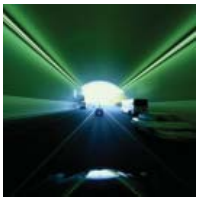
POWELL



IB-50022A
PowlVac® Ground & Test Device 15kV

15GT36ASDE-23 Electrically Operated Ground & Test Device per Con Edison Specification EI-4102

Powered by Safety®

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Signal Words

As stated in ANSI Z535.4-2002, § 4.13-4.13.3 the signal word is a word that calls attention to the safety sign and designates a degree or level of hazard seriousness. The signal words for product safety signs are **"Danger"**, **"Warning"**, and **"Caution"**. These words are defined as:

⚠ 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, could result in death or serious injury.

⚠ CAUTION

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

Not stated in ANSI Z535.4-2002, § 4.13-4.13.3 as a signal word but used in this manual is **"IMPORTANT"**. This is defined as:

⚠ IMPORTANT

IMPORTANT indicates a section of the manual covering a non hazardous situation, but one where Powell feels proper attention is warranted.

Qualified Person

For the purposes of this manual, a qualified person, as stated in NFPA 70®, is one familiar with the construction and operation of the equipment and the hazards involved.

In addition to the above qualifications, one must also be:

1. trained and authorized to energize, deenergize, clear, ground, and tag circuits and equipment in accordance with established safety practices.
2. trained in the proper care and use of personal protective equipment (PPE) such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
3. trained in rendering first aid if necessary.

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Ch 1 General Information

⚠ 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 immediately at 1.800.480.7273.

⚠ WARNING

Before any adjustment, servicing, part 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 Powell equipment, 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 at 1.800.480.7273.

⚠ IMPORTANT

Powell reserves the right to discontinue and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

A. Scope

The information in this instruction bulletin describes the following 15kV PowlVac® Electrically Operated Ground and Test Device:

- 15GT36ASADE-23 (Con Edison & Customer Interlocked versions)

B. Purpose

The information in this instruction bulletin is intended to provide information required to properly operate and maintain the PowlVac Ground & Test Device described in ***Ch 1 General Information,*** **A. Scope.**

This instruction bulletin provides:

1. Safety guidelines
2. General descriptions of the operation and maintenance of the ground & test device
3. Instructions for installation and placing the ground & test device into service
4. Instructions for part replacement
5. Information for ordering renewal parts
6. Illustrations, photographs, and description of the circuit breaker

The illustrations contained in this document may not represent the exact construction details of each particular type of ground and test device. The illustrations in this document are provided as general information to aid in showing component locations only.

All illustrations are shown using deenergized equipment.

⚠ WARNING

Be sure to follow the appropriate safety precaution while handling any of the equipment. Failure to do so may result in serious injury or death.

To the extent required, the products described herein meet the applicable ANSI, IEEE, and NEMA Standards; however, no such assurance is given with respect to local codes and ordinances which may vary greatly.

C. Instruction Bulletins Available Electronically

For more information visit www.powellind.com. To contact the Powell Service Division call 1.800.480.7273 or 713.944.6900, or email info@powellservice.com.

Ch 2 Safety

A. Safe Work Condition

The information in Section A is quoted from *NFPA 70E 2004 - Article 120, 120.1 Establishing an Electrically Safe Work Condition.*

120.1 Process of Achieving an Electrically Safe Work Condition

1. Determine all possible sources of electrical supply to the specific equipment. Check applicable up-to-date drawings, diagrams, and identification tags.

2. After properly interrupting the load current, OPEN the disconnecting device(s) for each source.

3. Wherever possible, visually verify that all blades of the disconnecting devices are fully OPEN or that drawout type circuit breakers are withdrawn to the fully disconnected position.

4. Apply lockout/tagout devices in accordance with a documented and established policy.

5. Use an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized. Test each phase conductor or circuit part both phase-to-phase, and phase-to-ground. Before and after each test, determine that the voltage detector is operating satisfactorily.

6. Where the possibility of induced voltages or stored electrical energy exists, ground the phase conductors or circuit parts before touching them. Where it could be reasonably anticipated that the conductors or circuit parts being deenergized could contact other exposed energized conductors or circuit parts, apply ground connecting devices rated for the available fault duty.

B. Safety Guidelines

Study this instruction bulletin and all other associated documentation before uncrating the circuit breakers.

