Instruction Bulletin - 01.4IB.51811
NDC Electric Remote Racking Device

For use with NDC Switchgear equipped with NDC Circuit Breakers
4000 to 8000A
Contact Information

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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** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

- **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

- **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** 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 death or serious injury.

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**
Prior to adjustments, servicing, maintenance, or any act requiring the operator to make physical contact with the equipment, the power source must be disconnected and the equipment grounded. Failure to do so may result in death or serious injury.

**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 NDC Electric Remote Racking Device for use with NDC Switchgear equipped with NDC circuit breakers having current ranges from 4000 to 8000A:

- NDC Electric Remote Racking Device Assembly and Motor Controller Switchbox - 21912G00A01000

B. Purpose

The information in this instruction bulletin is intended to provide details required to properly operate and maintain the Electric Remote Racking Device described in Ch 1 General Information, A. Scope.

This instruction bulletin provides:

1. Safety guidelines

2. General descriptions on the operation and maintenance of the electric remote racking device and motor controller switchbox assemblies.

3. Instructions for installation and preparation for use of the electric remote racking device and motor controller switchbox assemblies.

4. Instructions for part replacement

4. Illustrations, photographs, and description of the equipment described in Ch 1 General Information, A. Scope.

The illustrations in this document are provided as general information to aid in showing component locations only.

All photos and illustrations are shown using deenergized equipment.

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C. Instruction Bulletins Available Electronically

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

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 Instruction Bulletin number in the subject line.

D. Associated Bulletins

- 01.4IB.25002A Low Voltage Metal-Enclosed Type NDC DC Switchgear
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

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 the NDC Electric Remote Racking Device.
C. **GENERAL**

1. Only supervised and qualified personnel trained in the usage, installation, operation, and maintenance of the metal-enclosed switchgear 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 reliability and safety.

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

D. **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.

**NOTICE**

Warning and Caution labels are located in various places. Do not remove or deface any of these warning/caution labels.
Ch 3 Equipment Description

A. General

The NDC Electric Remote Racking Device (RRD) is an accessory which enables circuit breakers to be racked into and out of switchgear from a distance. The accessory consists of an RRD (Figure 1) and a motor controller switchbox (Figure 2).

B. Motor Controller Switchbox (MCS)

The MCS (Figure 2) supplies power and enables the selection of operating modes for the RRD. The MCS has a 25 foot cord (Figure 1, e) with a plug that is inserted into the RRDs twist lock receptacle (Figure 1, f). The length of the cord enables the user to move to a remote location from the circuit breaker during the racking in or racking out procedures. The MCS power supply cord (Figure 1, i) plugs into a 125VDC outlet.

C. NDC Electric Remote Racking Device (RRD)

The RRD (Figure 1) is installed on the front door of the circuit breaker compartment. The device is held to the door via key hole slots on the racking frame which attach to retaining studs on the compartment door. After the device is installed, the motor shaft knob can be turned to engage the drive coupling to the circuit breaker winding hub which drives the breaker racking mechanism. The drive coupling is held in place with a retaining screw. 

When the RRD is connected to the MCS and energized, the drive coupling operates the circuit breaker racking mechanism during racking in and racking out procedures.

CAUTION

The protective cover shall be in the down position prior to electrically operating the remote racking device.
Figure 1  NDC Electric Remote Racking Device (RRD)

a. Key Hole Slots  
b. Racking Shaft & Drive Coupling  
c. Retaining Screw  
d. Handle  
e. Power Cord  
f. Power Cord Receptacle  
g. Motor Controller Switchbox  
h. Adjustment Knob  
i. Motor Controller Switchbox Cord
**Figure 2  Close-up of Motor Controller Switchbox (MCS)**

a. Electrical Cord  
b. “In” Indicator Light  
c. “Out” Indicator Light  
d. Power Switch  
e. In/Out Selector Switch  
f. Push Button  
g. Handle
Ch 4 Installation & Operation

A. RECEIVING

When the remote racking 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.

