Ordering number
Manual operating drive																	UEKE3B1	1YMNUEKE3BM1002
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
																	2	

**Manual operating drive**

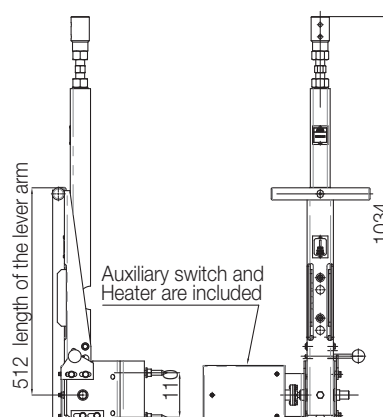
Application: 2-position reciprocal drive for all switches. With easy and fast adjustment screw. About 1m long additional rod. Recommended for wooden poles where regulation have to be performed every few years due to pole's dimensions change. Two hand operation. Insulated handle. Padlocking in OPEN and CLOSED positions. Suitable for switch or earthing switch.

Description																	Type	Ordering number
3-position rotary manual operating drive																	UEKE7A1	1YMNUEKE7AM1001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
																	4	

**Manual operating drive**

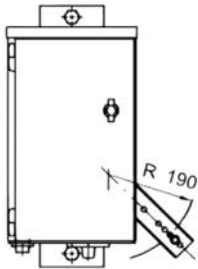
Application: 3-position rotary drive. Only for limited group of switches with epoxy insulators. Necessary for earthing switch NPAE7. Padlocking in OPEN, CLOSED and EARTHED positions.

Description																	Type	Ordering number
Manual operating drive with auxiliary switches																	UEKE2/A	1YMNUEKE2/M1001
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
																	3	

**Manual operating drive with auxiliary switches**

Application: 2-position reciprocal drive for all switches. With easy and fast adjustment screw. Recommended for wooden poles where regulation have to be performed every few years due to pole's dimensions change. Two hand operation. Insulated handle. Padlocking in OPEN and CLOSED positions. Additional 6NO + 6NC auxiliary switch in weather proof stainless steel box, equipped with anti-condensation heater. Suitable for switch or earthing switch.

Description				Type	Ordering number												
Motor operating drive				UEMC50	Please specify separately												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
											5						



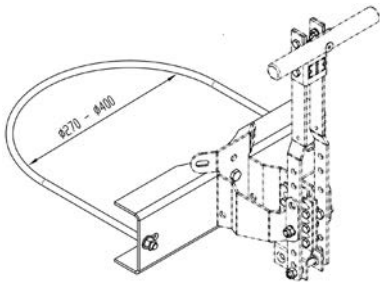
Motor operating drive

Application: 2-position reciprocal motor drive. Padlocking in OPEN and CLOSED positions.

For details and ordering numbers refer to the UEMC50 catalogue.

Field 13. Operating drive's fixing sets

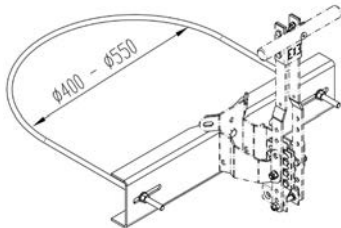
Description				Type	Ordering number												
Manual drive's fixing				NPAZM41	2RFA015922M0001												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
											A						



Manual drive's fixing.

Application: For all types of manual drives. Installation on circular concrete or steel pole. Diameter of pole ϕ 270-400 mm

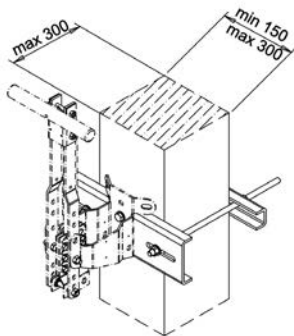
Description				Type	Ordering number												
Manual drive's fixing				NPAZM42	2RFA015970M0001												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
											B						



Manual drive's fixing.

