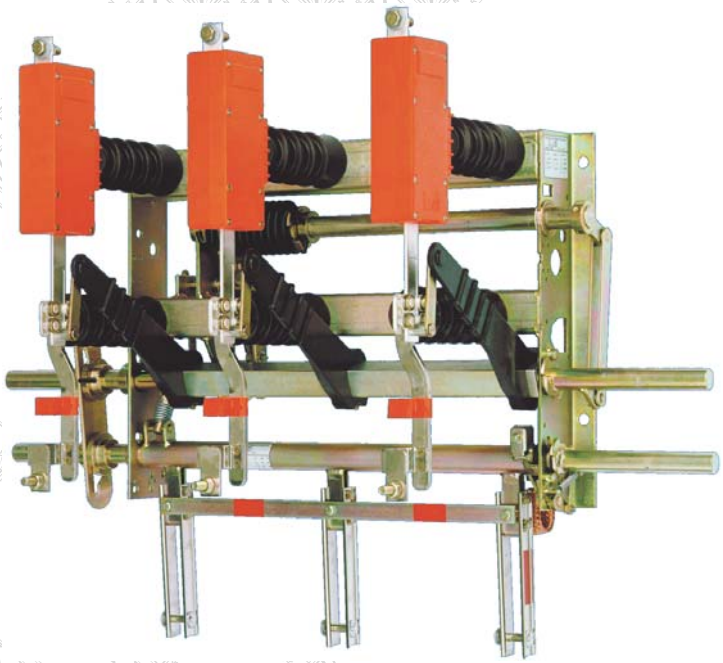
Instructions for assembly, operation and maintenance of indoor load disconnectors H 27

with hand and motor operated drives
single- and three-pole design
rated voltage 12 and 25 kV
rated current 400 and 630 A



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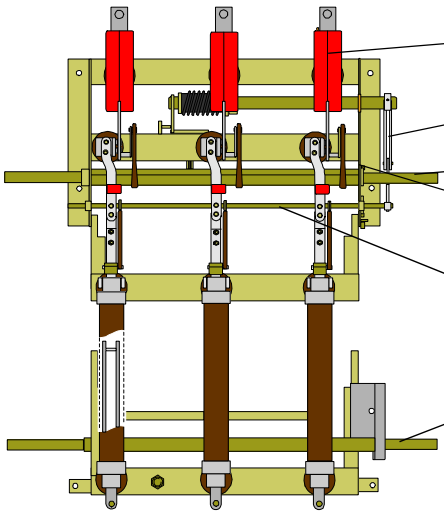
H 27 SuT UESV load disconnector – parts description



1 quenching chamber

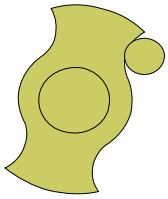
2 latching mechanism

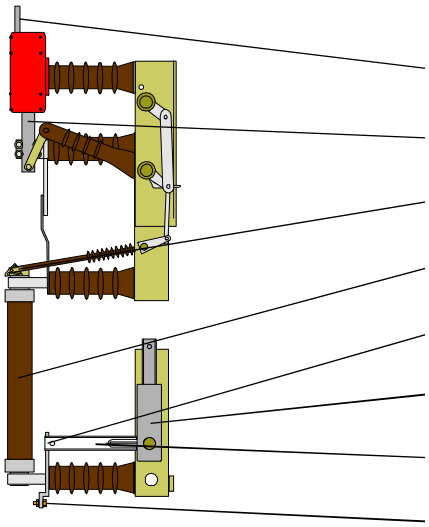
3 switch operating shaft

4 stop of operating shaft
(on the right or left side of the shaft)

5 fuse tripping shaft

6 earthing switch operating shaft





7 upper connection

8 main circuit

9 fuse tripping bar

10 HV fuse

11 earthing switch contact jaw

12 earthing mechanism

13 earthing switch knife contact

14 lower connection

Handling and storage

Unpack the load disconnector upon arrival. Check for damages caused during the transport. Any damage should be reported immediately to the supplier. After unpacking remove all remaining packaging material from the switching device and accessories.

