

Instruction Bulletin

Type VR Manual Ground and Test Device

For Use With MASTERCLAD™ Switchgear
27 kV

1200/2000 and 2750 A

Up to 40 kA Short-Circuit Current Rating

Class 6055

Retain for future use.



SQUARE D

NOTICE

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result** in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result** in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in minor or moderate injury.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in property damage.

NOTE: Provides additional information to clarify or simplify a procedure.

PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

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SECTION 1—INTRODUCTION

This bulletin contains instructions for receiving, handling, storage, installation, operation and maintenance for the Type VR 1200/2000 and 2750 A Manual Ground and Test (G&T) devices manufactured by Square D.

These devices are auxiliary devices for use with 27 kV MASTERCLAD™ switchgear during initial installation and maintenance. The devices provide a convenient means for grounding the load (cable) or the bus. They can be used to measure resistance and to perform phasing operations. Also, the devices can apply power from an external source for a high potential test or for fault location.

The G&T devices can be used with switchgear assemblies with symmetrical short-circuit current rating up to 40kA.

These devices have been designed and tested per ANSI/IEEE C37.20.6 - "Standard for Medium-Voltage Ground and Test Devices Used in Enclosures." The following components (see Figure 1) are furnished with the G&T devices:

- the basic G&T device
- temporary ground cables equipped with eyebolt for use with hook stick
- hook stick
- primary grounding bars
- interlock keys for each upper and lower door interlock
- spare interlock keys

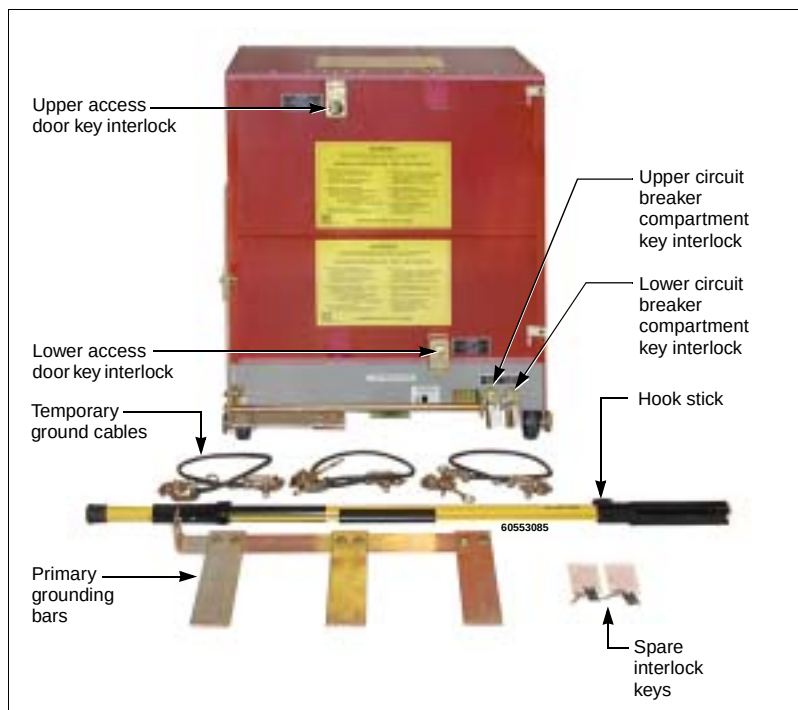


Figure 1: Manual G&T Device and Components

Product Overview

Interlocks

NOTE: The interlock plate must be in the correct position for proper grounding operation. DO NOT use the device if the interlock plate is missing. Contact your local Square D field sales office.

Refer to:

- “Interlock Plate” (below)
- “Interlock Plate Status” on page 16
- “Removing Interlock Plate for Testing or Phasing Operations” on page 40.

This section contains a basic overview of the workings of a manual G&T device and the identification of certain components. The main contacts are designed to fit a 1200/2000 or a 2750 A circuit breaker compartment.

Glass polyester doors permit access to either the upper or lower compartment of the ground and test device. These access doors slide into an isolated center compartment when opened. Each door is furnished with key interlocks to provide proper operation. A hasp is also provided on each door for padlocking. For location of interlocks see Figure 2.

All circuit breaker compartments are suitable for ground and test device use, and allow the option to test, then ground either the line or load side. A code plate, located on the G&T device, and a code plate bracket, located on the circuit breaker compartment floor, are used to allow the G&T device to be installed in the appropriate compartments.

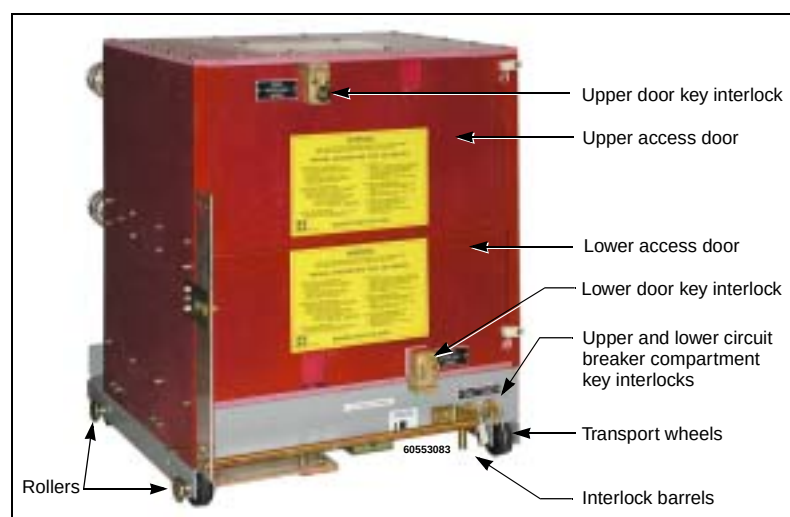


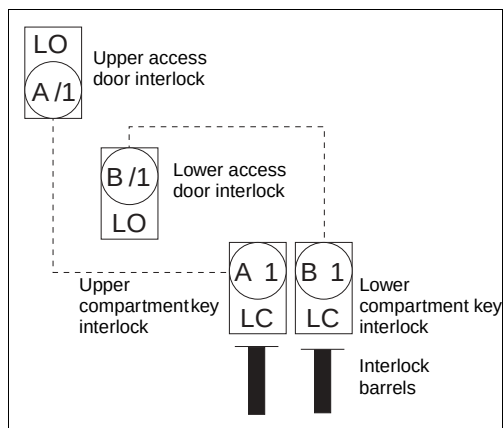
Figure 2: Interlock Locations

Interlock Scheme

The device is interlocked (see Figure 2) so that only the door covering the intended grounded connection may be opened. Load connections are normally the bottom terminals for lower circuit breaker compartments and the top terminals for upper circuit breaker compartments. Both interlock keys need to be inserted into and lock open (LO) the compartment key interlock to install the device into the circuit breaker compartment. The keys cannot be removed from the compartment key interlock without locking the device in place. To open an access door, the correct interlock key is needed to lock the device in position and then remove the key to lock open (LO) the corresponding access door for access. This interlock system prohibits the opening of both access doors when device is connected without the removal of the interlock plate. Keep spare interlock keys in a secure, remote location.

Interlock Plate

The interlock plate, attached to the interlock pan located on the floor of the circuit breaker compartment, is a safety device designed to block accidental access to the bus side of the equipment. The interlock plate can be rotated or removed to gain access to the bus side for grounding or phasing.



Typical Interlock Statuses
(see Figure 2 on page 8 for Interlock Locations)

A1 Key Interlock Status:

Upper Access Door Interlock=Locked Open (LO)
Upper Compartment Key Interlock=Locked Closed (LC)

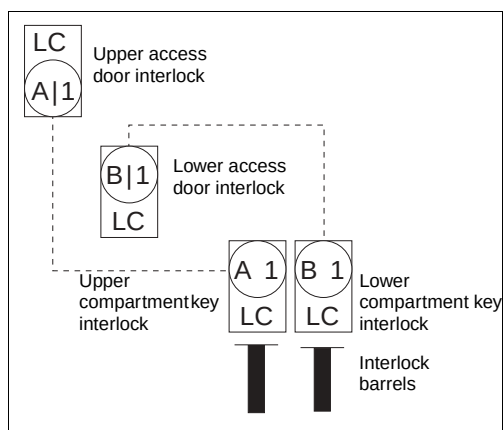
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Open (LO)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

Before installing the Manual G&T, both access doors can be locked open (LO) to gain access to both the upper and lower access compartments to remove the primary grounding bars and the temporary ground cables.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Closed (LC)

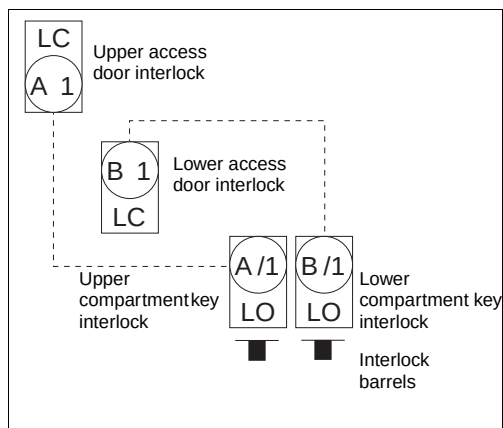
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

With both access doors locked closed (LC), the interlock keys can be removed from the access door interlocks and inserted into the upper or lower compartment key interlocks (LC).



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Open (LO)

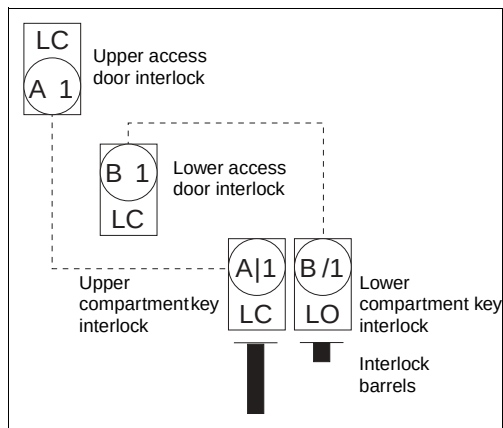
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Open (LO)

Interlock Barrels:

Upper Compartment Interlock Barrel=Retracted
Lower Compartment Interlock Barrel=Retracted

Upper and lower compartment key interlocks are both locked open (LO) to retract interlock barrels, allowing the device to be racked into upper or lower circuit breaker compartment. Keys cannot be removed from key interlocks when locked open (LO).



