Instruction manual

Vacuum circuit breaker (Vehicle) Type GEH
4.16kV-250MVA
4.16kV-250MVA upgraded to 350MVA

Installation operation maintenance IC1000-D240-A171-X-4AUS
Important
The information contained herein is general in nature and not intended for specific application purposes. It does not relieve the user of responsibility to use sound practices in application, installation, operation and maintenance of the equipment purchased. Siemens reserves the right to make changes in the specifications shown herein or to make improvements at any time without notice or obligation. Should a conflict arise between the general information contained in this publication and the contents of drawings or supplementary material or both, the latter shall take precedence.

Qualified person
For the purpose of this instruction manual a qualified person is one who is familiar with the installation, construction or operation of the equipment and the hazards involved. In addition, this person has the following qualifications:

- Is trained and authorized to de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
- Is trained in the proper care and use of protective equipment, such as: rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
- Is trained in rendering first aid.

Further, a qualified person shall also be familiar with the proper use of special precautionary techniques, personal protective equipment, insulation and shielding materials, and insulated tools and test equipment. Such persons are permitted to work within limited approach of exposed live parts operating at 50 volts or more, and shall, at a minimum, be additionally trained in all of the following:

- The skills and techniques necessary to distinguish exposed energized parts from other parts of electric equipment
- The skills and techniques necessary to determine the nominal voltage of exposed live parts
- The approach distances specified in NFPA 70E® and the corresponding voltages to which the qualified person will be exposed
- The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely.

DANGER
Hazardous voltages and high-speed moving parts.
Will cause death, serious injury or property damage.
Always de-energize and ground the equipment before maintenance. Read and understand this instruction manual before using equipment. Maintenance should be performed only by qualified personnel. The use of unauthorized parts in the repair of the equipment or tampering by unqualified personnel will result in dangerous conditions which will cause death, severe injury or equipment damage. Follow all safety instructions contained herein.

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- The approach distances specified in NFPA 70E® and the corresponding voltages to which the qualified person will be exposed
- The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely.
Note:

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser’s purposes, the matter should be referred to the local sales office.

The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens Industry, Inc. The warranty contained in the contract between the parties is the sole warranty of Siemens Industry, Inc. Any statements contained herein do not create new warranties or modify the existing warranty.

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Introduction

The type GEH family of vacuum circuit breakers is designed to meet all applicable ANSI, NEMA and IEEE standards. Successful application and operation of this equipment depends as much upon proper installation and maintenance by the user as it does upon the proper design and fabrication by Siemens.

The purpose of this instruction manual is to assist the user in developing safe and efficient procedures for the installation, maintenance and use of the equipment.

Contact the nearest Siemens representative if any additional information is desired.

Signal words

The signal words “danger,” “warning” and “caution” used in this manual indicate the degree of hazard that may be encountered by the user. These words are defined as:

**Danger** - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

**Warning** - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

**Caution** - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

**Caution (without safety alert symbol)** - Indicates a potentially hazardous situation that, if not avoided, may result in property damage.
Hazardous procedures
In addition to other procedures described in this instruction manual as dangerous, user personnel must adhere to the following:

1. Always work only on a de-energized circuit breaker. The circuit breaker should be isolated, grounded and have all control power removed before performing any tests, maintenance or repair.

2. Always perform maintenance on the circuit breaker after the spring-charged mechanisms are discharged (except for test of the charging mechanisms). Check to be certain that the indicator flags read OPEN and DISCHARGED.

3. Always let an interlock device or safety mechanism perform its function without forcing or defeating the device.

Field service operation and warranty issues
Siemens can provide competent, well-trained field service representatives to provide technical guidance and advisory assistance for the installation, overhaul, repair and maintenance of Siemens equipment, processes and systems. Contact regional service centers, sales offices or the factory for details, or telephone Siemens field service at 1-800-347-6659 or 1-919-365-2200 outside the U.S.

For medium voltage customer service issues, contact Siemens at 1-800-347-6659 or 1-919-365-2200 outside the U.S.
Receiving, handling and storage

Introduction
This section of the manual covers the receiving, handling and storage instructions for vacuum circuit breakers shipped separately from the switchgear. This section of the manual is intended to help the user identify, inspect and protect the circuit breaker prior to its installation.

Receiving procedure
Make a physical inspection of the shipping container before removing or unpacking the circuit breaker.

Check for shipment damage or indications of rough handling by the carrier. Check each item against the manifest to identify any shortages.

