

# Magnum breaker remote racking device (MRR1000)



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## NOTICE

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**ALL USERS OF THIS PRODUCT SHOULD READ AND FOLLOW THE INSTRUCTIONS PROVIDED HEREIN; HOWEVER, THIS INSTRUCTION BOOK SHOULD NOT BE CONSIDERED ALL INCLUSIVE REGARDING INSTALLATION OR MAINTENANCE PROCEDURES. IF FURTHER INFORMATION IS REQUIRED, YOU SHOULD CONSULT EATON'S ELECTRICAL SERVICES & SYSTEMS.**

**READ AND UNDERSTAND THIS AND OTHER SUPPLIED INSTRUCTIONS AND DRAWINGS IN THEIR ENTIRETY BEFORE INSTALLING OR OPERATING THIS DEVICE. ADJUSTMENT, REPAIR OR MAINTENANCE, OTHER THAN THOSE DESCRIBED HEREIN, MUST BE PERFORMED BY QUALIFIED PERSONNEL. A QUALIFIED PERSON IS ONE WHO IS FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF THIS EQUIPMENT AND THE HAZARDS INVOLVED.**

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## WARNING

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**IMPROPER USE OR MAINTENANCE OF THIS PRODUCT, OR OPERATING IT IN A MANNER FOR WHICH IT WAS NOT INTENDED, MAY RESULT IN DEATH, SERIOUS PERSONAL INJURY, OR PROPERTY DAMAGE.**

**READ AND UNDERSTAND THESE INSTRUCTIONS BEFORE ATTEMPTING ANY OPERATION OR MAINTENANCE OF THE CIRCUIT BREAKERS TO BE OPERATED BY THIS DEVICE**

**THE CIRCUIT BREAKERS DESCRIBED IN THIS MANUAL ARE DESIGNED AND TESTED TO OPERATE WITHIN THEIR NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE THE EQUIPMENT TO FAIL, RESULTING IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.**

**ALL SAFETY CODES, SAFETY STANDARDS, AND/OR REGULATIONS AS THEY MAY BE APPLIED TO THIS TYPE OF EQUIPMENT MUST BE STRICTLY ADHERED TO.**

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## NOTICE

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**THE DANGER, WARNING, AND CAUTION MESSAGES INCLUDED AS A PART OF THE PROCEDURAL STEPS IN THIS MANUAL ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE THIS PARAGRAPH TO FAMILIARIZE PERSONNEL WITH THIS TYPE OF PRESENTATION. THIS WILL HELP ASSURE THAT PERSONNEL ARE ALERT TO THESE TYPE MESSAGES. IN ADDITION, THESE MESSAGES ARE ALL UPPER CASE AND BOLDFACE.**

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This product is manufactured by Eaton at the Asheville Assemblies Plant: 221 Heywood Road, Arden, NC 28704.

All possible contingencies that may arise during installation, operation or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation, or maintenance of particular equipment, contact an Eaton sales or service representative.

## Section 1: Introduction

Eaton's MRR1000 provides a means of remotely inserting or removing any drawout circuit breaker in the Magnum DS® family of power circuit breakers. In addition, the MRR1000 enables the operator to remotely open and close any Magnum DS circuit breaker using the pushbuttons on the face of the breaker. Increased safety precautions and the need to protect personnel from the dangers of potential arc flash occurrences suggest the need to increase the distance between an operator and the front of a switchgear or switchboard during racking operations. With the MRR1000, an operator can be up to 25 feet away from the breaker compartment door during the rack-in or rack-out process.

Electric arcs result from thermal ionization that occurs when current flow is interrupted by the separation of conductors. Thermal ionization can generate temperatures as high as 35,000 °F. Conductor materials melt into metal vapor and the surrounding air is ionized. If the arc is external of the interrupting chamber of a power circuit breaker, then a violent explosion occurs resulting in an inferno of ionized gases, molten debris, metal shrapnel, and a flash of light (arc flash). When arc flash initiates within a switchgear/switchboard cabinet, the rapidly escalating pressure can dislodge compartment doors and side sheets of the switchgear and turn hardware into high-speed projectiles.

Arc flash levels are a function of circuit voltage, maximum available short circuit current at the point of flashover, conditions of confinement, and the distance between the point of flashover and the point of measurement.

Operating personnel are typically within two feet of the front of the power circuit breaker during the racking process. In the event of an arc flash event, this close proximity could cause serious injury or death. NFPA 70E provides guidance for the requirements of personal protective equipment (PPE) to protect personnel from the dangers of arc flash exposure. PPE for high levels of arc flash can be bulky, hot, and uncomfortable. This may dissuade personnel from wearing proper protection. The best way to limit exposure to arc flash during the process of racking power circuit breakers is to put more distance between the person and the possible point of exposure.

Eaton's remote racking device fulfills the objective of increased worker safety by permitting routine operations from an increased distance from the power circuit breaker.

