Technical Manual

CBS ArcSafe®

RRS-2 (Remote Racking System)

Distance Is Safety®

CBS ArcSafe®

A Group CBS Company

P.O. Box 550
Argyle, TX 76226
(940) 382-4411
www.CBS ArcSafe.com

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RRS-1 – Remote Racking System for rotary type breakers

The RRS-1 is a universal remote racking system capable of removing or inserting low and medium voltage draw out rotary circuit breakers while the operator remains outside the arc flash boundary. This device is portable, weighing less than 200 pounds, and user friendly requiring no modifications to the switchgear or circuit breakers. Each system will be custom designed to fit your switchgear needs.

RRS-2 – Remote Racking System for extraction type breakers

The RRS-2 is a universal remote racking system capable of removing or inserting low and medium voltage non-rotary circuit breakers while the operator remains outside the arc flash boundary. This device is portable, weighing less than 200 pounds, and user friendly requiring no modifications to the switchgear or circuit breaker. Each system will be custom designed to fit your switchgear needs.

RRS-3 – Single Application Remote Racking System

The RRS-3 system is an inexpensive single application remote racking system which allows the operator to install and remove a breaker while standing 25 to 75 feet away with a hand control unit. CBS ArcSafe also offers a radio remote option which allows for operation up to 150 feet away without the need for an extension cable. The radio remote option in some cases allows for closed door racking to occur once the RRS-3 has been attached to the breaker.

RSO – Remote Switch Operator

A remote switch operator is the power and control console for service personnel to remotely charge, close, and trip circuit breakers from a safe distance using a CBS ArcSafe® RSA. The RSO can be used in conjunction with the CBS ArcSafe® remote racking system for complete charge, close, trip, and racking operations or independently as a stand-alone device for use with a remote racking system. Each CBS ArcSafe® remote switch operator can also be operated with an optional wired/wireless pendant station.

RSA – Remote Switch Actuator

A remote switch actuator allows service personnel to move, push, pull, charge, close, and/or trip circuit breakers and other electrical equipment from a safe distance in conjunction with a CBS ArcSafe® RSO. The remote switching actuator attaches to the front of your circuit breaker and is mechanically assisted by magnets without the need for any modification to your switchgear. After setup and installation the RSO controls the RSA's operation.

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GroupCBS, Inc. P.O. Box 1557
Gainesville, Texas 76241, USA

CBS ArcSafe®
P.O. Box 550
Argyle, Texas 76226

Table of Contents

About the User's Guide

This user's guide describes the functions and features of the CBS ArcSafe® RRS-2. 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-2 features.

Before You Begin

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.

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-2 on your switchgear. Contact your local group CBS service provider at www.gcbs.com to assist in proper care and maintenance for your switchgear.

Distance Is Safety®

CBS ArcSafe®

A Group CBS Company

P.O. Box 550
Argyle, TX 76226
Tel: 940-382-4411
Fax: 940-382-9435

Website: www.CBSArcSafe.com
Email: info@CBSArcSafe.com

1.0 Description

The *CBS ArcSafe®* RRS-2 is a portable, highly configurable remote racking system designed to reposition circuit breakers that are equipped with non-rotary racking mechanisms. The primary goal for the design and operation of the RRS-2 remote racking system is to reposition circuit breakers with the operator positioned safely outside of the arc flash boundary.

The RRS-2 is powered from either standard AC power or the internal battery. The RRS-2 is operated with the pendant station via a 25' pendant retractile cord *(additional 25' cords are available)* or an optional radio remote pendant station. The pendant station allows for the operator to manipulate the tooling assembly which repositions the circuit breaker when equipped with the required tooling.

1.1 Components

The RRS-2 consists of three components, the structural, control, and tooling assemblies (breaker specific).

1.1.1 Structural Assembly

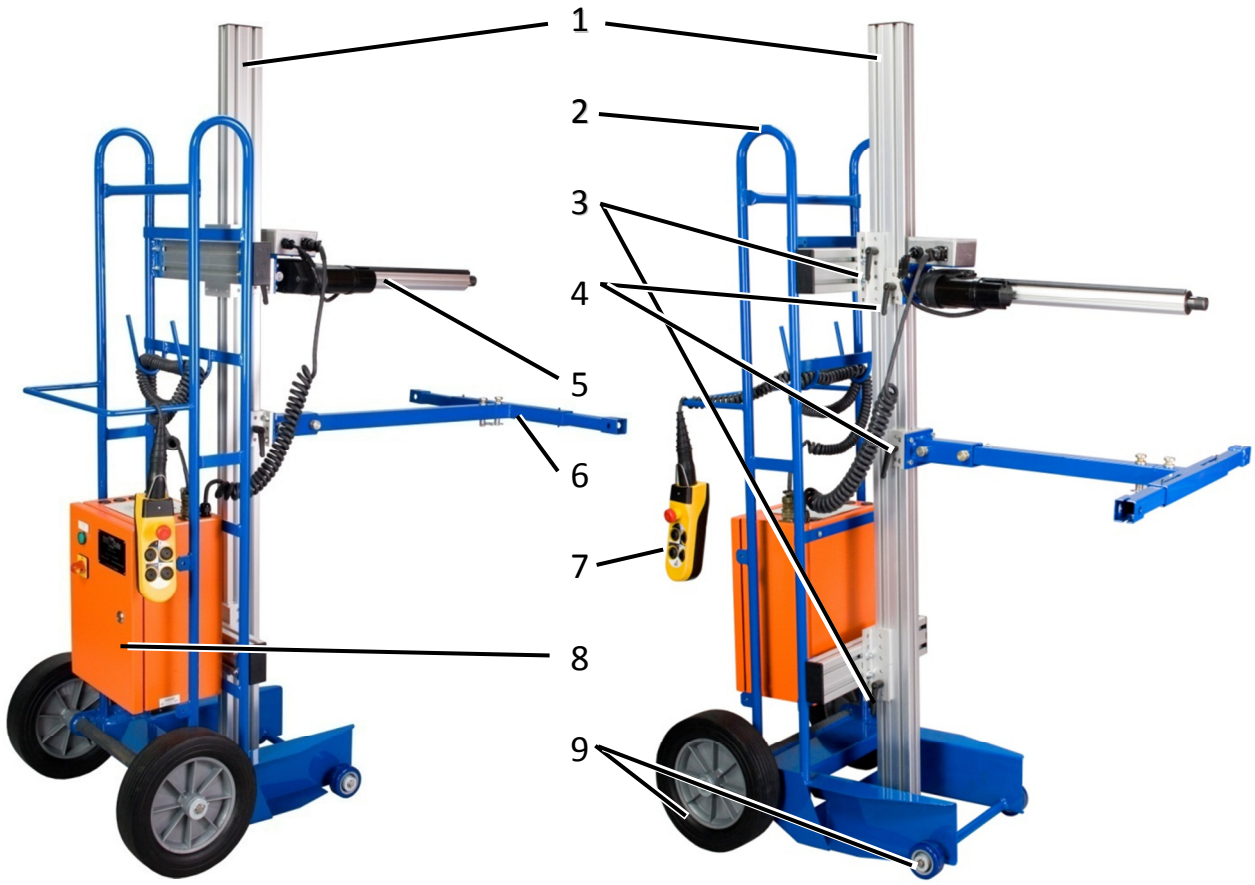
The RRS-2 structural assembly is made up of the frame (Fig. 1.1.2), slide rail (Fig. 1.1.1), cubicle brace (Fig. 1.1.6), transportation and stability wheels (Fig. 1.1.9), and the (optional) floor locks/stabilizers (Fig. 1.2).

