01.4IB.65031A PowlVac 38™ CDS
Manually Operated Test Device

38kV, 1200 & 2000A

*Powered by Safety*®
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Signal Words

As stated in ANSI Z535.4-2007, 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”, “Caution” and “Notice”. 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, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION, used without the safety alert symbol, is used to address practices not related to personal injury.

**NOTICE**

NOTICE is used to address practices not related to personal injury.

Qualified Person

For the purposes of this manual, a qualified person, as stated in NFPA 70E®, is one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid 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 qualified 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.

NOTICE

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.

NOTICE

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 PowlVac 38™ CDS Manually Operated Test device:

- 1200A - three or six poles; three phase, 38kV
- 2000A - three or six poles; three phase, 38kV

B. Purpose

The information in this instruction bulletin is intended to provide information required to properly operate and maintain the PowlVac 38 CDS manually operated 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 PowlVac 38 CDS manually operated test device
3. Instructions for installation and placing the test device into service
4. Instructions for part replacement
5. Information for ordering renewal parts
6. Procedure for critical adjustments
7. Illustrations, photographs, and description of the test device

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

All illustrations and photos 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

Changes to the instruction bulletin may be implemented at any time and without notice. Go to www.powellind.com to ensure use of the current instruction bulletin for the Powell equipment.

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.

For specific questions or comments pertaining to this instruction bulletin email documents@powellind.com with the IB number in the subject line.

D. Associated Instruction Bulletins

- 01.4IB.65202A PowlVac 38-AR™ Arc Resistant Metal-Clad Switchgear
- 01.4IB.65110A PowlVac 38™ CDS Vacuum Circuit Breaker
Ch 2  Safety

A.  Safe Work Condition

The information in Section A is quoted from NFPA 70E 2012 - 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.

Informational Note: See ANSI/ISA-61010-1 (82.02.01)/UL 61010-1, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements, for rating and design requirements for voltage measurement and test instruments intended for use on electrical systems 1000 V and below.

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 PowlVac 38™ CDS Manually Operated Test device.

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.

It is mandatory that the following rules be observed to ensure the safety of personnel associated with usage, installation, operation, and maintenance of these 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 38™ CDS manually operated test device.
C. **General**

1. Only supervised and qualified personnel trained in the usage, installation, operation, and maintenance of the PowlVac 38™ CDS manually operated 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 test device reliability and safety.

3. Service conditions and applications shall also be considered in the development of safety programs. Variables include ambient temperature; humidity; and any adverse local conditions including excessive dust, ash, corrosive atmosphere, vermin and insect infestations.

D. **Specific**

When operating the test device safety precautions 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 test device.

The following specific safety precautions must be observed:

1. Do not attempt to ground an energized circuit. The circuit to be grounded should always be treated as energized until proven otherwise.

2. 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.

3. Store the manually operated test device in a clean, dry area free from dust, dirt, moisture, caustic atmosphere, and vermin.

4. Keep all insulating surfaces, which include primary support insulation and insulation barriers, clean and dry.

5. Check all primary circuit connections to make certain that they are clean and tight.

6. Take extreme care while using this device to avoid contacting “live” or “hot” (energized) terminals.

E. **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 test device is handled, operated, or maintained.

**NOTICE**

**Warning and Caution labels are located in various places in and on the switchgear and on the test device. Always observe these warnings and caution labels. Do NOT remove or deface any of these warning/caution labels.**
A. General

The PowlVac 38™ CDS test device is similar to the PowlVac 38 CDS circuit breaker and can be temporarily inserted in place of a circuit breaker in a metal-clad switchgear compartment for the purpose of testing. The manual test device comes in a three or six test port model.

The test device consists of a wheeled frame on which are mounted primary disconnecting devices (Figure 2, a & b). The front of the device has four lockable access doors: two (2) upper doors, and two (2) lower doors (Figure 3, a & c). Three upper test ports are mounted behind the upper access doors, and three lower test ports are located behind the lower access doors. Each of the test device test ports is connected to one of the six primary disconnect devices in the switchgear compartment. The upper test device test ports are connected to the upper primary disconnect devices of the switchgear compartment. The lower test device test ports are connected to the lower primary disconnect devices of the switchgear compartment. Isolation barriers between the primary disconnect devices are also provided where required.

