PKT

# پارس کلید تابان

POLE MOUNTED 3-WAY

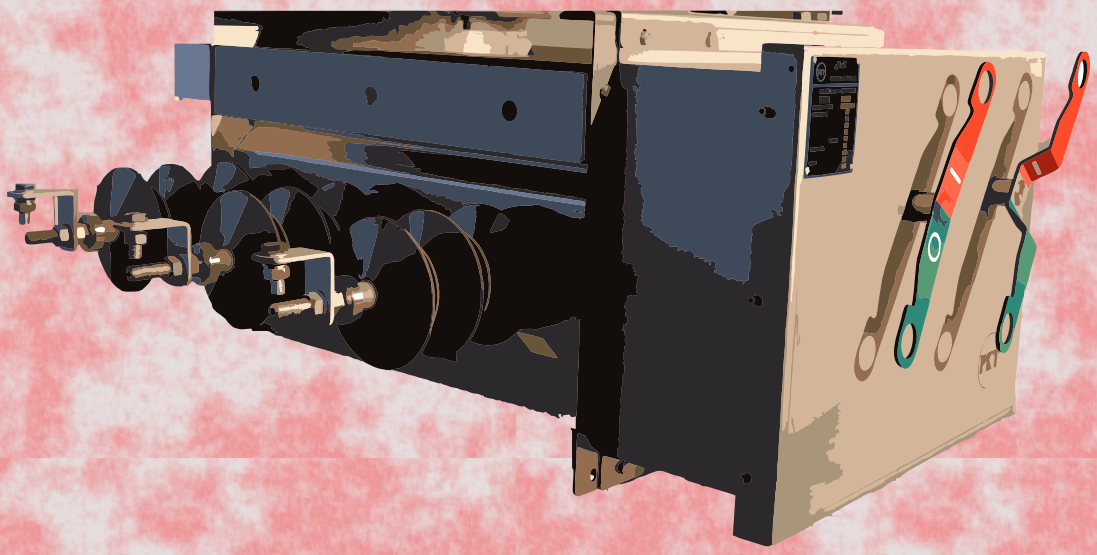
SWITCH-DISCONNECTOR

**O-ISec/D**

SWITCH-DISCONNECTOR WITH

DOUBLE EARTHING SWITCH

**O-ISec/E**



# Catalog and User Guide

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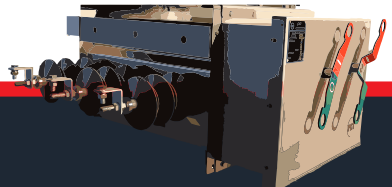


## Preface

### : Nomenclature

To avoid any misunderstanding the Sectos **O-ISec** switch-disconnector is referred .simply as the Sectos in this manual

## 1. General description

Sectos **O-ISec/D** is an $SF_6$-insulated, pole mounted 3-way switch-disconnector for demanding outdoor environments. The outer cone cable connector interface makes it suitable also for padmount use. Two independent switch-disconnectors in one hingcenclosure with the third tapped way can be used for easy and reliable line bran tin overhead, cable, or mixed networks. It has excellent load breaking and faul tors.cmaking capacity and satisfies the isolation requirements specified for disconne The earthed metal tank prevents all possible leakage currents across an open .switch

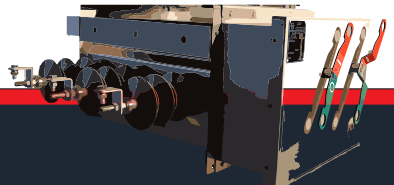
Sectos **O-ISec/E** is like **O-ISec/D**, but the tapped way is disabled. It can be used as .a normal switch with earthing option in both directions

**Connections**:

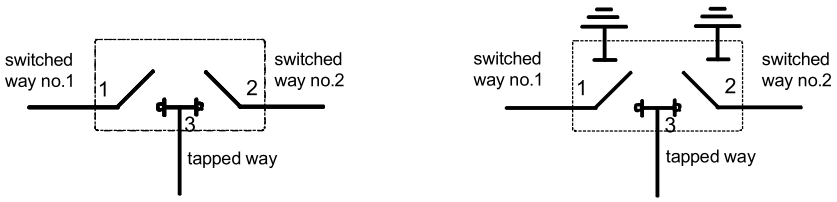
It is possible to connect Sectos to an overhead line directly, or to a cable network with a 400-series cable connector (DIN 47636, EN 50181:1997 type C, EDF HN 52-S-61). Optional interface: IEEE Std 386-1995 Fig.11 600 A dead-break interface No.1, 8.3 kV and 15.2 kV.

### : Earthing switch

Type **O-ISec/D** is also available with an integrated earthing switch for safe and reliable earthing of the downstream line. This version is called a 3-position switch to differentiate from the standard 2-position switch. The earth position is only switched manually and not via the motor drive.



In types **O-ISec/E** one operating mechanism is used for normal switching and ehearthing one direction. The second mechanism is needed only for earthing t opposite direction




Two-position 3-way
switch types O-ISec/D

Three-position 3-way
switch types O-ISec/E

Fig 1. Switch types.

**: Installation**

.The Sectos type **O-ISec/D** can be mounted horizontally below the crossarm

**Manual operation**:

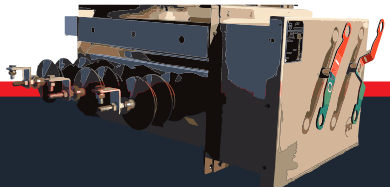
The 3-way switch has two independent operating mechanisms, one in each end numbered 1 and 2. Manual operation is possible by an insulated hook-stick.

**Motor operating device:**

Sectos switches can be supplied with an integrated motor drive for remote control of closing and opening operations. The integrated motor drive needs no mechanical adjustments on site. One control cable for each switch is required. See guide 34 UEMC 45_. The earthing switch operation shall always be done manually for safety reasons.

**Manual locking device :**

Horizontally mounted switches can be mechanically locked in any position. The locking position can be secured using a plastic chain fitted with a padlock. The motor control circuit is automatically disabled in the locked position. An alarm contact for remote indication is available. This option cannot be fitted with the low pressure lock out mechanism option.



**Position indication**:

The large position indicator symbols and reflective colours are easily visible even at night by using a flashlight.

The reliable indication of the device fulfils the design and testing requirements of IEC 129 A2 (1996) and the French standard NFC 64-140 (1990).

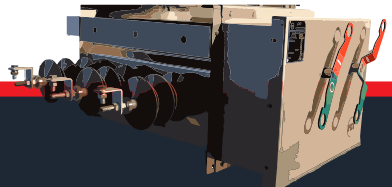
**Gas monitoring**:

The Sectos withstands the rated voltage even if the gas density has reduced, but operation of the device might then result in a hazardous situation. To guarantee safe operation under all circumstances, a density device is fitted.

