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MANUAL GROUND & TEST DEVICES (38kV UVGT)

Susol Series

User's Manual

Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for quick reference.

LS ELECTRIC

Contents

1. Important Safety Notes & Warnings

1.1 Safe Practices

It is mandatory that the instructions provided within this booklet be consulted to ensure safe interaction between the device and personnel and/or the facility and its equipment. The user has the responsibility of establishing a safety program that addresses the proper interaction with the equipment. This booklet is not intended to replace a safety program.

Only qualified persons, as defined in the National Electric Safety Code, who are familiar with the installation and maintenance of medium voltage circuits and equipment should be permitted to work with these Ground & Test Devices.

1.2 Safety Notations

Safety notations alert personnel to possible death, injury or property damage situations. The safety notations appear before the step in which the condition applies. The one safety notice and three hazard levels notations are:

⚠ DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury

1. Important Safety Notes & Warnings

⚠ NOTICE

Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

⚠ CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Personnel installing, operating, or maintaining this equipment must have thorough knowledge of all applicable local, regional, industry, government, and OSHA safety procedures as well as commonly accepted safe working practices. Personnel working in or around this equipment must also exhibit common sense and good judgment regarding the potential hazards for themselves and other personnel in the area. ***These instructions are intended for use by fully qualified personnel and are not a substitute for adequate training, experience and supervision.***

Should clarification or additional information be required, refer the matter to your nearest LS-ELECTRIC Sales office. When communicating with LS-ELECTRIC regarding the product covered by this UVGT Manual, always reference the LS-ELECTRIC assigned order number.

2. Introduction & Safe Practices

2.1 Scope

The purpose of this manual is to provide instructions for unpacking, storage, installation, operation and maintenance for the Manual Ground & Test Devices(hereafter G&T Devices). This manual should be carefully read and used as a guide during installation, commissioning, operation, and maintenance.

The specific ratings of each G&T Devices are listed on the individual nameplates. G&T Devices are safety devices. As such, proper operation is required to satisfy the device's intended purpose. Specific safe operating procedures for the use of the device must be developed by the user to satisfy individual requirements. Additionally, G&T Devices are maximum rated devices. Therefore, they should not under any circumstances be applied outside of their nameplate ratings.

This booklet provides information for the G&T Devices with ratings shown in Table 1. All information in this booklet was current at the time of printing

Property	Rating
Voltage Class (kV)	38
Phase Distance (inch)	11.81
Continuous Current (A)	1200 / 2000 / 3000
Short-time withstand current(kA, rms)	31.5 / 40
Momentary Current (kA, Peak)	81.9 / 104
Power frequency withstand voltage(kV)	80
Lightning impulse withstand voltage(kV)	170

Table 1: Ratings Table

⚠CAUTION

Damage from improper handling of the G&T device may reduce the dielectric strength of the device.

2.2 Receiving, Handling, and Storage

G&T Devices are subject to complete factory production tests and inspection prior to packaging and shipment. The shipping package is designed to provide reasonable protection during shipment and to provide convenient handling.

2.2.1 Receiving

Immediately upon receipt of a G&T Devices, examine the cartons to determine if any damage or loss was sustained during transit. If damage or indication of rough handling is evident, file a damage claim at once with the carrier and promptly notify the nearest district office. LS-ELECTRIC is not responsible for damage of goods after delivery to the carrier. Use care in unpacking to avoid damaging any G&T Devices parts.

Unpack the G&T Devices as soon as possible after receipt. If unpacking is delayed, difficulty may be experienced in making a claim for damages not evident upon receipt. Check the contents of each carton against the packing list before discarding any packing material. If any discrepancy is discovered, promptly notify your LS-ELECTRIC sales representative. Information specifying the purchase order number, carton number and part numbers of damaged or missing parts should accompany the claim.

2.2.2 Handling

G&T Devices shipping containers are designed to be handled by a fork lift. Lifting equipment may be used to uncrate the device. Lifting provisions are provided, or holes compatible with lifting devices for VCB are available, allowing for assembly and use. Once removed from the shipping container, the G&T Devices may be transported using the lift truck. This is the preferred transport method. Please refer to the illustration in Section '3.1.3 Representative Drawings and Configurations' for the lifting bracket or bracket attachment holes of the G&T Device. For further details, refer to the document: LS-ELECTRIC Susol UL VCB Safety instructions (7956 3173 011).

2.2.3 Storage

Store all equipment indoors in a well-ventilated area. For G&T Devices shipped in crates, store G&T Devices upright in their original shipping carton oriented as indicated on the shipping crates. If the G&T Devices are not placed in service for some time, it is advisable to provide adequate means of environmental protection. This may be done by keeping the G&T Devices in its original shipping container and storing in a warm, dry and uncontaminated atmosphere.

The G&T Devices should be stored to minimize condensation. Moisture can cause deterioration of metal parts and high voltage insulation. Cover with heavy wrapping paper or other moisture barrier. Use materials that will not trap moisture inside the unit. Do not cover louvered openings. The storage building should have a well-drained paved floor. The temperature should be above 60°F. The air should be dry (approximately 50% maximum humidity).

Pre-usage inspection and maintenance, if necessary, is recommended due to the intermittent nature of the usage of the device. See Section 4 “Maintenance” of this document for more information.

