Installation and Operation

CBS ArcSafe®

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A Group CBS Company

RRS-3 MB II

For GE Magne-Blast (AM) Breakers

In M-26 (5kV) or M-36 (15kV) Switchgear

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RRS-1 – *Universal Remote Racking System (Rotary)*

The CBS ArcSafe® RRS-1 is a universal remote racking system capable of remotely installing and removing rotary style draw out circuit breakers without requiring any modification to the existing switchgear. Operation of the simple to use RRS-1 is quite intuitive and requires only minimal setup. When used properly, the RRS-1 allows technicians to remain outside of the arc flash boundary during the potentially dangerous racking operation.

RRS-2 – *Universal Remote Racking System (Non-Rotary)*

The CBS ArcSafe® RRS-2 is a universal remote racking system capable of remotely installing and removing non-rotary style draw out circuit breakers without requiring any modification to the existing switchgear. Operation of the simple to use RRS-2 is quite intuitive and requires only minimal setup. When used properly, the RRS-2 allows technicians to remain outside of the arc flash boundary during the potentially hazardous racking operation.

RRS-3 – *Application Specific Remote Racking System (Rotary And Non-Rotary)*

The CBS ArcSafe® RRS-3 product line is made up of various application specific remote breaker racking devices. Each standalone system allows service personnel to remotely install and remove a particular type of circuit breaker safely while stationed safely outside of the arc flash boundary during the potentially dangerous operation. The lightweight and compact design of the RRS-3 systems makes them ideal for hard to access areas where space is at a premium.

RRS-4 – *PLC Based Universal Remote Racking System (Rotary)*

The CBS ArcSafe® RRS-4 universal remote racking system is an updated PLC based version of the best selling RRS-1. The dual mode, source programmable, PLC based control system offers two different operating modes to choose from based on user preference or the application. The RRS-4 is capable of remotely installing and removing rotary style draw out circuit breakers without requiring any modification to the existing switchgear, allowing users to remain outside of the arc flash boundary during the potentially hazardous racking operation.

RSA – *Remote Switch Actuator*

The CBS ArcSafe® Remote Switch Actuator (RSA) product line is made up of various application specific remote operating devices. These products allow service personnel to remotely perform all aspects of an operation for a particular type of electrical equipment from outside the arc flash boundary – reducing or eliminating the possibility of serious injury or death resulting from an arc flash.

RSO – *Remote Switch Operator*

During a remote operation, the CBS ArcSafe® RSO functions as both the power supply and user interface for the device being remotely operated by the user. When paired with an applicable CBS ArcSafe® device, this portable standalone system allows service personnel to remotely perform a racking or switching procedure from outside the arc flash boundary – reducing or eliminating the possibility of injury or death resulting from an arc flash

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About the User's Guide

This user's guide describes the functions and features of the CBS ArcSafe® Single Application Remote Racking System (RRS-3). This technical document is intended to act as a simplified reference for users of the equipment; allowing for safe, quick, and efficient use of the RRS-3 features.

DANGER!

This is a red hazard alert warning box; red hazard alert boxes contain information pointing out potential hazards to personnel and equipment.

ATTENTION!

This is a green information box; green information boxes are used to place emphasis on valuable information the user will want to pay particular attention to.

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DANGER!

Ensure that personnel using this equipment are adequately trained in the operation of the switchgear they are planning to work with; that they are correctly stationed outside the arc flash boundary; and that they comply with all applicable Federal, State, Local, and In-house safety regulations and procedures. Attention should be given to distance, angle, and personal protective equipment (PPE).

DANGER!

Ensure that switchgear is properly maintained and in good working order before using the RRS-3 on your switchgear. Contact your local group CBS service provider at www.gcbs.com to assist in proper care and maintenance for your switchgear.

1 Features and Components

The CBS ArcSafe® RRS-3-MB II is designed as a direct replacement for the elevating motor installed in General Electric (GE) Magne-blast AM-4.16 and AM-13.8 breakers in M-26 and M-36 switchgear. The RRS-3-MB II allows the operator to install or remove the circuit breaker remotely from outside of the arc flash boundary via either the control console or wireless pendant (Optional). The RRS-3-MB II is powered by standard 120VAC wall power is compatible with all Magne-blast control voltages and control schemes.

1.1 Components

The RRS-3-MB II consists of two main components; the drive assembly and the control assembly. Each will be broken down into its various components, with in depth descriptions, on the following pages

1.1.1 Drive Assembly

The RRS-3-MB II drive assembly consists of five main components listed below. Each component in the assembly is pictured on the following page with its corresponding name and figure number.

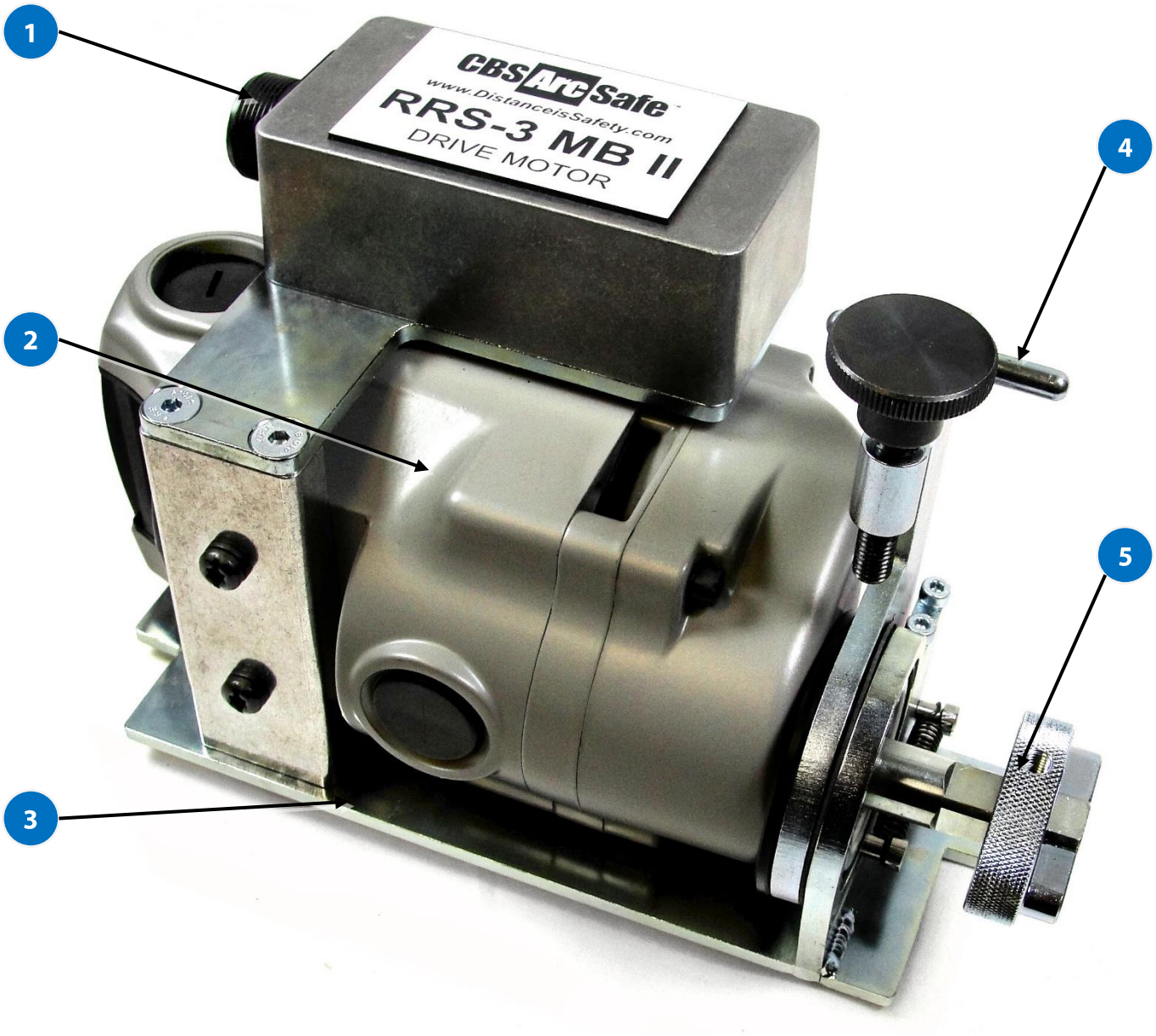
Power Receptacle (Figure 1.1) – This power receptacle accepts the 7 pin threaded style connector of the 30' (12' for radio remote models) cord to power the elevating motor. The opposite end of this cord will attach to the corresponding receptacle on the control console.