Each user has the responsibility to instruct and supervise all personnel associated with usage, installation, operation, and maintenance of this equipment on all safety procedures. Furthermore, each user has the responsibility of establishing a safety program for each type of equipment encountered.

The ground and test devices described in this instruction bulletin are operated by a high-energy, high-speed mechanism that is interlocked to provide specific operating sequences. It is mandatory that the following rules be observed to ensure the safety of personnel associated with usage, installation, operation, and maintenance of these ground and test devices.

The safety rules in this instruction bulletin are not intended to be a complete safety program. The rules are intended to cover only some of the important aspects of personnel safety related to PowlVac® Electrically Operated Ground and Test Device.

C. General

1. Only supervised and qualified personnel trained in the usage, installation, operation, and maintenance of the 15GT36ASADE-23 ground and test device shall be allowed to work on this equipment. It is mandatory that this instruction bulletin, any supplements, and service advisories be studied, understood, and followed.

2. Maintenance programs must be consistent with both customer experience and manufacturer's recommendations, including service advisories and instruction bulletin(s). A well planned and executed routine maintenance program is essential for ground and test devices' reliability and safety.

3. Service conditions and circuit breaker applications shall also be considered in the development of safety programs. Variables include ambient temperature; humidity; actual continuous current; thermal cycling; number of operations; interrupting duty; and any adverse local conditions including excessive dust, ash, corrosive atmosphere, vermin and insect infestations.

D. Specific

When operating the ground and test device safety precaution must be observed. **Improper use can result in death, serious personal injury, or damage to the equipment.** 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.
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 ports. Use of other plugs may damage the test port or may result in a poor connection which could be dangerous to the operator and/or damaging to the equipment.
5. Even though insulated, the test probes must not be inserted or extracted from energized test ports. 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 connection to an energized test port.
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 compartment 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.

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.

E. X-Rays

When high voltage is applied across the contacts of a vacuum interrupter, there is the possibility of generation of X-rays. The intensity of the X-radiation is dependent on the peak voltage and the contact gap. At the normal operating voltage for this type of equipment, the radiation levels are negligible. At the voltages specified for testing, test personnel shall be 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 the test personnel and the vacuum interrupters, and that the test personnel be no closer than one meter (3') from the front of the circuit breaker. **THE ELECTRICAL GROUND AND TEST DEVICE SHALL BE EITHER FULLY OPEN, OR FULLY CLOSED WHEN MAKING HIGH POTENTIAL TESTS. DO NOT TEST WITH CONTACTS PARTIALLY OPEN.**

F. Safety Labels

The equipment described in this document has **DANGER**, **WARNING, CAUTION,** and instruction labels attached to various locations. All equipment **DANGER**, **WARNING, CAUTION,** and instruction labels shall be observed when the circuit breaker is handled, operated, or maintained.

> ⚠ ***IMPORTANT***
>
> ***Warning and Caution labels are located in various places in and on the switchgear and on the circuit breaker removable element. Always observe these warnings and caution labels. Do NOT remove or deface any of these warning/caution labels.***

Ch 3 Equipment Description

A. General

The PowlVac® 15GT36ASADE-23 Electrically Operated Ground & Test Device is a drawout element that can be inserted into the circuit breaker compartment in the same manner as a PowlVac circuit breaker.

The PowlVac 15GT36ASADE-23 Electrically Operated Ground & Test Device provides a means for obtaining access to the primary disconnect devices of the switchgear compartment 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: *Fore safety reasons, the switch is prevented from opening electrically within a minimum of 20 seconds after closing.*

B. Key Locks

1) Key Lock "A"

Key lock "A" interlock is a single-cylinder lock used to electrically enable or disable the G&T device (Figure 1, s).

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.

