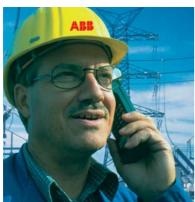
# **Medium voltage retrofit solutions**

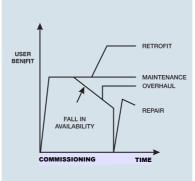
# Optimizing investment and performance

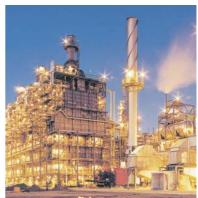




















# ABB - a global technology leader

ABB 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 operates in around 100 countries and employs over 1,08,000 people.

In India, ABB serves customers with a complete range of power and automation technologies. The company has a vast installed base, extensive manufacturing facilities and a countrywide marketing and service presence.

As a part of its Power Technologies offering, ABB serves electric, gas and water utilities as well as industrial and commercial customers with a wide range of products, systems and services for power generation, transmission and distribution. ABB's system solutions include Electrical Balance of Plant (EBOP) automation, controls and instrumentation, for power plants, bulk power transmission systems, turnkey substations, automation controls and instrumentation, utility automation and power distribution.

The product offering includes a wide spectrum of technologies across the entire voltage range including indoor and outdoor circuit breakers, air and gas insulated switchgear, disconnectors, capacitor banks, reactive power compensators, power transformers, distribution transformers, instrument transformers, Compact Secondary substations (CSS) and Ring Main Units (RMU).

### **Advantage ABB**

- √ 120 years of technology and innovation
- ✓ Unparalleled domain competence
- ✓ Global experience
- ✓ Complete solution capabilities
- ✓ Large installed base
- ✓ Environment-friendly technologies



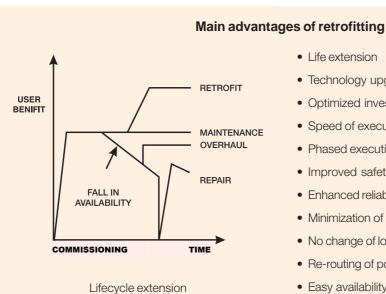
Retrofit of Reyrolle air blast circuit breakers with ABB SF6 circuit breakers

# Retrofit solutions for medium voltage equipment

With increasing demand for power, aging equipments are subject to stringent loads beyond their rated values at many existing installations. The equipment is also required to perform reliably, meet the necessary standards, combat increasing fault levels and be compatible with the latest data communication systems. In many cases, considering shutdown constraints and cost factors, the value proposition offered by Retrofit Solutions are far greater than replacing the old equipment.

The key value proposition of Retrofit Solutions is the optimization of performance and investment.

Typically, retrofit constitutes replacement of vital equipment having similar or advanced features, for life extension, reduced maintenance and improved functionality. This includes upgradation & modernization of basic equipment and allied parts. The retrofitted switchgear offers far greater system reliability, personnel safety and long term availability of spares with minimal investment and down time.



- - Technology upgradation
  - · Optimized investment
  - · Speed of execution

• Life extension

- Phased execution
- Improved safety standards
- Enhanced reliability
- Minimization of downtime (shut downs/ outages)
- No change of location foundation not disturbed
- Re-routing of power / control cables not required
- · Easy availability of spares

### Scope of MV retrofit

- Replacement of circuit breakers/other components as required
- Upgradation of panels with respect to current and voltage rating and fault level
- Conversion of fixed type circuit breaker to draw out type, circuit breaker to contactor, transformer feeder to motor feeder etc.
- Upgradation of protection relays

### Methodology

- Defining required performance parameters
- Study of existing system
- Gap analysis identifying problem areas
- Providing solutions based on latest technologies and addressing environmental standards
- Execution with minimum downtime

All products are manufactured in accordance with ISO 9001. The circuit breakers for retrofit conform to and are designed and typetested as per IEC standards.

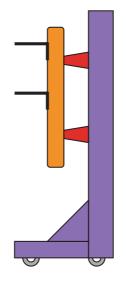


# One-to-one retrofit solutions

In a one-to-one retrofit solution the new circuit breaker is re-engineered:

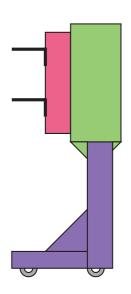
- The static portions of switchgear panel, busbars, CT/cable compartment and relay/metering compartment are not changed
- The horizontal/vertical travel distance of the breaker truck is matched with that of the old breaker
- The isolating power, main contacts and auxiliary contacts of the circuit breaker is matched with those of the old breaker
- Interchangeability of the breaker is maintained
- Retrofit can be taken up at convenient, short, pre-planned shutdowns

#### ORIGINAL CIRCUIT BREAKER



- Dimensionally compatible
- Interlocks matched
- Contact position matched

#### RETROFIT CIRCUIT BREAKER



- Wiring matched
- Racking arrangement replicated
- Computer aided re-engineering

ASEA make MOCB retrofitted with ABB vacuum circuit breaker



- Voltage class: 12kV
- Rated current: up to 3000A
- Breaking current: up to 40kA