Accessories such as the manual charging crank, the racking crank and the split plug jumper are shipped separately.

Shipping damage claims

**Important**: The manner in which visible shipping damage is identified by consignee prior to signing the delivery receipt can determine the outcome of any damage claim to be filed.

**WARNING**

Heavy weight.
Improper lifting or hoisting can result in death, serious injury or property damage.

Obtain the services of a qualified rigger prior to hoisting the circuit breaker to assure adequate safety margins in the hoisting equipment and procedures to avoid damage.

Notification to carrier within 15 days for concealed damage is essential if loss resulting from unsettled claims is to be eliminated or minimized.

1. When the shipment arrives, note whether the equipment was properly protected from the elements. Note the trailer number the equipment arrived on. Note also any blocking of equipment. During unloading, check the actual equipment delivered to verify it agrees with the delivery receipt.

2. Make immediate inspection for visible damage upon arrival and prior to disturbing or removing packaging or wrapping material. This should be done prior to unloading when possible. When total inspection cannot be made on vehicle prior to unloading, close inspection during unloading must be performed and visible damage noted on the delivery receipt. Take pictures if possible.
3. Any visible damage must be noted on the delivery receipt and acknowledged with the driver's signature. The damage should be detailed as much as possible. It is essential that a notation “possible internal damage, subject to inspection” be included on the delivery receipt. If the driver will not sign the delivery receipt with the damage noted, the shipment should not be signed for by the consignee or their agent.

4. Notify Siemens, medium-voltage customer service department immediately, at 1-800-347-6659 or 919-365-2200 outside of the US.

5. Arrange for a carrier inspection of the damage immediately.

**Important:** Do not move the equipment from the place it was set when unloading. Also, do not remove or disturb packaging or wrapping material prior to carrier damage inspection. Equipment must be inspected by carrier prior to handling after receipt. This eliminates loss due to claims by carrier that the equipment was damaged or further damaged on site after unloading.

6. Be sure the equipment is properly protected from any further damage by covering it properly after unloading.

7. If practical, make further inspection for possible concealed damage while the carrier’s inspector is on site. If inspection for concealed damage is not practical at the time the carrier’s inspector is present, it must be done within 15 days of receipt of the equipment. If concealed damage is found, the carrier must again be notified and inspection made prior to taking any corrective action to repair. Also notify Siemens immediately at 1-800-347-6659 or 1-919-365-2200 outside the U.S.

8. Obtain the original carrier inspection report and forward it with a copy of the noted delivery receipt to Siemens. Approval must be obtained by Siemens from the carrier before any repair work can be performed.

Before approval can be obtained, Siemens must have the documents referenced in the paragraph above. The carrier inspection report and/or driver’s signature on the delivery receipt does not constitute approval to repair.

**Note:** Shipments are not released from the factory without a clear bill of lading. Approved methods are employed for preparation, loading, blocking and tarping of the equipment before it leaves the Siemens factory. Any determination as to whether the equipment was properly loaded or properly prepared by shipper for over-the-road travel cannot be made at the destination. If the equipment is received in a damaged condition, this damage to the equipment has to have occurred while en route due to conditions beyond Siemens’ control. If the procedure outlined above is not followed by the consignee, purchaser or their agent, Siemens cannot be held liable for repairs. Siemens will not be held liable for repairs in any case where repair work was performed prior to authorization from Siemens.

**Handling procedure**

1. Carefully remove the shipping carton from the circuit breaker. Keep the shipping pallet for later use if the circuit breaker is to be stored prior to its installation.

2. Inspect for concealed damage. Notification to carrier must take place within 15 days to assure prompt claim resolution.

3. Each circuit breaker should be appropriately lifted, using lifting sling rated for at least 2,000 lbs. Circuit breaker shall be lifted by using the lifting angles mounted to the sides of the vehicle assembly or by Upper “B” phase post insulator. (Note: Lifting angles must be removed before inserting breaker into switchgear cubicle)

4. The palleted circuit breaker can be moved using a properly rated fork-lift vehicle. The pallets are designed for movement by a standard fork-lift vehicle.
Storage procedure
When the circuit breaker needs to be placed on its pallet for storage, be sure the unit is securely bolted to the pallet and covered with polyethylene film at least 10 mils thick.

Indoor storage
Whenever possible, store the circuit breaker indoors. The storage environment must be clean, dry and free of such items as construction dust, corrosive atmosphere, mechanical abuse and rapid temperature variations.

