

## **IB-51800 Remote Racking Device for PowlVac<sup>®</sup> AM**

used on GE Magneblast  
Vacuum Replacement Circuit Breakers

## **Contact Information**

### **Powell Electrical Systems, Inc.**

[www.powellind.com](http://www.powellind.com)

[info@powellind.com](mailto:info@powellind.com)

#### **Service Division**

PO Box 12818

Houston, Texas 77217-2818

Tel: 713.944.6900

Fax: 713.948.4569



## 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.

*This page is intentionally left blank.*



## Contents

<b>Ch 1</b>	<b>General Information.....</b>	<b>1</b>
A.	SCOPE .....	2
B.	PURPOSE.....	2
C.	INSTRUCTION BULLETINS AVAILABLE ELECTRONICALLY.....	2
<b>Ch 2</b>	<b>Safety.....</b>	<b>3</b>
A.	SAFE WORK CONDITION .....	3
B.	SAFETY GUIDELINES .....	3
C.	GENERAL.....	4
D.	SPECIFIC.....	4
E.	X-RAYS .....	5
F.	SAFETY LABELS.....	5
<b>Ch 3</b>	<b>Equipment Description.....</b>	<b>6</b>
A.	GENERAL.....	6
B.	MOTOR CONTROL BOX.....	6
C.	ELECTRIC RACKING DEVICE.....	6
<b>Ch 4</b>	<b>Installation &amp; Operation .....</b>	<b>9</b>
A.	RECEIVING .....	9
B.	HANDLING.....	9
C.	OPERATION.....	9
D.	INSERTING THE CIRCUIT BREAKER INTO THE SWITCHGEAR COMPARTMENT.....	10
E.	REMOVING THE REMOTE RACKING DEVICE FROM THE SWITCHGEAR COMPARTMENT.....	11
F.	REMOVING THE CIRCUIT BREAKER FROM THE SWITCHGEAR COMPARTMENT.....	11

---

## Figures

<b>Figure 1</b>	<b><i>PowlVac® AM Remote Racking Device.....</i></b>	<b>7</b>
<b>Figure 2</b>	<b><i>Close-Up of Motor Control Box.....</i></b>	<b>7</b>
<b>Figure 3</b>	<b><i>Racking Motor in Place (NOT locked in) .....</i></b>	<b>8</b>
<b>Figure 4</b>	<b><i>Mechanism Keeper Arm in Place .....</i></b>	<b>8</b>
<b>Figure 5</b>	<b><i>Racking Motor Locked in Place.....</i></b>	<b>8</b>
<b>Figure 6</b>	<b><i>Overhead View of Racking Motor.....</i></b>	<b>8</b>



## 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 Remote Racking Devices for PowlVac® AM replacement circuit breakers:

- 60730G22 - 125VDC
- 60730G25 - 250VDC

**B. PURPOSE**

The information in this instruction bulletin is intended to provide information required to properly operate and maintain the PowlVac AM Remote Racking Devices described in **Ch 1 General Information, A. SCOPE.**

This instruction bulletin provides:

1. Safety guidelines
2. General descriptions on the operation of the PowlVac AM Remote Racking Device
3. Instructions for installation
4. Illustrations, photographs, and description of the equipment described in **Ch 1 General Information, A. SCOPE.**

The illustrations contained in this document may not represent the exact construction details of each particular type of remote racking 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.*



***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](http://www.powellind.com). To contact the Powell Service Division call 1.800.480.7273 or 713.944.6900, or e-mail [info@powellservice.com](mailto: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

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 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® AM Remote Racking Device.*

**C. GENERAL**

1. Only supervised and qualified personnel trained in the usage, installation, operation, and maintenance of the circuit breaker 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 circuit breaker's 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**

1. **DO NOT WORK ON AN ENERGIZED CIRCUIT BREAKER.** If work must be performed on a circuit breaker, remove it from service and remove it from the metal-clad switchgear.
2. **DO NOT WORK ON A CIRCUIT BREAKER WITH THE CONTROL CIRCUIT ENERGIZED.**
3. **EXTREME CARE MUST BE EXERCISED TO KEEP ALL PERSONNEL, TOOLS, AND OTHER OBJECTS CLEAR OF MECHANISMS WHICH ARE TO BE OPERATED, DISCHARGED, OR RELEASED.** These circuit breakers utilize stored energy

mechanisms. These mechanisms must be serviced only by skilled and knowledgeable personnel capable of releasing each spring load in a controlled manner. Detailed information regarding these mechanisms is found in this instruction bulletin.

