[redacted]

Southern States

The Quality Name in High Voltage Switching

Type Ganged

Recloser

Distribution Automation Device

15.5 kV – 38 kV

INSTALLATION &

INSTRUCTION

MANUAL

This Page Intentionally Left Blank

Safety Information

⚠ WARNING

IMPROPER HANDLING, INSTALLATION, OPERATION OR MAINTENANCE OF THIS EQUIPMENT MAY CAUSE IMMEDIATE HAZARDS WHICH WILL LIKELY RESULT IN SERIOUS PERSONNEL INJURY OR DEATH.

⚠ WARNING

The equipment covered by this publication must be handled, installed, operated, and maintained by qualified persons who have direct knowledge and experience dealing with the hazards involved and are thoroughly trained in the handling, installation, operation and maintenance of high voltage transmission and distribution equipment. These instructions are meant for only such **Qualified Persons**. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. **Please ensure that you are using the latest installation and maintenance instructions which are updated electronically and available on our website.**

A **Qualified Person** is one who is trained in and has skills necessary:

- to read and comprehend this instruction book – understanding that these instructions are general in nature
- to accept personal responsibility to prepare and maintain an intrinsically safe work environment and maintain control of the work site to safeguard all persons present
- to develop and implement a proper rigging, lifting, and installation plan along with all safety precautions required to insure safe and proper lifting and installation of the equipment.
- to distinguish between energized and non-energized parts
- to determine proper approach distances to energized parts
- to properly work with and around energized or de-energized equipment that may be pressurized with gas
- for proper use of personal protective equipment, insulating and shielding materials, insulated tools for working near energized and /or pressurized electrical equipment
- to recognize and take necessary precautions for the unique and dynamic conditions of site and specialized equipment to maintain a safe work environment during handling, installation, operation, and maintenance of high voltage switching equipment
- to recognize indicators of energized or non-energized equipment, whether mechanical or electronic are subject to failure and should not be relied upon for personal safety. Before approaching this device, make sure there is an air gap between all energized lines, the equipment is grounded, and all OSHA electrical safety regulations are followed. In the event of conflicting status between mechanical and electronic indicators, please isolate equipment and contact factory.

NOTE: The mechanical indicator position should always be verified by comparing the recloser status with the electronic indicator (the SEL relay/switch controller). If these two indicators are ever in disagreement, the unit should be bypassed (if possible) or de-energized (grounded) and the user should notify the factory. As always, OSHA safety rules and regulations should always be followed when approaching the extended reach area.

The instructions in this manual are general guidelines for this type of equipment and not specific to the equipment supplied. Portions of it may not be applicable or may not have complete instructions for your specific equipment. Please ensure that you are using the latest installation and maintenance instructions which are updated electronically and available on our website.

If you do not understand any part of these instructions or need assistance, contact Southern States Service Division at 770-946-4562 during normal business hours (8:00am – 4:30pm EST, M-F) or 770-946-4565 after normal business hours.

Southern States, LLC

Equipment Receipt, Installation, Use, Operation and Maintenance Terms

("Terms of Use")

The purchaser ("Purchaser") of certain Equipment (the "Equipment") identified in the Instruction Manual accompanying these Terms of Use sold by Southern States, LLC ("Southern States"), by Purchaser's acceptance or Use of Equipment in any way, agrees to the Terms of Use set forth below (the word "Use" herein means receipt, testing, inspection, installation, operation, maintenance and otherwise handling the Equipment):

- Purchaser represents and warrants that it is fully qualified to Use the Equipment, and that it is a sophisticated user of the Equipment with a high level of expertise in the Use of the Equipment and Purchaser knows that Southern States is relying on Purchaser's sophistication and expertise with respect to the Equipment.
- The Purchaser will, within seven (7) days after receipt of the Equipment, inspect the Equipment and identify and notify Southern States in writing of any missing parts, damage or defects observed in the Equipment.
- The Purchaser will Use the Equipment, only in conformity with all manuals, data sheets and instructions provided by Southern States, and in keeping with sound engineering, utility and safety practice. Purchaser will at its own expense, provide all necessary labor, supplies, and facilities required to Use the Equipment.
    - The Purchaser may use its own personnel or engage a third party to Use the Equipment. The Purchaser shall insure that it only utilizes personnel who are fully qualified or certified by a reputable certification agency to Use the Equipment. In the event that Purchaser cannot find such qualified personnel, the Purchaser will notify Southern States and seek its advice to determine a mutually agreeable solution.
    - By separate agreement, Southern States may provide such services and the personnel to conduct such services in connection with the installation of the Equipment. In the event Southern States agrees to provide personnel to install, maintain, and operate the Equipment, such personnel will function only in an advisory capacity and shall have no responsibility for the supervision, or the quality or workmanship of such installation, maintenance, or operation of the Equipment.
- The Purchaser shall not install and operate the Equipment in a way such that a single point of Equipment failure leads to a cascading event or consequential damage to any person or property. Purchaser shall ensure redundancy in its system at all times. Purchaser acknowledges and agrees that electric service is by nature subject to interruptions due to Equipment failures and shall not agree to provide service free from the effects of Equipment failures.
- The Equipment will be maintained and inspected as provided by this instruction manual and in compliance with best industry practices, but in no event will the Equipment be inspected and tested less frequently than once in every 6 months.
- The Purchaser shall not repair, dismantle, or alter any of the Equipment without Southern States' written consent.
- Any failure of Equipment either in service, testing or inspection will be promptly reported in writing to Southern States within 24 hours of the failure so that adequate evidence can be collected, appropriate diagnostic tests can be conducted, and analysis of the failure can be determined.
- Southern States will have no liability for any direct, indirect, consequential or remote damage or injury, whether or not foreseen or foreseeable, to the Purchaser or any third party or person for any damages or injury to person or property caused by Purchaser's or any third party's actions, whether or not negligent, in the Use of the Equipment. Purchaser shall indemnify and hold Southern States and its employees, officers and directors against any damage or injury caused in whole or part by Purchaser's or any third party's action whether or not negligent, resulting from the Use of the Equipment. Southern States expressly rejects any liability to third parties. The Purchaser expressly waives any claim against Southern States, its employees, officers, directors and affiliates, for injury or damage to person or property resulting from Use of the Equipment not directly and solely caused by Southern States' negligence. For the purposes of clarity, Southern States shall not be liable, and be fully indemnified by the Purchaser, for the following related to the Equipment: normal wear and tear, excessive use and loading, improper interference or maintenance on the part of the Purchaser or third parties, incomplete or false information given by the Purchaser, inappropriate or improper Use, faulty operation, installation or start-up, faulty or careless handling, improper maintenance, use of unsuitable operating materials/substitute materials, defective construction work, hazardous ambient conditions unknown to the Purchaser, chemical, electro-chemical or electrical influences, changes to the subject of delivery made without Southern States consent.
- In the event that Southern States is found by a court of competent jurisdiction or a properly empaneled arbitral body to be liable to the Purchaser for any reason, Southern States shall be entitled to a reduction in the liability by taking into account the exceptions provided by statute, law, and any counterclaims Southern States may have against Purchaser.
- The failure of Purchaser to comply with these Terms of Use herein shall void any and all warranties related to the Equipment. These Terms of Use shall be deemed to be part of the binding contractual agreements between Purchaser and Southern States related to the Equipment and shall govern over any inconsistent term or provision in such other contractual agreements.