Application: For all types of manual drives. Installation on circular concrete or steel pole. Diameter of pole ϕ 400-550 mm

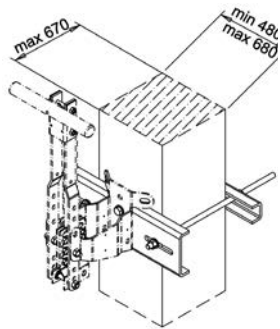
Description				Type	Ordering number												
Manual drive's fixing				NPAZM36	1YMNNPAZM3M6001												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
											C						



Manual drive's fixing.

Application: For all types of manual drives. Installation on rectangular concrete or steel pole. Dimensions of pole minimum 150x150 mm maximum 300-300 mm

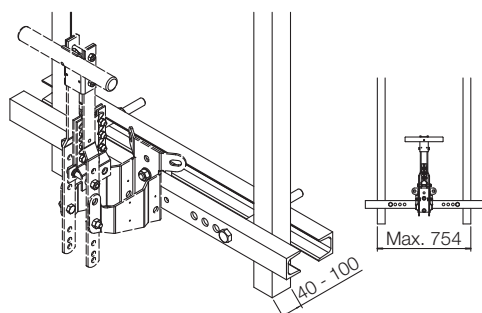
Description				Type	Ordering number												
Manual drive's fixing				NPAZM36/E1	1YMNNPAZM3M6/E1												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
											D						



Manual drive's fixing.

Application: For all types of manual drives. Installation on rectangular concrete or steel pole. Dimensions of pole minimum 480x200 mm maximum 680x670 mm.

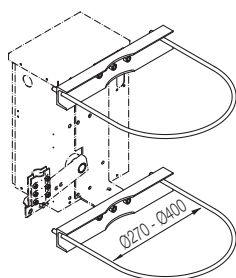
Description												Type	Ordering number				
Manual drive's fixing												NPAM21/E2	1YMNNPAM21M/E21				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
												E					



Manual drive's fixing.

Application: For all types of manual drives. Installation on steel lattice tower.

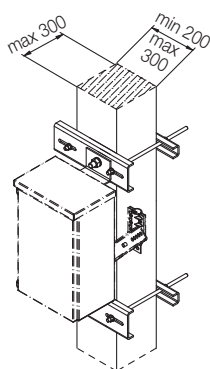
Description												Type	Ordering number				
Motor drive's fixing												–	1YMU000054M0003				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
												M					



Motor drive's fixing.

Application: For UEMC50 motor drives. Installation on circular concrete or steel pole. Diameter of pole $\phi 270-400$ mm

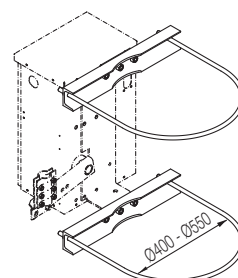
Description												Type	Ordering number				
Motor drive's fixing												UEMZ1066	1YMNUEMZ10M6601				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
												O					



Motor drive's fixing.

Application: For UEMC50 motor drive. Installation on rectangular concrete or steel pole. Dimensions of pole minimum 200x150 mm maximum 300-300 mm

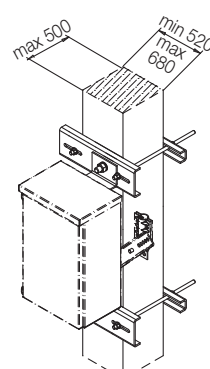
Description												Type	Ordering number				
Motor drive's fixing												–	1YMU000128M0001				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
												N					



Motor drive's fixing.

Application: For UEMC50 motor drives. Installation on circular concrete or steel pole. Diameter of pole $\phi 400-550$ mm

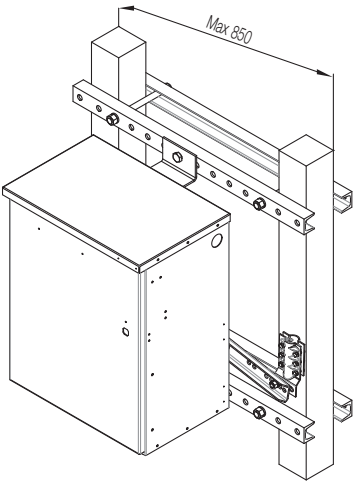
Description												Type	Ordering number				
Motor drive's fixing												UEMZ1146	1YMU000052M0001				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
												P					



Motor drive's fixing.

