Reclosers, switches and switchgear
Thomas & Betts is now ABB Installation Products, but our long legacy of quality products and innovation remains the same. From connectors that help wire buildings on Earth to cable ties that help put machines in space, we continue to work every day to make, market, design and sell products that provide a smarter, safer and more reliable flow of electricity, from source to socket.
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Switchgear building blocks

Overview

Use Elastimold® switchgear building blocks to create standard configurations and custom designs that improve your distribution system’s reliability.

Two basic components form the basis of Elastimold switchgear:
• Molded vacuum switches (MVS) – Single- and three-phase
• Molded vacuum interrupters (MVI) – Single- and three-phase

These components – When combined with electronic controls, motor operators and SCADA-ready controls – enable you to improve your distribution system’s reliability.

Whether yours is a standard or custom application, ABB has the right combination of components and expertise to fit your needs. The modularity and flexibility of Elastimold switchgear enable the user to combine the different individual components into products that improve the reliability and performance of distribution systems.

The benefits of Elastimold construction
• All switchgear components are fully sealed and submersible
• EPDM molded rubber construction with stainless steel hardware and mechanism boxes
• With no oil or gas to leak, the solid dielectric switchgear is maintenance free
• Deadfront construction insulates, shields and eliminates exposed live parts

The versatility to meet your needs
• Small footprint enables components to fit in tight padmount, subsurface, vault or riser pole installations
• Non-position sensitive – can be installed almost anywhere and in any position (e.g. hanging from ceilings, wall mounted, mounted at an angle, riser pole mounted)
• Modular construction allows for any combination of fused, switched and interrupter ways on one piece of switchgear up to 38 kV

The controls and motor operators to make it all work
• Electronic controls for protection and automatic source transfer applications
• Self-powered controls and customized protection curves enable flexibility of settings and operation in different locations throughout the distribution system
• Motor operators for remote or local open/close operation of three-phase switched or interrupter ways enable remote configuration of loops, sectionalizing of feeders and automatic or manual source transfer with a variety of RTUs and communication devices
Configure Elastimold® switchgear building blocks to solve challenges in your distribution system.

Elastimold switchgear products can be used in padmount, subsurface wet or dry vaults, small-vault and riser pole installations. They’re classified in three different categories according to the function they perform:

• Switching and sectionalizing equipment
• Automatic source transfer equipment
• Overcurrent protection equipment

The switching or manual sectionalizing of loads can be accomplished with the use of MVS modules, while overcurrent protection is accomplished using MVI modules, which can be used in conjunction with MVS modules. The simplest manual sectionalizer is a single MVS switch, and the simplest product for overcurrent protection is a single MVI unit. Either of these can be installed in a vault, on a pole or inside a padmount enclosure.

One of the most popular applications is as a replacement for existing oil fuse cutouts.

Two-, three-, four-, five- and six-way units with any combination of MVI and MVS modules are also available in subsurface and padmount styles. Switches aid in the manual reconfiguration of distribution loops by installing them at the open point in the circuit. Interrupters are applied in underground loops to aid in the sectionalizing of the main feeder, and by providing protection to the loads along the loop.

Please see pages 22–29 for more information on switchgear applications.
Molded vacuum switches and interrupters
MVS molded vacuum switches

Spring-energy, load-switching devices that make, carry and interrupt load currents through 600 A on 5–38 kV distribution systems.

- EPDM molded rubber insulation – MVSs are fully sealed and submersible
- With no gas or oil leak, vacuum switching and vacuum interruption components are maintenance-free
- Small footprint enables MVSs to fit in tight padmount, subsurface, vault or riser-pole installations

MVS molded vacuum switches include molded-in elbow connection interfaces and spring-energy mechanisms. Available in both single- and three-phase models, units are manually operated with a hotstick. Motor operator, SCADA and auto-transfer control options are available.

Application information
- Construction: submersible, corrosion resistant, fully shielded
- Operating temperature range: -40 °C to 65 °C

For dimensions, see page 30.
MVS load-break switches have been designed and tested per applicable portions of IEEE, ANSI, NEMA and other industry standards, including:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>IEEE C37.74</td>
<td>Standard for subsurface, vault and padmounted load-interrupting switches</td>
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<td>IEEE 386</td>
<td>Standard for separable connectors and bushing interfaces</td>
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<td>IEC 265</td>
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<td>Standard for padmount enclosures</td>
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**MVS ratings**

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Molded vacuum switches and interrupters  
MVI molded vacuum fault interrupters

Make, carry and automatically interrupt currents through 25,000 A symmetrical on 5–38 kV distribution systems.

- Vacuum interrupters, programmable, electronic, self-powered controls and EPDM rubber insulation provide compact, lightweight and submersible overcurrent protection
- Field programmable with a wide range of time-current characteristic (TCC) curves and trip settings
- TCC curves provide predictable tripping for ease of coordination with upstream and/or downstream protective devices
- Control monitors the circuit condition – when the programmed parameters are exceeded, a signal is sent to the tripping mechanism
- Available motor operators and controls enable radial feeders or loops to be reconfigured, either manually or via SCADA

MVI molded vacuum fault interrupters include molded-in elbow connection interfaces and trip-free mechanisms. They are available in single- and three-phase models.

**Application information**
- Construction: submersible, corrosion resistant, fully shielded
- Operating temperature range: -40 °C to 65 °C

For dimensions, see page 31.
MVI molded vacuum fault interrupters have been designed and tested per applicable portions of IEEE, ANSI, NEMA and other industry standards, including:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Voltage class (kV)</th>
<th>Maximum design voltage (kV)</th>
<th>Frequency (Hz)</th>
<th>BIL impulse (kV)</th>
<th>One-minute AC withstand (kV)</th>
<th>15-minute DC withstand (kV)</th>
<th>Load interrupting and loop switching (Amp)</th>
<th>Capacitor or cable charging interrupting (Amp)</th>
<th>Line charging (Amp)</th>
<th>Asymmetrical momentary and 3-operation fault close (Amp)</th>
<th>Symmetrical one-second rating (Amp)</th>
<th>Continuous current (Amp)</th>
<th>Eight-hour overload current (Amp)</th>
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<td>900</td>
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<tr>
<td>Frequency (Hz)</td>
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<td>BIL impulse (kV)</td>
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<td>One-minute AC withstand (kV)</td>
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<td>900</td>
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<td>Capacitor or cable charging interrupting (Amp)</td>
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<td>900</td>
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<tr>
<td>Line charging (Amp)</td>
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<td>15.5</td>
<td>50/60</td>
<td>125</td>
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<td>125</td>
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<td>630</td>
<td>900</td>
<td>1,000:1</td>
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<td>900</td>
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</table>

**Certified tests**

MVI molded vacuum switches and interrupters have been designed and tested per applicable portions of IEEE, ANSI, NEMA and other industry standards, including:

- ANSI C37.60 Standard for fault interrupters
- IEEE 386 Standard for separable connectors and bushing interfaces
- ANSI C57.12.28 Standard for padmounted enclosures

**MVI ratings**

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<thead>
<tr>
<th>Voltage class (kV)</th>
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<td>Spring operating</td>
<td>Mag actuator</td>
</tr>
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Higher fault-current rated switches and interrupters
Three-phase 38 kV/25 kA MVI and three-phase 27 kV/40 kA MVS

If you require higher fault-current ratings than the typical 12.5 kA specification, Elastimold® switchgear is available with ratings of 16 kA, 20 kA, 25 kA and even 40 kA. Please refer to the table below for ratings of specific models.

Three-phase 38 kV/25 kA MVI
The three-phase 38 kV/25 kA molded vacuum interrupter (MVI) incorporates Elastimold’s proven combination of EPDM molded insulation with a vacuum interrupter. This solid-dielectric unit features a 25 kA symmetrical fault interrupting vacuum bottle and a magnetic actuator mechanism.