The test device is equipped with a ground shoe which engages the ground bus in the switchgear compartment. A ground bar extends from the ground shoe to the lower front part of the test device (Figure 1, f). Three test probes with flexible testing cables attached are supplied. Refer to Ch 5 Operation, A. Testing for proper use of the test probes.

Each test device and metal-clad switchgear is provided with interference plates (Figure 2, c) which are designed to ensure that no test device with other than the required voltage and continuous current compartment compatibility is placed in the incorrect circuit breaker compartment. If an attempt is made to install an improperly rated test device into the circuit breaker compartment, these plates will interfere with each other and deter further insertion. The interference will occur before the test device reaches the disconnected position. Do not attempt to force the test device past the compartment interference plate or remove the interference plates from either the compartment or the test device.

Do not attempt to force the test device past the compartment interference plate or remove the interference plates from either the compartment or the test device.

The test device is equipped with a racking mechanism to engage and disengage it in the compartment. The racking mechanism is operated by the hand crank as described in instruction bulletin 01.4IB.65202A. The test device is equipped with a anti-rollout latch (Figure 1, h) to prevent inadvertent removal from the compartment.
**Figure 1**  
*PowlVac 38™ CDS Manually Operated Test Device - Front*

- a. Lifting Point
- b. Nameplate
- c. Warning Label
- d. Racking Crank Arm
- e. Caution Label
- f. Racking Access (teardrop)
- g. Ground Bar
- h. Anti-Rollout Latch
- i. Wheel

**Figure 2**  
*PowlVac 38™ CDS Manually Operated Test Device - Rear*

- a. Upper Primary Disconnecting Devices
- b. Lower Primary Disconnecting Devices
- c. Interference Plate
Figure 3  PowlVac 38™ CDS Manually Operated Test Device - Access Doors Open

- a. Upper Access Door
- b. Test Port
- c. Lower Access Door

Figure 4  Test Probe

- a. Test Probe
- b. Grounding Cable
- c. Test Device Connection Terminal
The PowlVac 38™ CDS Manually Operated Test Device can be supplied with the following compatibility options:

- 1200A only
- 2000A only

The 1200A test device is supplied with small, 2.25 inch diameter, primary disconnecting devices. The 2000A test device is supplied with large 3 inch diameter, primary disconnecting devices.

<table>
<thead>
<tr>
<th>Test Device Type</th>
<th>Max Voltage (kV)</th>
<th>Max Continuous Current (Amperes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38GT40CDS</td>
<td>38</td>
<td>1200</td>
</tr>
<tr>
<td>38GT40CDS</td>
<td>38</td>
<td>2000</td>
</tr>
</tbody>
</table>
Ch 4 installation

A. RECEIVING

When the test device is received check for any sign of damage. If damage is found or suspected, file all claims immediately with the transportation company and notify the nearest Powell representative.

Estimated size and weight for shipping a PowlVac 38™ CDS Manually Operated Test Device on a pallet:

- Size: 42” width x 42” depth x 47” height
- Weight: 500 lbs.

Figure 5 shows the test device enclosed in the carton used for shipment. The carton is attached to the shipping pallet by two metal bands. Remove these bands and lift the carton from the pallet so that the test device is visible. The test device is attached to the pallet by two metal bands. When these are removed the test device may be removed from the shipping pallet. Refer to Ch 4 Installation, B. HANDLING, for more information.

B. HANDLING

After the test device has been removed from its shipping pallet it may be rolled on its own wheels on a level surface. This is the preferred way of handling the test device. When rolling the test device it should be pushed and steered by the steel frame or the front cover.

CAUTION

Do not handle or move the test device by the primary disconnecting devices, as damage may occur.

If necessary, the test device can be moved by a fork lift truck or an overhead crane. When using a fork lift truck take care to avoid components located under the test device floor pan. The device can also be lifted by an overhead crane using the two lifting points which have been provided for hooks at the top of the frame side sheets (Figure 1, a). The test device will tilt backward when it is lifted by a crane. Therefore, when setting down the test device, it will be necessary to guide the test device to ensure that all four wheels are placed on a level surface. Use the top front of the frame to guide the test device to an upright position on a level surface.