LIMITED WARRANTY

Southern States, LLC ("SSLLC") warrants only to the Warranty Holder (hereinafter defined as the "End User" or the "Immediate Purchaser", as applicable, pursuant to the terms and conditions of this Limited Warranty as set forth below), that the Product identified below will, upon shipment, be free of defects in workmanship and material for the applicable Warranty Period. The "Warranty Period" is that period of time during which this Limited Warranty is effective, and such period begins on the invoice date issued by SSLLC for the Product, and continues until the earlier to occur of (1) the expiration of the Warranty Duration period, or (2) the Number of Operations, both as specified in the table below. If the Product is both purchased and installed within the United States or Canada, this Limited Warranty is granted to each end user of the Product who acquired the Product for its own use during the Warranty Period ("End User"). In all other situations, this Limited Warranty is granted only to the first purchaser of the Product ("Immediate Purchaser") from SSLLC. No primary or remote purchaser or owner of the Product who is not a Warranty Holder may claim any benefit under this Limited Warranty, or any remedial promise included in this Limited Warranty. SSLLC shall, upon prompt written notice from the Warranty Holder, correct a nonconforming Product by repair or replacement at the sole discretion of SSLLC of the nonconforming Product or any part or component of a nonconforming Product necessary in SSLLC's discretion to make such Product conforming. Any transportation charges, labor for removing, reinstalling the Product or part, and/or costs related to providing access to the Product shall be the responsibility of the Warranty Holder. Correction in this manner will constitute the Warranty Holder's exclusive remedy and fulfillment of all SSLLC's liabilities and responsibilities hereunder. SSLLC's duty to perform under this limited warranty may be delayed, at SSLLC's sole option, until SSLLC has been paid in full for all products purchased by the Warranty Holder. No such delay will extend the Warranty Period. If SSLLC does not make such repair or replacement, SSLLC's liability for damages on account of any claimed nonconformity will in no event exceed the purchase price of the Product in question. This Limited Warranty does not apply to any Product that has been disassembled, repaired, or altered by anyone other than SSLLC. This Limited Warranty will not apply to any Product that has been subjected to improper or abnormal use of the Product. SSLLC has no responsibility to repair or replace any Product or component thereof manufactured by another party, but SSLLC will assign, to the extent assignable, to the Warranty Holder any manufacturers' warranty that applies to products and components not manufactured by SSLLC.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES. THERE ARE NO OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. ALL IMPLIED WARRANTIES WHICH MAY ARISE BY IMPLICATION OF LAW, OR APPLICATION OF COURSE OF DEALING OR USAGE OF TRADE, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR OTHERWISE ARE EXPRESSLY EXCLUDED. SSLLC SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY, SPECIAL, OR PUNITIVE DAMAGES, EVEN IF SSLLC HAS BEEN ADVISED OF THE POSSIBILITY OF SAME. THE WARRANTY HOLDER IS SOLELY RESPONSIBLE FOR THE SUITABILITY OF THE PRODUCT FOR ANY PARTICULAR APPLICATION.

Product Purchased Region	Product Installed Region	Warranty Holder	Warranty Duration
U.S and Canada	U.S and Canada	End User	5 years
All Other Conditions		Immediate Purchaser	Earlier of 1 year from installation or 18 months from shipment