Lift the load disconnector by holding it at the base frame, only. Use never the arc quenching chambers and the current-carrying path as a component for lifting up the switching device. During the storage protect the device from damages, humidity and dirt.

Operating conditions

The load disconnector is intended for operation under normal conditions as defined by the EN 62271-1 standard, class „minus 15, indoor use“. Highest ambient temperature: 40°C; average temperature during 24 hours is not allowed to exceed 35 °C.

Assembly

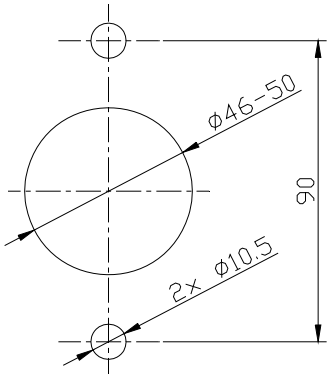
Assembly of the load disconnector
Screws are to be tightened up in a way to prevent the occurrence of deformation or stress in the load disconnector base frame (use shim blocks if needed).

Connection of busbars or cable terminals
When making connections take care of incoming terminals of the load disconnector (7, 14) which have to be kept away from stresses. Fix the connecting bolts with 70 Nm torque (using another key in opposite position).

Putting the blocking system into operation
The H 22 EK and H 22 EA load disconnectors with earthing switches are transported in ON switching position for both the load disconnector and earthing switch, to reduce the probability of damage to the switching contacts. Consequently, the blocking system is not operative during the transport.
Prior putting the device into operation the blocking system is to be enabled. This is done using the following steps:

1. Switch the load disconnector OFF.
2. Using a torque wrench tighten special cut-in M 10x25 bolt in the blocking segment with the torque of 55 Nm.
3. Check the proper function of the blocking mechanism.

Installation of the DK manual drive



The linkage joint of the DK lever-operated drive mechanism provides for a **vertical tilt of the drive of 45° compared to the switch disconnector shaft position –** see Figure. There is no need of stiffening the front side of the cell.

Slide the cone-type transmission on the shaft and fix it by supplied plug (the shaft incorporates a pre-drilled pin). **Pay attention to proper position of the cone-type transmission – it determines the turning direction of the drive.**

Now drill a hole into the front side of the switching cell, in accordance with the drawing. The centre of the control part of the drive has to be in line with the pinion of the cone-type transmission. Use shaft extension in case of need. Fix the control part of the drive using two M10 screws with nuts (part of delivery) and retighten slightly.

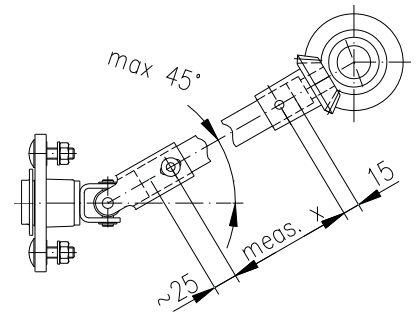
Fix the interconnecting rod length. Start from the pin hole axis on the pinion of cone-type transmission and take the distance up to the hole axis for a pin placed on the output of control part of the DK drive mechanism – see the figure. The pinion and the control part output are facing each other.

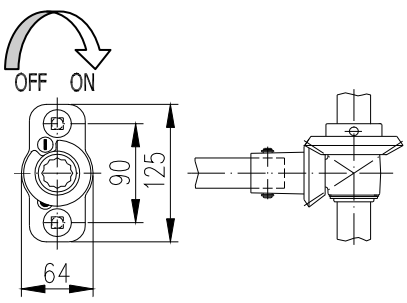
The total length of the connecting rod is then equal to the sum of measured length (x) plus 40 mm (i.e. $l = x + 40$). The cut short the rod from the front side of the switching cell (the part with insulation ferrule is to be placed next to the cone-type transmission).