The gas pressure inside the closed tank fluctuates with temperature. The Sectos ratings are not affected by these normal pressure changes. An ideal gas monitoring system is based to gas density rather than pressure. Three alternative means are provided :

1. Gas density switch. The Sectos is normally equipped with a gas density switch. If the switch is connected to a remote control system, it is recommended that the low pressure contact be wired to the alarm channels and the motor be prevented from operating. The change-over type alarm contact also provides for an alarm function in case of wiring failures. The standard gas density switch is temperature compensated and is independent of the ambient atmospheric pressure. The contacts are wired through the control cable of switch No.1.

2. Low pressure locking mechanism is an optional accessory and installed at the factory. If the pressure falls, the locking mechanism prevents the operation and a red alarm text “GAS LOW” is shown in front of the position indicator. This mechanism is especially suited to manually operated Sectos switches, when electrical alarm functions are not practical. An auxiliary contact is provided for possible remote indication. If the low pressure mechanism has operated, the gas pressure has to be increased to the normal level before the mechanism resets automatically and the Sectos is operational. This option cannot be fitted together with the manual locking device.



**Note !** The locking mechanism operation is based on the pressure difference between the switch tank and the ambient air. Different temperatures and atmospheric pressures give different operation points. The system is not recommended if the lowest ambient temperature may fall below minus 10 °C or the altitude exceeds 1000 meters.

3. Density gauge is a temperature compensated manometer type device. It is mounted on the filling valve and can be used together with the density switch for local indication or separately with manually operated Sectos switches. Normal density is indicated in the green zone and low density in the red zone.

**Surge arresters:**

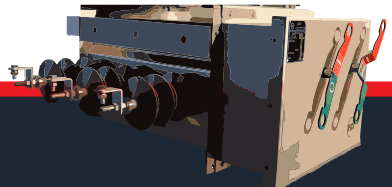
Surge arresters are necessary to guarantee correct insulation co-ordination on overhead lines.

**Current sensors**:

Remote controlled Sectos switches can be used for load monitoring, overcurrent and earth fault alarm. Optional current sensors may be mounted on the bushings. Retrofitting is also possible.

**Corrosion protection**:

The tank is made of stainless steel AISI 304. The welding is finished to have equal corrosion resistance as a new sheet surface. The mechanism housing is made of a painted corrosion resistant aluminium alloy. The IPX7 housing together with desiccants and inhibitor protects the electrical components of motor operated units so that an anti condensation heater is not necessary in normal conditions.



## 2. Technical specification

Sectos O-ISec/-- switch-disconnector complies with the IEC 60265-1 (1998) requirements for general purpose switches in electrical endurance class E3 ($I_K$ = 12,5 kA) and E2 ($I_K$ = 20 kA) and mechanical endurance class

M2 and requirements of EATS 41-27. The breaking tests under earth fault conditions enable use also in isolated or resonant earthed neutral systems.

| **Ratings** | | **_O-ISec 12_** | **O-ISec 17.5_** | **O-ISec 24** |
|---|---|---|---|---|
| Rated voltage | kV | 12 | 17.5 | 24 |
| Lightning impulse withstand voltage | | | | |
| to earth and between phases | kV | 75 | 95 | 125 |
| across isolating distance | kV | 85 | 110 | 145 |
| Power-frequency withstand voltage, wet | | | | |
| to earth and between phases | kV | 28 | 38 | 50 |
| across isolating distance | kV | 32 | 45 | 60 |
| Rated normal current | A | 630 | 630 | 630 |
| Mainly active load breaking current (100 CO operations) | A | 630 | 630 | 630 |
| Short-circuit ratings | | | | |
| short-time withstand current Ik (3 s) | kA | 25 | 25 | 25 |
| peak withstand current | kA | 50 | 50 | 50 |
| Short-circuit making current | kA | 50 | 50 | 50 |
| Number of short-circuit making operations | | | | |
| main switch 50 kA (CL E2) | n | 3 | 3 | 3 |
| main switch 31,5 kA (CL E3) | n | 10 | 10 | 10 |
| earthing switch 50 kA (CL E2) | n | 3 | 3 | 3 |
| earthing switch 31,5 kA ( CL E3) | n | 5 | 5 | 5 |
| Line- and cable-charging breaking current | A | 50 | 50 | 50 |
| Earth fault breaking current | A | 50 | 50 | 50 |
| Cable- and line-charging breaking current under earth fault conditions | A | 28 | 28 | 28 |
| No-load transformer breaking current | A | 6,3 | 6,3 | 6,3 |

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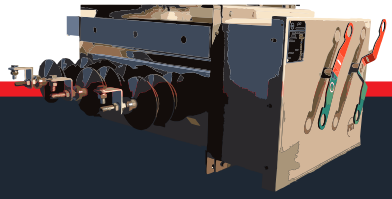
| | | |
|---|---|---|
| Degree of protection (Top motor box) | | IPX7 |
| Creepage distance of insulators | | |
| Silicon rubber | mm | 720 |
| Cast resin | mm | 500 |
| Ambient air temperature limits | | -25 °C...+60 °C |
| Mechanical endurance (number of close-open operations | | |
| main switch | n | 5000 |
| earthing switch | n | 1000 |
| Filling pressure (+20 °C) | bar (abs) | 1,5 |
| Alarm pressure (+20 °C) | | |
| density switch | bar (abs) | 1,2 |
| density gauge | bar (abs) | 1,1 |
| lock-out mechanism | bar (abs) | 1,1 |
| Minimum functional pressure (+20 °C) | bar (abs) | 1,1 |
| Weight (cast resin/silicon bushings) | kg | 144 |



## 3. Receipt/Inspection/Storage

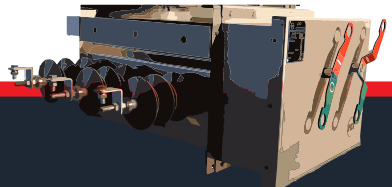
After the packing material has been removed, the Sectos should be checked for possible damage caused by rough handling during transportation. At the same time check that all parts contained in the packing list have been delivered. If the Sectos is delivered with a density switch or gauge, the gas pressure should also be checked,

The Sectos should be stored in a dry area, if it is not installed immediately.

**Note 1:** Do not use the bushing insulators for lifting purposes. Excessive mechanical stresses may increase gas leakage risks.

**Note 2:** Avoid contact with "black iron". The iron contamination may damage the corrosion resistant surface of the stainless steel.

Because Sectos is filled with $SF_6$-gas, all bolts and nuts for fixing the components which are a part of the sealed tank should not be loosened, tightened or removed. The spring mechanism housing should also be kept closed to avoid moisture ingress.



## 4. Installation

### 4.1 Installation of the plug-in insulators

Sectos is delivered either with integrated cast resin $SF_6$ / air bushings or an interface for series 400 cable connectors. This interface can be equipped with detachable plug-in type silicone rubber insulators for connection to overhead lines. Silicone is a flexible, hydrophobic and unbreakable material with excellent electrical properties. Installation of the plug-in insulators is shown in figure 2.