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### **⚠ DANGER**

**WHEN SWITCHGEAR IS CERTIFIED TO BE ARC RESISTANT PER ANSI C37.20.7, THE ARC-RESISTANT RATING IS ONLY VALID WHEN ALL DOORS ARE CLOSED AND PROPERLY LATCHED OR BOLTED, AND ALL COMPONENTS ARE INSTALLED AND WORKING PROPERLY. IN ADDITION, REMOVAL OF ANY BREAKER FROM ITS CELL WITHOUT REINSTALLING A BREAKER OR ARC-RESISTANT PROVISION COVER WILL VOID THE ARC-RESISTANT RATING. FOR COMPLETE INSTRUCTIONS REGARDING ARC-RESISTANT SWITCHGEAR, SEE IB01900001E, LISTED IN SECTION 7.**

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## 1.1 Compatibility

The remote racking device is compatible with any drawout breaker in the Magnum DS family of power circuit breakers. This includes the Magnum DS standard frame, narrow frame and doublewide frame rated for switchgear (ANSI), Magnum SB switchboard class and IEC 60947-2 applications, as well as CM52 network protector breakers. The application may be used while enclosed in Magnum DS low-voltage switchgear and switchboards with the breaker compartment door closed. The MRR1000 is also compatible with Magnum DS arc-resistant switchgear and also compatible with Magnum DS family of drawout power circuit breakers in other OEM installations.

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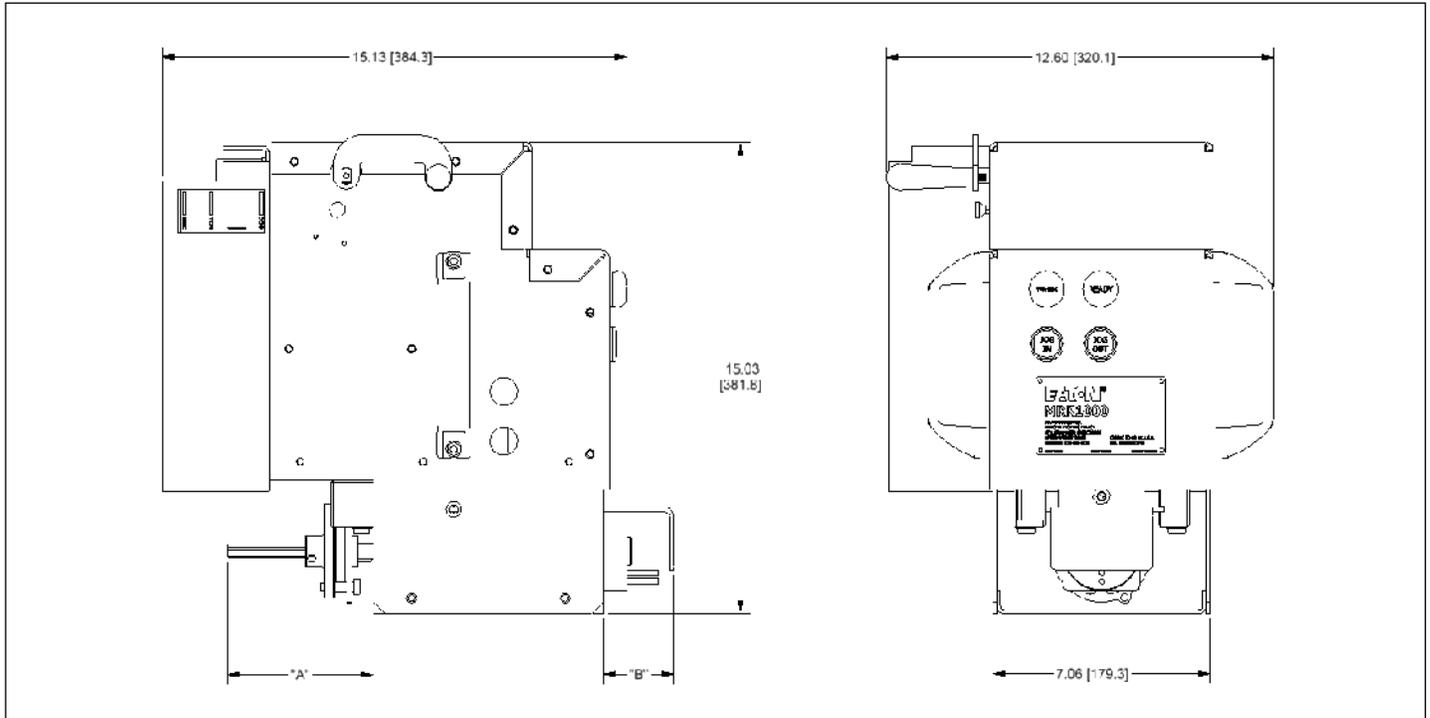
### **⚠ CAUTION**

**THE CASE DIMENSIONS, RETENTION METHOD, AND OPERATING MECHANISM OF THE MRR1000 ARE DESIGNED TO WORK EXCLUSIVELY WITH THE MAGNUM DS FAMILY OF POWER CIRCUIT BREAKERS. ANY ATTEMPT TO USE THE DEVICE WITH ANOTHER MANUFACTURER'S BREAKER WILL PUT THE OPERATOR AT RISK OF INJURY AND WILL VOID THE WARRANTY.**