3. Usage and Operation for Manual G&T DEVICE

3.1 G&T Devices Overview

3.1.1 Introduction

Type Solution Power switchgear assemblies are designed with all the bus work completely insulated for safety. Since the current carrying parts are not readily accessible, the Type UVGT Simple Manual G&T Device is designed for insertion into the breaker compartment to gain access to the primary stationary contacts. It provides a convenient means to:

1. Ground a circuit for maintenance work; (with the ground busbar assembled)
2. Apply potential for cable testing; (with the ground busbar disassembled)
3. Access both bus and line circuits for 'phasing out' tests; (with the ground busbar disassembled)

The G&T Device(UVGT) comes with the ground busbar disassembled initially.

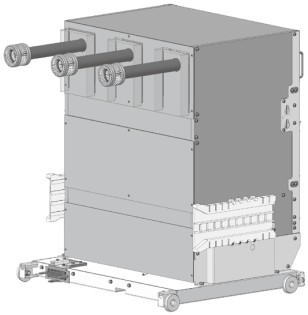
3.1.2 Terminal Type

The device is a drawout element that can be inserted into a circuit breaker compartment in the same way as a Susol UL-type circuit breaker. It includes three or six terminals, along with ground bus connections. Each terminal is isolated from one another and from the bus connection by insulating barriers. The upper and lower terminals are accessible by removing the respective front panel or opening the respective front door. The ground connection is located in the lower section of the device. ***It is most important that the bus or line terminals be correctly identified before using this device.***

The next page presents three types of terminal models. These consist of models with upper terminals, lower terminals, and models with both upper and lower terminals attached.

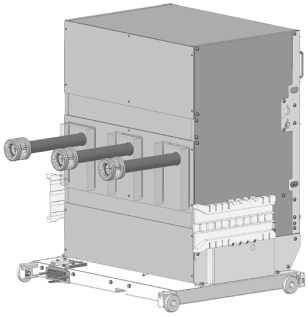
3. Usage and Operation for Manual G&T DEVICE

※ Classification of types based on terminals positioning



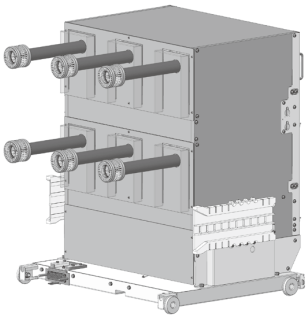
Upper terminals type

The Upper Terminals Type G&T Device is shipped with terminals attached only to the upper part of the device.



Lower terminals type

The Lower Terminals Type G&T Device is shipped with terminals attached only to the lower part of the device.



Upper&Lower terminals type

The Upper&Lower Terminals Type G&T Device is a type where terminals are attached to both the upper and lower parts of the device for shipment.

3.1.3 Representative Drawings and Configurations by Ratings

⚠ DANGER

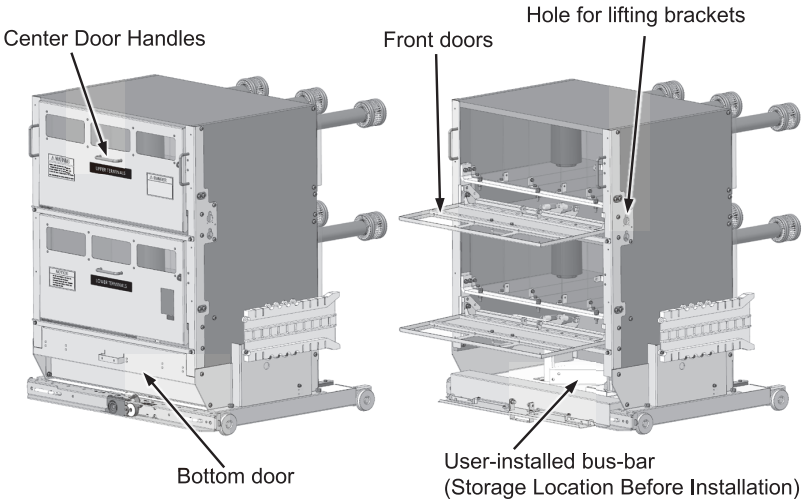
Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

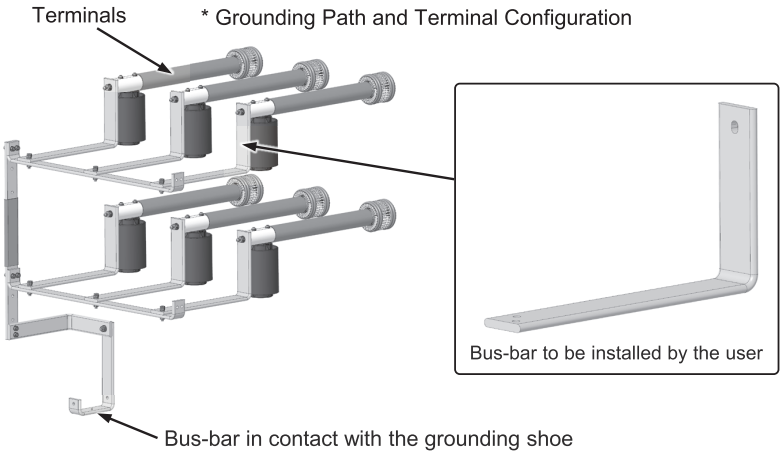
All G&T Devices are shipped with the grounding busbar assembly not installed to prevent accidental grounding of the device in an energized state. If such a situation occurs, it could lead to death or serious injury. For these reasons, it is recommended to disassemble the grounding busbar and store it in its initial state when storing the G&T after use for grounding purposes.

The grounding busbar set (including fastening bolts, nuts, etc.) for grounding is either enclosed with the device or stored in the storage compartment at the bottom of the device. The upcoming representative drawings by ratings will depict the upper and lower (six-terminal) type. Note that for Upper or Lower types, the grounding busbar set is provided only in the quantity needed for each type. Therefore, please note that it may differ from the illustration.