Elevating Motor (Figure 1.2) – The elevating motor powers the cubicle-installed racking mechanism to install or remove the circuit breaker.

Base Plate (Figure 1.3) – All components of the drive assembly are secured to the heavy gage steel base plate. The base plate acts as both the structural support for the RRS-3-MB II drive assembly and as a means for aligning and installing the unit in the cubicle.

Engagement Lever Latch (Figure 1.4) – The engagement lever latch provides a means to secure the switchgear's engagement lever in the fully engaged position during the remote racking operation.

Drive Coupler (Figure 1.5) – The drive coupler engages the drive assembly with the cubicle mounted racking mechanism when the engagement lever is fully engaged. The drive coupler is power by the elevating motor in order to raise or lower the breaker.



1. Power Receptacle
2. Elevating Motor
3. Base Plate

Figure 1: Drive Assembly

1.1.2 Control Assembly

The RRS-3 control assembly includes the control console and all cables required for to connect to both the cubicle and drive assembly.

Current Control Module (Figure 2.1) - The current control module display provides the breaker location feedback as well as instantaneous running current of the motor during a racking operation. In the case of faulty or non-operational control power, the current control module will allow the operator to rack the breaker by monitoring motor current.

Current Alarm (Figure 2.2) - The current alarm light alerts the user to the operational status of the motor when it is running in current mode. The light is steady on when the motor is running and flashes when the motor has stopped due to a CCM overcurrent stop command.

Power Switch (Figure 2.3) - Used to power on the unit in either local mode (LOC) or remote mode (REM). A light within the switch will alert the user that the main power is connected and the unit is on.

Tilt Alarm (Figure 2.4) - The tilt alarm indicating strobe alerts the user to a potentially dangerous tilt situation when the tilt switch attached to the breaker has been triggered.

Control Power Fuse (Figure 2.5) - In the case that the user selects the incorrect style of switchgear, this fuse will blow prior to fuses within the switchgear.

Control Power Style Selector (Figure 2.6) - Used to select the style of gear being operated based on the stock motor control options shown on the placard.

Motor Power Receptacle (Figure 2.7) - This power receptacle accepts the 7 pin threaded style connector of the 30' (12' for radio remote models) cord to power the elevating motor. The opposite end of this cord will attach to the drive assembly and power the elevating motor.

Supervisory Link Receptacle (Figure 2.8) - This receptacle accepts the 4 pin threaded style connector of the 30' (12' for radio remote models) cord to attach to interface with the cubicle. The opposite end of this cord will attach to the cubicle's control power plug.

Tilt Switch Receptacle (Figure 2.9) - This receptacle accepts the 4 pin twist style connector of the 30' (12' for radio remote models) cord to the tilt switch. The opposite end of this cord is hardwired directly to the tilt switch.

Radio Remote Receiver (Optional) (Figure 2.10) - Used in conjunction with the radio remote pendant station to operate the install/remove controls remotely via radio frequency.

10 Amp Circuit Breaker (Figure 2.11) - Used for protection against short circuits.

Install/Remove Controls (Figure 2.12) - User interface for installing and removing the breaker in local mode.

120 VAC Input (Figure 2.13) - Receptacle for power cord, allows the RRS-3-MB II to run solely from 120 VAC wall power.

1. Current Control Module
2. Current Alarm
3. Power Switch
4. Tilt Alarm
5. Control Power Fuse
6. Control Power Style Selector
7. Motor Power Receptacle
8. Supervisory Link Receptacle
9. Tilt Switch Receptacle
10. Radio Receiver (optional)
11. 10 Amp Breaker
12. Install/Remove Controls
13. 120VAC Input

Figure 2: Control Assembly

2 Preparation

This section will detail the necessary steps that must be taken prior to setting up or operating the RRS-3-MB II. The information provided in this section is critical for ensuring that the RRS-3-MB II is setup properly before installation and operation.

2.1 Cubicle Identification

Prior to beginning any racking procedure using the RRS-3 MB II, the user must identify which style of control power will be utilized during the racking operation. GE manufactured several different styles of Magne-blast cubicles, with each utilizing one of two known control power schemes. The RRS-3 MB II is equipped to operate in conjunction with both the newer style control power scheme and the older as well.

2.1.1 United States Only

This section will detail how to identify which style of control power circuit is present on the US GE style of Magne-blast gear to be remotely racked.

To identify the style of control circuit which is present on the Magne-blast to be remotely racked please see the following figure which helps to identify each type. The graphic shown below illustrates the different styles of switches used to operate the factory elevating motor found in standard GE Magne-blast gear.

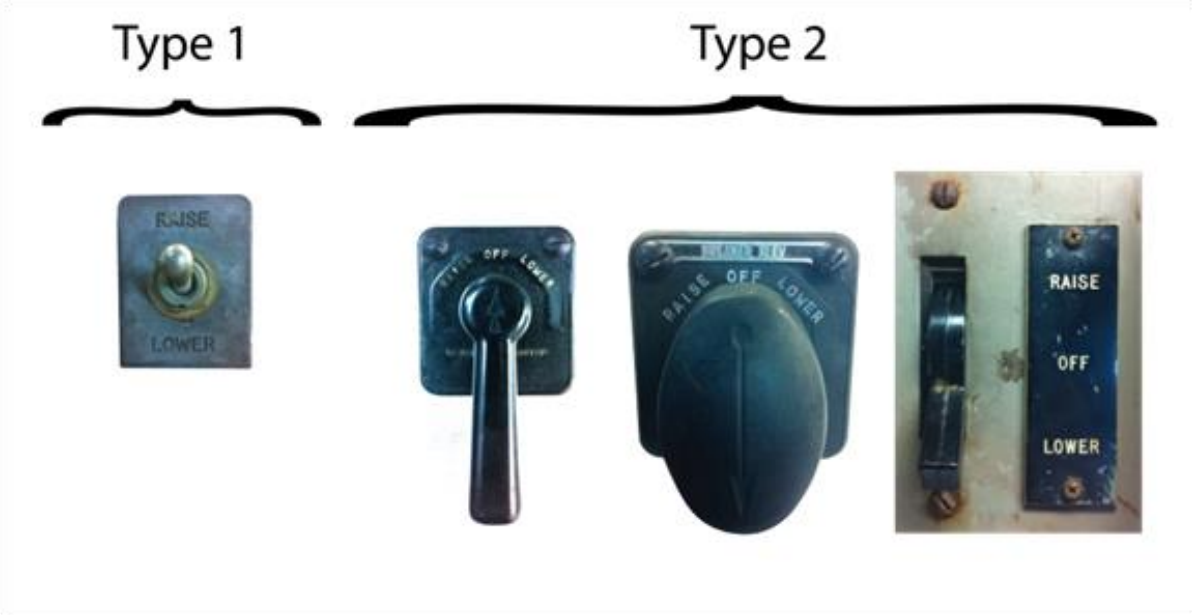


Figure 3: Factory elevating motor switches

Type 1 Control Power – "Type 1" control power can be easily recognized when inspecting the factory elevating motor. "Type 1" cubicles are identified as operating with a universal AC/DC motor with the raise/lower toggle switch located on the upper backside of the motor. This style of cubicle DOES NOT have an elevating motor control switch located inside the cell. Cubicles with this control power configuration are the newest generation of Magne-blast manufactured and are the most common style. For more detailed information on recognizing "Type 1" control power, please contact CBS ArcSafe®.