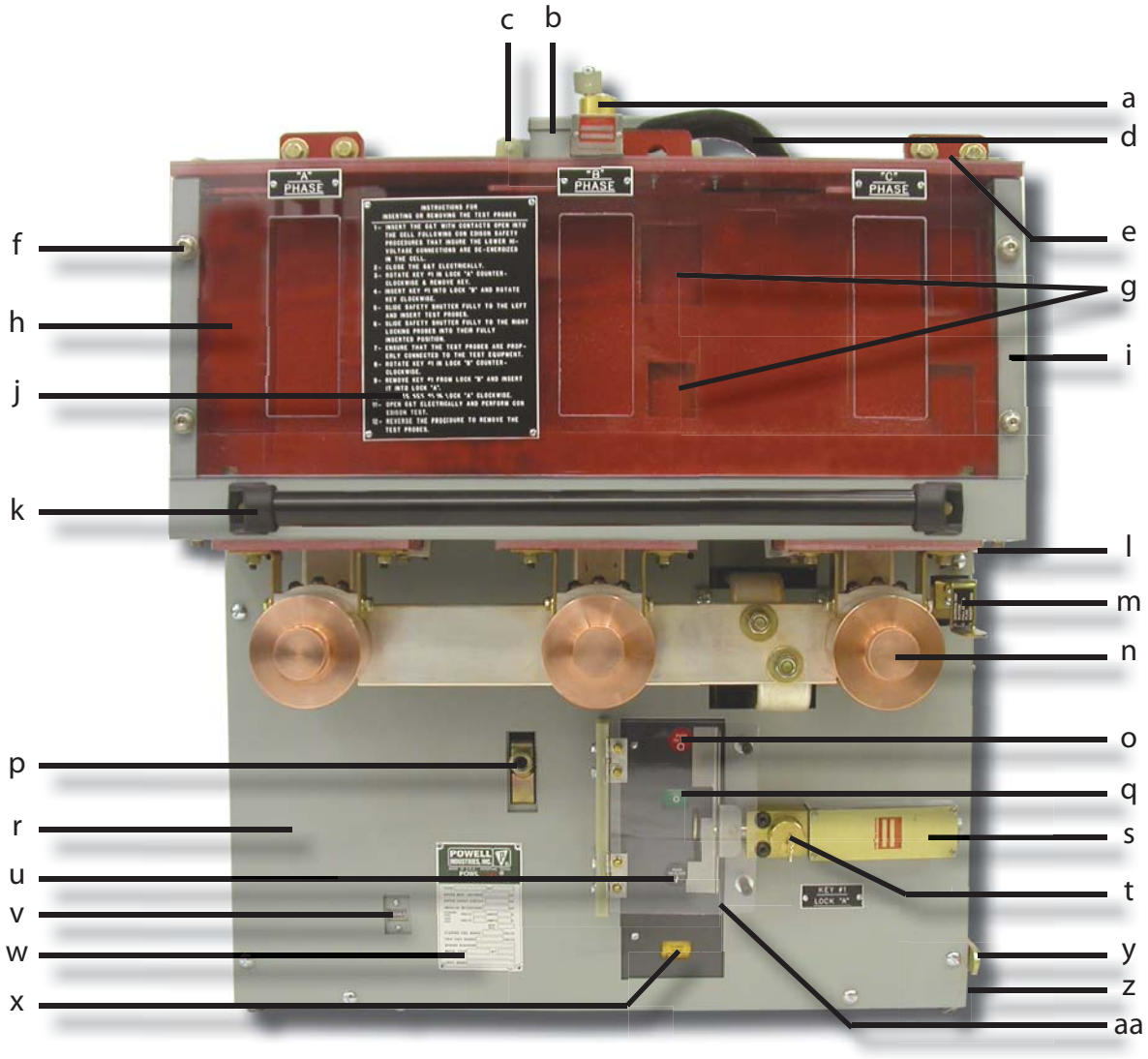
2) Key Lock "B"

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

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.

