



INSTRUCTIONS

IB-50022

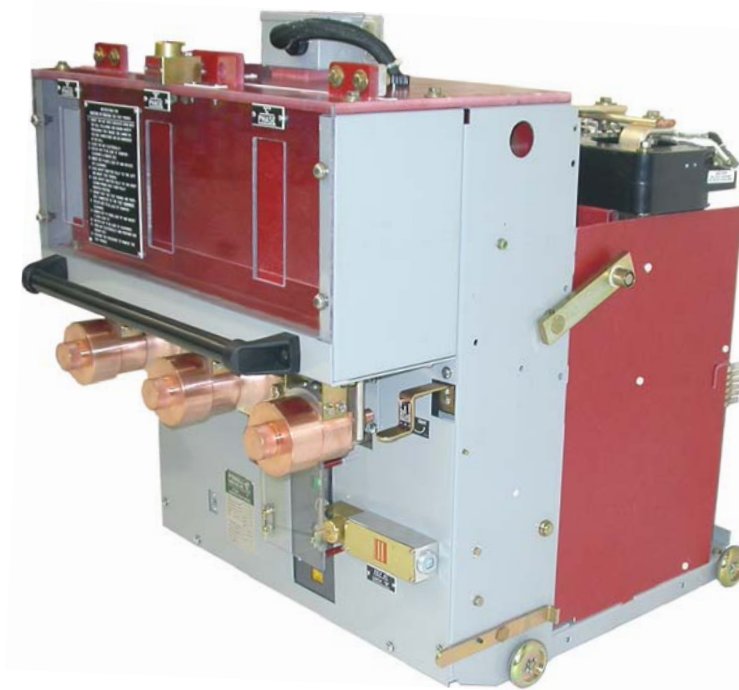
Installation

Maintenance

Renewal Parts

PowIVac® 15GT36ASDE-23 Electrically Operated Ground and Test (G&T) Device

**Instructions for the Consolidated Edison
Electrically Operated Ground and Test Device
Per Con Edison Specification EI-4102**



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**WARNING**

THE EQUIPMENT DESCRIBED IN THIS DOCUMENT MAY CONTAIN HIGH VOLTAGES AND CURRENTS WHICH CAN CAUSE SERIOUS INJURY OR DEATH.

THE EQUIPMENT IS DESIGNED FOR USE, INSTALLATION, AND MAINTENANCE BY KNOWLEDGEABLE USERS OF SUCH EQUIPMENT HAVING EXPERIENCE AND TRAINING IN THE FIELD OF HIGH VOLTAGE ELECTRICITY. THIS DOCUMENT, AND ALL OTHER DOCUMENTATION SHALL BE FULLY READ, UNDERSTOOD, AND ALL WARNINGS AND CAUTIONS SHALL BE ABIDED BY. IF THERE ARE ANY DISCREPANCIES OR QUESTIONS, THE USER SHALL CONTACT POWELL ELECTRICAL MANUFACTURING COMPANY IMMEDIATELY AT 1-800-480-7273.

**WARNING**

BEFORE ANY ADJUSTMENT, SERVICING, PARTS REPLACEMENT, OR ANY OTHER ACT IS PERFORMED REQUIRING PHYSICAL CONTACT WITH THE ELECTRICAL WORKING COMPONENTS OR WIRING OF THIS EQUIPMENT, THE POWER SUPPLY MUST BE DISCONNECTED. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN INJURY OR DEATH.

 **IMPORTANT**

THE INFORMATION IN THIS INSTRUCTION BULLETIN IS NOT INTENDED TO EXPLAIN ALL DETAILS OR VARIATIONS OF THE 15GT36ASADE-23 ELECTRICALLY OPERATED GROUND AND TEST DEVICE NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY OR HAZARD TO BE MET IN CONNECTION WITH INSTALLATION, TESTING, OPERATION, AND MAINTENANCE OF THE EQUIPMENT. FOR ADDITIONAL INFORMATION AND INSTRUCTIONS FOR PARTICULAR PROBLEMS, WHICH ARE NOT PRESENTED SUFFICIENTLY FOR THE USER'S PURPOSES, CONTACT POWELL ELECTRICAL MANUFACTURING COMPANY AT 1-800-480-7273.

I. INTRODUCTION

A. SCOPE

This instruction bulletin describes the following:

The 15GT36ASADE-23 Electrically Operated Ground and Test Device (G&T) (Con Edison and Customer Interlocked versions)

B. PURPOSE

The information in this document is intended to provide instructions for users to properly operate and maintain the electrically operated ground and test device described in Section A. Scope.

The instruction bulletin contains details of the following topics:

1. Safety
2. Equipment Description
3. Installation
4. Operation of the Ground and Test device
 - Procedure for Applying Grounds - Con Edison Feeder
 - Procedure for Inserting Probes
 - Procedure for Testing Feeder
 - Procedure for Removing Test Probes
 - Procedure for Removing Grounds
5. Maintenance
6. Recommended Renewal Parts

To the extent required, the products described herein meets applicable ANSI, IEEE, and NEMA Standards. No assurance for compliance is given for local codes and ordinances which vary greatly.

C. INSTRUCTION BULLETINS AVAILABLE ELECTRONICALLY

Many Powell Electrical Systems, Inc. Instruction Bulletins are posted on the company Web site at www.powellservice.com. For more information contact Powell Apparatus Service Division (PASD) at 1-800-480-7273, 713-944-6900, or info@powellservice.com.

II. SAFETY

The user should study this instruction bulletin and all other associated documentation before uncrating the ground and test device.

Each user has the responsibility to instruct and implement thorough maintenance and safety procedures for each type of equipment used. The user shall train all personnel, who are associated with the equipment, on usage, installation, operation maintenance and safety procedures. All safety procedures must be observed.

A. GENERAL

1. The PowIVac® 15GT36ASADE-23 Electrically Operated Ground and Test Device includes high-energy, fast-acting closing and tripping mechanisms. Improper operation or servicing techniques can be dangerous to the operator. These devices should be operated and/or serviced only by persons who are skilled in operation and/or service of high-voltage electrical apparatus and who are thoroughly familiar with these instructions and any supplementary information contained in drawings furnished with the ground and test device and/or switchgear in which it is used.

