

# Outdoor live tank vacuum circuit breaker

Model VBF for 36kV applications



**ABB**

# ABB ñ a global leader

ABB ([www.abb.com](http://www.abb.com)) is a global leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries.

ABB's Power Technologies division offers electric, gas and water utilities as well as industrial and commercial customers a wide range of products, system and services for power generation, transmission and distribution. ABB's turnkey solution capabilities in the sector range from substations to complete electrification and plant automation to bulk power transmission, utility automation and distribution systems.

The product offering covers a wide spectrum of technologies across the entire voltage range including indoor and outdoor circuit breakers, air and gas insulated switchgear, disconnectors, capacitor banks and reactive power compensators, power and distribution transformers as well as instrument transformers.

ABB in India has a long-standing presence over several decades. The company has extensive local manufacturing across 8 centers supported by a countrywide marketing presence, including 26 marketing offices, a widespread network of around 500 channel partners and 8 service centers in addition to customer training hubs and 3 global R & D centers.

## Advantage ABB

- ✓ 120 years of technology and innovation
- ✓ Unparalleled domain competence
- ✓ Vast global experience
- ✓ Total solution provider
- ✓ Large installed base
- ✓ Environment-friendly technologies



## Salient features

- Designed and type tested as per IEC 60056 / IS: 13118
- Vacuum interruption
- Porcelain clad construction suitable for outdoor substation ensures protection from fire and hazardous conditions
- Long electrical life with proven vacuum interrupters that utilise the excellent arc quenching and insulating properties of vacuum technology
- Suitable for auto-closure duty cycle of O-0.3 sec-CO-3 min-CO and CO-15 sec-CO
- Simple and reliable spring mechanism minimises operating energy and ensures longer mechanical life
- Simple installation – structure mounted with option of extension
- The complete breaker can be shipped as one unit with minimal adjustments to be made on site. As an option the breaker can be shipped in knocked down kits which can be easily assembled at site

## Construction

### Pole assembly

- Pole assembly consists of three poles and a common duct
- Each pole comprises a vacuum bottle, current transfer contacts and an insulating pull rod placed in the porcelain housing
- Robust housing for protection against fire and hazardous conditions
- Primary terminal connectors can be provided, such as NEMA 4
- All three poles are mounted on a common duct
- Poles are interconnected with each other as well as to the operating mechanism with a linkage arrangement
- Simple design - minimises spare parts

### Applications

- Distribution networks
- Capacitor switching
- Frequent switching duties
- Arc furnace duty
- Rapid auto-reclosing
- Switching unloaded transformers and reactors

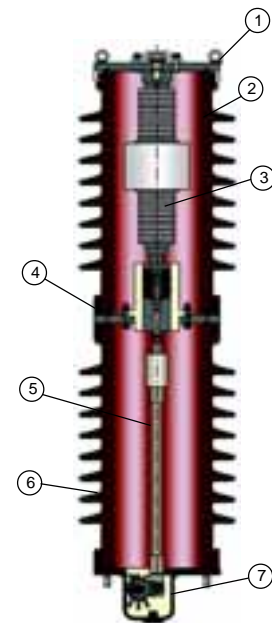
### Base cabinet

The base cabinet is made of painted mild steel with an option for galvanised steel. The cabinet houses a spring operated mechanism which is mechanically linked to all three poles. The cabinet also includes the following:

- Anti-condensation heater
- Circuit breaker status indicator
- Mechanical operation counter
- Breaker control switches
- Anti-pumping relay
- AC / DC fuses
- Auxiliary wiring
- Terminal blocks



Rear view with back cover open



1. Top Terminal
2. Arc Chamber Insulator
3. Vacuum Interrupter
4. Bottom Terminal
5. Insulating Rod
6. Support Insulator
7. Bottom Crank Housing