Application: For UEMC50 motor drive. Installation on rectangular concrete or steel pole. Dimensions of pole minimum 520x200 mm maximum 680-500 mm

Description																
Type																
Ordering number																
Motor drive's fixing																
NPAM21/E1 1YMNNPAM21M/E11																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
R																



Motor drive's fixing.
Application: For UEMC50 motor drive. Installation on steel lattice tower.

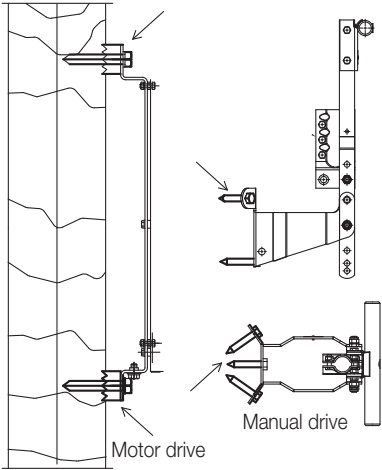
Field 14. Operating device for earthing switch from the fixed side
Please refer for detail description of drives to point 12.
Possible drive's fixing for earthing switches:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A																
A																
B																
C																

Field 15. Earthing switch operating device's fixing – fixed side
Please refer for detail description of drive's fixing to point 13.
Possible drives for earthing switches:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A																
A																
B																
B																
C																
C																
A																
B																
C																
D																
E																
Q																

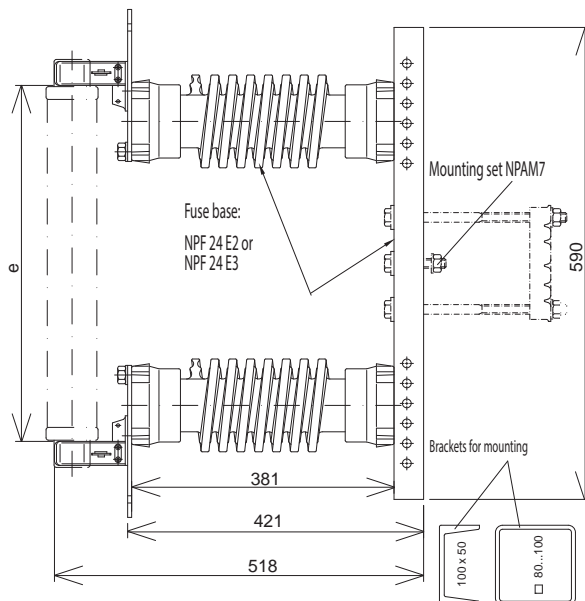
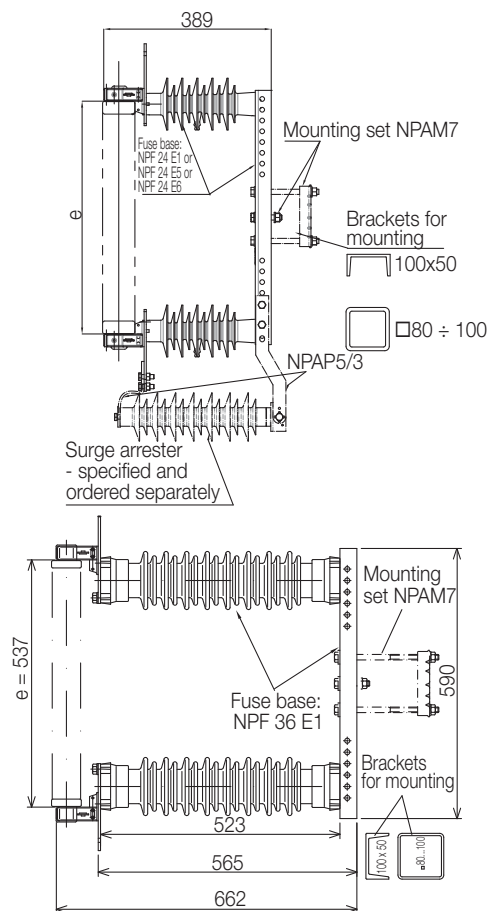
Description																
Type																
Ordering number																
Motor drive's fixing for wooden pole																
UEMZ1065 1YMU000017M0001																
Manual drive's fixing for wooden pole																
Included in manual drive																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Q																



