FC-Protector®
Innovative fault current limiter for indoor and outdoor applications
Agenda

Short-circuit challenge
New member of fault current limiter family
New power part
New control unit QR6-B
New control system
Wide range of applications
FC-Protector … as a short-circuit solution
Applications
Technical data
Unbeatable advantages
Summary
FC-Protector®

Short-circuit challenge

- Short-circuit current capability of system and existing equipment exceeded
- Coupling of independent systems
- Connection of additional generator
- Connection of additional transformer

- Upgrade existing installation
- Cost-efficient solution
- Reduction of electrical losses of reactor
- No room for indoor placement of equipment
FC-Protector®

New member of fault current limiter family

**ABB’s solution for standard applications suitable for indoor and outdoor conditions**

Solves short-circuit current problems in electrical networks before peak short-circuit current is reached

High mounting flexibility for wide range of indoor and outdoor applications

Reduced lead time due to standardized components and engineering process
FC-Protector®

New power part

**Compact design** consisting of insert and insert holder with impulse transformer and current transformer

Technology available for **indoor and outdoor** conditions

**Plug and play** insert replacement and **eco-efficient** refurbishment of reusable inserts

**Short lead and response times** due to standardized engineering process

**Fast and easy** implementation and **standardized interfaces**
**FC-Protector®**

New control unit QR6-B

- **Compact and type tested** control unit QR6-B

- **Reliable fault current detection** through continuously monitoring of instantaneous current

- Self-monitoring through **integrated fault detection**

- Analogue technology to **support speed and reliability** requirements

- **Well structured HMI** using colored display elements for indicating extended information
FC-Protector®

New control system

**IP55 control system cabinet**
- IP55 cabinet
- Outdoor suitability for harsh environments
- Low footprint

**IP4X control system cabinet**
- HMI front visibility
- Easy access and well structured
- Low footprint

**Low Voltage Compartment**
- Flexible integration into non-standard Low Voltage Compartment

IP55 control system cabinet
QR6-B integrated in outdoor cabinet
FC-Protector®
Wide range of applications

**Industry**
- Oil and gas
- Pulp and paper
- Cement
- Chemical
- Iron and steel
- Manufacturing

**Utility**
- Power distribution
- Power transmission
- Power generation
- Cogeneration connection

**“Green Energy“**
- Hydro power
- Biomass
- Combined heat and power production
- Wind power plant (onshore)
- Waste Heat Recovery
- Waste Treatment

More than 50 years of experience with fault current limitation technology
FC-Protector®
...as a short-circuit solution

Without FC-Protector

\[
i = i_1 + i_2
\]
\[
I_{k_{\text{perm.}}} = 25 \text{ kA}
\]
\[
I_{k} = 25 \text{ kA}
\]
\[
I_{k} = 31.5 \text{ kA}
\]
\[
I_{k_{\text{perm.}}} = 31.5 \text{ kA}
\]

Total clearing time of circuit-breaker

Current curve at the short-circuit location
FC-Protector®

...as a short-circuit solution

**Without FC-Protector**

\[ i = i_1 + i_2 \]
\[ i_1 = 25 \text{kA} \]
\[ i_2 = 31.5 \text{kA} \]
\[ i_{k, \text{perm.}} = 25 \text{kA} \]
\[ i_{k, \text{perm.}} = 31.5 \text{kA} \]

**With FC-Protector**

\[ i = i_1 + i_2 \]
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**FC-Protector®**

Applications

- Connection of an additional generator
- Coupling of two systems
- Bypassing a reactor through parallel operation

| Voltage | Current | MVA | %
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>110 kV</td>
<td></td>
<td>31.5 MVA</td>
<td>12</td>
</tr>
<tr>
<td>10 kV / 25 kA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 kV / 31.5 kA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 MVA</td>
<td></td>
<td>8</td>
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## FC-Protector®

### Technical data

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<tr>
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<th>7.2 kV</th>
<th>12 kV</th>
<th>17.5 kV</th>
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<tbody>
<tr>
<td>Rated voltage $U_r$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current $I_r$</td>
<td></td>
<td>... 2500 A</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit current $I_k$</td>
<td></td>
<td>... 63 kA</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Indoor (IP4X)</td>
<td>Outdoor (IP 55)</td>
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Remark: Higher values possible with $I_r$-limiter™.
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Unbeatable advantages

**Fast implementation**

Project related **basic engineering** according to customer’s requirements

**Quick response time** based on standardized engineering and documentation

**Short delivery time** based on standard components
## FC-Protector®

### Unbeatable advantages

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#### Fast implementation
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- **Short delivery time** based on standard components

#### Standard solution
- **Standardized and compact design** for all applications
- Fully **type tested** according to latest standards
- **Flexible indoor and outdoor** suitability
- **Weather and seismic proofed** solution

#### Equipment and process protection
- **Safe protection** of electrical installations and equipment, processes and systems, auxiliary supply in power plants by immediate separation from the fault affected network
- **Minimization of damage** by reducing short-circuit current energy and respectively limiting stress on network components
- **Improved „power quality“** by reducing voltage dip
## FC-Protector®

### Unbeatable advantages

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Leading to...

**Minimization of damage** by reducing short-circuit current energy and respectively limiting stress on network components

**Improved „power quality“** by reducing voltage dip

### Cost- and eco-efficient solution

**Protection** of customer's investment

**System extension** without replacing existing electrical equipment such as circuit-breaker, busbar or cable system

**Cost- and eco-efficient** due to minimization of electrical losses

**Cost-efficient** due to maximized uptime

**Downsizing** of the system by using lower rated equipment
FC-Protector®

Summary

**ABB’s solution for standard applications**

*Solves short-circuit current problems* in electrical networks before peak short-circuit current is reached

*High mounting flexibility* for wide range of indoor and outdoor applications

*Reduced lead time* due to standardized components and engineering process

How we can support you?
FC-Protector®

New solution for standard applications

Please visit our website for the latest product information