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Closed (LC)

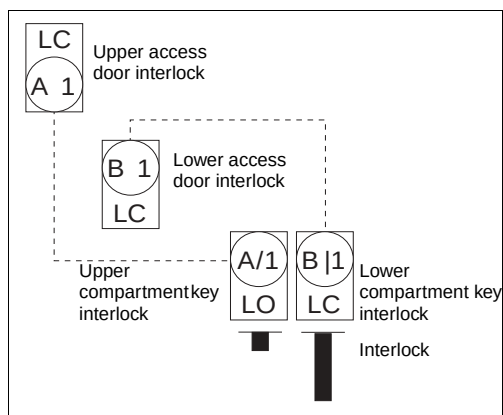
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Open (LO)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Retracted

Device is racked into upper circuit breaker compartment and upper compartment key interlock is locked closed (LC) to lock device into the connected position. Interlock key can now be removed from the upper compartment key interlock and used to lock open (LO) upper access door interlock.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Open (LO)

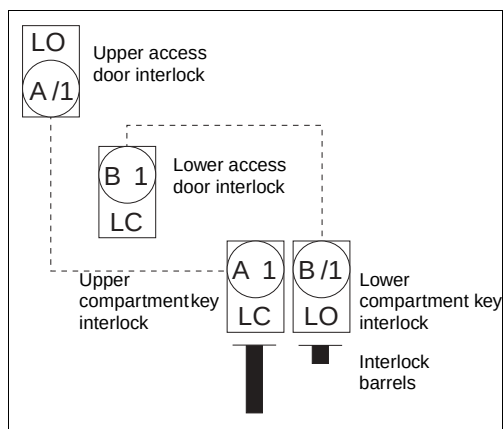
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Retracted
Lower Compartment Interlock Barrel=Extended

Device is racked into lower circuit breaker compartment and lower compartment key interlock is locked closed (LC) to lock device into the connected position. Interlock key can now be removed from the lower compartment key interlock and used to lock open (LO) lower access door interlock.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Open (LO)
Upper Compartment Key Interlock=Locked Closed (LC)

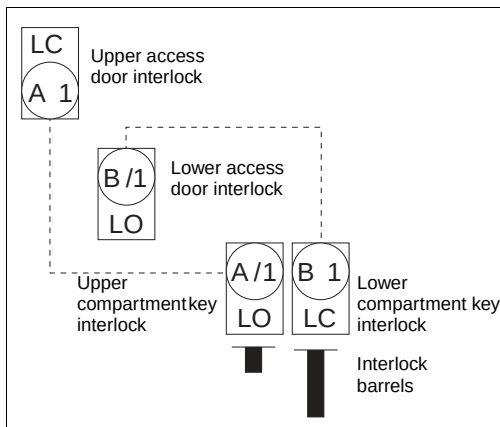
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Open (LO)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Retracted

Device is locked into an upper circuit breaker compartment. Interlock key has been inserted into upper access door interlock and has been used to lock open (LO) upper access door interlock to access the load (cable) side.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Open (LO)

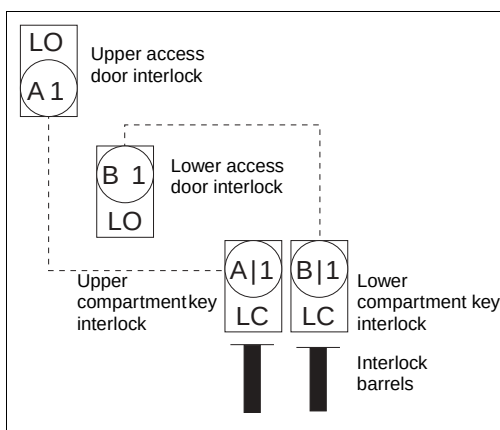
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Open (LO)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Retracted
Lower Compartment Interlock Barrel=Extended

Device is locked into a lower circuit breaker compartment. Interlock key has been inserted into lower access door interlock and has been used to lock open (LO) lower access door interlock to access the load (cable) side.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Open (LO)
Upper Compartment Key Interlock=Locked Open (LC)

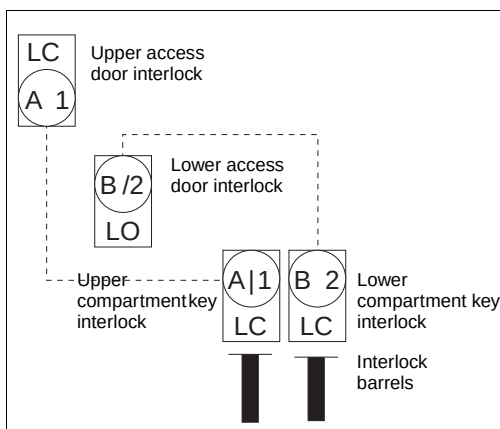
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LO)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

Device is racked into either upper or lower circuit breaker compartment. Interlock plate has been removed to allow both compartment key interlocks to be locked closed (LC) and extend both interlock barrels. Either interlock key can be removed to access the lower or upper access door interlocks.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Closed (LC)
Upper Compartment Key Interlock=Locked Closed (LC)

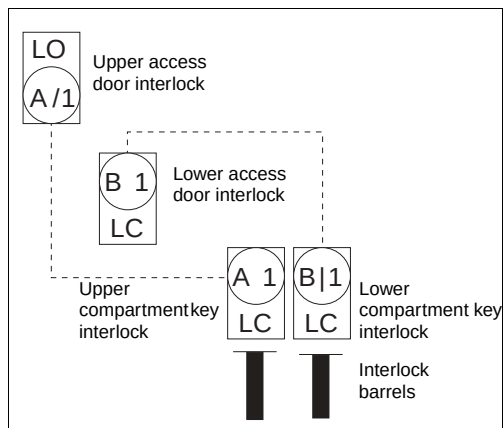
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Open (LO)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

Device is racked into an upper circuit breaker compartment. Interlock plate has been removed to allow both compartment key interlocks to be locked closed (LC) and extend both interlock barrels. Interlock key has been removed from the lower compartment key interlock to access the bus side through the lower access door interlock.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Open (LO)
Upper Compartment Key Interlock=Locked Closed (LC)

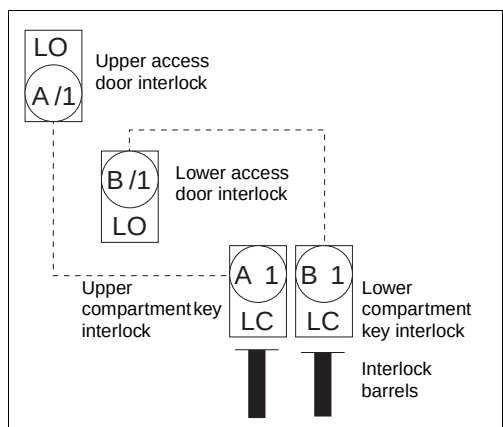
B1 Key Interlock Status:

Lower Access Door Interlock=Locked Closed (LC)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

Device is racked into a lower circuit breaker compartment. Interlock plate has been removed to allow both compartment key interlocks to be locked closed (LC) and extend both interlock barrels. Interlock key has been removed from the upper compartment key interlock to access the bus side through the upper access door interlock.



A1 Key Interlock Status:

Upper Access Door Interlock=Locked Open (LO)
Upper Compartment Key Interlock=Locked Closed (LC)

B1 Key Interlock Status:

Lower Access Door Interlock=Locked Open (LO)
Lower Compartment Key Interlock=Locked Closed (LC)

Interlock Barrels:

Upper Compartment Interlock Barrel=Extended
Lower Compartment Interlock Barrel=Extended

Device is racked into either an upper or lower circuit breaker compartment. Interlock plate has been removed to allow both compartment key interlocks to be locked closed (LC) and extend both interlock barrels. Interlock keys have been removed from the compartment key interlocks to access the bus and load (cable) side through the access door interlocks.

Manual G&T Component Identification

Figures 3, 4, and 5 show the location and identify components of the manual G&T device.