This MVI works with the Elastimold 80 MAX control. The small, lightweight, maintenance-free unit is ideal for padmount, subsurface and vault applications.

Three-phase 27 kV/40 kA MVS
The three-phase 27 kV/40 kA molded vacuum switch (MVS) incorporates Elastimold’s proven combination of EPDM molded insulation with a load-break switch vacuum bottle. This solid-dielectric unit is small, lightweight and maintenance-free. It meets IEEE C37.74 requirements up to 40 kA symmetrical peak and short-time current withstand tests. The switch uses a magnetic actuator mechanism that requires 120 V AC to operate.

For dimensions, see page 32.

### Elastimold switchgear available current ratings

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<th>12.5 kA</th>
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<td>●</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>MVI – three-phase (kV)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>27</td>
<td>●</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>38</td>
<td>●</td>
<td>–</td>
<td>–</td>
<td>●</td>
<td>–</td>
</tr>
</tbody>
</table>
Modular switchgear for subsurface and vault applications

Multi-way subsurface units are built using MVS and MVI modules rated up to 38 kV, as required by your application. These are mounted onto a common molded bus system and assembled on a free-standing, floor-mounted or wall-mounted frame.

The compact, modular design, which fits easily through a manhole cover, allows for combining with other devices. Components are interchangeable, upgradeable and field configurable, and they can be installed in any orientation.

For dimensions, see page 13.
Small-vault switchgear

Elastimold® small-vault switchgear improves safety with manual operation outside the vault
ABB has extended its line of underground distribution switchgear with Elastimold small-vault switchgear, which improves safety by allowing the user to access the switchgear from outside the vault with an insulated fiberglass pole (hot stick). In addition to safety, low maintenance and reliability, Elastimold small-vault switchgear fits into new and legacy small-vaults, which minimizes retrofitting costs for investor-owned utilities (IOUs), public power utilities and other power distribution operations.

**Safe**
Allows for manual operation from street level.
- Improved operator safety, visibility and accessibility
- Switchgear designs allows for hot stick operation from street level
- 45° tilt angle improves operator safety through full operability and visibility from street level

**Compact**
33% reduction in height and 14% reduction in width from standard switchgear.
- 6° adjustable vertical frame allows for customization to each vault
- Reduced height and width allows users to install in compact vaults

**Reliable**
Maintenance-free vacuum and EPDM molded insulation.
- Proven solid dielectric construction
- Technology with over 50 years of field-proven performance
- Fewer outages and significantly shorter outage duration
- All switchgear components are sealed and fully submersible

<table>
<thead>
<tr>
<th>Gear</th>
<th>Dimensions</th>
<th>Ways</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Small vault</td>
<td>Height (in.)</td>
<td>51.62</td>
<td>51.62</td>
</tr>
<tr>
<td></td>
<td>Width (in.)</td>
<td>50.50</td>
<td>69.35</td>
</tr>
<tr>
<td></td>
<td>Depth (in.)</td>
<td>27.50</td>
<td>27.50</td>
</tr>
<tr>
<td>Standard modular</td>
<td>Height (in.)</td>
<td>76.45</td>
<td>76.45</td>
</tr>
<tr>
<td></td>
<td>Width (in.)</td>
<td>48.79</td>
<td>73.83</td>
</tr>
<tr>
<td></td>
<td>Depth (in.)</td>
<td>20.00</td>
<td>20.00</td>
</tr>
</tbody>
</table>
Multi-way padmount installations are provided in either double-sided or single-sided painted mild steel enclosures. The standard enclosure color is Munsell green 7GY 3.29/1.5, with other paint colors available on request. Painted stainless steel or fiberglass enclosures are also available as options.

For dimensions, see page 33.
MOLDED VACUUM INTERRUPTER AND SWITCHGEAR CONTROLS

15

15

Molded vacuum interrupter and switchgear controls
Choose among various electronic control options to interrupt faults.

- Self-powered electronic control packages – No batteries or external power are required
- Controls send a signal to the vacuum interrupters to trip open and interrupt the fault when an overcurrent condition is detected
- Field-selectable fuse or relay curves and trip settings – one device for many protection schemes

Molded vacuum interrupters are provided with self-powered electronic control packages requiring no batteries or external power. Depending on the application, six electronic control options are available for the MVI – See below and on following page.

---

01 Internal control
02 External control

---

Internal control
This control is integral to the unit (no separate control box). It is accessible via a computer connection to view or modify settings. This control is used on ganged three-phase or single-phase MVI interrupters. Phase and ground trip, as well as inrush restraint, are available. The E-Set software enables the user to connect to the internal control, either in the shop or in the field, to program or change settings. An MVI-STP-USB programming connector is required to connect between the PC and the MVI. With a computer connected to the MVI control, the user can view real-time currents, the number of overcurrent protection operations, current magnitude of the last trip and the phase/ground fault targets. This is the standard control option.

Note: E-Set can be downloaded from www.elastimoldswitchgear.com.

External control with selectable single-/three-phase trip function (style 80)
This control is mounted externally to the mechanism of the interrupter and provides the ability to select between a single-phase trip and a three-phase trip. The 80 can be used with one three-phase interrupter or the 380 control with three single-phase interrupters. For three-phase applications, the ground trip function can be blocked from the front panel. Manual trip and reset target buttons are also located on the front panel. This control uses the E-Set software, which enables programming via a computer using the MVI-STP-USB adapter. E-Set features custom TCC curves and provides access to the last fault event information, as well as real-time current per phase.
Molded vacuum interrupter and switchgear controls

Smart grid ready
Works with the industry-leading protection and automation controls
- SEL® automation controls from Schweitzer Engineering Laboratories

Elastimold 80 control time current curves (TCCs)

<table>
<thead>
<tr>
<th>Curve no.</th>
<th>Curve reference no.</th>
<th>Curve type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay curves (minimum trip 30–600 A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>MVI-TCC-01</td>
<td>E slow</td>
</tr>
<tr>
<td>02</td>
<td>MVI-TCC-02</td>
<td>E standard</td>
</tr>
<tr>
<td>03</td>
<td>MVI-TCC-03</td>
<td>Oil fuse cutout</td>
</tr>
<tr>
<td>04</td>
<td>MVI-TCC-04</td>
<td>K</td>
</tr>
<tr>
<td>05</td>
<td>MVI-TCC-05</td>
<td>Kearney QA</td>
</tr>
<tr>
<td>06</td>
<td>MVI-TCC-06</td>
<td>Cooper EF</td>
</tr>
<tr>
<td>07</td>
<td>MVI-TCC-07</td>
<td>Cooper NX-C</td>
</tr>
<tr>
<td>08</td>
<td>MVI-TCC-08</td>
<td>CO-11-1</td>
</tr>
<tr>
<td>09</td>
<td>MVI-TCC-09</td>
<td>CO-11-2</td>
</tr>
<tr>
<td>10</td>
<td>MVI-TCC-10</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>MVI-TCC-11</td>
<td>CO-9-1</td>
</tr>
<tr>
<td>12</td>
<td>MVI-TCC-12</td>
<td>CO-9-2</td>
</tr>
<tr>
<td>13</td>
<td>MVI-TCC-13</td>
<td>Cooper 280ARX</td>
</tr>
<tr>
<td>14</td>
<td>MVI-TCC-14</td>
<td>F</td>
</tr>
<tr>
<td>15</td>
<td>MVI-TCC-15</td>
<td>GE relay</td>
</tr>
<tr>
<td>16–23</td>
<td>MVI-TCC-16–23</td>
<td>CO-8-1–CO-8-6</td>
</tr>
<tr>
<td>Fuse curves (minimum trip 10–200 A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>MVI-TCC-54</td>
<td>E slow</td>
</tr>
<tr>
<td>55</td>
<td>MVI-TCC-55</td>
<td>E standard</td>
</tr>
<tr>
<td>56</td>
<td>MVI-TCC-56</td>
<td>Oil fuse cutout</td>
</tr>
<tr>
<td>57</td>
<td>MVI-TCC-57</td>
<td>K</td>
</tr>
<tr>
<td>58</td>
<td>MVI-TCC-58</td>
<td>Kearney QA</td>
</tr>
<tr>
<td>59</td>
<td>MVI-TCC-59</td>
<td>Cooper NX-C</td>
</tr>
<tr>
<td>60</td>
<td>MVI-TCC-60</td>
<td>T</td>
</tr>
</tbody>
</table>
Ordering information
Elastimold® switchgear configurator and smart catalog numbering system make ordering easier.