2. The PowlVac® 15GT36ASADE-23 Electrically Operated Ground and Test Device is designed for use in P-51000 PowlVac® Metal-Clad Switchgear manufactured by Powell Electrical Manufacturing Company. Do not attempt to use this device in any other class of electrical equipment manufactured by Powell or any other manufacturer. This device is designed to be inserted in a metal-clad switchgear unit in place of a vacuum circuit breaker for grounding and testing purposes.
3. Only supervised and qualified personnel who are trained in the usage, installation, operation, and maintenance of electrically operated ground and test device shall be allowed to work on this equipment. It is mandatory that this instruction bulletin, any supplements, and service advisories are studied, understood, and followed.
4. Maintenance programs must be consistent with the customer experience and the manufacturer's recommendations, including information available in service advisories and the instruction bulletin(s). A well-planned and executed routine maintenance program is essential for the electrically operated ground and test device reliability and safety.
5. Service conditions and electrical ground and test device applications shall be considered in the development of maintenance programs. Service conditions include variables such as ambient temperature, humidity, number of operations, and any adverse local conditions such as excessive dust, ash, corrosive atmosphere, vermin, and insect problems.
2. Use great care when opening the test port shutters to gain access to the test receptacles. The test receptacles should always be treated as energized circuits until proven otherwise.
3. Any test device plugged into the test receptacles must be properly rated for the circuit voltage being tested, and all connections must be properly insulated.
4. Use only the test probes furnished with the device to plug anything into the test receptacles. Use of other plugs may damage the test receptacle or may result in a poor connection which could be dangerous to the operator and/or damaging to the equipment.
5. Even through insulated, the test probes must not be inserted or extracted from energized test jacks. The test probe insulation is only one part of a complete line-to-ground insulation system, and the surface of the test probe may be energized at a voltage above ground potential when connected to an energized test jack.
6. Do not attempt to force or bypass any interlocks. The interlocks are furnished for the safety of the operator and the protection of the equipment being tested and the test device. Forcing or bypassing the interlocks can result in a condition dangerous to the operator and/or damaging to the equipment.
7. Do not attempt to service the device while it is installed in a switchgear cell or on a lift truck. For service, the device must be located either on the floor or on a sturdy, level work bench, and blocked from rolling.

B. SPECIFIC

When operating the ground and test device safety precautions must be observed. **IMPROPER USE CAN RESULT IN DEATH, SERIOUS PERSONAL INJURY, OR DAMAGE TO PROPERTY.** It is important for the user to develop specific and safe operating procedures to be observed when using the ground and test device.

The following specific safety precautions **MUST** be observed:

1. Do not close the grounding switch on an energized circuit. The circuit to be grounded should always be treated as energized until proven otherwise.
8. For service, the device must be in the **OPEN** position and all operating springs must be discharged. These conditions should be verified before removing any covers or attempting any service.
9. Store the electrically operated ground and test device in a clean, dry area free from dust, dirt, moisture, caustic atmosphere, and vermin.
10. Keep all insulating surfaces, which include primary support insulation and insulation barriers, clean and dry.

11. Check all primary circuit connections to make certain that they are clean and tight.
12. Take extreme care while using this device to avoid contacting “live” or “hot” (energized) terminals.
13. Check for dielectric integrity at 27kVAC across the terminals to ground with the grounding switch **OPEN**.

C. X-RAYS

When high voltage is applied across the contacts of a vacuum interrupter, there is the possibility of the generation of X-rays. The intensity of this radiation is dependent on the amount of the peak voltage and the distance of the contact gap. Radiation levels are negligible at the normal operating voltage for this type of equipment. At the voltages specified for testing, personnel must be located in front of the ground and test device such that the two layers of steel used in the frame and front cover construction are between personnel and the vacuum interrupters. Personnel must be located no less than one meter (4 ft.) from the front of the ground and test device. **THE ELECTRICAL GROUND AND TEST DEVICE SHALL BE EITHER FULLY OPEN OR FULLY CLOSED DURING HIGH POTENTIAL TESTING. TEST SHALL NOT BE CONDUCTED WITH THE CONTACTS PARTIALLY OPEN.**

III. EQUIPMENT DESCRIPTION

A. GENERAL DESCRIPTION

The PowlVac® 15GT36ASADE-23 Electrically Operated Ground and Test Device (G&T) is a drawout element that can be inserted into the circuit breaker compartment in the same manner as a Powl-Vac® circuit breaker. See Figures 1, 2, and 3.

The PowlVac® 15GT36ASADE-23 Electrically Operated Ground and Test Device provides a means for obtaining access to the primary disconnect devices of the switchgear cell for purposes of grounding the primary circuits or conducting certain high voltage test procedures such as conducting high voltage withstand (hipot) tests.

The grounding switch is operated by a stored energy mechanism. It is capable of applying the ground against a **LIVE** circuit if operational errors have not cleared the circuit. However, in such a case, the relaying at the source of power is expected to cause the source interrupter to clear the circuit.

NOTE: For safety reasons, the switch is prevented from opening electrically within a minimum of 20 seconds after closing.

B. KEY LOCKS

1) Key Lock “A”

The key **Lock “A”** interlock is a single-cylinder lock used to electrically enable or disable the G&T device (Figure 1, q).

Key **Lock “A”** interlock is a single-cylinder lock equipped with an electrical switch element. The switch is **CLOSED** when the key is retained. When the switch is **OPEN**, the ground and test device is electrically disabled and the key is removable.

2) Key Lock “B”

Key **Lock “B”** interlock is a single-cylinder lock (Figure 1, g). The key **Lock “B”** interlock is used to open and lock the test port shutters (Figure 1, k).

The key, which normally resides in the key **Lock “A”** interlock, is available only when the ground and test device is in the **CLOSED** and locked position.

The key is then inserted into key **Lock “B”**. With the locking bolt retracted and the test port shutters unlocked, the key is retained. The key is removable only when the locking bolt is extended in either of two positions. One position is with the test port shutters closed, and the other position is with the test probes installed in the test ports and the shutter moved to the test probe locking position.

