



# Outdoor live tank SF<sub>6</sub> circuit breaker Type EDF SK

# ABB Power technologies – bringing power to the people

ABB's Power technologies offer electric, gas and water utilities as well as industrial and commercial customers a wide range of products, system and service solutions for power generation, transmission and distribution including complete electrics, generation plants, utility automation and bulk power transmission.

ABB's power technologies cover the entire voltage range including indoor and outdoor circuit breakers, air and gas insulated switchgear, disconnectors, capacitor banks, reactive power compensators, power and distribution transformers as well as instrument transformers.

Ongoing research and development and constant innovation ensures that ABB products, systems and solutions remain at the cutting edge of technology and at the same time are safe to use and environmentally friendly.



# SF<sub>6</sub> Circuit breaker EDF SK with Autopuffer™

The EDF SK is a live tank SF<sub>6</sub> Autopuffer™ circuit breaker designed for 36 – 84kV range and with a rated breaking current up to 31.5kA.

In the most common version, the circuit breaker is operated with one operating mechanism. In case of single pole operation each pole is supplied with its own operating mechanism.

## Main features and advantages

The EDF SK circuit breaker is based on the latest developments in arc research and offers the following advantages:

- Restrike-free interruption of capacitive currents due to high inherent dielectric strength of SF<sub>6</sub> gas and optimised contact movement
- Low over-voltages when switching inductive currents due to optimum quenching at current zero
- High dielectric strength even when SF<sub>6</sub> gas is at atmospheric pressure due to wide contact gap
- Low operating energy - reduced mechanical stress on breaker and low reaction forces on the foundation
- Low noise level - suitable for installation in residential areas
- High making capacity even in the case of parallel connected capacitor banks
- High seismic capability due to optimised pole and structure design
- Easy installation and commissioning. Each circuit breaker is pre-tested and shipped to site in the form of few easily inter-connected units

Rated voltage	36 - 84 kV
Rated current	up to 2500 A
Rated breaking current	up to 31.5 kA
Rated frequency	50 and 60 Hz
Installation	Outdoor

## Design

The circuit breaker pole includes the breaking unit, the support insulator and the pole linkage housing. The three poles of the breaker are mounted on a common support frame with the operating mechanism arranged below the same frame.

The three breaker poles have a common gas system. For operations up to –30° C, the system is filled with SF<sub>6</sub> gas at a pressure of 0.7MPa (abs), at a temperature of +20° C.

For applications where temperatures is as low as –50° C the common gas system is filled with a mixture of SF<sub>6</sub> gas and Nitrogen gas. When the SF<sub>6</sub> and Nitrogen gas mixture is used the breaking capacity is normally reduced one IEC step for e.g. 31.5 to 25 kA.

The operating reliability and service life of an SF<sub>6</sub> circuit breaker is dependent on the maintenance of SF<sub>6</sub> gas pressure and neutralisation of the effects of moisture and decomposed products in the gas. The above is achieved by:

- Double O-rings of Nitrile rubber used for sealing purposes with excellent results
- Each breaking unit is provided with an absorber that absorbs moisture and gaseous decomposed products
- Interruption capability is a function of SF<sub>6</sub> gas density. A density monitor consisting of a temperature-independent pressure switch is provided in the circuit breaker
- Temperature-dependent pressure variations of SF<sub>6</sub> gas are compensated by hermetically sealed reference gas volume. An alarm signal is triggered when pressure drops due to loss of gas

## Operating mechanism, type FSA

The circuit breaker is operated by a motor charged spring operating mechanism, which is installed in a splash-proof painted cubicle.

- One FSA is used for three-pole operation
- Three FSAs are used when single pole operation is required

## Options

- Brown/Grey insulators
- Silicon rubber insulators (Max. rated current 2000 A)
- For installation of current transformers, type IMB:
  - Brackets for IMB
  - Primary connection between CT and the EDF SK

## Quality and sustainability

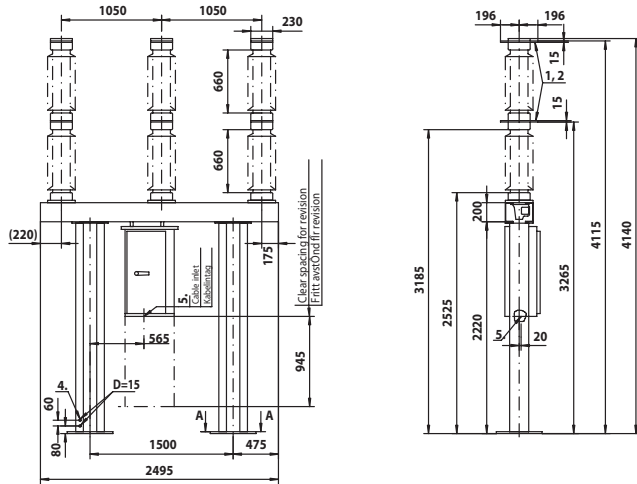
To ensure consistent and high product quality all components are subjected to stringent quality tests prior to manufacturing. To guarantee trouble-free functioning, comprehensive electrical and mechanical routine tests are carried out on the poles and operating mechanism after the product is fully assembled.

All ABB India manufacturing facilities are ISO:9001 and ISO:14001 certified.