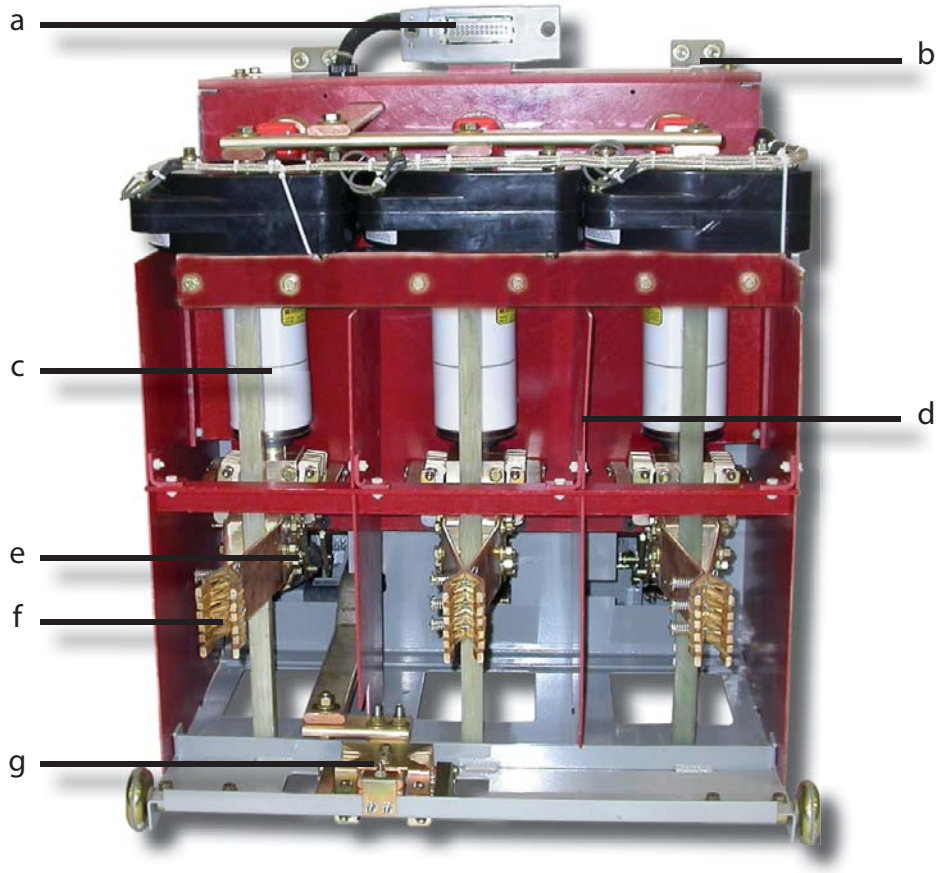
The key is then inserted into key lock "B". With the locking bolt retracted and the test port shutters unlocked, the key is retained. The key is removable only when the locking bolt is extended in either of two positions. One position is with the test port shutters closed, and the other position is with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

Figure 1 Ground & Test Device Front View



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

Figure 2 Ground & Test Device Rear View



a. Secondary Disconnect Receptacle
b. Test Port Shutter Operators
c. Vacuum Interrupter
d. Glastic Barrier
e. Hex-Head Cap Screws
f. Ground Connection

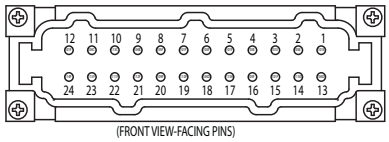
Figure 3 Ground & Test Device Control Scheme

DEVICE IDs

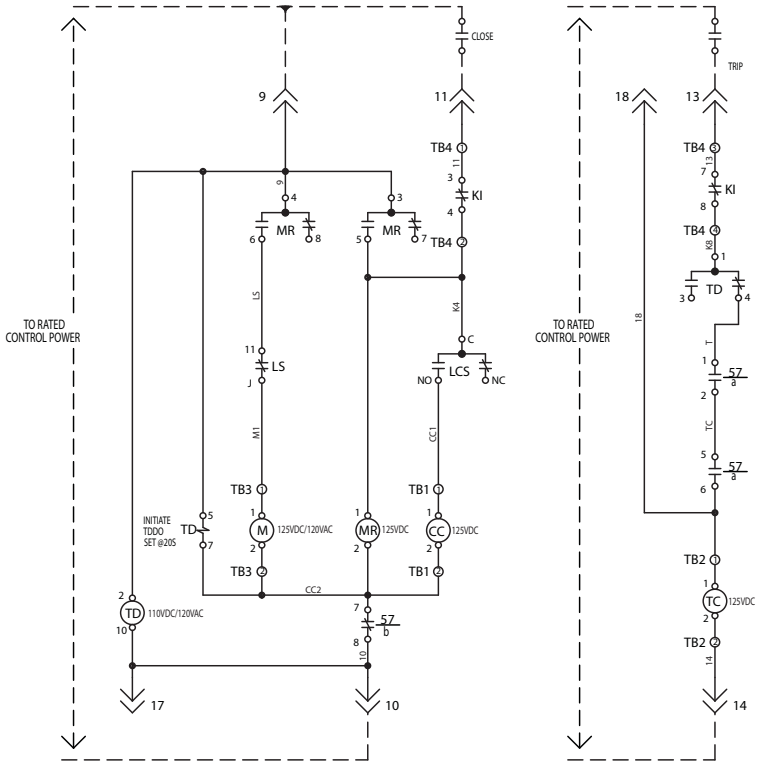
LS = SPRING CHARGE LIMIT SWITCH (SHOWN W/SPRING DISCHARGED)
LCS = LATCH CHECK SWITCH (SHOWN W/SPRING DISCHARGED)
Y = ANTI-PUMP RELAY
TC = BREAKER TRIP COIL
CC = BREAKER CLOSE COIL
M = CHARGING MOTOR
52/a = BREAKER AUXILIARY CONTACT (NORMALLY OPEN)
52/b = BREAKER AUXILIARY CONTACT (NORMALLY CLOSED)
SD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