3. Usage and Operation for Manual G&T DEVICE

3.1.3.1 G&T device for 38kV

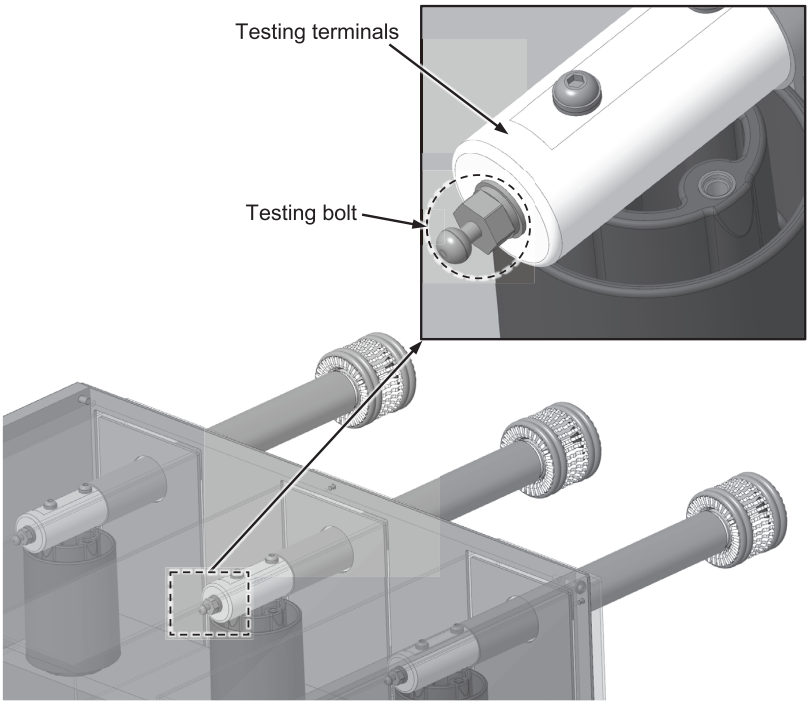




3. Usage and Operation for Manual G&T DEVICE

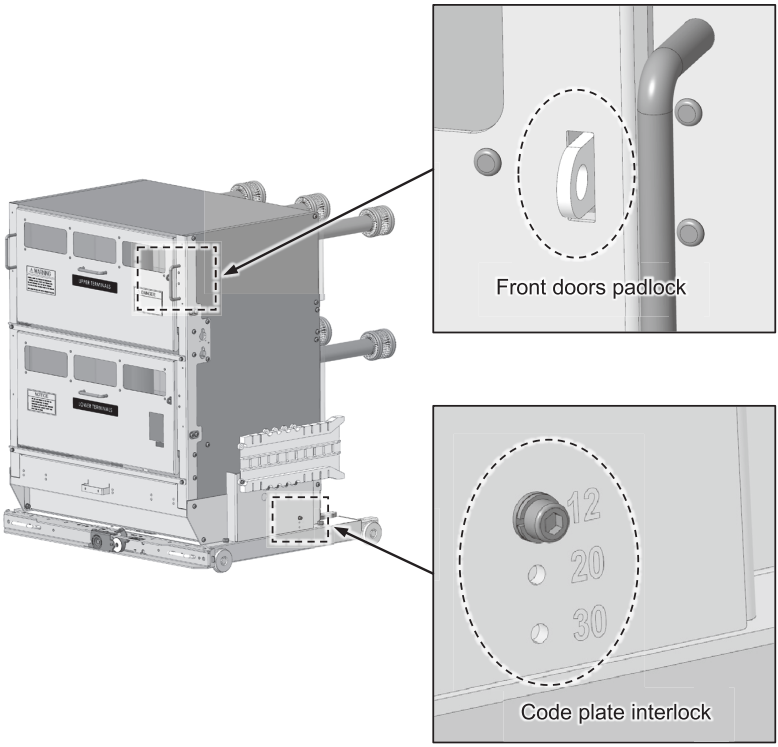
The following illustration depicts a typical configuration of the 38kV model. Please refer to the assembly configuration of the terminals and busbars. The 38kV model is equipped with front doors for each compartment to prevent access. Additionally, there is a storage compartment at the bottom where the Grounding busbar set can be stored. You can find it by opening the bottom door. All doors can be opened by pulling the center door handles, and the front door includes a lockable padlock bracket for safety.

Finally, the 38kV model comes with testing bolts attached for testing convenience. Please refer to the illustration below.



3.2 Interlock

The G&T Device is equipped with a code plate at the bottom right of the device to prevent the mixing of devices that do not match the rated grade. When inserting the G&T Device, ensure that the plate does not catch. If the code plate catches, do not force it in. Additionally, please refer to the configuration of the front door padlock bracket.



3. Usage and Operation for Manual G&T DEVICE

⚠ WARNING

This equipment may contain voltages at a level which may cause death or serious injury. This equipment should only be operated by qualified personnel. Follow usage instructions and safety precautions. Only use this equipment for its nameplate rating.

3.3 Grounding

3.3.1 Installation for G&T devices in the switchgear breaker compartment

Make sure to understand the DANGER, WARNING, and NOTICE messages on the front of the top (or bottom) covers or front doors.

