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OUTDOOR SECTION SWITCH

Type VLK

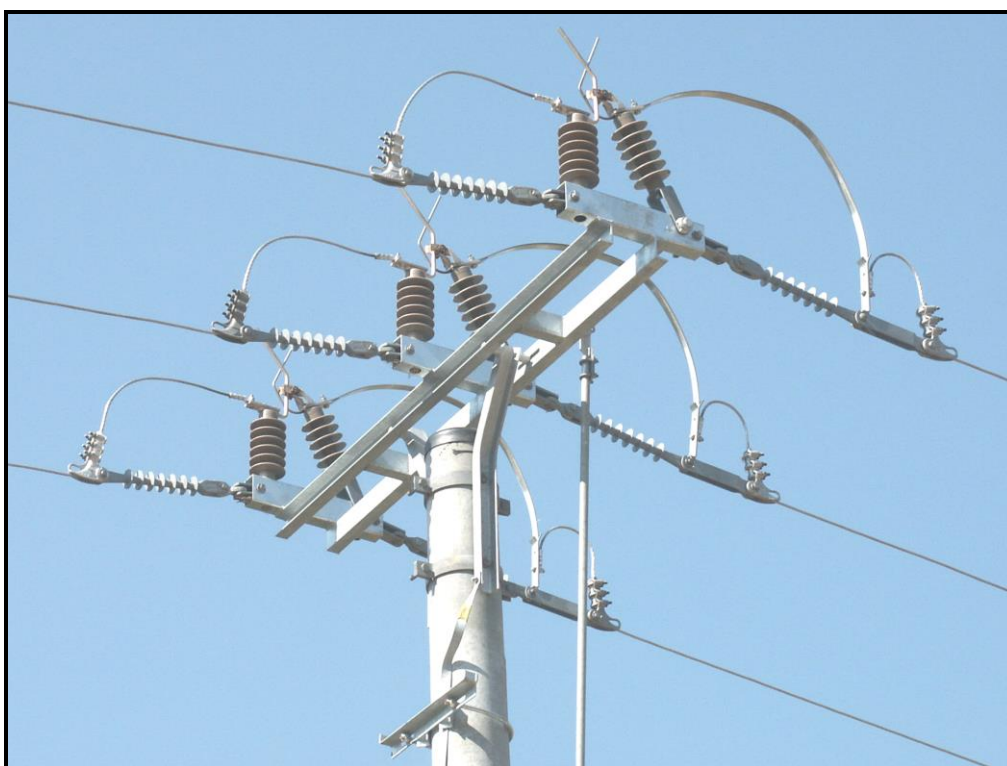
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12; 25 and 38.5 kV; 400 to 630 A

## ACCOMPANYING DOCUMENT

Holder of certificates TÜV CZ according to:

ČSN EN ISO 9001: 2001  
ČSN EN ISO 14001: 2005



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PD 013/07/2002-A

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INŽENÝRSKO - VÝROBNÍ ELEKTROTECHNICKÝ PODNIK, A.S.

## ASSEMBLY RULES

**1. The section switch** (see Fig. 2) is assembled to the pole using 2 tightening supports H. The support is secured to the pole in accordance with Fig. 3.

- A. Fastening to a wooden pole – using two M20x400 stud bolts.
- B. Fastening to a concrete pole using two R 120 sleeves. Each sleeve consists of two parts linked each to the other with two M16x80 screws. Tightening of the supports to the sleeves is done using M20 nuts with shims (21).

The section switch frame is secured to the tightening supports using four M16x30 screws.

### 2. How to assemble the drive mechanism

Usually the manual drive mechanism (position 1, Fig. 2) with the corresponding pullrods, are mounted to the pole in a position which is turned round by 90° in respect to the power line (the mounting position may also be in parallel with the power line). Then we fix the drive mechanism to the pole using two sleeves and two holders (position 9, Fig. 2), at an altitude of 1200 to 1250 mm above the ground. Fixing to the holders occurs through two M16x30 screws.

### 3. Assembly of the rocking bearings

The lower (position 2, Fig. 2) and the upper (position 3, Fig. 2) rocking bearings are secured to the pole using the sleeves.

The upper rocking bearing is provided with a single-arm clamping terminal with a barrel-type bushing which makes possible to diverge the upper pull rod by up to 10° to either side.