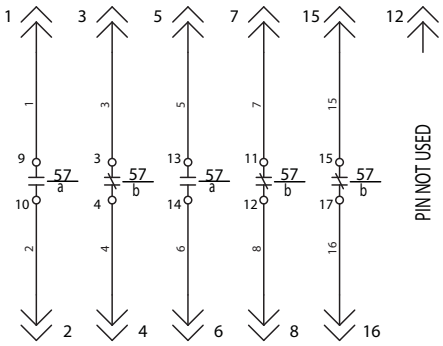
DEVICE CROSS-REFERENCE TABLES

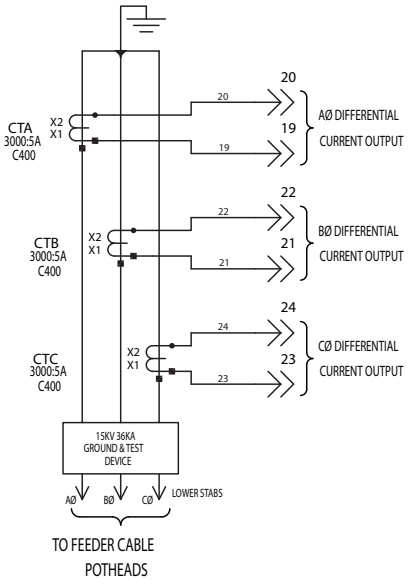
SD



(FRONT VIEW-FACING PINS)







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

KI

CP	1 2	5 6
⊣⊢		
CP	3 4	7 8
⊣/⊢	105C	105D

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
⊣⊢		
CP	11 J	9 M1
⊣/⊢	108B	

LCS

CP	NO C NC
⊣⊢	108C

Ch 4 Installation

A. Receiving

When the ground and test device is received, check for signs of damage. If damage is found or suspected, file claims as soon as possible with the transportation company and notify the nearest Powell representative.

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

Size: 42" wide x 42" deep x 47" high
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 remaining bands and lift the ground and test device off the 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.

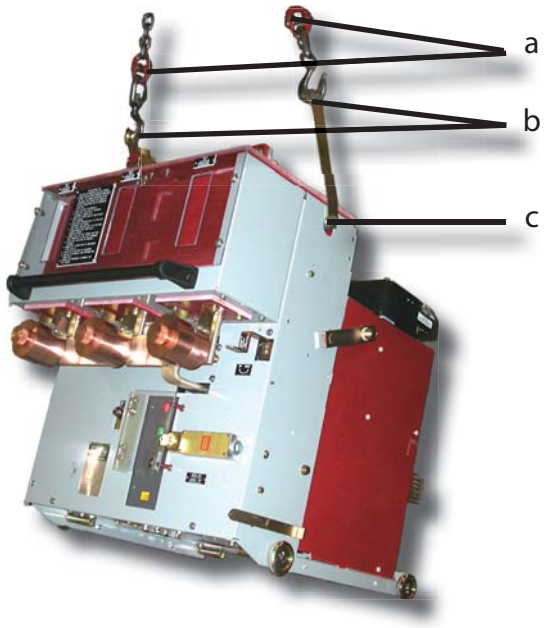
After the ground and test device has been removed from its shipping pallet, the preferred method for moving and handling a ground and test device is to roll it on its own wheels on a lever surface. When rolling the device, it should be pushed and steered by the device frame or by the handle on the front cover.

⚠ CAUTION

Do NOT handle or move the ground and test device by the primary disconnecting devices, as damage to the device may occur.