⚠ DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

Because the connection of the conductors in the switchgear can vary, it is very important that the user verify exactly which portion of the circuit is connected to the upper terminals in the circuit breaker cell, and which portion of the circuit is connected to the lower terminals in the circuit breaker cell***. It is mandatory that the user of the test device review all switchgear drawings, both electrical and physical, to make sure which terminals are connected to the circuit which is to be tested or grounded.***

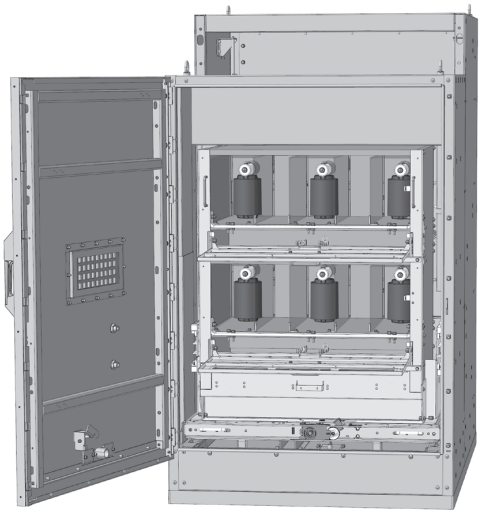
Insert the G&T device rated accordingly into the switchgear breaker compartment after removing the VCB. For further details, refer to the document: LS-ELECTRIC Susol UL VCB Safety instructions (7956 3173 011).

3. Usage and Operation for Manual G&T DEVICE

Insert the test device into the switchgear breaker compartment, rack the G&T device to the disconnected position, using the same procedures as for the circuit breaker.

Next, open the cover or front door of the G&T Device in the area where Circuit Testing will be performed.

(The illustration below depicts only the six terminals type. When you use it in practice, please open only the necessary covers doors.)

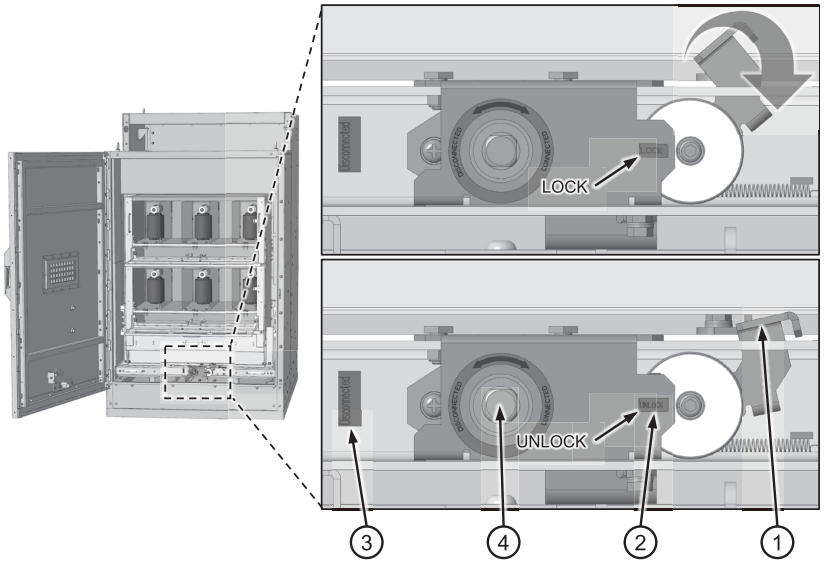


The 38kV G&T device combined with Cradle.

To conduct Circuit Testing, the rack-in operation of the G&T Device and switchgear must be carried out with the doors open, so move the G&T device to the Connected position according to the following method.

For further details, please refer to the Racking In/Out Operation section of the document: LS-ELECTRIC Susol UL VCB Safety instructions (7956 3173 011).

3. Usage and Operation for Manual G&T DEVICE



① Unlocking lever ② locking indicator ③ Position indicator ④ Racking-in/out screw

※ Racking In Operation (Disconnected → Test → Connected) with Door Open

Insert the racking-in/out handle into the racking-in/out screw.

Before racking-in/out, press the unlocking lever to unlock.

- Turning clockwise will put the breaker into connected position
- Turning counterclockwise will put the breaker into disconnected position. (Refer to the illustration above.)

For further details, please refer to the Racking In/Out Operation section of the document: LS-ELECTRIC Susol UL VCB Safety instructions (7956 3173 011).

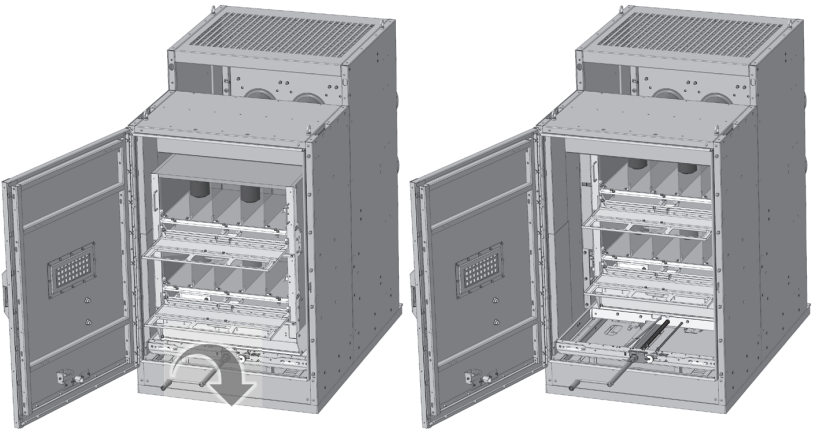
3.3.2 Circuit Testing

The following steps should be performed only after appropriate safety measures have been taken, including suitable protective clothing, eye protection, dielectric gloves, etc. The terminals should be considered energized until tests confirm that they are not. Test probes for suitable test instruments or voltage indicators may be used to contact the G&T Device terminals, using an appropriate hot stick type (refer to ASTM F711~83 and F855-83) device. The hot stick, test leads, test instrument or voltage indicators must all have voltage ratings compatible with the system voltage involved.