* See Table 3 for Fault Duty Interruption Warranty Terms

This Page Intentionally Left Blank

Ganged Recloser

15.5 kV – 38 kV

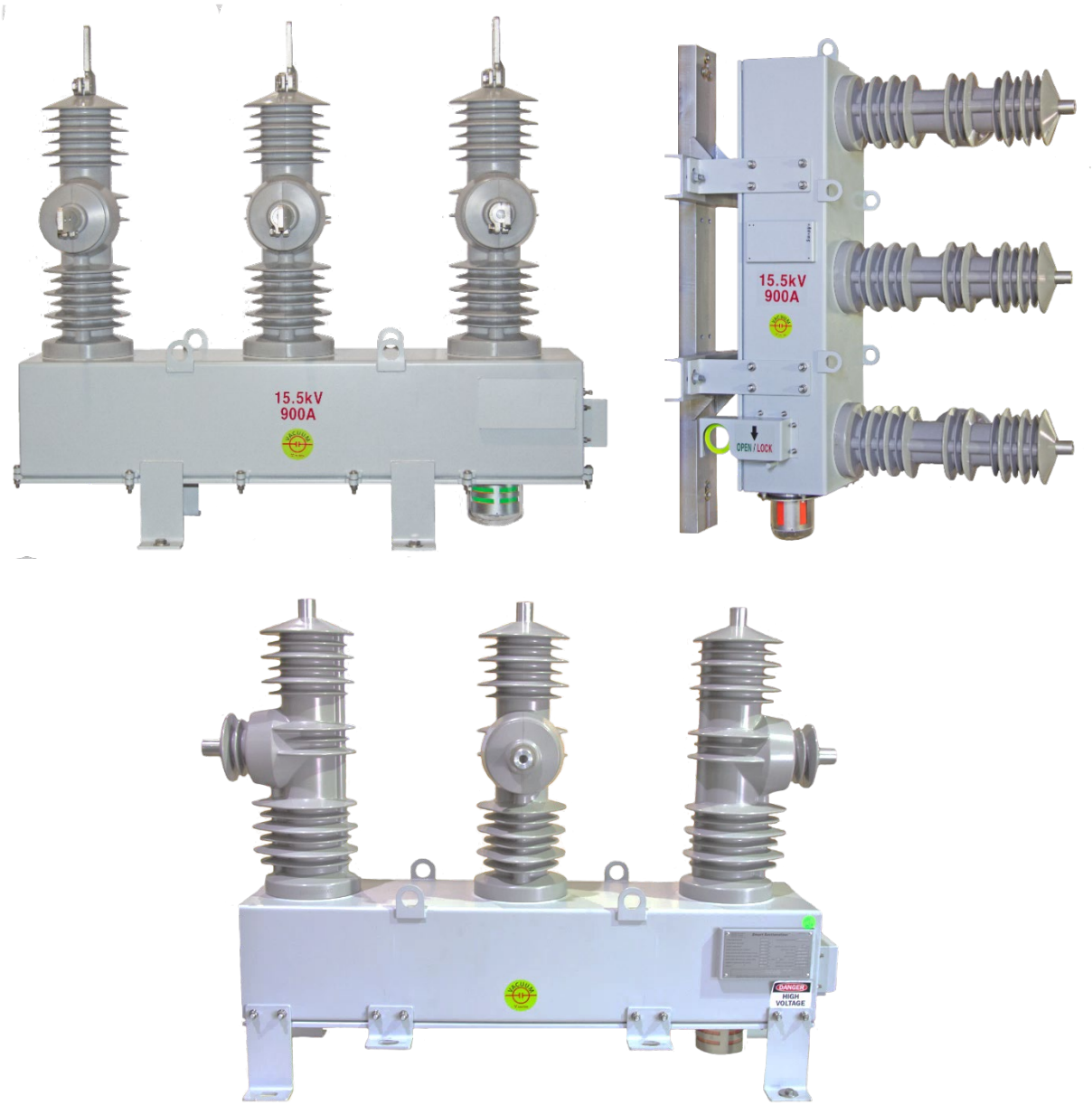


Table of Contents

List of Tables and Figures

Tables Page

Figures Page

Summary & Introduction

Summary

These instructions do not intend to cover all details or variations in equipment or provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Southern States Representative.

The contents of this instruction manual should not become part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligations of Southern States. The Warranty contained in the contract between the parties is the sole warranty of Southern States. Any statements contained herein do not create new warranties or modify the existing warranty.

Important

The information contained herein is general in nature and not intended for specific application purposes. It does not relieve the user of responsibility to use sound practices in application, installation, operation, and maintenance of the equipment purchased. Southern States reserves the right to make changes in the specifications shown herein or to make improvements at any time without notice or obligations. Should a conflict arise between the general information contained in this publication and the contents of drawings or supplementary material, or both, the latter shall take precedence.

Introduction

The Southern States ganged recloser is an outdoor, three-phase, electronically controlled Distribution Automation Device which isolates faulted sections of distribution lines when desired. The device uses vacuum interrupters, current transformers, and capacitive voltage sensors encapsulated in outdoor Hydrophobic Cycloaliphatic Epoxy (HCEP). The recloser is supplied standard with three internal current transformers and six internal capacitive LEA voltage sensors. The device is compatible with a variety of Programmable Automation Controllers including SEL-2411, SEL-751, SEL-651RA, SEL651R-2, and Beckwith-7679. Other custom electronic controls are available upon request.

A standard package consists of:

- 3 phase vacuum distribution automation device
- Six NEMA terminal pads
- Control cabinet fitted with third party controller
- Control and power cables
- Mounting bracket (grounding lug included)
- Wiring diagram
- Document package (inside cabinet) with:
    - SEL controller document
    - QR code document linking to digital instruction manual

The instructions contained within this manual are necessary for the safe installation, maintenance, and operation of the ganged recloser. A qualified person, familiar with this of type equipment, should carefully read and follow the instructions.

These instructions are intended to provide a general guideline for the installation, adjustment, and maintenance of the ganged recloser. It is not possible to cover all details, equipment variations, and potential conditions. Contact Southern States, LLC in the event conditions associated with a specific application are not sufficiently addressed.

All photographs and sketches in this manual are for illustration purposes only and may not be to scale. Refer to the Unit Assembly drawing provided with each device for specific details. During installation, it may be necessary to make adjustments other than those described in this manual. Contact your local representative or the Southern States facility if questions should arise.

Distinctive signal words are used to indicate the degree of hazard that may be encountered by the user. Identification of the signal words and their definition follow:

⚠ DANGER	Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Ratings & Specifications

Table 1: Recloser Ratings

Maximum Voltage	**15.5 kV**	**27 kV**	**38 kV**
Continuous Current	900 A*		
Rated Frequency	50/60 Hz		
Basic Insulation Level	110 kV	150 kV	170 kV
Symmetrical Interrupting Current	16 kA	12.5 kA	
Asymmetric Peak Making Current	40 kA	32.5 kA	
Line Charging Current	2 A	5 A	
Cable Charging Current	10 A	25 A	40 A
60 Hertz Withstand Voltage:			
Dry, one minute	50 kV	60 kV	70 kV
Wet, ten seconds	45 kV	50 kV	60 kV
Creepage Distances:			
Terminal to Terminal	673 mm / 26.5 in	876 mm / 34.5 in	1160 mm / 45.7 in
Lower Terminal to Ground			
Mechanical Life	10,000 (Close / Open Operations)		
Ambient Temperature	-40^{O}C to +60^{O}C		

***** For ambient temperatures above 50^{O}C, maximum continuous current is 825A

Table 2: Cabinet Specifications

Control Cabinet	Southern States LLC
Cabinet Enclosure Type	NEMA 4X
Cabinet & Tank Material	304 Stainless Steel (Painted)
Control/Power Cables	35’ or 50’ standard *(Custom lengths available)*
Voltage Sensors	6 x Embedded Sensors (< 3% accuracy)
Fault Indicator	19 LED Visible Lights on Bottom of Tank
Interrupter Housing Material	Hydrophobic Cycloaliphatic Epoxy (HCEP)
Mounting Orientation	Horizontal or Vertical