B. HANDLING

The electric racking device weighs approximately 20 lbs. and the motor control box assembly weighs approximately 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. When handling the electric racking device, personnel should securely grasp the device by its handle during movement and installation to avoid possible personal injury or damage to the electric racking device. Avoid dropping or hitting the electric racking device with hard objects.

CAUTION

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 prior to each use.

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. 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.

The instructions in this section are intended to explain procedures for safely using the NDC RRD and the MCS.

1) Inserting the Circuit Breaker into the Switchgear Compartment

Refer to Powell supplied NDC Circuit Breaker Operation & Maintenance Manual 55/4190 (latest issue) for instructions to insert circuit breaker into compartment.

2) Installing NDC Electric Remote Racking Device

a. Ensure circuit breaker door is closed and latched.

b. Ensure circuit breaker red trip/truck lock handle is in “unlocked” position (Figure 3, b).

Figure 3 Handle Positions Prior to Installing Device

a. Circuit Breaker On/Off Indicator
b. Circuit Breaker Trip/Truck Lock Handle
c. Circuit Breaker Winding Handle
d. Retaining Nut (4)

Safety Note: Step b. will ensure circuit breaker is tripped. Visually verify breaker is open using “On/Off (Open/Closed)” indicator on the front of the breaker (Figure 3, a).

c. Ensure black winding handle is unfolded to right (Figure 3, c).

Note: Steps b. and c. are required to install device coupling, otherwise coupling is physically blocked from being installed.
d. Lift RRD by handles *(Figure 1, d)* and position device frame in place on breaker door by aligning bottom retaining nut slot first and then top key holes *(Figure 4, b)* with top retaining nut *(Figure 4, a)*.

e. With RRD secured to door, lift front lexan cover to gain access to drive coupling *(Figure 5)*.

f. If drive coupling pin hole is not aligned with winding hub padlock pin, use red adjustment knob *(Figure 6, a)* located on back of the RRD to achieve alignment.

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**Figure 4** Attaching Device to Breaker Door

![Figure 4](image)

- a. Top Retaining Nut
- b. Key Hole Slot

**Figure 5** Lifting Safety Cover

![Figure 5](image)

**Figure 6** Aligning Racking Shaft Position

![Figure 6](image)

- a. Adjustment Knob

**Figure 7** Engaging Racking Shaft

![Figure 7](image)

- a. Drive Coupling
h. Remove retaining screw from its storage location (Figure 8, a) and wind retaining screw into coupling by hand (Figure 9, a). Snug screw with a flat blade screwdriver. This will hold racking shaft in place during operation.

3) Racking Circuit Breaker into Service/Connected Position

   a. Ensure MCS power switch is in the “OFF” (down) position (Figure 2, d).
   b. Connect motor controller switchbox cord (Figure 10, b) to 125VDC supply (Figure 10, a).
   c. Connect the power cord cylindrical plug (Figure 1, e) into the power cord receptacle (Figure 1, f) on the RRD. Lock the plug by turning it clockwise.

   i. Close lexan safety cover.

   ! CAUTION

   Keep lexan safety cover closed when operating motor controller. Keep hands away from rotating winding handle.
g. When push button is depressed, “IN” indicator light (Figure 2, b) will be energized and illuminated.

h. When breaker is fully racked “IN”, RRD torque limiter will begin to slip and there will be an audible clicking sound along with a vibration of the RRD. At this point, release button. Breaker position indicator will have disappeared behind breaker fascia and corners of breaker fascia will be approximately flush with fascia surround (Figure 11).

4) Racking Circuit Breaker to Isolated/Test Position


b. Ensure MCS power switch is in “OFF” (down) position (Figure 2, d).

c. Connect motor controller switchbox cord (Figure 10, b) to 125VDC supply (Figure 10, a).

d. Connect the power cord cyclindrical plug (Figure 1, e) into the power cord receptacle (Figure 1, f) on the RRD. Lock the plug by turning it clockwise.

e. When racking “OUT” turn IN/OUT selector switch (Figure 2, e) on MCS to “OUT” position.

