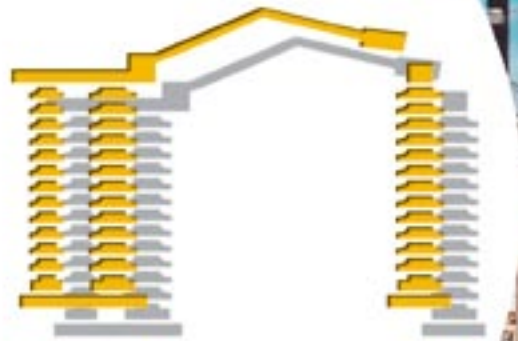


OH knee type disconnecter with vertical break

The specialists



In service since 1972 (2500 3-pole installed since then), the vertical break disconnecter (OH) is a knee-type device with a horizontal disconnection that separates 2 conductors of the same level. It enables reduced phase to phase clearance and offers a particularly high resistance to forces.

Compared to conventional vertical break systems, its unique design gives it specific advantages

- Reduced vertical dimensions: ideal for sub-stations with superimposed busbars, and less sensitive to wind and seismic loads in the open position.
- Less work when operating thus reduced operation time with same motor power and fewer constraints in movement transmission devices.
- Electrical and mechanical functions are dissociated.
- Absence of a low frame that links fixed part (1) to the moving part.
- Extended permissible misalignment latitude of fixed and moving contacts.

It uses the same technology as the SSP disconnecter (System Pantograph Disconnector) with which it shares most of its parts. As a result of our know-how and of our experience, this line of disconnector distinguishes itself through **its simplicity and robustness**, and allows better management of replacement spare parts stocks and of operating staff training.

Construction details



OH 550 kV 6300 A

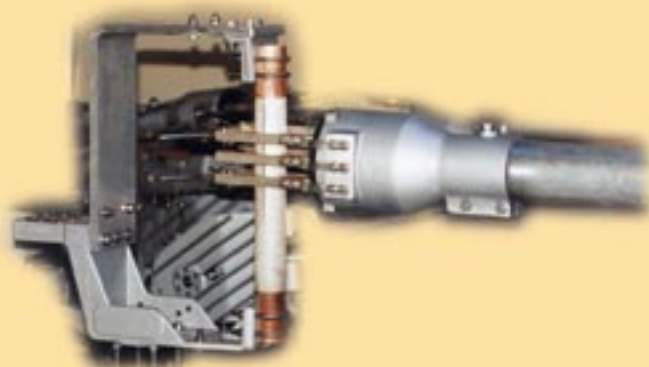
Dependability of the main contact

Dissociated kinematics

This dependability is ensured by a physical separation of the mechanical and electrical functions. Balancing systems and systems that load the jaws are located inside the conductor; 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 performance

When a short-circuit flows through it, electrodynamic forces are used to increase the pressure of the contact fingers on the fixed contact (1). The tubular design of the live part also prevents the emergence of internal electrodynamic forces.



Operating principle

The insulating rod transmits the movement to the lower arm

- The knee-type unit is supported by a single insulator (17), the contact head (18) moves along a **horizontal** 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.

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)

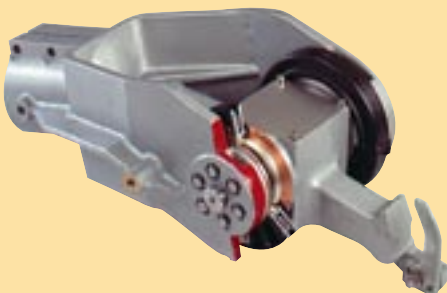
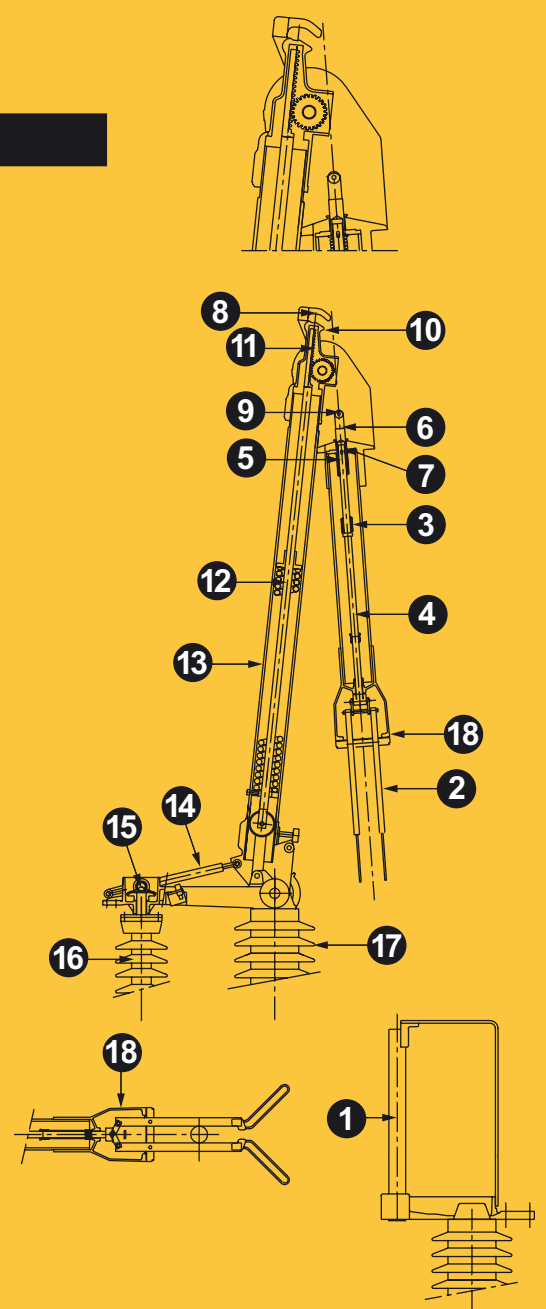
- At the end of closing, the roller (9) moves up the ramp (10) and lodges in a recess, which puts pressure on the spring (5) by means of the clevis (7). By pressing on the control rod (4) this spring enables the jaws to be tightened (2) and ensures high contact pressure on the fixed contact (1).