Manual or motor drive's fixing.
Application: For manual or motor drive. Installation on wooden pole.
Fixed to the pole by wood screws.

Fuse bases

Independent fuse bases for separate mounting. Designed for fuses according DIN43625 standard. Recommended fuse links type: ABB CEF-U



Description	Insulator's creepage distance [mm]	Rated voltage [kV]	Rated impulse withstand voltage [kV]	Rated power frequency withstand voltage [kV]	Rated current [A]	e [mm]	Type	Ordering number (single phase element)
7,2 kV fuse base, epoxy insulators	755	7,2	60	20	160	292	NPF12E1	1YMN000127M0001
12 kV fuse base, epoxy insulators	755	12	75	28	100	292	NPF12E1	1YMN000127M0002
17,5 kV fuse base, epoxy insulators	755	17,5	95	38	63	292	NPF12E1	1YMN000127M0003
17,5 kV fuse base, epoxy insulators	755	17,5	95	38	160	442	NPF24E5	1YMN000128M0001
24 kV fuse base, epoxy insulators	755	24	125	50	63	442	NPF24E5	1YMN000128M0002
24 kV fuse base, epoxy insulators	755	24	125	50	100	537	NPF24E6	1YMN000129M0001
24 kV fuse base, porcelain insulators	620	24	125	50	60	442	NPF24E2	1YMN000130M0001
24 kV fuse base, porcelain insulators	620	24	125	50	100	537	NPF24E3	1YMN000130M0002
36 kV fuse base, porcelain insulators	900	36	170	70	40	537	NPF36E1	1YMNPF36EM1001
Fuse base mounting to crossarm							NPAM7	1YMNPNAM70M0001
Surge arrester support							NPAP5	1YMNPNAP5/M1001

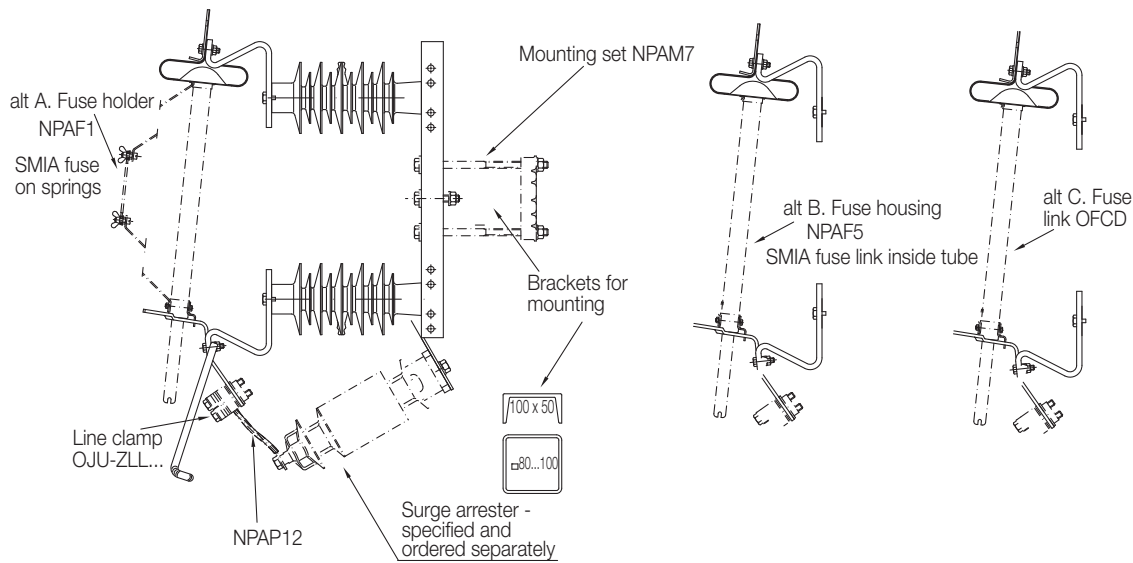
Fuse links and surge arrester ordered separately.