4. **DO NOT ATTEMPT TO CLOSE THE CIRCUIT BREAKER MANUALLY ON AN ENERGIZED CIRCUIT.**
5. **DO NOT USE AN OPEN CIRCUIT BREAKER AS THE SOLE MEANS OF ISOLATING A HIGH VOLTAGE CIRCUIT.** For complete isolation, the circuit breaker shall be in the disconnected position or shall be withdrawn completely.
6. **ALL COMPONENTS SHALL BE DISCONNECTED BY MEANS OF A VISIBLE BREAK AND SECURELY GROUNDED FOR SAFETY OF PERSONNEL PERFORMING MAINTENANCE OPERATIONS ON THE CIRCUIT BREAKERS.**
7. Interlocks are provided to ensure the proper operating sequences of the circuit breakers and for the safety of the user. If for any reason an interlock does not function as described, do not make any adjustments, modification, or deform the parts. **DO NOT FORCE THE PARTS INTO POSITION. CONTACT POWELL FOR INSTRUCTIONS.**



## 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 circuit breaker 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 CIRCUIT BREAKER 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.



### **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 PowIVac-AM® Remote Racking Device is an accessory which enables circuit breakers to be racked into and out of switchgear from a distance. The accessory consists of a motor control box (Figure 1, e) and electric racking device assemblies (Figure 1, a, b, c, & d).

### **B. MOTOR CONTROL BOX**

The motor control box (Figure 2) supplies power and enables the selection of operating modes for the electric racking device. The motor control box has a 30 foot long cord (Figure 1, b) which is connected to the electric racking device. The length of the cord enables the user to move to a safe distance from the circuit breaker during the racking in or racking out procedures.

### **C. ELECTRIC RACKING DEVICE**

The electric racking device uses a mechanism keeper arm (Figure 1, c) to connect to the front of the circuit breaker cell. The racking drive coupler (Figure 1, d) engages the elevating mechanism after the racking device is installed. The racking drive coupler (Figure 1, d) can be turned to engage the drive socket with the circuit breaker racking shaft. When the racking device is connected to the motor control box and energized, the drive socket operates the circuit breaker racking mechanism during the racking in or racking out procedures.