Outdoor storage
Outdoor storage is not recommended. When no other option is available, the circuit breaker must be completely covered and protected from rain, snow, dirt and all other contaminants.

Space heating
Space heating must be used for both indoor and outdoor storage to prevent condensation and corrosion. When the circuit breaker is stored outdoors, 250 watts per circuit breaker of space heating is recommended. If the circuit breaker is stored inside the switchgear enclosure, and the switchgear is equipped with space heaters, energize the space heaters.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Rating Label</td>
</tr>
<tr>
<td>B</td>
<td>Manual spring-charging port</td>
</tr>
<tr>
<td>C</td>
<td>CHARGED/DISCHARGED indicator</td>
</tr>
<tr>
<td>D</td>
<td>OPEN/CLOSED indicator</td>
</tr>
<tr>
<td>E</td>
<td>Operation counter</td>
</tr>
<tr>
<td>F</td>
<td>Manual close pushbutton</td>
</tr>
<tr>
<td>G</td>
<td>Manual open pushbutton</td>
</tr>
<tr>
<td>H</td>
<td>Racking access hole</td>
</tr>
<tr>
<td>I</td>
<td>DISCONNECT/TEST Indicator Window</td>
</tr>
<tr>
<td>J</td>
<td>Racking access handle</td>
</tr>
</tbody>
</table>

Type SGEH vacuum circuit breaker front panel controls
Vehicle description

Vehicle function
Type GEH circuit breakers are comprised of the interrupter/operator module fitted to a vehicle. This interrupter/operator module is an integral arrangement of operating mechanism, dielectric system, vacuum interrupters, and means of connecting the primary circuit. The vehicle supports the interrupter/operator module, providing mobility and fully coordinated application in General Electric type AMH switchgear.

This manual should be used jointly with the Circuit Breaker Operator Instruction Manual, E50001-F710-A251-V1-4A00.

Alignment
All aspects of the circuit breaker structure which impact alignment and interchangeability are checked at the factory. Field adjustment will not normally be required, but variations in existing switchgear may require field adjustment.

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DANGER

Hazardous voltage and high-speed moving parts. Will cause death, serious injury and property damage.
De-energize before working on this equipment.
Do not by-pass interlocks or otherwise make inter-locks inoperative.
Spring discharge mechanism (Figure 1)
The spring discharge mechanism is mounted on the right side of the vehicle frame. In operation, the spring dump roller is actuated by the spring dump guide mounted in the switchgear cubicle.

The spring dump roller rides slightly below the spring dump guide in the cubicle during racking. Upon insertion or removal of the circuit breaker from the switchgear cubicle, the spring dump roller is displaced downward by the cubicle mounted spring dump guide, forcing the discharge of the circuit breaker close spring.

MOC Actuator System (Figure 1)
The MOC Actuator System consists of the MOC Roller and linkage, which actuates the cubicle MOC switches when the breaker performs a close operation. Additionally, the MOC Actuator System employs the use of a MOC-Saver device, which consists of a Snubber Assembly and Velocity Controller which work in conjunction to control the velocity and impact of the MOC roller on the cubicle MOC switches to prevent damage to the MOC switches and ensure proper MOC function and reliability.

Secondary contacts (Figure 1)
Two, eight-point secondary contact assemblies are mounted to the circuit breaker frame, one on each side of the breaker at the rear of the frame assembly. The secondary contacts on the circuit breaker engage the cubicle secondary contact assemblies in the TEST and CONNECT positions allowing electrical operation of the breaker at both positions.

Control cable box (Figure 1)
The type GEH circuit breaker employs a plug-in cable which completes circuit breaker electrical connections between the mechanism housing and the vehicle’s secondary disconnects.

Insulating barriers (Figure 1)
Insulating barriers are required for use on type GEH circuit breakers. Interphase and exterior barriers are removed or inserted vertically into the vehicle assembly.

![Figure 1: Operational Interlock Overview](image-url)
The racking interlock slide mechanism is mounted on the front of the vehicle assembly and provides access to the circuit breaker racking shaft. The racking interlock slide is held closed, blocking the insertion of the racking crank, until racking is desired. In order to rack the circuit breaker, the racking interlock slide must be moved fully to the left, exposing the racking aperture and allowing the insertion of the racking crank into the circuit breaker racking shaft.

The movement of the racking interlock slide to the left to access the circuit breaker racking shaft will automatically trip the circuit breaker from the CLOSED condition to the OPEN condition, and discharge the close spring if charged. The circuit breaker is automatically held in the OPEN condition with the close spring discharged whenever the racking interlock slide is open and the racking crank inserted into the circuit breaker racking shaft.