- Simplifies and speeds up the configuration of complex switchgear
- Walks you step by step through your options
- Allows for both standard and derivative configurations
ABB launched a switchgear configurator for modular designs to better service customers, while maintaining desired flexibility and cost effectiveness. The modular designs are classified into two categories: standard and derivative. Standard types use only the available options listed in the switchgear configurator. Derivative types have minor deviations from the standard design, including but not limited to cabinet color, cabinet size, reverse color indicators and 120 V AC motors.

The standard and derivative configurations are committed to supplying faster turnaround times for drawings and quotations. In addition, the modular design allows for simple and fast switchgear changes, expansions and upgrades. The configurator has built-in logic to easily configure switchgear options and provide simpler interactions between the customer and the factory. Any options not outlined in this document, including but not limited to nonstandard cabinet sizes, radios, antennas, custom relays and non-standard wiring, will designate the configuration as custom and will have to be approved by ABB before quotation and order.

Get started now. Visit: https://productconfigurator.tnb.com/ext/Login

---

### Switchgear configurator

<table>
<thead>
<tr>
<th>Benefits summary</th>
<th>Configurator Options standard or derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnaround time for configuration</td>
<td>10 minutes (approximately)</td>
</tr>
<tr>
<td>Turnaround time for drawings</td>
<td>2–3 weeks (one time)</td>
</tr>
<tr>
<td>Turnaround time for budgetary pricing</td>
<td>Standard types: after completion of configuration</td>
</tr>
<tr>
<td></td>
<td>Derivative types: 48 hours or less</td>
</tr>
<tr>
<td>Turnaround time for estimated delivery time</td>
<td>48 hours</td>
</tr>
<tr>
<td>Lead time for delivery of final product</td>
<td>Option A (first time) = 2–3 weeks plus TOPS LT</td>
</tr>
<tr>
<td>Price</td>
<td>Cost efficiencies enabling more aggressive pricing</td>
</tr>
<tr>
<td></td>
<td>Firm fixed pricing</td>
</tr>
<tr>
<td>Change in design requests</td>
<td>No charge 2 weeks prior to manufacturing (may impact delivery)</td>
</tr>
<tr>
<td>Quantities</td>
<td>No minimum quantities</td>
</tr>
</tbody>
</table>
Ordering information
Elastimold® MVS and MVI units

The following diagram shows how to construct a catalog number for molded vacuum switches and interrupters.

Example: The catalog number for a molded vacuum interrupter on a three-phase, 27 kV system, with 600 A terminal and parking stands between bushings is MVI3212766PS.

Indicates field that must be filled in to complete order.

1) For riser pole option, specify where to locate air bushings.
2) Wind farm option is only for 38 kV, 600 A interrupter.
3) Air bushings can only be specified for 600 A.

Controls and accessories

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>External 80 control with selectable single-/three-phase trip function (to be used on ganged three-phase MVI mechanism)</td>
</tr>
<tr>
<td>380</td>
<td>External 80 control with selectable single-/three-phase trip function (to be used on three single-phase mechanisms)</td>
</tr>
<tr>
<td>MO120A</td>
<td>120 V AC motor controller for MVS3 or MVI3 units (includes standard 30-ft. cable)</td>
</tr>
<tr>
<td>MO12D</td>
<td>12-24 V DC motor controller for MVS3 or MVI3 units (includes standard 30-ft. cable)</td>
</tr>
<tr>
<td>PS</td>
<td>Parking stand for MVS or MVI (between bushings for single- or three-phase units)</td>
</tr>
<tr>
<td>MPS</td>
<td>Parking stand for MVS3, MVI3 or RMVI3 on mechanism cover</td>
</tr>
<tr>
<td>PS6</td>
<td>Double parking stand for MVS3, MVI3 or RMVI3 (between bushings and on mechanism cover)</td>
</tr>
<tr>
<td>BT</td>
<td>Bail tab plate installed for three-phase units only</td>
</tr>
<tr>
<td>P</td>
<td>Customer settings to be programmed at the factory</td>
</tr>
</tbody>
</table>

NOTE: Leave suffix blank for internal (self-contained) control.
### Ordering information
Elastimold® multi-way switchgear and transfer packages

The following diagram shows how to construct a catalog number for multi-way switchgear or transfer packages.

**Example:** Multi-way switchgear
**MD3142T2P62XIXXAE000:** Multi-way, double-sided padmount, 3-phase, 15.0 kV, 12.5 kA interrupting capability, 4-ways, 2 source ways, source component: three-phase molded vacuum switches (MVS3), 2 load ways, load component: three-phase molded vacuum interrupter (MVI3), 600 A bushing interfaces (source), 200 A bushing well interfaces (load), source control: none, load control: Elastimold MVI internal control, PT: PT not required, enclosure: mild steel, Munsell green 7GY 3.29/1.5 and flat ground bar, English labels and instructions.

---

<table>
<thead>
<tr>
<th>Ordering Information</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switch type</strong></td>
<td>Multi-way switchgear <strong>M</strong> Standard auto transfer – motors <strong>T</strong> Fast auto transfer – actuators <strong>F</strong> Auto loop restoration <strong>L</strong></td>
</tr>
<tr>
<td><strong>Phases</strong></td>
<td>3-phase <strong>3</strong></td>
</tr>
<tr>
<td><strong>Number of ways</strong></td>
<td>2-way <strong>2</strong> 3-way <strong>3</strong> 4-way <strong>4</strong> 5-way <strong>5</strong> 6-way <strong>6</strong></td>
</tr>
<tr>
<td><strong>Voltage class</strong></td>
<td>15.0 kV <strong>1</strong> 27.0 kV <strong>2</strong> 38.0 kV <strong>3</strong> 15.0 kV/20 kA <strong>4</strong></td>
</tr>
<tr>
<td><strong>Number of source ways</strong></td>
<td>1-way <strong>1</strong> 2-way <strong>2</strong> 3-way <strong>3</strong> 4-way <strong>4</strong> 5-way <strong>5</strong> 6-way <strong>6</strong></td>
</tr>
<tr>
<td><strong>Number of load ways (no. of ways – no. source ways)</strong></td>
<td>None <strong>X</strong> 1-way <strong>1</strong> 2-way <strong>2</strong> 3-way <strong>3</strong> 4-way <strong>4</strong> 5-way <strong>5</strong></td>
</tr>
<tr>
<td><strong>Source ways interface</strong></td>
<td>200 A bushing well source <strong>2</strong> 600 A bushing source <strong>6</strong></td>
</tr>
<tr>
<td><strong>Load way components</strong></td>
<td>None <strong>X</strong> Solid tap/direct bus connection (600 A or 200 A) <strong>B</strong> 1-phase MVS switch <strong>S</strong> 3-phase MVS switch <strong>T</strong> 3-phase MVS switch with motor <strong>U</strong> 1-phase MVI fault interrupter <strong>H</strong> 3-phase MVI fault interrupter <strong>J</strong> 3-phase MVI fault interrupter with motor <strong>P</strong> 3-phase MVI fault interrupter with motor &amp; voltage sensors <strong>R</strong></td>
</tr>
<tr>
<td><strong>Source way components</strong></td>
<td>Solid tap/direct bus connection (600 A or 200 A) <strong>B</strong> 1-phase MVS switch <strong>S</strong> 3-phase MVS switch <strong>T</strong> 3-phase MVS switch with motor <strong>U</strong> 1-phase MVI fault interrupter <strong>H</strong> 3-phase MVI fault interrupter <strong>J</strong> 3-phase MVI fault interrupter with motor <strong>P</strong> 3-phase MVI fault interrupter with motor &amp; voltage sensors <strong>R</strong></td>
</tr>
</tbody>
</table>