C. STORAGE

Shipping and storage of electrical equipment requires measures to prevent the deterioration of the apparatus over a long unused period. The mechanical and dielectric integrity must be protected. Electrical equipment is designed for use in a variety of environments. When the equipment is in transit and storage, these design considerations are not fully functional. In general, the following measures must be considered.
1. Equipment designed for indoor installation must be stored indoors in a climate controlled environment to prevent condensation of moisture. Exposure to rain and the elements, even for a short period, can permanently damage the equipment. Space heaters within the equipment should be energized, if so equipped. Humidity controlling desiccant materials should be utilized when space heaters are not provided or cannot be energized. The temperature should be kept above 33°F/1°C and below 140°F/60°C. The relative humidity should be kept below 60% or a dew point of 15°C/59°F. The equipment should be stored in such a manner as to leave all doors and panels accessible for inspection. The equipment must be inspected on a routine basis to assure operational integrity.

2. Equipment designed for outdoor exposure may be stored either in indoor or outdoor storage locations. The equipment must be protected from airborne external contaminates if stored outdoors. Outdoor storage will also require additional care to maintain temporary covers over the openings and shipping splits. The equipment must be provided with control power to facilitate the energization of space heaters, as well as other temperature and humidity controlling equipment. The temperature should be kept above freezing (>33°F/1°C) and below (<140°F/60°C). The relative humidity should be kept below 60% or a dew point of 15°C/59°F. The equipment should be stored in such a manner as to leave all doors and panels accessible for inspection. The equipment must be inspected on a routine basis to assure its integrity.

3. The auxiliary control devices, ship loose material and protective relays must also be protected. This includes items such as battery chargers, UPS systems, lighting, installation hardware and air conditioning. If prolonged storage is anticipated, humidity controlling desiccant materials should be utilized. Desiccant packets should be installed in all compartments and packing containers.

D. INSERTING THE TEST DEVICE INTO METAL-CLAD SWITCHGEAR

Refer to the metal-clad switchgear instruction bulletin and drawings produced specifically for the installed equipment including additional information and cautions before attempting to insert the test device into the test device compartment.

NOTICE

Be sure that the racking crank arms at the sides of the test device point in the direction of the primary disconnecting devices.

Each test device and metal-clad switchgear is provided with interference plates (Figure 2, c) which are designed to ensure that no test device with other than the required voltage or continuous current is placed in the incorrect circuit breaker compartment. If an attempt is made to insert an improperly rated test device into the circuit breaker compartment, these plates will interfere with each other and deter further insertion. The interference will occur before the test device reaches the disconnected position. Do not attempt to force the test device past the compartment interference plate or remove the interference plate or remove the interference plates from either the compartment or the test device.
1) **Prior to Inserting the Test Device into the Metal-Clad Switchgear**

   a. **Check the Primary Disconnecting Devices and Test Device Compartment**

   Examine the primary disconnecting devices for any signs of damage or contamination. Check to see that none are bent out of alignment. If contamination is found refer to [Ch 6 Maintenance, A. General, 2) Inspection and Cleaning](#). If the primary disconnecting devices are damaged make no attempt to repair. Contact Powell for further information.

   Examine the circuit breaker compartment to see that it is clean and clear of debris that might interfere with test device travel.

   b. **Racking the Test Device into Non Arc Resistant Switchgear**

   The PowlVac 38™ CDS test device is designed to be manually racked into the non arc resistant switchgear with the circuit breaker compartment door open using the manual racking handle that is provided.

   Refer to instructions in [Ch 5 Operation, A. Testing](#) to operate the test device.

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**E. Inserting the Test Device into Arc Resistant Metal-Clad Switchgear**

For arc resistant metal-clad switchgear, closed-door racking interlocks must be temporarily defeated for racking test devices into the circuit breaker compartment. The use of test devices requires access to the front of the devices to allow for connection of the remote electrical control to the test device.