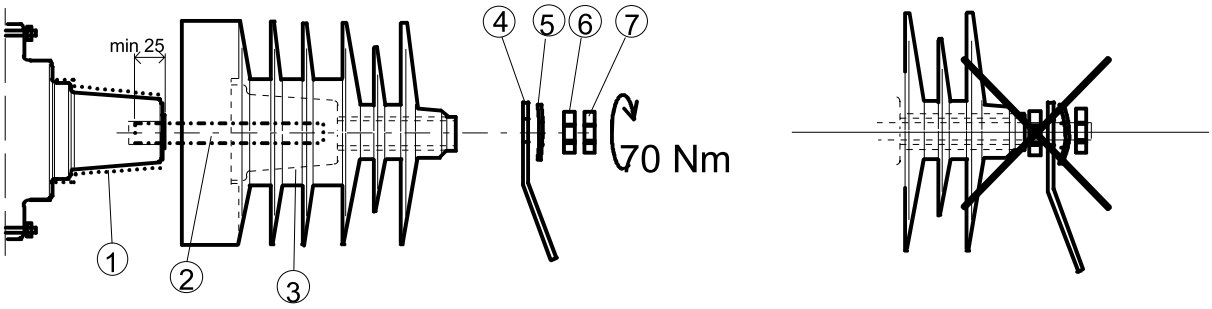
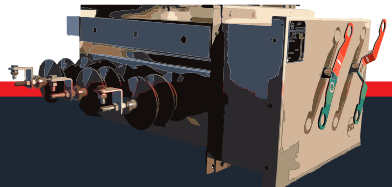



Fig. 2. Installation of the plug-in insulators

1. Ensure that the conical surfaces between the bushing (1) and the plug-in parts (3) are clean and faultfree. If needed, clean the surfaces with a damp cloth, drying throughly afterwards.
2. With rubber gloves on, apply an even and thin layer of special paste P8 on the conical surface of the bushing (1).
3. Turn the long M16 stud (2) by hand to the bottom of the hole in the bushing part.
4. Hold the thick part of the plug-in insulator (3) and push it by hand as far as possible so that terminal (4), spring washer (5) and nut (6) can be fitted manually.
5. The plug-in insulator is finally set by tightening the nut (6) to a torque of 70 Nm. Prevent torsional stresses by holding the terminal (4). Lock the assembly with counternut (7).

Terminals can be replaced by an outdoor type cable lug with a 16 mm hole. A 12 mm cable lug can be mounted on the terminal.



## 4.2 Installation of the hook-stick lever

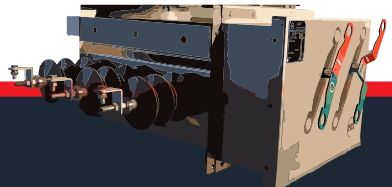
Install the hook-stick lever before lifting the switch up on the pole. See Figure 3. Note the position of the instruction plates when the switch is in the open position. If 59) should be used to give clearance for the rotating lever .

## 4.3 Installation on the crossarm

4.3.1 Lifting

Fix the two lifting hooks to the other side of the switch. Allthough this position is partly unbalanced, this way is easier to lift and fix the switch below the cross-arm. Hold the switch in a balanced position when commencing the lifting so that the insulators do not touch the ground.

**Note !** The switch must not be lifted or moved from the insulators. This may cause excessive stress on the insulators and increase the leakage risk.



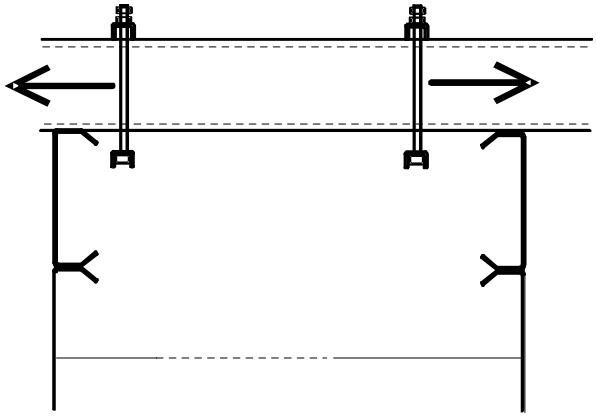


Fig. 4. Fixing to the crossarm

Fix the clamps loosely to the cross-arm so that they can be moved by hand. Lift the Sectos below the crossarm. Turn it to a upright position and put one of the fixing clamps in the grooves of the switch and tighten. One clamp keeps the switch in the upright position so that the other clamp can be mounted easily, see figure 4. Tighten the fixing clamps (M = 50 Nm) and remove the lifting belt. The fastening can be ensured by double nuts.

4.3.2 Installation

Spacer plates are required, if a 3-position switch with a hook stick lever is mounted below the crossarm, see figure 5.

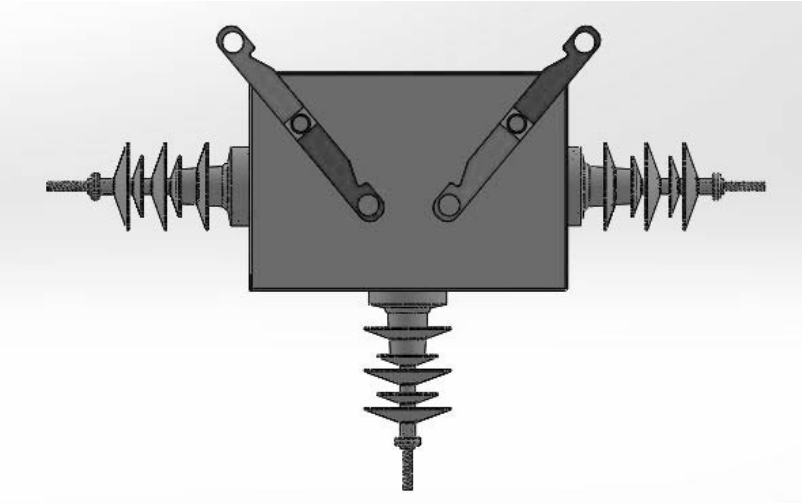
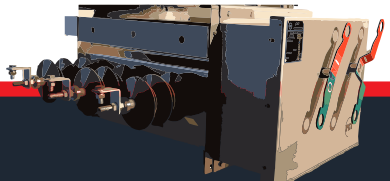


Fig. 5. Installation below crossarm



## 4.4 Installation of the surge arresters

Surge arresters are necessary to guarantee correct insulation co-ordination on overhead lines. The rated discharge current should be 10 kA peak. The rated voltage should be selected according to the instructions of the manufacturer. The neutral earthing conditions and the maximum duration of earth fault should be noted. The surge arresters should be mounted on both sides of a switch, which may be in open position for long periods ( Normally Open Point disconnectors), one two or three sets depending on the case. The preferable position is in parallel with the switch bushings mounted on a metal frame (option). See the detailed drawing enclosed. An alternative position is the line crossarm. The cable distance from the switch bushings to the surge arresters should not exceed 5 m. Also the earthing connection between the line crossarm and switch frame should be as short as possible. A set of fixing parts for arresters is available as an optional accessory.

