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egic

SSP 1-arm pantograph disconnector

The specialists

In service since 1954 (3000 3-pole installed since then), the Pantograph System Disconnector (SSP) is a device for vertical disconnection that separates 2 stacked horizontal layers.

SSP

Advantages of the conventional pantograph system

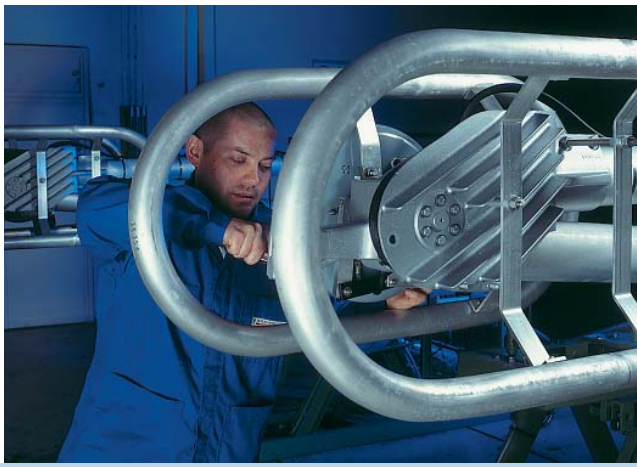
- Small floor dimensions.
- Maintenance is possible on the entire disconnector while the upper busbar is live.

… plus specific advantages

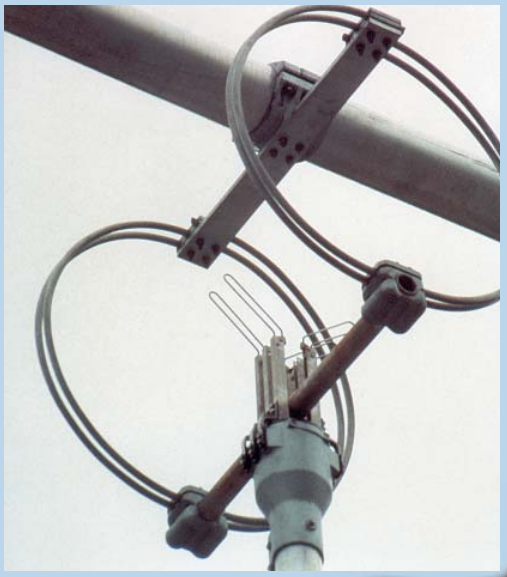
Above 170 kV, there are specific advantages, which are the result of a unique design:

- electrical and mechanical functions are dissociated when coming into contact with the upper bar,
- reduced device dimensions (the arm's movement only works sideways) which decreases the phase to phase clearance in most cases,
- high connection latitude to upper contact which allows for a large sensing range on conductors (flexible and tubular),
- electrical joints divided by two,
- balancing system is housed in the lower half arm (13), which simplifies and lightens the upper frame (18).

It uses the same technology as the OH disconnector (horizontal knee-type) with which it shares most of its parts.
As a result of our know-how and our experience, this line of switchgear distinguishes itself through its **simplicity and sturdiness**, and allows better management of replacement spare parts stocks and operating staff training.



Construction details



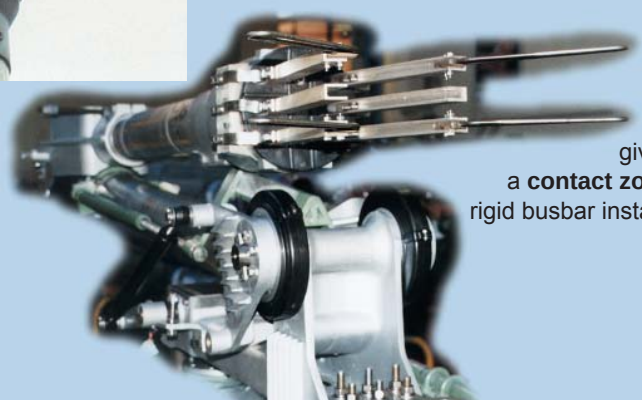
Main contact dependability

Dissociated kinematics

This dependability is ensured by **a physical separation of the mechanical and electrical functions.** Balancing systems and systems that load clamps are located inside the upper half arm; once completed the main contact pressure remains perfect whatever the service conditions may be, and it is independent from the disconnector's general movement transmission mechanism.