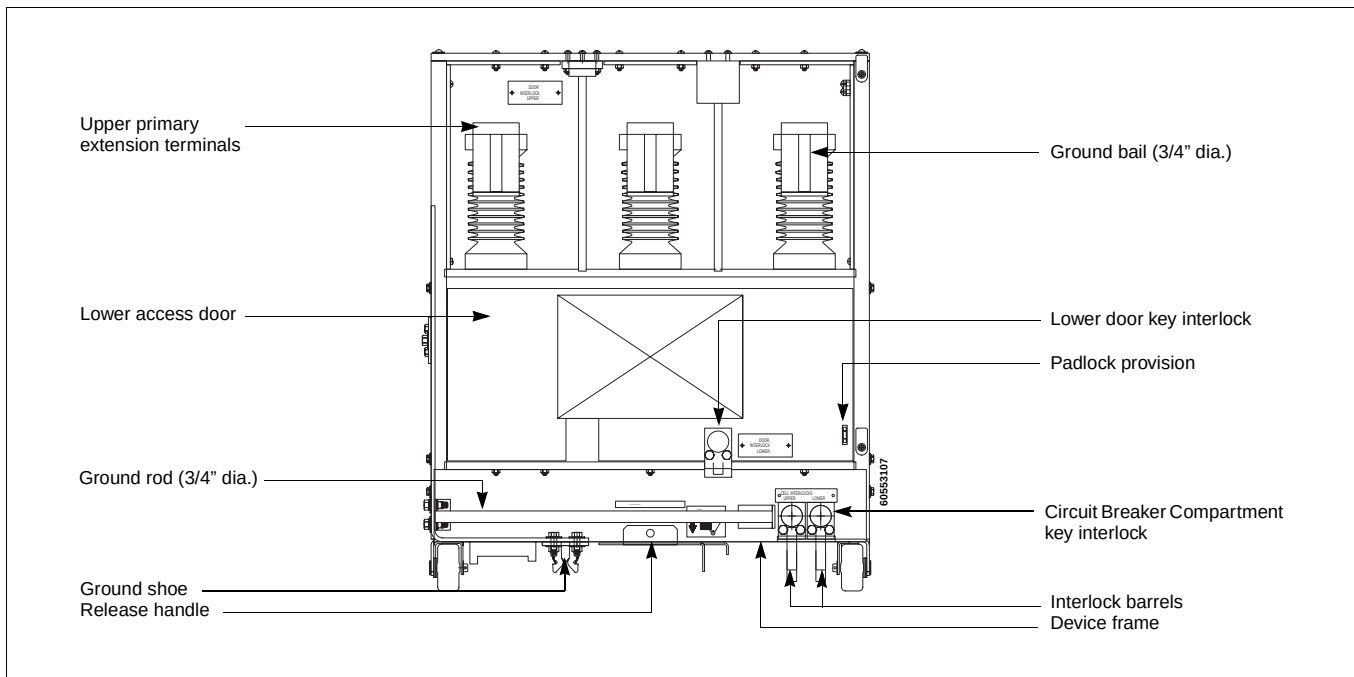


Figure 3: Ground and Test Device Front View: Upper Door Open

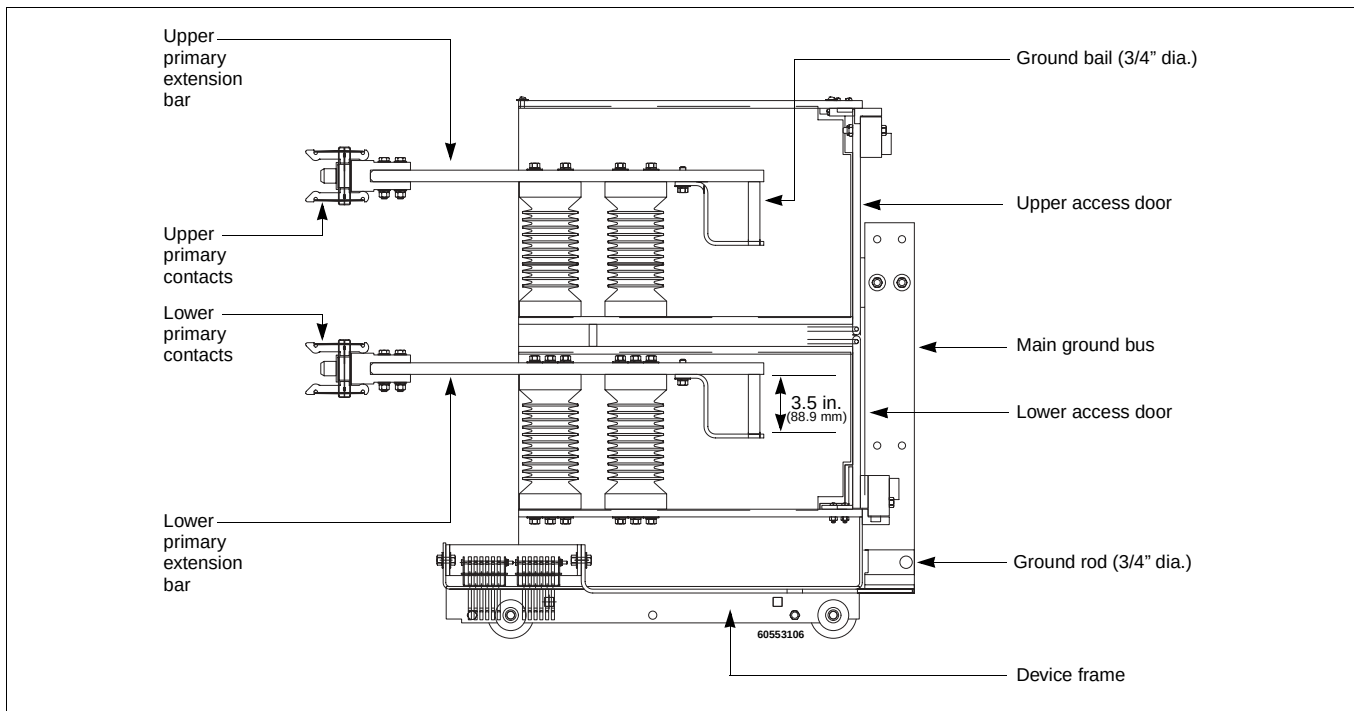


Figure 4: Ground and Test Device Sectional Side View, 1200/2000 A shown (2750 A is similar)

SECTION 2—SAFETY PRECAUTIONS

DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified personnel familiar with medium voltage equipment are to perform work described in this set of instructions. Workers must understand the hazards involved in working with or near medium voltage circuits.
- Perform such work only after reading and understanding all of the instructions contained in this bulletin.
- Turn OFF all power before working on or inside equipment.
- Use a properly rated voltage sensing device to confirm that the power is OFF.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Be aware of potential hazards; wear personal protective equipment, and take adequate safety precautions.
- Do not make any modifications to the equipment or operate the system with the interlocks removed. Contact your local Square D representative for additional instructions if the equipment does not function as described in this manual.
- Carefully inspect your work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors, and covers before turning on the power to this equipment.
- All instructions in this manual are written with the assumption that the customer has taken these measures before performing maintenance or testing.

Failure to follow these instructions will result in death or serious injury.

SECTION 3—RECEIVING, HANDLING, AND STORAGE

Receiving

Upon receipt, check the packing list against the equipment received to ensure the order and shipment are complete. Claims for shortages or errors must be made in writing to Square D within 60 days after delivery. Failure to give such notice will constitute unqualified acceptance and a waiver of all such claims by the purchaser.

Immediately inspect the equipment for any damage which may have occurred in transit. If damage is found or suspected, file a claim with the carrier immediately and notify Square D. Delivery of equipment to a carrier at any of the Square D plants or other shipping points constitutes delivery to the purchaser regardless of freight payment and title. All risk of loss or damage pass to purchaser at that time.

For details concerning claims for equipment shortages and other errors, refer to Square D "Terms and Conditions of Sale".

Handling

The G&T device may be damaged by rough handling. Handle the equipment with care.

Storage

Keep equipment in a clean, dry, corrosion-free area protected from damage.

SECTION 4—USING THE G&T DEVICE FOR GROUNDING THE LOAD (CABLE) SIDE

Preparing the Circuit Breaker Compartment for Installation

Interlock Plate Status

NOTE: The interlock plate must be in the correct position for proper grounding operation. DO NOT use the device if the interlock plate is missing. Contact your local Square D field sales office.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This manually operated G&T device provides access to high voltage conductors. Use extreme care when using this device.
- This equipment must be installed and serviced only by qualified personnel.
- Remove all tools and objects left on this device before installing the device into the circuit breaker compartment.

Failure to follow these instructions will result in death or serious injury.

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment (see Figure 5). The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment. Follow steps 1–3 to ensure that your interlock plate is in the correct position.

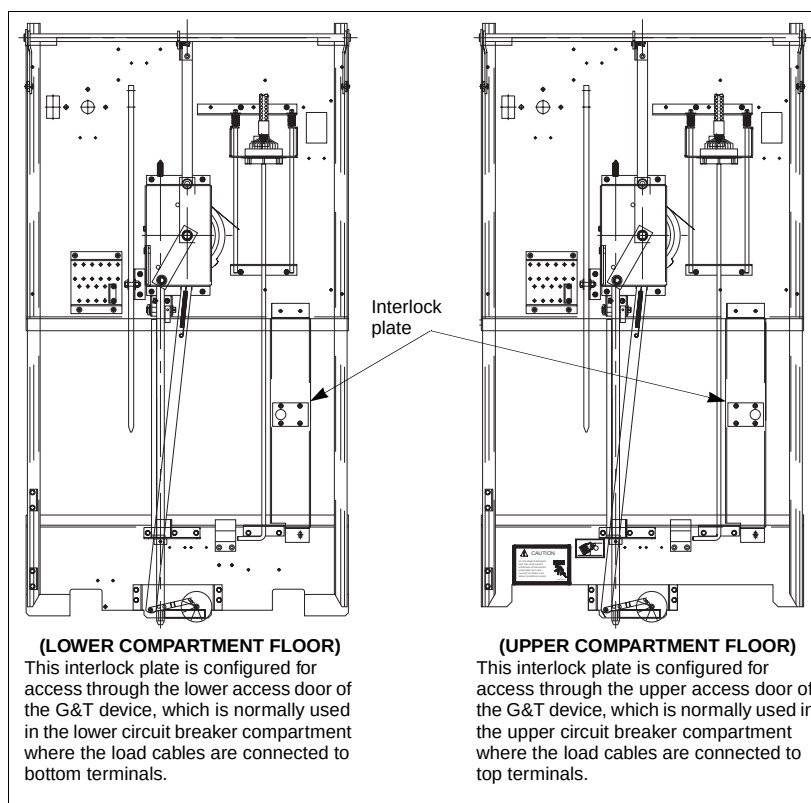


Figure 5: Circuit Breaker Compartment Floor Showing Interlock Pan Location and Typical Interlock Plate Status for Grounding the Load (Cable) Side

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment. The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment. Ensure that the interlock plate is securely attached in the correct position.

Failure to follow this instruction will result in death or serious injury.

1. Check your customer order drawings and familiarize yourself with the interlock system, paying special attention to the location of the bus and load (cable) circuits.
2. Ensure that your interlock plate is in the correct position. The Interlock plate should block the extension of the interlock barrel that is interlocked with the access door of the bus side of the equipment. If interlock plates are in the incorrect position, or if interlock plates have been removed, reattach plates correctly.
3. Ensure that the interlock plate is securely attached.

NOTE: The interlock plate must be in the correct position for proper grounding operation. DO NOT use the device if the interlock plate is missing. Contact your local Square D field sales office.

Preparing the G&T Device for Installation

Pre-Installation Inspection and Maintenance

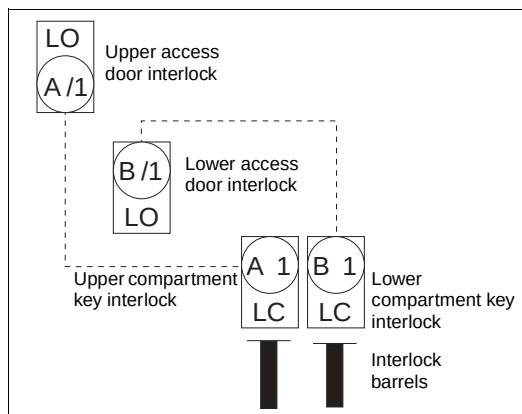


Figure 6: Interlock Status, Step 1

Follow steps 1–7 to ensure the G&T is in satisfactory working condition.

1. To perform inspection, both access doors need to be open. If necessary, lock open both of the access door interlocks (see Figure 6) and open doors.
2. Verify that all primary and grounded connections are tight.
3. Clean any dust and contaminants from insulated parts.
4. Remove all tools and miscellaneous items left on this device before installing the device into the circuit breaker compartment.
5. Ensure that the grounding bar and temporary grounding cables are not connected to the G&T (see Figure 7). If so, follow steps a–b to remove grounding bars and temporary ground cables.
 - a. Disconnect and remove the primary ground bars.
 - b. Disconnect and remove all temporary ground cables.



Figure 7: Primary Grounding Bars and Temporary Ground Cables

6. Close both access doors.
7. Lock closed (LC) both access doors.

Hi-Pot (Dielectric) Test

Table 1: Hi-Pot Test Voltages

Equipment Rating	Field Test Voltage	
	AC	DC
27 kV	45 kV	63 kV

Retracting Interlock Barrels for Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

When performing a hi-pot test:

- Do not exceed the voltages specified in Table 1.
- Keep all people at least six ft. (2 m) away from the G&T device.
- Discharge to ground after each test.

Failure to follow these instructions will result in death or serious injury.

Follow steps 1–5 to perform hi-pot tests.

NOTE: Do not use the equipment if consistent unacceptable results are achieved. Contact Square D for technical assistance.

1. Ensure that all people are at least 6 ft. (2 m) away from the G&T device being tested.
2. Perform a phase-to-ground hi-pot test on each pole.
 - a. Gradually increase the voltage to the levels indicated in Table 1.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
3. Discharge to ground.
4. Perform a phase-to-phase hi-pot test.
 - a. Gradually increase the voltage to the levels indicated in Table 1.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
5. Discharge to ground.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to install the device into a circuit breaker compartment. Attempting to install the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

Follow steps 1–5 to retract the interlock barrels necessary for installing the G&T device.