Slide Rail (Fig. 1.1.1) – The slide rail is an extruded aluminum track system, allowing for the quick repositioning of the cubicle brace and actuator assembly. Several optional slide rail configurations are available, including single and double rails, fixed or extended-height rail mounting, and several rail lengths.

Steel Frame (Fig. 1.1.2) – All components of the RRS-2 are directly or indirectly mounted to and supported by the steel frame. The curved top tubes act as handles when tilting the unit on the rear wheels for transportation. Integrated storage hooks are provided to secure the pendant station and pendant retractile cord when not in use.

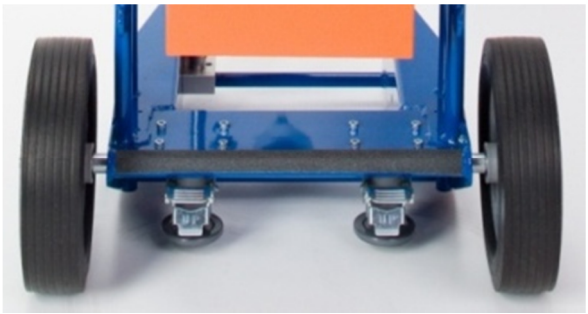
Cubicle Brace (Fig. 1.1.6) – The cubicle brace is a telescoping support arm with brace, designed to secure the RRS-2 to the circuit breaker cubicle during operation. The cubicle brace engages the RRS-2 slide rail, allowing it to be repositioned as required. The cubicle side of the brace is configured with a cubicle specific brace (Fig. 3) designed to quickly secure the cubicle brace and the RRS-2 to the cubicle.

Tooling (Fig. 1.5) – The RRS-2 tooling is custom built for every breaker and allows for the RRS-2 to attach to a variety of breakers simply by swapping out the tooling. Typically, the main actuator racks the circuit breaker while the secondary actuator depresses the circuit breaker interlocks although this may differ depending on the breaker and switchgear being repositioned.



1. Slide Rail
2. Steel Frame
3. Slide Rail Locks
4. Tooling Locks
5. Main Actuator
6. Cubicle Brace
7. Pendant Station
8. Control Cabinet
9. Transportation and Stability Wheels

Figure 1.1 – Structural Assembly



Floor Locks (*optional*)

Stabilizers (*optional*)

Figure 1.2 – RRS-2 Floor Locks and Stabilizers (optional)

Transportation and Stabilization Wheels (Fig. 1.1.9) – The rear transportation wheels allow the RRS-2 to be tilted back and transported, similar to a hand-truck. The front stability wheels create a secure and steady, level platform during operation and storage. The solid rubber transportation wheels can be replaced with pneumatic tires (*optional*) for easier movement over rough terrain. The unit can also be equipped with stair climber rails (*optional*).

Floor Locks and Stabilizers *optional (1.2) – The RRS-2 may be equipped with optional floor locks or stabilizers. Engaging the floor locks lifts the transportation wheels off the ground to limit RRS-2 movement during operation. The stabilizers help to prevent the RRS-2 from tilting backwards during operation.

Stair Climber Rails *optional (Fig. 1.3) – The stair climbers allow for the RRS-2 to easily be moved up/down stairs and in/out of vehicles.

Pneumatic Tires *optional (Fig. 1.4) – The RRS-2 may be equipped with optional pneumatic tires in order for the RRS-2 to easily travel over gravel or other rough surfaces.

Figure 1.3 – RRS-2 Stair Climber Rails (optional)

Figure 1.4 – RRS-2 Pneumatic Tires (optional)

PS-2 PS-4 PS-R4 PS-R6

Figure 1.3 – Pendant Station

Figure 1.4 – Control Cabinet, Internal

Siemens Type MA, Foot-Pedal Interlock

Westinghouse Type DB, Position Interlock

Figure 1.5 – Interlock Actuators and Tooling

ATTENTION

These are only two interlock actuators and tooling of many designs that are available. Every RRS-2 tooling accessory is custom built for your switchgear.

1.1.2 Control Assembly

The RRS-2 control assembly includes the pendant station (Fig. 1.3) and control cabinet (Fig. 1.4).