Crossarm selection – see point 3.

Crossarm's fixing to poles – see point 4.

Line clamps – see point 7.

Independent fuse bases for separate mounting. Designed for fuses type SMIA-KR or OFCD.



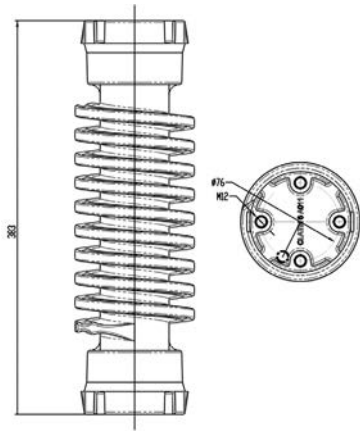
Description	Insulator's creepage distance [mm]	Rated voltage [kV]	Rated impulse withstand voltage [kV]	Rated power frequency withstand voltage [kV]	Rated current [A]	Type	Ordering number (single phase element)
24 kV fuse base, epoxy insulators	755	24	125	50	63	NPF24B2	1YMNNPF24BM2001
Accessories:							
Fuse base mounting to crossarm						NPAM7	1YMNNPAM70M0001
Connecting cable: fuse base- surge arrester						NPAP12	1YMNNPAP12M0001
SMIA fuse's holder. Fuse link installed on springs. When the fuse blow up visible break will be created						NPAF1	1YMNNPAF10M0001
SMIA fuse's housing. Fuse link installed inside the housing						NPAF5	1YMNNPAF5/M1001

Fuse links			
SMIA-KR 24kV:			
Current [A]	Type	Ordering number – One box (set of 12 pcs):	
4	SMIA-KR 4	1YMNSMIAKRM0401	
6	SMIA-KR 6	1YMNSMIAKRM0601	
10	SMIA-KR 10	1YMNSMIAKRM1001	
16	SMIA-KR 16	1YMNSMIAKRM1601	
20	SMIA-KR 20	1YMNSMIAKRM2001	
25	SMIA-KR 25	1YMNSMIAKRM2501	
35	SMIA-KR 35	1YMNSMIAKRM3501	
50	SMIA-KR 50	1YMNSMIAKRM5001	
63	SMIA-KR 63	1YMNSMIAKRM6301	
OFCD 24kV:			
Current [A]	Type	Ordering number 1pc:	
6,3	OFCD 24/6,3	1YMNOFCD24M0601	
16	OFCD 24/16	1YMNOFCD24M1601	
25	OFCD 24/25	1YMNOFCD24M2501	

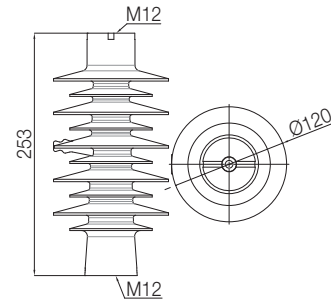
- Crossarm selection – see point 3
- Crossarm's fixing to poles – see point 4
- Line clamps selection – see point 7

—
Spare parts, insulators:

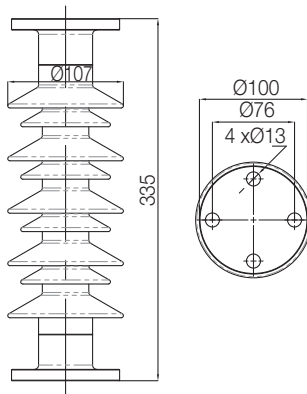
Description	Type	Ordering number
Porcelain insulator 24 kV, 620 mm creepage distance	NPSZJ2	1YMNNPSZJ2M0001



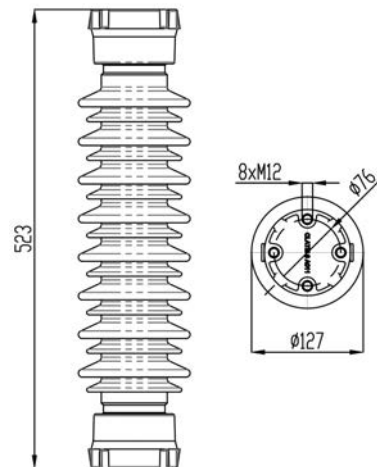
Description	Type	Ordering number
HCEP epoxy insulator 24 kV, 755 mm creepage distance	NPSZJ21	1YMNNPSZJ2M1002



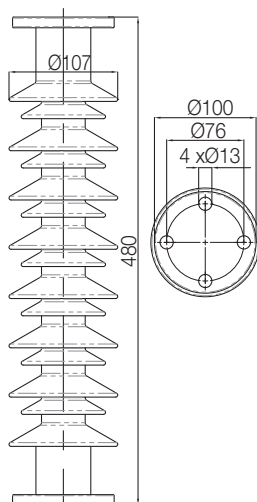
Description	Type	Ordering number
Silicon insulator 24 kV, 760 mm creepage distance	NPSZJ31	1YMNNPSZJ3M1001



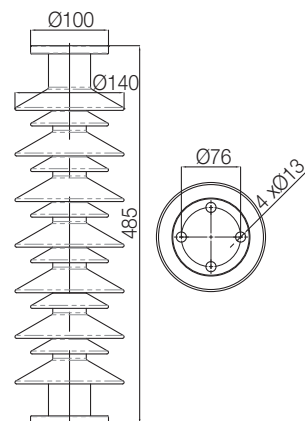
Description	Type	Ordering number
Porcelain insulator 36 kV, 900 mm creepage distance	NPSZJ3	1YMNNPSZJ3M0011



Description	Type	Ordering number
Silicon insulator 36 kV, 1205 mm creepage distance	NPSZJ32	1YMNNPSZJ3M2001

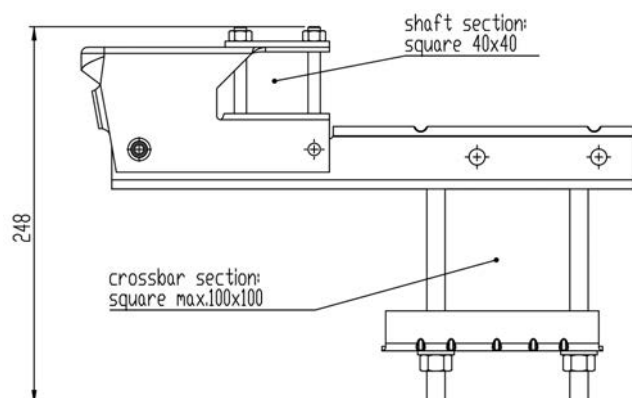


Description	Type	Ordering number
Silicon insulator 36 kV, 1365 mm creepage distance	NPSZJ33	1YMNNPSZJ3M3001

