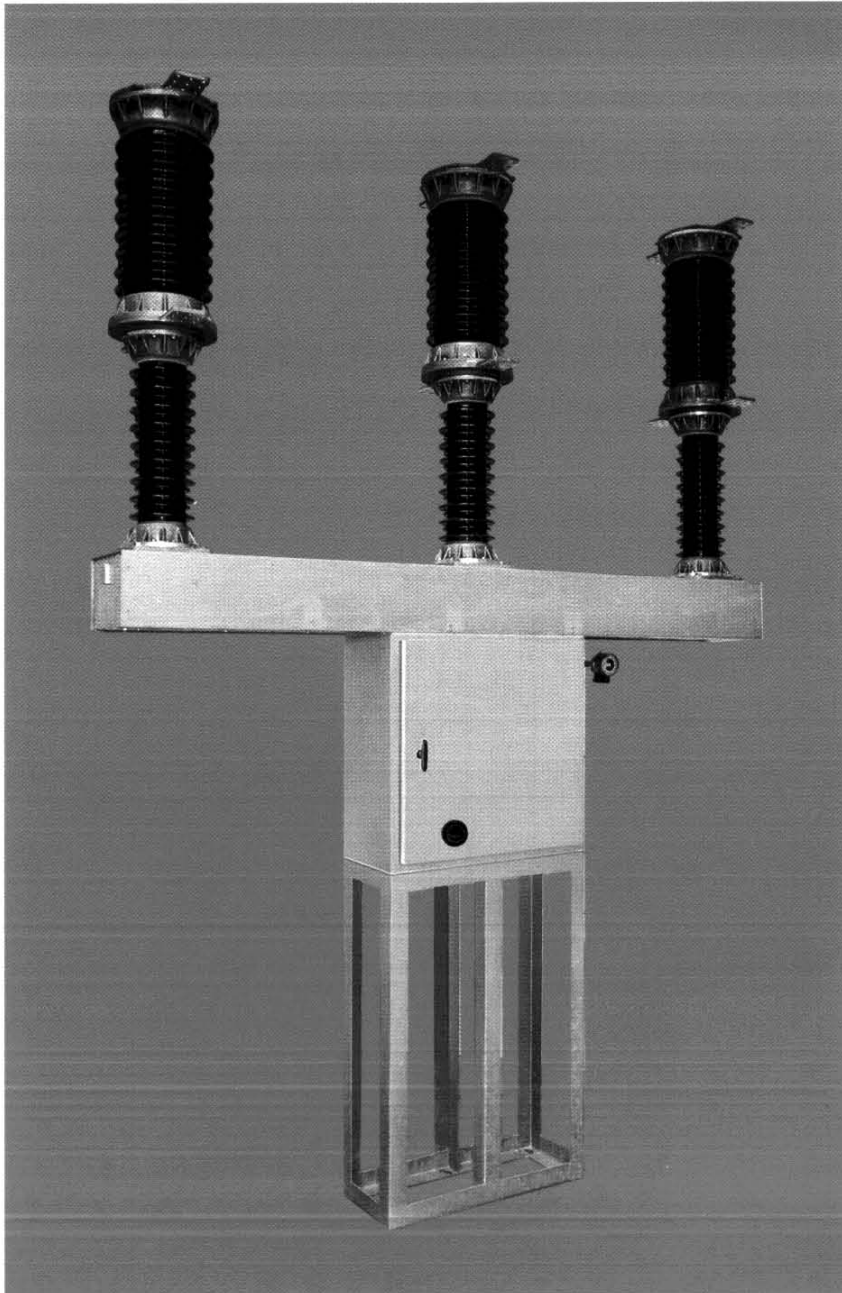


high voltage transmission

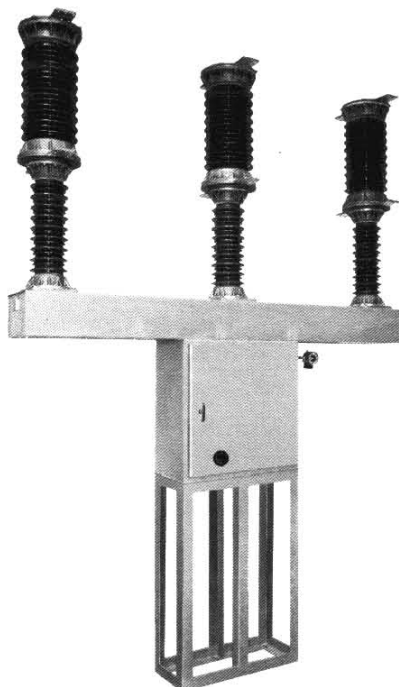
## SF6 circuit-breakers

**SB6**

**SB6-72**  
**72.5 kV**



## SB6 72.5 kV



SB6-72 circuit-breaker, 72.5 kV

### application

SB6-72 circuit-breakers are used on high voltage transmission networks of **72.5 kV**. They use single break **SF6** interrupters actuated by a three-pole stored-energy **spring-type mechanism**.

SB6-72 circuit-breakers are shipped as completely assembled and tested three-phase units to ensure rapid, straightforward and inexpensive installation; no on-site adjustments are required.

### technology

SB6-72 circuit-breakers implement a proven technique :

- each pole is a hermetically sealed unit ;
- the set of three poles is actuated by a single stored-energy spring type operating mechanism ;
- the circuit-breaker is maintained in the open or closed position by a mechanical latch ;
- the circuit-breaker, delivered on site with a small overpressure of SF6 to ensure the integrity of the internal insulation, is filled from the bottom to a relative pressure of 0.7 MPa (7 bars), at 20° C ; no special equipment or procedures are required.
- SF6 can be added with the breaker in service ;