To gain access to the front of the device the breaker compartment door must remain open during use. Refer to instruction bulletin 01.4IB.65202A, [Ch 5 Operation, F. Interlocks, 1) Closed-Door Racking Interlocks](#) for the procedure to defeat the interlock.

Once the door interlock is defeated, refer to instructions in [Ch 5 Operation, A. Testing](#) to operate the test device.
Ch 5 Operation

As stated in IEEE C37.20.6-2007, §9.5, “Ground and test devices are used infrequently and therefore are stored for long periods of time. They should be stored in a clean, dry area, free from dust, dirt, moisture, and the like.” However, even though it is assumed that the test device was stored properly, it should be carefully inspected and maintained before each use.

The following procedure is recommended before each use of the test device.

1. All insulating surfaces, including but not limited to the primary support insulation, voltage probes, and isolation barriers, should be clean and dry.
2. All primary circuits, including cables and connections, should be clean and tight.
3. All primary and ground disconnect contacts should be clean, with the correct contacts in place and properly lubricated.
4. All locks and interlocks should be fully functional in accordance with the instruction bulletin of the test device.
5. A 1 minute power frequency voltage withstand test should be conducted on the complete test device at 75% of the rated values.

Note: Field tests may be conducted with dc voltage sources provided that the instantaneous dc voltage is no more that 1.414 times 75% of the normal frequency withstand ac rms voltage listed in Table 1 of IEEE Std C37.20.2-1999.

Table B Field Dielectric Test Values

<table>
<thead>
<tr>
<th>Rated Maximum Voltages (kV rms)</th>
<th>Power Frequency Withstand (kV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>60</td>
</tr>
</tbody>
</table>

CAUTION

Because of the construction of bus sectionalizing units and other special types of construction, it is NOT possible to make a general statement about which set of primary disconnects is connected to the switchgear main bus and which is connected to the outgoing conductors. Before using the test device, the operator must determine the physical location of the primary disconnects to be tested. This can be determined by referencing the equipment drawings or by examining the equipment.

A. Testing

The test device may be used to gain access to switchgear connections for high voltage testing. For testing, follow these steps:

NOTICE

Prior to inserting or removing the circuit breaker, refer to the latest version of the appropriate circuit breaker and switchgear bulletins and any site specific work instructions.

CAUTION

Prior to removing the circuit breaker from the circuit breaker compartment, make sure that the control circuits are deenergized.
1. Remove the circuit breaker from the compartment to be tested.
2. Verify that the diameter of the primary disconnect devices of the manual test device matches the diameter of the circuit breaker removed in Step 1.
3. With the test probes disconnected and stored, and the access door or doors over the test ports connected to the terminals to be tested removed, align the wheels of the test device with the floor pan channels of the compartment and verify that the floor pan channels are free of debris prior to inserting the test device.
4. Roll the test device into the breaker compartment until the racking crank arms make contact with the vertical slots in the compartment. The anti-rollout latch underneath the test device will engage the block in the compartment, preventing accidental removal of the test device from the compartment.

**WARNING**

Do NOT attempt to use the PowlVac 38™ CDS Test Device to ground an energized circuit. An attempt to do so will result in severe damage to the device and the switchgear in which it is being used, and may result in serious injury to operating personnel.

5. Rotate the levering access (teardrop) flap (Figure 1, f) on the test device front cover so that the racking shaft is visible.
6. Insert the racking handle onto the racking shaft.
7. Turning the racking handle clockwise will begin to rack the test device into the compartment. When the test device is racked into the compartment, the force needed to rotate the racking handle will be low at the beginning of motion as the movement of the racking crank arms is only opening the shutters. Once the shutters are open, the test device begins to move toward the stationary primary disconnecting devices. When the movable primary disconnecting devices of the test device engage with the stationary primary disconnecting devices of the compartment, the force required to rotate the racking handle will increase appreciably. This force will decrease as the primary disconnecting devices spread and engage fully. Continuing rotation of the racking handle will cause the test device to travel further into the compartment ensuring wipe or overlap of the primary disconnecting devices. Continue racking until the test device reaches the end of the racking travel, the user will notice an increased amount of force. If the operator continues to apply force, a torque limiter on the racking handle will produce a sharp clicking sound indicating the torque limit is reached at 35-ft-lb. Should the operator continue to apply force, the torque limiter will continue to operate with no further buildup of torque on the test device racking mechanism.