Type 2 Control Power – "Type 2" control power can be easily recognized when inspecting the factory elevating motor. "Type 2" cubicles are identified as operating with a DC shunt wound motor with no toggle switch located on the motor. This style of cubicle DOES HAVE an elevating motor control switch located inside of the cell. Cabinets with this control power configuration represent a small percentage of the existing Magne-blast switchgear in use today and are among the older generation of the switchgear. For more detailed information on recognizing "Type 2" control power, please contact CBS ArcSafe®.

2.1.2 Canadian Only

This section will detail how to identify which style of control power circuit is present on the Canadian GE style of Magne-blast gear to be remotely racked.

To identify the style of control circuit which is present on the Magne-blast to be remotely racked please see the following figure which helps to identify each type. The graphic shown below illustrates the different styles of switches used to operate the factory elevating motor found in standard GE Magne-blast gear.

Type 1

Type 2

Figure 4: Canadian factory elevating motor switches

Type 1 Control Power – "Type 1" control power can be easily recognized when inspecting the factory elevating motor. "Type 1" cubicles are identified as operating with a universal AC/DC motor with the raise/lower toggle switch located on the upper backside of the motor. This style of cubicle DOES NOT have an elevating motor control switch located inside the cell. Cubicles with this control power configuration are the newest generation of Magne-blast manufactured and are the most common style. For more detailed information on recognizing "Type 1" control power, please contact CBS ArcSafe®.

Type 2 Control Power – "Type 2" control power can be easily recognized when inspecting the factory elevating motor. "Type 2" cubicles are identified as operating with a DC shunt wound motor with no toggle switch located on the motor. This style of cubicle DOES HAVE an elevating motor control switch located inside of the cell. Cabinets with this control power configuration represent a small percentage of the existing Magne-blast

switchgear in use today and are among the older generation of the switchgear. For more detailed information on recognizing "Type 2" control power, please contact CBS ArcSafe®.

2.2 MBSL Control Power Voltage Requirements

In addition to the two different control power schemes found in GE Magne-blast switchgear, users may also want to be aware of the control power voltage present within the cubicle. This control power, which is utilized within to power the limit switches and factory elevating motor, may be found in one of five different voltage configurations. The five standard voltage configurations are 48 VDC, 120 VAC, 125 VDC, 230 VAC, and 250 VDC. The RRS-3-MB II is universal and will operate with any of the 5 control voltage configurations.

2.2.1 Measuring Control Voltage (United States Only)

This section will detail how to measure control voltage on the US GE style of Magne-blast switchgear.

1. First, inspect the images shown in Figure 5 (Standard Cable) and study the pin layout.

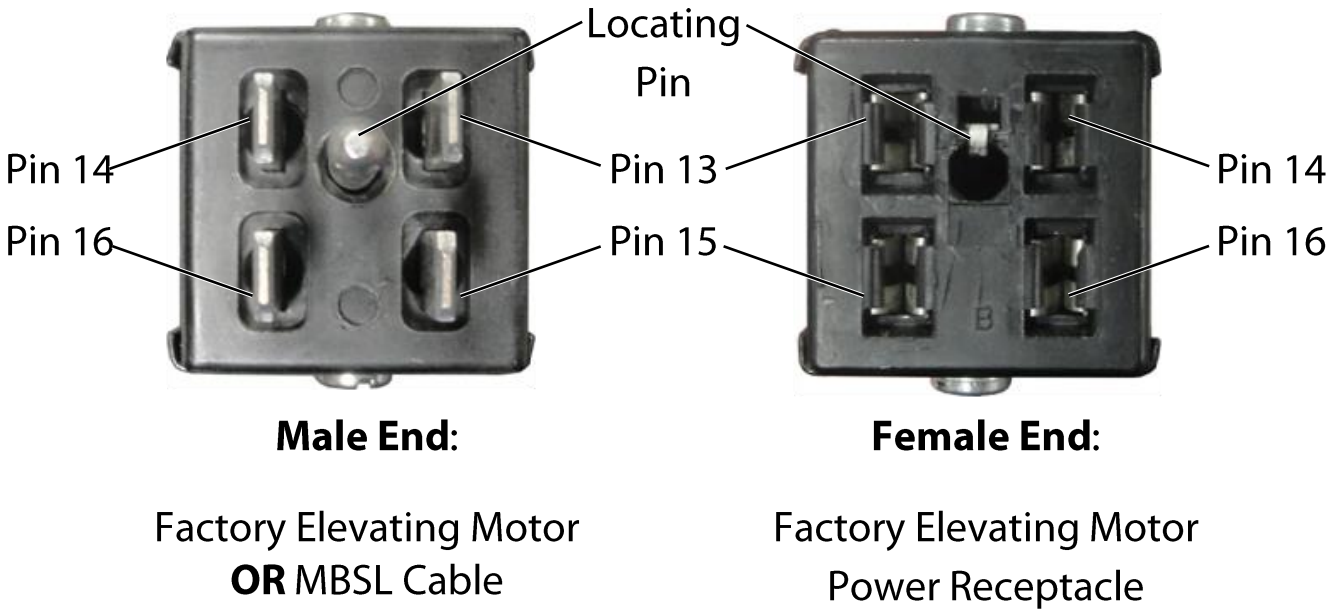


Figure 5: Standard MBSL Cable Pin Layout

2. Next, determine what position the Magne-blast circuit breaker is in: either fully installed, fully removed, or neither.

3. With a multimeter, test voltage on the female end (Factory elevating motor power receptacle) located within the Magne-blast cubicle according to the breaker location as follows:

   a. If fully installed, test voltage across pins 15 and 13.

   b. If fully removed, test voltage across pins 15 and 14.

   c. If neither, test voltage across either pins 15 and 13 or pins 15 and 14.

4. The voltage reading should correspond closely with one of the 5 previously mentioned control voltage configurations. If it does not, contact CBS ArcSafe® for more information.

2.2.2 Measuring Control Voltage (Canada Only)

To determine the control power configuration in Canadian GE style of Magne-blast switchgear, please contact CBS ArcSafe® for information.

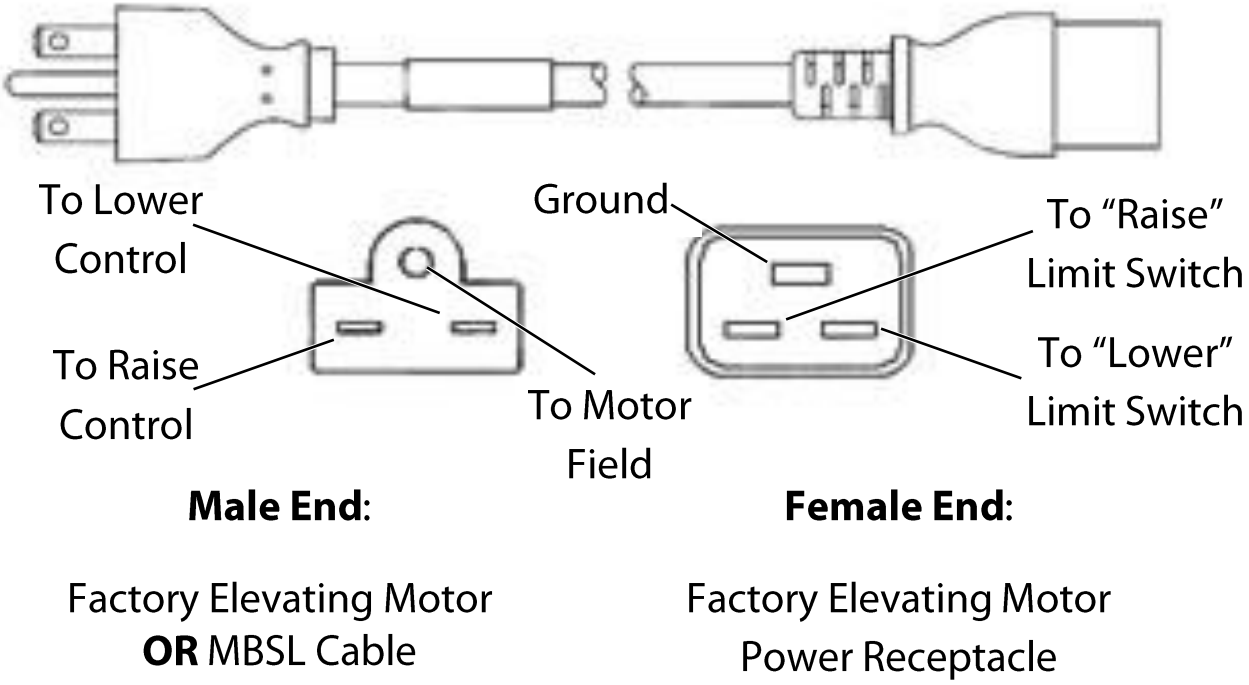


Figure 6: Canadian MBSL Cable Pin Layout

3 Installation

This section will outline the steps required to install the RRS-3 MB-II.