- the SF6 pressure is permanently monitored by a temperature - compensated pressure switch ;
- a molecular sieve situated in the crankcase of each pole, absorbs residual humidity ;

### options

The following options are available for SB6-72 circuit-breakers :

- **insulators with a special shed profile** for use in heavily polluted environments ;
- **grey insulators** (standard is brown) ;
- **phase-distance of 1300 mm** (standard is 1050 mm) ;
- **without supporting structure**.

### reliability

The high degree of reliability of SB6-72 circuit-breakers is based on :

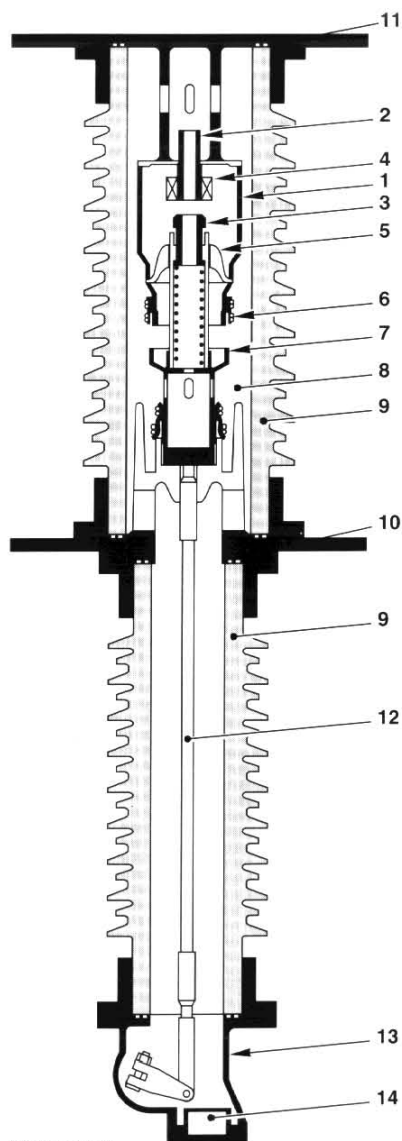
- more than 25 years of experience in circuit-breakers using the SF6 gas as insulating and quenching medium ;
- mechanical endurance tests covering 10000 switching operations carried out without maintenance, and tests performed in a climatic test chamber ;
- rigorous quality control for each subassembly and for the complete unit.
- optimized interruption process which
  - allows low contact speed resulting in low mechanical stresses
  - induces extremely low contact wear
  - prevents current chopping when switching low inductive currents ;
- separate current path for continuous and arcing currents.