Note: Housing on push button is a switch, and can be rotated to either “IN” or “OUT” positions.

f. Move power switch to “ON” (up) position (Figure 2, d).

g. To begin racking circuit breaker out of compartment, depress push button on MCS (Figure 2, f).

Note: If push button is released during operation, motor will stop.

h. When push button is depressed, “OUT” indicator light (Figure 2, c) will be energized and illuminated.

i. When breaker is fully racked “OUT”, RRD torque limiter will begin to slip and there will be an audible clicking sound along with a vibration of the RRD. At this point, release button. The breaker position indicator will be fully visible and the word “ISOLATED” will appear in front of fascia surround (Figure 12).
Figure 12  Breaker in Isolated/Test Position

NOTICE

Excessive operation of this device beyond the travel required to rack “IN” or “OUT” the circuit breaker may damage the assembly. If the remote location that was selected is in a location where the breaker cannot be seen and the torque limiter cannot be heard, it is suggested to perform a racking operation on dead bus and time the operation. Document the time and rack the breaker in and out using the documented time.

To remove RRD from door, refer to Ch 4 Installation & Operation, D. Operation, 5) Removing NDC Electric Remote Racking Device.

Refer to NDC Circuit Breaker Operation & Maintenance Manual 55/4190 (latest issue) for instructions to remove circuit breaker from compartment.

5) Removing NDC Electric Remote Racking Device

a. Disconnect the power cord cylindrical plug (Figure 1, e) from the power cord receptacle (Figure 1, f) on the RRD by turning it counterclockwise.

b. Disconnect motor controller switchbox cord (Figure 10, b) from 125VDC power supply cord (Figure 10, a).

c. Open safety cover (Figure 5).

d. Remove retaining screw from coupling (Figure 9, a) and secure retaining screw in storage location (Figure 8, a).

e. Remove drive coupling from winding hub (Figure 7, a) and retract fully toward motor assembly.

f. Lift RRD upward to align hole in sheet metal with retaining studs and then pull backwards to remove the assembly.

g. Fold in black winding handle (Figure 3, c).

h. Turn red trip/truck lock handle to “Locked” position (Figure 3, b).

WARNING

Keep lexan safety cover closed when operating motor controller. Keep hands away from rotating winding handle.
**Ch 5  Maintenance**

**A. General**

A regular maintenance schedule should be established to obtain the best service and reliability from the electric racking device.

Actual inspection and maintenance will depend on individual application conditions such as number of racking operations, time between uses, and storage conditions. When the electric racking 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*.

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

**B. Inspection and Cleaning**

Inspect the electric racking 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 electric racking device with a vacuum cleaner, a clean, dry cloth, or an industrial type wiper. Do NOT use an air hose to clean the electric racking device. Dirt or grit may be blown into critical parts, including bearings, which will cause excessive wear of the parts.

Verify warning label is in place and is readable (*Figure 13*). If not, replace. See *Table A* for renewal parts.

**Figure 13  Warning Label**

a. “Pinch Point” Warning Label

Inspect safety cover assembly for any cracking. Replace cover if cracked.

Verify safety cover mounting fasteners are secure.

Verify safety cover friction hinges hold moveable cover in place when lifted. Adjust friction screws if necessary (*Figure 14*). Do not use harsh chemicals or abrasive agents to clean the safety covers or the safety label. If the label becomes marred or disfigured, the label shall be replaced using the label part number specified in *Table A*.

**Figure 14  Adjusting Friction Hinge**
Ch 6  Recommended Renewal Parts

A. Ordering Instructions

1. Order Renewal Parts from Powell at powellind.com or call 1.800.480.7273.

2. Always specify the complete nameplate information including:
   - Device Type
   - Serial Number
   - Rated Voltage
   - Rated Amps

3. Specify the quantity and description of the part and the instruction bulletin number. A description should be accompanied by a marked illustration from this instruction bulletin, a photo or simply submit a sketch showing the part needed.
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