3.1 Requirements for Racking

Before performing any MBSL assisted remote racking procedure, please ensure that the following prerequisites have been met:

- The circuit breaker racking mechanism is in proper working order and functions correctly during install and remove operations.
- The circuit breaker has been properly maintained with all parts in proper working order.
- The cubicle mounted mercury or mechanical switches are properly adjusted and fully functional.
- The circuit breaker is in the applicable position based on the operation to be performed and OPEN according to manufacturer specifications.
- Control power is available to the control power receptacle and is in working order.

DANGER!

For your safety please ensure that all personnel follow the personal protective equipment rules and regulations along with following all of the manufacturer guidelines at ALL times.

3.2 Installation

Use the following installation procedure to install the drive assembly onto the switchgear and connect all cords to the control console and switchgear. Please ensure that all cords are clear of moving parts prior to operation; interference can damage cords and/or equipment.

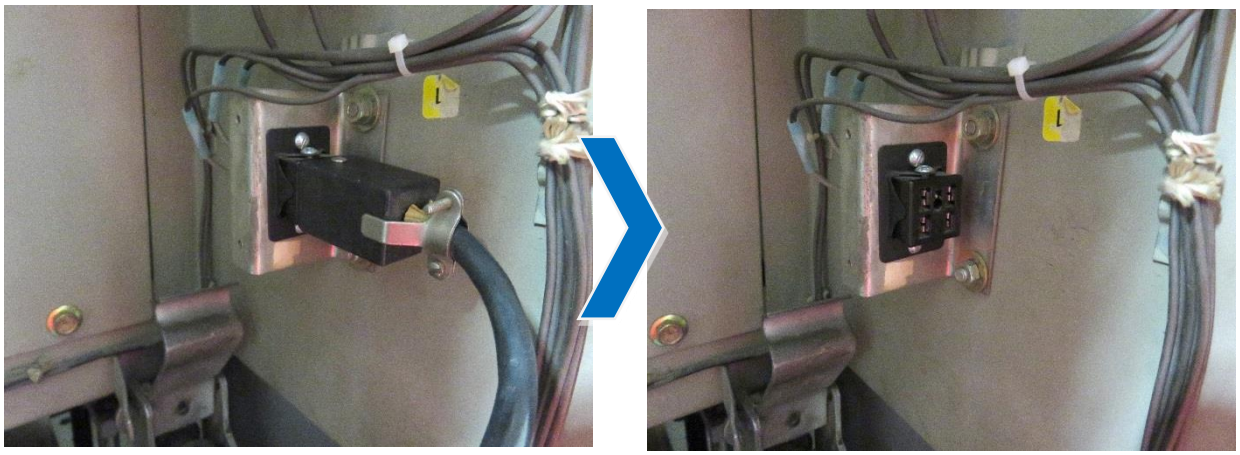
DANGER

Before performing any electrical maintenance operation please ensure that the proper plant operating procedures are always followed and all PPE requirements are met and/or followed.

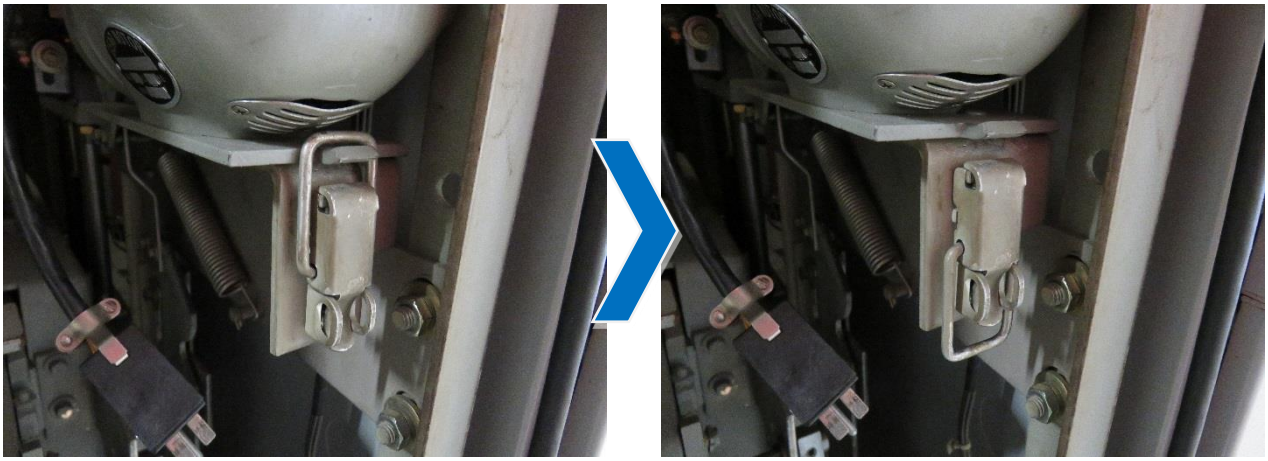
1. First, ensure that the breaker to be operated is “OPEN” by checking that both the “OPEN” indicating light is on and that the mechanical indicator on the breaker displays “OPEN” as well. If it is not, make sure to open the breaker before continuing.
2. Next, verify that the breaker is in either the fully connected (Upper position) or fully disconnected (Lower position) position and contacting the applicable limit switches at this point.

3. If a factory elevating motor is installed, please remove by following these steps:

   a. Disconnect the elevating motor control power plug from the supervisory link receptacle.

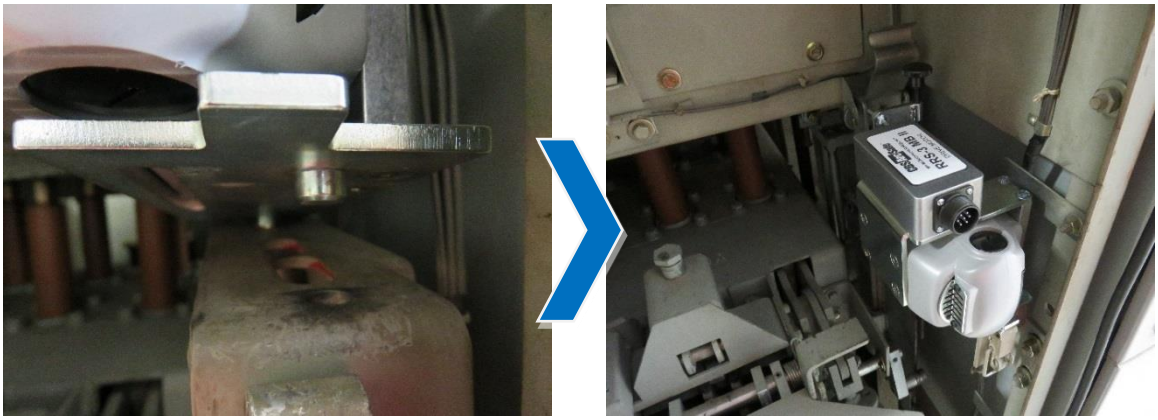


   b. Unlatch the snap hasp below the elevating motor. (For bolt in style elevating motors please contact CBS ArcSafe® for adapter plates and/or modified drive assemblies depending on application).



