Eco Changes is the Mitsubishi Electric Group’s environmental statement, and expresses the Group’s stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

Safety Warning
To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

MITSUBISHI ELECTRIC CORPORATION
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We recommend to replace the aged VCBs in order to ensure the safe and reliable operation of your switchgear.

Our solution for end-of-life VCBs

Manufacturing of VCB type 10-VPR-25M & 10-VPR-25B(B) ceased in 1983, as well as the supply of replacement parts which also was ceased in 2000. Since those VCBs cannot be supplied anymore, We recommend to replace the aged VCBs with our compatible new VCBs (Retrofit VCB) in order to extend equipment life and ensure the safe and reliable operation of your switchgear.

Retrofit VCBs will improve reliability and increase economical efficiency.

Existing VCB

Aged circuit breakers may cause unexpected accidents and power outages.

- Type: 10-VPR-25M
- Type: 10-VPR-25B (B)

RCBs to be replaced.

Retrofit VCB

Retrofit VCBs to be used:

- Type: VV-10-VPR-25M
- Type: VV-10-VPR-25BB

Reasons for replacement

• Deterioration
• Increase in maintenance work
• No spare parts is available
• Introduction of new Information System (communications network)

Effects of upgrade

• Improvement in reliability of power supply
• Saving of running cost and maintenance work and duration
• Prevention of power failure accidents by adopting a communication network

Maintenance Chart for VCBs

We recommend to replace the aged VCBs with Retrofit VCBs to extend the switchgear’s life and to ensure the safe operation according to the table below.

General Background of Replacement

Use of aged equipment can increase the incidence of accidents, and jeopardize the reliable operation failure of the system.

Why Retrofit VCB?

Retrofit VCBs will improve reliability and increase economical efficiency.

Aged circuit breakers may cause unexpected accidents and power outages.

Retrofit VCBs to be used.

- VV-10-VPR-25M
- VV-10-VPR-25BB

Why Retrofit VCB?

- Initial cost
- Outage time
- Maintenance
- Reliability after replacement

1 Retrofit VCB

2 Replacement of panel

Initial cost

1 hour/panel

Outage time

1 hour/panel + see note

Maintenance after replacement

2 weeks / 1 arrangement

Reliability after replacement

Retrofit VCB

Best solution

NOTE: Outage time may be changed depending on site condition.
**Features of Retrofit VCB**

**High reliability**
- The highly reliable BH-2 operating mechanism is incorporated in the Retrofit VCB.
- This operating mechanism is used in Mitsubishi's latest VCBs.

**Saving maintenance time**
- Short maintenance time: less moving parts yields a shorter working time.
- 15 years maintenance-free BH-2 mechanism.

**Simple & Safe Operation**
- The Retrofit VCB can be easily drawn-out or inserted by a single levering action.

**Full compatibility**
- Wiring modification of control circuit is not required.
  Only an interlock plate must be installed to the floor of the VCB compartment.

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**VV Ratings**

The VV Retrofit VCB complies with the international standard IEC 60056.

<table>
<thead>
<tr>
<th>Retrofit VCB type</th>
<th>VV-10VPR-25M</th>
<th>VV-10VPR-25BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing operation mechanism</td>
<td>Motorised stored energy spring mechanism</td>
<td></td>
</tr>
<tr>
<td>Rated voltage (kV)</td>
<td>11(13.8)</td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>630, 1250</td>
<td>1600, 2000</td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>50 / 60</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>20 / 25</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current (kA)</td>
<td>20 / 25</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current (kA)</td>
<td>20 / 25</td>
<td></td>
</tr>
<tr>
<td>Rated breaking time (cycles)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Power frequency withstand voltage (kV)</td>
<td>28 (36)</td>
<td></td>
</tr>
<tr>
<td>Lightning impulse withstand voltage (kV)</td>
<td>75 (95)</td>
<td></td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>O-1 min.-CO-3min.-CO CO-15sec.-CO</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>130</td>
<td>140</td>
</tr>
<tr>
<td>Type of existing VCB</td>
<td>10-VPR-25M, 10-VPR-25BB</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**: Contact MITSUBISHI ELECTRIC through our distributor, if the application of ANSI standard is required.

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**High Reliability & Saving Maintenance Time**

**Retrofit VCB**
- Improved insulated frame
- Reduced in number of parts
- Superior anti-tracking characteristics & mechanical strength
- Single mould-no use of glue
- 50% of that of previous model

**BH-2 operating mechanism**
- 20% reduction in control power consumption compared with previous model
- Greaseless
  - Special low-friction NiP surface treatment of gears
- High performance grease
  - Special “long-life” grease for other surfaces
  - Maintenance free for 15 years due to high quality parts and grease
**Maintenance free**

Maintenance free for 15 years or more.
(Maintenance interval may be changed depending on enviorment condition)

Mitsubishi Grease is fluoride-based. There was no evidence of oxidation during tests on Mitsubishi grease. It has also been confirmed that there is no increase in friction after these tests were completed. The coefficient of friction remains small and regular under both low and high temperature conditions unlike other types of grease.