Table 3: Fault Interrupting Duty Cycle

Duty per ANSI C37.60 / IEC62271-111 v2.0:2012-09,
Operating Duty: Open – 0.5 sec – Close/Open – 1 sec – Close/Open – 1 sec – Close/Open

% Max Interrupting Rating	Minimum X/R Ratio	Number of Unit Operations at 16 kA
20%	4	44
50%	8	56
100%	15	16
	Total	116

NOTE:

Above ratings apply to the following service conditions:

- The maximum altitude is 1,000 meters above sea level (M.A.S.L)
- Maximum Wind velocity: Below 90 mph

Table 4: Torque Specifications

Description	Torque Spec
2 Hole NEMA Terminal Pads	11 ft*lbs
Mechanism Bottle (External Bolted – M8 Size)	10 ft*lbs
Mechanism Bottle (Internal Bolted – M6 Size)	4 ft*lbs
Cabinet Ventilation Plate	4 ft*lbs

Standards

The recloser has been designed and tested in accordance with the following standards as applicable:

- ***IEEE C37.63-2013***: IEEE Standard for Automatic Line Sectionalizer for Alternating Current Systems up to 38kV.

- ***IEEE C37.60™-2012/IEC62271-111 edition 2.0:2012-09***: IEEE/IEC Standard for Vacuum Interruption Reclosers.

- **IEC62271-111 edition 2.0:2012-09 edition2.0:6.11**: X-Radiation Limits Test Standard.

- **IEC62271-111 edition 2.0:2012-09 edition 2.0:6.106**: Partial Discharge (corona) Test Standard.

Production Acceptance Testing

Each Southern Sates recloser is assembled, tested, and thoroughly inspected at Southern States facility prior to delivery. Each unit is tested and calibrated as a complete assembly with each specific mechanism, control cabinet, and control cables.

Each unit is subjected to the following production tests as outlined in **IEEE C37.63-2013 and IEEE C37.60™-2012/IEC62271-111 edition 2.0:2012-09 standards:**

- Electrical operations test as driven from the control.
- One-minute power-frequency dry withstand test, 60 Hz on main circuit.
- Contact resistance test on the main circuit.
- Control, secondary wiring, and accessory check test.
- Partial discharge test.
- Mechanical operations test, 25 O-C reclose sequence.
- Voltage and current metering accuracy test.
- Fault indicator test.

Product Description

Overview (Horizontally Mounted Units)

The recloser is an outdoor, three-phase, electronically controlled Distribution Automation Device which isolates faulted sections of distribution lines when desired. The device uses vacuum interrupters, current transformers, and capacitive voltage sensors encapsulated in outdoor Hydrophobic Cycloaliphatic Epoxy (HCEP).

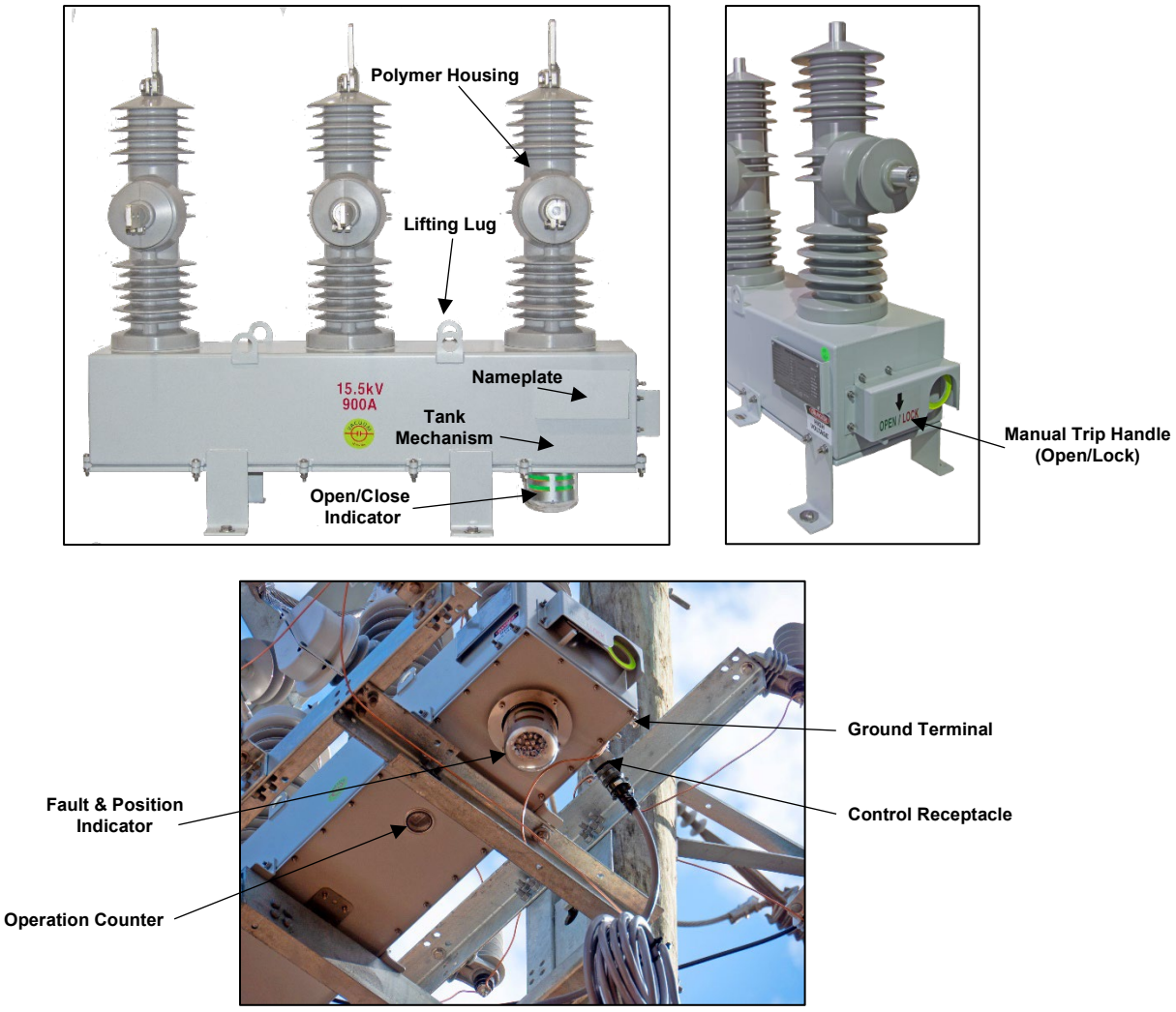


Figure 1: Typical Horizontal Mounted Recloser Construction

Note: Please refer to customer drawings for specific construction details.