The racking interlock slide mechanism is connected to the racking switch roller on the left side of the vehicle assembly by a series of linkages. Via the linkages, movement of the racking interlock slide to the left to expose the racking shaft displaces the racking switch roller downward to the point that the racking switch roller will ride along the cubicle mounted racking switch rail. This displacement of the racking switch roller results in the circuit breaker obtaining the trip-free condition.

During racking, the cubicle mounted racking switch rail maintains the racking switch roller in the trip-free position and holds the racking interlock slide open even if the racking shaft is removed. As a result, the circuit breaker is unable to obtain the CLOSED condition unless in the DISCONNECT, TEST or CONNECT positions.
Circuit breaker position Interlock (Figure 3)
The circuit breaker position interlock consists of the foot pedal and plunger linkage, and is mounted on the lower right side of the vehicle frame. At the DISCONNECT and TEST positions the plunger automatically engages the appropriate slot in the cubicle mounted position interlock pad, locking the circuit breaker in position. In order to move or rack the circuit breaker, the foot pedal must be depressed, which raises the plunger and frees it from the cubicle position interlock pad.

Position indicating assembly (Figure 3)
The position indicating assembly is mounted on the under side of the circuit breaker. As the breaker is racked, the roller of the position indicating assembly rides along the floor mounted cubicle rail, and actuates the breaker cubicle position indicating assembly to display either the DISCONNECT or TEST label at the specific position of the breaker during the racking procedure.

Continuous current interlock
The continuous current interlock functions to ensure circuit breaker and cubicle of like continuous current ratings are applied, and that circuit breakers with dissimilar continuous current ratings are excluded from cubicles of unlike current ratings.

Seismic restraint system
A seismic restraint system is available as an accessory for type GEH circuit breakers. The Seismic Restraint System secures the type GEH circuit breaker in the disconnect position during maintenance or other outage periods when the breaker is out of service. Contact your nearest Siemens representative for information.

Figure 3. Circuit Breaker Position Interlock
Recommended tools
• Racking crank (optional): Original circuit breaker racking crank may be used. Siemens racking crank tool (if needed) is PN 18763436528.
• Cell normalization tool (optional): Siemens offers a cell normalization tool (PN 18497257509) to assist in adjusting the physical interfaces between the circuit breaker and the switchgear cubicle.

Installing the circuit breaker into the switchgear cubicle (Figure 2, 3)
The following steps must be performed to safely install the circuit breaker into the switchgear cubicle.

Note: CLOCKWISE ROTATION of racking crank for inserting circuit breaker. COUNTERCLOCKWISE ROTATION of racking crank for removal of circuit breaker.

The four lifting angles that are mounted to the sides of the type GEH circuit breaker frame must be removed before attempting to install the circuit breaker into the switchgear cubicle.

1. Ensure that the circuit breaker is in the "OPEN" condition. Push circuit breaker into switchgear cubicle until stopped. Note that during movement the foot pedal will lower as the circuit breaker position interlock plunger rides along the cubicle floor mounted interlock pad. When the circuit breaker reaches the DISCONNECT position the circuit breaker position interlock plunger will fall into the DISCONNECT position slot of the cubicle position interlock pad, and the foot pedal will rise to the original position (Figure 3). At this point the circuit breaker will be locked in the DISCONNECT position. The breaker cubicle position indicator opening on the front cover of the circuit breaker will display the "DISCONNECT" label.

2. To continue racking the circuit breaker to TEST position, move the racking interlock slide to the left, exposing the racking shaft aperture (Figure 2). If the closing spring has been left in the charged condition, or the breaker left in the “CLOSED” condition, the movement of the racking interlock slide to the left will automatically discharge the closing spring, and automatically trip the breaker to the “OPEN” condition. Insert the racking crank into the racking shaft aperture until it fully engages the circuit breaker racking shaft. Depress the foot pedal (freeing the circuit breaker position interlock plunger) only until the racking shaft engages and the circuit breaker begins racking into the cell, then release the foot pedal and rotate the racking shaft clockwise. When the circuit breaker reaches the TEST position, the circuit breaker position plunger interlock will automatically fall into the TEST position slot of the cubicle position interlock pad. At this point the circuit breaker will be locked in the Test position. The breaker cubicle position indicator opening on the front cover of the circuit breaker will display the “TEST” label.