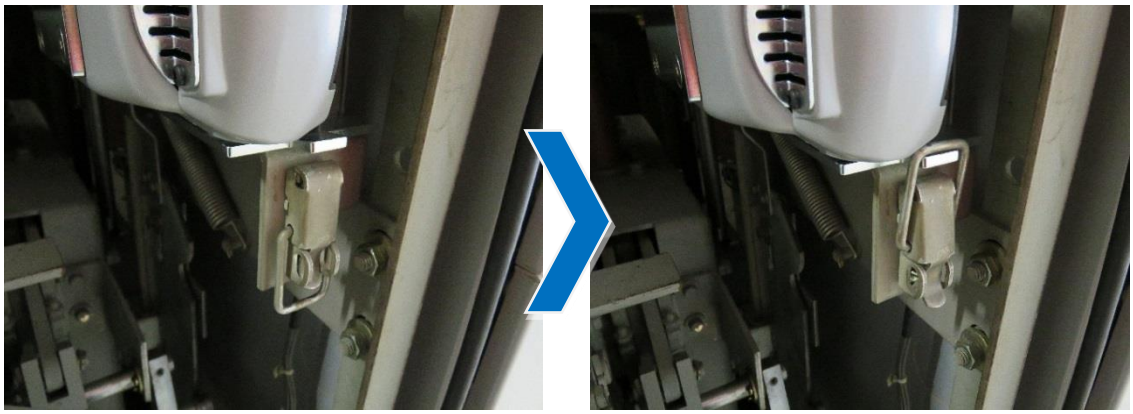
   c. Remove the stock elevating motor.

4. Place the RRS-3-MB II drive assembly onto the elevating motor pedestal. Install the motor to the correct location using the two locating dowels mounted on the bottom of the base plate to maintain alignment.



5. Secure the RRS-3-MB II into place by latching the snap hasp to the backside of the drive assembly base plate.

NOTE:
If the latch is either too loose or too tight, the location of the latch itself may be adjusted to work with the replacement elevating motor. See section "5.2.1 Snap Hasp Adjustment" for more details.



6. With the RRS-3-MB II drive motor secured into place, pull the engagement lever latch on the RRS-3 aside, and then pull the engagement lever in the cubicle toward the motor to engage the drive head of the RRS-3-MB II with the cubicle mounted racking mechanism. Ensure that the drive head mates properly with the cubicle racking mechanism; hand rotation of the motor may be necessary for proper alignment.

ATTENTION!
Please ensure that the drive head of the MBGA mates correctly with the cubicle mounted racking mechanism. Improper alignment may cause difficulties during operation.

ATTENTION!
If the axis of rotation of the MBGA's drive head does not align with the axis of rotation of the cubicle mounted racking mechanism when the engagement lever is pulled, the elevating motor platform may need to be repositioned. See section "5.2.2 Elevating Motor Pedestal Adjustment" for more details.

7. With the engagement lever pulled toward the elevating motor and drive head aligned, use the engagement lever latch located on the front of the drive assembly to hold down the lever by following these steps:

   a. Rotate the engagement lever latch over the top of the engagement lever, all the while keeping it pulled toward the motor.

   b. To secure the engagement lever in place, tighten the thumb screw on the latch until the engagement lever sits firmly in place.

ATTENTION!

Ensure that when the engagement lever is lowered, the mercury switch in the cabinet is being fully engaged. To make adjustments to the engagement lever, mercury switch, or the linkage between them, see section 5.2.3 Engagement Lever Adjustment.

DANGER!

Before performing any electrical maintenance operation please ensure that the proper plant operating procedures are always followed and all PPE requirements are met and/or followed.

8. If applicable, mount the tilt sensor onto a horizontal level surface of the breaker where it will not interfere with the racking operation and connect the tilt sensor cord to the tilt sensor receptacle on the topside of the control cabinet. If applicable, reset the tilt sensor to correspond to its current location by pressing the "RESET" button on the top side of the tilt sensor (RRS-3-MB II power must be on to reset the device).

9. Connect the motor power cord to the power receptacle on the drive assembly's elevating motor and then to the control console.

10. Connect the supervisory link cable to the cubicle's control power outlet (Where the stock elevating motor plugs in) and then to the control console.

11. Connect the AC power cord to the RRS-3-MB II via the receptacle located on the face of the control console. Next, plug the AC power cord into the power source, this unit operates on standard 120VAC wall power.

ATTENTION!

Please ensure that all cables are clear of moving parts. Failure to do so could damage cables and/or equipment.

4 Operation

This section outlines how to operate the RRS-3 MB II, both in MBSL and CCM modes.

DANGER!

Operating CBS ArcSafe® equipment prior to training may void all warranties, written or implied.

4.1 Operation Using MBSL Mode

This section describes the necessary steps to install and remove the Magne-blast circuit breaker using the RRS-3-MB II in MBSL (Magne-blast Supervisory Link) mode. Using this mode, the operator can install or remove the Magne-blast circuit breaker remotely and automatically using the breaker's built in limit switches and preexisting circuitry.

4.1.1 Cabinet Style Selection

Prior to beginning any racking procedure using the RRS-3-MB II in MBSL mode, the user must select which cabinet circuit style will be utilized during the racking operation. The RRS-3-MB II is equipped to operate in conjunction with the two different control schemes manufactured by GE. Please see section 2 of this document which describes how to find this information.

DANGER!

Always select the proper mode before installation and operation. Never operate the RRS-3-MB II in the incorrect mode. Doing so will result in incorrect or inconsistent operation.

In the event that that the wrong mode is selected, there are safeguards in place to keep from damaging control power elements within the switchgear.

In order to help identify the style of control circuit which will be operated using the RRS-3-MB II, CBS ArcSafe has placed a placard on the face of the control console to aid in identifying each type. This placard, shown below, illustrates the different styles of switches found in standard GE Magne-blast gear to operate the factory elevating motor.

4.1.2 Circuit Breaker Installation

To install the circuit breaker to the CONNECTED position, perform the following steps.

DANGER!

For your safety please ensure that all personnel follow the personal protective equipment rules and regulations along with following all of the manufacturer guidelines at ALL times.

1. Ensure that the RRS-3-MB II, as well as all cords and accessories, are properly installed and setup on the switchgear per the instructions in sections 2 and 3 of this manual.

2. Again, verify the circuit breaker is OPEN according to manufacturer specifications.

3. Next, locate the placard on the lower left hand corner of the RRS-3-MB II control console faceplate (Also shown in **Figure 3**). This placard will instruct the user as to which of the two options to choose on the control power selector switch.

a. Set the selector switch to "1" if the stock elevating motor is the universal motor with the raise/lower toggle switch located on the back side of the motor.

b. Set the selector switch to "2" if the stock elevating motor is the DC shunt wound motor with the raise/lower switch located inside the cubicle featuring any of the three styles shown on the placard.

If the gear to be operated is Type 2, the circuit breaker is in the lowered position, and is to be installed during the racking operation, use the cubicle mounted motor control switch to select the "RAISE" command. This will ensure that the RRS-3-MB II is operating using the correct circuitry within the cabinet.

DANGER!

Do not switch between style 1 and 2 with the power on. Always ensure that power is off before switching between the two options.

4. Turn the unit on using the main power switch on the face of the control console. (If the RRS-3-MB II is equipped with the radio remote option, please select either the local or radio option when powering the unit on.)