Overview (Vertically Mounted Units)

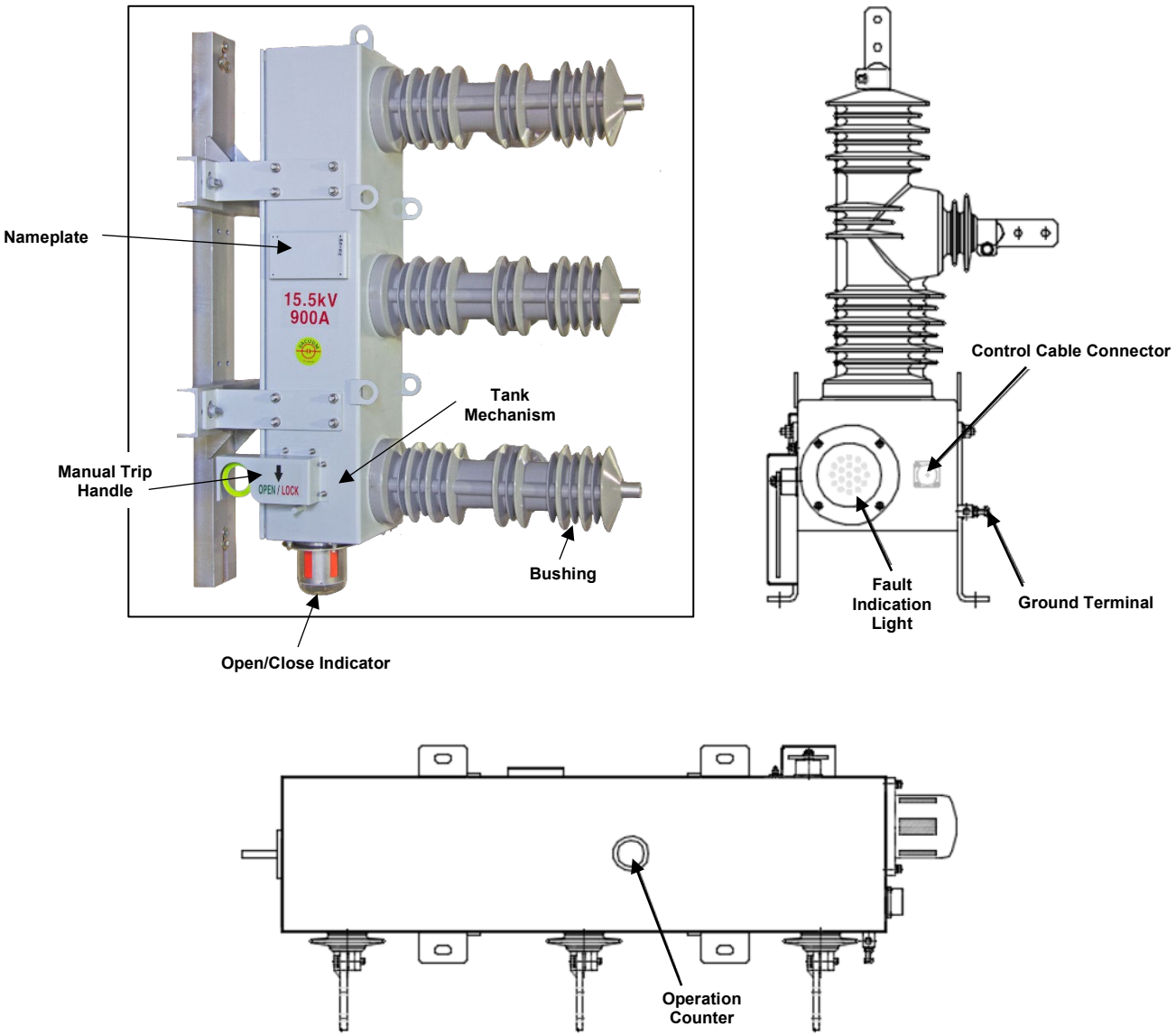


Figure 2: Typical Vertical Mounted Recloser Construction

VY & VZ Terminal Voltage Connections

The Southern States recloser by default has the VY terminal voltage connections located on the side terminals of the recloser and the VZ terminal voltage connections located on the top terminals of the recloser as depicted in Figure 3.

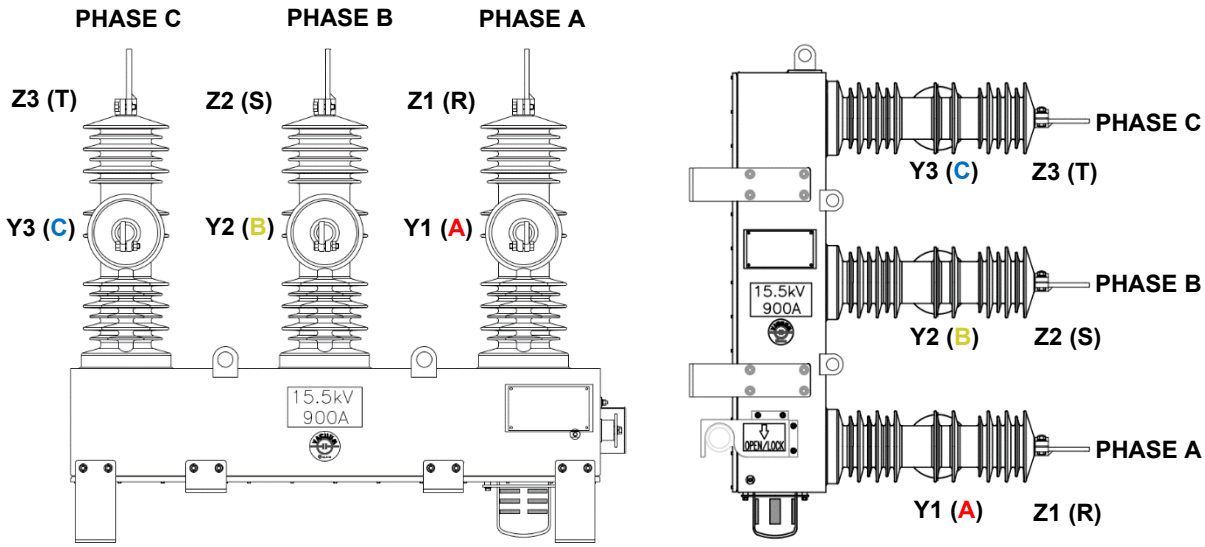


Figure 3: Recloser VY123 & VZ123 Voltage Terminal Connection Configuration

Note: Phase Coloring shown as modeled after industry standards according to Figure 3(Phase A = Red, Phase B = Yellow, Phase C = Blue)