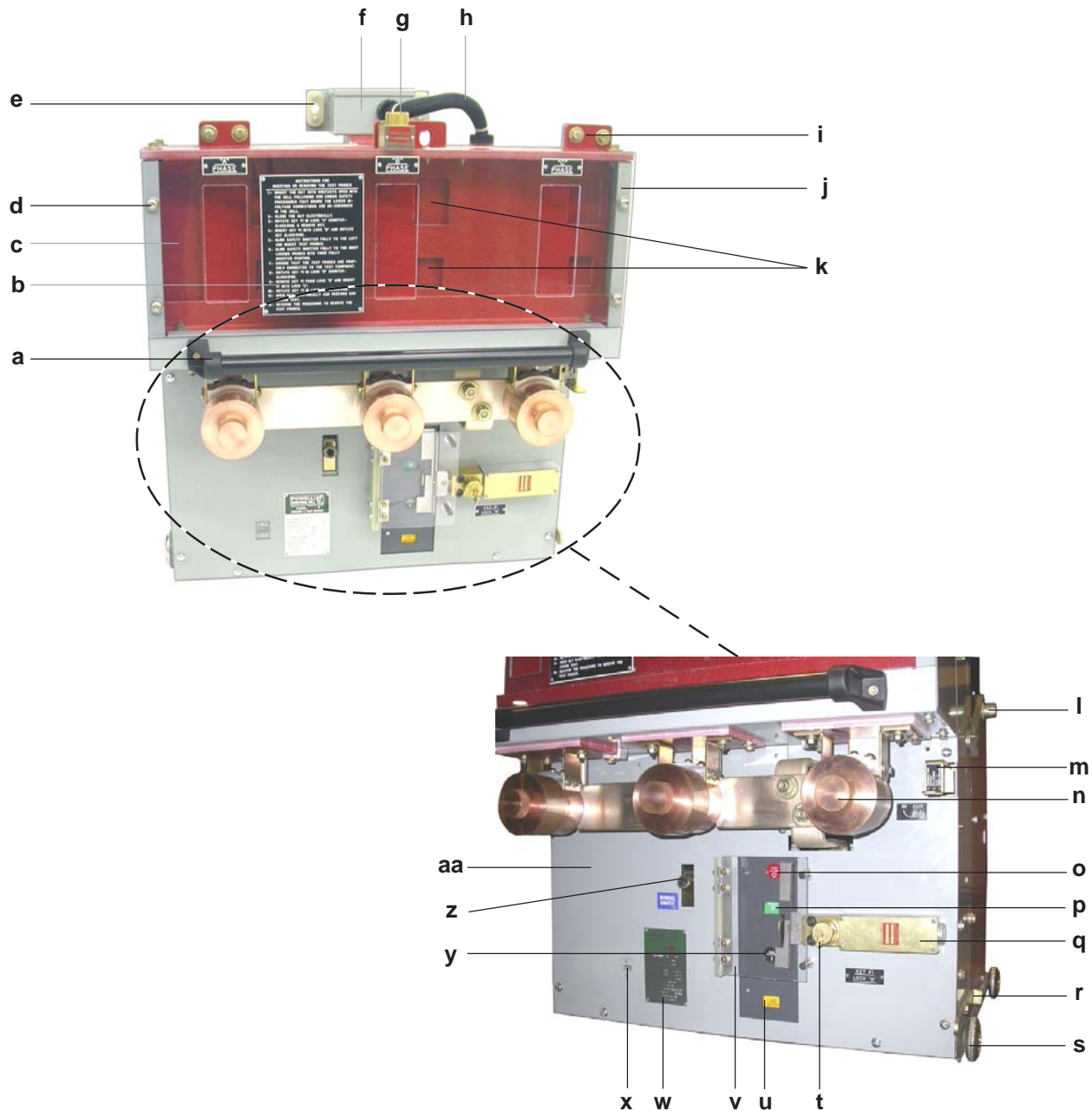


Figure 1. Electrically Operated Ground and Test Device (Front Exterior)

- | | | |
|-------------------------------|--------------------------|----------------------------|
| a. Front Handle | j. Equipment Housing | s. Wheel |
| b. Instruction Plate | k. Test Port | t. Key "1" |
| c. Test Port Cover (clear) | l. Racking Arm | u. Spring Charge Indicator |
| d. Fastener | m. Racking Access Handle | v. Transparent Guard Door |
| e. Pin Guide | n. Spark Gap | w. Nameplate |
| f. Secondary Disconnect | o. Manual Trip Operator | x. Operations Counter |
| g. Lock "B" | p. OPEN/CLOSE Indicator | y. Manual Close Operator |
| h. Wiring Bundle | q. Lock "A" | z. Manual Charging Crank |
| i. Test Port Shutter Operator | r. Anti-Rollout Latch | aa. Device Front Cover |

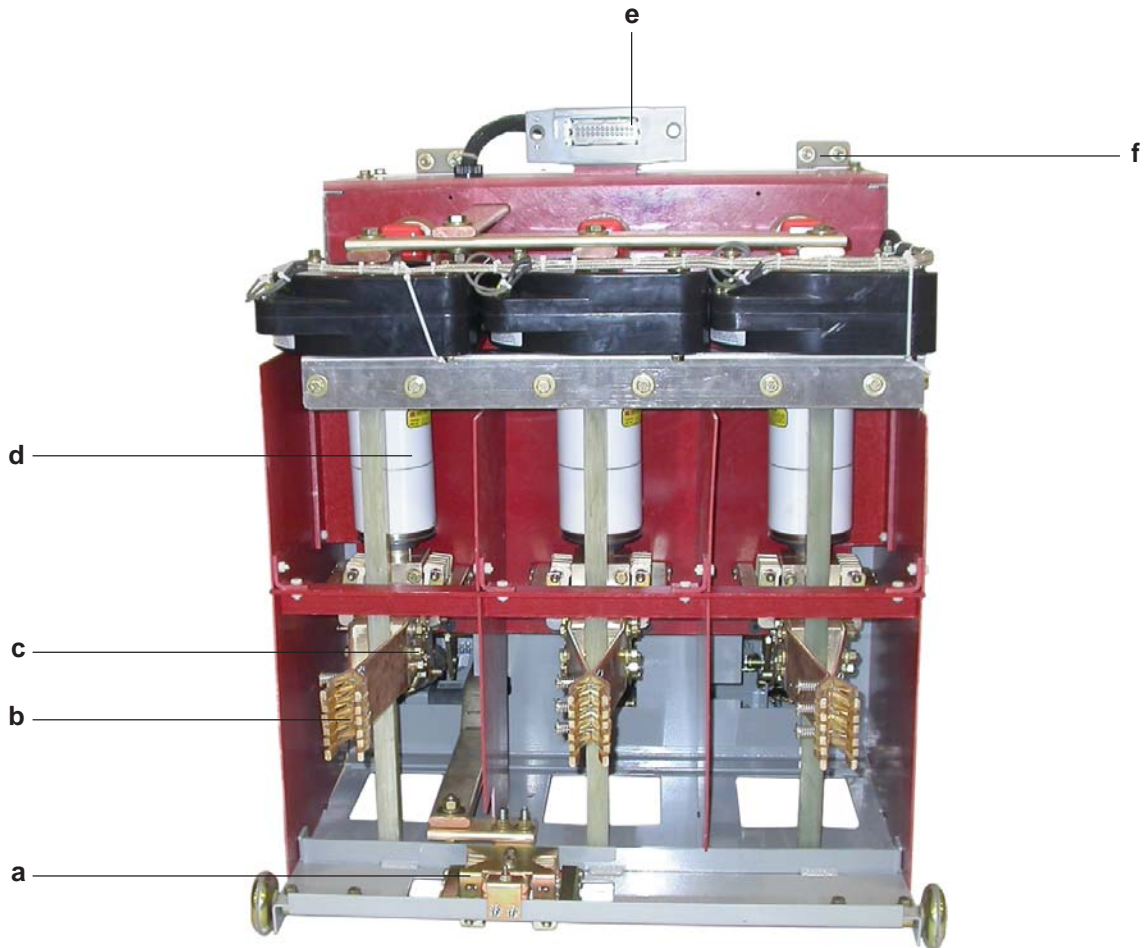


Figure 2. Electrically Operated Ground and Test Device Primary Disconnect View

- | | | |
|--|------------------------|--------------------------------|
| a. Grounding Shoe | c. Hex-Head Cap Screws | e. Secondary Disconnect Plug |
| b. Removable Primary Disconnects
(all three phases) | d. Vacuum Interrupters | f. Test Port Shutter Operators |