Pendant Station (Fig. 1.1.7, Fig. 1.3)
The pendant station controls the tooling assembly. There are many different types of pendant stations available including the PS-2 (2 button), PS-4 (4 button), PS-R4 (radio remote 4 button), PS-R6 (radio remote 6 button). On the wired models the 25' pendant retractile cord connects the pendant station to the control cabinet. The cord can be uncoupled from the control cabinet via a screw connector for storage or to add optional pendant extension cords. Onboard storage of the pendant station and pendant retractile cord is provided via the frame storage hooks or the storage bag. The pendant station and pendant retractile cord can be replaced with an optional radio remote system, consisting of a radio remote pendant station and receiver.

> ***Emergency Stop Pushbutton***
> When the red emergency stop pushbutton is depressed the unit is deactivated, but NOT turned off. In order to resume normal operation the pushbutton must be turned counterclockwise.

Pendant Retractile Cord (Fig. 1.1.13)
The pendant retractile cord allows for the operator of the RRS-2 to distance themselves from the breaker during the racking/unracking operations.

> **DANGER!**
> ***The pendant retractile cord may not remove the service personnel from the arcflash area in some circumstances. Attention should be given to distance, angle, and personal protective equipment (PPE). If the operator cannot leave the arcflash area with the length of the cable, we offer extension cables, radio remote pendant stations, and wireless video systems to ensure that the operator can be as far away from the racking/unracking operation as needed for safety.***

Control Cabinet (Fig. 1.1.8, Fig. 1.4)
The primary function of the control cabinet is to house and protect the system controls and power supply. Additional controls, including the main power switch and controls for optional equipment are located on the control cabinet.

Cabinet Access (Fig. 1.1.14)
The control cabinet can be opened using a flat-head screwdriver to unlock the cabinet. The cabinet houses the control wiring, and battery for the RRS-2.

1.1.3 Tooling Assembly

The components of the RRS-2 tooling assembly are dependent on the circuit breaker being racked however the components generally include the main and secondary linear actuators and the tooling that adapts the actuators to the circuit breaker racking mechanism.

Main Actuator (Fig. 1.1.5) – The main actuator supplies the driving force needed to reposition switchgear. There are two models available the standard 600 ft lb (80 m-kg) and the optional 1200 ft lb (170 m-kg) actuator. They both use an internal clutch to limit force available to prevent over racking. The actuator attaches to the RRS-2 via the slide rail, and can easily be repositioned with the lever locks (Fig. 2-4).

Secondary Actuator (Fig. 1.5) – The secondary actuator is generally used on the circuit breakers interlocks and supplies the driving force needed to engage circuit breaker interlock devices which are normally actuated manually by the operator. Mounting of the secondary linear actuator is dependent on the circuit breaker type.

2.0 Controls and Indications

Current Control Module (Fig. 2.1.1) – The current control module controls the current limit settings of the CBS ArcSafe® RRS-2. The current control module also switches the current limiter between manual and automatic shutoff operation.

Lights Control Switch (Fig. 2.1.2) *optional – The light control switch operates the optional CBS ArcSafe® LED lighting system that is attached to the RRS-2. Please remember to turn the lights off when not in use.

Camera Control Switch (Fig. 2.1.3) *optional – The camera control switch operates the optional CBS ArcSafe® camera system. The camera sends a wireless video feed to your display monitor. For more information please see Appendix C for the wireless camera system user's guide.

Power Switch and Indication Light (Fig. 2.1.4) – The main power control switch to the unit. The switch is ON when the unit is operating, and OFF when the unit is stowed and/or charging. The power indication light indicates the state of the power switch.

Main Linear Actuator Port (Fig. 2.1.5) – The main linear actuator port provides power for the main racking functions of the RRS-2 when the main linear actuator cable is properly connected.

Auxiliary Linear Actuator Port (Fig. 2.1.6) – The secondary linear actuator port provides power for the auxiliary racking procedures needed when the auxiliary linear actuator cable is properly connected.

Pendant Station Port (Fig. 2.1.7) – The pendant station port allows for the connection of the pendant station and optional extension cords.

Low Battery Indicator (Fig. 2.1.8) – When the battery is low the current control module will display "-bA"indicating a low battery. In order for continued operation the RRS-2 will need to be connected to AC power in order to charge.

ATTENTION
The RRS-2 may be used for racking equipment while charging on AC power.

Over-Current Protection Relay (located inside cabinet) – The over-current protection relay protects the electrical system of the CBS ArcSafe® remote racking system. The relay will trip to remove power from the unit when an over-current condition exists; a manual reset is required to restore power to the system.