5. Once powered on, the RRS-3-MB II display should read as follows with the lower dot (To indicate that the breaker is in the disconnected or lowered position) between the first two characters lit as shown on the following page:

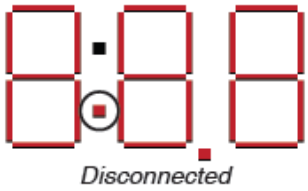


Figure 7: CCM Display for Disconnected Position

a. If the dot is displayed as shown, all circuitry within the Magne-blast cubicle is working properly, please proceed to step 6.

b. If there is no visible dot, discontinue use immediately and refer to Appendix A:Troubleshooting Guide. Check the control power fuse on the RRS-3-MB II and replace if necessary.

c. If the dot is in the upper position although the breaker is in the lowered or disconnected position, discontinue use immediately and refer to the troubleshooting section.

DANGER!

If at this point in the procedure the lower dot is NOT displayed, or the upper dot is displayed although the circuit breaker is in the disconnected position, discontinue use right away and refer to Section 4. Continued use beyond this point may damage equipment as the RRS-3-MB II will not operate as intended.

6. If applicable, press the small black RESET button located on the top of the tilt sensor to zero it. (Tilt sensor will only be accurate on surfaces with less than 10° of slope, please install on flat and level surface.)

7. Exit the arc flash boundary with either the control console, or the radio remote (if equipped).

   a. If unit is equipped with the radio remote option, see Appendix section B.2 for details on setup and operation with the radio remote.

8. Press and hold the "INSTALL" button to begin the installation racking procedure. The RRS-3-MB II will begin the racking procedure and continue until it automatically shuts off when the internal switches in the cubicle have been made, and the circuit breaker is in the fully connected position. During the racking process the "Current Alarm" light will remain illuminated to show that the elevating motor is operating and will only turn off once the operation is complete.

DANGER!

Monitor the tilt alarm strobe carefully during operation. If the tilt alarm strobe flashes repeatedly during operation, this indicates that the tilt sensor has been triggered due to an unsafe tilt condition. This strobe is an indication only and will not shut off the unit.

9. Power the unit off, and then disconnect all cables from drive assembly, control assembly, and cubicle. Release the engagement lever latch from the drive assembly and remove the drive assembly. Store drive assembly, and store all cords in provided storage bag for protection.

4.1.3 Circuit Breaker Removal

To remove the circuit breaker to the DISCONNECTED position, perform the following steps.

DANGER!

For your safety please ensure that all personnel follow the personal protective equipment rules and regulations along with following all of the manufacturer guidelines at ALL times.

1. Ensure that the RRS-3-MB II, as well as all cords and accessories, are properly installed and setup on the switchgear per the instructions in sections 2 and 3 of this manual.

2. Again, verify the circuit breaker is OPEN according to manufacturer specifications.

3. Next, locate the placard on the lower left hand corner of the RRS-3-MB II control console faceplate (Also shown in **Figure 3**). This placard will instruct the user as to which of the two options to choose on the control power selector switch.

a. Set the selector switch to "1" if the stock elevating motor is the universal motor with the raise/lower toggle switch located on the back side of the motor.

b. Set the selector switch to "2" if the stock elevating motor is the DC shunt wound motor with the raise/lower switch located inside the cubicle featuring any of the three styles shown on the placard.

   If the gear to be operated is Type 2, the circuit breaker is in the raised position, and is to be removed during the racking operation, use the cubicle mounted motor control switch to select the "LOWER" command. This will ensure that the RRS-3-MB II is operating using the correct circuitry within the cabinet.

DANGER!

Do not switch between style 1 and 2 with the power on. Always ensure that power is off before switching between the two options.

4. Turn the unit on using the main power switch on the face of the control console. (If the RRS-3-MB II is equipped with the radio remote option, please select either the local or radio option when powering the unit on.)

5. Once powered on, the RRS-3-MB II display should read as follows with the upper dot (To indicate that the breaker is in the connected or raised position) between the first two characters lit as shown on the following page:

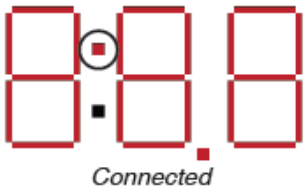


Figure 8: CCM Display for Connected Position

a. If the dot is displayed as shown, all circuitry within the Magne-blast cubicle is working properly, please proceed to step 6.

b. If there is no visible dot, discontinue use immediately and refer to Appendix A:Troubleshooting Guide. Check the control power fuse on the RRS-3-MB II and replace if necessary.

c. If the dot is in the lower position although the breaker is in the raised or connected position, discontinue use immediately and refer to the troubleshooting section.

DANGER!

If at this point in the procedure the upper dot is NOT displayed, or the lower dot is displayed although the circuit breaker is in the connected position, discontinue use right away and refer to Section 4. Continued use beyond this point may damage equipment as the RRS-3-MB II will not operate as intended.

6. If applicable, press the small black RESET button located on the top of the tilt sensor to zero it. (Tilt sensor will only be accurate on surfaces with less than 10° of slope, please install on flat and level surface.)

7. Exit the arc flash boundary with either the control console, or the radio remote (if equipped).

   a. If unit is equipped with the radio remote option, see Appendix section B.2 for details on setup and operation with the radio remote.

8. Press and hold the "REMOVE" button to begin the removal racking procedure. The RRS-3-MB II will begin the racking procedure and continue until it automatically shuts off when the circuit breaker is fully removed and the internal switches in the cubicle have been made and the circuit breaker is in the fully disconnected position. During the racking process the "Current Alarm" light will remain illuminated to show that the elevating motor is operating and will only turn off once the operation is complete.

DANGER!

Monitor the tilt alarm strobe carefully during operation. If the tilt alarm strobe flashes repeatedly during operation, this indicates that the tilt sensor has been triggered due to an unsafe tilt condition. This strobe is an indication only and will not shut off the unit.

9. Power the unit off, and then disconnect all cables from drive assembly, control assembly, and cubicle. Release engagement lever latch from the drive assembly and remove the drive assembly. Store drive assembly and all cords in provided storage bag for protection.

4.2 Operation Using CCM Mode

DANGER!

The RRS-3-MB II should only be operated in CCM mode in emergencies where no other option exists. CBS ArcSafe® ALWAYS recommends diagnosing and repairing problems within the cubicle to allow for standard operation using the built in circuitry allowing for automatic operation. Racking in CCM mode is available as an emergency alternative for defective cubicles only and should only be used as such. CBS ArcSafe® recommends using the RRS-3-MB II only in switchgear known to be in proper functioning order. For more details please contact CBS ArcSafe®.

4.2.1 Introduction

Please read the warning above before continuing any further. All operators using the RRS-3-MB II in CCM mode must always recognize that while operating the RRS-3-MB II in CCM mode, the built in limit switches which allow the breaker to rack to the correct position and then stop will be disabled and the unit will run solely on current monitoring. If the RRS-3-MB II does not display the applicable raised or lowered dot, this may indicate faulty control within the cell. Please be aware that faulty control power may also mean that other systems within the breaker are not working properly either. Please take extreme caution when working in this situation.

4.2.2 Manual Current Control Operation

Using manual current control allows the user to monitor and record the instantaneous or max current draw during the racking operation. This allows for quick and easy setting of the current control module for future current controlled remote racking operations. In order to set the current control module to "manual" or "jog" control, the install and remove current limit settings must be set to 0.0 amps. Perform the following steps to set the current control limit settings to 0.0 amps:

1. Ensure that the RRS-3-MB II has been properly set up for operation as described in Sections 2 and 3 of this manual.

2. Verify the circuit breaker is OPEN according to manufacturer specifications.

3. Ensure that the Control Power Style Selector switch is set to 1 for manual operation.

4. With the main power switch on, press and hold the install/remove soft pushbutton on the CCM (NOT the Install/Remove controls on the faceplate) while pressing the DOWN soft pushbutton to set the CCM to 0.0 amps.

5. In order to store the maximum current draw during the racking operation press the DOWN/MAX CURRENT button so that the decimal point on the CCM is blinking. The LCD display will display the highest current drawn from the RRS-3-MB II and not the instantaneous current draw during the operation. If the same pushbutton is pressed again, then the CCM display will resume normal operation and the instantaneous value of current draw will be displayed.