3. If breaker operation is desirable in the TEST position, the racking crank must be removed from the racking shaft aperture and the racking interlock slide moved fully to the right (Figure 2).

4. To rack the circuit breaker to the CONNECT position from the TEST position, move the racking interlock slide to the left, exposing the racking shaft aperture (Figure 2). If the closing spring has been left in the charged condition, or the breaker left in the “CLOSED” condition, the movement of the racking interlock slide to the left will automatically discharge the closing spring, and automatically trip the breaker to the “OPEN” condition. Insert the racking crank into the racking shaft aperture until it fully engages the circuit breaker racking shaft. Depress the foot pedal (freeing the circuit breaker position interlock plunger) and begin rotating the racking crank clockwise. As the breaker begins to move, the foot pedal may be released. The breaker is in the CONNECT position when the front cover of the breaker is flush to the outside of the front frame of the switchgear cubicle.
Introduction
Periodic inspections and maintenance are essential to obtain safe and reliable operation of the circuit breaker as well as the switchgear.

When circuit breakers and/or the switchgear are operated under “Usual Service Conditions”, maintenance and lubrication is recommended at ten year intervals or at the number of operations indicated in Table 2. “Usual” and “Unusual” service conditions for medium-voltage metal-clad switchgear are defined in ANSI C37.20.2, section 8.1.

Generally, “usual service conditions” are defined as an environment in which the equipment is not exposed to excessive dust, acid fumes, damaging chemicals, salt air, rapid or frequent changes in temperature, vibration, high humidity, and extremes of temperature.

The definition of “usual service conditions” is subject to a variety of interpretations. Because of this, you are best served by adjusting maintenance and lubrication intervals based on your experience with the equipment in the actual service environment.

Regardless of the length of the maintenance and lubrication interval, Siemens recommends that circuit breakers and switchgear should be inspected and exercised annually.

Recommended maintenance and lubrication
Periodic maintenance and lubrication should include all the tasks shown in Table 1.

Table 1 — Maintenance tasks
- Circuit Breaker Operator tasks
- Checks of the primary power path
  - Cleanliness check
  - Primary disconnects
- Fastener check
- Electrical control checks
  - Wiring and terminals check
  - Secondary disconnect check
  - Automatic spring charging check
  - Electrical close and trip check
- Vacuum integrity check
- High potential test
- Insulation and contact resistance tests
- Inspection and cleaning of circuit breaker insulation
- Racking mechanism
- MOC actuator system
- Floor interlock and operating lever
- Functional tests
- Periodic maintenance intervals

WARNING
The use of unauthorized parts in the repair of the equipment, or tampering by unqualified personnel will result in dangerous conditions which will cause death, serious injury or equipment damage.

Follow all safety instructions contained herein.
Recommended procedures for each of the listed tasks are provided in this section of the manual.

The list of tasks in Table 1 does not represent an exhaustive survey of maintenance steps necessary to ensure safe operation of the equipment. Particular applications may require further procedures. Should further information be desired or should particular problems arise which are not covered sufficiently for the Purchaser’s purposes, the matter should be referred to the local Siemens sales office.

Removing the circuit breaker from the switchgear cubicle (Figure 2, 3)

Prior to performing any inspection or maintenance checks or tests, the circuit breaker must be removed from the switchgear. The following steps must be performed to safely remove the circuit breaker from the switchgear cubicle.

1. The first step is to de-energize the breaker. Pressing the Trip pushbutton opens the circuit breaker prior to removal from the switchgear (Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00).

2. The second step in the removal procedure is to de-energize control power to the circuit breaker. Open the control power disconnect device.

3. Move the racking interlock slide to the left and fully insert the racking crank into the breaker racking shaft and rotate counter-clockwise (Figure 2). When the breaker reaches the TEST position, the circuit breaker position interlock plunger will automatically fall into the TEST position slot of the cubicle position interlock pad (Figure 3). At this point the circuit breaker is locked in the TEST position. The breaker cubicle position indicator opening on the front cover of the circuit breaker will display the “TEST” label.

4. To rack the breaker from the TEST position to the DISCONNECT position, move the racking interlock slide to the left if necessary to expose the racking shaft aperture (Figure 2). If the closing spring has been left in the charged condition, or the breaker left in the “CLOSED” condition, the movement of the racking interlock slide to the left will automatically discharge the closing spring, and automatically trip the breaker to the “OPEN” condition. Insert the racking crank into the racking shaft aperture until it fully engages the circuit breaker racking shaft. Depress the foot pedal (freeing the circuit breaker position interlock plunger) only until the racking shaft engages and the circuit breaker begins racking out of the cell, then release the foot pedal and rotate the racking shaft counter-clockwise. When the circuit breaker reaches the DISCONNECT position, the circuit breaker position interlock plunger will automatically fall into the DISCONNECT position slot of the cubicle position interlock pad and the breaker racking shaft will disengage.