*Contact *CBS Arc Safe™* for ordering information at (940) 382-4411

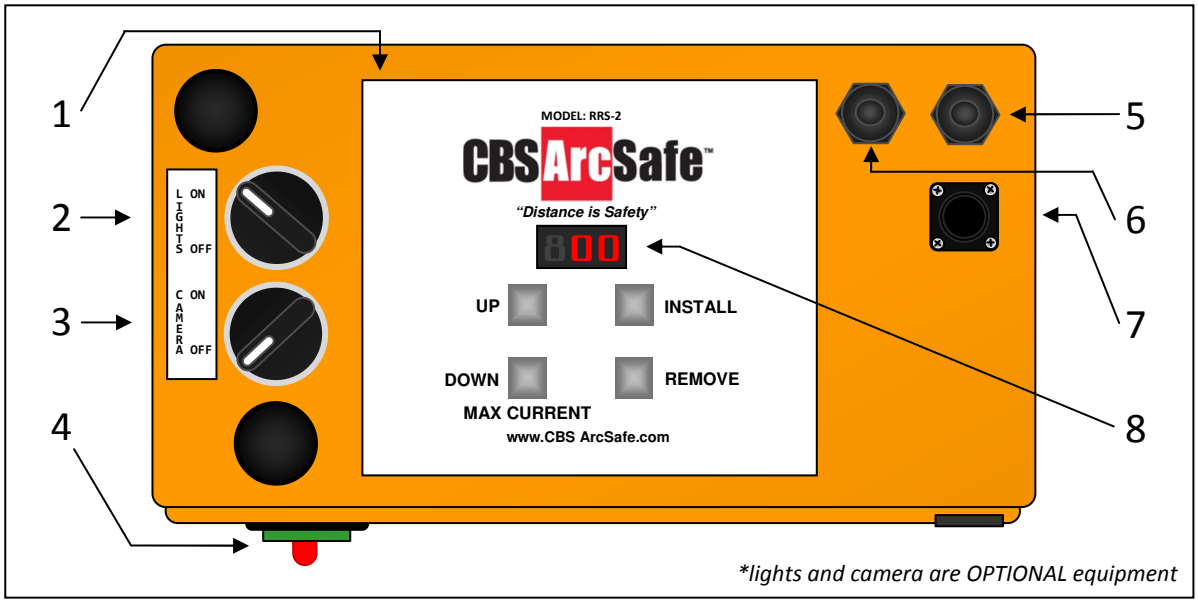


Figure 2.1 – RRS-2 Electrical Cabinet Mounted Controls

3.0 Preparation and Operation

The preparation and operation of the remote rack is described in the following sections and include:

3.1 Set up Training

This section lists the necessary steps to set up training for your RRS-2.

3.2 Unpacking the RRS-2

This section lists the necessary steps to uncrate the remote rack and prepare it for operational readiness.

3.3 Charging the RRS-2

This section describes the procedure for charging the remote racking system to prepare it for future operations.

3.4 Setting the Actuator Limit Switches

This section describes the procedure for charging the remote racking system to prepare it for future operations.

3.5 Setting up the RRS-2 for Operation

This section lists the preliminary steps for operation.

3.6 Current Control Module

This section explains the purpose of the current control module and how to use the current control system.

3.1 Set up Training

Included with your purchase of the RRS-2 is 4 hours of training from either a CBS ArcSafe® equipment representative or an approved CBS ArcSafe® outside representative. Please call CBS ArcSafe® at (940) 382-4411 to set up this FREE training seminar for your service personnel prior to ANY operations.

DANGER!

It is VERY important to have proper training before using this unit as improper use may damage your RRS-2 and void all warranties written or implied.

3.2 Unpacking the RRS-2

The RRS-2 is placed in a protected condition to allow the unit to be shipped more efficiently and to prevent damage from occurring. Perform the following steps to unpack the RRS-2 and prepare it for operation.

DANGER!

Do not unpack the RRS-2 until your FREE training seminar has been provided. Unpacking the unit before training may void your warranty. This guide is intended for personnel that have already received the proper training.

1. *Remove the cardboard cover* by cutting the perimeter at the base with a utility knife or removing the nails/screws.

2. Carefully *remove the steel strapping* that secures the remote rack to the pallet and roll the unit onto the floor.

3. Inventory the CBS ArcSafe® RRS-2 components to ensure nothing is missing. A CBS ArcSafe® representative will assist with inventory before the FREE training seminar.

4. If pneumatic tires are installed on the unit *(optional),* ensure the tires are inflated to their proper pressure.

5. Properly attach necessary tooling to the RRS-2.

6. The CBS ArcSafe® RRS-2 is now ready for charging and setting up for operation.

3.3 Charging the RRS-2

The CBS ArcSafe® remote racking unit is equipped with batteries to enable operation when AC power is unavailable. Perform the following steps to charge and store the unit to prepare for future operation:

1. Rotate the power switch to the OFF position if not using the RRS-2.

ATTENTION

It is perfectly safe to charge the RRS-2 during operations, however if you leave the unit on while storing it the unit will pull unnecessary electricity from the outlet.

2. Connect the RRS-2 Power Supply into an AC outlet via the included power cable and ensure that the red light on the side of the unit turns on while plugged in and charging.

3. While charging feel free to use the RRS-2 in normal operation mode.

4. Whenever possible, leave the CBS ArcSafe® RRS-2 plugged in and properly stowed with either the CBS ArcSafe® dust cover or the waterproof cover to ensure the RRS-2 is protected until the next operation. Once fully charged the battery charger switches to a 'Standby Voltage Mode' maintaining a fully charged battery.

DANGER!

Storing the RRS-2 in freezing temperatures will drastically reduce battery performance, CBS ArcSafe® recommends storing the unit where temperatures are regulated 68˚F to 77˚F. If storage in freezing temperatures is required, contact CBS ArcSafe® for handling proper storage solutions.

ATTENTION

At or below 40°F / 5°C we recommend using the AC power supply over the battery power in order for the unit to operate at max power. At temperatures lower than 40°F / 5°C the current provided by the batteries becomes limited and thus may not provide enough racking power for your breaker.

3.4 Setting the Actuator Limit Switches

On the actuators used for pressing interlocks and for installing/removing breaker there are magnetic limit switches that help to control how far the actuators extend and retract. This allows the actuators to be set so that they only extend and retract to set limits and cannot over extend/retract themselves for operations where specific distances need to be traveled.

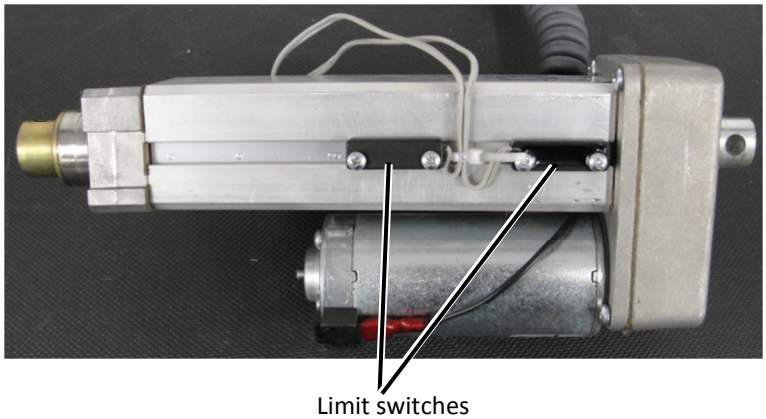


Figure 3.4 – Adjustable by Screw actuator

There are three different types of operational actuators; these three types are non-adjustable, adjustable by Philips head, and adjustable by Allen wrench. The non-adjustable actuators are generally quite small and will never need to be adjusted and there are no limit switches on them to set.