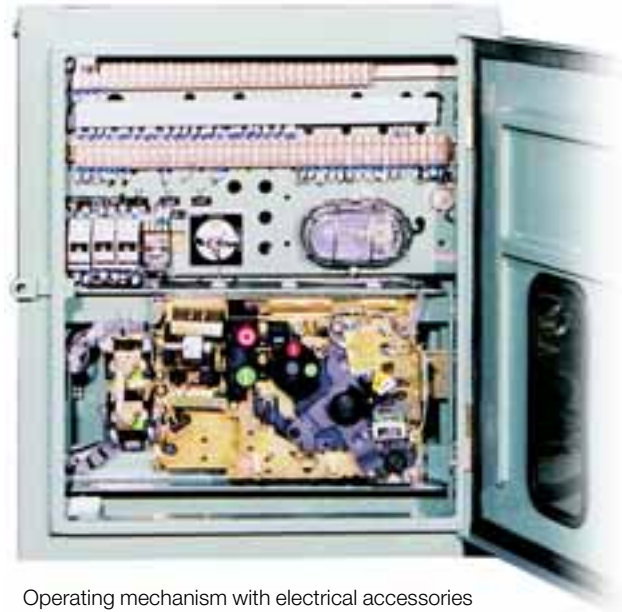
Sectional view of pole part

# Operating mechanism

For high operational reliability and minimal maintenance, a simple and robust spring-operated mechanism is used.

## Features

- O-C-O operation without recharging
- Closing spring is charged by motor in less than 15 seconds
- Mechanical / electrical anti-pumping
- Provision for manual charging
- Suitable for high speed auto-reclosing
- Manual closing and tripping arrangement
- Mechanical 'ON-OFF' and 'SPRING CHARGED' indication
- Auxiliary switch: 13 NO+13 NC
- Additional tripping solenoid (Optional)



Operating mechanism with electrical accessories



Closing / opening coil



Auxiliary switch



Spring charging motor

## Certified routine tests

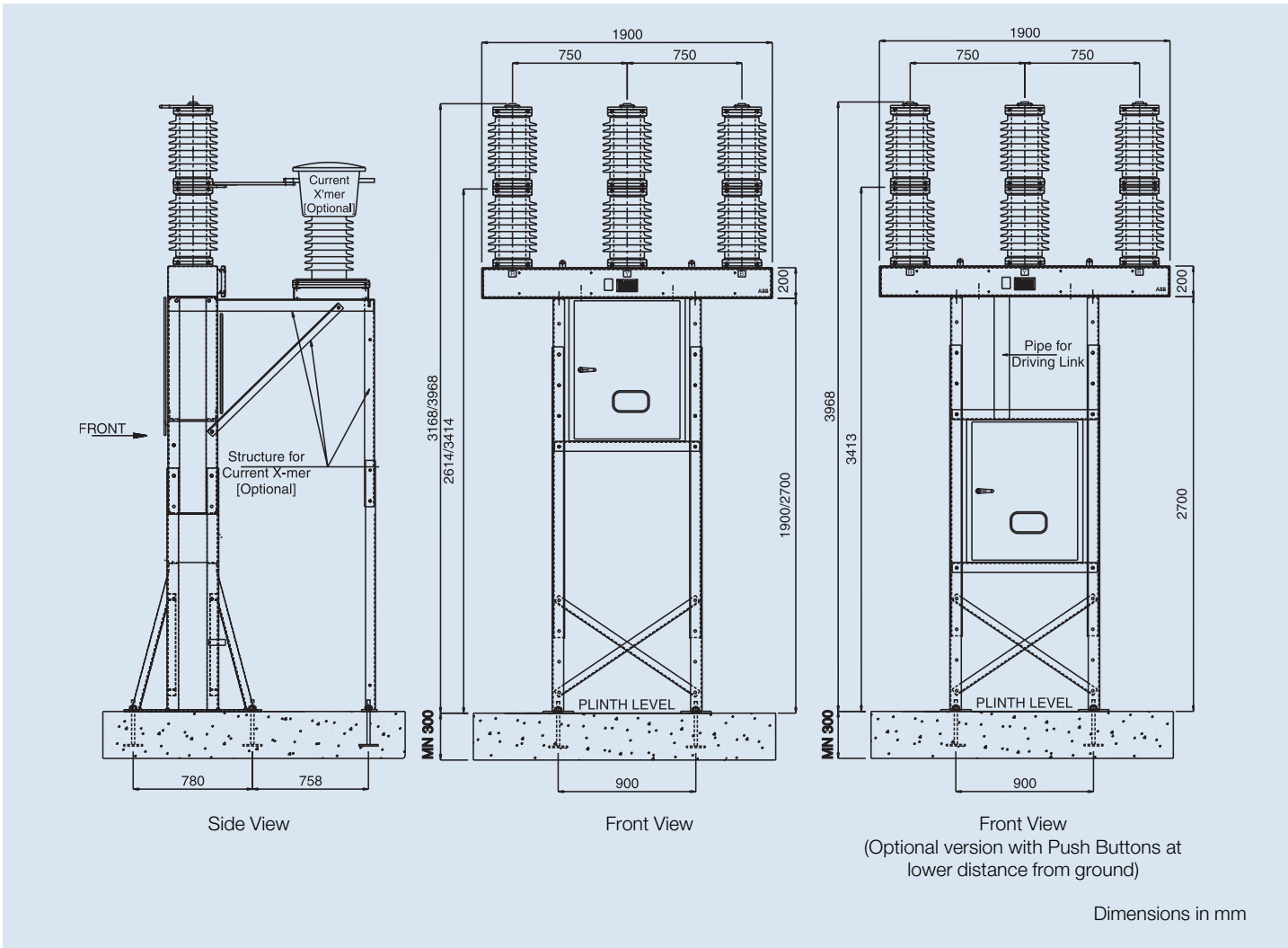
Each breaker is subjected to the following routine tests in the factory as per ANSI C 37.09 and IEC - 60056 / IS:13118