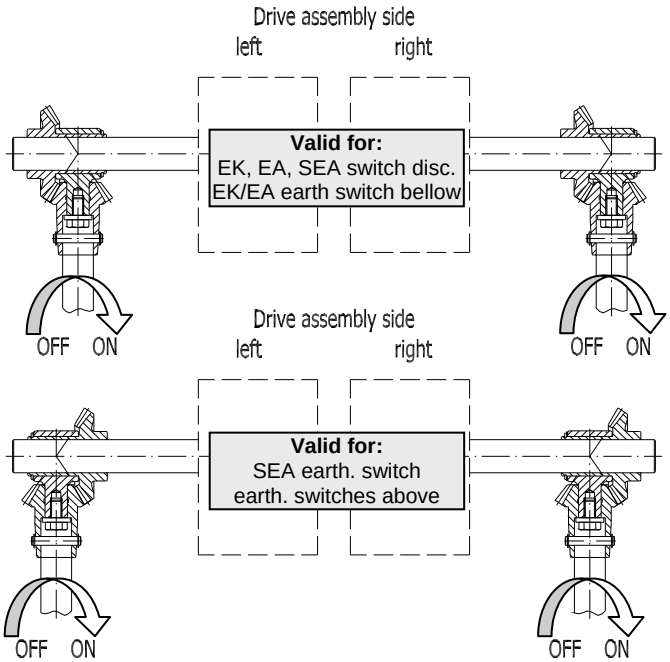
Dismantle the control part of the DK drive. Put connecting rod into the gear-type transmission and secure it using a pin. Slide the control part of the drive on the connecting rod from the front side of the cell and mark the centre of hole on the rod for the insertion of a second pin (the marking takes place from both sides of the output of the drive control part). Drill out a hole in the rod, for the insertion of the pin.

Set together the whole drive group. Using the pins and the cone-type transmission supplied join together the rod and the drive control part. Retighten the control part of the drive on the cell front side.

Check the drive function by performing a few operations. Then slide on the switching state indicator (with switch disconnector either in ON or OFF position) following the successful testing. The indicator cut out has to show the actual switching position of the switch disconnector.







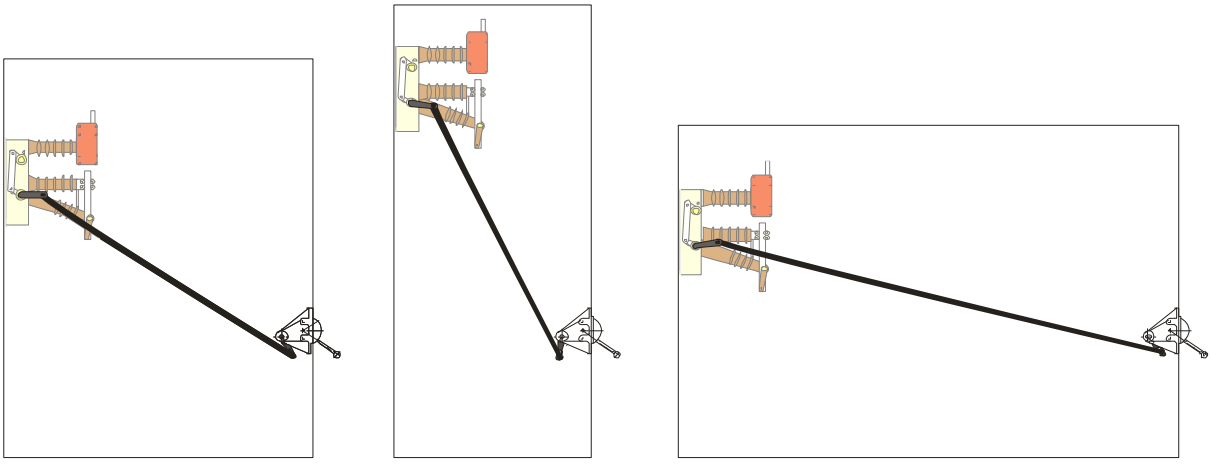
Assembly of the drives on the cell front

When mounting the switching device on a wall, with the SHA manual drive mechanism or the UM 20 and UM 30 motor drives (mounting place on the cell front) the switching path and switching angle have to be adjusted in a way to let the driving shaft reach the stop block (4) in both switching end positions when manipulating with the load disconnector.

