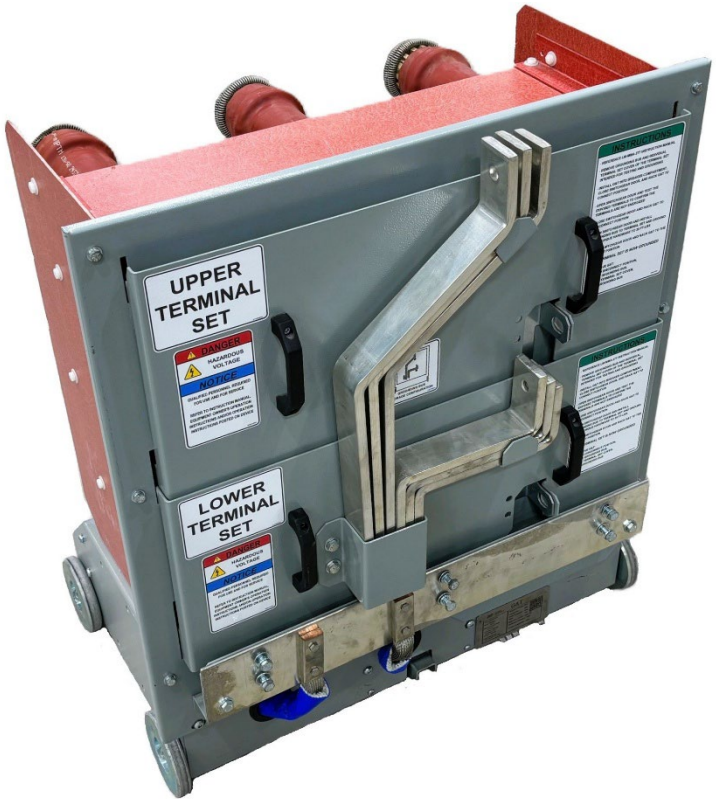


# J100CLAD™ Ground & Test (G&T)

Ground and Test Device Product Manual

Switchgear
Solutions

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# Introduction

## Scope

This manual is designed solely for informational use regarding the handling, installation, and operation of the J100CLAD GROUND AND TEST DEVICE (G&T). It's meant to be used exclusively by adequately trained individuals and should not replace proper training, experience, or supervision. It is recommended to read this guide thoroughly and keep it with the other documents supplied with the G&T.

JST Power Equipment provides solutions for different installation configurations. For this reason, some details and variations may not be in this manual. As needed, consult the latest technical documents, or contact a JST Power Equipment representative. To the extent permitted by law and not otherwise prohibited by contract, JST Power Equipment will not be responsible for any special, indirect, incidental, or consequential loss or damage of equipment, loss of power, cost of capital, or any other claims for damages or injury resulting from the use of the information in this manual.

## Definitions

**G&T** – Ground and Test Device

**Terminal Set** – An individual set of three primary terminals for connection to the corresponding three switchgear breaker terminals typically called *upper* or *lower*, or *bus* or *line* depending on design configuration.

**Grounding Bus** – Copper Bus used to complete the circuit between the terminal set and the Switchgear Ground.

**Upper and Lower G&T Doors** – Metal plates which are used to respectively cover the upper and lower terminal sets.

## Purpose

The purpose of the G&T is to provide a method of electrical access to bus or line. This can be for testing for the presence of voltage on a particular set of breaker terminals (bus connection or line connection) of a particular breaker compartment, providing a method of securely connecting the breaker terminals to the switchgear ground system grounding the corresponding bus or line, for testing of the cables, or for phasing measurement.

The reason for this connection to the ground system is for service/maintenance of the switchgear, service/maintenance of a downstream device, or switchgear testing.

## Safety

It is mandatory that the instructions provided within this manual be consulted and followed to establish 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 Electrical Safety Code, who are familiar with the installation and maintenance of medium voltage circuits and equipment should be permitted to work with Ground & Test Devices.

Qualified persons 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.

Qualified persons 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 persons and are not a substitute for adequate training, experience and supervision.

Should clarification or additional information be required, refer the matter to your nearest JST Sales office.

Safety notations alert personnel to possible death, injury or property damage situations. The safety notations appear before the step in which the condition applies.

**DANGER**

This is used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

This is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

***NOTICE***

This is used to highlight important instructions, guidelines, or other practices not related to physical injury.

# Technical Data

## Ratings

Maximum Voltage: 15kV
BIL: 95kV
Power Frequency Withstand Voltage: 36kV, 1min.
Short Circuit Current: 50kA
Short Circuit Current Duration: 2 seconds
Peak Withstand: 130kA
Racking Endurance: 500 cycles
Standards Conformance: IEEE C37.20.6-2024

## Continuous Current Variants

While there is no continuous current rating for a G&T, there are two variants of 15kV, 50kA G&Ts which vary based on the breaker and breaker compartment continuous current rating. There is a 1200A variant with 16 finger contacts per terminal (Figure 1) and a 2000A/3000A variant with 30 finger contacts per terminal (Figure 2). The 1200A variant can work in any breaker compartment rated 15kV or less, 50kA or less, and 1200A. The 2000A/3000A variant can work in any breaker compartment rated 15kV or less, 50kA or less, and 2000A or 3000A.