**Indicates field that must be filled in to complete order.**
Ordering Information
Elastimold® multi-way switchgear and transfer packages

Example: Auto transfer switchgear with Elastimold control package
TD3242H2P62AFFXAE000: Automatic transfer, double-sided padmount, 3-phase, 27.0 kV, 125 kV BIL, 12.5 kA interrupting capability, 4-ways, 2 source ways, source component: three-phase molded vacuum switches (MVS3) with 12–24 V DC motor and voltage sensors, 2 load ways, load component: three-phase molded vacuum interrupter (MVI3), 600 A bushing interfaces (source), 200 A bushing well interfaces (load), source control: Elastimold automatic transfer control, load control: Elastimold 80 control: TCCs select through E-set software, PT: two (2) 27 kV PT (13200–14400 V AC (WYE)), enclosure: mild steel, Munsell green 7GY 3.29/1.5 and flat ground bar, English labels and instructions.

Online switchgear configurator
The ABB online switchgear configurator makes it easy to order Elastimold switchgear by walking you step by step through configuration. See pages 17–18 for details.

Indicates field that must be filled in to complete order.
Applications

Underground distribution switchgear

**Load switching is required when:**
- A load needs to be isolated to perform maintenance on the line/circuit
- A load needs to be isolated to repair a fault
- A loop needs to be reconfigured to feed a certain load from a different substation and isolate the faulted portion of the loop

In any case, the use of a manual sectionalizer contributes to reduce the length of time that unfaulted or unaffected portions of the system are exposed to an outage. This results in improved reliability of the system as the duration of outages is reduced (i.e. the SAIDI and CAIDI reliability indices). Switching products can be applied as replacements for existing oil fuse cutouts or as manual sectionalizers for loops or radial feeders. Depending on the application, these sectionalizers may be installed in a vault or inside a padmount enclosure. Pole installations are also available.

**Without manual sectionalizing**
- No manual sectionalizing unit
- Permanent faults F1 and F2
- Interruption duration: F1 = 1 hr.; F2 = 2 hr.
- Evaluation period = 1 yr.
- \[ \text{SAIDI} = \frac{(1 \text{ hr.}) \times (1000) + (2 \text{ hr.}) \times (1000)}{1000} = 3 \text{ hr./yr.} \]
- \[ \text{SAIFI} = \frac{1000 + 1000}{1000} = 2 \text{ interruptions/yr.} \]

In this example, a radial feeder is exposed to two failures in one year. Without any manual sectionalizing, all customers are subject to both failures and are out of power until failures are restored. Assuming that the duration of outage one (F1) is 1 hour, and outage 2 (F2) is 2 hours, the calculation of SAIDI shows 3 hours of interruption duration per year.

**With MVS manual sectionalizing – Improved reliability!**
- MVS manual sectionalizing unit = Shorter restoration time for 500 customers
- Permanent faults F1 and F2
- Interruption duration: F1 = 1 hr.; F2 = 2 hr. for 500 users; F2 = 1 hr. for 500 users
- Evaluation period = 1 yr.
- \[ \text{SAIDI} = \frac{(1 \text{ hr.}) \times (1000) + (1 \text{ hr.}) \times (500) + (2 \text{ hr.}) \times (500)}{1000} = 2.5 \text{ hr./yr.} \]
- \[ \text{SAIFI} = \frac{1000 + 1000}{1000} = 2 \text{ interruptions/yr.} \]

With the use of an MVS at the midpoint of the feeder, the restoration time is reduced. Once the fault is located, the MVS is open to isolate the faulted portion of the feeder. At this point, the other half of the feeder can be energized, reducing the outage duration or SAIDI from 3 hours to 2.5 hours per year (16.6%).

---

**Applications**

Underground distribution switchgear

**1. Similar application of MVS switches in loop configurations contribute to significantly reduce the outage duration. In these cases, single- or multi-way switch configurations can be applied.**
Fault-interrupting devices are used on:
- Feeders to sectionalize, so that if there is a fault, only a small section of the load is affected
- Radial taps deriving from a main feeder or loop, so that a fault on a tap is isolated from the main circuit
- Network transformers to isolate the devices in case of overcurrent, excessive pressure/temperature, etc.

While a switching device contributes to decrease the duration of outages, fault interrupters contribute to decrease the duration AND frequency of outages (i.e. SAIDI, CAIDI, SAIFI, CAIFI reliability indices).

Without manual or automatic sectionalizing
- No automatic sectionalizing unit
- Permanent faults F1 and F2
- Interruption duration: F1 = 1 hr.; F2 = 2 hr.
- Evaluation period = 1 yr.
- SAIDI = [(1 hr.) x (1000) + (2 hr.) x (1000)]/1000 = 3 hr./yr.
- SAIFI = [1000 + 1000]/1000 = 2 interruptions/yr.

In this example, a radial feeder is exposed to two failures in one year. Without any automatic sectionalizing (overcurrent protection), all customers are subject to both failures and are out of power until failures are restored. Assuming that the duration of outage one (F1) is 1 hour, and outage two (F2) is 2 hours, the calculation of SAIDI shows 3 hours of interruption duration per year. The calculation of the frequency of interruptions (SAIFI) shows two interruptions per year.

With MVI automatic sectionalizing – Improved reliability!
- MVI automatic sectionalizing unit = Eliminate one interruption for 500 users
- Permanent faults F1 and F2
- Interruption duration: F1 = 1 hr.; F2 = 2 hr.
  for 500 users
- Evaluation period = 1 yr.
- SAIDI = [(1 hr.) x (1000) + (2 hr.) x (500)]/1000 = 2 hr./yr.
- SAIFI = [1000 + 500]/1000 = 1.5 interruptions/yr.

With the use of an MVI overcurrent fault-interrupting device at the midpoint of the feeder, failure F2 only affects half of the load. Proper protection coordination between the MVI and the substation breaker enables the MVI to clear the fault before any customers between the MVI and the breaker are affected. Frequency and duration of interruption are significantly reduced. SAIDI is reduced from 3 to 2 hours of interruption per year (33%), and SAIFI is reduced from 2 to 1.5 interruptions per year (25%).
Applications
Distribution automation solutions and automatic source transfer systems

Products that adapt to ever-changing system load conditions.

Distribution automation solutions
Tighter reliability, efficiency and loading requirements of the power system result in the need to keep costs at a minimum. Bringing more automation and intelligence to the power grid network to address numerous power utility concerns – ranging from reducing operational expenses to meeting new regulatory requirements – has prompted migration toward the next generation of distribution and substation automation.

Elastimold® distribution automation products provide automation solutions for real-time monitoring of critical feeders, reducing outage duration and supporting the shifting of loads between sources to alleviate overload conditions. These products offer a complete solution package, including Elastimold switchgear and Schweitzer Engineering Laboratories (SEL) controls such as the SEL® 451, for interoperability and rapid automation implementation. Elastimold® distribution automation solutions include:

Automatic source transfer (preferred/alternate) loop automation (fault detection, isolation and restoration – FDIR)

Automatic source transfer systems
The main application of source transfer packages is to transfer a load from one power source to another. In some cases, when the load is not critical, this is done manually with a switching device. In the case of critical loads for hospitals, financial institutions, manufacturing facilities and other loads involving computerized equipment, a fast transfer is required between the main (preferred) source and backup (alternate) source. It is important that the automatic source transfer not affect load operation because any interruption of the business process translates into costly production loss and setup time. The preferred and backup sources are normally utility feeders, but in some instances may be a generator.