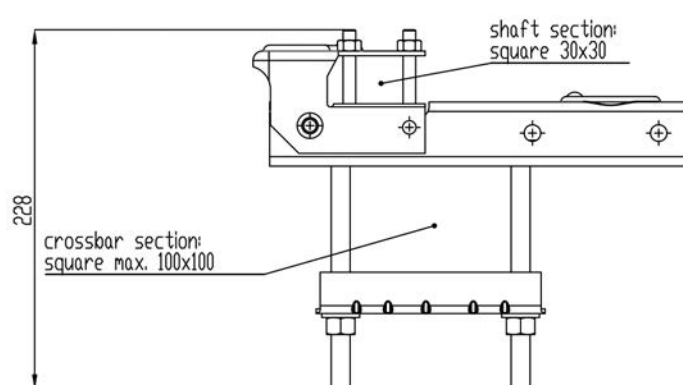


Spare parts, bearings/frames:

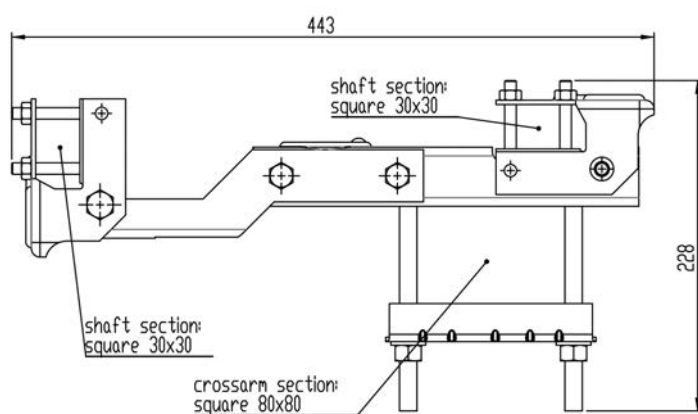
Description	Type	Ordering number
– Bearing for NPS installation between 2 poles; for shaft 40x40; switch with porcelain or silicon insulators – Or frame replacement	NPAZL3	1YMNNPAZL3M0002



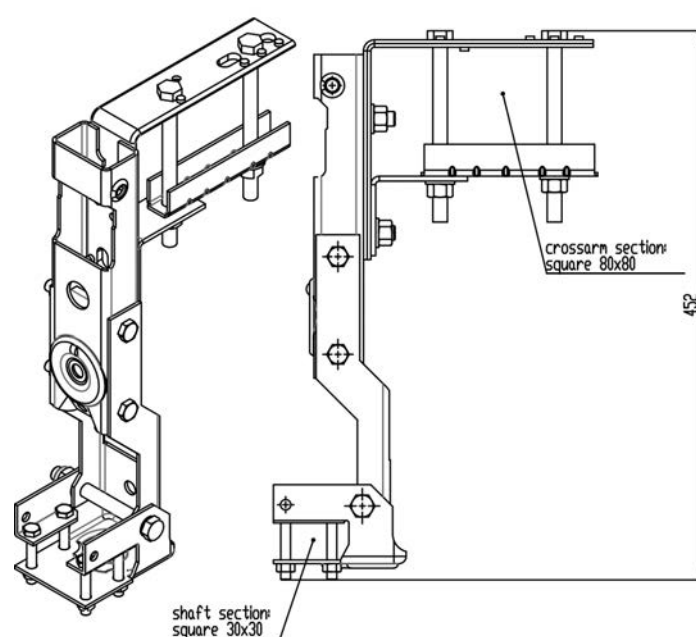
Description	Type	Ordering number
– Bearing for NPS installation between 2 poles; for shaft 30x30 switch with epoxy insulators – Or frame replacement	NPAZL4	1YMNNPAZL4M0001



Description	Type	Ordering number
– Bearing for the NPS switch and the earthing switch from fixed side; for shaft 30x30; switch with epoxy insulators – Or frame replacement	NPAZL41	1YMNNPAZL4M1001



Description	Type	Ordering number
– Bearing for the earthing switch from rocking side; for shaft 30x30; switch with epoxy insulators – Or frame replacement	NPAZL36	1YMNNPAZL3M6001



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- standard two years warranty
- for technical enquiries please contact the factory or relevant local ABB representative (see www.abb.com for contact details),

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- factory based training: two-day training course designed for participants to become proficient in application, installation, operation, maintenance, testing, and commissioning of NPS.

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