### 4. Assembly of the pull rods and the adjustment of the section switch stroke

Common types of the poles, i.e. the 9/6; 10,5/6 and 12/6 types are each provided with three pull rods of various length, in accordance with the pole type. The lower operation pull rod (position 4, Fig. 2) is provided with the G1" thread from one side. This threaded end is then screwed into the driving pull rod coupling (Fig. 4), and the other end fixed in the stirrups of the lower rocking bearing clamping terminal. The middle position pull rod (position 5, Fig. 2) consists of a threadless tube coupling, clamped into the rocking bearing stirrups. The upper control pull rod (position 6, Fig. 2) is then clamped into the stirrups of the rocking clamping terminal (position 7, Fig. 2), linked through a bolt with the cut-in lever (position 8, Fig. 2). The clamping point is situated in the last but one hole, starting from the section switch shaft, at its one side, and into the single-arm rocking clamping terminal (position 7, Fig. 2) of the upper rocking bearing (position 3, Fig. 2) at its other lower side.

### 5. Adjustment of the drive mechanism

- a) Put the section switch and the drive mechanism into ON switching position. The end stop for both the ON and OFF switching position has been carefully adjusted at the manufacturer's plant.
- b) Measure and adapt the length of the medium position pull rod pipe (position 5, Fig. 2), and fix temporarily the pull rod into the clamping terminals (using e.g. the central stirrup of each of the terminal).

### ATTENTION!

Incorrect assembly of the sleeves with pull rod bearings results in the decrease of the stroke and the non-achievement of the load-break switch's ON and OFF positions. Verify that a displacement of the hand drive lever to an angle of 90° from the pole axis causes the same angle deviation (90°) at all the interbearings (see Fig. 6 – the pull rods).

In the B point inspect that the stop rocker arm on the section switch shaft bears on the stops in both the ON and OFF switching positions (see Fig. 6).

In the C point inspect whether there is a coupling pull rod between the barrel-type sleeve (on the cut-in lever) of the single-arm clamping terminal and the barrel-type sleeve of the single-arm terminal of the upper rocking bearing (see Fig. 6).

Improper assembly of the pull rod (caused mostly by a confusion in the replacement of the rocking bearings with barrel-type for those with the cylindrical-type sleeve, or by an improper assembly of the interbearing (interbearing turned round by 180°) may be detrimental to the control force acting on the

manual drive mechanism (displacement and turnign up of the clamping terminals at the joint sections, bending of the pull rod).

- c) The drive mechanism and the section switch are properly adjusted when the stop position for both the ON and OFF switching position have been achieved even when operated in a slow manner. In the ON switching position the drive mechanism pull rod has to act under spring (generated by pressure developed by the drive mechanism) which is necessary for keeping the stop always at its limit position.
- d) After a few testing switching operations and after having verified the proper function of the drive mechanism and that of the section switch, retighten and check all the M10 nuts of the clamping terminal stirrups, and the M16 nuts to fix the rocking bearings and the drive mechanism together.
- e) Any interference being not in conformity with the manufacturer's instructions may be detrimental to the mechanical and electrical properties of the switching device. Such an interventions, when performed during the warranty period, make the manufacturer's warranty void and null.

**NOTE:**

Pole earthing conductor is to be connected to the identified point on the drive unit.

The assembly and connection of the overhead and outdoor lines, as well as the earthing connection (to the engineering specifications, section No. 18 and 19) is not the subject of this assembly instructions and, as such, it is to be carried out in conformity with the regulations issued by the utility companies.

## **MAINTENANCE INSTRUCTIONS**

The VLK type section switch features a switching device which necessitates only a very limited extent of maintenance and revision works to have performed. In order to ensure the required reliability of the device it is recommended to check the device and the drive mechanism visually on a regular basis (approx. once a year).

The purpose of such a visual inspection is also the verification of the state of insulators.

Section switches being out of operation for a longer period should regularly be switched ON and OFF in no-load state, which provides for the cleaning of the contact surfaces and enables to verify the correct mechanical operation of the switching device.

In the course of the revision works, which are recommended to be performed once in 10 years in the voltage-free state of the switching device, the following servicing works are performed:

- a) Verification of the state of main contacts, cleaning and greasing of the contact surfaces using the „Barrieta L 55/1“ grease (manufacturer: Klüber Lubrikation – Germany)
- b) Verification of the state of bearings, cleaning and greasing with the „plastic MOGUL G 3 grease (to ČSN 656912).
- c) Inspection of the state of supporting and tensile insulators. Cleaning of the insulators.
- d) Verification of the mechanical operation of both the drive mechanism and the section switch.