When using any device to indicate the presence of voltage, first test the test instrument or voltage indicator to ensure it works. Then, test the circuit for the presence of voltage. Finally, retest the test instrument or voltage indicator to ensure it still works. If the test instrument or voltage indicator does not function properly both before and after use on the circuit, assume it is giving unreliable results. Obtain reliable test equipment before continuing. When the circuit has been verified to be de-energized, perform the test again to reconfirm the status, and also verify the correct functioning of the test instrument or voltage indicator. ***After familiarizing yourself with the instructions above, proceed with the following sequence to confirm the presence of voltage.***

3. Usage and Operation for Manual G&T DEVICE

Rack the device to the “Connected” position with the racking tool. The device must be completely in the “Connected” position. Reference the instructions for the relevant switchgear found below: UVGT installation, Operations and Maintenance Manual, Document: LS-ELECTRIC Susol UL VCB Safety instructions(7956 3173 011). (Refer to the illustration below.)



The Handle(or MCRS) is used to move the device
between Disconnected, Test, Connected positions

After moving the G&T device to the connected position, test the contacted terminal ends to ensure there is no voltage on the terminal set intended for grounding.

If it is desired to perform high potential testing, use appropriate test equipment and follow all instruction and safety precautions provided by the manufacturer of the test equipment. The appropriate test leads may be connected to the test terminals, and the external test voltage applied. Once the high potential testing has been completed, ground the test apparatus to remove static charge, and then remove the test leads.

If additional testing is not conducted, move the G&T Device from the connected position to the disconnected position.

Then, remove the testing equipment, or if grounding is desired, refer to the next section on "Installation for Ground Busbar" to install the ground busbar.

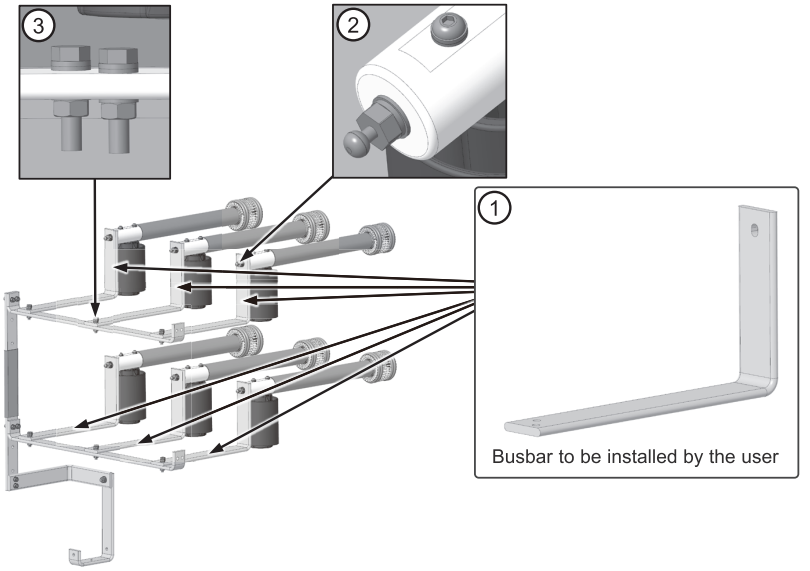
3.3.3 Installation for Ground Busbar

If it has been confirmed that there is no voltage at the previous terminals and the G&T Device has been moved to the disconnected position, the grounding preparation is complete. The device can be assembled for grounding purposes using the Ground Busbar set stored in the lower compartment. The following section outlines how to assemble the Ground Busbar set. Note that only the upper and lower terminals types are listed as representative, so be aware that components may differ between the upper and lower terminals types. However, the assembly method remains the same. It is important to ensure a sturdy grounding path from the terminal to the ground shoe. Refer to the torque values table on page 24 for the bolt tightening torque.

3. Usage and Operation for Manual G&T DEVICE

3.3.3.1 G&T device for 38kV

Enclosed grounding busbar set accessories



① Busbar to be installed by the user (6 EA) --- Stored in the compartment
② M10 Testing Hex Bolt, Spring and Plain Washer (6 Sets) --- Pre-assembled
③ M8 L35 Hex Bolt(SEMS), Plain Washer and Nut (12 Sets) --- Pre-assembled

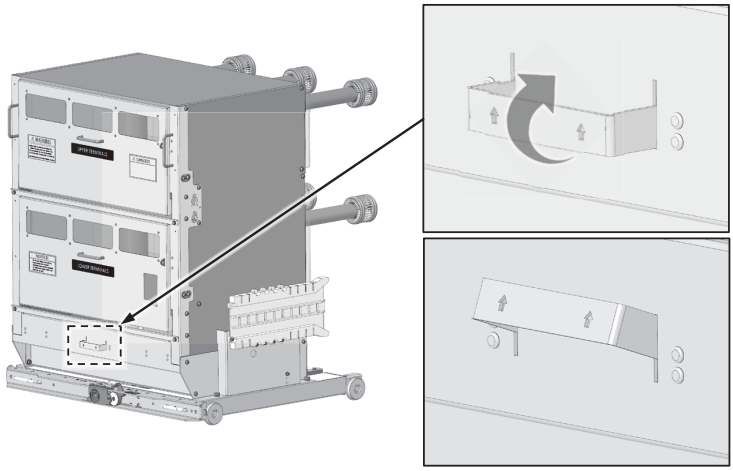
First, verify the enclosed grounding busbar set. The quantity enclosed is listed above for the six-terminal type. However, for the three-terminal type, Item① consists of 3 units, Item② consists of 3 sets, and Item③ consists of 12 sets.