Adjustable by Philips head screwdriver

1. Loosen the two screws with a Philips head screwdriver.
2. Position the limit switches as desired, these switches determine how the actuator extends and retracts.
3. Secure the limit switches by screwing back in the screws – be EXTREMELY careful not to over tighten these screws as they are fragile, very little torque is needed in order to secure those limit switches.

Adjustable by Allen wrench

1. Locate the plastic cover with wires entering.
2. Gently pry the plastic cover off with a flathead screwdriver.
3. Loosen the two set screws with a #2 Allen Wrench.
4. Position the limit switches as desired, these switches determine how the actuator extends and retracts.
5. Secure the limit switches by screwing back in the set screws – be EXTREMELY careful not to over tighten these screws as they are fragile, very little torque is needed in order to secure those limit switches.

3.5 Setting up the RRS-2 for Operation

This section explains the steps necessary to prepare the RRS-2 for racking operations, however tooling has been tailored to your specific needs and may require a different operational setup then described here.

1. Ensure the RRS-2 is charged and/or the unit is plugged in to an AC power source.
2. Ensure the breaker being racked is OPEN according to manufacturer specifications.
3. Position the remote racking system in front of the circuit breaker to be racked, with the cubicle brace aligned with the circuit breaker cubicle.
4. Ensure the safety shut off switch on the pendant station is off.
5. Turn the power switch to the ON position, the green POWER ON light will light up.
6. Position the necessary tooling to the breaker.

ATTENTION
For selected models of circuit breakers, the RRS-2 will move slightly. This may include the RRS-2 slightly rocking or rolling forwards/backwards, however violent movements should not occur. If any movement seems concerning please contact your CBS ArcSafe® agent.

7. The RRS-2 is now ready for operation.

3.6 Current Control Module (CCM) Configuration

The current control module (CCM) can be set to either manual or automatic operation, however the current control module limits the max current to 30 A even in manual mode. In manual operation the current control module is capable of storing the max current values for setting of the CCM for future Automatic (Normal) remote rack operations.

DANGER!

The CCM limits maximum current to 30 A to prevent extremely high values of torque from being placed on your switchgear and if the CCM Installation or Removal current ever exceeds 25 amps or you notice high levels of variance between 1 breaker compared to other similar pieces of gear you should look into performing maintenance to the switchgear or investigate the switchgear for damaged racking mechanisms.

3.6.1 Manual Current Control Configuration

Using manual current control allows for the monitoring and recording of the current draw during the racking operation, which allows for easier setting of the current control module for future Automatic (Normal) remote rack operations. In order to set the current control module for manual control the 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-2 has been properly set up for operation.

2. With the main power switch ON, press and hold the install/remove trip point pushbutton while pressing the UP or DOWN current trip pushbuttons to 0.0 amps.

3. In order to store the maximum current being pulled during the racking operation press the down button so that the decimal point on the CCM is blinking. The LED display will indicate the reading being set and also display the highest current being drawn while the RRS-2 is in operation. If the down button is not pressed than the CCM will display the present amount of current being drawn.

4. Uncoil the pendant retractile cord and exit the arc flash boundary to a safe distance from the circuit breaker.

5. The internal memory of the current control module will retain the last value set.

DANGER!

If using the RRS in manual mode prevents the service personnel from moving outside the arc-flash boundary, comply with all applicable Federal, State, Local, and In-house safety regulations and procedures' regarding arc-flash. CBS ArcSafe® also offers a remote camera system which can be used to view the current control LCD and/or the racking operations remotely.

ATTENTION

Monitoring and recording the current draw on the current control module during the racking operation will allow for easier setting of the current control module for future Automatic (*Normal)* remote rack operations.

6. Rack the circuit breaker normally.

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

    a. Rewind the pendant retractile cord and return the pendant station to the storage hooks.

    b. Disengage the foot brakes if engaged.

    c. Remove the circuit breaker racking adapter and any extensions from the breaker and RRS-2.

    d. Turn the power switch off.

    e. Cover the RRS-2 with the dust cover or the waterproof cover (optional) and store the unit in a clean, dry location.

3.6.2 Automatic Current Control Configuration

1. Ensure that the RRS-2 has been properly set up for operation.

2. Set the current control module. To set the current control module for the circuit breaker type being removed/installed, perform the following steps:

   a. With the main power switch ON, press and hold the install/remove trip point pushbutton while pressing the UP or DOWN current trip pushbuttons to the desired value.

   b. The LED display will indicate the reading being set and also display current draw while the RRS-2 is in operation.

   c. The factory default setting is 0.0 amps.

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

   e. The best method in determining a suitable current limit setting is operational experience or by predetermining the current limit by operating the RRS in manual operation the first time a breaker is installed and removed via the remote rack. See the previous section for information.

   f. By pushing the Down/Max Current button before running the RRS-2 the internal memory of the current control module will retain the largest current values reached during operation. To reset turn the Max Current function off by pressing the button once more and then turning the Max Current function back on.

   g. Run the RRS-2

3. Uncoil the pendant retractile cord and exit the arc flash boundary to a safe distance from the circuit breaker.

4. Press and release the install pushbutton on the pendant station, the remote racking unit will continue the racking operation until the current draw on the system reaches the current set point. The remote racking can be stopped at any time using the red emergency stop pushbutton on the pendant station; the racking can also be stopped by pressing the opposite remove (install) pushbutton on the pendant station of RRS-2 remote racking systems.

5. If the current control module is set to an accurate level for the switchgear being operated, the racking operation will stop when the switchgear reaches the DISCONNECT or CONNECTED position and depending on how the breaker racks the RRS-2 may also stop at the TEST position automatically.

6. When the circuit breaker racking operation is complete, the RRS-2 can be detached from the circuit breaker and stowed.