The clamping handle on the load disconnector shaft and that of the earthing switch have to be firmly fixed with a torque of 90 Nm acting on the M12 screw. Re-check the torque after approx. 10 minutes. In case the lever slips through on the shaft due to improper tightening, do not tighten up the lever on the stripped part of shaft but move it to another, non-damaged place.

The position of clamping lever on the drive shaft, that of the control pull rods and the drive lever with gearing on the side is shown in the following pictures. Take notice especially of the pull-rod break-through point near the load disconnector shaft and of the drive working angle. The same rules apply also for UM motor drives mounted to the cell front.

Make the drive adjustments with load disconnector in OFF position. In no way go beyond the dead point.



Switching the load disconnector off without using the operating drive

The load disconnectors of H 27 EK and H 27 EA types are transported in the ON position. The drive adjustments (drives on cell front) are done with load disconnector in OFF position.

The load disconnectors of H 27 EA type are equipped with energy storing mechanism and therefore it is possible to switch them off.

By the H 27 EK type load disconnector act upon the following steps: elude the OFF position break lever towards yourself and move insulated switching pull rod with contact down. The placing of the OFF position break lever and insulated switching pull rod is perceptible from the following pictures.

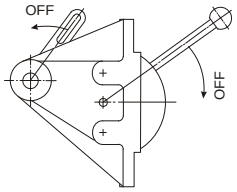
OFF position break lever (back view)

OFF position break lever (front view)

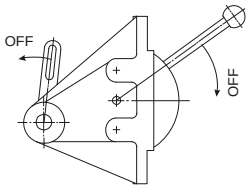
Switching the device off without using the operating drive (front view)