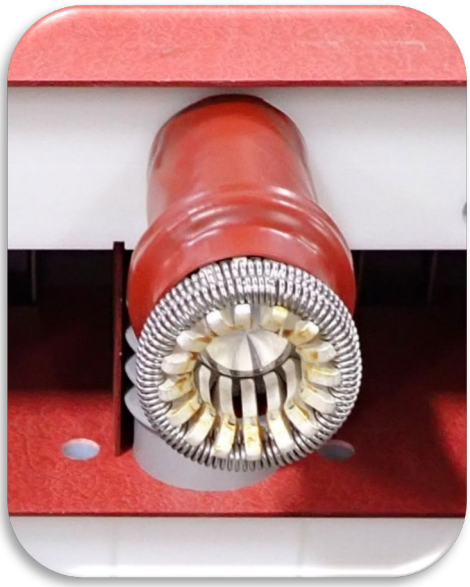

**FIGURE 1: G&T Contacts 1200A VARIANT**

**FIGURE 2: G&T Contacts 2000A/3000A VARIANT**

# Operation

## Inspection and Preparation

First inspect the G&T for damage to the insulation or the current carrying parts.
Do not use the G&T if there is damage to the insulation or the current carrying parts.
There should be (3) upper grounding bus and (3) lower grounding bus secured across the front of the G&T. The doors should be secured into the upper and lower positions.
Remove all of the grounding bus from the front of the G&T and set aside (Figure 3).

**FIGURE 3: G&T with ground bus installed in shipping/storage condition**

Remove the corresponding door of the terminal set desired to test and/or ground, leaving the door of the other terminal set installed (Figure 4). Do not remove both doors, as there is no option to ground both terminal sets at the same time.

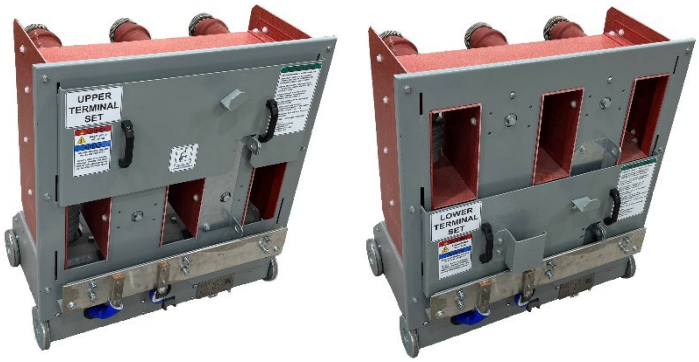


**FIGURE 4: G&T with Upper and Lower doors removed**

# Determining Location and Configuration

To determine the terminals intended for testing and grounding, reference the switchgear layout, line diagrams, and supplied switchgear drawings.
See (Figure 5) for a reference of a typical section view of switchgear. Typically, the upper terminals of the upper breaker and the lower terminals of the lower breaker are connected to the line or load, and the lower terminals of the upper breaker and the upper terminals of the lower breaker are connected to the main bus.

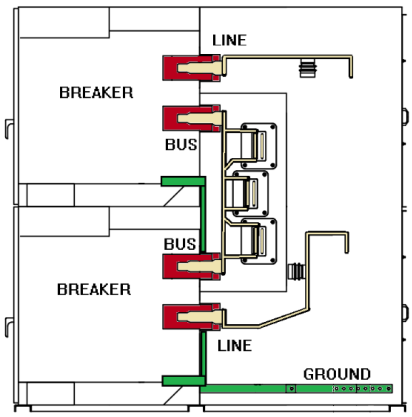


**FIGURE 5: Reference Switchgear Section View**

## Procedure

The source of voltage should be disconnected by a method which depends on the use case of the G&T, such as opening the switchgear main breaker or opening a switch at the upstream source.

Using a lift truck, insert G&T into breaker compartment (Figure 6) and push until latched to the racking mechanism in the DISCONNECT position (Figure 7). **Check that the grounding bus is <u>not</u> installed.**