Elastimold switchgear offers automatic transfer (AT) packages with motor operators and voltage sensors capable of performing a full transfer in less than two seconds. For even faster transfer requirements, the fast transfer option using a magnetic actuator mechanism enables switching in 6 1/2 cycles, or approximately 110 milliseconds. In either case, the system monitors voltage on the preferred source and initiates a transfer when voltage drops below the acceptable level for the customer. At this point, the preferred source is disconnected and the alternate source is connected.

Loop automation systems
In the case of underground loops, the switching devices along the loop can be used to reconfigure the loop to perform automatic fault detection, isolation and service restoration (FDIR). Thus, regardless of fault location, the switches will isolate the faulted portion of the loop and restore service to the remaining customers.
Applications
Distribution automation solutions and automatic source transfer systems

Elastimold® switchgear combined with SEL® controls provides the scheme of the future

The opportunity to drop in a complete automation package enables utility companies to create highly reliable commercial and industrial parks in locations subject to frequent and possibly extended outages. The FDIR scheme allows restoration in only a few seconds, minimizing traditional restoration issues and associated loss of productivity and revenue, and provides the following key benefits:

- Automatic detection of the open point of the loop
- Automatic reconfiguration of the loop to restore power to the load
- Ability to enable or disable the automatic network restoration scheme from any unit
- Infinite expandability – no limit to the number of units that can be installed
- No need for overcurrent protection coordination upon reconfiguration
- SCADA system interface: fiber optic, Ethernet and radio

Under normal operating conditions, the critical load is connected to the preferred source through S2. If power from the preferred source is lost due to an upline fault, the automatic source transfer unit detects the loss of voltage on S2. It automatically opens S2 and closes S1 to energize the critical load from the alternate source. With fast transfer, switching can be accomplished in $6\frac{1}{2}$ cycles – or about 110 milliseconds.
Applications
Operational scenarios

Operational scenario examples

Set-up and system normal state
- Loop automation scheme with two or more Elastimold® multi-way switchgear units
- Loop is fed from two different sources
- One piece of switchgear serves as the normally open point in the loop
- Each multi-way switchgear is automated with the SEL451-5

• Source switches have overcurrent fault-protection capabilities
• Each multi-way switchgear senses:
  - Current on all phases and on all ways
  - Voltage on both sides of the gear on the main loop

Operation scenario 1

Loss of voltage on one source due to an upstream fault
1. Normal state
2. SWG1-1 opens on loss of source voltage after time delay
3. Search for closest downline open switch
4. SWG2-1 closes to restore load
5. FDIR scheme disables itself
Applications
Operational scenarios

Operation scenario 2

**Fault located between two automated switchgear units**
1. Normal state
2. WG1-2 times to trip; SWG1-1 tripping is momentarily blocked
3. Search for next downline switch
4. If switch is open, FDIR scheme disables itself, OR if switch is closed, switch opens to isolate fault, searches for next downline open switch to restore load and FDIR scheme disables itself

---

**Operation scenario 3**

**Bus fault within the switchgear**
1. Normal state
2. SWG1-1 and SWG1-2 open
3. Close SWG2-1 to restore load between SWG1 and SWG2
4. FDIR scheme disables itself
Applications

Network transformer protection

The reliability of conventional radial or looped underground distribution circuits is measured in terms of the number and/or frequency of interruptions. These measurements cannot be directly applied to a network system. A typical network system has built-in redundancy. During most events, the continuity of power supplied to the end user is not affected by fault conditions on the high side of the network transformers. So, from the point of view of customer interruptions, network systems are reliable.

However, transformer failures have been known to result in catastrophic fires, explosions and even loss of lives. The failure or overload of multiple transformers within a network may ultimately result in the interruption of service to the end user.

Loss of redundancy

Loss of redundancy is a method that highlights the increased vulnerability of the system every time a network transformer is lost. Loss of redundancy indices are calculated as indicated in figure 2.

The number of transformers in the circuit is the number of transformers energized by the same feeder.

The loss of redundancy indices are calculated in the following example.

**Example 1: No high-side transformer protection**

Consider one substation breaker and one exclusive feeder out to the network. Five transformers are energized by the same feeder. Assume one permanent fault on one transformer in one year. Also assume the faulted transformer is de-energized for six hours (see figure 3).

Because there is only one breaker for five transformers, a failure in one transformer translates to the interruption of power to five transformers for six hours.

While the substation breaker may detect most overcurrent faults, faults caused by excessive pressure/heat or fires cannot be detected by the breaker. One method that automatically isolates a network transformer from the primary side, regardless of the type of failure, is the installation of an MVI fault interrupter on the high side of the transformer. This MVI can isolate based on overcurrent conditions, but also can be wired to isolate the transformer in case of fire, excessive pressure/heat, emergency signal, etc.

Benefits of such a setup to the network system and the end users include:

- Minimization of fire damage
- Reduction or elimination of transformer damage due to pressure or temperature build-up
- Longer transformer life

| Duration of loss of redundancy (hours/year) | = 6 hours/year |
| Frequency of loss of redundancy (times/year) | = 1 time/year |

01 Loss of redundancy can occur as a consequence of:
- Transformer fire
- Transformer overheating
- Transformer pressure build-up
- Overcurrent condition
Applications

Network transformer protection

The following example calculates the loss of redundancy to the same system used in Example 1, but adding protection to the primary side of the transformers.

**Example 2: High-side transformer protection**

There is one substation breaker and one exclusive feeder out to the network. Five transformers are energized by the same feeder. Each transformer is equipped with a fault interrupter installed on the high side. Assume one permanent fault on one transformer in one year. Assume the transformer is de-energized for six hours (see figure 4).

A failure in one transformer translates to the interruption of power to only one transformer for six hours.

Once an MVI is installed, remote operation from the entrance of the vault or via SCADA is possible with the addition of a motor operator and control. Installation of panic/emergency push buttons at the entrance of the vault is also possible; pressing this emergency switch will instantaneously trip open one or all of the interrupters in a vault and isolate the transformers.

\[
\begin{align*}
\text{Duration of loss of redundancy (hours/year)} &= \frac{(6 \times 1)}{5} = 1.2 \text{ hour/year} \\
\text{Frequency of loss of redundancy (times/year)} &= \frac{1}{5} = 0.2 \text{ time/year}
\end{align*}
\]
**Product dimensions**

**MVS molded vacuum switches**

**Single-phase switches approximate weight: 30 lbs.**

Available with 600 A one-piece bushings or 200 A wells on either/both terminals.

**Three-phase switches approximate weight: 135 lbs.**

Available with 600 A one-piece bushings or 200 A wells on either/both terminals.
Product dimensions
MVI molded vacuum fault interrupters

Front view single-phase

200 A wells

Well interface accepts standard bushing inserts

600 A bushings

Conforms to ANSI Std. 386

600 A T elbow interface

Programmable control & current transformer

Closed/tripped

Open/reset

Alternate handle position; handle may be repositioned in 60° increments

Alternate handle position; handle may be repositioned in 60° increments

Front view three-phase

Ground Lug

14° (358 mm) Mounting
**Product dimensions**

38 kV/25 kA molded vacuum fault interrupters  
Weight: 300 lbs.