Type designation and use of the SHA drives

SHA – negative direction

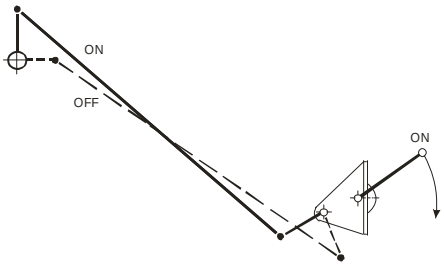


SHA 10



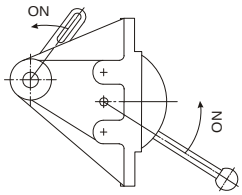
SHA 11

Disconnector and load disconnector

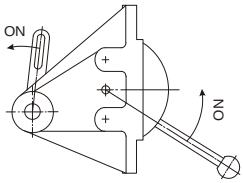


SHA 10

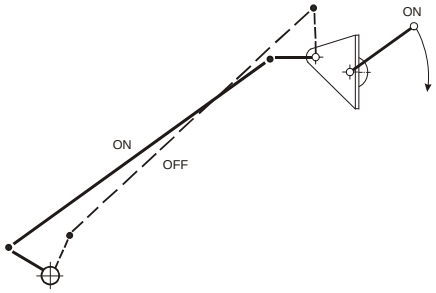
SHA – tracking



SHA 30



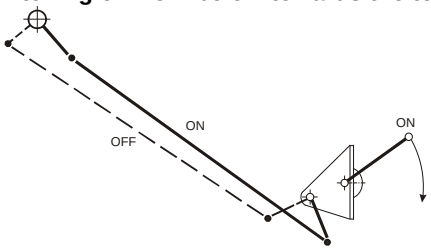
SHA 31



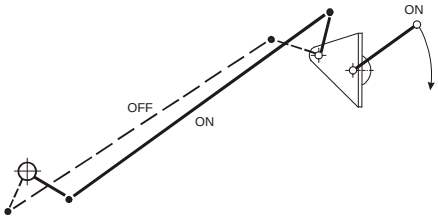
SHA 31

Earthing switch

switching on from below towards the top

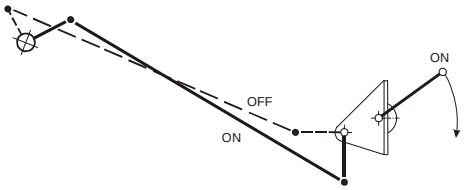


SHA 30

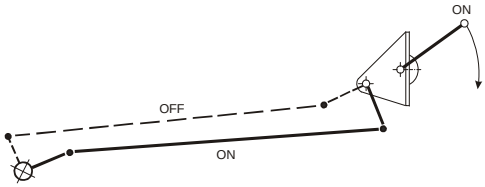


SHA 11

switching on from the top towards down



SHA 30



SHA 30

Operation test before putting the device in operation

Checking the end position of the load disconnector and the earthing switch.
In the course of handling with both the manual and motor operated drive the switching shaft (3) must abut against the end block (4). If the load disconnector is equipped with earthing switch the earthing switch shaft (6) must reach the end positions.

Checking the current-carrying path
The knife contacts (8) must approach the quenching chamber opening (1) in a symmetrical way.

Checking the fuse tripping mechanism (SEA type load disconnectors)
The check is done either by pushing on the fuse contact or using the test fuse cartridge. Following the trip the load disconnector has to switch OFF in all the three poles. The operation test has to be carried out in all the three poles. *Keep clear of the area in front of the arc quenching chamber (knife contacts are shot off from the chamber during the instantaneous breaking operation!)*

Checking the UM motor operated drives and manual emergency control
Function of the drive, its parameters and protections are described in a separate catalogue. The drive is capable of reliable operation at voltages within the range of 85 to 110% of rated control voltage.

In case of emergency the shaft mounted drives (UM 50) can be controlled using breaking rod and handle with lug, fixed to the load disconnector shaft. When operating the device in case of emergency the connection between the drive and the switching device becomes uncoupled automatically. The operator is thus protected from faulty switching. If the positions of the load disconnector and the drive do not correspond following the emergency operation, the connection becomes established after the positions become aligned.

In case of emergency the cell front mounted drives (UM 20, UM 30) are operated using a crank with internal square shaft end.

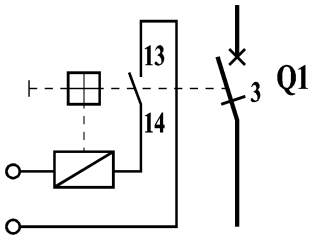
During emergency operations the switching shaft has to reach the end position for both switching positions, and abut on the end block.

Checking the operating release
Releases can be mounted only to load disconnectors equipped with spring charged tripping mechanism (i.e. not on the EK design). Operation release has to be blocked with auxiliary switch.

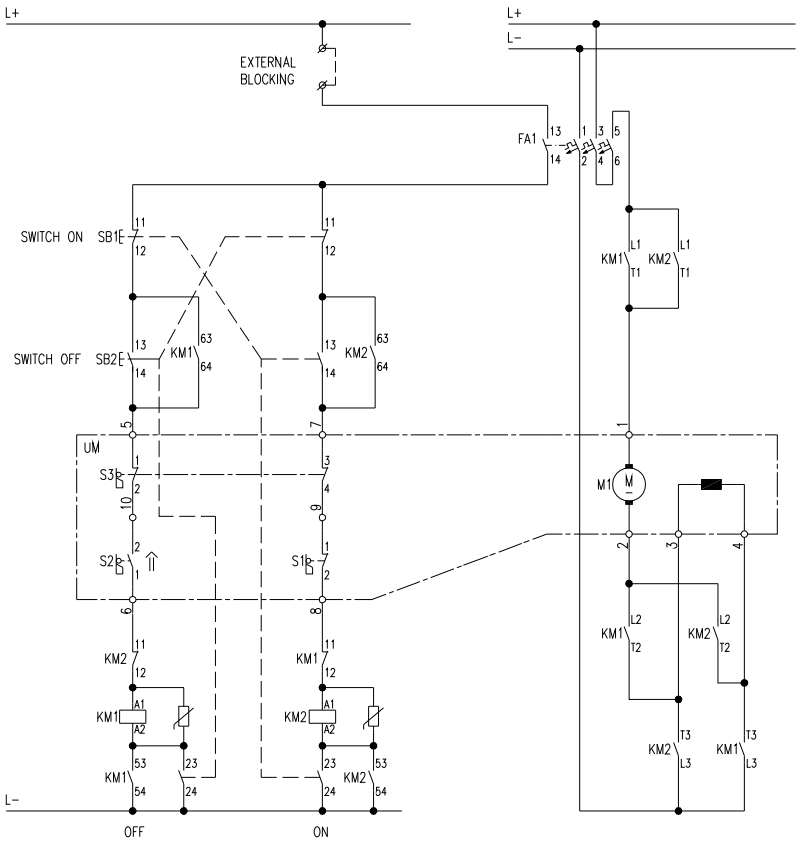
Wiring diagram of operation release (applies for DC and AC releases):