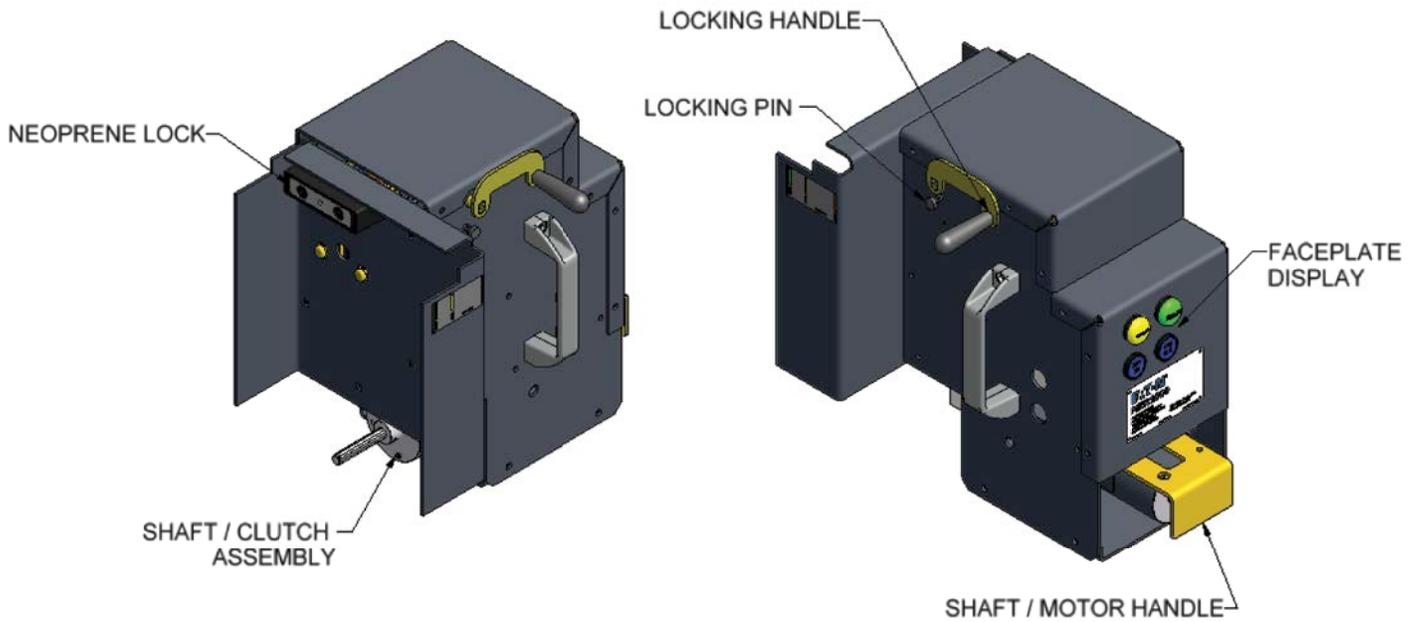
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Unlike some remote operating devices, the MRR1000 requires no additional mounting kit on the body of the circuit breaker or on the surface of the switchgear/switchboard. In fact, no modification or additional tools are required. The MRR1000 utilizes features found on every breaker of the Magnum DS family, making it convenient to install and use.





	<b>"A" shaft inch (mm)</b>	<b>"B" handle inch (mm)</b>
Retracted position	2.75 (69.85)	4.28 (108.71)
Extended position	4.75 (120.65)	2.28 (57.91)



## Section 2: Safe practices for power circuit breakers

The Magnum DS family of power circuit breakers are equipped with high speed, stored energy operating mechanisms. They are designed with several built-in interlocks and safety features to provide safe and proper operating sequences.

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### WARNING

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**TO PROTECT THE PERSONNEL ASSOCIATED WITH INSTALLATION, OPERATION, AND MAINTENANCE OF THESE BREAKERS, THE FOLLOWING PRACTICES MUST BE FOLLOWED:**

- **ONLY QUALIFIED PERSONS, AS DEFINED IN THE NATIONAL ELECTRICAL SAFETY CODE, WHO ARE FAMILIAR WITH THE INSTALLATION AND MAINTENANCE OF LOW-VOLTAGE CIRCUITS AND EQUIPMENT, SHOULD BE PERMITTED TO WORK ON THESE BREAKERS.**
  - **ALWAYS REMOVE THE BREAKER FROM THE ENCLOSURE BEFORE PERFORMING ANY MAINTENANCE. FAILURE TO DO SO COULD RESULT IN ELECTRICAL SHOCK LEADING TO DEATH, SEVERE PERSONNEL INJURY, OR PROPERTY DAMAGE.**
  - **DO NOT WORK ON A CLOSED BREAKER OR A BREAKER WITH CLOSING SPRINGS CHARGED. THE CLOSING SPRING SHOULD BE DISCHARGED AND THE MAIN CONTACTS OPEN BEFORE WORKING ON THE BREAKER. FAILURE TO DO SO COULD RESULT IN CUTTING OR CRUSHING INJURIES.**
  - **BREAKERS ARE EQUIPPED WITH SAFETY INTERLOCKS. DO NOT DEFEAT THEM. THIS MAY RESULT IN DEATH, BODILY INJURY, OR EQUIPMENT DAMAGE.**
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### NOTICE

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**FOR COMPLETE INSTRUCTIONS ON INSTALLATION, OPERATION AND MAINTENANCE OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

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## Section 3: Receiving, handling, and storage

Magnum remote racking device (MRR1000) units are subjected to complete factory production tests and inspection before being packed. They are shipped in containers designed to provide maximum protection to the equipment during shipment and storage and at the same time to provide convenient handling.