If a short screened cable is used to connect the switch to the overhead line, the arresters shall be mounted at the switch terminals. If the cable lengtht is over 30 m, arresters shall be mounted at both ends.

## 4.5 Installation of current sensors (CT:s)

Current sensors and the connection box can be mounted on each way of the switch using a separate mounting base. See the detailed drawing enclosed. See 135 KOKU 100 E1 for more technical information.

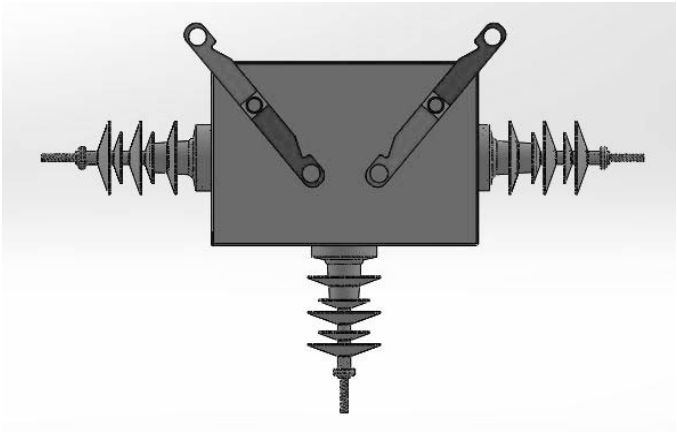
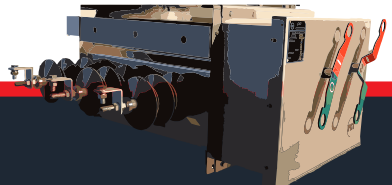


Fig. 6. Alternative mounting positions for surge arresters and CT:s and connection box.



### 4.7 Auxiliary circuits and control cable

Remove the protective cover of the auxiliary circuit connector to avoid short-circuit risks. Note the clearances and fix the control cable by outdoor type fasteners.

The circuit diagrams of switch 1 and switch 2 are identical except the gas density alarm, which is normally included only in switch 1 ( open circuit in switch 2):

3-position switches, manual operation

3-position switches, motor operation

3-position switches, motor+locking lever

2-position switches, motor+locking lever

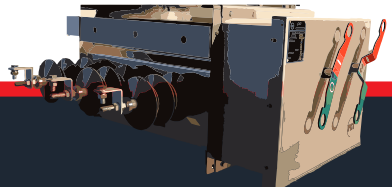
2-position switches, motor operation

2-position switches, manual operation

## 5. Earthings

### 5.1 Switch frame

The frame of the switch should always be earthed in accordance with the local safety regulations. The maximum duration and amplitude of fault current should be noted when selecting the minimum earthing conductor area. Note also the earthing resistance, corrosion protection, and mechanical protection and insulation of the lower part. Both the disconnecting and earthing functions of the switch are ineffective if the frame is not earthed. In addition the line insulator crossarm shall be earthed, if the switch is mounted on a separate crossarm.



The standard terminal clamp type OJUZLL1 can be used for 16...63 $mm^2$ copper wires or the optional type OJUZLL 3 for 16...70 $mm^2$ aluminium wires. Alternatively any cable lug for an M12 bolt can be connected to the tin plated earthing terminal at the end of the switch.

The switch can also be earthed by earthing the crossarm for example with the earthing terminal NPTMS 8.

## 5.2 Integrated earthing switch ( 3-position switches)

Both switched ways can be earthed independently. The tapped way is floating, when both switches are in open or earthed position. The earthing switch on the downstream side provides natural interlocking between the main switch and earthing switch in a radial network. The switch and earthing switch functions are described in the drawing below.

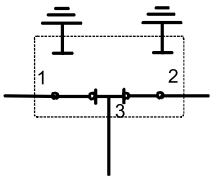
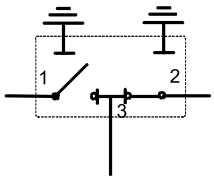
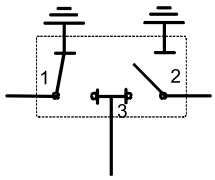
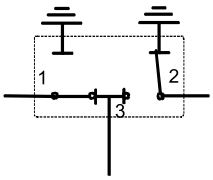
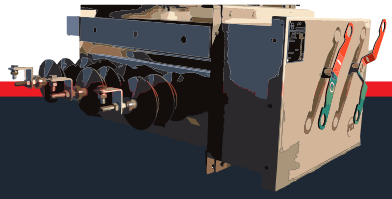
| Main circuit diagram |  | |  | |  | |  | |
|---|---|---|---|---|---|---|---|---|
| Switch nr. | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| Position indicator symbols | I | I | O | I | ⏚ | O | I | ⏚ |
| Alternative position symbols | CLOSED | CLOSED | OPEN | CLOSED | ⊥ | OPEN | CLOSED | ⊥ |

Fig. 8. 3-position switch function diagram.



## 5.3 Auxiliary circuits

The auxiliary system may be different from case to case. The earthing and protection of each specific system should be planned carefully for safety and protection reasons. As a minimum the following general rules should be followed:

All systems:

* The shield of measuring and control cables shall be earthed at both ends to protect the control electronics.

* The frames of all components of the pole mounted station should be connected to the common earth ( switch, VT, control equipment)

* The primary of any voltage transformer shall be connected between two phases, not between phase and earth. The secondary shall be earthed to the frame or to the control cabinet earth.

Isolated or resonant earthed neutral systems:

* The earth fault voltages should be limited to fulfil local safety regulations concerning combined earthing of low and high voltage systems. The operator should not be exposed to dangerous earthing voltages and these voltages should not be conducted to low voltage circuits.

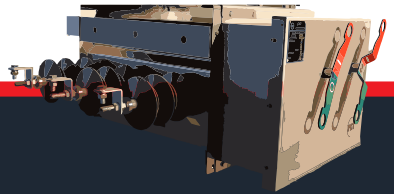
Earthed and low-ohm earthed neutral systems:

* The earth fault voltages cannot normally be limited to a safe level.

* All components, connected to the high voltage earth, (control cabinet, local I/O push buttons, possible manual operating elements) should be mounted so high, that theycannot be reached from conductiveear th level. An insulating ladder or platform should be used.

Alternatively an earth mat belowthe control box may be us ed to limit touch voltages . The risk ofpotential step voltages should be analyzed in this case. See the enclosed drawing O-ISec .

* The auxiliary supply should be taken from a transformer on the same pole, or other source, neutral connected to the common earth ( solar or wind energy). The pole mounted station should not be connected to a public low voltage or telephone network.