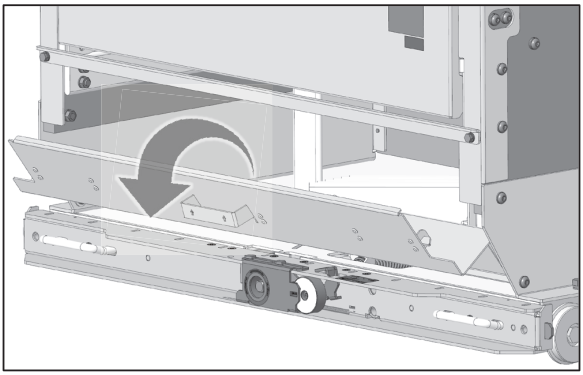
Please note that Item①, required for the installation of the grounding busbar, is stored in the lower compartment of the G&T device, while Items② and ③ are pre-assembled on their respective assembly locations.

3.3.3.3 G&T device for 38kV (continued)

The grounding busbar set for the 38kV G&T device is stored in the lower compartment.

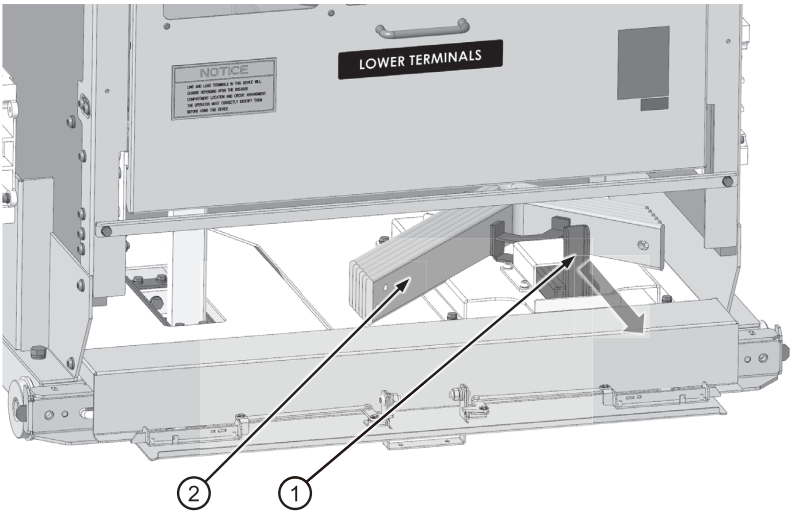
1) First, lift the center handle of the lower compartment door upwards in the direction of the arrow. Then, while holding the handle, carefully pull it downwards to open.





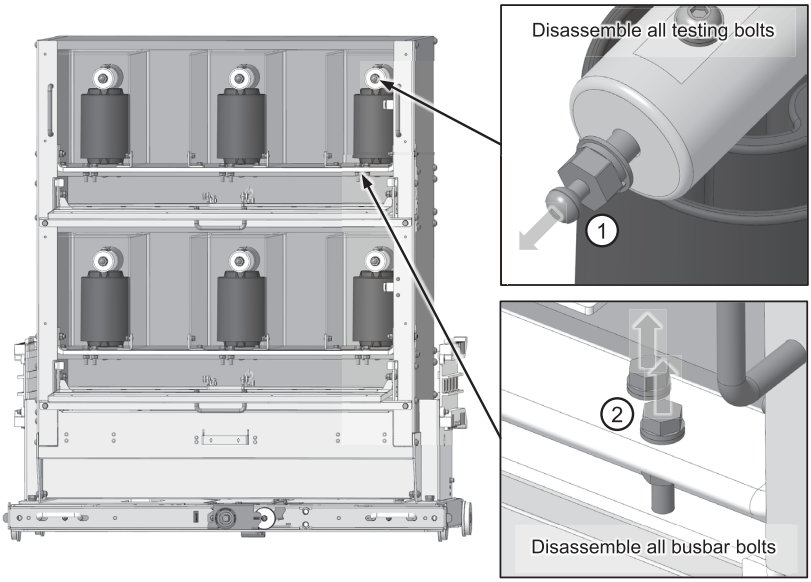
3.3.3.3 G&T device for 38kV (continued)

2) Refer to the illustration below to take the grounding busbar out of the compartment. First, use your right hand to pull the busbar securing handle labeled as ①. Then, with your left hand, carefully take out each grounding busbar labeled as ② from the compartment one by one. Once all busbars are out of the compartment, carefully release the securing handle and close the lower compartment door.