27 kV/40 kA molded vacuum switches

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## Product dimensions

Padmount switchgear enclosures

---

### Cabinet sizes

<table>
<thead>
<tr>
<th>Cabinet dimension (in.)</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Double-sided 2-way/1 or 2 switchgear products – all voltage classes</strong></td>
<td></td>
</tr>
<tr>
<td>36 W x 64 D x 54 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>48 W x 64 D x 54 H</td>
<td>(1) PT, motor, voltage sensors</td>
</tr>
<tr>
<td><strong>Double-sided 3- and 4-ways – all voltage classes</strong></td>
<td></td>
</tr>
<tr>
<td>Lead time for delivery of final product</td>
<td>8–12 weeks target after Engineering</td>
</tr>
<tr>
<td>54 W x 64 D x 54 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>64 W x 64 D x 60 H</td>
<td>(1) PT, motor, voltage sensors</td>
</tr>
<tr>
<td>74 W x 64 D x 60 H</td>
<td>(2) PTs, motor, voltage sensors</td>
</tr>
<tr>
<td><strong>Double-sided 5- and 6-ways</strong></td>
<td></td>
</tr>
<tr>
<td>108 W x 82 D x 54 H</td>
<td>All units, 15 and 27 kV only</td>
</tr>
<tr>
<td>108 W x 88 D x 54 H</td>
<td>38 kV units only</td>
</tr>
<tr>
<td><strong>Single-sided 2-way/1 switchgear product – all voltage classes</strong></td>
<td></td>
</tr>
<tr>
<td>60 W x 30 D x 42 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>72 W x 40 D x 42 H</td>
<td>(1) PT only</td>
</tr>
<tr>
<td><strong>Single-sided 2-way/2 switchgear products – all voltage classes</strong></td>
<td></td>
</tr>
<tr>
<td>60 W x 40 D x 64 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>72 W x 40 D x 64 H</td>
<td>(1) or (2) PTs, motors, voltage sensors</td>
</tr>
<tr>
<td><strong>Single-sided 3-way</strong></td>
<td></td>
</tr>
<tr>
<td>88 W x 40 D x 64 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>100 W x 40 D x 64 H</td>
<td>(1) or (2) PTs, motors, voltage sensors</td>
</tr>
<tr>
<td><strong>Single-sided 4-way</strong></td>
<td></td>
</tr>
<tr>
<td>114 W x 40 D x 64 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>126 W x 40 D x 64 H</td>
<td>(1) or (2) PTs, motors, voltage sensors</td>
</tr>
<tr>
<td><strong>Single-sided 5-way</strong></td>
<td></td>
</tr>
<tr>
<td>142 W x 40 D x 64 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>154 W x 40 D x 64 H</td>
<td>(1) or (2) PTs, motors, voltage sensors</td>
</tr>
<tr>
<td><strong>Single-sided 6-way</strong></td>
<td></td>
</tr>
<tr>
<td>170 W x 40 D x 64 H</td>
<td>Manual gear or motors</td>
</tr>
<tr>
<td>182 W x 40 D x 64 H</td>
<td>(1) or (2) PTs, motors, voltage sensors</td>
</tr>
</tbody>
</table>
Molded vacuum reclosers
Single- and three-phase molded vacuum reclosers, 15–38 kV

The recloser you want, all in one package.
The need for automated reclosers has never been greater, but many of today’s reclosers come with penalties. They weigh too much, and that makes them difficult to install. They aren’t easy to upgrade, so you have to guess about what features to include in case you need them several years from now. What’s more, if the recloser you stock doesn’t come with superior technical support, service and built-in quality, you may find it worse than no recloser at all.

Elastimold® molded vacuum reclosers address all of these problems, and more.

Elastimold molded vacuum reclosers are 33% lighter than typical units today, so they’re easier and less expensive to install. Modular design means smart grid sensors can be added quickly and simply. Our reclosers are compatible with SEL® controls, the best in the business. Elastimold customer support, technical expertise and collaborative working relationships with customers mean that you will have the information you need, exactly when you need it.

SEL is a registered trademark of Schweitzer Engineering Laboratories, Inc.

Smart, light and flexible.
Elastimold reclosers are world-class, by design. They respond to every hardware requirement that utilities want, and then some.

- **Smart** – Our reclosers are smart grid ready with three integral load-side voltage sensors and provision to add source-side voltage sensors, if desired. They were designed to be fully compatible with the industry’s No. 1 name in controls, Schweitzer Engineering Laboratories.
- **Light** – The three-phase Elastimold reclosers weigh 33% less than existing typical units. The simplicity of the mechanism design, and the compactness of the encapsulated components, contribute to making Elastimold reclosers easier to move and install.
- **Flexible** – Elastimold reclosers are modular, so field upgrades and retrofits are easy and fast. The single-phase reclosers have a pole rotation mounting bracket for easier installation.
- **Made with your needs in mind** – We designed our reclosers only after extensive talks with electric utilities. Their features, from easier-to-see open/close indicators to the many robust extra features that we consider “standard,” are there because of you.

- Solid dielectric insulation
- Current & voltage sensors
- Lifting rings
- Integrated pole mounting bracket
- Highly visible 360° indicators
- Manual tripping lever
**Molded vacuum reclosers**

**Recloser construction**

The Elastimold® molded vacuum recloser (MVR) operates electrically by energizing a magnetic actuator system with a completely sealed housing. Each pole contains a vacuum interrupter sealed in solid dielectric insulation for mechanical and high dielectric strength.

An open-closed position indicator provides a 360° view. An external manual trip assembly is located on the side; when in the down position, it maintains the recloser in a lockout position until it is manually restored. All electrical control connections are made through a sealed single-environment control cable connector on the side.

The combination of the molded vacuum recloser with microprocessor controls accurately detects a wide range of line disturbances and provides reliable, high-speed isolation for adverse conditions.
Molded vacuum reclosers

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Current sensor

Load-side voltage sensor

---

Smart grid ready
Integral CT and load-side voltage sensors; with provisions to add Elastimold® source-side voltage sensors.

Typical control settings
A range of controls is available for Elastimold reclosers. A typical control includes:

- Overcurrent protection – fast and delay curves
- Sensitive earth fault
- Complete metering
- Recloser wear monitor
- Fault locator
- Flexible control logic and integration
- Supervisory control and data acquisition ready – Multiple communications protocols
- Load profile

Compatible with SEL® recloser controls
- SEL-351R
- SEL-351RS Kestrel®
- SEL-351R Falcon™
- SEL-651R

NOTES: Use with the SEL-351R and SEL-351R Falcon requires connection via MVR power module. The power module is connected to the recloser via a 6-ft., 32-pin cable.

Voltage sensors require SEL-651R x 2 control with six 8 V AC low-energy analog (LEA) inputs.

SEL is a registered trademark of Schweitzer Engineering Laboratories, Inc.
Molded vacuum reclosers

Light

Lightweight
Internal diaphragm and silicone rubber sheds reduce weight

Proven solid dielectric insulation
Molded EPDM main body with overlapping silicone rubber sheds for improved dielectric weatherability and UV performance

Simplified mechanism
Translates into a lightweight device

Weight

<table>
<thead>
<tr>
<th></th>
<th>15 kV</th>
<th></th>
<th>27 kV</th>
<th></th>
<th>38 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Others standard</td>
<td>Elastimold standard</td>
<td>Others standard</td>
<td>Elastimold standard</td>
<td>Others standard</td>
</tr>
<tr>
<td>Single-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(lb.)</td>
<td>100</td>
<td>57</td>
<td>100</td>
<td>57</td>
<td>130</td>
</tr>
<tr>
<td>(kg)</td>
<td>45</td>
<td>25.8</td>
<td>45</td>
<td>25.8</td>
<td>60</td>
</tr>
<tr>
<td>Three-phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(lb.)</td>
<td>333</td>
<td>208</td>
<td>333</td>
<td>208</td>
<td>430</td>
</tr>
<tr>
<td>(kg)</td>
<td>150</td>
<td>94.3</td>
<td>150</td>
<td>94.3</td>
<td>195</td>
</tr>
</tbody>
</table>

Flexible

Modular design
Optimized modular design is lightweight and maintenance free.
Design is modular and allows for individual pole or shed replacement if ever required

Pole rotation mount
The single-phase recloser has a unique pole rotation mounting bracket for easier installation and repositioning from 0° to 180°
Molded vacuum reclosers

Easy-to-see position indicator

360° position indicator view with large color-coded reflective open/closed indicators on bottom of recloser for easy visibility from ground level

Reliable long-life mechanism

The state-of-the-art design of our magnetic actuator offers over 10,000 trip and close full-load operations with no maintenance required