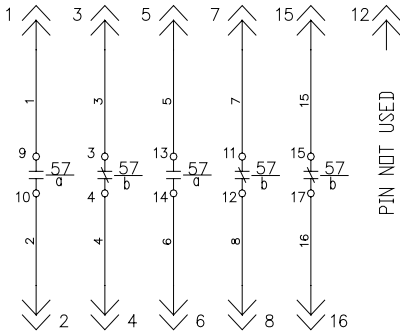
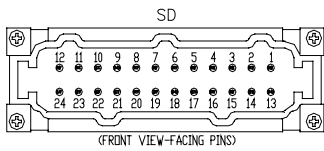


Figure 3. Electrically Operated Ground and Test Device Left Side View

DEVICE IDs

- LS = SPRING CHARGE LIMIT SWITCH (SHOWN W/SPRING DISCHARGED)
- LCS = LATCH CHECK SWITCH (SHOWN W/SPRING DISCHARGED)
- Y = ANTI-PUMP RELAY
- TC = BREAKER TRIP COIL
- CC = BREAKER CLOSE COIL
- M = CHARGING MOTOR
- 52/a = BREAKER AUXILIARY CONTACT (NORMALLY OPEN)
- 52/b = BREAKER AUXILIARY CONTACT (NORMALLY CLOSED)
- SD = BREAKER SECONDARY DISCONNECT (⋈)
- TB = TERMINAL BLOCK

DEVICE CROSS-REFERENCE TABLES



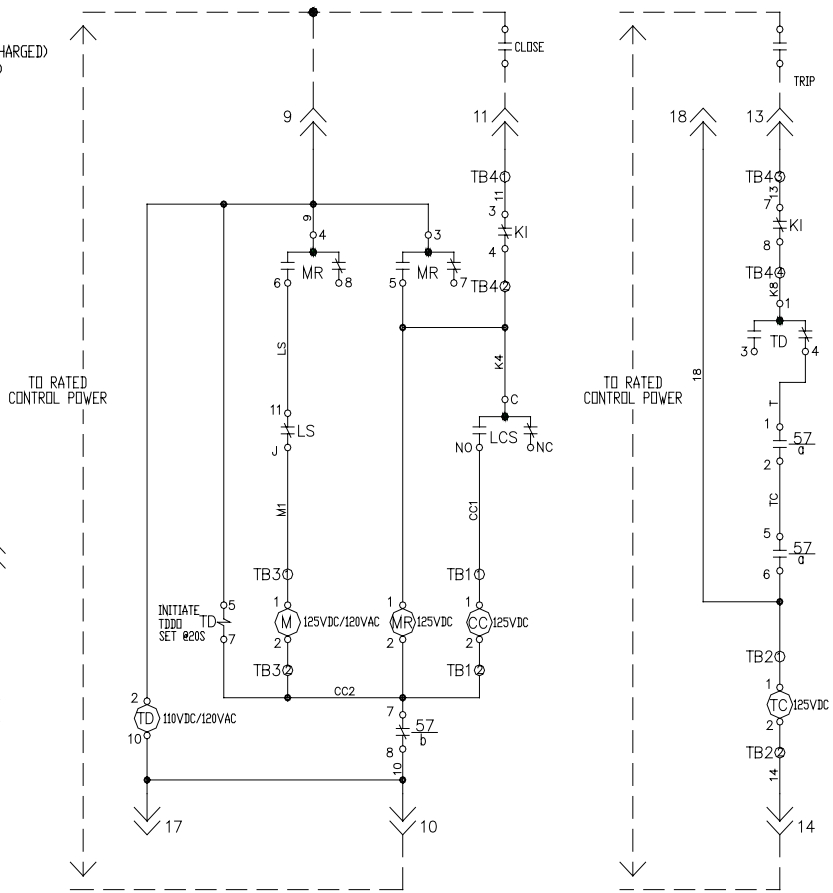
57	CP	1 2	5 6	9 10	13 14	16 18
	109D	111D	103E	103F		
	3 4	7 8	11 12	15 17		
	103E	114C	103F	103F		

MR	CP	6 4 8	5 3 7
	105B	105C	

TD	CP	3 1 4	9 11 8
	106D		

LS	CP	12 K	E F
	11 J	9 M	
	108B		

LCS	CP	NO C NC
	108C	



KI	CP	1 2	5 6
	3 4	7 8	
	105C	105D	

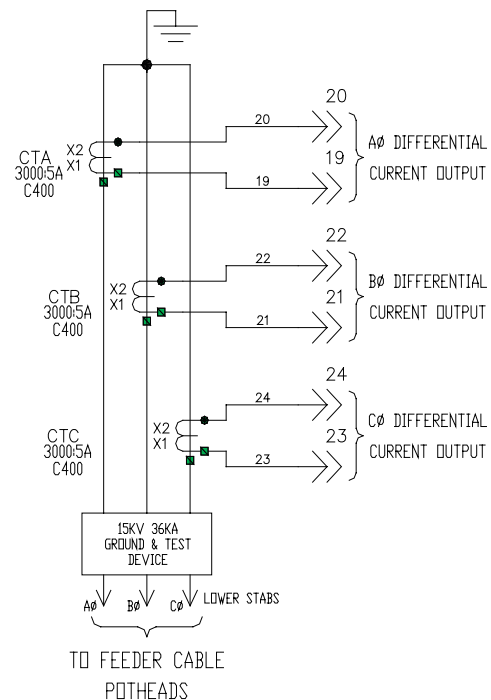


Figure 4. Electrically Operated Ground and Test Device Schematic

IV. INSTALLATION

A. RECEIVING

Inspect the electrically operated ground and test device for any signs of damage when it is received. If damage is found or suspected, immediately file applicable claims with the transportation company and notify the nearest representative of Powell Electrical Systems, Inc.