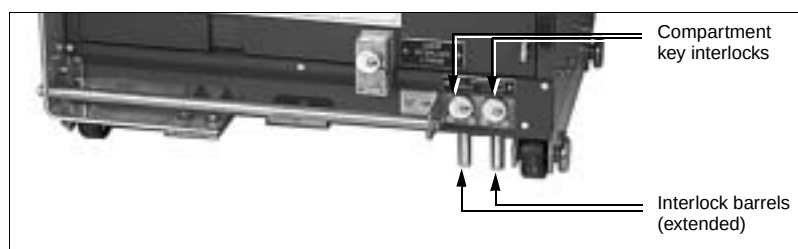


Figure 8: Circuit Breaker Compartment Key Interlocks with Access Doors Closed (Interlock Barrels Extended)

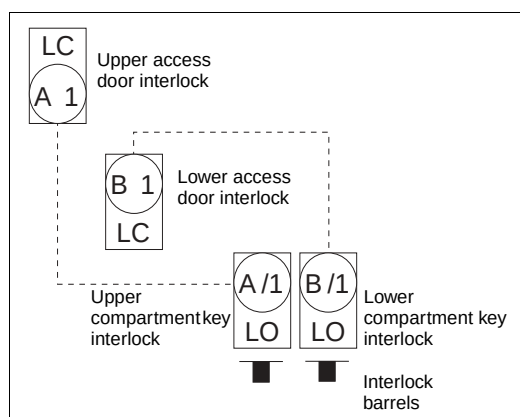


Figure 9: Interlock Status (Step 5)

1. Close both of the access doors (if necessary).
2. Lock closed both of the access doors to release interlock key (if necessary).
3. Remove interlock keys from upper and lower access door interlock.
4. Insert interlock keys into the compartment key interlocks located at the base of the G&T device (see Figure 8).
5. Lock open (LO) both key interlocks to retract both interlock barrels (see Figure 9 for interlock status).

Installing the G&T Device into the TEST/ DISCONNECT Position

TEST
DISCONNECT

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Check the customer order drawings and nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.

Failure to follow this instruction can result in equipment damage.

Follow steps 1–5 to install the G&T device into the TEST/DISCONNECT position.

1. Check the customer order drawings and the nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.
2. Verify that the racking position indicator (see Figure 10) reads “TEST/DISCONNECT”.
3. Open the circuit breaker compartment door.

⚠ WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to install a G&T device into switchgear on a raised pad, or into an upper circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

4. Align the G&T device rollers with the positioning rails (see Figure 10) mounted on the side walls of the circuit breaker compartment.

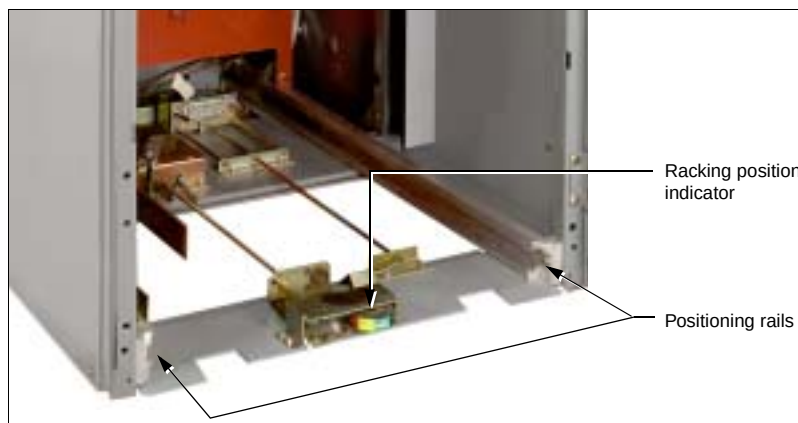


Figure 10: MASTERCLAD Switchgear Circuit Breaker Compartment

NOTE: If inserting the G&T device into switchgear mounted on a raised pad, or into an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using a MASTERCLAD lift truck, refer to Square D Bulletin No. 6055-30.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in equipment damage.

5. Push the G&T device into the circuit breaker compartment until the front of the device aligns with the test position arrows (see Figure 11) located on the bottom of the circuit breaker compartment. When the device is in the TEST/DISCONNECT position, the release handle should engage.



Figure 11: Test and Connected Position Arrows

NOTE: If the G&T device does not easily roll into the circuit breaker compartment, remove the device. If necessary, pull the release handle to release the device from the TEST/DISCONNECT position. Repeat steps 4 and 5. If satisfactory results are not achieved, contact your Square D field sales office.

Racking the G&T Device into the CONNECTED Position

Follow steps 1–5 to rack the G&T device into the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft (see Figure 12).



Figure 12: Racking Handle Engaged onto Racking Shaft with Circuit Breaker in the TEST/DISCONNECT Position

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

TRANSPORT

CONNECTED

3. Rotate the racking handle clockwise.
4. *When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".*

NOTE: If the G&T device does not easily rack into the circuit breaker compartment, remove the G&T device and repeat steps 1-4. If satisfactory results are not achieved, contact your Square D field sales office.

5. Continue rotating the racking handle clockwise until the racking position indicator reads "CONNECTED".

NOTE: When the racking position indicator reads "CONNECTED", the G&T device is fully racked into the circuit breaker compartment and the G&T's primary contacts are connected.

Opening the G&T Device Access Door

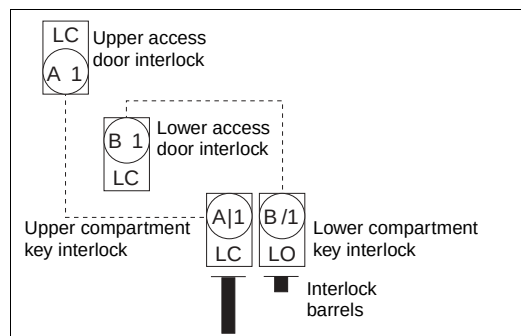


Figure 13: Interlock Status (Step 2.a.)

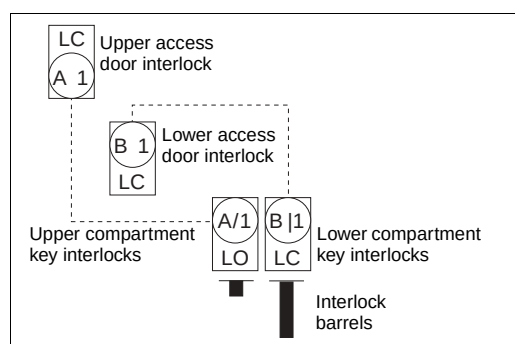


Figure 14: Interlock Status (Step 2.b.)

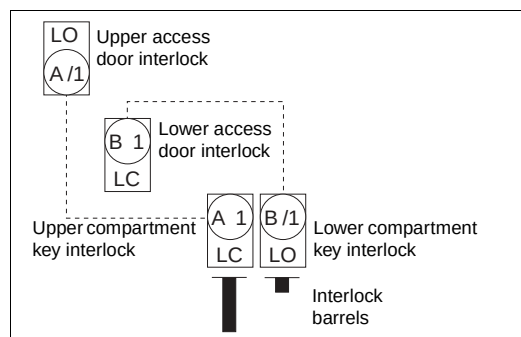


Figure 15: Interlock Status (Step 4.a.)

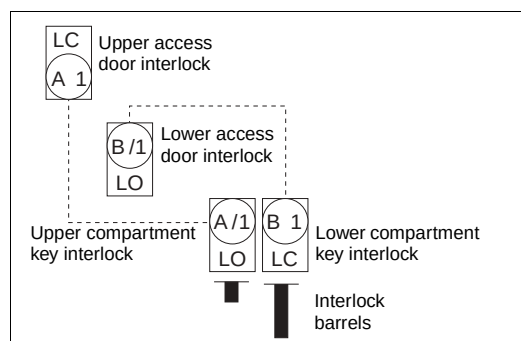


Figure 16: Interlock Status (Step 4.b.)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Before grounding this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Use appropriate personal protection equipment when exposed to energized conductors.

Failure to follow these instructions will result in death or serious injury.

Follow steps 1–5 to open the G&T device access door.

1. Open the circuit breaker compartment door.
2. Lock closed (LC) the compartment key interlock to extend the interlock barrel and release the interlock key.
 - a. If device is racked into an upper circuit breaker compartment, lock closed (LC) the left circuit breaker compartment key interlock to extend the left interlock barrel (see Figure 13) and release the interlock key.
 - b. If device is racked into a lower circuit breaker compartment, lock closed (LC) the right circuit breaker compartment key interlock to extend the right interlock barrel (see Figure 14) and release the interlock key.
3. Remove the interlock key from compartment key interlock.

NOTE: Only one of the interlock keys can be removed from the compartment key interlocks.
4. Insert the interlock key and turn the key clockwise to lock open (LO) the access door interlock.
 - a. If device is racked into an upper circuit breaker compartment, lock open (LO) the upper access door interlock (see Figure 15).
 - b. If device is racked into a lower circuit breaker compartment, lock open (LO) the lower access door interlock (see Figure 16).
5. Open the appropriate access door.

Grounding the Load (Cable) Side

Follow steps 1–4 to ground the load (cable) side of the equipment.

1. Check each ground bail (see Figure 17) with a properly rated voltage sensing device to ensure that power is **OFF**. If any voltage is detected **DO NOT** ground the circuit under any circumstance.

NOTE: If voltage is detected, remove the source of the voltage before proceeding. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.

2. Using a hook stick, install the three temporary ground cables. Connect the cable end to the ground rod and then connect the other end to the ground bail at the primary extension terminals (see Figure 17).

NOTE: The device does not have full short-circuit rating with only the temporary cables in place.

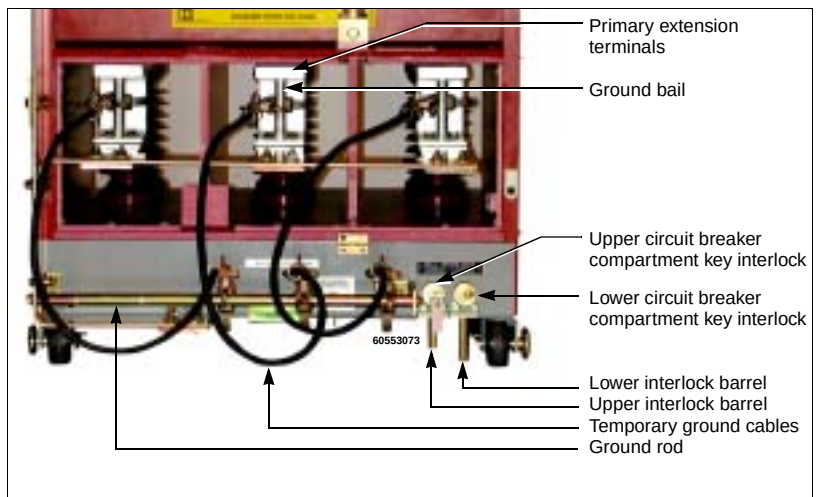


Figure 17: Temporary Ground Cables Installed

3. Install the primary grounding bars to the main ground bus (see Figure 18) and then to the primary extension terminals. Torque all bolts to 35 lb-ft (26 N•m).