### 3.1 Receiving

Until the MRR1000 unit is ready to be delivered to the point of use, do not remove it from the shipping box. If the unit is to be placed in storage for an extended period, maximum protection can be obtained by keeping it in its box.

Upon receipt of the equipment, inspect the box for any signs of damage or rough handling. Open the box carefully to avoid any damage to the contents. Use care when using a box cutter or similar sharp object so as not to damage contents. The AC power cord and remote pendant control cord can be damaged by a sharp object.

When opening the container, be careful that any loose items or hardware are not discarded with the packing material. Check the contents of each package against the packing list.

Examine the MRR1000 unit for any signs of shipping damage such as broken, missing or loose hardware, damaged or deformed components. File claims immediately with the carrier if damage or loss is detected and notify the nearest Eaton's Electrical Services & Systems office.

### 3.2 Handling

The MRR1000 unit shipping containers are not designed to be handled by a fork lift truck. If containers must be moved for any significant distance, it is suggested to use a suitable dolly or hand truck to move the approximately 40 lb (18 kg) package.

### 3.3 Storage

Because of electric circuits inside the unit, as well as moving parts, it is essential to keep the remote racking device dry at all times. If exposed to water or rain, performance of the device cannot be guaranteed and will void the warranty. If the unit is to be placed in storage, attention should be given to keeping the unit in a low humidity environment. Ensure the unit is free from damage and is satisfactory operating condition prior to storage.

### 3.4 MRR1000 approximate weights

<b>Unit type</b>	<b>Weight in lb (kg)</b>
MRR1000 breaker mounting unit	33 (15)
MRR1000 packaged for shipment	40 (18)

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## Section 4: Procedures

### 4.1 General

Magnum DS switchgear and switchboard enclosures use a “Thru-the-Door” racking method that increases operator safety when inserting or removing power circuit breakers. The MRR1000 permits operation while the breaker compartment door remains closed, even in arc-resistant enclosures. However, in some OEM supplied enclosures, “Thru-the-Door” racking may not be possible. The MRR1000 is fully functional and not reliant on the presence or absence of a door to operate. However, for the purposes of this instruction, it will be assumed the breaker compartment door is closed.

Follow all procedures defined by the using company’s Personal Protective Equipment and Safety Policy. Follow all precautions and requirements listed in the installation, operating, and maintenance instructions of the subject circuit breakers.

### 4.2 Unpacking—preparations for use

1. Remove all packing materials, unwind power cord and pendant control cord.
2. Obtain 120 Vac power. Use of a standard extension cord is permissible with a minimum of 6 A current capacity.
3. Connecting power to the unit will activate the “READY” light on the faceplate (there is no “on/off” switch). However, no operation will begin until use of pendant buttons as described in Steps 4.3.3 and 4.4.3, below.

### 4.3 Procedure for removing a power circuit breaker

#### 4.3.1 Installation on the circuit breaker face

1. The face of a typical Magnum DS circuit breaker is shown in **Figure 1**. Note the small recessed cavity in the upper right hand corner. This cavity is the principal element for retention of the MRR1000—ensure this cavity is free from contaminants such as dust, grease, or oil.
2. Ensure the shaft/motor assembly is in the rear-most position. Pull the handle attached to the shaft/motor assembly firmly rearward to verify the assembly is seated in the rear detent.
3. Ensure the locking handle is in the unlocked position (**Figure 2**). If the handle is in the locked position, pull out on the locking pin as shown to release the handle.
4. Lift the MRR1000 to the level of the selected power circuit breaker.
5. Align the top flange and two side flanges of the housing with the nose of the circuit breaker and insert through the breaker compartment door. The rubber gasket that surrounds the breaker face will easily push aside. (On arc-resistant style breaker doors, the retractable bellows will also permit insertion of the remote racking device.)



Figure 1. Magnum DS circuit breaker



Figure 2. MRR1000 locking handle



Figure 3. MRR1000 neoprene lock

6. Align the neoprene lock (Figure 3) with the cavity noted above (Figure 4). Push the housing of the MRR1000 against the body of the circuit breaker until it stops.
7. While supporting the weight of the MRR1000, rotate the locking handle forward until it clicks into place (Figure 5).