### characteristics <sup>(1)</sup>

circuit-breaker	type	SB6 72
rated voltage (kV)	IEC	72.5
	ANSI	72.5
rated insulation level		
kV rms 50/60 Hz-1min	IEC	140
	ANSI	160
kV 1.2/50 $\mu$ s impulse	IEC	325
	ANSI	350
rated frequency (Hz)		50-60
rated current (A)		2000
max. breaking capacity (kA rms)	50 Hz	31.5
	60 Hz	25
max. making capacity (kA peak)	IEC	80
	ANSI	68
max. short time withstand current (kA rms-3 s)		31.5
rated operating sequence		0 - 0.3 s - CO - 1 min - CO or CO - 15 s - CO
interrupting time (ms)		60
min. creepage distance to earth (mm)		1160

(1) The characteristics indicated above correspond to IEC and ANSI standards. Other values are available on request.

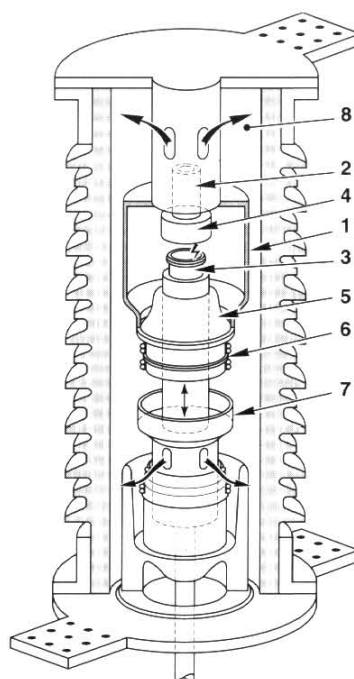
SB6-72 circuit-breaker pole unit



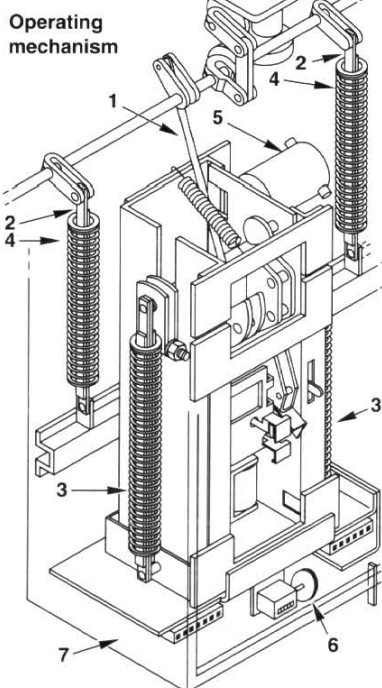
- Circuit breaker**
- 1 Expansion cylinder
  - 2 Fixed arcing contact
  - 3 Moving arcing contact
  - 4 Coil
  - 5 Insulating spacer
  - 6 Fixed main contact
  - 7 Moving main contact
  - 8 Exhaust volume
  - 9 Insulator
  - 10 Lower current terminal
  - 11 Upper current terminal
  - 12 Insulating connecting rod
  - 13 Transmission box
  - 14 Molecular sieve

- Operating mechanism**
- 1 Closing rod
  - 2 Tripping rods
  - 3 Closing springs
  - 4 Tripping springs
  - 5 Charging mechanism gear motor
  - 6 Position indicator
  - 7 Operating mechanism enclosure

Schematic view of breaking chamber



- Breaking chamber**
- 1 Expansion cylinder
  - 2 Fixed arcing contact
  - 3 Moving arcing contact
  - 4 Coil
  - 5 Insulating spacer
  - 6 Fixed main contact
  - 7 Moving main contact
  - 8 Exhaust volume



## breaking chamber

It consists of an expansion cylinder (1), inside which the arcing contacts (2,3) are arranged ; the fixed contact is fitted with a coil (4).

In the closed position the current flows through the expansion cylinder. Main contacts (6, 7) are located outside the arc interruption area.

Electrical arc interruption is achieved by auto-expansion which combines gas expansion and arc rotation.