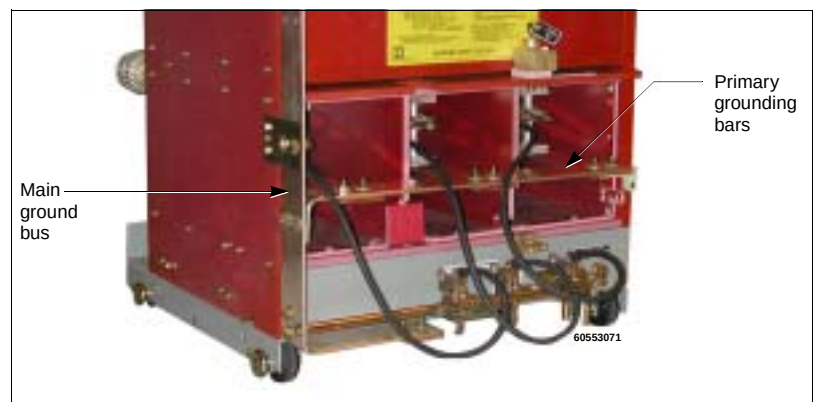


Figure 18: Primary Grounding Bars Installed

4. Remove the temporary ground cables (see Figure 19).



Figure 19: Temporary Ground Cables Removed

The load side of the ground and test device is now properly grounded. To remove the G&T device after grounding, following the steps for removal in "Preparing the G&T Device to be Racked Out of the CONNECTED Position After Grounding" on page 25.

Preparing the G&T Device to be Racked Out of the CONNECTED Position After Grounding

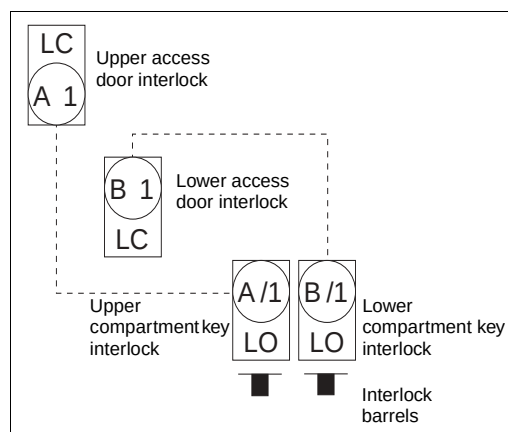


Figure 20: Interlock Status (Step 6)

Complete steps 1–6 to prepare the G&T device for racking out of the CONNECTED position after grounding the load (cable) side.

1. Connect the temporary ground cables to the ground bails and ground rod.
2. Disconnect the primary grounding bars.
3. Disconnect the temporary ground cables using a hook stick.
4. Close access door.
5. Lock closed (LC) the door interlock with the interlock key, and remove key.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to remove the device from a circuit breaker compartment. Attempting to remove the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

6. Insert the interlock key into the circuit breaker compartment interlock and lock open (LO) the interlock to retract the interlock barrel for racking (see Figure 20).

Racking the G&T Device out of the CONNECTED Position

The G&T device can be racked out of the CONNECTED position using a racking mechanism located on the floor of the circuit breaker compartment. Follow steps 1–5 to rack the G&T device out of the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device out of the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

3. Rotate the racking handle counterclockwise.
4. *When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".*

NOTE: If the G&T device does not easily rack out of the circuit breaker compartment, check the interlock status. If satisfactory results are not achieved, contact your Square D field sales office.

5. Continue rotating the racking handle counterclockwise until the racking position indicator reads "TEST/DISCONNECT".

NOTE: When the racking position indicator reads "TEST/DISCONNECT", the G&T's primary contacts are disconnected.

CONNECTED

TRANSPORT

TEST
DISCONNECT

Removing the G&T Device from the Circuit Breaker Compartment

TEST
DISCONNECT

Follow steps 1–5 to remove the G&T device from the circuit breaker compartment.

1. Open the circuit breaker compartment door.
2. Pull the G&T device's release handle to release the device from the TEST/DISCONNECT position.

⚠ WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to remove a G&T device from switchgear on a raised pad, or out of an upper circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

3. Pull the G&T device out of the circuit breaker compartment.
NOTE: If removing the G&T device from switchgear on a raised pad, or from an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using lift truck, refer to Square D Bulletin No. 6055-30.
4. Close the circuit breaker compartment door.
5. If storing equipment, store accessories or spare parts with the device.
Close all doors and cover the equipment to protect it from dust and debris.

SECTION 5—USING THE G&T DEVICE FOR GROUNDING THE BUS

Preparing the Circuit Breaker Compartment for Installation

Interlock Plate Status

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This manually operated G&T device provides access to high voltage conductors. Use extreme care when using this device.
- This equipment must be installed and serviced only by qualified personnel.
- Remove all tools and objects left on this device before installing the device into the circuit breaker compartment.

Failure to follow these instructions will result in death or serious injury.

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment (see Figure 21). The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment. Follow steps 1–3 to ensure that your interlock plate is in the correct position.

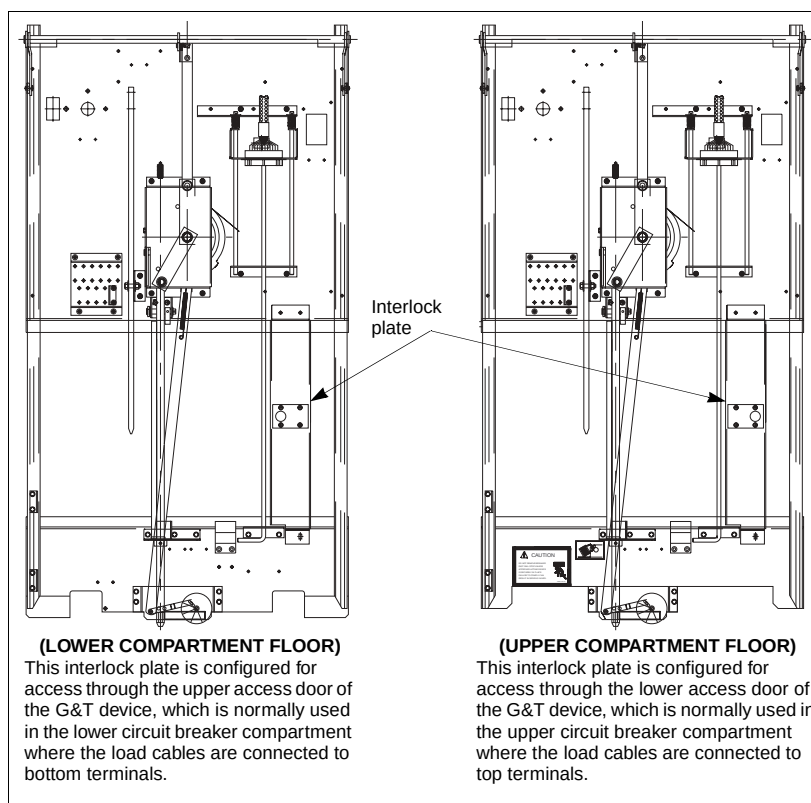


Figure 21: Interlock Pan Location and Typical Interlock Plate Status for Grounding the Bus

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment. The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment. Ensure that the interlock plate is securely attached in the correct position.

Failure to follow this instruction will result in death or serious injury.

1. Check your customer order drawings and familiarize yourself with the interlock system, paying special attention to the location of the bus and load (cable) circuits.
2. Ensure that your interlock plate is in the correct position. The Interlock plate should block the extension of the interlock barrel that is interlocked with the access door of the load (cable) side of the equipment. If interlock plate is in the incorrect position, or if the interlock plate has been removed, reattach the interlock plate correctly by rotating it 180 degrees.
3. Ensure that the interlock plate is securely attached.

Preparing the G&T Device for Installation

Pre-Installation Inspection and Maintenance

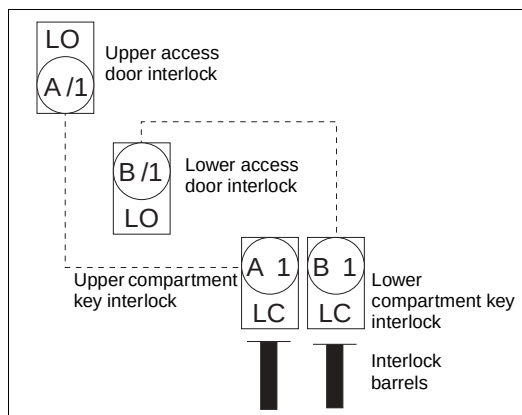


Figure 22: Interlock Status (Step 1)

Follow steps 1–7 to ensure the G&T is in satisfactory working condition.

1. To perform inspection, both access doors need to be open. If necessary, lock open both of the access door interlocks (see Figure 22) and open doors.
2. Verify that all primary and grounded connections are tight.
3. Clean any dust and contaminants from insulated parts.
4. Remove all tools and miscellaneous items left on this device before installing the device into the circuit breaker compartment.
5. Ensure that the grounding bar and temporary grounding cables are not connected to the G&T (see Figure 23). If so, follow steps a–b to remove grounding bars and temporary ground cables.
 - a. Disconnect and remove the primary ground bars.
 - b. Disconnect and remove all temporary ground cables.



Figure 23: Primary Grounding Bars and Temporary Ground Cables

6. Close both access doors.
7. Lock closed (LC) both access doors.

Hi-Pot (Dielectric) Test

Table 2: Hi-Pot Test Voltages

Equipment Rating	Field Test Voltage	
	AC	DC
27 kV	45 kV	63 kV

Retracting Interlock Barrels for Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

When performing a hi-pot test:

- Do not exceed the voltages specified in Table 1.
- Keep all people at least six ft. (2 m) away from the G&T device.
- Discharge to ground after each test.

Failure to follow these instructions will result in death or serious injury.

Follow steps 1–5 to perform hi-pot tests.

NOTE: Do not use the equipment if consistent unacceptable results are achieved. Contact Square D for technical assistance.

1. Ensure that all people are at least 6 ft. (2 m) away from the G&T device being tested.
2. Perform a phase-to-ground hi-pot test on each pole.
 - a. Gradually increase the voltage to the levels indicated in Table 2.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
3. Discharge to ground.
4. Perform a phase-to-phase hi-pot test.
 - a. Gradually increase the voltage to the levels indicated in Table 2.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
5. Discharge to ground.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to install the device into a circuit breaker compartment. Attempting to install the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

Follow steps 1–5 to retract the interlock barrels necessary for installing the G&T device.