### 5.4 Surge arresters

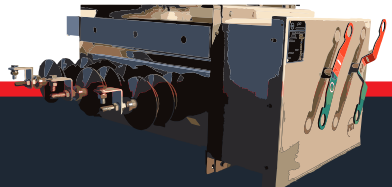
The earthing cable should be as straight as possible and steep curves should be avoided. Minimum area 16 $mm^2$ Cu. The separate earthing cable should be connected to the common earth below the control cabinet, If the surge arresters are mounted on a separate cross arm. The separate cable is not necessary, if the surge arresters are mounted and earthed on the switch frame.

.

## 6. Energising

Before energising the Sectos make sure that:

1. The gas pressure is checked via the gas density monitoring contact or density gauge.
2. The functioning of operating devices and position indicators is correct.
3. Ensure that the position of the switched ways and the tapped way is correct in the network configuration.
4. The line and earthing cables are connected and the clearances are sufficient.
5. The auxiliary circuits ( if any) are connected. The cover of the auxiliary connector is fixed or removed, a hanging cover may reduce the clearances.
6. The lightning overvoltages are limited below the withstand level of the Sectos.
7. Ensure that conducting parts, which may be exposed to dangerous earth fault voltages during faults, cannot be touched from ground level .



## 7. Maintenance

Sectos is maintenance free for the expected service life of the switch. The mechanism is protected by a hermetically sealed housing and no greasing is required. The mechanism housing should not be opened to avoid moisture ingress and reassembling failures. If the housing has to be opened, the desiccants and inhibitors should be replaced with new ones.

### 7.1 Gas monitoring and refilling

The leakage rate has been measured at the factory and the gas refilling is not normally needed for the expected lifetime of the switch. The low pressure alarm can be connected to a remote control system. The gas pressure of the manually operated Sectos switches should be checked at least every fifth year.

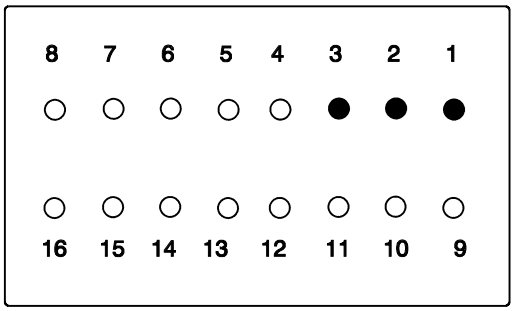
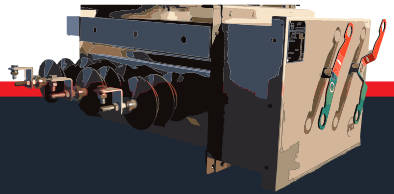



Fig.9. Multiple plug-in connector ( switch nr. 1 ).

Gas pressure can be checked with an ohmmeter or a test lamp from terminals 1, 2 and 3 from the multiple plug-in connector of switch nr.1. A closed contact between 1-3 signifies that pressure is normal. If 1-3 is open and 2-3 is closed, gas pressure is too low. In that case the gas pressure has to be checked with a manometer through the filling valve (type DILO / BG3-408/R5) placed on the bottom of the Sectos. The manometer or refilling device should be equipped with DILO manometer fitting G1/4 3-408/R20. The refilling device O-ISec 4 for a 6 mm hose may be used.



## 8. Operation safety

### 8.1 Normal operation

Pole mounted Sectos switches are safe to operate even in the most abnormal situations. However the operation is not allowed if there is any doubt about the correct $SF_6$ pressure (chapter 7.1).

Follow the local safety instructions if you are going to work close to the line behind the switch. The common rules are:

1. Open the switch and check the open position from the position indicator.

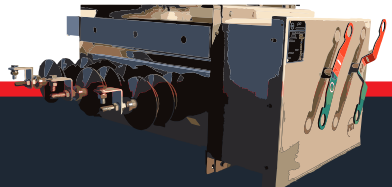
2. Prevent unintended closing following the local safety regulations; for example by warning shields, optional locking device, or chains and padlock.

3. Ensure that the line is dead with an accepted voltage testing device.

4. Connect the line to the earth using the integrated earthing switch or a portable equipment for earthing, IEC 1230(1993). Ensure that the correct line section is earthed by the integrated earthing switch. Ensure that the condition of the frame earthing circuit is good by measuring the earthing resistance regularly.

   Note: The tapped way can be earthed only by a portable equipment.

5. The secondary of the optional CT must be short-circuited, if the secondary load is removed while the primary line is live.



## 8.2 $SF_6$ - gas

Pure $SF_6$ -gas is a nontoxic, non-flammable, heavy inert insulating cooling gas of high dielectric strength and thermal stability.

The Sectos uses $SF_6$-gas as an insulation and arc quenching medium. Arcing in $SF_6$ switchgear decomposes a small amount of the gas. Part of these decomposition products may be toxic. Under normal operating conditions these products are only present in small quantities and for limited periods of time, within the switch enclosure before they are absorbed by a filter. During normal operation of the Sectos the operator does not need any special protection.

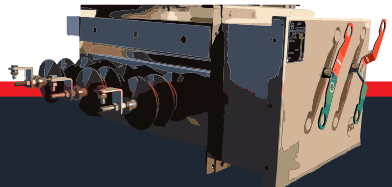
## 8.3 Recommended procedure for disposal of the Sectos

Sectos includes valuable materials for recycling: stainless steel, copper, aluminium, steel, and $SF_6$ -gas.

Small amounts of $SF_6$ decomposition products may have been formed during the breaking operations. These are largely eliminated by the absorbent inside the tank. However, some precautions are recommended to ensure safe handling of these materials, ecpecially after exceptional internal arc faults. Local regulations if any should be followed. The re-cycling/disposal can be sub-contracted to PKT or to a specialised company. Alternatively the user can follow the procedure below.

During the procedure, care should be taken to avoid contact of decomposition powders and cleaning fluids with skin or eyes. Compressed air should not be used for removing powders.

1. $SF_6$ -gas can be removed from the switch using a vacuum pump and a compressor to transfer to bottle suitable for this gas. When the gas is pumped off allow dry air flow into the evacuated tank. The gas manufacturers are prepared to receive used $SF_6$ -gas for recycling.