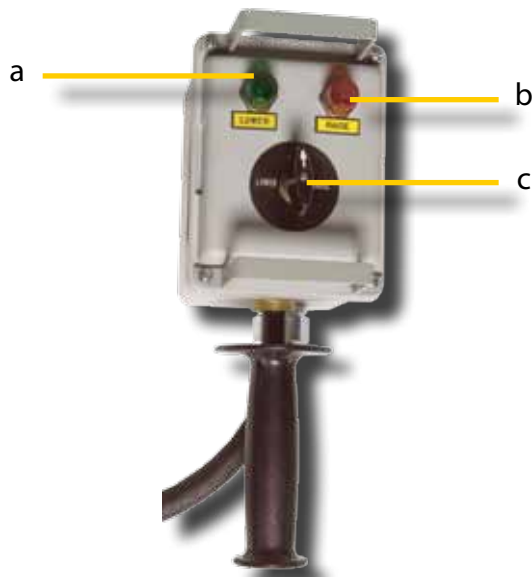


**Figure 1** PowlVac® AM Remote Racking Device



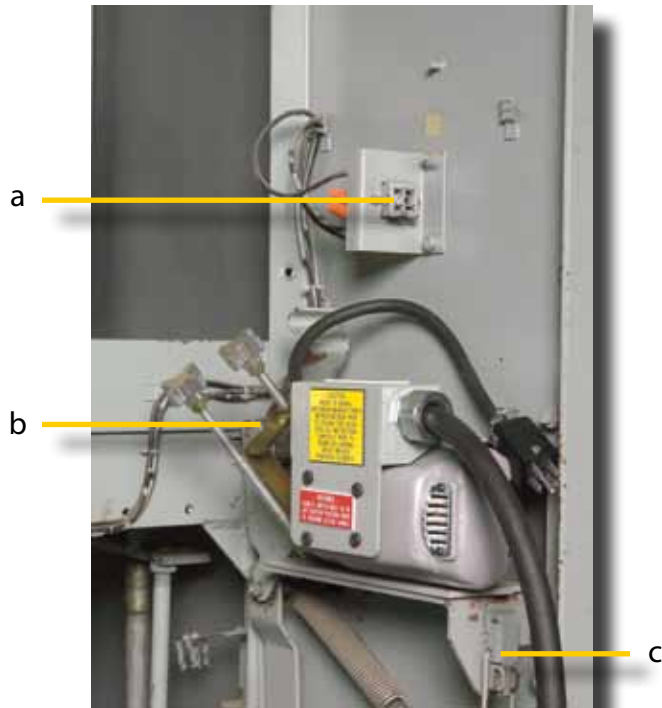
- a. Power Supply Cord
- b. Control Box Cord
- c. Mechanism Keeper Arm
- d. Clutch Coupler
- e. Motor Control Box
- f. Handle

**Figure 2** Close-Up of Motor Control Box



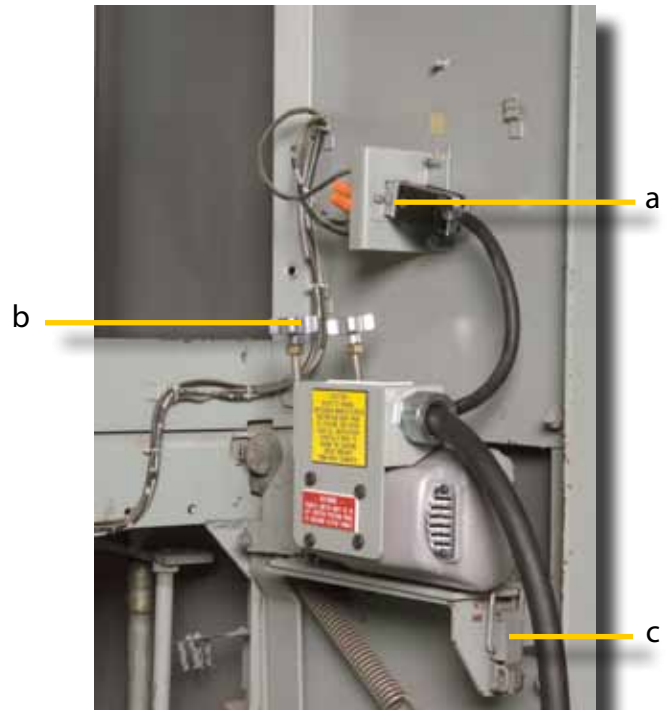
- a. Lower Indicating Light
- b. Raise Indicating Light
- c. Selector Switch (shown in neutral position)

**Figure 3 Racking Motor in Place (NOT locked in)**



- a. Circuit Breaker Compartment Power Receptacle
- b. Mechanism Keeper Arm
- c. Circuit Breaker Compartment Latch (open position)

**Figure 5 Racking Motor Locked in Place**



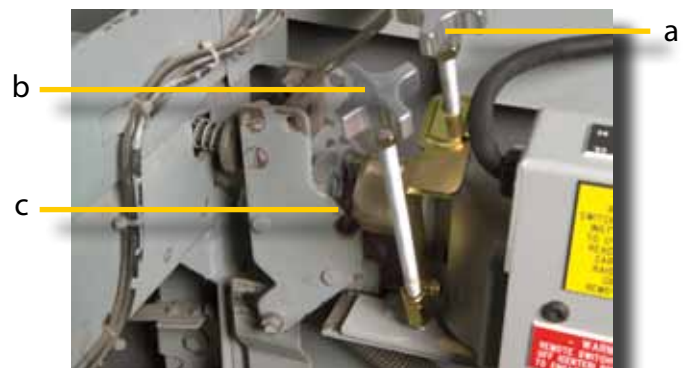
- a. Power Supply Cord Inserted into the Power Receptacle
- b. Mechanism Keeper Knob
- c. Circuit Breaker Compartment Latch (locked position)

**Figure 4 Mechanism Keeper Arm in Place**



- a. Clutch Handle

**Figure 6 Overhead View of Racking Motor**



- a. Right Hand Knob
- b. Left Hand Knob
- c. Drive Coupler



## Ch 4 Installation & Operation

### A. RECEIVING

Upon receipt, remove any shipping material and inspect the electric racking device for damage that may have occurred during shipment. Check the equipment received against the shipping documents to ensure receipt of the complete shipment.