The estimated size and weight of the electrical ground and test device, when it is crated and placed on a pallet is:

**Size: 42" width x 42" depth x 47" height
Weight: 650 lbs.**

The ground and test device is shipped enclosed in a carton and strapped to a shipping pallet. The carton, which contains the ground and test device, is attached to the pallet by two metal bands. Remove the metal bands and lift the carton to remove it from the ground and test device. With the carton removed, there are two more metal bands that attach the ground and test device to the pallet. Remove the two metal bands from the ground and test device and the pallet, and remove the ground and test device from the shipping pallet.

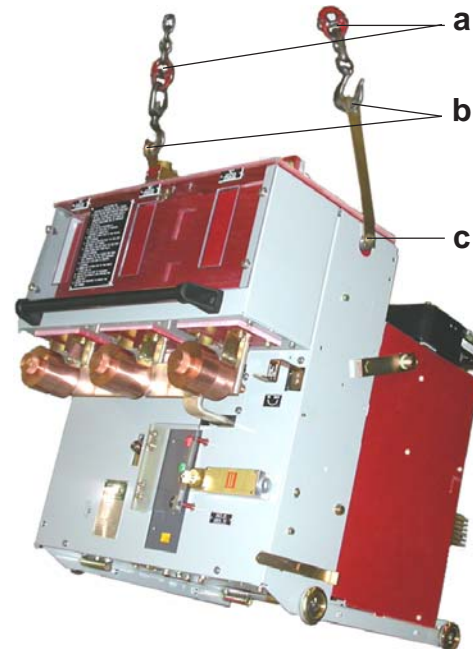
B. HANDLING

To avoid personal injury while handling the ground and test device, personnel should not stand under the raised ground and test device nor place hands or feet under the ground and test device frame as it is being lowered.

After the ground and test device has been removed from its shipping pallet, the preferred method for moving and handling a ground and test device is to roll it on its own wheels on a level surface. When rolling the ground and test device, it should be pushed and steered by the device frame or by the handles on the front cover. **DO NOT HANDLE OR MOVE THE DEVICE BY THE PRIMARY DISCONNECTING STABS, AS DAMAGE TO THE GROUND AND TEST DEVICE MAY OCCUR.**

An overhead crane (Figure 5, a) can be used to move the ground and test device. When using an overhead crane to move the ground and test device use a double hook crane and 2 lifting devices (Figure 5, a

and b). Place the crane hooks into the hook hole end. Then place the support end of the lifting devices onto the G&T (Figure 5, b). Ensure the crane hooks and lifting devices are secure before lifting the G&T on the crane (Figure 5, c). Move the G&T to the required location.



**Figure 5. Crane with the Electrically Operated
Ground and Test Device Attached**

- a. Double Hook Crane
- b. Lifting Device Hook Hole
- c. Lifting Support Pin

C. STORAGE

Since the ground and test device is an accessory device not normally in continuous service, it is very important that it be stored carefully so that it will be available when needed. The following precautions must be taken to assure proper storage of the ground and test device.

1. **THE GROUND AND TEST DEVICE MUST NOT BE STORED IN A CIRCUIT BREAKER COMPARTMENT. IT CAN ONLY BE STORED IN A STORAGE COMPARTMENT.**

2. The ground and test device should be carefully protected against condensation, preferably by storing it in a warm, dry room of moderate temperature, such as 40°-100°F, since dampness has an adverse effect on the insulating parts.
3. The ground and test device should be stored in a clean location, free from corrosive gasses or fumes. Particular care should be taken to protect the device from moisture and cement dust, as this combination has a very corrosive effect on many parts.
4. If the ground and test device is stored for any length of time, it should be inspected periodically for rust and to ensure it is in good mechanical condition. Should the ground and test device be stored under adverse conditions, it should be cleaned and dried before performing the commissioning tests and before placing the ground and test device into an energized circuit breaker compartment.

D. PREPARING THE ELECTRICALLY OPERATED GROUND AND TEST DEVICE FOR USE

Before shipment from the factory, all functions of the ground and test device are thoroughly checked. Powell Electrical Manufacturing Company recommends that prior to each use, the ground and test device should be thoroughly checked and the following tests be performed in the sequence listed below:

1. High Voltage Insulation Integrity
2. Vacuum Integrity
3. Control Voltage Insulation Integrity
4. Electrical Operation Check

1) High Voltage Insulation Integrity

The primary circuit insulation on the ground and test device may be checked phase-to-phase and phase-to-ground using a 2500V insulation resistance tester. Since definite limits cannot be given for satisfactory insulation values when testing with an insulation resistance tester, a record should be kept of the insulation resistance tester readings, as well as the temperature and humidity readings. The records should be used to detect any weakening of the insulation system from one check period to the next.

To check insulation integrity, the AC high potential test described below is strongly recommended.

The ground and test device insulation should be tested with the ground and test device vacuum interrupter contacts in the closed position. Test each pole of the ground and test device separately, with the other 2 poles and the frame grounded. Perform the field dielectric test described in ANSI Standard C37.20.2, at the voltage level appropriate for the equipment. This test should check all primary phase-to-ground and phase-to-phase insulation.

The tests described in this section are the only tests required to determine the insulation integrity. Because of the design of the PowlVac® insulation system, no valid data can be obtained using other types of high-voltage insulation tests.

2) Vacuum Integrity

Powell recommends AC testing for reliable verification of vacuum integrity. PowlVac® 15kV ground and test devices shall be tested with a minimum of 25kVAC applied across fully open contacts for 10 seconds. No dielectric breakdown during the test period constitutes a successful test.

NOTE: *This test does not replace the AC high potential testing (HIPOT) used to determine "High Voltage Insulation Integrity."*

Powell offers a compact and lightweight PowlVac® Vacuum Integrity Tester designed specifically for PowlVac® circuit breakers. If the test device is used, refer to the instruction bulletin provided with the vacuum integrity tester.

Powell recognizes the widespread use of DC hipot equipment to verify vacuum integrity. However, the capacitive component of the vacuum interrupter during DC testing may yield false negative test results, which are often misinterpreted as vacuum interrupter failure. When DC testing is performed, a test set providing a full wave rectified 50kVDC hipot voltage can be applied for 5 seconds as a "go – no go" test.

It is not necessary to record the leakage readings because a dielectric breakdown will trip all portable DC hipot test sets. If a DC test breakdown occurs, the test must be repeated after reversing the DC high voltage test supply connection across the vacuum interrupter. Only when the vacuum interrupter has failed both tests should the operation condition be questioned.