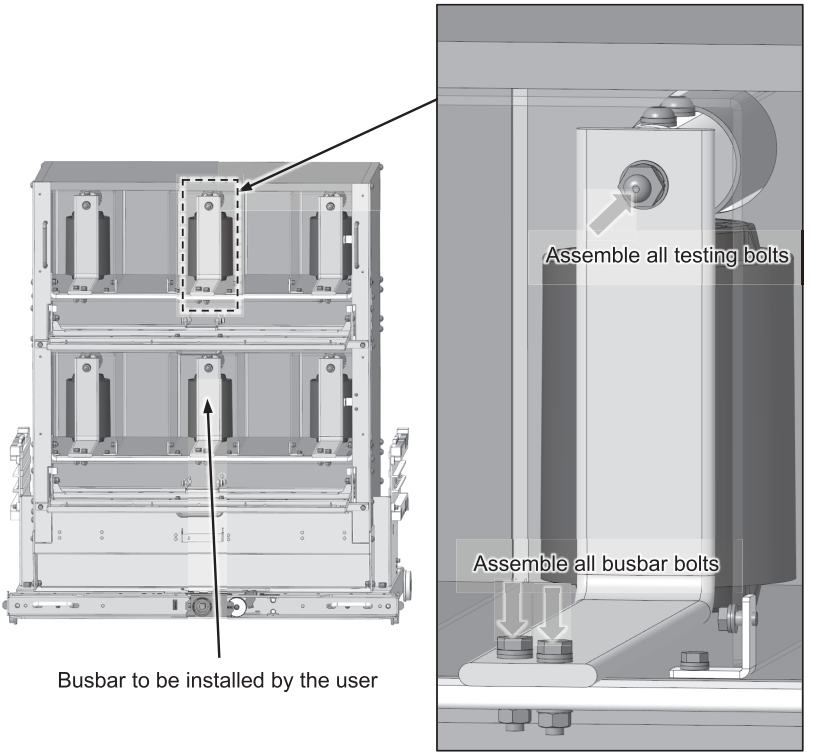
3.3.3.3 G&T device for 38kV (continued)

3) Open the front door of the compartment where grounding will be performed, and loosen all the M10-testing bolts(①) attached to the terminal. Also, disassemble all the M8-bolts(②) of the grounding busbar as shown in the illustration below. When disassembling, be sure to remember the order of the bolts, nuts, spring washers, and plain washers. Ensure that the bolts, nuts, spring washers, and plain washers are stored carefully, as they will all be used for reassembly, to avoid any loss.



3.3.3.3 G&T device for 38kV (continued)

4) Following the illustration below, position the user-installed busbar and reassemble the previously disassembled M10-testing bolts, M8-busbar bolts, spring washers, plain washers, and nuts. At this point, loosely assemble all the bolts first, then tighten them to the specified torque as outlined on page 24.

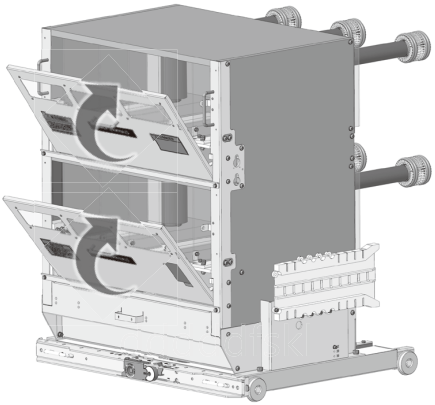


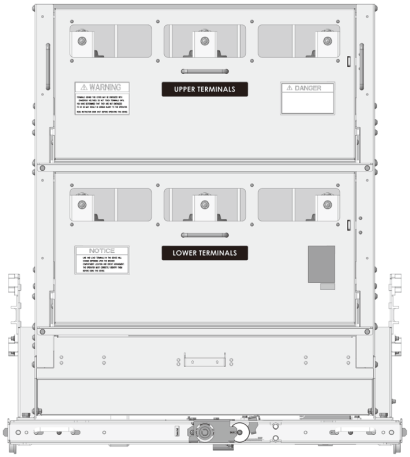
⚠ WARNING

Finally, ensure that all bolts are tightened to the specified torque

3.3.3.3 G&T device for 38kV (continued)

6) Once the installation of the grounding busbar is complete, close all doors of the G&T device. The system is now ready for grounding.



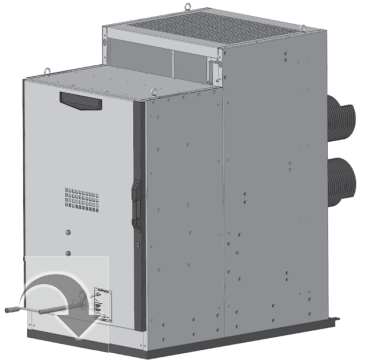


Torque / Size of Bolt	Steel		Brass	
	(kgf·cm)	(lbf·ft)	(kgf·cm)	(lbf·ft)
M3	7.3 (6.2~8.4)	0.53 (0.45~0.61)	4.3 (3.7~4.9)	0.31 (0.27~0.35)
M3.5	11.2 (9.5~12.9)	0.81 (0.69~0.93)	6.6 (5.6~7.6)	0.48 (0.41~0.55)
M4	16.8 (14.2~19.3)	1.22 (1.03~1.40)	9.8 (8.4~11.3)	0.71 (0.61~0.82)
M5	33.0 (28.0~37.0)	2.39 (2.03~2.68)	19.1 (16.2~22.0)	1.38 (1.17~1.60)
M6	56.0 (48.0~65.0)	4.05 (3.47~4.70)	33.0 (28.0~38.0)	2.38 (2.03~2.75)
M8	135 (115~156)	9.76 (8.32~11.30)	89.0 (68.0~91.0)	6.44 (4.92~6.58)
M10	270 (230~310)	19.53 (16.64~22.42)	159 (135~182)	11.5 (9.76~13.16)
M12	470 (410~540)	34.0 (29.66~39.06)	270 (230~310)	19.53 (16.64~22.42)

Table 2: Torque value

3.3.4 Connecting G&T Devices for Grounding

1) With the busbars attached, close and secure the circuit breaker compartment door and rack the device into the “ Connected ” position. The handle(or MCRS) is used to move the device between the Disconnected, Test, Connected positions. At this time, please ensure that all front covers or front doors of the G&T Device are closed.



2) With the ground busbars installed and the device racked into the 'Connected' position, the terminal set is automatically connected to the ground bus in the circuit breaker compartment.

3.2 Removing Ground and Withdrawing the Device

1) Rack the device to the Disconnected position.
2) Open the circuit breaker compartment door, disconnect and remove the ground busbar. Disassembly is the reverse of assembly.