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 with 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 presently in service (SSP and OH types) is entirely satisfactory throughout the world. This technology has been used successfully for 30 years by EDF-RTE (French National Grid).

Earthing switch

Coupling the disconnecter is possible with 1 or 2 (3 for double OH) earthings :

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

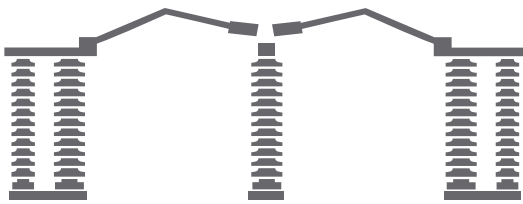
Switching device

For busbar disconnectors :

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

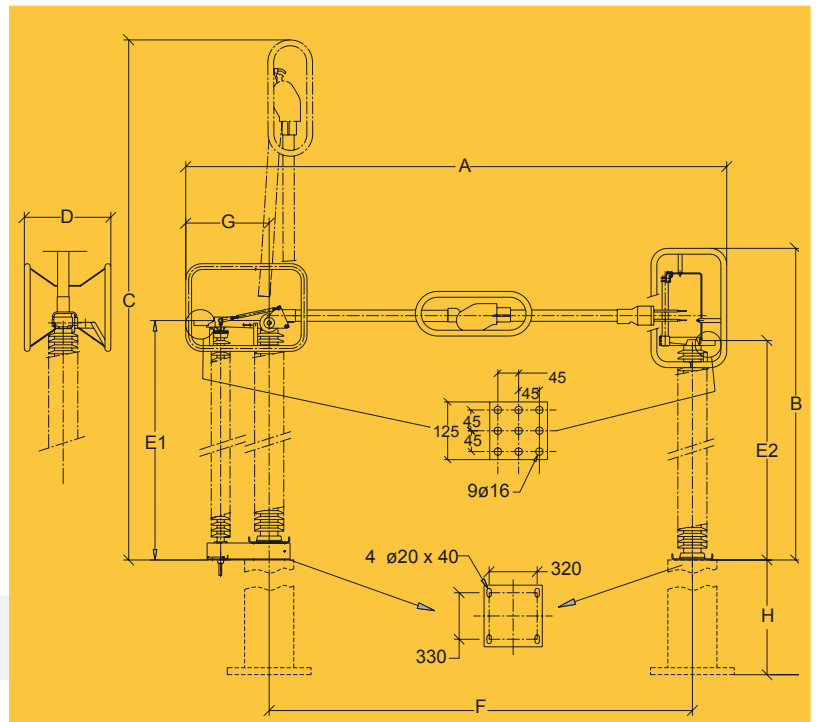
Compact substations

There are many different installation possibilities for the OH; in particular the double OH allows for compact substations to be designed. In the same frame of mind, the fixed contact of the OH can be directly connected to a current or voltage transformer.



Double OH

OH					
U_R (U_n) (kV)	245	360	420	550	800
U_P (BIL) across isolating distance (kV)	1200	1175 (+205)	1425 (+240)	1550 (+315)	2100 (+455)
U_P (BIL) to earth (kV)	1050	1175	1425	1550	2100
U_S (SIL) across isolating distance (kV)	NA	900 (+345)	900 (+345)	900 (+450)	1100 (+650)
U_S (SIL) to earth (kV)	NA	950	1050	1175	1425
I_r (I_n) (A)	up to 6300 A				
I_k (I_{sc}) (kA)	from 31.5 kA/3 s to 75 kA/3 s / 187 peak				
Dimensions (mm)					
A	4285	5200	5600	6280	7500
B		3920	4370	4870	5480
C	4420	5560	6220	7030	8200
D	670	890	890	890	890
E1	2500	3120	3570	4090	4640
E2	2500	3120	3550	4090	4640
F	3310	3960	4360	5080	5980
G	620	860	860	860	860
H	from 2500 to 4000				
earthing switch position	parallel	parallel	parallel	parallel	parallel or perpendicular



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