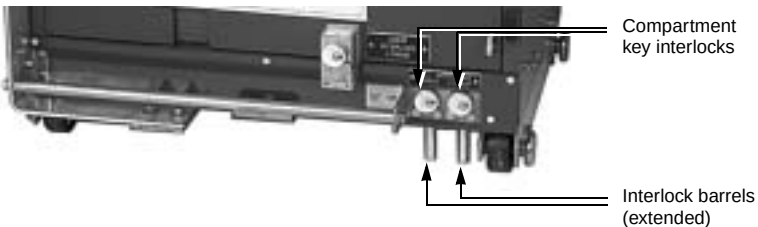


Figure 24: Circuit Breaker Compartment Key Interlocks with Access Doors Closed (Interlock Barrels Extended)

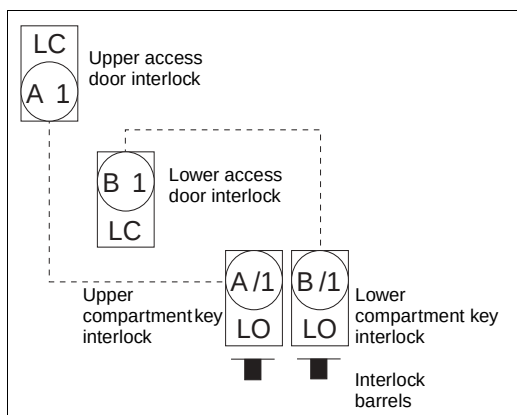


Figure 25: Interlock Status (Step 5)

1. Close both of the access doors (if necessary).
2. Lock closed both of the access doors to release interlock key (if necessary).
3. Remove interlock keys from upper and lower access door interlock.
4. Insert interlock keys into the compartment key interlocks located at the base of the G&T device (see Figure 24).
5. Lock open (LO) both key interlocks to retract both interlock barrels (see Figure 25 for interlock status).

Installing the G&T Device into the TEST/ DISCONNECT Position

TEST
DISCONNECT

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Check the customer order drawings and nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.

Failure to follow this instruction can result in equipment damage.

Follow steps 1–5 to install the G&T device into the TEST/DISCONNECT position.

1. Check the customer order drawings and the nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.
2. Verify that the racking position indicator (see Figure 26) reads “TEST/DISCONNECT”.
3. Open the circuit breaker compartment door.

WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to install a G&T device into switchgear on a raised pad, or into an upper circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

4. Align the G&T device rollers with the positioning rails (see Figure 26) mounted on the side walls of the circuit breaker compartment.

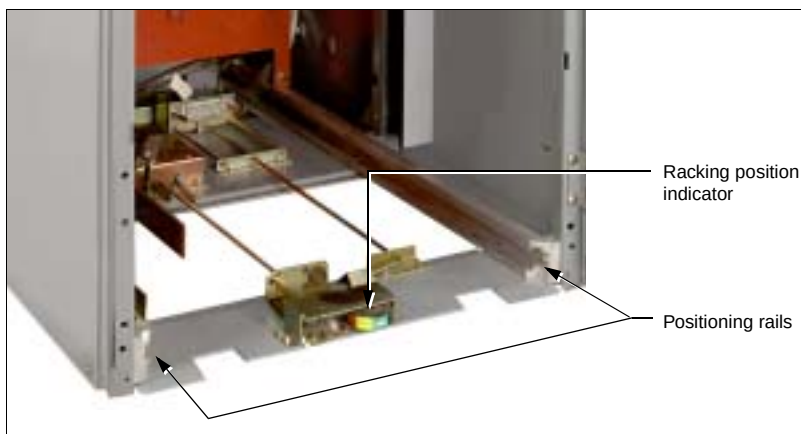


Figure 26: MASTERCLAD Switchgear Circuit Breaker Compartment

NOTE: If inserting the G&T device into switchgear mounted on a raised pad, or into an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using a MASTERCLAD lift truck, refer to Square D Bulletin No. 6055-30.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in equipment damage.

5. Push the G&T device into the circuit breaker compartment until the front of the device aligns with the test position arrows (see Figure 27) located on the bottom of the circuit breaker compartment. When the device is in the TEST/DISCONNECT position, the release handle should engage.



Figure 27: Test and Connected Position Arrows

NOTE: If the G&T device does not easily roll into the circuit breaker compartment, remove the device. If necessary, pull the release handle to release the device from the TEST/DISCONNECT position. Repeat steps 4 and 5. If satisfactory results are not achieved, contact your Square D field sales office.

Racking the G&T Device into the CONNECTED Position

Follow steps 1–5 to rack the G&T device into the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft (see Figure 28).



Figure 28: Racking Handle Engaged onto Racking Shaft with Circuit Breaker in the TEST/DISCONNECT Position

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

TRANSPORT

CONNECTED

3. Rotate the racking handle clockwise.
4. *When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".*

NOTE: If the G&T device does not easily rack into the circuit breaker compartment, remove the G&T device and repeat steps 1-4. If satisfactory results are not achieved, contact your Square D field sales office.

5. Continue rotating the racking handle clockwise until the racking position indicator reads "CONNECTED".

NOTE: When the racking position indicator reads "CONNECTED", the G&T device is fully racked into the circuit breaker compartment and the G&T's primary contacts are connected.

Opening the G&T Device Access Door

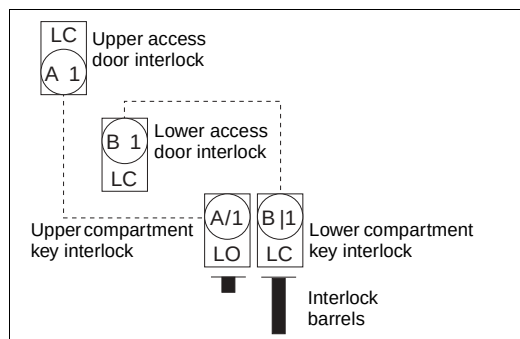


Figure 29: Interlock Status (Step 2.a.)

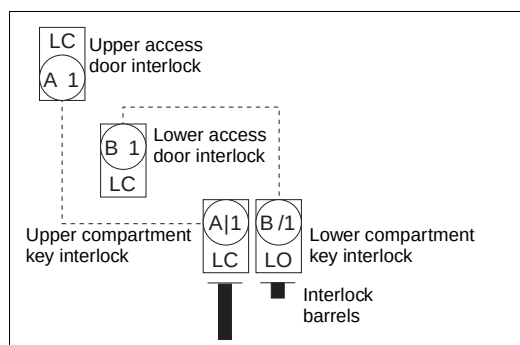


Figure 30: Interlock Status (Step 2.b.)

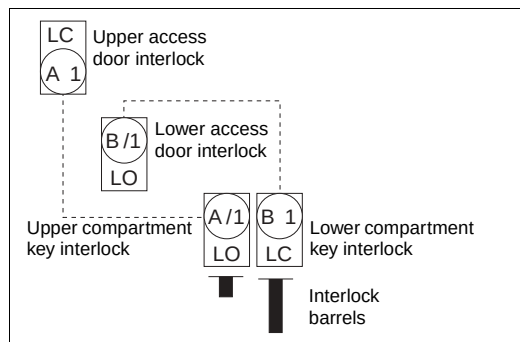


Figure 31: Interlock Status (Step 4.a.)

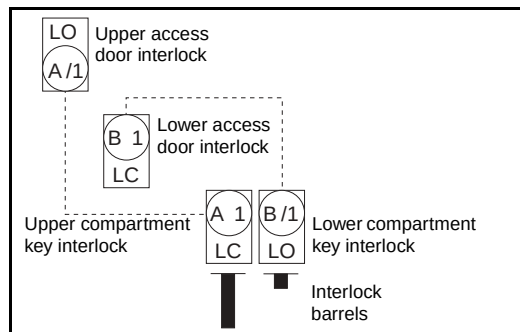


Figure 32: Interlock Status (Step 4.b.)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Before grounding this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Use appropriate personal protection equipment when exposed to energized conductors.

Failure to follow these instructions will result in death or serious injury.

Follow steps 1–5 to open the G&T device access door.

1. Open the circuit breaker compartment door.
2. Lock closed (LC) the compartment key interlock to extend the interlock barrel and release the interlock key.
 - a. If the device is racked into an upper circuit breaker compartment, lock closed (LC) the right circuit breaker compartment key interlock to extend the right interlock barrel (see Figure 29) and release the interlock key.
 - b. If device is racked into a lower circuit breaker compartment, lock closed (LC) the left circuit breaker compartment key interlock to extend the left interlock barrel (see Figure 30) and release the interlock key.
3. Remove the interlock key from compartment key interlock.

NOTE: Only one of the interlock keys can be removed from the compartment key interlocks.
4. Insert the interlock key and turn the key clockwise to lock open (LO) the access door interlock.
 - a. If device is racked into an upper circuit breaker compartment, lock open (LO) the lower access door interlock (see Figure 31).
 - b. If device is racked into a lower circuit breaker compartment, lock open (LO) the upper access door interlock (see Figure 32).
5. Open the appropriate access door.

Grounding the Bus Side

1. Check each ground bail (see Figure 33) with a properly rated voltage sensing device to ensure that power is **OFF**. If any voltage is detected **DO NOT** ground the circuit under any circumstance.

NOTE: If measured voltage did not decrease rapidly, remove the source of the voltage before proceeding. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.

2. Using a hook stick, install the temporary ground cables. Connect the cable end to the ground rod and then connect the other end to the ground bail at the primary extension terminals (see Figure 33).

NOTE: The device does not have full short-circuit rating with only the temporary cables in place.

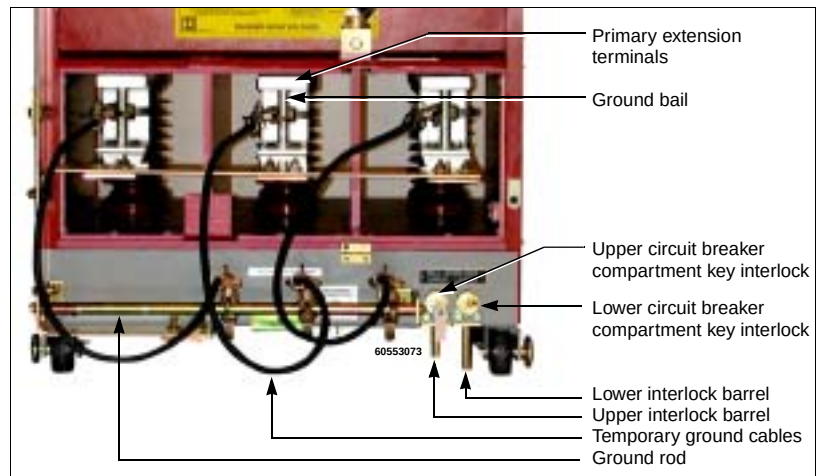


Figure 33: Temporary Ground Cables Installed

3. Install the primary grounding bars to the main ground bus (see Figure 34) and then to the primary extension terminals. Torque all bolts to 35 lb-ft (26 N•m).