Figure 4. MRR1000 attachment to breaker



Figure 5. MRR1000 locking handle engaged

**⚠ WARNING**

**FAILURE TO FULLY ENGAGE THE NEOPRENE LOCK WILL RESULT IN POOR CONTACT WITH THE BREAKER CAVITY, INCREASING THE RISK OF THE UNIT FALLING DURING OPERATION. IN ADDITION, FAILURE TO FULLY ENGAGE THE LOCKING HANDLE PREVENTS REMOTE OPERATION. SEE TROUBLESHOOTING IN SECTION 6.**

8. An installed MRR1000 is shown in Figure 6.



Figure 6. MRR1000 installed on breaker

### 4.3.2 Engaging the shaft/motor assembly

1. Ensure the breaker is in a de-energized state. This can be accomplished by opening the breaker using control circuits within the switchgear/switchboard assembly or using the MRR1000 remote close/trip described in Section 4.5.

#### NOTICE

**FOR COMPLETE INSTRUCTIONS ON INSTALLATION, OPERATION, AND MAINTENANCE OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

2. Lift the levering device access door immediately in front of the square drive shaft (Figure 7). If the breaker has not been de-energized, this door WILL NOT OPEN.

#### ⚠ DANGER

**DO NOT TRY TO DEFEAT THIS INTERLOCK. ATTEMPTING TO RACK-OUT AN ENERGIZED BREAKER MAY RESULT IN DEATH, SERIOUS INJURY, OR PROPERTY DAMAGE.**



Figure 7. Magnum DS levering device access door

3. Using the handle on the rear of the shaft/motor assembly, gently push the motor toward the breaker. The assembly will disengage from the detent and slide forward.
4. In most instances, the square drive shaft will not by default align with the square drive socket within the circuit breaker. While pushing gently on the handle and simultaneously using the adjustment buttons on the faceplate display labeled: "JOG IN" or "JOG OUT" (Figure 8), the drive shaft can be minutely rotated to permit alignment of the two mating parts. Once aligned, push the shaft into the socket until it stops.

### 4.3.3 Remote operation

1. If the unit was not connected to AC power in Step 4.2, do so now.
2. The "READY" light on the faceplate display will indicate the status of the unit.
3. Using the remote operation pendant (Figure 9) move an acceptable distance ① away from the unit. The maximum extension of the control cord is 25 ft (7.6 m). Ensure the operator will be able to see the faceplate display on the housing of the MRR1000. Visibility of the "TURNING" light (Figure 8) is important as described in Step 5 below.
4. The operating pendant requires two hands to operate. The "ENABLE" button must always be depressed to activate any of the other buttons. Depressing the "ENABLE" button will cause the "READY" light on the pendant to illuminate. If the "READY" button does not illuminate, see Troubleshooting in Section 6.

① An acceptable distance shall be determined by completing an Arc Flash Incident Energy Calculation and by using the company's Personal Protective Equipment and Safety Policy.



Figure 8. MRR1000 faceplate display

5. To begin removal of the circuit breaker, depress and hold the green "OUT" button. The motor will begin to turn and the "TURNING" light on the faceplate will begin to blink. The "TURNING" light will blink repeatedly while the shaft is rotating.
6. The circuit breaker and the MRR1000 will begin to travel out of the cell.

#### NOTICE

**THE CIRCUIT BREAKER MECHANISM IS INTERLOCKED SUCH THAT CHARGED CLOSING SPRINGS ARE AUTOMATICALLY DISCHARGED IF THE CIRCUIT BREAKER IS LEVERED INTO OR OUT OF THE CELL. DISCHARGE TAKES PLACE BETWEEN THE DISCONNECT AND TEST POSITION. THIS IS NORMAL OPERATION.**

7. When the "TURNING" light ceases to blink ①, the breaker levering device has reached the end of its travel. Release the buttons on the pendant to stop the motor. Breaker "DISCONNECT" position can be verified by the status indicator in the lower right corner of the breaker face (Figure 10).

① Depending on the position of the shaft/clutch mechanism, the "TURNING" light may be either off or steady on to indicate a stopped condition.



Figure 9. MRR1000 operating pendant



Figure 10. Magnum DS position indicator

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**⚠ CAUTION**

**THE MOTOR DOES NOT HAVE AUTOMATIC SHUT-OFF. ONCE THE BREAKER LEVERING DEVICE REACHES THE END OF ITS TRAVEL, THE MOTOR WILL CONTINUE TO TURN WHILE THE SHAFT/CLUTCH MECHANISM (FIGURE 11) WILL COMPENSATE FOR THE INCREASED TORQUE BY SLIPPING BETWEEN THE SHAFT AND MOTOR. CONTINUING TO OPERATE THE MOTOR FOR AN EXTENDED PERIOD PAST THE OPERATING LIMITS WILL CAUSE EXCESSIVE WEAR ON THE CLUTCH AND MAY PREMATURELY SHORTEN THE LIFE OF THE REMOTE RACKING UNIT.**

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8. Withdraw the shaft/motor assembly from the drive socket by pulling rearward on the handle. If the shaft seems to bind with the drive socket, utilize the "JOG IN" or "JOG OUT" buttons described in Step 4.3.2 above to free the shaft.
9. The levering device access door will close. If the door does not close, the breaker is not fully in the "DISCONNECT" position.
10. While supporting the weight of the MRR1000, pull out the locking pin (Figure 2) to release the locking handle and rotate the handle rearward. The unit can now be removed from the circuit breaker.