An overhead crane (Figure 4) can be used to move the ground and test device. When using an overhead crane to move the device use a double hook crane and two lifting devices (Figure 4, a & b). Place the crane hooks into the hook hole ends. Then place the support end of the lifting devices on to the ground and test device (Figure 4, b). Ensure the crane hooks and lifting devices are secure before lifting the device.

Figure 4 Lifting Ground and Test Device using a Crane



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 ensure 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 affect 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 affect 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 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 open position. Test each pole of the ground and test device separately with the other two 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 contact 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 highpot 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 500V or 1000V insulation resistance tester or with an AC high potential tester. The AC high potential test should be made at 1125V, 50 to 60Hz 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 675V, 50 to 60Hz. 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, x) on the front cover shows the

main closing spring condition. The OPEN/CLOSED indicator (Figure 1, q) 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 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 should 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 ground and test device. 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 ground and test device 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 ground and test device 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 control, 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 G&T. 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 circuit breaker control switch on the front door will cause the ground and test device 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 or the test jumper cable 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 bulletin 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.

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

1) Electrical Ground and Test Device Inspection

a. 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 is present see ***Ch 6 Maintenance***, **A. Inspection and Cleaning.**

> ⚠ ***IMPORTANT***
>
> ***If the primary disconnecting devices are damaged, make no attempt to repair them. Contact Powell immediately for further directions.***

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

Ch 5 Operation

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.

The PowlVac® 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, e).

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

B. Operation of the Ground and Test Device

1) Procedures for Applying Ground Con Edison Feeder

a. Verify the Con Edison ground and test device is being inserted in the compartment of the feeder to be grounded.
b. Insert the ground and test device in to the compartment until a "stop" is encountered.
c. Open the transparent guard (Figure 1, aa) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle (Figure 1, m) exposing the racking input shaft.

⚠ CAUTION

PowlVac® 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 ground and test device.

d. Insert a PowlVac racking handle into the racking input shaft (Figures 5 & 6).
e. Rack the G&T device into the CONNECTED position. Rotate the racking handle (Figure 6) clockwise until a positive stop is felt or the torque limiter of the racking handle operates.
f. Follow Con Edison safety procedures to ensure that the lower high voltage connections in the compartment are deenergized.
g. Close the G&T device using the remote control switch.
h. Rotate the key in Lock "A" electrically disabling the G&T device (Figure 1, t). Remove the key from Lock "A". The G&T is now electrically and mechanically locked in the CLOSED position.
i. Secure the key in the Con Edison lock box.

Figure 5 Racking Access Handle

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

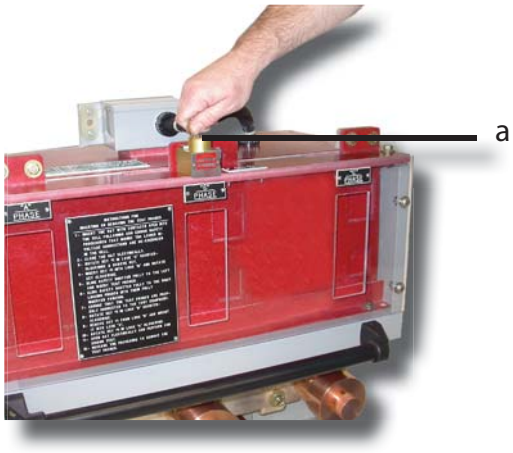
Figure 6 Insert the Racking Handle

a. Racking Handle

Figure 7 Rotate Key in Lock "A"

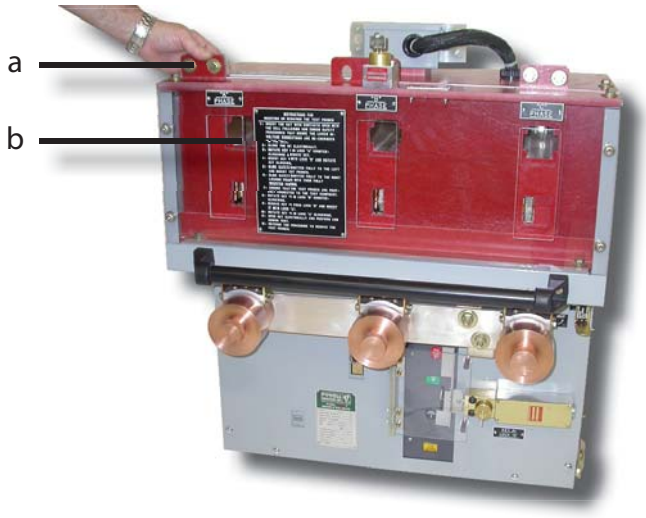
a. Key Lock "A"