7. Rewind the pendant retractile cord and return the pendant station to the storage hooks provided.

    a. Remove the circuit breaker racking adapter and any extensions from the breaker and RRS.

    b. Switch the power isolation switch to the OFF position.

    c. Cover the RRS-2 with the dust cover or the waterproof cover (optional) and store the unit in a clean, dry location.

3.6.2 Automatic Current Control Time Stop Configuration

One of the key features of using the automatic current control module configuration is being able to change the time stop parameters. This allows for the user to set how long the current can be over the set amount before turning off, anywhere from 0 seconds to .9 seconds in increments of .1 seconds (for versions 2.4 or newer). To set the Time Stop follow the following instructions.

1. Press both the Install and Remove buttons at the same time.

2. Press the Up or Down buttons to set the Time Stop length from 0 seconds - .9 seconds.

ATTENTION
The factory default and recommended setting for normal use is .1 seconds.

3. Press either the Install or Remove buttons to exit the Time Stop editing feature, the Time Stop will be automatically saved.

4.0 Operation

This section describes the steps necessary to install and remove the circuit breaker using the RRS-2.

4.1 Circuit Breaker Installation

These are the following requirements and steps for circuit breaker installation using the RRS-2.

4.1.1 Requirements for Installation

The following installation procedure assumes that the following prerequisites have been met:

1. *The circuit breaker racking mechanism is in working order.*
2. *The circuit breaker has been properly maintained.*
3. *The circuit breaker is removed from the cubicle and OPEN* according to manufacturer specifications.
4. *The tooling is connected properly to both the circuit breaker and the RRS-2.*

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.

DANGER!

Remove control power from the control circuit if applicable in order to prevent the accidental closing or tripping of the breaker during the racking procedure.

4.1.2 Steps for Installation

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

1. Ensure the RRS-2 is properly setup and attached to the breaker using the breaker specific tooling provided.

2. Verify the circuit breaker is OPEN according to manufacturer specifications and company safety policies.

3. Exit the arc flash boundary with the pendant station.

1. Ensure the emergency stop push button is deactivated by turning the button clockwise to unlatch.

4. Use the pendant station as is discussed in the given RRS-2 tooling guide to install the breaker. If the pendant retractile cord is not long enough for the operator to leave the arc flash boundary additional pendant extension cords are available and the pendant station and pendant retractile cord can be replaced with an optional radio remote system.

5. Detach and uninstall the RRS-2 unit from the circuit breaker cubicle.

4.2 Circuit Breaker Removal

These are the following requirements and steps for circuit breaker removal using the RRS-2.

4.2.1 Requirements for Removal

The following removal procedure assumes that the following prerequisites have been met:

1. *The circuit breaker racking mechanism is in working order.*
2. *The circuit breaker has been properly maintained.*
3. *The circuit breaker is installed in the cubicle and OPEN* according to manufacturer specifications.
4. *The tooling is connected properly to both the circuit breaker and the RRS-2.*

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.

4.2.2 Steps for Removal

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

2. Ensure the RRS-2 is properly setup and attached to the breaker using the breaker specific tooling provided.

3. Verify the circuit breaker is OPEN according to manufacturer specifications and company safety policies.

4. Exit the arc flash boundary with the pendant station.

DANGER!

Exiting the arc flash boundary may prevent the operator from observing the circuit breaker during repositioning, if this situation occurs we recommend acquiring the CBS ArcSafe® camera system in order to remotely view the repositioning.

Although the pendant station allows the operator to be away from the immediate arc flash boundary personal protective equipment requirements must still be met at all times.

5. Ensure the emergency stop push button is deactivated by turning the button clockwise to unlatch.

6. Use the pendant station as discussed in the given RRS-2 tooling guide. If the pendant retractile cord is not long enough for the operator to leave the arc flash boundary additional pendant extension cords are available and the pendant station and pendant retractile cord can be replaced with an optional radio remote system.

7. Detach and uninstall the RRS-2 unit from the circuit breaker cubicle.

5.0 Maintenance

5.1 Introduction

The *CBS ArcSafe®* RRS-2 is designed to require little maintenance; however, adopting a regular maintenance program will keep the RRS-2 in good condition allowing years of trouble-free service.

5.2 Prior to Use

Before use examine the general condition of the unit.

1. *Inspect the switch and indicators for tightness and damage.*
2. *Inspect the cables for wear or cracking, always replace a damaged cable.*
3. *Check cable core grips for tightness.*
4. *Check for loose fasteners.*
5. *Ensure actuators are free of dirt and grime by wiping down with a dry cloth.*
6. *Run the unit unloaded to verify there is no abnormal noise or vibration. If abnormal condition exists, do not use.*
7. *If the unit has been inactive for more than 30 days, please measure the voltage across each battery in order to ensure that they are both running at 12Vdc for a combined 24Vdc*

5.3 After Use

After use, clean the RRS-2 ensuring the power supply vents are free of dust and debris. Ensure the unit is free of oil or grease and if necessary, clean with a dry cloth. Store the device covered with either the standard dust cover or the waterproof cover (optional), in a clean, dry location to prevent damage.

5.4 Every 12 to 18 Months

Every twelve to eighteen months, depending on use, *CBS ArcSafe®* recommends performing the following preventative maintenance.

1. Check that the batteries maintain a charge.

2. Perform an electrical inspection of internal wiring, checking for signs of heat and loose connections.

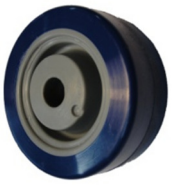
3. Check all cables for extreme wear or cracks.

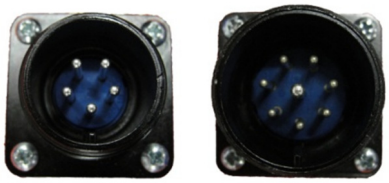
4. Check that the pneumatic tires (optional) are properly pressurized to 24 PSI and sufficiently sealed.

6.0 Ordering Replacement Parts

When ordering replacement parts please specify the serial number and MFD from the RRS-2 nameplate.