Source & Load Configuration

The Southern States recloser by standard has the source configured as the top terminals of the recloser and the load side as the side terminals of the recloser. This setting can be viewed and configured for reclosers paired with 651RA & 651R2 SEL relays as shown in Figure 4:

Disclaimer: Please consult the appropriate SEL manual for more details for setting configuration. These figures are intended to serve only as a brief overview of the configuration for SS reclosers and how to view/modify the source/load setting for our most common configurations of 651RA&R2 SEL relays only

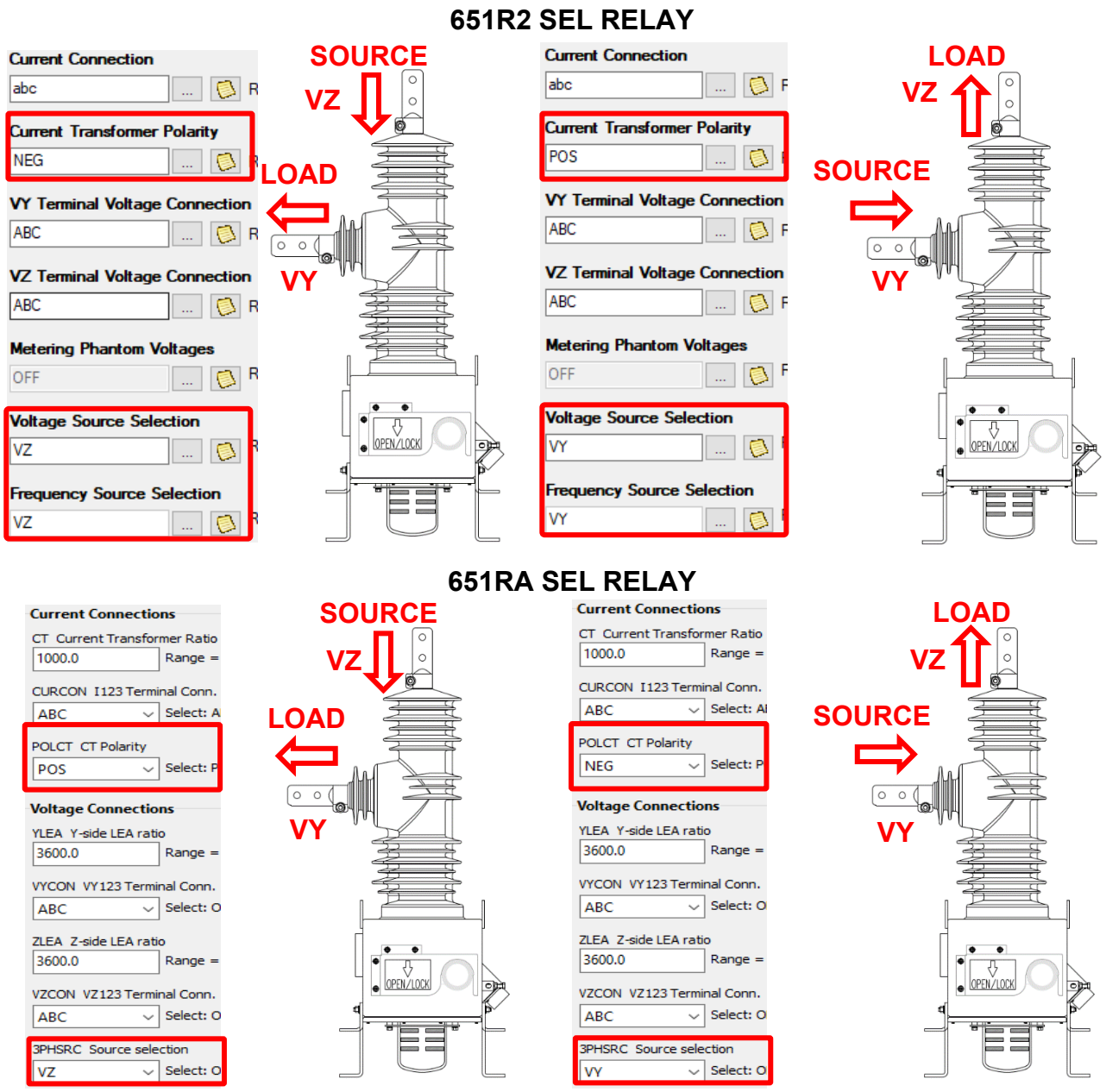


Figure 4: Recloser Source & Load Configuration

Epoxy Resin Bushing

The Southern States recloser utilizes environmentally friendly Hydrophobic Cycloaliphatic Epoxy (HCEP) as the dielectric insulating medium. The vacuum interrupters, current transformers, and voltage sensors are directly encapsulated in the HCEP. This provides complete encapsulation of the internal vacuum interrupter. This HCEP offers high damage resistance and is highly resistant to ozone, oxygen, moisture, contamination, and ultraviolet light.

The creepage distance from terminal to ground of the Solid dielectric modules meets IEC-60815 site pollution severity class “Very Heavy.”