Figure 8 Transfer Key from Lock "A" to Lock "B"



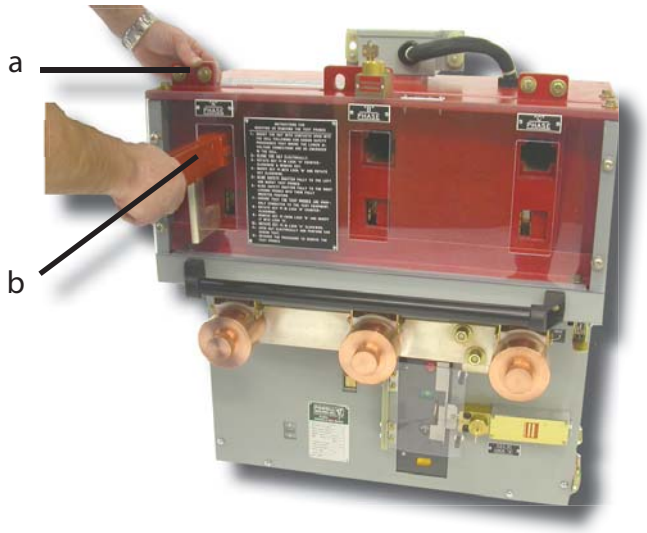
a. Key Lock "B"

Figure 9 Sliding Safety Shutter to the Left



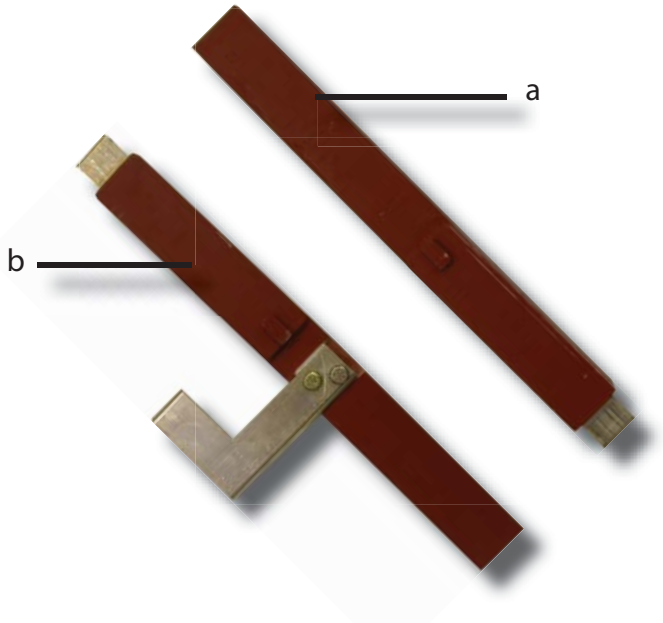
a. Test Port Shutter Operators
b. Test Ports with Shutter Open

Figure 10 Inserting Test Probes



a. Test Port Shutter Operators
b. Test Probe

Figure 11 Test Probes



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

2) Procedure for Testing Feeder

a. Verify the Con Edison ground and test device is being inserted in the compartment of the feeder to be grounded.
b. Insert the ground and test device in to the compartment until a "stop" is encountered.
c. Open the transparent guard (Figure 1, aa) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle (Figure 1, m) exposing the racking input shaft.

⚠ CAUTION

PowlVac® 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 ground and test device.

d. Insert a PowlVac racking handle into the racking input shaft (Figures 5 & 6).
e. Rack the G&T device into the CONNECTED position. Rotate the racking handle (Figure 6) clockwise until a positive stop is felt or the torque limiter of the racking handle operates.
f. Follow Con Edison safety procedures to ensure that the lower high voltage connections in the compartment are deenergized.
g. Close the G&T device using the remote control switch.
h. Close the G&T device using the remote control switch.
i. Rotate the key in Lock "A" electrically disabling the G&T device (Figure 1, t). Remove the key from Lock "A". The G&T is now electrically and mechanically locked in the CLOSED position.
j. Transfer the key removed from Lock "A" to Lock "B" and rotate (Figure 9). Lock "B" unlocks the test port shutter.
k. 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.
l. Install the test probes into the test ports (Figure 10). Move the test port shutter to the right to capture the test probes with the test probe shutter.
m. Rotate the key in Lock "B" to lock the test probes in the test ports. The key in Lock "B" is now available (Figure 8).
n. Transfer the key to key Lock "A" and rotate (Figure 7). The G&T device control circuit is now enabled. The key in Lock "A" is captive.
o. Open the G&T device by using the remote control switch.