No attempt should be made to try to compare the condition of one vacuum interrupter with another, nor to correlate the condition of any vacuum interrupter with low values to DC leakage current. There is no significant correlation.

3) Control Voltage Insulation Integrity

If the user wants to check the insulation integrity of the control circuit, it may be done with a 500-volt or 1000-volt insulation resistance tester or with an AC high potential tester. The AC high potential test should be made at 1125 volts, 50 to 60 Hz for one minute. The charging motor must be disconnected prior to testing the control circuit. The charging motor itself may be similarly tested at a voltage not to exceed 675 volts, 50 to 60 Hz. Be sure to remove any test jumpers and reconnect the charging motor when the tests are complete.

E. POWER GROUNDING SWITCH OPERATION

1) Closing

With the standard electrical control scheme, the closing spring is not charged until a closing operation is called for by an external signal. When a closing signal is received, the main closing spring immediately starts to charge. As soon as the spring is fully charged the grounding switch is closed. The main closing spring remains uncharged after a closing operation. The spring **CHARGED/DISCHARGED** indicator (Figure 1, u) on the front cover shows the main closing spring condition. The **OPEN/CLOSED** indicator (Figure 1, p) shows the position of the grounding switch.

2) Opening

The grounding switch may be **OPENED** electrically or manually.

NOTE: A manual **TRIP** button is located on the front cover of the G&T device, but should be used only in an emergency or during G&T device maintenance.

3) Electrical Operation Check

To check the basic electrical operation of the G&T, a circuit breaker test cabinet must be used. Connect the secondary disconnect from the test cabinet to the G&T to be tested. The test cabinet provides control voltage via a secondary disconnect plug to the G&T and the appropriate control switches to verify the **CLOSE** and **OPEN** functions of the G&T. With the secondary disconnect plug installed in the G&T under test, operate the power switch on the test cabinet. Operation of the control switch on the front door of the test cabinet to the close position will cause the G&T to **CLOSE**. Operating the control switch on the front door of the test cabinet to the **OPEN** position will cause the circuit breaker to **OPEN**.

Alternatively, a test jumper cable may be used to electrically operate the G&T using the control circuitry of the circuit breaker compartment. Caution must be exercised if this option is chosen to ensure that operation of the control circuitry of the compartment used for test does not cause undesirable effects or unintended operation of other interconnected equipment such as supervisory controls, SCADA, or automatic transfer schemes.

First, remove the control fuses in the compartment. Connect the jumper cable to the secondary disconnect plug in the compartment and to the circuit breaker. Insert the fuses. Operation of the G&T control switch on the front door of the compartment will cause the G&T to close. Operating the breaker control switch on the front door will cause the G&T to **OPEN**.

NOTE: For safety reasons, the switch is prevented from opening electrically within a minimum of 20 seconds after closing.

When the electrical check is completed, disconnect the secondary disconnect of the test cabinet from the ground and test device.

**F. INSERTING THE ELECTRICAL GROUND
AND TEST DEVICE INTO THE METAL-CLAD
SWITCHGEAR**

Inserting the ground and test device into the metal-clad switchgear is similar to inserting a circuit breaker into the switchgear. Refer to instruction book, IB-60030 63kA Automatic Secondary Disconnect (ASD) Circuit Breaker, for general information about inserting circuit breakers into metal-clad switchgear. Study instructions and cautions before attempting to insert a ground and test device into the switchgear equipment.

NOTE: Access information bulletins on line at the Powell Web site: www.powellservice.com. To order instruction bulletins by telephone, call Powell Electrical Services, Inc.: 1-800-480-7273.

For normal insertion of the ground and test device into the switchgear, the maximum force required on the levering-in crank will not exceed 35 foot-pounds. Excessive force may damage the device or the switchgear equipment.

**1) Electrical Ground and Test Device
Inspection**

1. Inspect the primary disconnecting devices for proper lubrication, damage, debris, and dirt. Ensure that disconnecting devices are in alignment and are not bent. If damage or dirt are present, see Section V. MAINTENANCE, A. INSPECTION AND CLEANING.

IMPORTANT: If the primary disconnecting devices are damaged, make no attempt to repair them. Contact Powell Electrical Services, Inc. for further information.

2. Inspect the switchgear compartment to ensure that it is clean and clear of debris that might interfere with ground and test device travel.

V. OPERATING PROCEDURES
A. GENERAL INFORMATION

The **CON EDISON** ground and test device is supplied with **Key #1**. **Key #1** is used in either **Key Lock "A"** or **Key Lock "B"** as specified in the procedures in this section.

The Powl-Vac® 15GT36ASADE-23 Electrically operated Ground and Test Device allows selective testing of one, two, or all three Phases simultaneously.

To eliminate the testing of any phase, remove the three (3) 5/16" - 18" X 3-1/2" Hex-head cap screws that attach the chosen primary disconnect fingers to the phase support block (Figure 2, c).

The disconnect finger assembly will slide off the block and may be set aside for re-assembly upon completion of the required circuit testing.

**B. OPERATING THE POWLVAC®
15GT36ASDE-23 ELECTRICALLY
OPERATED GROUND AND TEST DEVICE**
**1) Procedures for Applying Ground
Con Edison Feeder**

1. Verify the Con Edison G&T device is being inserted in the compartment of the feeder to be grounded.
2. Insert the G&T device into the compartment until a "stop" is encountered.
3. Open the transparent guard door (Figure 1, v) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle (Figure 1, m and Figure 6) exposing the racking input shaft.



CAUTION

**POWL-VAC® RACKING HANDLES
INCORPORATE A BUILT-IN TORQUE LIMITING
FEATURE IN THE DESIGN THAT PREVENTS
EXCESSIVE FORCE FROM BEING APPLIED
TO THE POWLVAC® RACKING MECHANISM.
USE ONLY POWLVAC® RACKING HANDLES
TO CONNECT OR DISCONNECT THE G&T
DEVICE.**

4. Insert a PowlVac® racking handle onto the racking input shaft (Figure 6 and Figure 7).
5. Rack the G&T device into the **CONNECTED** position. Rotate the racking handle (Figure 7) clockwise until a positive stop is felt or the torque limiter of the racking handle operates.
6. Follow Con Edison safety procedures to ensure that the lower high-voltage connections in compartment are de-energized.
7. Close the G&T device using the remote control switch.
8. Rotate the key in **Lock “A”**, electrically disabling the G&T device (Figure 1, t and Figure 8). Remove the key from **Lock “A”**. The G&T device is now electrically and mechanically locked in the **CLOSED** position
9. Secure the key in the Con Edison lock box.