1	Hydrophobic Cycloaliphatic Epoxy Resin Bushing
2	Conductor
3	Vacuum Interrupter
4	Conductor
5	Insulated Operating Rod
6	Current Transformers (3) *not shown*
7	Voltage Sensors (6) *not shown*

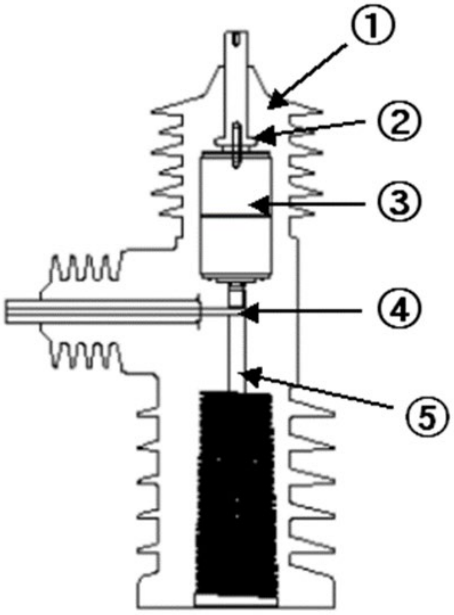


Figure 5: Interrupter Detail

Mechanism Control

The mechanism consists of a permanent magnetic actuator (PMA) for each phase. Capacitors in the tank mechanism are continuously charged from the control system to store necessary energy for operating PMA during an open or close operation. The PMA operates by applying a trigger signal for open or close from the control. Each phase is connected by a steel rod that causes them to open or close all together based on the signal from the switch control. No operating power is required to hold the unit open or closed.

Mechanism Tank

The mechanism tank is constructed of 304 stainless steel and is painted ANSI-70 gray. The mechanism tank is equipped with four lugs (see Figure 6) for four-point lifting and a terminal for ground on the rear of the mechanism. A 4-digit mechanical counter is provided on the bottom panel of the mechanism for mechanical operations counting.

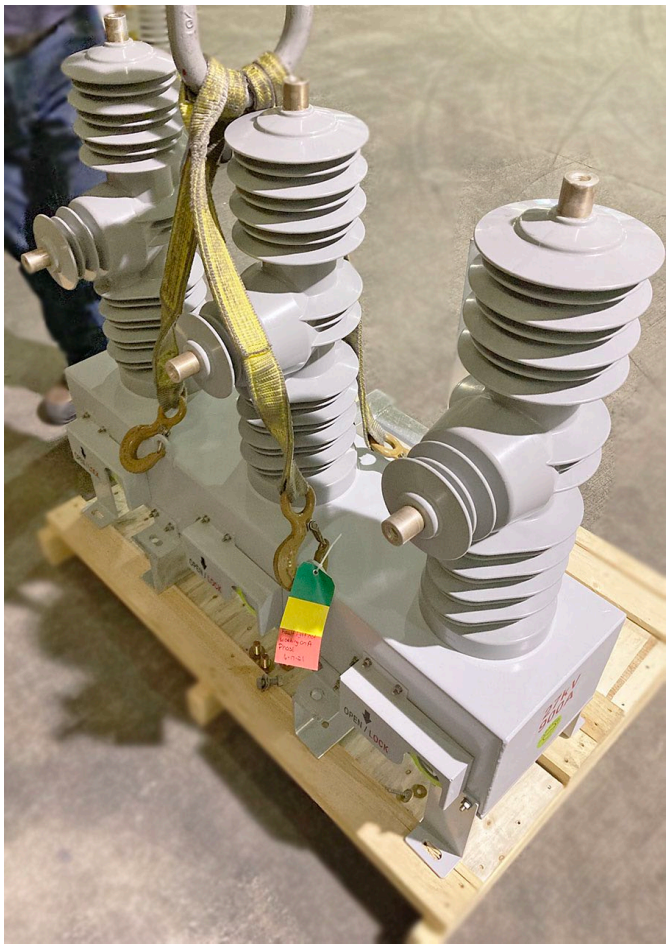


Figure 6: Lifting Lugs

Vacuum Interrupters

The recloser uses Transverse Magnetic Field (TMF) vacuum interrupters.

Current Transformer & Voltage Sensor

Each three-phase device has a total of six capacitive voltage sensors and 3 sensing current transformers (1000:1 ratio) encapsulated inside the epoxy bushing. Three voltage sensors are located on the load side and three on the source side of each device permitting voltage readings on the source and load of each phase module. The voltage sensors are Low Energy Analog type (LEA) and have a nominal secondary output of 4V at customer nominal Line- Ground Voltage.

Manual Open Handle

A manual high-visibility, yellow operating handle is provided on the mechanism under the sleet hood. The sleet hood restricts the buildup of ice on the handle operation shaft.

Pulling the yellow handle down when recloser is in the closed position will result in a manual opening operation. With the handle in the DOWN position, the device is in a “lock” state and electrical close operation will not be possible.

Returning the yellow operating handle to the UP position will not close the recloser. The yellow operating handle must be returned to the UP position for the recloser to respond to a close signal from the Manual Override pushbuttons or third-party Control Device.

Open/Close Position & LED Indicator

A reflective red/green (closed/open) position indicator is located on the bottom panel of the mechanism housing and is visible 360° from ground level. The position indicator is mechanically linked to the opening mechanism, providing positive indication of all three-phase positions. When the switch is closed, the position indicator shows red. When the switch is open, the position indicator shows green.

The closed/open indicator is fitted with an LED assembly that will illuminate and blink when driven by the third-party controller. The LED assembly is configured through the third-party controller to illuminate when overcurrent is reached.

Control Cabinet (Internal)

(See Unit Assembly Drawing for control cabinet dimensions)

All recloser control cabinets are rated NEMA4X and are constructed of 304 stainless steel. Each control cabinet is fitted with third-party controller mounted inside the control cabinet.