Improved short-circuit performances

When a short-circuit flows through it, electrodynamic forces are used to increase the contact fingers pressure on the fixed contact bar.
The tubular design of the live part also prevents the emergence of internal electrodynamic forces.



Increased connection latitude

During disconnector closing, contact jaws remain wide open; contact loading occurs at the end of stroke, upon arrival on the upper bar; this gives the disconnector a **contact zone that is adapted** to all flexible or rigid busbar installation types.

Operating principle

The insulating rod transmits the movement to the lower arm

- Supported by a single insulator (17), the knee-type unit moves along a vertical plane.
- A 90° rotation of the insulating rod (16) transmits the movement to the lower arm (13) through a taper coupling (15) and the crank-rod system (14).

Locked in the closed position

- The device is locked in closed position when the system moves past the dead centre (14).

Transmission of the movement to the upper tube

- The upper arm movement is controlled by a rack and pinion system (11).

Balancing the entire unit

- A spring (12) ensures constant balance so as to reduce the operating torque, when the equipment opens or closes.

Contact pressure ensured by a spring (5)

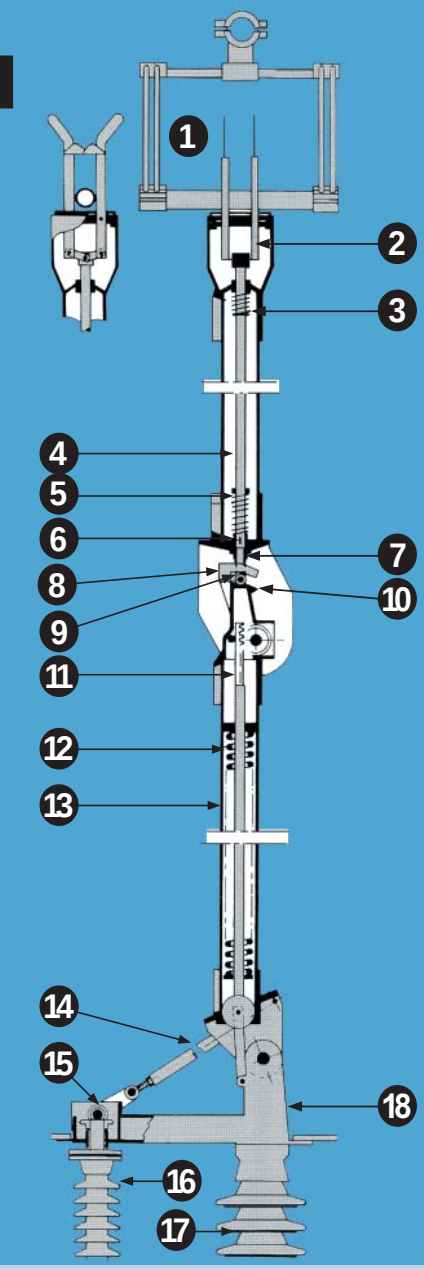
- At the end of closing, the roller (9) moves up the ramp (10) and lodges in a recess, which puts pressure on the spring (5) by means of the clevis (7). By pressing on the control rod (4), this spring enables the jaws to be tightened (2) and ensures high contact pressure on the fixed contact (1).

Opening of jaws ensured by a spring (3)

- When the device opens, and the roller leaves its recess and the ramp, the spring (3) releases the control rod and allows the jaws to open.

Opening of the equipment under ice

- In the case of frost or ice, the hook (8) acts as an ice breaking device pulling forcibly the clevis (7) which pulls the control rod (4) by means of the mechanical pin (6).



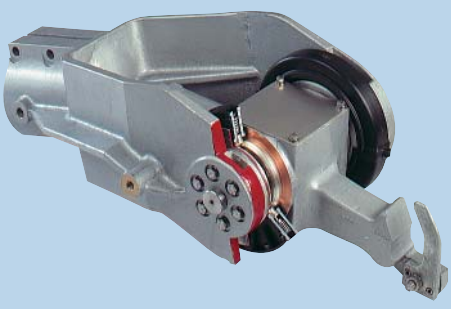
Advanced technology for rubbing contacts