Release controlled by bias current: release attraction: 85-110 % Un
release drop off: < 35 % Un

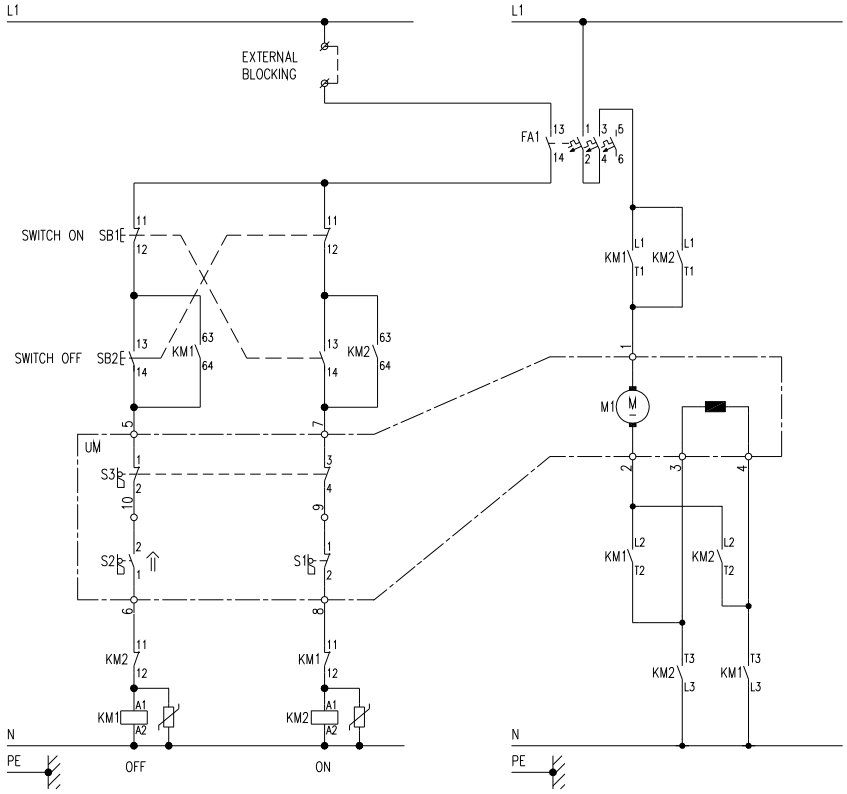
The relative making period (ED) is given by a ratio between the making and dead operation period and expressed in per cent (% ED). ED value for electromagnetic releases is: for DC: 15 % ED
for AC: 25 % ED



Circuit diagram for UM type motor operated drives – DC voltages



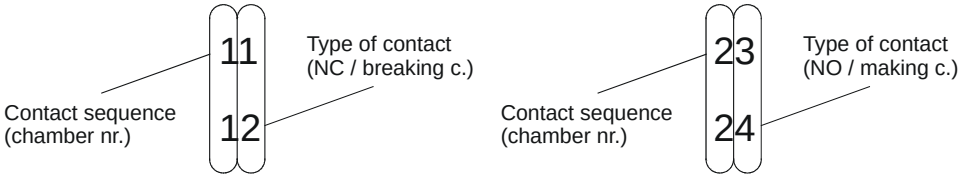
Circuit diagram for UM type motor operated drives – AC voltages