8. Once the test device has reached the connected position remove the racking handle from the racking drive shaft and operate the test device as required.
9. If the testing to be done involves measurement of system voltages, such as verifying the proper phase relationship between circuits on the two sides of the device:
   a. Remove the necessary access doors.
   b. Using proper high voltage instrumentation and observing all safety rules, make the desired measurements.
10. If the testing to be done involves application of test voltages, such as for high potential testing (hipot):
   a. Ensure that the circuit to be tested is deenergized. If there are power sources to this circuit other than the circuit breaker where the test device is to be used, the switching devices at these alternate sources shall be locked or tagged open in accordance with the user's standard safety procedures to ensure that they will not be closed during the testing operation.
   b. Verify that the circuit is deenergized. Using a high voltage voltmeter and test probe rated for the system voltage, or another safe voltage measuring method, verify that the three terminals to be tested are not energized.
   c. Attach the test probes to the appropriate test ports and conduct tests.

11. When testing is completed, remove the test probes.

12. Rotate the levering access (teardrop) flap on the test device front cover so that the racking drive shaft is visible.

13. Insert the racking handle onto the racking drive shaft.

14. Turning the racking handle counterclockwise will begin to rack the test device out of the compartment. Once the test device has reached the disconnect position press the anti-rollout latch to release the test device and pull the device out of the circuit breaker compartment.

15. Replace the access doors on the test device.
**Ch 6 Maintenance**

**A. General**

The test device requires little routine maintenance. Proper storage when the device is not in use is essential. See *Ch 4 Installation*, C. Storage for storage procedures.

1) **Lubrication**

Powell offers a complete lubrication kit (Powlube-104) which contains all the lubricants required for maintaining the test device. Powlube-104 consists of (1) A-grease, (1) B-grease, and (1) C-oil. Prior to March 2014, Powell provided Powlube-101 and Powlube-102 which contained (1) tube of Anderol 757 or Rheolube 368A, (1) tube of Mobilgrease 28 and (1) bottle of Anderol A456 oil.

A-grease should be lightly applied to those bearing surfaces that are accessible. Inaccessible surfaces such as bearings may be lubricated with a light synthetic machine oil such as C-oil. B-grease should be applied to the electrical contact surfaces.

The contact surfaces of the primary disconnect devices and the fingers of the ground shoe should be lubricated with a thin film of B-grease. Before use, particularly if the device has been in storage for a long period of time, wipe these surfaces clean and apply fresh lubricant.

The racking device and wheels require the same lubrication as on the circuit breakers. Refer to 01.4IB.65110A for details.

2) **Inspection and Cleaning**

Visually check the test device for loose or damaged parts. Tighten or replace loose or missing hardware. Any damaged parts that will interfere with the normal operation of the test device should be replaced.

Clean the test device by removing any loose dust and dirt. Use a vacuum cleaner or wipe with a dry lint-free cloth or an industrial-type wiper to clean the test device.
Ch 7  Recommended Renewal Parts and Replacement Procedures

A. Ordering Instructions

1. Order Renewal Parts from the Powell Service Division at www.powellservice.com or call 1.800.480.7273.
2. Always specify complete nameplate information, including:
   a. Test Device Type
   b. Serial Number
   c. Rated Voltage
   d. Rated Amps
   e. Impulse Withstand
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 renewal parts should be stored to enable the prompt replacement of any worn, broken, or damaged part. 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 greater amount of renewal parts should be stocked, the quantity depending on the severity of the service and the time required to secure replacements.

Since parts may be improved periodically, renewal parts may not be identical to the original parts. Table C lists the recommended spare parts to be carried in stock by the user. It is recommended that one set of parts be stocked at all times.

<table>
<thead>
<tr>
<th>Table C Recommended Renewal Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantity</strong></td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
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</table>
01.4IB.65031A PowlVac 38™ CDS
Manually Operated Test Device

38kV, 1200 & 2000A

June 2014