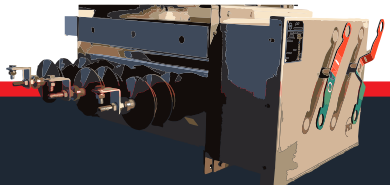


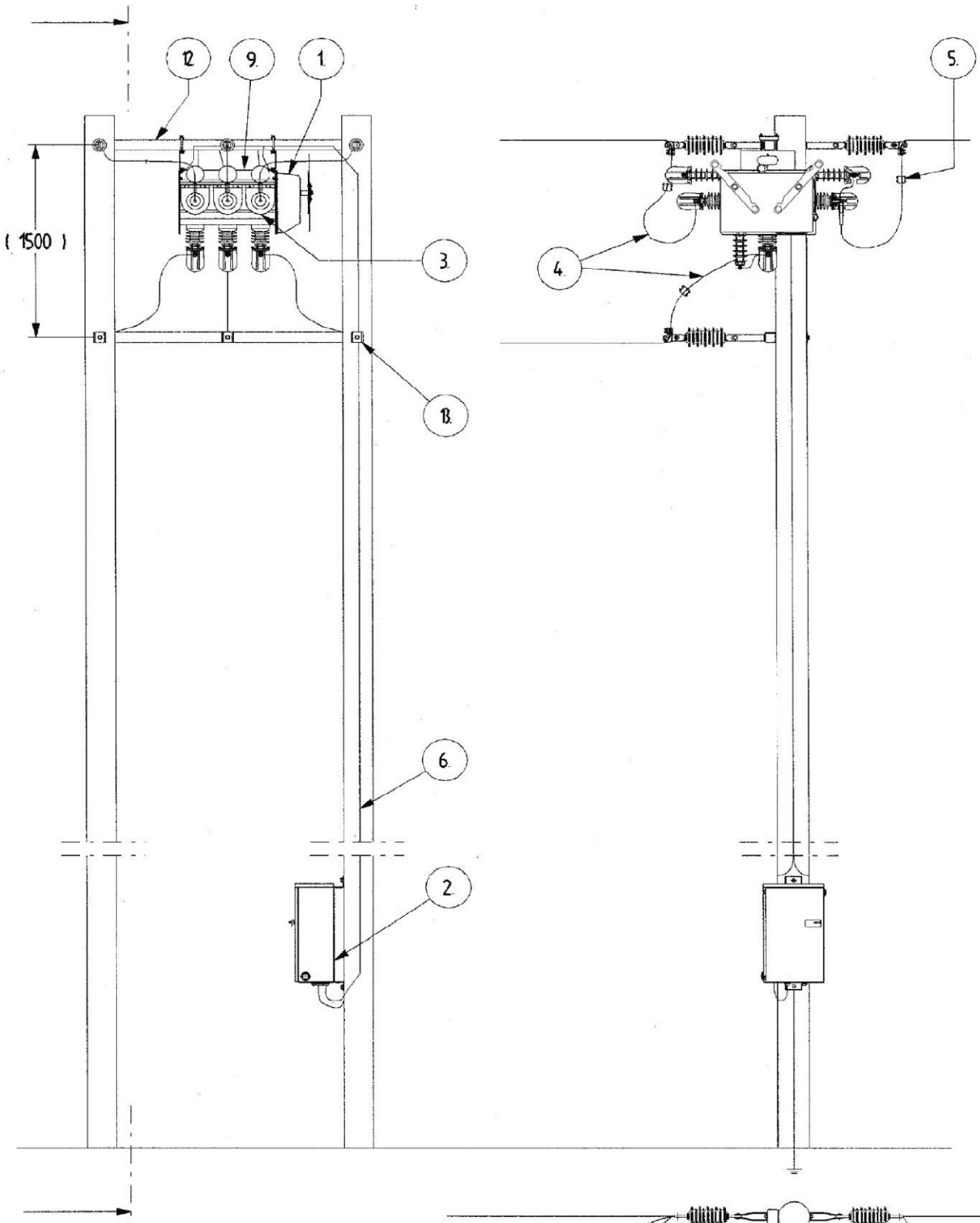
2. The tank should be cut open outdoors or in a well ventilated room. Cutting methods based to high temperature ( > 500 °C) should not be used to awoid formation decomposition products.

   The absorbent should be taken away to be neutralised. A suitable method is immersing in a solution of 1 ...3 kg sodium carbonate ($Na_2CO_3$) in 100 l water for 24...48 hours. Contact with skin and eyes should be avoided, especially if higher concentrations are used.

3. All other parts of the switch can be handled as normal metallic or plastic waste. It is recommended that the possible decomposition powder if any be removed using a vacuum cleaner or by rinsing with clean water. The vacuum cleaner bags should be neutralised with same procedure as the absorbent.

For more information see IEC Technical Report 1634 (1995): "High-voltage switchgear and controlgear - Use and handling of sulphur hexafluoride ($SF_6$) in high-voltage switchgear and controlgear", Chapter 6.5: "Treatment at end of life of $SF_6$-filled equipment".




12
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( 1500 )
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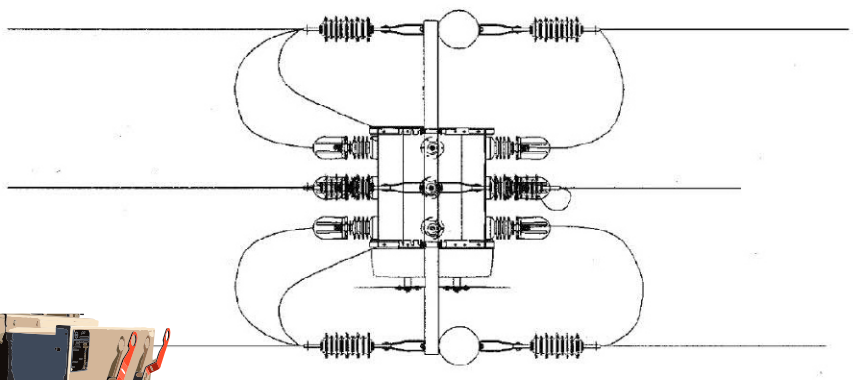