## **PACKING AND TRANSPORT REGULATIONS**

- a) The packing takes place using transport crates made available by the manufacturer. During the transport the section switch is in ON switching position.
- b) The transport may be carried out using any available transport means.
- c) During the transport it is not necessary to protect the switching device against the atmosphere. Take care when depositioning the device. It is forbidden to unload the device by leaning it on the contact horns or other parts of the contact system.
- d) The assembly procedures when mounting the section switch on the pole are described in the „Assembly rules“ section.

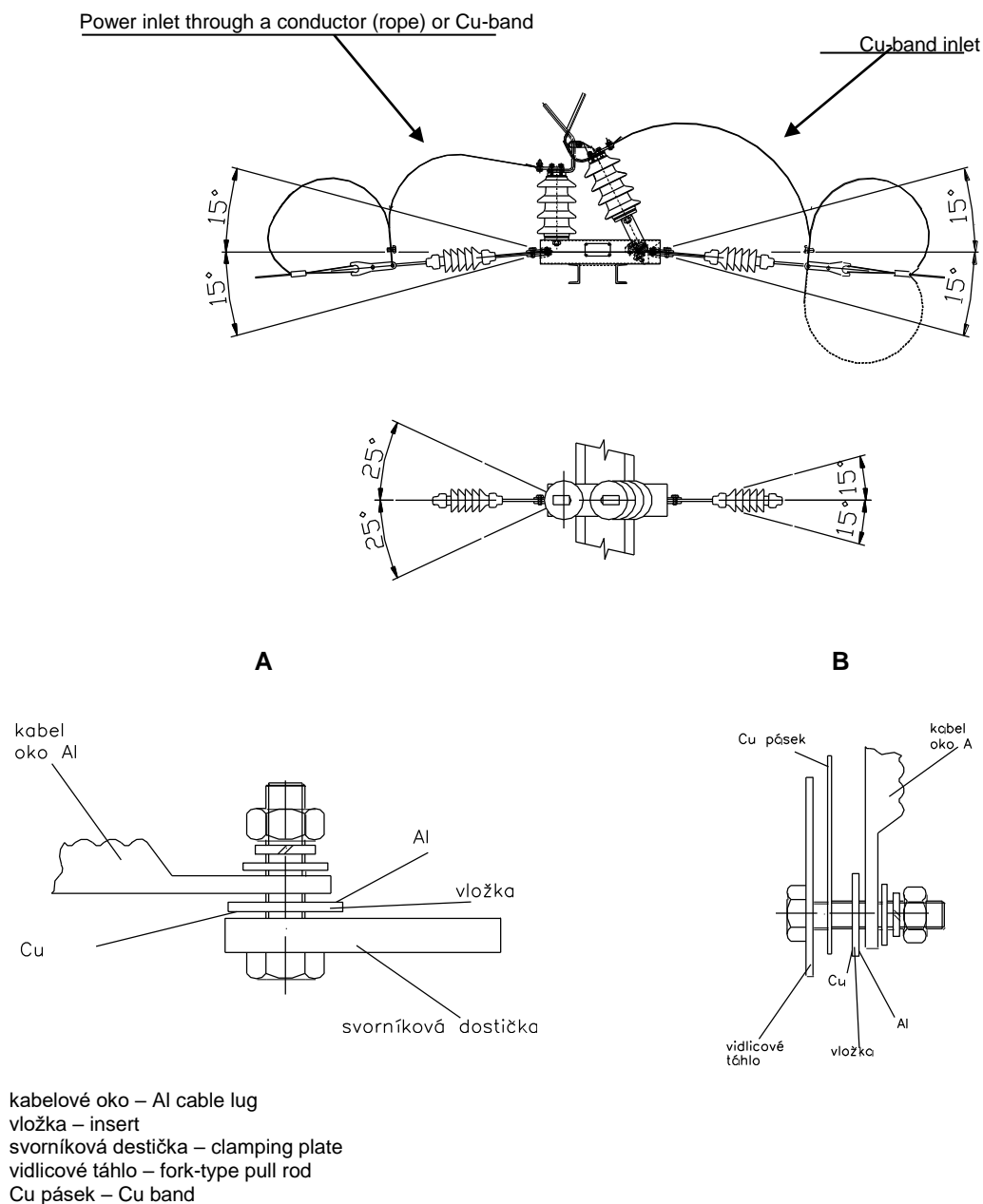
## LIST OF APPENDICES

- Fig. 1 Connection of the VLK section switch to the line
- Fig. 2 Arrangement of the VLK section switch for the assembly with the drive mechanism
- Fig. 3 Mounting the VLK section switch to the pole
- Fig. 4 Hand operated drive mechanism
- Fig. 5 Types of the supporting bearings used
- Fig. 6 Correct assembly steps
- Fig. 7 Concrete pole diameters chart