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**⚠ CAUTION**

**ALWAYS REMOVE THE REMOTE RACKING DEVICE FROM THE BREAKER WHEN NOT IN USE.**

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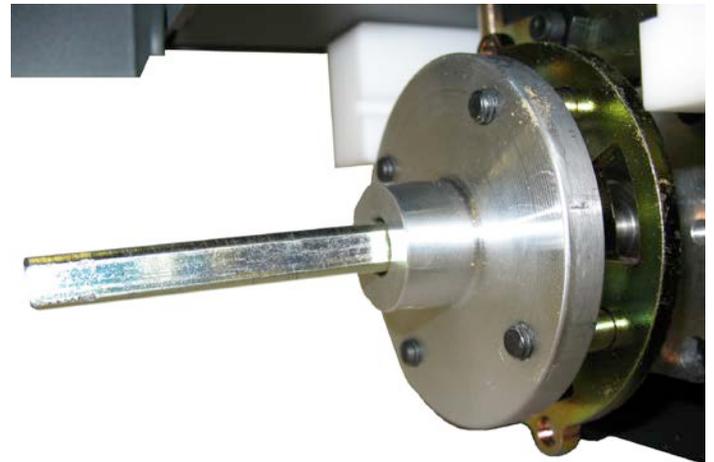


Figure 11. MRR1000 shaft/clutch mechanism

#### 4.4 Procedure for inserting a power circuit breaker

##### 4.4.1 Installation on the circuit breaker face

1. A Magnum DS circuit breaker can remain in its breaker compartment in a disconnected state while the door is closed. It is not necessary to open the door to operate the MRR1000. When facing the circuit breaker, note the small recessed cavity in the upper right hand corner. This cavity is the principal element for retention of the MRR1000—ensure this cavity is free from contaminants such as dust, grease, or oil.
2. Ensure the shaft/motor assembly is in the rearmost position. Pull the handle attached to the shaft/motor assembly firmly rearward to verify the assembly is seated in the rear detent.
3. Ensure the locking handle is in the unlocked position (**Figure 2**). If the handle is in the locked position, pull out on the locking pin as shown to release the handle.
4. Lift the MRR1000 to the level of the selected power circuit breaker.
5. Align the top flange and two side flanges of the housing with the nose of the circuit breaker.
6. Align the neoprene lock (**Figure 3**) with the cavity noted above (**Figure 4**). Push the housing of the MRR1000 against the body of the circuit breaker until it stops.
7. While supporting the weight of the MRR1000, rotate the locking handle forward until it clicks into place.

#### **⚠ WARNING**

**FAILURE TO FULLY ENGAGE THE NEOPRENE LOCK WILL RESULT IN POOR CONTACT WITH THE BREAKER CAVITY, INCREASING THE RISK OF THE UNIT FALLING DURING OPERATION. IN ADDITION, FAILURE TO FULLY ENGAGE THE LOCKING HANDLE PREVENTS REMOTE OPERATION. SEE TROUBLESHOOTING IN SECTION 6.**

##### 4.4.2 Engaging the shaft/motor assembly

1. Ensure the breaker contacts are “OPEN” and the closing spring is “DISCHARGED”. This condition can be verified by observation of the status indicators on the front of the circuit breaker (**Figure 12**). Also ensure the racking mechanism is in the “DISCONNECT” position as indicated by the position indicator on the front of the circuit breaker (**Figure 10**).

#### **NOTICE**

**FOR COMPLETE INSTRUCTIONS ON INSTALLATION, OPERATION, AND MAINTENANCE OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

2. Lift the levering device access door immediately in front of the square drive shaft (**Figure 7**). If the breaker contacts have not been opened, this door WILL NOT OPEN.



**Figure 12. Magnum DS breaker status indicators**

#### **⚠ DANGER**

**DO NOT TRY TO DEFEAT THIS INTERLOCK. ATTEMPTING TO RACK-IN A CIRCUIT BREAKER WITH CLOSED CONTACTS MAY RESULT IN DEATH, SERIOUS INJURY, OR PROPERTY DAMAGE.**

3. Using the handle on the rear of the shaft/motor assembly, gently push the motor toward the breaker. The assembly will disengage from the detent and slide forward.
4. In most instances, the square drive shaft will not by default align with the square drive socket within the circuit breaker. While pushing gently on the handle and simultaneously using the adjustment buttons on the faceplate display labeled: “JOG IN” or “JOG OUT” (**Figure 8**), the drive shaft can be minutely rotated to permit alignment of the two mating parts. Once aligned, push the shaft into the socket until it stops.