From the RRS-2 nameplate:	
Nomenclature:	*RRS-2*
Serial number	
MFD:	

Remote Racking Unit RRS-2 Parts List		
Item	Description	CBS ArcSafe® Part Image
1	2 * 12Vdc Batteries for 24 Vdc	
2	Battery Charger	
3	Power Cable	
4	Charging Light	
5	Front Wheel	
6	Door Lock	

Remote Racking Unit RRS-2 Parts List Cont.		
Item	Description	CBS ArcSafe® Part Image
7	25’ Pendant Retractile Cord Extension *optional	
8	Power Switch	
9	Power Light	
10	Storage Bag	
11	PS mounted Receptacle R2/R4	
12	Stair Climber Rails	

Remote Racking Unit RRS-2 Parts List Cont.		
Item	Description	CBS ArcSafe® Part Image
13	Standard Tires	
14	Pneumatic Tires *Recommended for rough terrain	

Appendix A: Specifications

1.0 Specifications

Charging Time:	3 Hours (maximum)
Dimensions (L x W x H):	40“ x 40” x 5’ high (assembled unit).
Frame Weight *(uncrated)*:	160 lbs/75 kg *(base unit weight)*

2.0 Available Additional Options

Wireless Camera System – The wireless camera system includes a hardwired/mountable camera and a wireless video system so that the racking operation can be viewed remotely.

Radio Remote Pendant Station – The radio remote pendant station allows for the operator to control the RRS-2 remotely without needing to be tethered to the RRS-2.

High Lift – The high lift system, when installed allows for the RRS-2 to rack/unrack breakers that are up to 90” high, although depending on the application needs some high lift systems are built higher.

LED Light – The LED light system attaches a light to the front of the RRS-2 in order to account for low light conditions.

Stair Climber Rails – The stair climbers allow for the RRS-2 to easily be moved up/down stairs and in/out of vehicles.

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Appendix B: Troubleshooting Guide

Symptom	Problem	Solution
The system power will not energize when the main power switch is in the ON position.	The over-current protection relay has tripped.	Reset the over-current protection relay within the electrical cabinet.
	The emergency stop pushbutton is latched.	Rotate the emergency stop pushbutton clockwise to reset.
	The battery leads are disconnected.	Reconnect the battery terminal leads.
	The batteries are completely discharged.	Charge the system batteries.
	An open circuit has occurred within the sealed batteries.	Test and replace the system batteries.
The system batteries will not charge/will not hold a charge.	The battery leads are disconnected.	Reconnect the battery terminal leads.
	The battery charger is not connected to AC power.	Check the AC power connection.
	Faulty batteries or charger.	Replace faulty equipment. Contact your CBS ArcSafe® Technical Sales/ Support Agent to obtain replacement parts.
	The RRS-2 has been stored in freezing temperatures.	Contact your CBS ArcSafe® Technical Sales/ Support Agent for solutions.
	The batteries have aged from non-use.	Replace the system batteries. In order to obtain the longest life out of your batteries they must be discharged regularly. Contact your CBS ArcSafe® Technical Sales/ Support Agent to obtain replacement parts.
	The batteries are being stored without a charge.	Replace the system batteries. Batteries must be charged before the unit is stored. Contact your CBS ArcSafe® Technical Sales/ Support Agent to obtain replacement parts.

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Appendix C: Wireless Camera System

1.0 Components

Wireless Camera – The wireless camera is either mounted on the front of the remote racking system or magnetically mounted to the switchgear.

Monitor Case – The monitor case houses the wireless video receiver, LCD display, power cable, and internal battery pack.

Wireless Video Receiver – The wireless video receiver is inside of the monitor pack and has multiple channels for combating wireless interference.

LCD Display – The LCD display is mounted inside of the monitor pack and folds flat for storage.

Power Cable – The power cable charges the internal battery pack and powers the unit if AC power is available.

Battery Pack (internal) – The battery pack in the wireless camera system will run for approximately 5 hours on a single charge.

Available 1/15/2010

2.0 Camera System Set-up

The wireless camera is either hard mounted to the remote racking system or magnetically mounted to the switchgear being racked; turning the 'CAMERA' switch, located on the Current Control Module on the RRS, clockwise to the ON position supplies power to the camera. When power is supplied to the camera, the camera then transmits the video signal wirelessly to the receiver. When the receiver is supplied power via the battery or the AC power cable provided, it outputs the signal to the LCD display.

ATTENTION

The maximum reception distance for the wireless camera system is 300 ft, however if there are any obstructions between the camera and the receiver some interference may build up and distort the wireless signal.

3.0 Camera System Operation

The system is operated in the following manner:

(1) Charge the LCD display.

a. The initial charge was performed by CBS ArcSafe® personnel, subsequent charges are performed by plugging the LCD power cable into AC power.

(2) Power on the camera.

a. The camera is located on the CBS ArcSafe® Remote Racking System; the camera is powered on by turning the 'CAMERA' switch located on the Remote Racking Unit Control Panel clockwise to the ON position.

(3) Power on the wireless camera kit.

a. Ensure the Monitor Case is fully charged or is connected to AC power.
b. Power on the monitor by turning the main power switch clockwise.

(4) Changing Wireless Channels

a. Sometimes there will be a need to change wireless channels if too much interference affects your signal, if this is done please make sure to change wireless channels on both the wireless camera and the wireless receiver to make sure they are both sending/receiving to the same channel after being changed.

4.0 Camera Troubleshooting Guide

Symptom	Solution
Poor signal / static due to electromagnetic interference	The wireless camera and receiver can switch to multiple wireless channels; switching channels or ensuring a direct line of sight with the camera may reduce the effects of interference (See System Operation Section for information regarding changing channels). Re-align wireless system antennas.
No video signal	Check to ensure the camera is connected to the racking unit. Check to ensure the 'CAMERA' switch is ON. Check to ensure that the camera and receiver are on the switched to the same channel. Check to ensure power is available to both the receiver and the monitor. Ensure the receiver is connected to either the battery or its AC power supply. Ensure the LCD display is charged or connected to its AC power supply. Ensure the rechargeable power supply has an adequate charge. Ensure the A/V cable is connected to the output of the wireless receiver and the input of the LCD display.

