Apparatus retrofit solutions
OneFit
Contents

Sections

Section A:
• Asset upgrade
• Retrofit
• Technical solutions

Section B:
• OneFit
• True plug-in technology
• Ready to go
• Packages
Asset upgrade
Full system provider

Modernization need → Site audit & assessment → Service portfolio → Supply: • Maintenance • Retrofit • Replacement → Installation & Commissioning
Retrofit

Overview

- Phased-out devices replacement
- Mechanical and electrical adaptation design
- Current production apparatus

Benefits
- Asset upgrade
- Retrofit
- Technical solutions
Retrofit

Technical solutions

<table>
<thead>
<tr>
<th>Conversion</th>
<th>Roll-in replacement</th>
<th>Retrofill</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Conversion Image]</td>
<td>![Roll-in Replacement Image]</td>
<td>![Retrofill Image]</td>
</tr>
<tr>
<td>Hard-bus retrofit</td>
<td>Cradle-in cradle</td>
<td></td>
</tr>
<tr>
<td>Interchangeable with original apparatus</td>
<td>Interchangeable with new equipment</td>
<td></td>
</tr>
</tbody>
</table>

- Original components
- New device
- Adaptation system
- New frame/cassette
Technical solutions

Conversion

Features

- Cost effective solution
- Inspection and testing activities needed
- Manufacturing and logistic constraints

Existing truck and some parts re-used
New apparatus
Technical solutions
Roll-in replacement

Features
• Significant modifications to the switchgear are not required
• Reduced downtime
• Higher performances and additional features

Original parts
Adaptation system
New device
Technical solutions

Retrofill

Features

• Renew of the main functional components of the original switchgear
• Suggested solution when shutters and interlocks are in bad condition
• Significant site work needed

Original parts
New frame/cassette
New device
Adaptation system
Technical solutions
Retrofill: Hard-bus retrofill

Features

- A new frame hosts a standard apparatus
- An additional power circuit makes the connection
- Existing bushings generally remain in place
Technical solutions
Retrofill: Cradle-in-cradle

Features

- A new cassette hosts a standard apparatus
- Inner and outer interfaces are included
- Existing bushings are generally replaced
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OneFit

The latest ABB hard-bus retrofill

ABB integrally safe plug-in design

ABB technology added value

ABB integrally safe plug-in design
OneFit

Design concept for horizontal drawout breakers

- Integrally safe plug-in system
- Insulating system
- Frame
- Door *
- Original panel
- Basement
- Shutter
- ABB breaker

* On request
OneFit

Design concept for vertical lift breakers

- Integrally safe plug-in system
- Insulating system
- Frame
- Door *

* On request

- Original panel
- Basement
- Shutter
- Standard apparatus
Type tests: IEC and GB version

Type tested solution according to:

- Latest IEC Standards:
  - 62271-1 (for the frame)
  - 62271-100 (for the circuit-breaker)
  - 62271-200 when the original panel is provided to perform the tests

- Latest GB Standards:
  - 3906 Alternating current metal-enclosed switchgear
OneFit
Type tests: ANSI version

Type tested solution according to latest IEEE Standards:
• C37.20.2 Standard for Metal Clad Switchgear
• C37.04 Rating structure of high voltage circuit breakers
• C37.59 Requirements for conversion of power switchgear equipment

VM1/A circuit breaker
Automatic shutter
1. Full metallic segregation during breaker insertion to and removal from the frame avoiding accidental electrical-contact injuries.

2. Automatically operated insulating shutter during breaker rack-in and out. Available also motor operated, increasing the distance between the operator and any fault incident.
OneFit
Generator breaker application

OneFit with VD4G targets brown field generator applications. VD4G range fulfills MVA and rating current of each generator breaker replacement:

- VD4G vacuum generator circuit breaker family
- Type tested solution according to the new dual logo IEEE/IEC 62271-37-013-2015 Standards
- Up to 15kV operating voltage, 17.5 kV IEC rated insulation class
# OneFit