BBC MOCB retrofitted with ABB SF6 circuit breaker



- Voltage class: 12kV
- Rated current: up to 2000A
- Breaking current: up to 40Ka

Voltas SF6 circuit breaker retrofitted with ABB SF6 circuit breaker



- Voltage class: 12kV
- Rated current: up to 3000A
- Breaking current: up to 40kA

# Russian MOCB retrofitted with ABB SF6 circuit breaker



Voltage class: 12kVRated current: up to 2500ABreaking current: up to 40kA

Fuji make MOCB retrofitted with ABB vacuum circuit breaker



Voltage class: 12kVRated current: up to 3000ABreaking current: up to 40kA

NGEF MOCB retrofitted with ABB vacuum circuit breaker



Voltage class: 12kVRated current: up to 3000ABreaking current: up to 40kA

Reyrolle BOCB retrofitted with ABB vacuum circuit breaker



Voltage class: 12kVRated current: up to 1600ABreaking current: up to 25kA

Westinghouse BOCB retrofitted with ABB vacuum circuit breaker



Rated current: up to 1250A
Breaking current: up to 25kA

Siemens make MOCB retrofitted with ABB vacuum circuit breaker

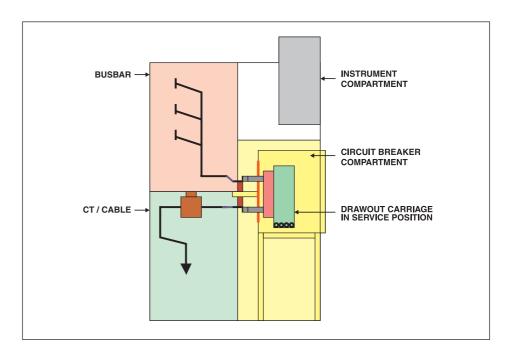


Voltage class: 12kVRated current: up to 2000ABreaking current: up to 40kA

## Module retrofit solutions

In a module retrofit solution, the circuit breaker compartment is re-engineered:

- The old circuit breaker along with the breaker compartment is replaced with the new circuit breaker and breaker housing designed and tested for the existing switchgear
- Existing partitions, shutters, power contacts, racking mechanism and control circuit plugs and sockets are replaced with new ones as required
- The jumper links in the busbar compartment are modified to match the contacts of the retrofitted module
- Precise alignment of breaker and panel contacts is ensured during product design and assembly



UNISAFE MODULE with ABB Vacuum circuit breaker / vacuum contactor



Voltage class: 12kV

Rated current: up to 1250A

• Breaking current: up to 25kA

VHA12 MODULE with ABB SF6 / Vacuum circuit breaker/vacuum contactor



Voltage class: 12kV

Rated current: up to 3000A

• Breaking current: up to 40kA

VHA33 MODULE with ABB SF6 circuit breaker



Voltage class: 33kV

Rated current: up to 2500A

Breaking current: up to 25kA

### Make of MV Circuit Breakers retrofitted by ABB

Sr. no.	Existing CB Make	Existing CB Type	Retrofitted CB Type
1	ABB / ASEA/BBC	ABCB / MOCB	SF6 / VCB /V-Contact
2	VOLTAS	SF6	SF6 /VCB / V-Contact
3	RUSSIAN	ABCB / MOCB	SF6
4	NGEF	MOCB/SF6	SF6/VCB/V-Contact
5	WESTINGHOUSE	BOCB	VCB
6	FUJI	MOCB	VCB
7	REYROLLE	BOCB, ABCB	SF6 / VCB
8	SIEMENS	MOCB	SF6 / VCB

## Some significant retrofit solutions executed by ABB

Customer	Rating
NTPC	12 / 6.6 kV
Tata Power Company Ltd	11 / 24 / 36 kV
MPPGCL	6.6 kV
UPVUNL	12 / 6.6 / 3.3 kV
APPGCL	12 kV
MARUTI / HYUNDAI	12 / 6.6 kV
MRF/CEAT/GOODYEAR	12 / 6.6 kV
ONGC	22 / 12 / 6.6 kV
AIR	12/6.6 kV
GRASIM - Cement Plants	12 / 6.6 kV
SAIL	12 / 6.6 kV
NALCO/BALCO	12 / 6.6 KV
Hindustan New Print Ltd	12 kV

## ABB medium voltage retrofit solutions - Installed base (up to March 2007)

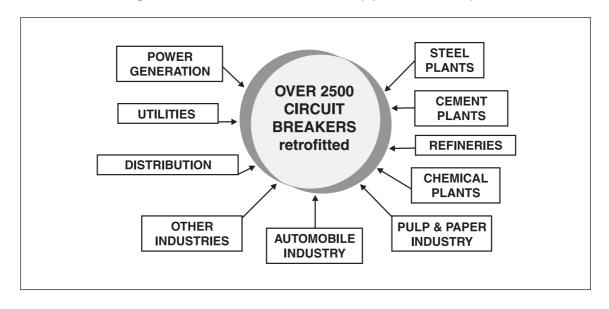




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