6. Exit the arc flash boundary with the control console to a safe distance from the circuit breaker.

DANGER!

Ensure that while using the RRS-3-MB II in manual mode all service personnel remain outside the arc-flash boundary and comply with all applicable Federal, State, Local, and In-house safety regulations and procedures' regarding arc-flash. CBS ArcSafe® also offers a robust remote camera system which can be used to view the current control LCD and/or the racking operations remotely if the operator is not in a position to view the racking operation.

7. Press and hold the applicable pushbutton on the face of the control console to rack the breaker to the desired location, all the while monitoring the CCM display to find the maximum value recorded. The internal memory of the current control module will retain the highest value recorded for 1 minute.

ATTENTION!

Please record the maximum value attained during this process. This value will aid in setting up the RRS-3-MB II for automatic current control operation.

8. Carefully monitor breaker location during this process, as there is no automatic stop for motor operation during this particular process. Therefore, the motor will continue to operate as long as the command is being given.

DANGER!

Due to the nature of the operation being performed, it is possible to over-rack the circuit breaker and damage equipment. Always monitor breaker location during this process to prevent over-racking the breaker or damaging equipment.

9. When the circuit breaker racking operation is complete, the RRS-3-MB II can be uninstalled from the circuit breaker and stored.

4.2.3 Automatic Current Control Operation

After operating the RRS-3-MB II using manual CCM mode, users should have a recorded value of maximum current required to perform both install and remove racking operations. With these known values, operators can now set the CCM to run automatically based on current alone using the following steps.

1. Ensure that the RRS-3-MB II has been properly set up for operation as described in section 2.
2. Verify the circuit breaker is OPEN according to manufacturer specifications.
3. Ensure that the Control Power Style Selector switch is set to 1 for manual operation.
4. Set the current control module. To set the current control module for the circuit breaker type being installed/removed, perform the following steps:
    a. With the main power switch ON, press and hold the install/remove soft pushbutton while pressing the UP or DOWN current soft pushbuttons to the desired value.

b. The best method in determining a suitable current limit setting is by predetermining the current limit by operating the RRS-3-MB II in manual mode the first time a breaker is installed and removed and recording the maximum value attained.

ATTENTION!

At this point, recall the highest value recorded during manual racking operation from the previous section for the applicable install or remove operation. Set the CCM value approximately 10% higher than the maximum value recorded to begin.

The required current setting is determined by a number of factors including breaker type, size, environment, and physical condition.

5. Press and release the applicable install/remove pushbutton on the control console or radio remote to begin the racking operation. The remote racking unit will continue the racking operation until the current draw on the system reaches the current set point. During the racking process the "Current Alarm" light will remain illuminated to show that the elevating motor is operating and will only turn off once the CCM has reached its limit. At this point the "Current Alarm" light will begin to flash, alerting the operator that the operation has completed and that the CCM has reached its current setpoint. The remote racking operation can be stopped at any time by pressing the opposite install/remove pushbutton on the control console or radio remote.

6. If the current control module has been set to an accurate level for the switchgear being operated, the racking operation will stop when the switchgear reaches the applicable DISCONNECT or CONNECTED.

7. When the circuit breaker racking operation is complete, the RRS-3-MB II can be detached from the circuit breaker and stowed.

5 Adjustments

The RRS-3 MB II comes adjusted from the factory to fit most common configurations, and should not need to be adjusted in most cases. However, in some cases, minor adjustments to the breaker cabinet or RRS-3 may be necessary to achieve proper operation. This section instructs the user on the various adjustments that may need to be performed.

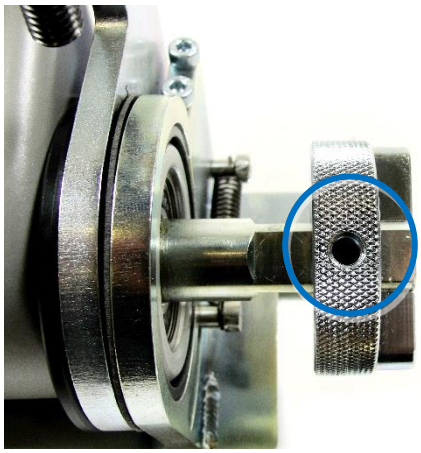
5.1 RRS-3 MB II Adjustments

This section describes the various adjustments that can be performed on the RRS-3 MB II.

5.1.1 Motor Drive Depth

To adjust the motor drive depth, do the following:

1. Loosen the set screws on each side of the drive head, as shown.



2. Install the RRS-3 MB II drive assembly as described in Section 3: Installation.
3. Slide the drive head in or out as required so that it mates properly with the cubicle racking mechanism.
4. Re-tighten the set screws on the drive head.

5.2 Magne-blast Cabinet Adjustments

This section describes the various adjustments that may be made to the Magne-blast cabinet in order to achieve proper operation with the RRS-3 MB II.

5.2.1 Snap Hasp Adjustment

The snap hasp latch locks the drive motor in place on the elevating motor pedestal, within the GE Magne-Blast cabinet. To adjust this latch for proper fit to the RRS-3 MB II, do the following:

1. Loosen the two screws on the backside of the latch mount.
2. Install the RRS-3 MB II drive assembly as described in section 3.
3. Once the RRS-3 MB II drive motor is correctly positioned, with the hasp hooked over the drive motor but not latched, slide the hasp so that it is nearly closed, but not fully, and that there is no gap between the drive motor plate and the hook at the end of the hasp.
4. Re-tighten both screws on the backside of the latch mount to secure the latch in its newly adjusted location.

5.2.2 Elevating Motor Pedestal Adjustment

The elevating motor pedestal is the platform inside the GE Magne-blast cabinet which the drive motor of the RRS-3 MB II mounts to. To adjust its height, do the following:

1. Loosen the bolts holding the pedestal in place
2. Install the RRS-3 MB II drive assembly as described in section 3.
3. Slide the pedestal as required to properly align the drive motor of the RRS-3 MB II with the cubicle racking mechanism.
4. Re-tighten the bolts holding the pedestal in place.

5.2.3 Engagement Lever Adjustment

The engagement lever operates a linkage inside the GE Magne-Blast cubicle which engages a limit switch, enabling racking to take place. If during operation the RRS-3-MB II is not functioning properly this switch may not be fully engaged and therefore preventing the supervisory link from working properly. In this case, it may be necessary to adjust the linkage or the mercury switch itself. To adjust this lever and linkage, please refer to the instruction manual for the switchgear requiring adjustment, or contact CBS ArcSafe:

5.2.4 Switch Adjustment

The mercury switches (or roller switches) inside the GE Magne-Blast cubicle establish travel limits for the breaker racking mechanism. To adjust these switches, please refer to the instruction manual for the switch-gear requiring adjustment, or contact CBS ArcSafe.

6 Maintenance

The CBS ArcSafe® RRS-3-MB II remote racking system is designed to be a robust and reliable unit; however, adopting a regular maintenance schedule will keep the RRS-3-MB II in peak condition for the life of this product, providing years of trouble free service.

6.1 Prior to Use

Before each use examine the overall condition of the unit, noting any conditions that may affect operation. This practice will help to prevent the operator from installing and operating a unit that shows any signs of misuse which may lead to improper operation. Several key points to check for mistreatment or damage include, but are not limited to:

1. Inspect all plugs and receptacles to ensure proper connection is made.
2. Inspect all cables for wear or damage. Replace any damaged cable immediately.
3. Check for loose or missing hardware, retighten or replace as necessary.
4. Test all pushbuttons and ensure each is fully operational.
5. Test radio remote connectivity and batteries (If applicable).
6. Ensure unit is free of dirt and grime by wiping down periodically.

6.2 After Use

After each use, inspect the device to ensure that no damage was incurred during the most recent operation. Inspect all mechanical and electrical components to ensure that each is fully functioning for future use. Ensure that the unit is free of dirt, oil, and/or grease and, if necessary, clean the unit prior to storage. Place all components neatly into provided storage bag while ensuring cables are properly coiled and free of tangles. Store the device in a clean and dry location to prevent damage when not in use.