## VD4G onboard OneFit

<table>
<thead>
<tr>
<th>OneFit frame [AxBxC]</th>
<th>W600 [535x859x792mm]</th>
<th>W700 [685x859x792mm]</th>
<th>W800 [754x886x792mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VD4G version</strong></td>
<td>VD4G/P-25</td>
<td>VD4G/P-40</td>
<td>VD4G/LR-50</td>
</tr>
<tr>
<td>Poles distance</td>
<td>150mm</td>
<td>210mm</td>
<td>210mm</td>
</tr>
<tr>
<td>Rated voltage Ur</td>
<td>15kV</td>
<td>15kV</td>
<td>15kV</td>
</tr>
<tr>
<td>Rated normal current (40° C) Ir</td>
<td>1250A</td>
<td>up to 2000A</td>
<td>2500A</td>
</tr>
<tr>
<td>Rated frequency fr</td>
<td>50/60Hz</td>
<td>50/60Hz</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Symmetrical short-circuit current Iscg Class G1</td>
<td>16kA</td>
<td>25kA</td>
<td>50kA</td>
</tr>
<tr>
<td>Rated short-time withstand current Ik (3 s)</td>
<td>25kA</td>
<td>40kA</td>
<td>50kA</td>
</tr>
</tbody>
</table>

(a) 3150A rated normal current value may require forced ventilation depending on the original panel design.

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OneFit

Customer benefits in retrofit solutions

Both ABB and non-ABB installed base applicability targeting full life time extension

Quick and easy integration of the generator circuit breakers into existing switchgear lineups

Integrated solution with the same operating interface of the distribution retrofit breakers

ABB technical support and analysis of the existing network and the new retrofit breakers

Compliance with latest Standards of the complete retrofit solution
True plug-in technology

Adaptable

Original panel dimensions are not constraints anymore
True plug-in technology

Flexible

Existing breaker design is over
True plug-in technology

Universal

Screwed  Round  Flat

No limits to interface
Ready to go

Optimized solution

Safety upgrade due to embedded interlocking system with new shutter

Improved dielectric properties due to new integrated insulation design

Design compliance with all circuit breakers type and fused contactors

Application example n. 1
Ready to go
Apparatus range

Benefit of the widest apparatus range

HD4, VD4, VD4 Digital, VD4G, VM1, VSC
Inducted voltage injuries avoided due to closed door racking

Arc fault operator effects prevented by the remote motor operated racking system

Switchgear revamping with replacement of circuit breaker, measuring sensors and protection relay
Ready to go
Modernization

- Earthing switch functionality modernization
- New interlocking functionalities
- Cable testing truck
- Earthing truck also with making capability

ABB ES truck with reliable short circuit making capability

ABB ES truck – without making capability
Ready to go
Link to the future

Interchangeable equipment with new extension panels and additional switchgear
Reusable apparatus in replacement switchgear
Packages

Fit for purpose

OneFit
OneFit Safety
OneFit Safety Plus
OneFit eSafety Plus

Keep the original standards… increase the safety for personnel … renew the switchgear
Packages

OneFit

**The true retrofill solution**

New apparatus racking system, integrated metal isolating shutter and state-of-the-art interlocking system
Packages

OneFit Safety

**Increased protection for personnel**

Added features overcome the existing equipment design constraints providing closed-door operational mode, avoiding accidental electrical-contact injuries.
A new level of operational safety

Embedded remote racking provides a safer operating environment for personnel, increasing the distance between the operator and arc-flash-incident energy at the switchgear site.
Packages

OneFit eSafety Plus

**Integral equipment revamping**

Unique solution for the full switchgear revamping (breakers and relays retrofitting)

Integrated current sensors with no heat dissipation

Voltage sensors unaffected by ferroresonance risk

Relay retrofitting with Relion® family

Best choice for retrofitting old breakers with onboard measuring transformers or direct relays

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Packages
OneFit eSafety Plus

**Integral equipment revamping**

Current sensors onboard OneFit frame
Suitable in combination with HD4, VD4 P150 versions and VSC apparatus type
New life to the switchgear integrating relay and voltage sensors
The integration measuring sensors onboard VD4 Digital gives new life to the switchgear MTTR (Mean Time to Repair) much shorter than conventional solutions.

VD4 Digital is the ideal solution for all installations where a high degree of continuity of service is required.

Combisensors onboard VD4