## CONNECTION OF THE SECTION SWITCH TO THE LINE

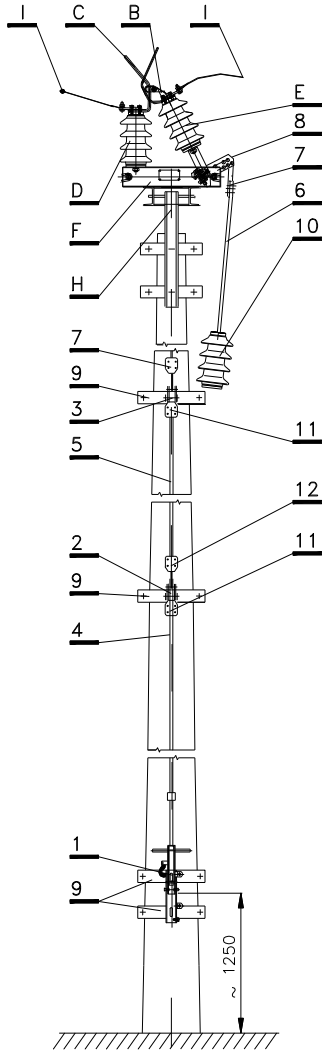
Fig. 1

### Inlets



## ARRANGEMENT OF THE VLK SECTION SWITCH WHEN MAKING THE ASSEMBLY WITH THE DRIVE MECHANISM

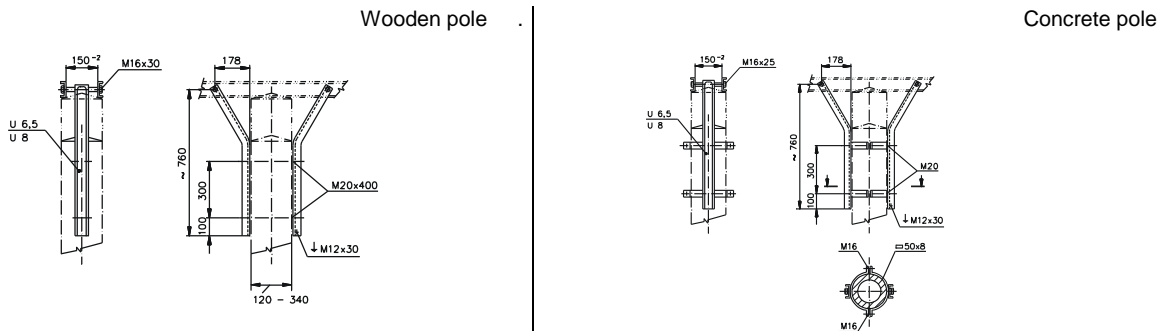
obr. 2



- B – main current-carrying path
- C – auxiliary current-carrying path  
(arc quenching contact system)
- D – fixed supporting insulator
- E – rocking supporting insulator
- F – supporting frame
- H – tightening supports
- I – flexible band inlets
- 1 – hand operated drive mechanism
- 2 – lower rocking bearing
- 3 – upper rocking bearing
- 4 – lower control pull rod
- 5 – central control pull rod
- 6 – upper control pull rod
- 7 – single-arm clamping terminal, with barrel sleeve
- 8 – cut-in lever
- 9 – tightening sleeves  
(R 130; R 155; R 178)
- 10 – insulator in the inside of the pull rod  
(for wooden poles, only)
- 11 – two-arm clamping terminal
- 12 – single-arm clamping terminal without barrel sleeve