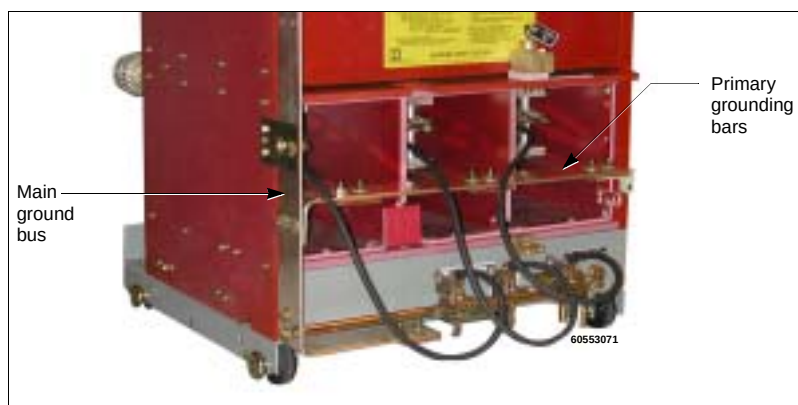


Figure 34: Primary Grounding Bars Installed

4. Remove the temporary ground cables (see Figure 35).



Figure 35: Temporary Ground Cables Removed

The bus side of the ground and test device is now properly grounded. To remove the G&T device after grounding, following the steps for removal in "Preparing the G&T Device to be Racked Out of the CONNECTED Position After Grounding" on page 38.

**Preparing the G&T Device to be Racked
Out of the CONNECTED Position
After Grounding**

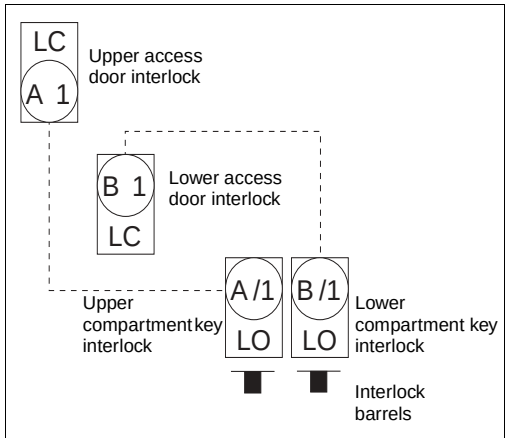


Figure 36: Interlock Status (Step 6)

**Racking the G&T Device out of the
CONNECTED Position**



Complete steps 1–6 to prepare the G&T device for racking out of the CONNECTED position after grounding the bus side.

1. Connect the temporary ground cables to the ground bails and ground rod.
2. Disconnect the primary grounding bars.
3. Disconnect the temporary ground cables using a hook stick.
4. Close access door.
5. Lock closed (LC) the door interlock with the interlock key, and remove key.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to remove the device from a circuit breaker compartment. Attempting to remove the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

6. Insert the interlock key into the circuit breaker compartment interlock and lock open (LO) the interlock to retract the interlock barrel for racking (see Figure 20). Both interlock barrels should be retracted before attempting to remove the G&T device from the circuit breaker compartment.

The G&T device can be racked out of the CONNECTED position using a racking mechanism located on the floor of the circuit breaker compartment. Follow steps 1–5 to rack the G&T device out of the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device out of the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

3. Rotate the racking handle counterclockwise.
4. When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".

NOTE: If the G&T device does not easily rack out of the circuit breaker compartment, check the interlock status. If satisfactory results are not achieved, contact your Square D field sales office.

TEST
DISCONNECT

Removing the G&T Device from the Circuit Breaker Compartment

TEST
DISCONNECT

5. Continue rotating the racking handle counterclockwise until the racking position indicator reads "TEST/DISCONNECT".

NOTE: When the racking position indicator reads "TEST/DISCONNECT", the G&T's primary contacts are disconnected.

Follow steps 1–6 to remove the G&T device from the circuit breaker compartment.

1. Open the circuit breaker compartment door.
2. Pull the G&T device's release handle to release the device from the TEST/DISCONNECT position.

⚠ WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to remove a G&T device from switchgear on a raised pad, or out of an upper circuit breaker compartment.

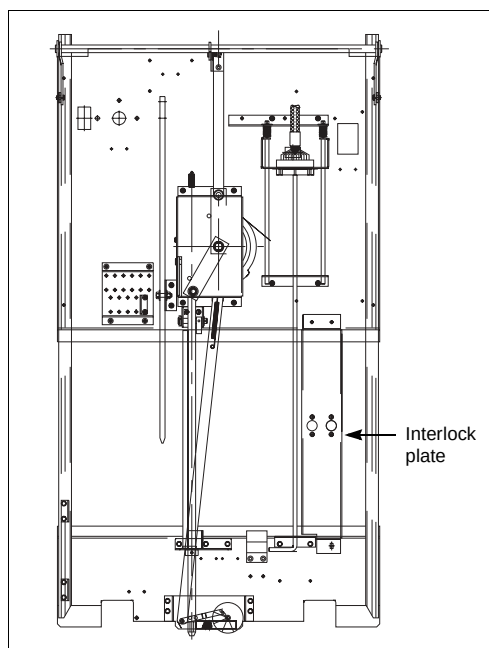
Failure to follow this instruction can result in death or serious injury.

3. Pull the G&T device out of the circuit breaker compartment.
NOTE: If removing the G&T device from switchgear on a raised pad, or from an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using lift truck, refer to Square D Bulletin No. 6055-30.
4. Change the position of the interlock plate to its normal position for grounding the load (cable) side of the equipment.
 - a. Remove the interlock plate from the interlock pan
 - b. Rotate the interlock plate 180°
 - c. Bolt interlock plate to the interlock pan.
5. Close the circuit breaker compartment door.
6. If storing equipment, store accessories or spare parts with the device. Close all doors and cover the equipment to protect it from dust and debris.

SECTION 6—USING THE G&T DEVICE FOR TESTING OR PHASING OPERATIONS

Preparing the Circuit Breaker Compartment for Installation

Removing Interlock Plate for Testing or Phasing Operations



**Figure 37: Location of Interlock Pan and
Typical Interlock Plate Status for
Testing or Phasing**

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This manually operated G&T device provides access to high voltage conductors. Use extreme care when using this device.
- This equipment must be installed and serviced only by qualified personnel.
- Remove all tools and objects left on this device before installing the device into the circuit breaker compartment.

Failure to follow these instructions will result in death or serious injury.

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment (see Figure 37). The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

The interlock plate is attached to the interlock pan, which is located on the floor of the circuit breaker compartment. The interlock plate is part of an interlock system which blocks accidental access to the bus side of the equipment. Removing the interlock plate will allow access to both the upper and lower access doors, which could expose user to energized circuit. Do not remove the interlock plate if planning to use the device for grounding the load (cable) or bus side of the equipment.

Failure to follow this instruction will result in death or serious injury.

Remove the interlock plate from the interlock pan.

Preparing the G&T Device for Installation

Pre-Installation Inspection and Maintenance

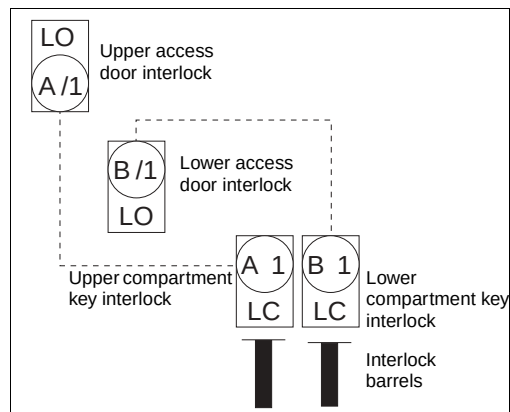


Figure 38: Interlock Status (Step 1)

Follow steps 1–7 to ensure the G&T is in satisfactory working condition.

1. To perform inspection, both access doors need to be open. If necessary, lock open both of the access door interlocks (see Figure 38) and open doors.
2. Verify that all primary and grounded connections are tight.
3. Clean any dust and contaminants from insulated parts.
4. Remove all tools and miscellaneous items left on this device before installing the device into the circuit breaker compartment.
5. Ensure that the grounding bar and temporary grounding cables are not connected to the G&T (see Figure 39). If so, follow steps a–b to remove grounding bars and temporary ground cables.
 - d. Disconnect and remove the primary ground bars.
 - e. Disconnect and remove all temporary ground cables.



Figure 39: Primary Grounding Bars and Temporary Ground Cables

6. Close both access doors.
7. Lock closed (LC) both access doors.

Hi-Pot (Dielectric) Test

DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

When performing a hi-pot test:

- Do not exceed the voltages specified in Table 1.
- Keep all people at least six ft. (2 m) away from the G&T device.
- Discharge to ground after each test.

Failure to follow these instructions will result in death or serious injury.

Follow steps 1–5 to perform hi-pot tests.

NOTE: Do not use the equipment if consistent unacceptable results are achieved. Contact Square D for technical assistance.

1. Ensure that all people are at least 6 ft. (2 m) away from the G&T device being tested.
2. Perform a phase-to-ground hi-pot test on each pole.
 - a. Gradually increase the voltage to the levels indicated in Table 3.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
3. Discharge to ground.
4. Perform a phase-to-phase hi-pot test.
 - a. Gradually increase the voltage to the levels indicated in Table 3.
 - b. Verify that the G&T device sustains the specified voltage without flashover for one minute.
5. Discharge to ground.

Table 3: Hi-Pot Test Voltages

Equipment Rating	Field Test Voltage	
	AC	DC
27 kV	45 kV	63 kV

Retracting Interlock Barrels for Installation

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to install the device into a circuit breaker compartment. Attempting to install the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

Follow steps 1–5 to retract the interlock barrels necessary for installing the G&T device.

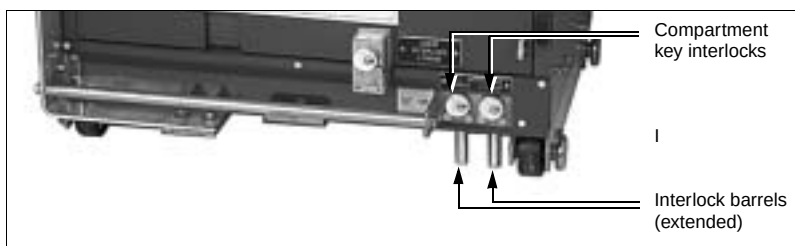


Figure 40: Circuit Breaker Compartment Key Interlocks with Access Doors Closed (Interlock Barrels Extended)

1. Close both of the access doors (if necessary).
2. Lock closed both of the access doors to release interlock key (if necessary).
3. Remove interlock keys from upper and lower access door interlock.
4. Insert interlock keys into the compartment key interlocks located at the base of the G&T device (see Figure 40).
5. Lock open (LO) both key interlocks to retract both interlock barrels (see Figure 41 for interlock status).

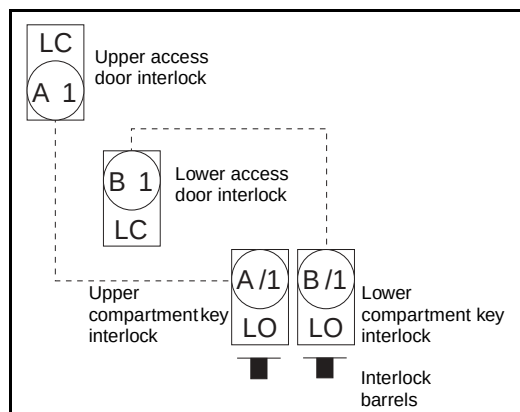


Figure 41: Interlock Status (Step 5)

Installing the G&T Device into the TEST/
DISCONNECT Position

TEST
DISCONNECT

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Check the customer order drawings and nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.