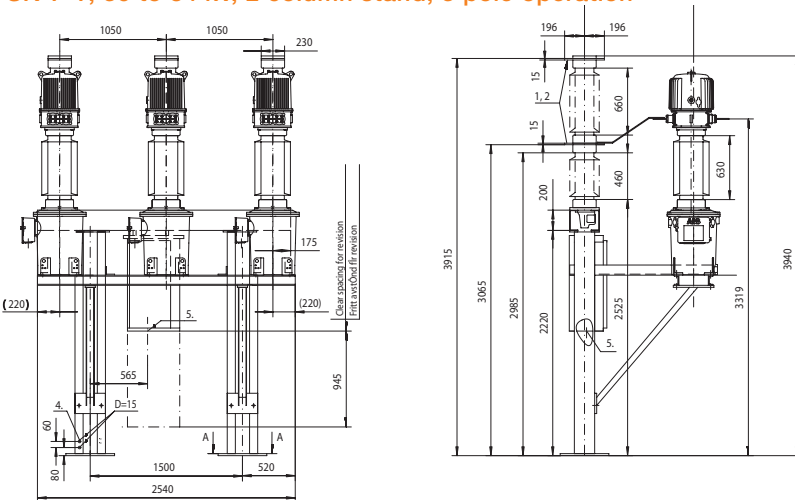
# Dimensions

## EDF SK 1-1, 36 to 84 kV, 2 column stand, 3 pole operation



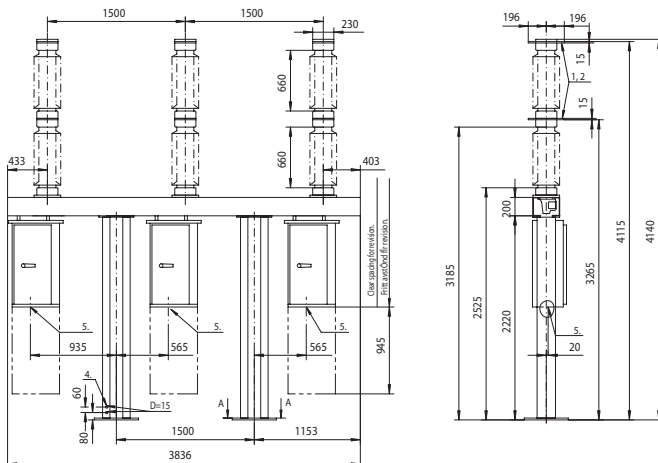
Dimensions in mm

## EDF SK 1-1, 36 to 84 kV, 2 column stand, 3 pole operation



Dimensions in mm

## EDF SK 1-1, 36 to 84kV, 2 column stand, 1 pole operation



Dimensions in mm

# Technical data

## Values complying with IEC 62271-100 and ANSI C37

EDF SK 1 – 1			36	52	72.5	84
Rated Voltage	IEC	kV	36	52	72.5	84
	ANSI	kV	38		72.5	84
Power frequency withstand voltage						
– 1 min dry	IEC	kV	70	95	140	140
– 1 min wet	IEC	kV	70	95	140	140
– 1 min dry	ANSI	kV	105		160	
– 10 sec wet	ANSI	kV	105		140	
Lightning impulse withstand voltage (LIWL)						
– Full wave 1,2/50 µs	IEC	kV	170	250	325	325
– Chopped wave 2 µs	ANSI	kV	200		250	
– Chopped wave 3 µs	ANSI	kV	258		452	
– Chopped wave 3 µs	ANSI	kV	230		402	
Creepage distance to earth <sup>1) 2)</sup>		mm	1390	1390	1995	1995
Creepage distance across break <sup>1) 2)</sup>		mm	1995	1995	1995	1995
Rated normal current		A	2500	2500	2500	2500
Rated breaking current <sup>3)</sup>	at 50 Hz	kA	31.5	31.5	31.5	25
	at 60 Hz	kA	31.5	31.5	31.5	-
First pole to clear factor					1.5	
Making current <sup>3)</sup>	at 50Hz	kAp	79	79	79	62.5
	at 60Hz	kAp	82	82	82	-
Duration of short circuit		s			3	
Closing time		ms			60	
Opening time		ms			35	
Total break time		ms			55	
Dead time		ms			300	
Rated reclosing time, 60 Hz	ANSI	cycles			20	
Rated operating sequence	IEC and ANSI				O – 0.3 sec – CO – 3 min – CO	
	ANSI				CO – 15 sec – CO	

1) Other values on request. 2) Tolerance according to IEC 233. 3) 100% SF<sub>6</sub> gas.

Data and illustration without engagement. We reserve the right to make changes in the course of technical development.

## Transportation and erection

The EDF SK circuit breaker is transported as a complete unit filled with SF<sub>6</sub> gas to a slight overpressure. As the circuit-breaker is assembled and routine tested in the factory, the erection work at site is minimal and can easily be done in a day.

Filling of the SF<sub>6</sub> gas to specified working pressure can be facilitated by using the following pressurising equipment:

- A special control valve for connection of SF<sub>6</sub> gas bottle and a 20m long hose with connector
- Complementary control valve for connection to Nitrogen gas (bottle for mixed gas filling)

Please note that deviation for gas connection may occur based on local standards.

## Shipping data

Type	Number of cases	Total Volume	Total Gross weight	Total Net weight
EDF SK 36 - 84 kV three pole operation, incl. one op. mechanism and support columns	2	3.8	1123	873
EDF SK 36 - 84 kV single pole operation, incl. three op. mechanism and support columns	2	4.9	1490	1190

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