**WARNING**

Heavy weight. Can result in death, serious injury or property damage. Do not transport a circuit breaker using a lift truck with the lift truck in the raised position.
At this point the circuit breaker is locked in the DISCONNECT position. The breaker cubicle position indicator opening on the front cover of the circuit breaker will display the "DISCONNECT" label (Figure 3).

5. To remove the circuit breaker from the cubicle depress the foot pedal and withdraw the circuit breaker from the cubicle using the handles mounted on the front cover.

Circuit breaker operator tasks
Perform tests as described in manual E50001-F710-A251-V1-4A00.

Checks of the primary power path
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Cleanliness check
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

In addition to the circuit breaker operator, Figure 4 shows a side view of the circuit breaker with the insulating barriers removed in order to show the upper and lower primary disconnects.

These components must be clean and free of dirt and any foreign objects. Use a dry lint free cloth. For stubborn dirt, use a clean cloth saturated with denatured alcohol (except for the vacuum interrupters). For stubborn dirt on a vacuum interrupter use a damp cloth and then thoroughly dry using a dry lint free cloth.

The phase barriers are plates of glass polyester insulating material which are attached to the circuit breaker to provide suitable electrical insulation between the vacuum interrupter primary circuits and the switchgear.

Always re-install the phase barriers carefully to their original location prior to inserting the circuit breaker into the switchgear.

Primary disconnects
Figure 4 is a side view of the circuit breaker showing the upper and lower primary disconnects.

Inspect the primary disconnect arms for physical integrity and absence of mechanical damage. Any evidence of burning or pitting would indicate weakness of the contact finger springs.

Using a clean cloth saturated with denatured alcohol, clean old lubricant from primary disconnects, and apply contact lubricant (part #15-172-791-214) in a thin layer.

Fastener check
Inspect all fasteners for tightness. Replace any fasteners that appear to have been frequently removed, show damage or are missing.

Electrical control checks:
Wiring and Terminals Check
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.
Secondary disconnect check  
Check the terminal connections of the secondary wiring harness to ensure all hardware is secure.

Automatic spring charging check  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Electrical close and trip check  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Vacuum integrity check  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

High potential test  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Insulation and contact resistance Test  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Note: Maximum Contact Resistance is read from primary bus stab to primary bus stab with primary disconnects removed. A value of 13 micro-ohms should be added to the maximum contact resistance specified in the Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Inspection and cleaning of circuit breaker insulation  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Racking mechanism  
Remove existing lubricant from racking shaft. Apply Kluber Isolflex Topas L32 grease (part # 3AX11333H) or Beacon #325 (part # 15-337-131-001) to the threads of the racking shaft. For inaccessible surfaces, Anderol 732 aerosol synthetic fluid grease (part # 15-172-816-058) may be used.

MOC actuator system  
Refer to Figure 1

MOC actuator system shall be maintained and lubricated as following:  
1. Visually inspect to confirm that the velocity controller is not leaking oil.
2. Verify velocity controller rod resistance. Disassemble one end of the velocity controller from the vehicle frame and verify rod resistance by pushing rod “in” and “out”. Re-assemble the velocity controller assembly to the vehicle frame.

3. Check snubber assembly for visual damage (broken clips and loose hardware).
4. Lubricate cubicle MOC assembly as described by the original manufacturer’s maintenance procedures.

Maintenance of the circuit breaker MOC actuator system DOES NOT mitigate the requirements to maintain cubicle mounted MOC system components. These shall be maintained in accordance with IEEE C37.59 and the original equipment manufacturer’s recommendations.

Functional tests  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00.

Periodic maintenance Intervals  
Refer to Circuit Breaker Operator Manual E50001-F710-A251-V1-4A00 and Table 2.

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<thead>
<tr>
<th>Item</th>
<th>Lubrication Interval</th>
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<tr>
<td>Primary Disconnect contact surfaces</td>
<td>100 racking operations or 10 years</td>
</tr>
<tr>
<td>MOC Actuator System</td>
<td>1000 operations or 10 years</td>
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</table>

Table 2 — Periodic Lubrication Interval
The information provided in this document contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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