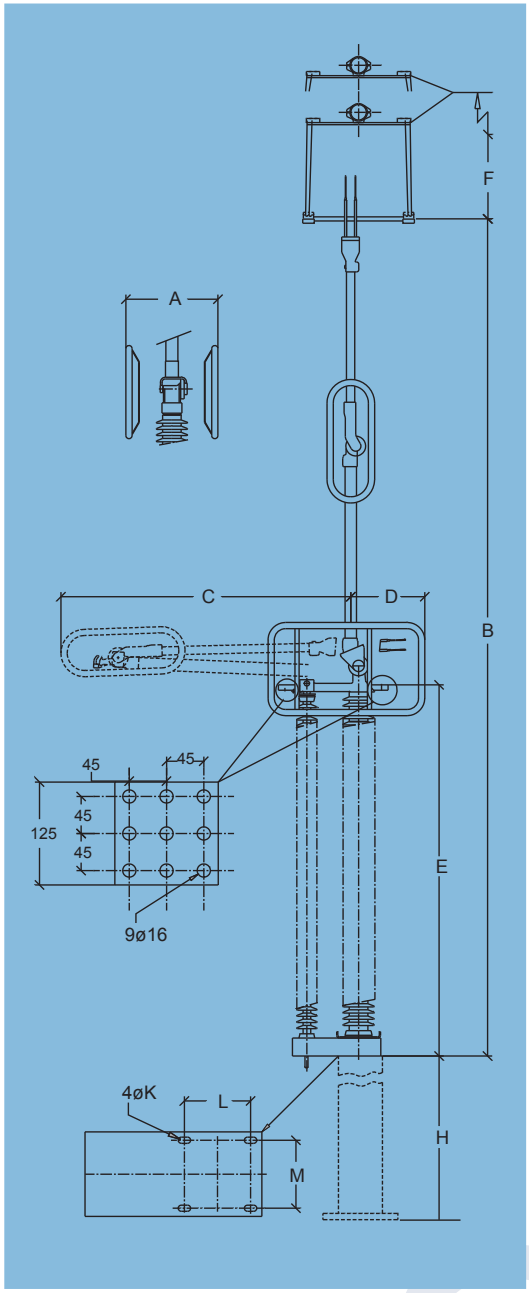
Dependability of the electrical link

The contact system using conic fingers via a point contact ensures a permanent electrical link between rotating conductive parts.
Each finger is kept under pressure using an independent spring.
Their number has been studied to reduce the repulsion effect when a short-circuit occurs (performance is 187 kA).
The insulated housing prevents the current from being transmitted by the springs, and the ventilation enables the unit to withstand high temperatures.

Maintenance-free contact

The contacts are self-cleaning (maintenance-free) and do not show any wear after 10 000 operating cycles; return experience on all devices (SSP and OH), is entirely satisfactory throughout the world. SSP has been used successfully for 30 years by EDF-RTE (French National Grid).





SSP						
U_R (Un) (kV)	170	245	360	420	550	800
U_P (BIL) across isolating distance **(kV)**	860	1200	1175 (+205)	1425 (+240)	1550 (+315)	2100 (+455)
U_P (BIL) to earth **(kV)**	750	1050	1175	1425	1550	2100
U_S (SIL) across isolating distance **(kV)**	NA	NA	900 (+345)	900 (+345)	900 (+450)	1100 (+650)
U_S (SIL) to earth **(kV)**	NA	NA	950	1050	1175	1425
Ir (In) (A)	up to 4000 A					
Ik (Isc) (kA)	from 31.5 kA/3 s to 63 kA/3 s/160 peak					
Dimensions (mm)						
A		670	890	890	890	890
B	4235	5660	6890	7800	8950	10725
C	1100	1735	2330	2580	2880	3270
D	670	655	640	640	640	705
E	1700	2500	3120	3580	4080	4644
F (adjustable)	600 to 800	600 to 800	600 to 1000	600 to 1000	600 to 1000	600 to 1000
H	from 2500 to 4000					
L	180	180	320	320	320	320
M	230	230	330	330	330	330
K	18 L 40	20 L 40	20 L 40	20 L 40	20 L 40	20 L 40
earthing switch position	parallel	parallel	parallel	parallel	parallel	parallel or perpendicular

Earthing switch

Disconnector coupling is possible with 1 earthing switch:

- same short-time current as the disconnector,
- manual or electrical operation,
- mechanical and electrical interlocking with the disconnector,
- compliant with **IEC 62271-102 annex C** “Induced current switching by earthing switches” on request.

Switching device

For busbar disconnectors:

- compliant with **IEC 62271-102 annex B** : “Bus-transfer current switching by disconnectors” on request.

SSP

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