### B. HANDLING

The electric racking device weighs 20 lbs. and the motor control box assembly weighs 5 lbs. The preferred method for moving the electric racking device and motor control box is to place them securely on a hand operated shop cart. Avoid dropping or hitting the electric racking device with hard objects.



**Protect the motor control box and the racking device from moisture. Failure to do so may cause damage to the equipment.**



**Do NOT handle or carry the racking device by the power cords. Damage to the power connections may cause an electrical short. The power cords should be inspected for any signs of damage before each use.**

### C. OPERATION



**Do NOT work on an energized circuit breaker. Follow circuit breaker safety guidelines and operating instruction provided in the specific circuit breaker instruction bulletin.**

Attaching and operating the electric racking device can be accomplished by one person.

Follow these steps to place the breaker in the operating position:

1. Lower the elevating mechanism lifting brackets until the lifting brackets are in the fully lowered position. The breaker should then enter the compartment freely.
2. After first assuring the breaker is in the open position, push the breaker into the compartment until it rests against the rear of the front lifting saddle of the elevating mechanism. The clearance between the interference block on the interlock mechanism should be from 1/16" to 1/8". At this point the breaker positive interlock roller should be centered in the bottom "vee" of the interlock cam plate.

For more detailed information on the circuit breaker handling, see the instruction bulletin for the circuit breaker in use.

**D. INSERTING THE CIRCUIT BREAKER INTO THE SWITCHGEAR COMPARTMENT****CAUTION**

***Before installing any circuit breaker into a switchgear compartment, the user MUST verify that the circuit breaker rating meets the metal-clad switchgear rating.***

Follow the steps below to insert the circuit breaker into the switchgear compartment:

**CAUTION**

***Prior to inserting the circuit breaker into the switchgear compartment, make sure that the control circuits are deenergized.***

1. Remove the existing elevating motor if required.
2. On the remote motor control box move the power switch to the neutral/off position (Figure 2, c).
3. Place the Powell remote racking motor onto the vacated shelf in the compartment (Figure 3).
4. Latch the motor plate into place. The circuit breaker compartment latch (Figure 5, c) should latch onto the tab on the rear of the motor base plate. There is also a guide pin on the bottom of the base which should match the hole in the cubicle mounting plate. The Powell racking motor should mount in place the same way the original motor was mounted.
5. Connect the 5 prong plug (Figure 5, a) on the remote racking motor into the circuit breaker compartment power receptacle.
6. Loosen the left hand knob (Figure 6, b) so the mechanism keeper arm moves freely from the vertical position to 45 degrees to the left.
  - a. Left Hand Knob (Figure 6, b) - when loosened the mechanism keeper arm can move freely from the vertical position to approximately 45 degrees to the left (Figure 3). The mechanism keeper arm is locked in the vertical position once the left hand knob has been tightened.
  - b. Right Hand Knob (Figure 6, a) - is used to lock the clutch handle in place so the limit switch will pick up and power will flow to the motor.
7. Ensure the male and female clutch couplers (Figure 6, c) are aligned. They can be aligned by turning the knurled male coupler on the remote device.
8. With the mechanism keeper arm 45 degrees left of center (Figure 3, b), pull the racking motor clutch handle (Figure 4, a) down.
9. Move the mechanism keeper arm back to the center position and turn the left knob until the mechanism keeper arm is locked in place (Figure 5).
10. Release the clutch handle. The clutch couplers should be fully engaged. If they are not fully engaged, turn the right hand knob to push the clutch handle further down to fully engage the couplers and pick up the limit switch.
11. With the circuit breaker fully inserted into the cubicle, move the selector switch (Figure 2, c) on the remote motor control box to the "RAISE" position.