##### 4.4.3 Remote operation

1. If the unit was not connected to AC power in Step 4.2, do so now.
2. The “Ready” light on the faceplate display will indicate the status of the unit.
3. Using the remote operation pendant (**Figure 9**), move an acceptable distance ① away from the unit. The maximum extension of the control cord is 25 ft (7.6 m). Ensure the operator will be able to see the faceplate display on the housing of the MRR1000. Visibility of the “TURNING” light (**Figure 8**) is important as described in Step 5 below.
4. The operating pendant requires two hands to operate. The “ENABLE” button must always be depressed to activate any of the other buttons. Depressing the “ENABLE” button will cause the “READY” light on the pendant to illuminate. If the “READY” button does not illuminate, see Troubleshooting in Section 6.

① An acceptable distance shall be determined by completing an Arc Flash Incident Energy Calculation and by using the company’s Personal Protective Equipment and Safety Policy.

5. To begin insertion of the circuit breaker, depress and hold the red "IN" button. The motor will begin to turn and the "TURNING" light on the faceplate will begin to blink. The "TURNING" light will blink repeatedly while the shaft is rotating.
6. The circuit breaker and the MRR1000 will begin to travel into the cell. The mounting flanges of the MRR1000 will pass through the door opening. The rubber gasket that surrounds the breaker face will easily push aside. (On arc-resistant style breaker doors, the retractable bellows will also permit insertion of the remote racking device.)
7. When the "TURNING" light ceases to blink , the breaker levering device has reached the end of its travel. Release the buttons on the pendant to stop the motor. Breaker "CONNECT" position can be verified by the status indicator in the lower right corner of the breaker face.

 Depending on the position of the shaft/clutch mechanism, the "TURNING" light may be either off or steady on to indicate a stopped condition.

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### CAUTION

**THE MOTOR DOES NOT HAVE AUTOMATIC SHUT-OFF. ONCE THE BREAKER LEVERING DEVICE REACHES THE END OF ITS TRAVEL, THE MOTOR WILL CONTINUE TO TURN WHILE THE SHAFT/CLUTCH MECHANISM (FIGURE 11) WILL COMPENSATE FOR THE INCREASED TORQUE BY SLIPPING BETWEEN THE SHAFT AND MOTOR. CONTINUING TO OPERATE THE MOTOR FOR AN EXTENDED PERIOD PAST THE OPERATING LIMITS WILL CAUSE EXCESSIVE WEAR ON THE CLUTCH AND MAY PREMATURELY SHORTEN THE LIFE OF THE REMOTE RACKING UNIT.**

8. Withdraw the shaft/motor assembly from the drive socket by pulling rearward on the handle. If the shaft seems to bind with the drive socket, utilize the "JOG IN" or "JOG OUT" buttons described in Step 4.4.2 above to free the shaft.
9. The levering device access door will close. If the door does not close, the breaker is not fully in the "CONNECT" position.
10. While supporting the weight of the MRR1000, pull out the locking pin (**Figure 2**) to release the locking handle and rotate the handle rearward. The unit can now be removed from the circuit breaker.

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### CAUTION

**ALWAYS REMOVE THE REMOTE RACKING DEVICE FROM THE BREAKER WHEN NOT IN USE.**

## 4.5 Procedure for remotely tripping or closing a power circuit breaker

### 4.5.1 General

The MRR1000 offers the added safety feature of opening or closing the breaker contacts from a distance using the remote pendant.

These instructions assume the breaker is contained within the breaker compartment with the MRR1000 attached to the face of the breaker per the steps outlined in other portions of this instruction booklet.

### 4.5.2 Operation

1. The levering device access door on the face of the breaker must be closed for any open or close operations to function (**Figure 1**). This is an internal safety feature of the Magnum DS family of circuit breakers. Failure to close this door will not prevent operation of the MRR1000, but operation of the open/close buttons will not produce any change of state inside the circuit breaker.

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### NOTICE

**FOR COMPLETE INSTRUCTIONS ON INSTALLATION, OPERATION, AND MAINTENANCE OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

2. To open or close a circuit breaker, move an acceptable distance  away from the unit with the remote operating pendant in hand. The maximum extension of the control cord is 25 ft (7.6 m).
3. The operating pendant requires two hands to operate. The "ENABLE" button must always be depressed to activate any of the other buttons. Depressing the "ENABLE" button will cause the "READY" light on the pendant to illuminate. If the "READY" button does not illuminate, see Troubleshooting in Section 6.
4. To open the contacts of the circuit breaker, depress the green "OPEN" button. The MRR1000 solenoid will fire and activate the "OPEN" feature of the circuit breaker.

 An acceptable distance shall be determined by completing an Arc Flash Incident Energy Calculation and by using the company's Personal Protective Equipment and Safety Policy.

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### NOTICE

**THE CIRCUIT BREAKER MECHANISM IS INTERLOCKED SUCH THAT CHARGED CLOSING SPRINGS ARE AUTOMATICALLY DISCHARGED IF THE CIRCUIT BREAKER IS LEVERED INTO OR OUT OF THE CELL. DISCHARGE TAKES PLACE BETWEEN THE DISCONNECT AND TEST POSITION. THIS IS NORMAL OPERATION.**

5. To close the contacts of the circuit breaker, depress the red "CLOSE" button. The MRR1000 solenoid will fire and activate the "CLOSE" feature of the circuit breaker.