2) Procedure for Testing Feeder

1. Verify the Con Edison G&T device is being inserted in the compartment of the feeder to be grounded.
2. Insert the G&T device into the compartment until a “stop” is encountered.
3. Open the transparent guard door (Figure 1, v) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle (Figure 1, m and Figure 6) exposing the racking input shaft.
4. Insert a PowlVac® racking handle onto the racking input shaft (Figure 6 and Figure 7).
5. Rack the G&T device into the **CONNECTED** position. Rotate the racking handle clockwise until a positive stop is felt or the torque limiter of the racking handle operates.


CAUTION

POWL-VAC® RACKING HANDLES INCORPORATE A BUILT-IN TORQUE LIMITING FEATURE IN THE DESIGN THAT PREVENTS EXCESSIVE FORCE FROM BEING APPLIED TO THE POWL-VAC® RACKING MECHANISM. USE ONLY POWL-VAC® RACKING HANDLES TO CONNECT OR DISCONNECT THE G&T DEVICE.

6. Follow Con Edison safety procedures to ensure that lower high-voltage connections are de-energized in cell.
7. Close the G&T electrically using the remote control switch.
8. Rotate the key in **Lock “A”**, electrically disabling the G&T device (Figure 8). Remove the key from **Lock “A”**. The G&T device is now electrically and mechanically locked in the **CLOSED** position
9. Transfer the key removed from **Lock “A”** to **Lock “B”** and rotate (Figure 9). **Lock “B”** unlocks the test port shutter.
10. Open the test port shutter using the slide handle to move the shutter fully to the left (Figure 10). With the test ports fully open, the key in **Lock “B”** remains captive.
11. Install the test probes into the test ports (Figure 11 and Figure 13). Move the test port shutter to the right to capture the test probes with the test probe shutter.
12. Rotate key in **Lock “B”** to lock the test probes in the test ports. The key in **Lock “B”** is now available (Figure 9).
13. Transfer the key to key **Lock “A”** and rotate (Figure 8). The G&T device control circuit is now enabled. The key in **Lock “A”** is captive.
14. Open the G&T device by using the remote control switch.

The G&T device is now prepared for testing.

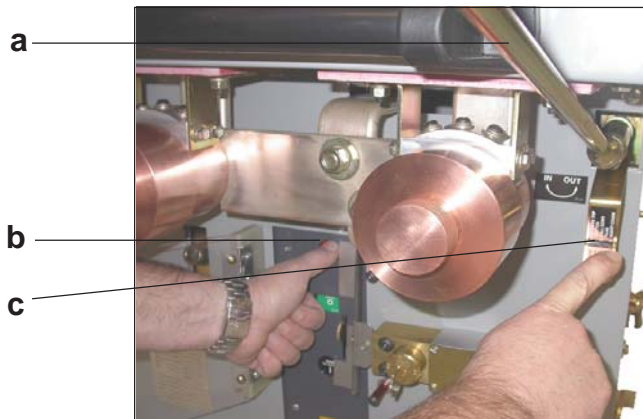
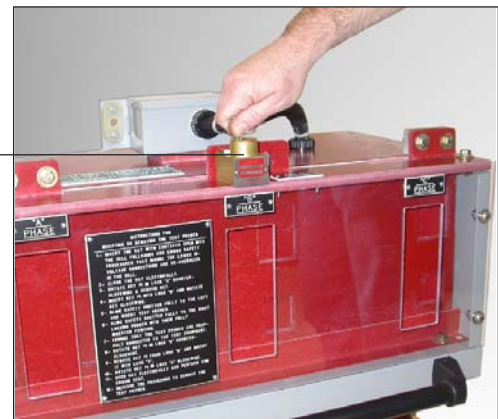


Figure 6. Pull Down the Racking Access Handle

- a. Racking Shaft
- b. Manual Push to Trip
- c. Racking Access Handle



**Figure 9. Transfer the Key From
Lock "A" to Lock "B"**

- a. Lock "B"

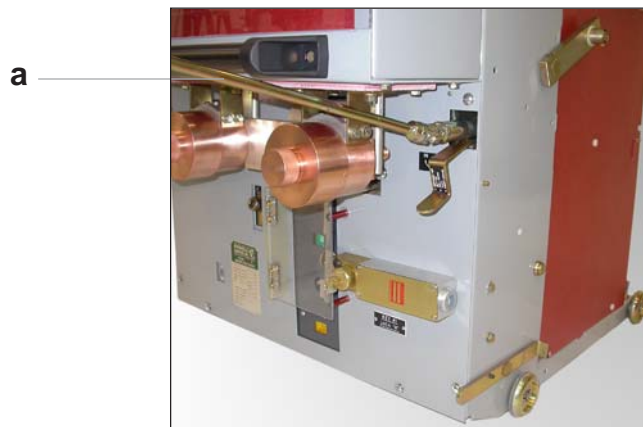


Figure 7. Insert the Racking Handle

- a. Racking Handle

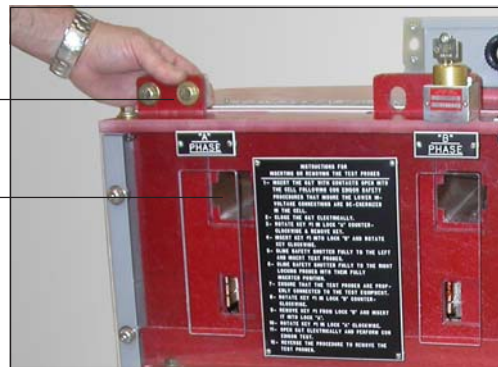


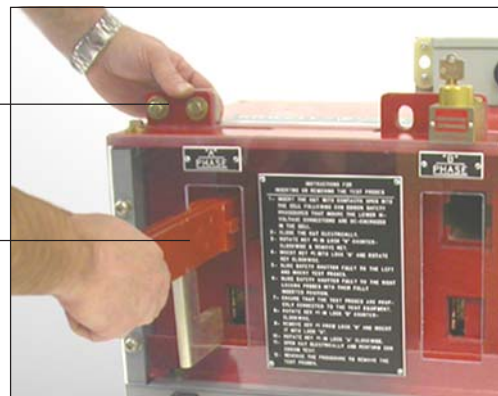
Figure 10. Slide the Safety Shutter to the Left

- a. Test Port Shutter Operators
- b. Test Ports with Shutter Open



Figure 8. Rotate the Key in Lock "A"

- a. Lock "A"