**IMPORTANT**

***Powell recommends the operator watch the breaker elevate for the first 3-4 rotations while the shutters are still closed to assure the circuit breaker is elevating on a level plane.***

***Once the operator has verified the breaker is level, the operator may move away from the cubicle.***

12. The breaker will continue to elevate to the fully elevated position. The compartment limit switches will interrupt power to the racking motor once the circuit breaker is fully elevated.
13. Move power switch to neutral/off position.

When the breaker is fully elevated the clearance between the breaker lifting rail and the upper stop bolts should not be more than  $\frac{1}{8}$ " and not less than  $\frac{3}{32}$ ".

The positive interlock roller should be centered in the upper "vee" and the interlock roller should have  $\frac{1}{16}$ " clearance to the stationary interference plate directly under it.

**E. REMOVING THE REMOTE RACKING DEVICE FROM THE SWITCHGEAR COMPARTMENT****CAUTION**

***Prior to removing the remote racking motor from the circuit breaker compartment, make sure that the control circuits are deenergized.***

Once the circuit breaker is fully elevated into the circuit breaker compartment, the remote racking motor may be removed from the equipment. Follow the steps below to remove the motor from the equipment:

1. Loosen the left hand knob (Figure 6, b) so the mechanism keeper arm moves freely.
2. Move the mechanism keeper arm to the left so the racking clutch handle will spring back into the disconnected/stationary position.
3. Disconnect the 5 prong plug (Figure 5, a) from the compartment power receptacle.
4. Disengage the circuit breaker compartment latch (Figure 5, c) from the tab on the rear of the motor base plate.
6. Remove the racking motor from the switchgear compartment.

**Note:** *As soon as the clutch handle is released the circuit breaker charging motor will start running if the control circuits are not deenergized.*

**F. REMOVING THE CIRCUIT BREAKER FROM THE SWITCHGEAR COMPARTMENT**

Follow the steps below to remove the circuit breaker from the switchgear equipment:

**CAUTION**

***Prior to removing the circuit breaker from the circuit breaker compartment, make sure that the control circuits are deenergized.***

1. Remove the existing elevating motor if required.
2. On the remote motor control box move the power switch to the neutral/off position (Figure 2, c).
3. Place the Powell remote racking motor onto the vacated shelf in the switchgear compartment (Figure 3).
4. Latch the motor plate into place. The circuit breaker compartment latch (Figure 5, c) should latch onto the tab on the rear of the motor base plate. There is also a guide pin on the bottom of the base which should match the hole in the cubicle mounting plate. The Powell racking motor should mount in place the same way the original motor was mounted.
5. Connect the 5 prong plug (Figure 5, a) on the remote racking motor into the circuit breaker compartment power receptacle.
6. Loosen the left hand knob (Figure 6, b) so the mechanism keeper arm moves freely from the vertical position to 45 degrees to the left.
  - a. Left Hand Knob (Figure 6, b) - when loosened the mechanism keeper arm can move freely from the vertical position to approximately 45 degrees to the left (Figure 3). The mechanism keeper arm is locked in the vertical position once the left hand knob has been tightened.
  - b. Right Hand Knob (Figure 6, a) - is used to lock the clutch handle in place so the limit switch will pick up and power will flow to the motor.
7. Ensure the male and female clutch couplers (Figure 6, c) are aligned. They can be aligned by turning the knurled male coupler on the remote device.
8. With the mechanism keeper arm 45 degrees left of center (Figure 3, b), pull the racking motor clutch handle (Figure 4, a) down.
9. Move the mechanism keeper arm back to the center position and turn the left hand knob until the mechanism keeper arm is locked in place.
10. Release the clutch handle. The clutch couplers should be fully engaged. If they are not fully engaged, turn the right hand knob to push the clutch handle further down to fully engage the couplers and pick up the limit switch.
11. With the circuit breaker fully inserted into the compartment, move the selector switch (Figure 2, c) on the remote motor control box to the "LOWER" position.
12. The breaker will continue to lower to the fully racked out position. The compartment limit switches will interrupt power to the racking motor once the circuit breaker is fully racked out.



# **IB-51800** **Remote Racking Device for** **PowIVac<sup>®</sup> AM**

*used on GE Magneblast Vacuum  
Replacement Circuit Breakers*

January 2011