![Graph showing oxidation stability test](image)

![Graph showing coefficient of friction under low and high temperatures](image)

**Simple & Safe Operation**

**Simple Operation**

- The Retrofit VCB can be drawn-out or inserted in a single levering action while many rotations of a handle are required for the existing VCB. Therefore operation of the Retrofit VCB is simple and easy. (see note)

**Safe Operation**

- Mechanical interlock
  1. When VCB is in the closed condition, and insertion from test position or the drawing-out from connected position cannot be done.
  2. VCB cannot be closed by operating the manual close button when VCB is at the position between test position and connected position on the way.

- Electrical interlock
  1. When VCB is in closed condition, the interlock pin cannot be pulled out from the hole of the interlock plate. Therefore, VCB at connected position cannot be drawn-out and VCB of test position cannot be inserted.
  2. VCB cannot be closed by electrically when VCB is at the position between test position and connected position on the way.

**Greaseless surface treatment of the gears**

NiP plating removes the need for grease.

Friction between the gear surfaces increases due to surface wear resulting from contamination. Gears easily gather contamination if they have grease applied to their surface and when they are not located in an enclosed area. The gears of a Mitsubishi vacuum circuit breaker are NiP plated in order to eliminate the need for application of grease. The coefficient of friction remains low even if no grease is applied. The wear at the contact is small due to the hardness of the NiP plating.

![Graph showing coefficient of friction on NiP plating (without grease)](image)

![Graph showing wear value](image)
### Complete Interchangeability

**Retrofit VCB**

**Type**

- VV-10-VPR-25M
- VV-10-VPR-25BB

**Existing VCB**

**Type**

- 10-VPR-25M
- 10-VPR-25BB(B)

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### Operating & Control Voltage / Current

#### Operation and control voltage fluctuation range

<table>
<thead>
<tr>
<th>Classification</th>
<th>Standard</th>
<th>IEC 60056</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing operation/control voltage</td>
<td>DC</td>
<td>70~110%</td>
</tr>
<tr>
<td>Tripping control voltage</td>
<td>DC</td>
<td>75~110%</td>
</tr>
</tbody>
</table>

#### Closing and tripping control current vs. current-flow time (see Fig. 1)

<table>
<thead>
<tr>
<th>VCB type name</th>
<th>Current (A), Time (s)</th>
<th>DC (V)</th>
<th>AC (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV-10-VPR-25M</td>
<td>Closing</td>
<td>3.5</td>
<td>6.5</td>
</tr>
<tr>
<td>VV-10-VPR-25BB</td>
<td>Tripping</td>
<td>3.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

**NOTE:** Other than DC 100V control source are available.

#### Motor-operation control current vs. current-flow time (see Fig. 2)

<table>
<thead>
<tr>
<th>VCB type name</th>
<th>Current (A), Time (s)</th>
<th>DC (V)</th>
<th>AC (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV-10-VPR-25M</td>
<td>Closing</td>
<td>5</td>
<td>1.8</td>
</tr>
<tr>
<td>VV-10-VPR-25BB</td>
<td>Tripping</td>
<td>0.1</td>
<td>5</td>
</tr>
</tbody>
</table>

**NOTE:** Other than DC 100V control source are available.

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### Applicable Standards

#### Special Environment and Application

**Operation Environment**

MV type vacuum circuit breaker conforms to the JEC-2300 and IEC 60056 (high voltage alternating current circuit breaker) and designed/manufactured as an indoor unit. Therefore, this circuit breaker should be operated under normal environments specified in right table. Daily and periodical check and maintenance should be carried out enough according to VCB's instruction manuals. If it is necessary to operate this circuit breaker under special condition not listed in right table, consult the manufacture.

**Instructions for Installation**

If it is necessary to operate this circuit breaker in a dusty place, a place with corrosive gas, at a location exposed to abnormal vibration or impact, or in an outdoor panel environment, etc., special care must be paid to deal with items such as dust, corrosion, vibration, impact, water drops, condensation, and etc.
**Outline and Dimensions**

**Existing VCB**

Type 10-VPR-25M
1250 A (Typical)

Type 10-VPR-25B (B)
1250 A (Typical)

**Retrofit VCB**

Type VV-10-VPR-25M/25BB
1250 A (Typical)

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**Information for Replacement**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrofit VCB type</td>
<td>10-VPR-25M, 10-VPR-25BB</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>• Draw-out handle</td>
</tr>
<tr>
<td></td>
<td>• Manual charging handle</td>
</tr>
<tr>
<td></td>
<td>• Contact exhaustion limit gauge</td>
</tr>
<tr>
<td>Interlock plate</td>
<td>An interlock plate will be fitted to the floor of the VCB compartment.</td>
</tr>
</tbody>
</table>

**Details of Panel Modification**

As mentioned, the interlock plate need to be installed on the floor of the VCB compartment as following procedure.

Total modification work will take about 1 hour per 1 VCB.

1. Make 6 holes (Ø5.2mm) at the marked points on the floor by using a guide plate.
2. Make threads in the holes by using M6 hand tap to tighten the bolts.
3. Fix the interlock plate with 6 bolts (M6×12) on the floor.
4. Put the stickers for indicating both test and service positions on the floor.

**Caution:** For your safety, shutdown must be required during the modification.

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**NOTE:** Customers can perform the replacement at site as detailed instruction manuals are provided. Training by MITSUBISHI ELECTRIC staff is available on request.