## MOUNTING THE SECTION SWITCH TO THE POLE

Fig. 3



The section switch can be fixed straight on to the mast head

## MANUAL DRIVE MECHANISM

## TYPES OF SUPPORTING BEARINGS USED

Fig. 4

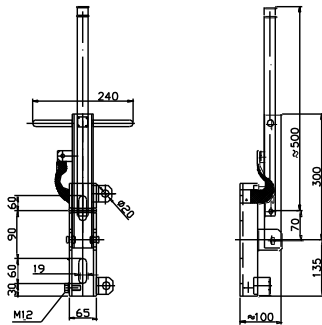
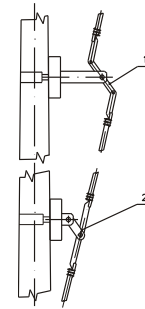


Fig. 5



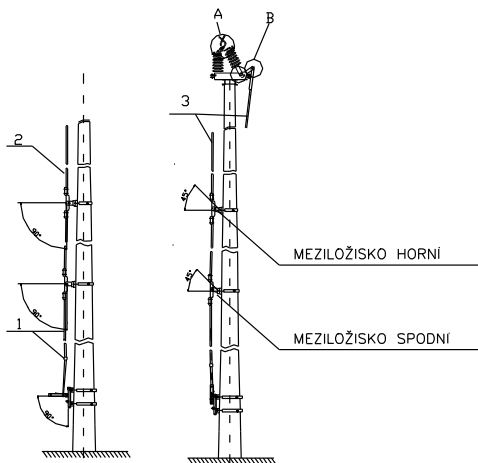
1 – Turn-round bearing  
2 – Rocking bearing

## CORRECT ASSEMBLY STEPS

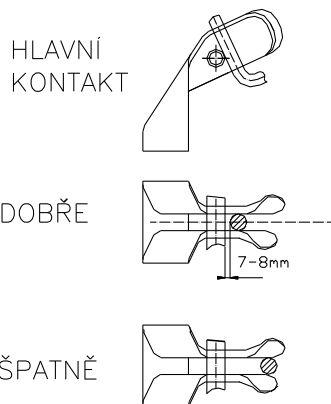
Fig. 6

### CONTROL PULL RODS – ADJUSTMENT

meziložisko horní – upper interbearing  
meziložisko spodní – lower interbearing



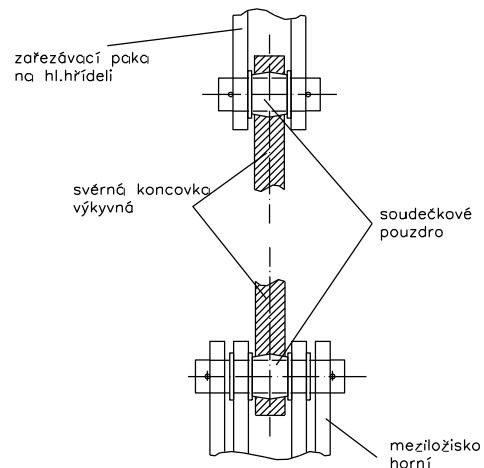
### MAIN CONTACT – „A“ INSPECTION POINT



HLAVNÍ KONTAKT = MAIN CONTACT  
DOBŘE = CORRECT  
ŠPATNĚ = NOT CORRECT  
DORAZ KONCOVÉ POLOHY = END POSITION STOP

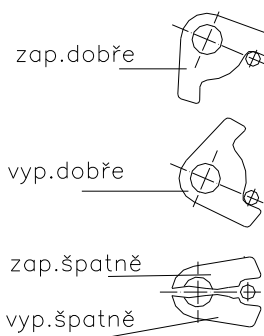
### ASSEMBLY OF THE NO. 3 PULL ROD – INSPECTION POINT C

zařezávací páka na hl. hřídeli – cut-in lever on the main shaft  
svěrná koncovka výkyvná – clamping rocking terminal  
sudečkové pouzdro – barrel-type sleeve  
meziložisko horní – upper interbearing