- Verification of components
- Low / high / nominal closing coil voltage:  
i.e. at 85%, 110% & 100% of nominal voltage\*
- Low / high / nominal tripping coil voltage:  
i.e. at 70%, 110% & 100% of nominal voltage\*
- Low / high / nominal spring charging motor voltage at 85%, 110% & 100% of nominal voltage\*
- Trip-free operation
- Control wiring: 2000V to ground for 1 minute (if applicable)
- Test for withstanding power frequency voltage at 70kV for 1 minute
- Opening and closing speed
- Contact resistance
- Anti-pumping test

\*Other voltage levels available on request



# General arrangement drawing



## Mounting structure

A robust extruded steel angle structure is used for mounting the breaker which can be extended for mounting current transformers depending on customer requirements.

## Transportation, erection, commissioning and maintenance

- To minimise erection time, the breaker is transported as an assembled unit mounted on a support assembly, which needs to be replaced by the standard mounting structure (supplied alongwith the breaker) at site.
- The breaker can also be transported in parts if required
- The advanced circuit breaker design minimises maintenance

Operating manual available on request.

## Commitment to quality and sustainability

All ABB India manufacturing facilities confirm to the highest quality standards and environment norms. These are all ISO 9001 and ISO 14001 compliant and are certified by leading international authorities.



# Technical details

Description	Unit	Rating
Circuit breaker type	–	VBF36.16.25
Rated Voltage	kV	36
Power Freq. withstand voltage	kVrms	70
*Impulse withstand voltage	kVpeak	170
Rated frequency	Hz	50
**Creepage distance to earth	mm	900
Rated normal current	A	1600
Rated breaking current	kA	26.3
Rated short time withstand current	kA for 3 sec	26.3
Rated making current	kApeak	65.75
First pole to clear factor	–	1.5
Duty cycle	–	O-0.3 sec-CO-3 min-CO /CO-15 sec-CO
Opening time	ms	40 ± 10
Total break time	ms	55 ± 10
Closing time	ms	60 ± 15
Reclosing time	ms	300
Contact stroke	mm	20
No. of breaks / pole	–	1
Weight (approx.)	Kg	850

\*200 kVpeak available on request

\*\*Higher creepage distance (31mm / kV) available on request

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



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