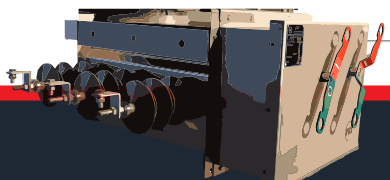

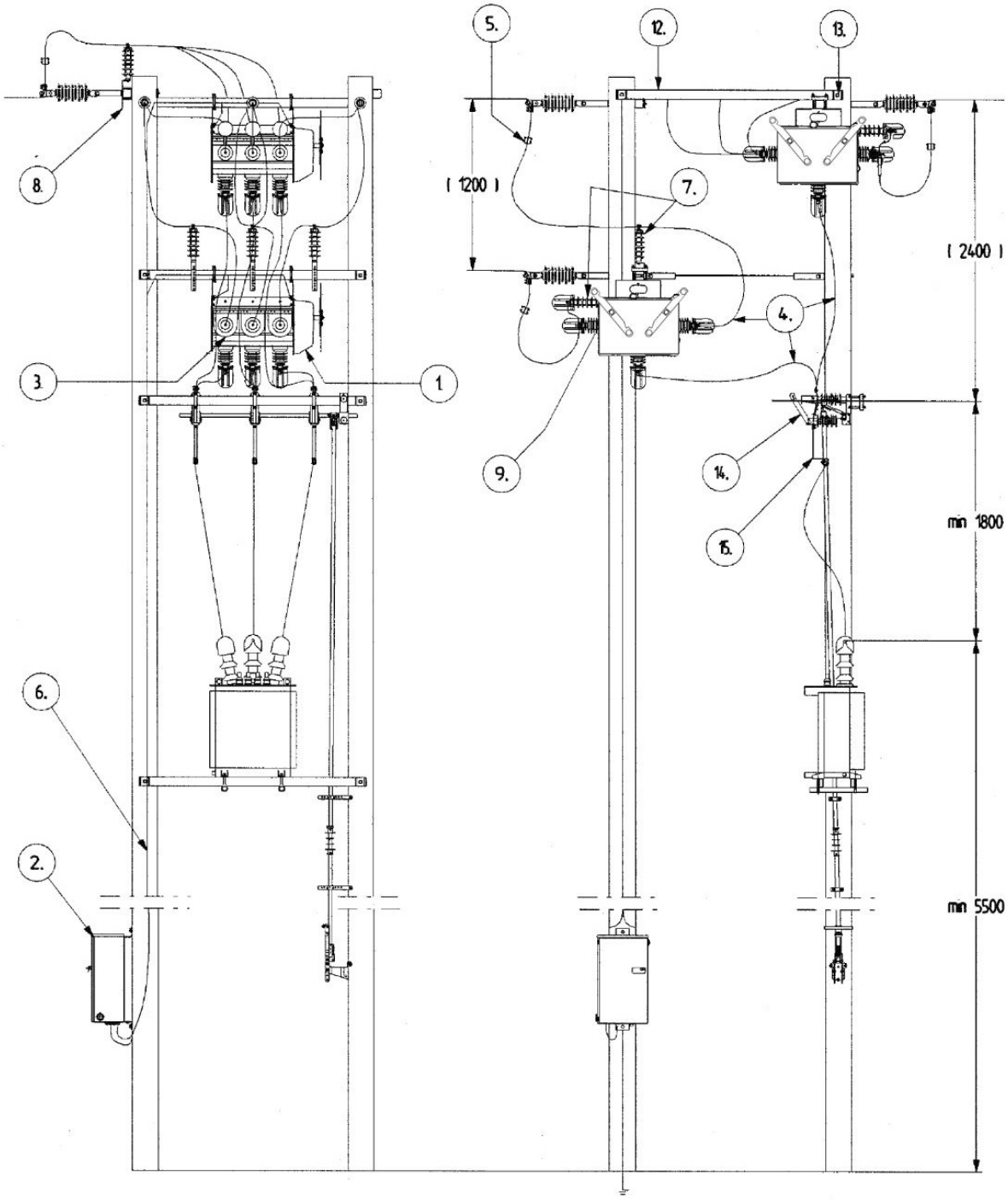
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min 1800
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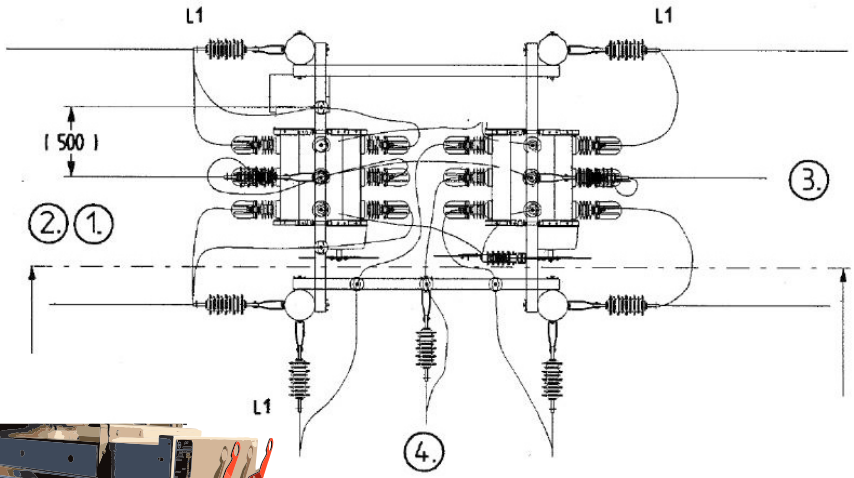
L1
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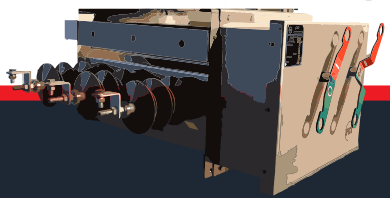
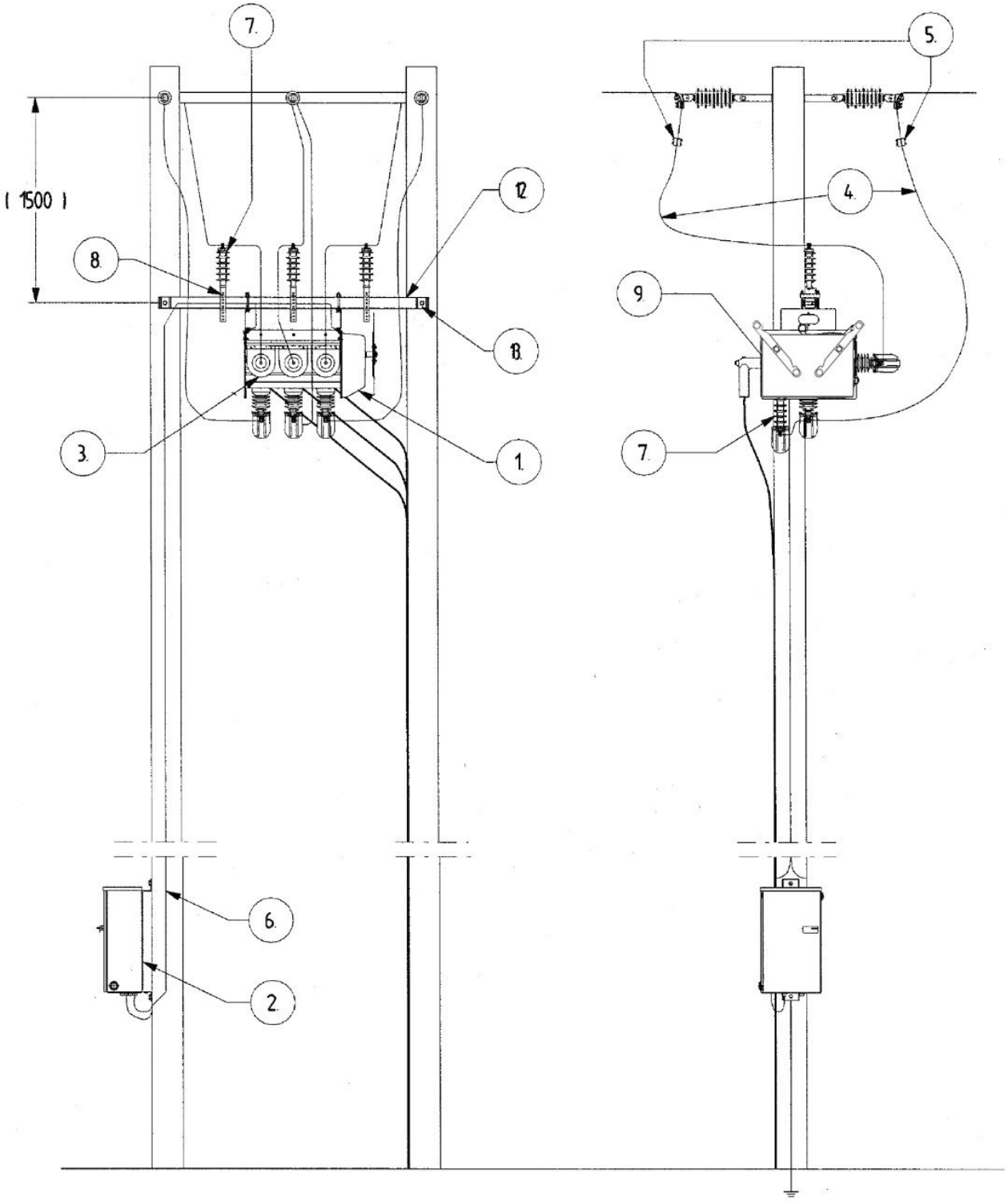
L1
4.