3.3 Testing(Reliability Test of G&T Device)

Prior to each use, the following tests should be completed to assure the G&T DEVICE is in good condition.

3.3.1 Power frequency withstand voltage test

1) Remove the grounding busbar set from all terminals.
2) For each terminal complete the following test sequence:
   a. Connect the high potential lead to one pole .
   b. Ground the remaining poles and GROUND & TEST DEVICE frame.
   c. Start machine with output potential at 0 (zero) Vac.
   d. Confirm the rated voltage on the nameplate of each G&T Device, and then increase the Vac RMS up to 75% of the Power frequency withstand voltage.
   (ex : For a rated voltage of 38 kV, increase the potential to 60 kVac RMS.)
   e. Hold for one minute.
   f. Decrease potential to 0 (zero) Vac and turn off machine.
3) Repeat this testing for the remaining terminals.

A successful withstand indicates satisfactory insulation strength of the primary circuit.

3.3.2 Current Path Resistance

1) Connect the grounding busbars for the terminal set to be used (upper or lower)
2) Connect one lead from the test set to the ground bar(or last vertical busbar) on the bottom of the G&T Device.
3) Connect the other lead from the test set to the primary contact of the G&T Device terminal to be tested.
4) Measure the end-to-end grounding path resistance through the primary disconnect, grounding common busbar and vertical busbars and ground shoes(or last vertical busbars using a digital low resistance ohmmeter (DLRO).

The measured resistance should not exceed 150 micro-ohms.

4. Maintenance

After removal from storage the following pre-usage inspection and maintenance should be performed. The contacts should be inspected for wear of the silver or tin plating, and should be lubricated with 'SHC32' grease. The contact surfaces where the cables are mounted and the barrier module should be free from grease or debris. The recommended grease for the wheels and truck is PLG-322 grease. Excess or old grease should be wiped off the wheels and truck of the device if present.

⚠ WARNING

Maintenance should only be performed by qualified and knowledgeable personnel

Recommended Renewal and Maintenance Parts: contact your LS-ELECTRIC sales office.

End of life of product, Methods of disposal

End of life of Product

LS-ELECTRIC products are manufactured to meet or exceed the standards of compliance for quality and environmental management systems in accordance with ISO 9001 and ISO 14001. All of these items can be supplied with a certificate of quality. LS-ELECTRIC is committed to complying with all legal and other relevant requirements for environmental protection in accordance with the ISO 14001 standards. The responsibility of the company is to facilitate subsequent recycling or disposal at the end of the product's life. During disposal of the product, it is always necessary to act in accordance with all local and national legal requirements that are in effect at the time of disposal.

Methods of Disposal

Disposal can either be carried out in a manner of ways depending upon material of product. Below is the recommended method of disposal for various raw materials.

LS-ELECTRIC is committed to complying with the relevant legal and other requirements for environmental protection according to the ISO 14001 standard.

The duty of the company is to facilitate subsequent recycling or disposal at the end of product life. During disposal of the product, it is always necessary to act in accordance with local legal requirements in force.

RAW MATERIANL	RECOMMENDED METHOD OF DISPOSAL
Metal material (Fe, Cu, Ag, Zn, ect.)	Separation and recycling
PC	Disposal
BMC	Disposal
Rubber	Disposal
Packing material	Recycling disposal

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

There are no understandings, agreements, representations of warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, other than those specifically set out by an existing contract between the parties. Any such contract states the entire obligation of the seller. The contents of this document shall not become part of or modify any prior or existing agreement, commitment or relationship. The information, recommendations, descriptions and safety notations in this document are based on LS-ELECTRIC experience and judgment with respect to metal-clad and metal-enclosed switchgear.

This information should not be considered to be all inclusive or covering all contingencies. No warranties, expressed or implied, including warranties of fitness for a particular purpose or merchantability, or warranties of fitness for a particular purpose or merchantability, or warranties arising from course of dealing or usage of trade, are made regarding the information, recommendations, descriptions and safety notations contained herein. In no event will LS-ELECTRIC be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever including but not limited to damage to or loss of use of equipment, plant or power system, cost of capital, loss of profits or revenue, cost of replacement power, additional expenses in the use of existing power facilities, or claims against the user by its customers resulting from the use of information, recommendations, descriptions and safety notations contained herein.

Warranty

Model Name			Buying Date	
Serial No.			Warranty Period	1years
Customer Information	Name			
	Address			
	Tel.			
Sales Office (Distributor)	Name			
	Address			
	Tel.			

- Product quality is strictly controlled and inspected.
- If he defective part is identified to have been properly used under the guarantee term, it will be repaired at our expense.
- The problems occur out of warranty term will be repaired at your expense.
- When applying for repair, please present this warranty.

■ **In-Warranty Repair – Under Guarantee Term**

■ **Out-of-Warranty Repair**

The guarantee will not be applied to any of the below listed conditions even if the term of guarantee is still valid.

- Defect caused by misusage or improper maintenance of customer
- Defect caused by improper repair or modification by unauthorized distributors or service center
- Damage caused by natural phenomenon such as earthquake, fire, flooding and lightning
- Claim guarantee without presented warranty form.

LS ELECTRIC

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LS ELECTRIC

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LS ELECTRIC

Technical Question or After-sales Service
For more inquiry or service request.
Please Scan QR to visit **www.ls-electric.com/support/qna**

Specifications in this instruction manual are subject to change without notice due to continuous products development and improvement

MANUAL GROUND & TEST DEVICES (38kV UVGT)
2025.03