**Note:** Breaker closing springs require charging before the breaker contacts will close. This can be accomplished using the manual charging handle present on every breaker; or on electrically operated breakers, springs can automatically charge via an electric motor circuit.

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### NOTICE

**FOR COMPLETE INSTRUCTIONS ON INSTALLATION, OPERATION, AND MAINTENANCE OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

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### WARNING

**USE OF THE MRR1000 DOES IN NO WAY OVERRIDE NOR ELIMINATE STANDARD SAFETY PRACTICES FOR WORKING WITH POWER CIRCUIT BREAKERS. INTERLOCKS AND OTHER SAFETY FEATURES ESSENTIAL TO THE TRIPPING OR CLOSING OF THE BREAKER CONTACTS MUST BE REGARDED WITH THE UTMOST CAUTION DURING ANY INSTALLATION, OPERATION, OR MAINTENANCE OPERATION.**

## Section 5: Warranty

### 5.1 General

All Magnum DS breaker remote racking device (MRR1000) units are covered by the warranty stated in Eaton's Selling Policy 25-000. If the unit does not function as described in this instruction booklet, do not attempt any repair that would require opening the case or the pendant. There are no serviceable parts inside the case or pendant. Attempts to repair or modify the unit will void the warranty.

#### **⚠ WARNING**

**DO NOT ATTEMPT TO INSERT OR REMOVE ANY POWER CIRCUIT BREAKER WITH A REMOTE RACKING DEVICE (MRR1000) THAT IS NOT FUNCTIONING PROPERLY. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN DEATH, SERIOUS PERSONAL INJURY, OR PROPERTY DAMAGE.**

If a problem occurs, contact an Eaton Care representative immediately by calling toll free 877-ETN-CARE (877-386-2273). Normal business hours are 7:30 a.m. until 4:30 p.m., EST, Monday through Friday, except for holidays. If the call is placed after or before normal business hours, you may leave a voice message. An Eaton Care representative will return your call within 24 hours (48 hours on holidays and weekends), determine the cause of the problem, and advise a course of action.

If it becomes necessary to replace the unit, the representative will administer express shipment of a replacement unit and will also convey any special instructions, if required, for return of the defective unit.

Upon receipt of the replacement unit, inspect the container for any signs of damage or rough handling. Carefully open the container and save any hardware and packing materials. These materials as well as the shipping box will be used to repack and return the defective equipment to the factory. A set of Federal Express shipping instructions and a shipping label will be in the container. Be careful not to discard these items. There is no charge for the return shipment.

This instruction book is published solely for information purposes and should not be considered all-inclusive. If further information is required, you should consult an authorized Eaton sales representative.

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## Section 6: Troubleshooting

#### **⚠ CAUTION**

**THERE ARE NO SERVICEABLE PARTS INSIDE THE CASE OR PENDANT. ATTEMPTING A MODIFICATION OR REPAIR OTHER THAN THOSE EXPLAINED IN THIS SECTION COULD EXPOSE PERSONNEL TO SHOCK HAZARD FROM INTERNAL CAPACITORS. OPENING THE CASE OR PENDANT TO ATTEMPT A REPAIR WILL VOID THE WARRANTY.**

#### **NOTICE**

**FOR TROUBLESHOOTING FUNCTIONS OF THE MAGNUM DS FAMILY OF CIRCUIT BREAKERS, REFER TO THE SPECIFIC BREAKER PUBLICATIONS LISTED IN SECTION 7 OF THIS DOCUMENT.**

Symptom	Probable cause	Corrective action
Unit will not stay attached to face of circuit breaker	Contaminants on surface of breaker retention cavity or on neoprene lock	Remove any contaminants using a non-abrasive, non-corrosive cleanser
Locking handle will not disengage	Locking pin maintains handle in locked position	Pull locking pin away from housing to release handle
Pendant non-operational: "READY" light does not illuminate when "ENABLE" button is pushed in conjunction with another operation button	Locking handle not engaged	Engage locking handle in fully locked position
Remote "CLOSE" function does not close circuit breaker contacts	Circuit breaker closing spring is not charged	Charge breaker closing spring using manual charging handle or electric motor circuit (must be in "Test" or "Connect" position)
Unit will not turn "Lev-In" mechanism in breaker	"Lev-In" screw excessively tightened	Loosen "Lev-In" screw before attaching unit to breaker

## Section 7: Additional publications

In addition to this instruction booklet, the following instruction books and drawings are commonly included with any Magnum DS circuit breaker and/or provided with any Eaton Low-Voltage Assembly shipment. Please inspect the documentation provided before contacting an Eaton service representative for replacements.

IB 2C12060H08	Instructions for Installation, Operation and Maintenance of Magnum DS, DSX and DSL Low-Voltage Power Circuit Breakers
IB 2C12063H02	Instructions for Installation, Operation and Maintenance of Magnum SB Insulated Case Low-Voltage Power Circuit Breakers
IB 01901001E	Instructions for Magnum DS Metal-Enclosed Low-Voltage Assemblies
IB 01900001E	Instructions fro Magnum DS Metal-Enclosed Low-Voltage Arc-Resistant Assemblies