**Figure 11. Insert High or Low Voltage
Test Probes**

- a. Test Port Shutter Operators
- b. Test Probe

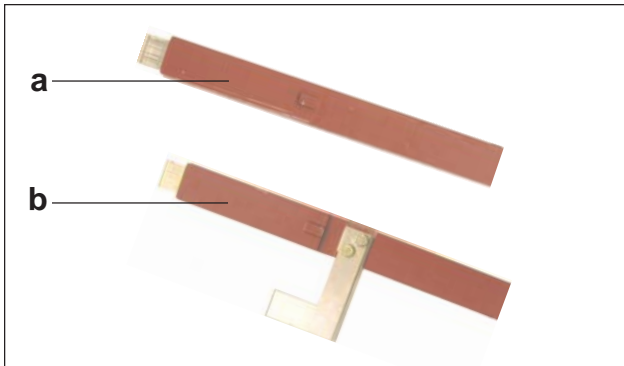


Figure 12. Test Probes

- a. High Voltage Test Probe
- b. Low Voltage Test Probe

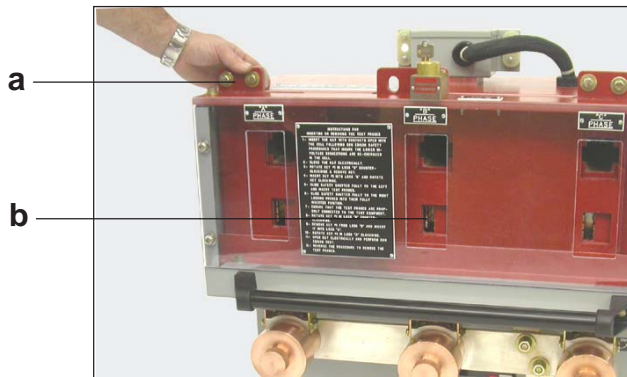


Figure 13. Shutter Operator and Test Ports

- a. Test Port Shutter Operators
- b. Test Port Shutter Partly Closed

3) Procedure for Removing Test Probes

1. Close the G&T device using the remote control switch.
2. Rotate the key in **Lock “A”**, electrically disabling the G&T device (Figure 8). Remove the key from **Lock “A”**. The G&T device is now electrically and mechanically locked in the **CLOSED** position
3. Transfer the key removed from **Lock “A”** to **Lock “B”** and rotate (Figure 9). **Lock “B”** unlocks the test port shutter.
4. Open the test port shutter using the slide handle to move the shutter fully to the left (Figure 10). With the test ports fully open, the key in **Lock “B”** remains captive.
5. Remove the test probes from the test ports (Figure 11 and Figure 12).
6. Move the test port shutter fully to the right (Figure 13). Rotate the key in **Lock “B”** and remove the key. The test ports are now locked closed.
7. Transfer the key removed from **Lock “B”** to **Lock “A”** and rotate (Figure 8). The G&T device control circuit is now enabled. The key in **Lock “A”** is captive.
8. Open the G&T device using the remote control switch.
9. Open the transparent guard door (Figure 1, v) and depress the manual push to trip button (Figure 1, y) and pull down on the racking access handle exposing the racking input shaft (Figure 6).
10. Insert a PowlVac® racking handle onto the racking input shaft (Figure 6 and Figure 7).
11. Rack the G&T device into the **DISCONNECTED** position. Rotate the racking handle counterclockwise until a positive stop is felt or the torque limiter of the racking handle operates.
12. Remove the G&T device from the compartment.



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4) Procedure for Removing Grounds

1. Obtain the key from the Con Edison lock box on premises.
2. Insert the key in **Lock “A”** and rotate (Figure 8). The G&T device control circuit is now enabled. The key in **Lock “A”** is captive.
3. Open the G&T device using the remote control switch.
4. Open the transparent guard door (Figure 1, v) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle (Figure 1, m and Figure 6) exposing the racking input shaft.
5. Insert a PowlVac® racking handle onto the racking input shaft (Figure 7).
6. Rack the G&T device into the **DISCONNECTED** position. Rotate the racking handle counterclockwise until a positive stop is felt or the torque limiter of the racking handle operates.
7. Remove the G&T device from the compartment.

VI. MAINTENANCE

A. GENERAL

A regular maintenance schedule should be established to obtain the best service and reliability from the ground and test device. The ground and test device is designed to require maintenance every 1000 operations or once a year, whichever occurs first.

Actual inspection and maintenance will depend on individual application conditions such as number of operations, time between uses, and storage conditions. When the ground and test device has been in storage for an extended period of time, it must be inspected and cleaned before being used. See Section IV. **INSTALLATION, C. STORAGE, D. PREPARING THE ELECTRICAL GROUND AND TEST DEVICE FOR USE.**

A permanent record of maintenance work and inspections should be kept. The degree of record detail depends on the operating conditions. The record should include the dates and results starting from the date the device is first put into service. Dates and results of inspections and routine maintenance activities should be recorded.

B. INSPECTION AND CLEANING

Inspect the ground and test device for loose or damaged hardware or parts. Tighten any loose hardware, and replace missing or damaged hardware or parts.

When necessary, remove loose dust and dirt from the ground and test device with a vacuum cleaner, a clean, dry cloth, or an industrial-type wiper. **DO NOT** use an air hose to clean the ground and test device. Dirt or grit may be blown into critical parts, including bearings, which will cause excessive wear of the parts.

Primary insulation should be cleaned if needed. Wipe insulation parts clean with a dry lint-free cloth or an industrial-type wiper. If dirt adheres and will not come off by wiping, remove it with distilled water or a mild solvent such as denatured alcohol. Ensure that the ground and test device is dry before use. **DO NOT** use any type of detergent to wash the surface of the insulators, as the detergent may leave an electrical conducting residue on the surface as it dries.

C. LUBRICATION

The contact surfaces of the primary disconnect stabs and the fingers of the ground shoe should be lubricated with a thin film of Mobilgrease 28. Before use, particularly if the ground and test device has been in storage for a long period of time, wipe these surfaces with a clean, dry cloth, and apply fresh lubricant.

VII. RENEWAL PARTS

A. ORDERING

Should any part require replacement due to wear or damage, order renewal parts from Powell Apparatus Service Division (PASD).

When ordering parts, provide the following information from the ground and test device name plate:

- Name of the ultimate user
- Location of the installation
- Type of device including rated voltage and rated amps
- Serial number of the device (see device name plate)
- Description of the part
- Photo of the device with the needed part marked will be helpful in assuring that the proper part is furnished

To order parts, visit the Powell Web site at **www.powellservice.com** or call **1-800-480-7273**.

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INSTRUCTIONS

IB-50022

**PowlVac® 15GT36ASDE-23 Electrically Operated
Ground and Test (G&T) Device
Instructions for the Consolidated Edison
Electrically Operated Ground and Test Device
Per Con Edison Specification EI-4102**

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