### END POSITION STOP – INSPECTION POINT „B“

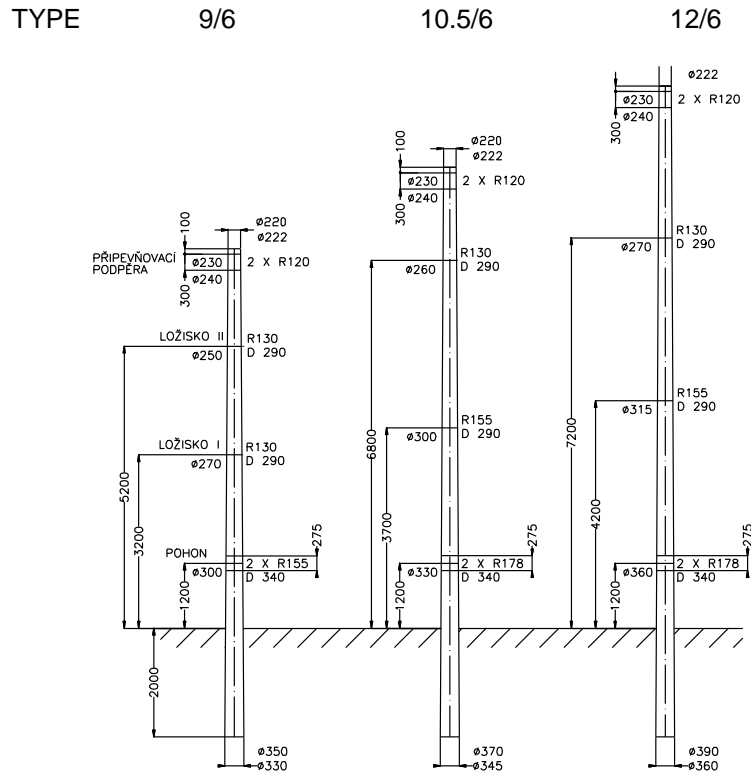
#### DORAZ KONCOVÉ POLOHY



ZAPNUTÍ DOBŘE = ON POSITION CORRECT  
VYPNUTÍ DOBŘE = OFF POSITION CORRECT  
ZAP. ŠPATNĚ = ON POSITION NOT CORRECT  
VYP. ŠPATNĚ = OFF POSITION NOT CORRECT

**CHART OF DIAMETERS OF CONCRETE POLES MANUFACTURED BY THE UTILITY COMPANIES „JČE“ AND „ELEKTROVOD SENEC“, AND THE CORRESPONDING SLEEVES AND HOLDERS**

Fig. 7



DESIGNATION OF THE SLEEVE	USED FOR DIAMETER	DRAWING NUMBER
R 120	230; 240	62 - 2433
R 130	250; 260; 270	42 - 4251
R 155	300; 315	42 - 4252
R 178	330; 360	42 - 4253
D 290	interbearing holder	32 - 1147
D 340	holder of the drive mechanism	32 - 1143

**CU – FLEXIBLE POWER INLETS**

POLE DESIGN	ANCHORAGE	RATED VOLTAGE KV	LENGTH OF THE INLET		NUMBER OF 400A BANDS FOR 1 PIECE OF SWITCHING DEVICE
			FIXED SUPPORT	MOVABLE SUPPORT	
wooden and concrete pole	single type	25	1100 prod. No. 62-2150	1340 prod. No. 62-2150	3 + 3
		38.5	1340 prod. No. 62-2151	1540 prod. No. 62-2152	3 + 3
	double type	25	1340 prod. No. 62-2151	1540 prod. No. 62-2152	3 + 3
		38.5	1540 prod. No. 62-2152	1740 prod. No. 62-1934	3 + 3

**Note:**

The Cu power inlet bands on the fixed support side may be replaced by an extension of the outdoor line conductor, fixed by a cable lug to the supporting insulator connecting flag. Aluminium lugs are provided with a plate made of „Cupal“ brand of material.

## LIST OF ACCESSORIES

Item No.	Name	pcs
1.	Manual drive mechanism	1
2.	Rocking bearing	1
3.	Upper rocking bearing (with rocking clamping terminal)	1
4.	Lower control pull rod (with G1" thread)	1
5.	Central control pull rod	1
6.	Upper control pull rod	1
7.	Single-arm clamping terminal with barrel-type sleeve	1
8.	Cut-in lever	1
9.	Fastening sleeve	4
10.	Insulator mounted in the pull rod (for wooden poles only)	1
11.	Drive mechanism holder	2
12.	Fastening holder H	2
13.	Fork-type pull rod with guide rail	6 (3)*
14.	R 120 sleeve	2 pair
15.	Cu power inlet – 1 set of 3 pcs	6 (3)*

\*) see the „Note“ under the chart of Cu-flexible power inlets

## LIST OF TOOLS NECESSARY FOR MOUNTING THE VLK TYPE SECTION SWITCH ONTO A POLE/MAST

1.	ring spanner No.	24
2.	open-end wrench No.	24
3.	socket wrench No.	17
4.	socket wrench No.	30

Manufactured and supplied by:

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