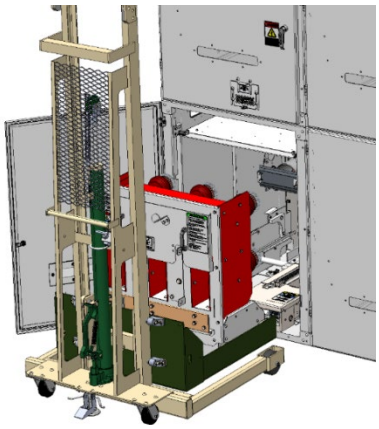

**FIGURE 6: G&T inserted into Switchgear with Lift**

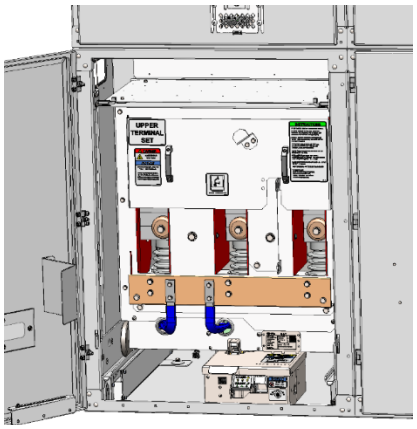

**FIGURE 7: G&T inserted into DISCONNECT position**

<u>Close the switchgear door</u> and rack the G&T to the TEST position and then rack to the CONNECT position.
<u>Open the switchgear door</u> and test the exposed terminals to determine the absence of voltage.
A commonly used method for this is a non-contact voltage presence indicator on a hot stick.
Once the absence of voltage is confirmed, <u>close the switchgear door</u>, and rack the G&T to the TEST position, and then to the DISCONNECT position.

**DANGER**

**HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH.**
HANDLING EXPOSED HIGH VOLTAGE HAS MANY SAFETY REQUIREMENTS INCLUDING PERSONAL PROTECTIVE EQUIPMENT, APPROACH DISTANCES,

***NOTICE***

LOCK OUT TAG OUT PROCEDURES SHOULD BE PUT INTO PLACE TO PREVENT CLOSING THE SUPPLY VOLTAGE SWITCH WHILE THE G&T IS INSTALLED.

## Procedure *(continued)*

After the absence of voltage is confirmed and the G&T is racked to the DISCONNECT position, retrieve the corresponding grounding bus:

- Longer for the Upper Terminals (Figure 8)
- Shorter for the Lower Terminals (Figure 9).

Use the supplied hardware to connect the grounding bus to the terminal set and the grounding system.

The hardware to connect the grounding bus to the terminals are:

- (qty 3) 1/2”-13 x 1.25” Grade 5 Hex Bolt
- (qty 3) 1/2” Spring Lock Washer
- (qty 3) 1/2” Flat Washer

The hardware to connect the grounding bus to the grounding system are:

- (qty 6) 3/8”-16 x 1.5” Grade 5 Hex Bolt
- (qty 6) 3/8” Spring Lock Washer
- (qty 6) 3/8” Flat Washer

Tighten hardware in an alternating pattern to seat the bus flat against the terminals, then torque the hardware to 30 FT-LBS.

Close the door and rack the G&T to the TEST position, and then to the CONNECT position.

**The terminal set is now grounded.**

**Keep the door closed.**

**FIGURE 8: G&T with Upper Grounding Bus**

**FIGURE 9: G&T with Lower Grounding Bus**

**WARNING**

**KEEP THE DOOR CLOSED AND REFRAIN FROM TOUCHING THE SWITCHGEAR FRAME WITH THE G&T CONNECTED.**

IF THE SUPPLY VOLTAGE IS SWITCHED BACK ON WHILE THE TERMINALS ARE GROUNDED, THE G&T IS CAPABLE OF WITHSTANDING THE SHORT CIRCUIT WITHOUT SIGNIFICANT DAMAGE ALLOWING THE UPSTREAM DEVICE TO TRIP. DURING THIS SHORT CIRCUIT, THERE MAY BE SPARKS EMITTED AND THE SWITCHGEAR FRAME, WHICH IS ALSO CONNECTED TO GROUND, MAY MOMENTARILY RAISE IN VOLTAGE TO HAZARDOUS LEVELS.

### Procedure *(continued)*

To remove the G&T, rack the G&T to the TEST Position, then to the DISCONNECT position. Remove the grounding bus and return the hardware to the terminals and grounding system. Reinstall the terminal set door and replace the grounding bus to the storage positions (Figure 10).

**FIGURE 10: G&T with Grounding Bus in Storage Position**

# Maintenance

### G&T Inspection

The following procedure is recommended before each use of the G&T device.
All insulation surfaces, including but not limited to the primary support insulation, and isolation barriers, should be clean and dry.
All primary circuits, including ground bus, should be clean and dry.
All locks and interlocks should be fully functional.
All primary and ground disconnect contacts should be clean, with the correct contacts in place and properly lubricated.

### Lubrication

Before each use of the G&T, during inspection, the primary and ground contacts should be inspected for lubrication. If contacts are dry, caked, or dirty they should be cleaned with isopropyl alcohol and lubricated with SANCHEM NO-OX-ID A-SPECIAL ELECTRICAL CONTACT GREASE.

### Testing

To verify the integrity of the electrical insulation in the G&T, a Hipot test can be performed on the G&T with the grounding bus removed. Hipot test voltage (power frequency withstand voltage) is applied to each individual terminal with all other terminals and the ground connection grounded to the hipot test set. The voltage level and length of time for the test will be according to the test plan developed by the user and the relevant standards.

**Warranty and Disclaimer.**

**Failure to follow the guidance set forth in this Product Manual will void the warranty and/or potentially create dangerous conditions for your employees, your property and third parties. If there is injury, death, property or other damages because of this failure, JST is not liable. Please follow the guidance set forth herein.**

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