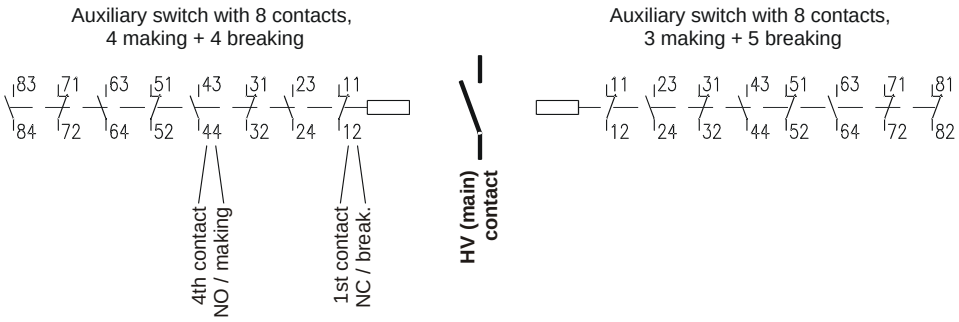
Motor overcurrent circuit breakers matching					
DC voltage	**Range**	**Alignment**	**AC voltage**	**Range**	**Alignment**
24 V	6,3-10 A	9,2 A			
60 V	2,5-4 A	5,6 A	110 V	2,5-4 A	2,6 A
110 V	1,6-2,5 A	2,1 A	230 V	1,6-2,5 A	2 A
220 V	0,63-1 A	0,8 A			

Checking the auxiliary switches

The adjustment of auxiliary switches takes place at the manufacturer's, in accordance with the stipulations of standards, and has not be changed without the consent of the suppliers. Contact terminals of auxiliary switches are marked with numbers, depending on the sequence and type of contact:



The numbering starts always from the shaft (see the following example of contact description). The first contact is a NC contact followed with NO contact. In such a way the contacts are alternating until the required number of one specific type of contact runs out. The remaining contacts of one specific type are grouped at the end. Switching devices are equipped with auxiliary switches containing always even number of contacts. Examples of description and the arrangement of contacts:



Operation

The switching device operation does not require any specific knowledge, and differs according to the type of switching device and the drive mechanism used.

The SHA drives are controlled via a control lever of l = 515 mm (for controlling the load disconnector), or a lever of l = 365 mm (for controlling the earthing switch). DK drives and drives for mounting on the side (D drive) are controlled with a lever with hexagon.

Motor operated drives are electrically controlled using local pushbuttons, or from a central operator's room. The drives are fixed to the shaft of the switching device (UM50, VM50), or operated via breaking pull rod and lever with a lug in case of emergency. The front side cell mounted drives (UM20/30, VM20/30) are operated with a crank with internal square.

Maintenance

Under normal operating conditions maintenance works are to be carried out every 10 years. During the maintenance the following works are carried through:

Cleaning

- insulators
- insulated switching pull rod
- insulated tripping rod from the fuses
- arc-quenching chambers (outer surface)
- switching knife-type contacts (in OFF position)
- switching springs
- earthing contacts

Lubrication

- **Do not grease the switch blades!**
- all bearings, friction lodgement and hinges (on mechanical parts of the base frame) shall be treated with oil applied by spraying (see table below)
- surfaces of the main contacts may be greased with specified greasing agent, only, with a very thin layer of grease applied
- after having been cleaned the earthing switch contacts are treated with grease

To be applied to	Lubricating means prescribed
main contact surfaces	Omnigliss on the cloth, wipe to dry
all bearings	Omnigliss spray or other spray containing Molykote
earthing switch contacts	Barrierta L55/1 grease

Make a few switching operations after the termination of maintenance works.