The ground and test device is now prepared for testing.

3) Removing the Test Probes

a. Close the G&T device using the remote control switch.
b. Rotate the key in Lock "A" , electrically disabling the G&T device (Figure 7). Remove the key from Lock "A". The G&T device is now electrically and mechanically locked in the CLOSED position.
c. Transfer the key removed from Lock "A" to Lock "B" and rotate (Figure 8). Lock "B" unlocks the test port shutter.
d. Open the test port shutter using the slide handle to move the shutter fully to the left (Figure 9). With the test ports fully open, the key in Lock "B" remains captive.
e. Remove the test probes from the test ports (Figure 10).

f. Move the test port shutter fully to the right. Rotate the key in Lock "B" and remove the key. The test ports are now locked closed.
g. Transfer the key removed from Lock "B" to Lock "A" and rotate (Figure 7). The G&T device control circuit is now enabled. The key in Lock "A" is captive.
h. Open the G&T device using the remote control switch.
i. Open the transparent guard door (Figure 1, aa) and depress the manual trip operator (Figure 1, o) and pull down on the racking access handle exposing the racking input shaft (Figure 5).

⚠ CAUTION

PowlVac® 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 ground and test device.

j. Insert a PowlVac® racking handle onto the racking input shaft (Figures 5 & 6).
k. Racking 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.
l. Remove the G&T device from the compartment.

4) Procedure for Removing Grounds

a. Obtain the key from the Con Edison lock box on premises.
b. Insert the key in Lock "A" and rotate (Figure 7). The G&T device control circuit is now enabled. The key in Lock "A" is captive.
c. Open the G&T device using the remote control switch.
d. Open the transparent guard (Figure 1, aa) and depress the manual trip operator (Figure 1, o) and pull down the racking access handle (Figure 1, m) exposing the racking access input shaft.
e. Insert a PowlVac® racking handle onto the racking input shaft (Figure 6).
f. 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.
g. Remove the G&T device from the compartment.

Ch 6 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 ***Ch 4 Installation,* C. Storage** and **D. Preparing the Electrically Operated Ground and Test Device for Use.**

A permanent record of maintenance work and inspection 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 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 time, wipe these surfaces with a clean, dry cloth, and apply fresh lubricant.

Ch 7 Recommended Renewal Parts and Replacement Procedures

A. Ordering Instructions

1. To order Renewal Parts from Powell, visit the website at www.powellind.com or call 1.800.480.7273.
2. Always specify the complete nameplate information including:
   - Name of end user
   - Location of installation
   - Type of device including rated voltage and rated amperes
   - Serial number of the device
   - Description of part
3. Specify the quantity and description of the part and the instruction bulletin number. If the part is in any of the recommended renewal parts tables, specify the catalog number. If the part is not in any of the tables, a description should be accompanied by a marked illustration from this instruction bulletin or photo.

B. Recommended Renewal Parts

A sufficient amount of stocked parts minimizes service interruptions caused by breakdowns and saves time and expense. When continuous operation is a primary consideration a larger quantity of renewal parts should be stocked depending on the severity of the service and the time required to secure replacement parts.

Since parts may be improved periodically, renewal parts may not be identical to the original parts. The recommended quantity is not specified. This must be determined by the user based on the application.

Powell recommends that only qualified persons perform maintenance on these units. Refer to the Qualified Person Section in the front of this instruction bulletin. If these ground and test devices are installed in a location where they are not maintained by a qualified person, a spare ground and test device should be on site ready replacement. The malfunctioning unit can then be returned to the factory for reconditioning.

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POWELL

IB-50022A
PowlVac® Ground and Test Device 15kV

15GT36ASDE-23 Electrically Operated Ground & Test Device
per Con Edison Specification EI-4102

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