During an opening stroke, the current carrying contacts will separate first. Current will flow through the arcing contacts and coil (4) will be inserted in the current path. The arc will appear.

The arc will be subjected to two effects : First, heating of the gas by the arc causes a thermal expansion of the gas inside the expansion cylinder; SF6 gas will thus be blown across the arcing contacts to the exhaust volume which remains at a lower pressure.

Secondly, the arc will be subjected to a magnetic field produced by the coil and thus rotate very rapidly. This contributes to the dionisation of the SF6 of the arc core. Furthermore, the arc roots move rapidly around the arcing contacts, which prevents their erosion.

Finally, the magnetic field will confine the arc to the central area ; therefore no nozzle will be needed.

## operating mechanism

With auto-expansion, the arc is "blowing itself out", without need for any auxiliary piston action ; this allows the use of a low-energy operating mechanism.

The SB6-72 breaker is operated by a reliable spring mechanism widely used in medium voltage switchgear.

This mechanism actuates all three pole units via a drive shaft. The main parts are :

■ **a set of two closing springs** associated with an electric release, which simultaneously :

- close the pole units,
- reset the opening springs ;

■ **a set of two opening springs** associated with an electric release, which opens the pole units ;

■ **an electric gear motor** which automatically recharges the operating mechanism by compressing the closing springs as soon as the pole units are closed.

## maintenance

Only long-term maintenance is recommended.

It is limited to the following operations :

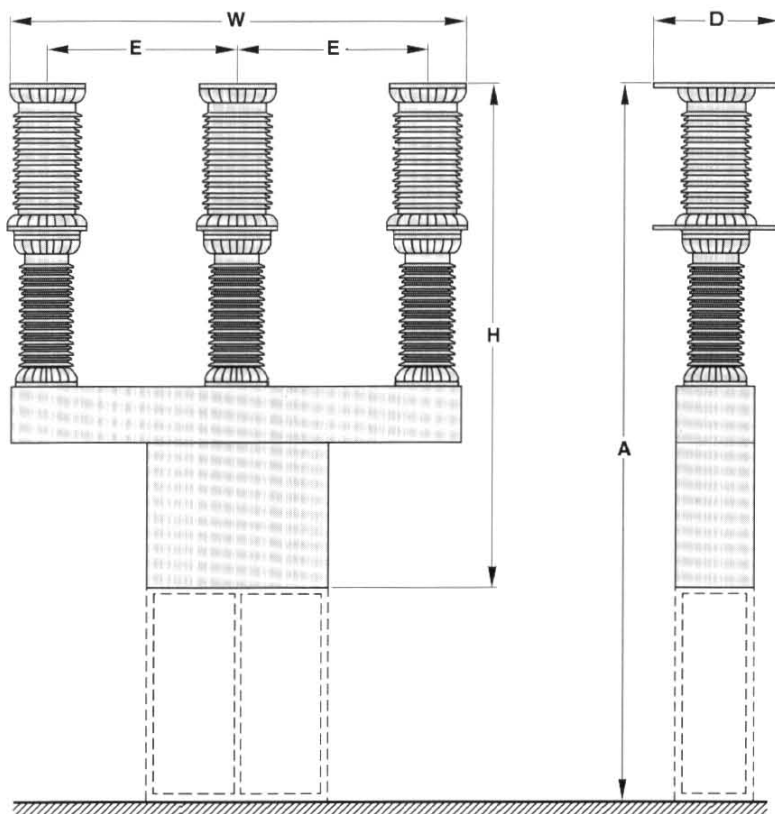
■ inspection every 6 years or after 3000 operating cycles, including recording of operating times and lubrication of the mechanism.

■ replacement of contacts after 12 operations at full 31.5 kA short-circuit. (At lower currents the endurance increases significantly).

# high voltage SF6 circuit-breakers

## SB6 72.5 kV

### dimensions



### Dimensions and weights

complete circuit- breaker	dimensions (mm)					weight* (kg)
	H	A	W	D	E	
<b>SB6</b>						
<b>72</b>	2714	3974	2490	650	1050	720

\* without supporting structure.

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