6.3 Annual Maintenance

Depending on usage, at least once a year perform the checklists and regular maintenance listed in the two previous sections. If usage is frequent, make sure to carefully check all wear items and replace as necessary.

Appendix A: Troubleshooting Guide

Symptom	Problem	Solution
Neither upper nor lower dot is displayed when supervisory link is installed	The supervisory link is not plugged in.	Install the supervisory link cable to the cabinet and control console.
	Unit is in the incorrect mode.	Turn the power off and switch to the correct mode based on gear being operated.
	The internal circuitry in the cabinet is faulty.	Contact CBS ArcSafe® for solutions.
	The control power fuse is blown	Replace the control power fuse and continue operation.
Dot position does not correspond to circuit breaker position.	Control wiring inside the cabinet is an uncommon style.	Contact CBS ArcSafe® for solutions

Appendix B: Radio Remote Pendant

This section will describe to the user the setup and operation of the RRS-3 MB II using the analog radio remote.

B.1 Radio Remote Components

The radio remote option for the RRS-3 MB II consists of two main parts: the transmitter and the receiver. The transmitter is the handheld radio remote that the user will interact with when operating the device remotely. The receiver is mounted inside the RRS-3 and receives the signal from the transmitter. The following paragraphs and figures will illustrate the key features of each.

Radio Remote Transmitter (Figure B-1) – The radio remote transmitter has a 3 button layout that is designed to wirelessly control the operational features of the RRS-3 MB II.

Radio Remote Receiver (Figure 2.10)– The radio remote receiver receives the radio remote signals generated by the transmitter that are required to control the RRS-3 MB II. The radio remote receiver is housed on the side of the RRS-3 MB II case.

ATTENTION!

The provided radio remote transmitter is manufactured specifically for the system that it came with. The radio remote will NOT work with any other CBS ArcSafe® products; therefore ensure that the radio remote transmitter is kept with the proper system.

1. Unused Button
2. INSTALL Button
3. REMOVE button
4. Operation Key

Figure B-1: Analog Radio Remote Transmitter

B.2 Setup and Operation

Operating the RRS-3 MB II using the analog radio remote pendant station is very similar to standard local operation. The following steps will detail the setup and operation of the RRS-3 MB II using the analog radio remote.

1. Place the RRS-3 MB II near the area where the remote operation will occur, unlatch and open the lid to expose the controls and cord.
2. Install the RRS-3 MB II drive motor and other components as described in this manual onto the equipment to be remotely operated.
3. Remove the cable from the cord storage area and attach it to the receptacle on the RRS-3 MB II.
4. Power on the RRS-3 MB II by turning the power switch to "REM" to utilize the radio remote.
5. Next, ensure that the operation key is inserted into the slot on the front of the radio remote. The radio remote will not function unless the key is inserted into the slot
6. Check to ensure that all components are properly installed and connected. Once everything has been verified as being correct, exit the arc flash boundary with the radio remote. Remote operation may now begin.
7. At this point, refer to the Operation of this manual for specific operating instructions.
8. Once remote operation has been RRS-3 MB II by turning the main power switch to the "OFF" position. Disconnect the RRS-3 MB II Drive Motor, and Place all cords and radio remote (If applicable) into the cord storage area and store for future use as directed.

B.3 Radio Remote Specifications

The following table contains the relevant specifications relating to the optional radio remote pendant station.

Radio Remote Technical Specifications		
Max Operating Distance	…	150 ft
Frequency	…	310-320 MHz
Operating Temperature	…	-31°F to 167°F
Transmitter Power	…	2 AA Batteries
Security Coding	…	128-bit framing protocol with 32-bit serial number embedded; error detection and correction encoded
Transmitter Size	…	5.2” x 1.75” x 0.9”.
Transmitter Button Life	…	Tested to 2,000,000 Operations

Appendix C: Local Operator

The RRS-3 MB II Local Operator allows an operator to bypass the electronic controls provided by the RRS-3 MB II Control Assembly and the Magne-blast gear, and directly power the RRS-3 MB II Drive Motor. The Local Operator link is intended for use in case of major hardware failure, or other rare circumstances where operating the standard RRS-3 MB II is not possible.

The Local Operator accessory is designed to work only with Magne-blast gear using 120VAC or 125VDC control power schemes. For further information, please contact CBS ArcSafe.

DANGER!

When using the RRS-3 MB II Local Operator accessory to rack a breaker, the internal travel limit switches and sensors will be ignored, allowing the operator to rack a breaker in case these components are damaged or otherwise inaccessible.

Racking a breaker in this way can result in serious injury or damage to equipment due to overtravel, and other hazards. If at all possible, it is highly recommended use the standard RRS-3 MB II Control Assembly to perform any racking operations.

ATTENTION!

Only use the Local Operator accessory for the RRS-3 MB II with 120VAC or 125VDC control power schemes. Attempting to use the Local Operator with any other power scheme will result in severe damage to the RRS-3 MB II Drive Motor and/or the Local Operator accessory.

C.1 Components

The Local Operator accessory for the RRS-3 MB II consists of two main parts: the wired pendant, and the motor adapter box. The wired pendant is the handheld remote that the user will interact with when operating the device remotely. The motor adapter box is screwed into the connector on the back of the RRS-3 and provides power to the motor and Local Operator accessory from the Magne-blast cabinet. The following paragraphs and figures will illustrate the key features of each.

Wired Pendant Remote (Figure C-1) – The wired remote pendant has a 3 button layout that is designed to wirelessly control the operational features of the RRS-3 MB II.

Motor Adapter Box (Figure C-2) – Motor adapter box plugs into the connector on the RRS-3 MB II Drive Motor, and the Magne-blast supervisory link connection.

Figure C-1: Local Operator Wired Pendant

Figure C-2: Local Operator Motor Adapter Box

C.2 Setup and Operation

This section will detail the steps required to set up and operate the RRS-3 BMII Local Operator accessory.

1. Ensure that the RRS-3-MB II Drive Motor has been properly set up for operation as described in section 3.2, steps 1-7.
2. Install the Screw the Motor Adapter Box of the Local Operator accessory onto the RRS-3 MB II Drive Motor.
3. Connect the supervisory link cable from the Motor Adapter Box to the cubicle's control power outlet (Where the stock elevating motor plugs in).
4. Exit the Arc-flash boundary with the Local Operator wired pendant. Operation can now take place.

DANGER!

Ensure that while using the RRS-3-MB II in manual mode all service personnel remain outside the arc-flash boundary and comply with all applicable Federal, State, Local, and In-house safety regulations and procedures' regarding arc-flash. CBS ArcSafe® also offers a robust remote camera system which can be used to view the current control LCD and/or the racking operations remotely if the operator is not in a position to view the racking operation.

5. Press and hold the applicable pushbutton on the pendant to rack the breaker to the desired location.
6. Carefully monitor breaker location during this process, as there is no automatic stop for motor operation during this particular process. Therefore, the motor will continue to operate as long as the command to operate is being given.

DANGER!

Due to the nature of the operation being performed, it is possible to over-rack the circuit breaker and damage equipment. Always monitor breaker location during this process to prevent over-racking the breaker or damaging equipment.

7. After the breaker has been racked, disconnect the supervisory link cable from the cubicle control power outlet, and remove the Motor Adapter Box from the RRS-3 MB II Drive Motor.

Remove the RRS-3 MB II Drive Motor from the cubicle.

Appendix D: Notes

CBS ArcSafe®

Distance Is Safety®

A Group CBS Company

RRS-3 MB II
Installation and Operation

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Email: info@CBSArcSafe.com

DANGER!

Ensure that personnel using this equipment are adequately trained in the operation of the switchgear they are planning to work with; that they are correctly stationed outside the arc flash boundary; and that they comply with all applicable Federal, State, Local, and In-house safety regulations and procedures. Attention should be given to distance, angle, and personal protective equipment (PPE).