Single- and three-phase tripping capabilities

The fast and highly reliable electrically ganged operation provides flexibility of simultaneous three-phase tripping or single-phase tripping with three-phase lockout

The manual trip lever is mechanically linked to trip and lockout all three phases simultaneously

Reduced inventory items

Incorporating extra features and extended capabilities as standard can lead to less stock on your floor

<table>
<thead>
<tr>
<th>Rated maximum voltage</th>
<th>Others standard</th>
<th>Elastimold standard</th>
<th>Others standard</th>
<th>Elastimold standard</th>
<th>Others standard</th>
<th>Elastimold standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous current (A)</td>
<td>630</td>
<td>800</td>
<td>630</td>
<td>800</td>
<td>630</td>
<td>800</td>
</tr>
<tr>
<td>BIL (kV)</td>
<td>95</td>
<td>150</td>
<td>125</td>
<td>150</td>
<td>150</td>
<td>170</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollution level</th>
<th>15 kV Required creep</th>
<th>Elastimold standard</th>
<th>27 kV Required creep</th>
<th>Elastimold standard</th>
<th>38 kV Required creep</th>
<th>Elastimold standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>I – Light</td>
<td>9.8</td>
<td>248</td>
<td>–</td>
<td>–</td>
<td>17.0</td>
<td>432</td>
</tr>
<tr>
<td>II – Medium</td>
<td>12.2</td>
<td>310</td>
<td>–</td>
<td>–</td>
<td>21.3</td>
<td>540</td>
</tr>
<tr>
<td>III – Heavy</td>
<td>15.3</td>
<td>388</td>
<td>–</td>
<td>–</td>
<td>26.6</td>
<td>675</td>
</tr>
<tr>
<td>IV – Very heavy</td>
<td>18.9</td>
<td>481</td>
<td>41.5</td>
<td>1054</td>
<td>33.0</td>
<td>837</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollution level</th>
<th>15 kV Required creep</th>
<th>Elastimold standard</th>
<th>27 kV Required creep</th>
<th>Elastimold standard</th>
<th>38 kV Required creep</th>
<th>Elastimold standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>I – Light</td>
<td>9.8</td>
<td>248</td>
<td>–</td>
<td>–</td>
<td>17.0</td>
<td>432</td>
</tr>
<tr>
<td>II – Medium</td>
<td>12.2</td>
<td>310</td>
<td>–</td>
<td>–</td>
<td>21.3</td>
<td>540</td>
</tr>
<tr>
<td>III – Heavy</td>
<td>15.3</td>
<td>388</td>
<td>–</td>
<td>–</td>
<td>26.6</td>
<td>675</td>
</tr>
<tr>
<td>IV – Very heavy</td>
<td>18.9</td>
<td>481</td>
<td>41.5</td>
<td>1054</td>
<td>33.0</td>
<td>837</td>
</tr>
</tbody>
</table>
Arresters are recommended to provide protection against overvoltage conditions. When arresters are installed, they should be mounted on the supplied arrester brackets or as close to the recloser as practical.

Required for SEL-351R and SEL-351R Falcon™. Cable plugs directly into recloser on SEL-351RS Kestrel® and SEL-651R.
Molded vacuum reclosers
Dimensions for Elastimold® single-phase molded vacuum reclosers

**15 kV and 27 kV**

- 10.07” (255.9 mm)
- 2.80” (71.1 mm)
- 12.50” (317.5 mm)
- 28.90” (734 mm)
- 19.65” (499.2 mm)
- 35.04” (890.1 mm)
- 15 kV and 27 kV

**38 kV**

- 10.07” (255.9 mm)
- 2.80” (71.1 mm)
- 12.50” (317.5 mm)
- 23.99” (609.3 mm)
- 19.65” (499.2 mm)
- 35.04” (890.1 mm)
- 38 kV

Dimensions for Elastimold three-phase molded vacuum reclosers

**15 kV and 27 kV**

- 15.50” (393.7 mm)
- 24.20” (614.8 mm)
- 16.40” (416.5 mm)
- Ø 0.56” (14.2 mm)
- TYP 1.75” (44.5 mm)
- 30.70” (779.8 mm)
- Ø 0.56” (14.2 mm)
- TYP 1.75” (44.5 mm)

**38 kV**

- 15.50” (393.7 mm)
- 24.20” (614.8 mm)
- 18.20” (462.3 mm)
- Ø 0.56” (14.2 mm)
- TYP 1.75” (44.5 mm)
- 35.51” (902.1 mm)
Molded vacuum reclosers
Typical pole-mounting installations

Single-phase recloser

Three-phase recloser
## Molded vacuum reclosers
Ratings and test data summary

<table>
<thead>
<tr>
<th>Description</th>
<th>15 kV</th>
<th>27 kV</th>
<th>38 kV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal system voltage (kV RMS)</td>
<td>14.4</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Rated maximum voltage (kV RMS)</td>
<td>17.1</td>
<td>29.3</td>
<td>38</td>
</tr>
<tr>
<td>Nominal frequency (Hz)</td>
<td>50 or 60</td>
<td>50 or 60</td>
<td>50 or 60</td>
</tr>
<tr>
<td>Phase spacing on three-phase units (inches)</td>
<td>15.5</td>
<td>15.5</td>
<td>15.5</td>
</tr>
<tr>
<td>BIL (kV)</td>
<td>150</td>
<td>150</td>
<td>170</td>
</tr>
<tr>
<td>Power frequency withstand–dry (kV)</td>
<td>50</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Power frequency withstand–wet (kV)</td>
<td>45</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Continuous current (A RMS)</td>
<td>800</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>Eight-hour overload current (A RMS)</td>
<td>960</td>
<td>960</td>
<td>960</td>
</tr>
<tr>
<td>CT ratio</td>
<td>1,000 to 1</td>
<td>1,000 to 1</td>
<td>1,000 to 1</td>
</tr>
<tr>
<td>Interrupting current (kA RMS symmetrical)</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Making current (kA asymmetrical peak)</td>
<td>32.5</td>
<td>32.5</td>
<td>32.5</td>
</tr>
<tr>
<td>Creepage distances (inches–line to ground)</td>
<td>41.5</td>
<td>41.5</td>
<td>51</td>
</tr>
<tr>
<td>Arc-extinction medium</td>
<td>Vacuum</td>
<td>Vacuum</td>
<td>Vacuum</td>
</tr>
<tr>
<td>Insulation medium</td>
<td>EPDM/Silicon rubber</td>
<td>EPDM/Silicon rubber</td>
<td>EPDM/Silicon rubber</td>
</tr>
<tr>
<td>Mechanical operations</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Operating temperatures</td>
<td>-40 °C to 65 °C</td>
<td>-40 °C to 65 °C</td>
<td>-40 °C to 65 °C</td>
</tr>
<tr>
<td>Voltage sensor accuracy (load/line)</td>
<td>3% / 1%</td>
<td>3% / 1%</td>
<td>3% / 1%</td>
</tr>
<tr>
<td>CT accuracy</td>
<td>Class 1</td>
<td>Class 1</td>
<td>Class 1</td>
</tr>
<tr>
<td>Weight (single-phase/three-phase)</td>
<td>57 lb. / 208 lb.</td>
<td>57 lb. / 208 lb.</td>
<td>58 lb. / 211 lb.</td>
</tr>
</tbody>
</table>

* Single-phase 38 kV units are rated for use on grounded systems only.
Three-phase 38 kV units can be used for single-phase tripping on grounded systems only.
For ungrounded systems, three-phase tripping is required.
Elastimold MVRs are tested under the requirements of ANSI C37.60-2003. This table highlights the testing covered in Elastimold test report #372-17-12010:

<table>
<thead>
<tr>
<th>C37.60-2003 Standard clause &amp; description</th>
<th>15 kV MVR compliance</th>
<th>27 kV MVR compliance</th>
<th>38 kV MVR compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 Insulation (dielectric) tests</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6.3 Switching tests</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6.4 Making current capability</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6.5 Operating duty tests</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6.6 Minimum tripping current tests</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6.7 Partial discharge (corona) tests</td>
<td>●</td>
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<td>6.10 Temperature rise tests</td>
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<td>6.11 Time-current tests</td>
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<td>6.12 Mechanical duty tests</td>
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<tr>
<td>6.13 Surge withstand capability (SWC) tests</td>
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<tr>
<td>Other testing UV/weathering tests</td>
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<td>●</td>
</tr>
<tr>
<td>Other testing IEC 62217 – Salt fog spray test (1,600 hours)</td>
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</table>
## Molded vacuum reclosers

### Catalog numbering system

The following diagram shows how to construct a catalog number for a molded vacuum recloser:

- Indicates field that must be filled in to complete the full catalog number.
- Indicates optional field

### Catalog Numbering System

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Options</th>
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<tr>
<td><strong>Product type</strong></td>
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<tr>
<td><strong>Voltage class</strong></td>
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<td><strong>15 kV</strong> (optional)</td>
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<td></td>
<td></td>
<td><strong>27 kV</strong> (optional)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>38 kV</strong> (optional)</td>
</tr>
<tr>
<td><strong>Frame</strong></td>
<td></td>
<td><strong>Pole mounting frame for MVR1</strong></td>
</tr>
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<td></td>
<td></td>
<td><strong>Pole mounting frame for MVR3</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Adjustable height substation frame for 3-phase (single-tank)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Standard cluster-mounting for triple single</strong></td>
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<td></td>
<td></td>
<td><strong>Horizontal mounting frame for triple-single</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Pole mounting for triple single</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Vertical mounting for triple single</strong></td>
</tr>
<tr>
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<td></td>
<td><strong>Custom frame</strong></td>
</tr>
<tr>
<td><strong>Control power transformer (CPT)</strong></td>
<td></td>
<td><strong>None (customer-supplied)</strong></td>
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<tr>
<td></td>
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<td><strong>15 kV class</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>7200: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>6720: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>7960: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<td></td>
<td></td>
<td><strong>13200: 120 V, 1 kVA, 2PRI/2SEC (two bushing)</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>27 kV Class</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>13200: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<tr>
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<td></td>
<td><strong>14400: 120 V, 1 kVA, 2PRI/2SEC (two bushing)</strong></td>
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<td><strong>38 kV class</strong></td>
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<td><strong>19920: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<td><strong>2300: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<td><strong>2400: 120 V, 1 kVA, 1PRI/1SEC (single bushing)</strong></td>
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<td><strong>Dual primary</strong></td>
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<td><strong>14,400 V/7200 V: 120 V (dual primary), 1 kVA</strong></td>
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<td><strong>Customer-specified PT</strong></td>
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<tr>
<td><strong>Control model</strong></td>
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<td><strong>Ships without control (customer-supplied)</strong></td>
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<td><strong>651R AC transfer</strong></td>
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<td><strong>651R customer special</strong></td>
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<td><strong>Beckwith M-7679 R-PAC standard</strong></td>
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<td><strong>Beckwith M-7679 R-PAC premium</strong></td>
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<td><strong>Beckwith M-7679 R-PAC customer special</strong></td>
</tr>
<tr>
<td><strong>Control cable length and type</strong></td>
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<td><strong>Unit ships without cable</strong></td>
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<td></td>
<td><strong>60’, standard</strong></td>
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<td></td>
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<td><strong>100’, standard</strong></td>
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<td></td>
<td></td>
<td><strong>75’, standard</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>100’, standard</strong></td>
</tr>
<tr>
<td><strong>Number of control power transformers</strong></td>
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<td></td>
<td><strong>Single oil-filled CPT</strong></td>
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<td><strong>Dual oil-filled CPT (applicable to 3-phase or triple-single)</strong></td>
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<td></td>
<td><strong>Single dry-type PT</strong></td>
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<td><strong>Dual dry-type PT (applicable to 3-phase or triple-single)</strong></td>
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<td><strong>Phases</strong></td>
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<td><strong>Single phase</strong></td>
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<td></td>
<td><strong>Three phase</strong> (single tank)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Triple single (3-single)</strong></td>
</tr>
</tbody>
</table>

Notes:
- Single-phase reclosers function with the SEL-351RS Kestrel control.
- Three-phase reclosers function with SEL-651R-2, SEL-351R or SEL-351R Falcon controls. The MVR power module must be specified when using a SEL-351R or SEL-351R Falcon control.
- Load-side voltage sensors are standard on all units and function with any SEL control having at least three 8 V AC, 1M LEA inputs (LEA voltage inputs are not used with a SEL-351R or SEL-351R Falcon control).
- All units are upgradeable to source-side voltage sensing but require a SEL-651RXDG control with six 8V AC, 1M LEA inputs.
45MOLDED VACUUM RECLOSERS

Control type | 1-Phase | 3-Phase | Triple-single
---|---|---|---
SEL-351RS Kestrel | 10/14-pin cable | X | X
SEL-351R | X | 14-pin cable | X
SEL-351R Falcon | X | 14-pin cable | X
SEL-651R-2 | X | 32-pin cable | 32-pin cable
Beckwith M-7679 R-PAC | X | 32-pin cable | 32-pin cable

Notes:
1. Use with the SEL-351R or SEL-351R Falcon control requires connection via MVR power module. The power module is connected to the recloser via a 6 ft. 32-pin cable.
2. Voltage sensors require 8 V AC, 1M LEA inputs.
SEL is a registered trademark of Schweitzer Engineering Laboratories, Inc.
### Molded vacuum reclosers

#### Accessories

<table>
<thead>
<tr>
<th>Cat. no.</th>
<th>Accessory name/description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3188D0120G1</td>
<td>Three-phase line-side arrester frame</td>
</tr>
<tr>
<td>3188D0121G1</td>
<td>Three-phase load-side arrester frame</td>
</tr>
<tr>
<td>3188C0122G1</td>
<td>Single-phase line-side arrester frame</td>
</tr>
<tr>
<td>3188C0123G1</td>
<td>Single-phase load-side arrester frame</td>
</tr>
<tr>
<td>3070A1191P1</td>
<td>Wildlife protector top bushing (one per phase)</td>
</tr>
<tr>
<td>3070A1190P1</td>
<td>Wildlife protector side bushing (one per phase)</td>
</tr>
<tr>
<td>3188C0075G1</td>
<td>Source-side voltage sensors (one per phase)</td>
</tr>
<tr>
<td>3188D0119G1</td>
<td>Substation mounting frame</td>
</tr>
<tr>
<td>3188B0126G1</td>
<td>NEMA 2-hole pad</td>
</tr>
<tr>
<td>3180A0661P1</td>
<td>NEMA 4-hole pad</td>
</tr>
<tr>
<td>3070B0913G1</td>
<td>Aerial lug</td>
</tr>
</tbody>
</table>

**Fisher Pierce® overhead faulted circuit indicator – Adaptive Trip™; 4-hr. automatic reset time with current reset override (60 sec. after restoration of power), five ultra-bright LEDs for increased visibility display**

<table>
<thead>
<tr>
<th>Cat. no.</th>
<th>Accessory name/description</th>
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<tbody>
<tr>
<td>1548FH-ANC3JNA1</td>
<td>Fisher Pierce overhead faulted circuit indicator – Adaptive Trip™; 4-hr. automatic reset time with current reset override (60 sec. after restoration of power), with 4-hr. temporary fault reset time, temporary fault indication option, four red and one amber LED</td>
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</tbody>
</table>
Appendix

Part number index

<table>
<thead>
<tr>
<th>Cat. no.</th>
<th>Page</th>
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<tbody>
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<tr>
<td>1548FH-ANC3XNA1</td>
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Additional information

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