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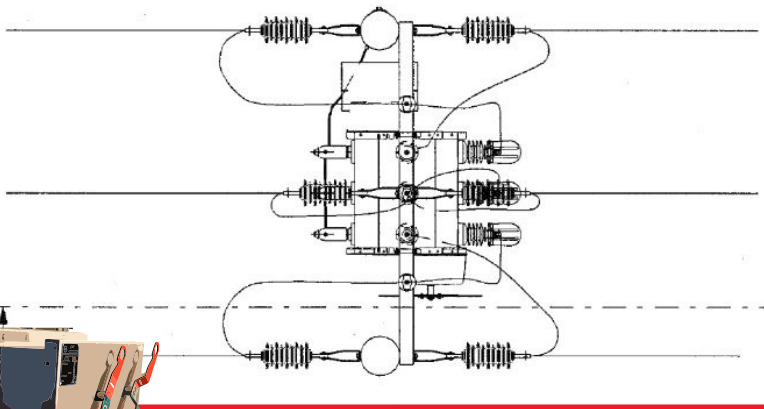
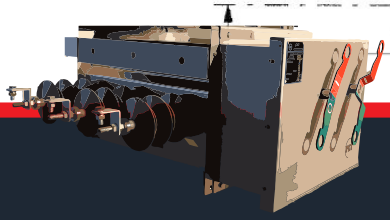




Enclosure 1. **Line connections**

General

Copper connectors:

Note the conductor area fits the used connector and tighten by correct torque.

Aluminium connectors:

Ensure that the conductor area and material fits the used connector . The solid aluminium bar shall be left in the empty slot, if a double slot connector ( type KG_) is used for a single conductor. The oxidized surface of the conductor end and the grooved bottom of the connector shall be removed by a steel brush and the surfaces greased immediately by a special grease for aluminium connections to prevent reoxidation. The slots of the connectors are greased by the manufacturer. Tighten by correct torque.

Note: The aluminium oxide layer increases contact resistance and may cause dangerous overheating.

Combined connectors for aluminium and copper:

Note which slot is for copper; tin plated copper bars are forced in the other slot for copper conductors. Follow the preceeding instructions depending on the conductor type. Leave the solid aluminium bar in the aluminium slot, if only copper conductor is connected.

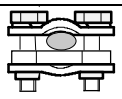
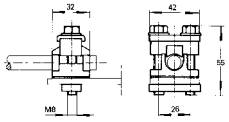
Aluminium cable clamps:

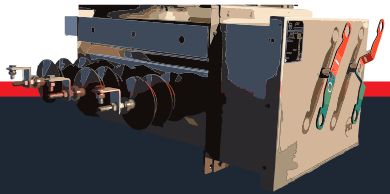
Cable clamps may be connected direct on the bushings or on the optional terminal bar.
Ensure that the conductor area and material fits the used clamp. Brush the conductor end. The conductor hole is filled with grease, which also protects the connector, if immediately inserted. Compress according to the instructions of the tool manufacturer starting from the cable end. It is not necessary to brush the tin plated cable lugs. The large washer is used to stabilize stresses and the spring washer compensates dimension variations due to temperature changes and creepage.

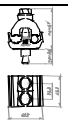
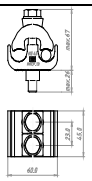
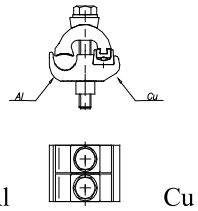
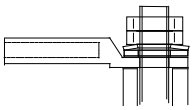
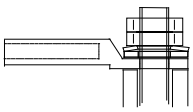
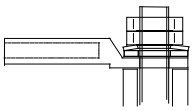
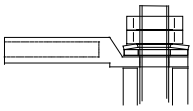
Copper cable clamps:

Follow the instructions of Aluminium clamps. The brushing and greasing is not necessary.

Standard line connectors for Sectos:

| connector type | | Conductor material and area | Bolt size / torque |
|---|---|---|---|
| OJUZLL1/3 |  | Cu 16 … 63 $mm^2$ | M8 20 Nm |
| NPTL 24/3 |  | Al 62 … 90 $mm^2$ | M8 20 Nm |



| | | | |
|---|---|---|---|
| OJUZLL 3/3<br>(KG6.1) |  | 2 x Al 16 … 70 $mm^2$ | M8 20 Nm |
| OJUZLL 4/3<br>(KG43) |  | 2 x Al 50… 240 $mm^2$ | M10 40 Nm |
| KG 36 |  | Al 50 … 240 $mm^2$ / Cu 10 … 95 $mm^2$ | M10 40 Nm |
| Cable clamps:<br>EXMAR17050-12 /Sn40<br>EXMAR17050-16 /Sn40 |  | Al 50 $mm^2$<br>2 compressions by hexagonal tool nr. 16, Elpress or compatible | M12 50 Nm<br>M16 70 Nm |
| EXMAR17095-12 /Sn40<br>EXMAR17095-16 /Sn40 |  | Al 95 $mm^2$<br>3 compressions by hexagonal tool nr. 22, Elpress or compatible | M12 50 Nm<br>M16 70 Nm |
| EXMAR17120-12 /Sn40<br>EXMAR17120-16 /Sn40 |  | Al 120 $mm^2$<br>3 compressions by hexagonal tool nr. 22, Elpress or compatible | M12 50 Nm<br>M16 70 Nm |
| EXMAR17150-12 /Sn40<br>EXMAR17150-16 /Sn40 |  | Al 150 $mm^2$<br>3 compressions by hexagonal tool nr. 25, Elpress or compatible | M12 50 Nm<br>M16 70 Nm |