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Appendix D: Radio Remote Pendant Station

1.0 Components

Radio Remote – The radio remote allows for the use of a radio remote pendant station in order to control the operation of your RRS.

ATTENTION
The radio remote pendant station is designed specifically for the system that it came with. The radio remote will NOT work with any other CBS ArcSafe® Remote System, therefore please keep the radio remote with the system that it came with. Also to limit interference please ensure that the channel numbers of units purchased at different dates differ.

Radio Remote Receiver – The radio remote receiver receives the radio remote signals needed to control the RRS. The radio remote receiver is attached to the system and although it is quite sturdy, care must be taken to ensure that during movement the remote receiver is not damaged. The radio remote receiver is powered by 2 AA batteries in the internals of the unit.

1. PS-R4
2. PS-R6
3. PS-R6-C

Figure D.1 – Available radio remote pendant station models

2.0 Radio Remote Models

PS-R4 (Fig. D.1.2)

The PS-R4 radio remote has 4 control buttons that are designed to wirelessly control the included systems operation. In order to use the PS-R4 the operator must ensure that the emergency-stop button is raised by rotating the button clockwise and turning the operating switch clockwise from the off position, past the on positions, to the start position and then releasing the switch letting it spring back to the on position.

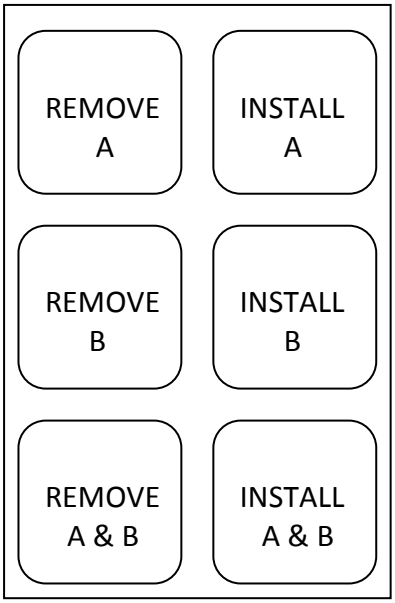
ATTENTION
The power on the system will appear off until the radio remote is turned on when using your system with the PS-R4. Therefore please ensure that the pendant station is turned on before troubleshooting why the power in your system is not turning on.

PS-R6 (Fig. D.1.3)

The PS-R6 radio remote has six control buttons that are designed to wirelessly control the included systems operation and one start button that connects the PS-R6 to the receiver. In order to use the PS-R6 the operator must ensure that the emergency-stop button is raised by rotating the button clockwise and turning the operating switch clockwise from the off position to the on position, and then press the start button to connect the PS-R6 to the receiver.

ATTENTION
The power on the system will appear off until the radio remote is turned on when using your system with the PS-R6. Therefore please ensure that the pendant station is turned on before troubleshooting why the power in your system is not turning on.

3.0 Button Configurations



PS-R6-C

Figure D.2 – Possible Button Configurations

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4.0 Radio Remote Troubleshooting Guide

Symptom	Problem	Solution
The system power will not energize when using the remote, but the system power energizes and runs with the normal pendant station.	The emergency-stop push-button is latched.	Rotate the emergency stop pushbutton clockwise to reset.
	The radio remote is not communicating with the receiver.	Ensure that the remote has been properly connected wirelessly to the receiver. This can be done by either inserting the green key (PS-R3), rotating the operating switch to the start position (PS-R4), or pressing the start button (PS-R6).
	The radio remote is designed for another unit. (PS-R4,PS-R6)	Ensure that the radio remote being used is the radio remote provided for that particular unit, the radio remotes are NOT interchangeable between systems and are unique for every system.
	The radio remote's batteries are dead and therefore cannot connect .	Replace the 2 AA batteries inside of the remote. This may require you removing the remote from its protective plastic cover and carefully unscrewing the back cover on the remote.
The remote pendant station is "dead," but the system power is on.	The radio remote is not communicating with the receiver. (PS-R3)	Ensure that the remote has been properly connected wirelessly to the receiver. This can be done by inserting the green key (PS-R3), rotating the power switch to the start position (PS-R4), or pressing the start button (PS-R6).
	The radio remote is designed for another unit.	Ensure that the radio remote being used is the radio remote provided for that particular unit, the radio remotes are NOT interchangeable between systems and are unique for every system.
	The radio remote's batteries are dead.	Replace the batteries inside of the remote. This may require you carefully removing the remote from its protective plastic cover and carefully unscrewing the back cover on the remote.

Distance Is Safety®

CBS ArcSafe®

A Group CBS Company

P.O. Box 550
Argyle, TX 76226
Tel: 940-382-4411
Fax: 940-382-9435
Website: www.CBSArcSafe.com
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).

Guarantee: Equipment is guaranteed free of inherent electrical or mechanical defects for one (1) year from date of shipment, and to perform according to ratings, under normal conditions and with competent supervision. Our obligation is limited to repair or replacement of defective parts, FOB our plant, Denton, TX. We're not responsible for consequential damage, for repairs or replacement made by others except when agreed to in writing.

*PLEASE TEAR OUT

WARRANTY REGISTRATION – CBS ArcSafe® Products

Distance Is Safety®

A Group CBS Company

IMPORTANT: Complete and mail this warranty registration form as soon as possible.

Date: _____

CBS ArcSafe® Model (CIRCLE ONE): **RRS-2** **RRS-2-BE**

CBS ArcSafe® Serial Number: _____

Company: _____

Address 1: _____

Address 2: _____

City: _____

State/Province: _____

Zip/Postal Code: _____

Country: _____

Telephone and Fax: _____

Contact Person (please print): _____

Please mail or fax warranty registration to:

FAX: (940) - 382 - 9425

CBS ArcSafe®

P.O. Box 550

Argyle, TX 76226

*PLEASE TEAR OUT