Failure to follow this instruction can result in equipment damage.

Follow steps 1–5 to install the G&T device into the TEST/DISCONNECT position.

1. Check the customer order drawings and the nameplates on the circuit breaker compartment to verify that the G&T device is installed into the proper circuit breaker compartment.
2. Verify that the racking position indicator (see Figure 42) reads “TEST/DISCONNECT”.
3. Open the circuit breaker compartment door.

⚠ WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to install a G&T device into switchgear on a raised pad, or into an upper circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

4. Align the G&T device rollers with the positioning rails (see Figure 42) mounted on the side walls of the circuit breaker compartment.

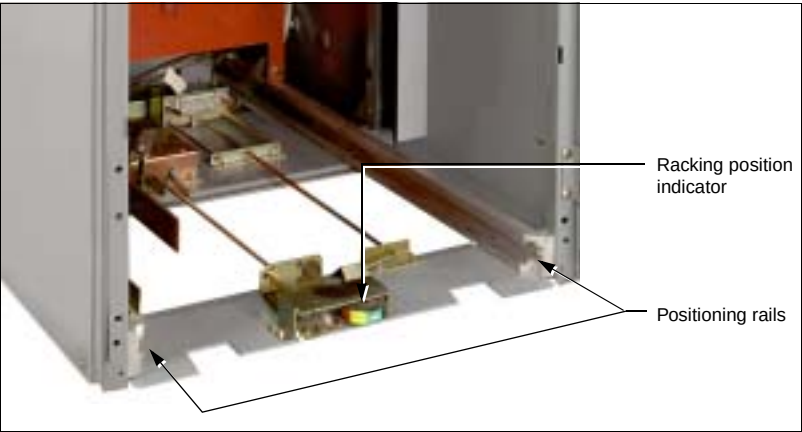


Figure 42: MASTERCLAD Switchgear Circuit Breaker Compartment

NOTE: If inserting the G&T device into switchgear mounted on a raised pad, or into an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using a MASTERCLAD lift truck, refer to Square D Bulletin No. 6055-30.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in equipment damage.

5. Push the G&T device into the circuit breaker compartment until the front of the device aligns with the test position arrows (see Figure 43) located on the bottom of the circuit breaker compartment. When the device is in the TEST/DISCONNECT position, the release handle should engage.



Figure 43: Test and Connected Position Arrows

NOTE: If the G&T device does not easily roll into the circuit breaker compartment, remove the device. If necessary, pull the release handle to release the device from the TEST/DISCONNECT position. Repeat steps 4 and 5. If satisfactory results are not achieved, contact your Square D field sales office.

Racking the G&T Device into the CONNECTED Position

Follow steps 1–5 to rack the G&T device into the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft (see Figure 44).



Figure 44: Racking Handle Engaged onto Racking Shaft with Circuit Breaker in the TEST/DISCONNECT Position

TRANSPORT

CONNECTED

Preparing the G&T Device for Testing or Phasing Operations

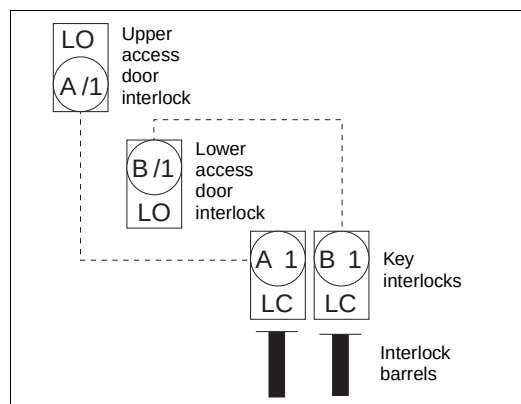


Figure 45: Interlock Status for Accessing Both Bus and Load (Cable) Side (Step 1)

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device into the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

3. Rotate the racking handle clockwise.
4. When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".

NOTE: If the G&T device does not easily rack into the circuit breaker compartment, remove the G&T device and repeat steps 1-4. If satisfactory results are not achieved, contact your Square D field sales office.

5. Continue rotating the racking handle clockwise until the racking position indicator reads "CONNECTED".

NOTE: When the racking position indicator reads "CONNECTED", the G&T device is fully racked into the circuit breaker compartment and the G&T's primary contacts are connected.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

Use appropriate personal protection equipment when exposed to energized conductors.

Failure to follow this instructions will result in death or serious injury.

1. Open access door(s) required for testing or phasing operation.

NOTE: If access to both doors are necessary, open both access doors. Both circuit breaker compartment key interlocks need to be locked closed (LC), which will extend both interlock barrels. This will lock the G&T device into connected position, as well as release both keys needed to access the bus and load (cable) side (see Figure 45). If in an upper circuit breaker compartment, access to the bus side is normally through the lower access door. If in a lower circuit breaker compartment, access to the bus side is normally through the upper access door.

DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- When applying external test voltage to the circuit, the circuit must be de-energized.
 - When performing tests on this equipment, assume all circuits are live until they are completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
 - Use a properly rated voltage sensing device to determine if the circuit is energized.
- If testing an energized circuit, the test instrumentation must be rated for full system voltage.

Failure to follow these instructions will result in death or serious injury.

2. After either access door is opened, check each ground bail with a properly rated voltage sensing device to determine if the circuit is energized.

NOTE: If testing on an energized circuit, the test instrumentation must be rated for the full system voltage. If the ground and test device will be used to apply an external test voltage to the circuit, the circuit must first be de-energized.

The G&T is now ready for testing or phasing operations.

Preparing the G&T Device to be Racked Out of the CONNECTED Position After Testing and Phasing Operations

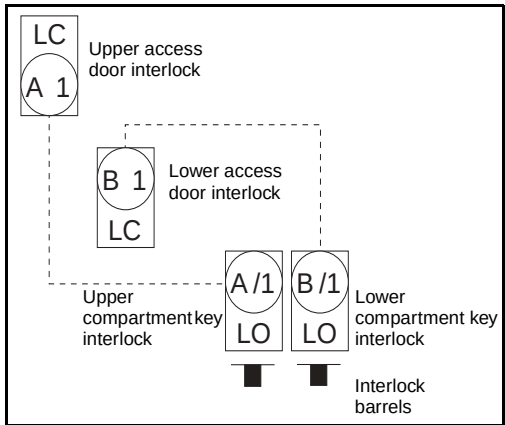


Figure 46: Interlock Status (Step 3)

Racking the G&T Device out of the CONNECTED Position

Complete steps 1–3 to prepare the G&T device for racking out of the CONNECTED position after testing or phasing operations.

1. Close access door(s).
2. Lock closed (LC) the access door interlock(s) with the interlock key(s), and remove key(s).

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Both interlock barrels must be retracted to remove the device from a circuit breaker compartment. Attempting to remove the device with interlock barrels extended could damage interlock barrels and disable an important interlock feature.

Failure to follow this instruction can result in damaging interlock barrels and racking mechanism.

3. Insert the interlock key(s) into the compartment key interlock(s) and lock open (LO) the interlock(s) to retract the interlock barrel(s) for racking (see Figure 46). Both interlock barrels should be retracted before attempting to remove the G&T device from the circuit breaker compartment.

The G&T device can be racked out of the CONNECTED position using a racking mechanism located on the floor of the circuit breaker compartment. Follow steps 1–5 to rack the G&T device out of the CONNECTED position.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Always keep the circuit breaker compartment door closed when racking the G&T device from one position to another when switchgear is energized.

Failure to follow this instruction can result in death or serious injury.

1. Close the circuit breaker compartment door.
2. Insert the Square D racking handle into the racking port and engage handle onto racking shaft.

⚠ WARNING

HAZARD OF BODILY INJURY OR EQUIPMENT DAMAGE

Never force the G&T device out of the circuit breaker compartment. If a mechanism is not operating easily, inspect the equipment and the interlock status.

Failure to follow this instruction can result in death or serious injury.

3. Rotate the racking handle counterclockwise.
4. *When the G&T device is being transported to or from the CONNECTED position, the racking position indicator will read "TRANSPORT".*

NOTE: If the G&T device does not easily rack out of the circuit breaker compartment, check the interlock status. If satisfactory results are not achieved, contact your Square D field sales office.

CONNECTED

TRANSPORT

TEST
DISCONNECT

Removing the G&T Device from the Circuit Breaker Compartment

TEST
DISCONNECT

5. Continue rotating the racking handle counterclockwise until the racking position indicator reads "TEST/DISCONNECT".

NOTE: When the racking position indicator reads "TEST/DISCONNECT", the G&T's primary contacts are disconnected.

Follow steps 1–6 to remove the G&T device from the circuit breaker compartment.

1. Open the circuit breaker compartment door.
2. Pull the G&T device's release handle to release the device from the TEST/DISCONNECT position.

⚠ WARNING

HAZARD OF PERSONAL INJURY

Use only a MASTERCLAD lift truck manufactured by Square D to remove a G&T device from switchgear on a raised pad, or out of an upper circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

3. Pull the G&T device out of the circuit breaker compartment.

NOTE: If removing the G&T device from switchgear on a raised pad, or from an upper circuit breaker compartment, a Square D MASTERCLAD lift truck must be used. For instructions on using lift truck, refer to Square D Bulletin No. 6055-30.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

Removing an interlock plate will allow access to the bus side. If removed, an interlock plate should be immediately reattached. Failure to reattach interlock plate will disable an important interlock feature.

Failure to follow this instruction will result in death or serious injury.

4. Reattach interlock plate to the interlock pan in its normal position for grounding the load (cable) side of the equipment (see Figure 5 on page 16).
5. Close the circuit breaker compartment door.
6. If storing equipment, store accessories or spare parts with the device. Close all doors and cover the equipment to protect it from dust and debris.

SECTION 7—MAINTENANCE

⚠ WARNING

HAZARD OF PERSONAL INJURY OR EQUIPMENT DAMAGE

Before performing any maintenance or repair work always remove the ground and test device completely from the circuit breaker compartment.

Failure to follow this instruction can result in death or serious injury.

Proper maintenance of the ground and test device is necessary for satisfactory operation. Perform the following checks each time before the device is used:

1. Visually inspect the entire ground and test device for loose parts or connections.
2. Lightly coat the contact surfaces and primary contact fingers with grease (Mobil® 28 red grease or approved equivalent).
3. Use a clean dry cloth to ensure that the insulation is free from dust and contaminants.
4. Inspect insulated parts if the device has been stored for a prolonged period or exposed to high humidity. Ensure that the insulation is intact. A standard 60 cycle high potential test at 45 kV RMS (see Table 3 on page 42) will indicate whether the device is satisfactory for service. Apply the voltage to each phase individually for one minute with the other two phases and the frame grounded to earth.
5. Verify that the ground and test device sustains the specified voltage without flashover for one minute. If it does not, inspect the insulators for leakage paths. If necessary, clean the surface of each insulator and repeat steps 1–3.
6. Discharge the primary terminals to ground after each test.

[illegible]

Type VR Manual Ground and Test Device, 27 kV; 1200 and 2000; Up to 40 kA Short-Circuit Current Rating

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