Each control Cabinet is equipped standard with the following components:

1. Surge Protection Device (SPD)
2. AC Breaker
3. DC Breaker
4. AC-DC Power Supply
5. Hygrotherm (Humidity and Temperature Control)
6. Heater
7. Control Board
8. 24VDC Terminal Block and Panel for Customer Communications
9. Lithium-ion batteries (10Ah standard, 20Ah optional)

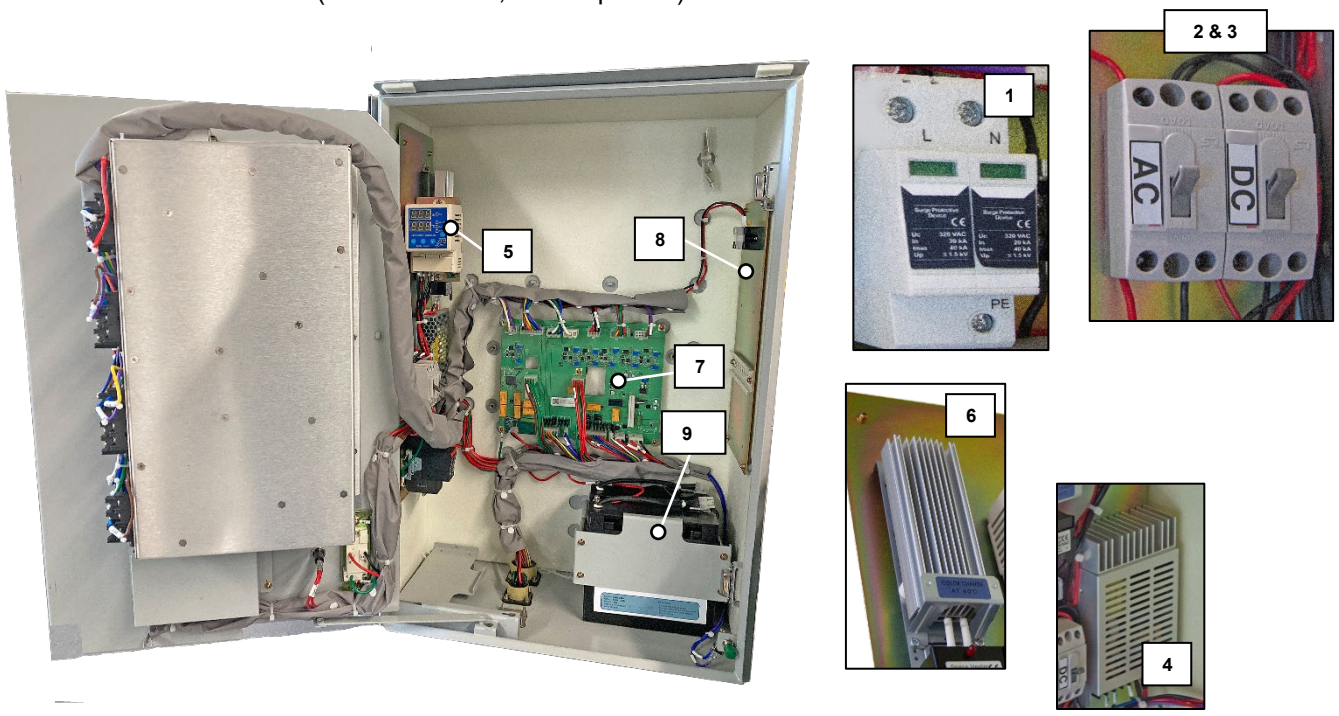


Figure 7: Control Cabinet Overview (Internal)

External Control Cabinet & Swing Panel

1	Power Receptacle
2	Control Receptacle
3	Ground Terminal
4	SS Logo
5	Nameplate
6	Door Switch
7	Customer Control Relay
8	Manual Override Button
9	Control Pushbuttons
10	120 VAC Receptacle Outlet

Figure 8: Control Cabinet Overview (External)

Connecting Cables

The Southern States recloser is supplied standard with 32’ or 52’ standard control and power cable lengths. Optional custom lengths are available upon request.

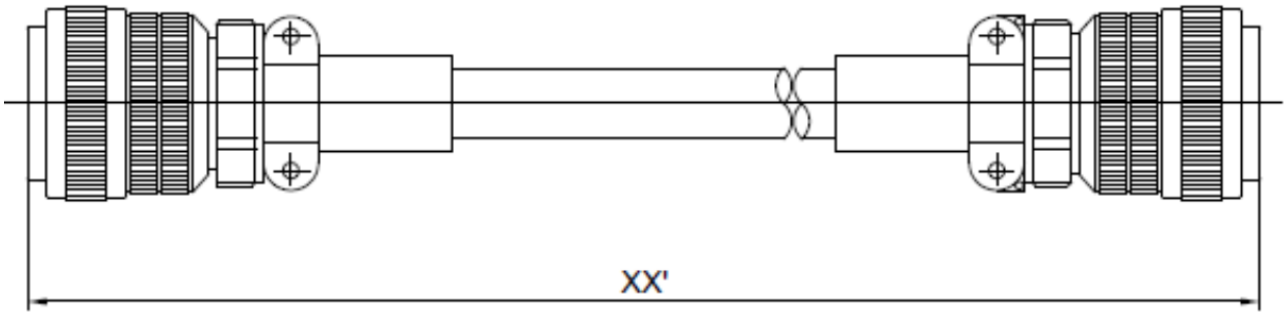


Figure 9: Control Cable

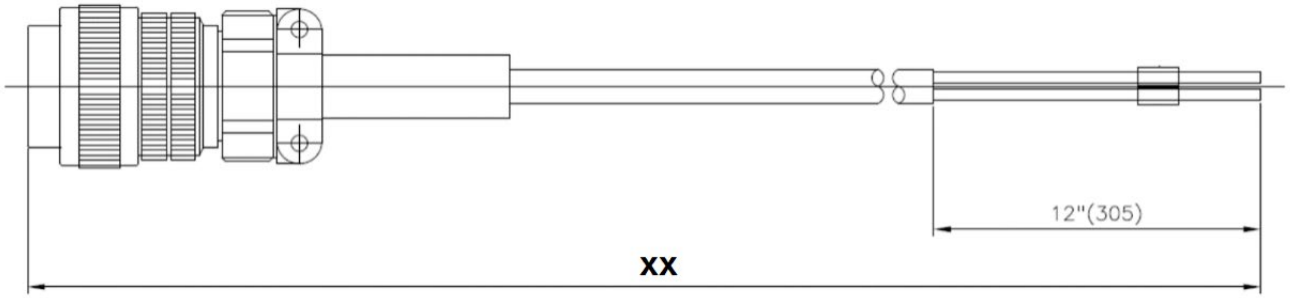


Figure 10: Power Cable

Control System

Note: The following is a description of the basic control features provided by Southern States recloser. Due to variations in customer specifications, there may be differences in control features.

Note: Each customer third-party controller will be loaded with a test configuration file. View the relay control configuration document in standard delivery package documentation for information pertinent to control relay configuration.

The recloser comes with a control cable to be connected between the mechanism and control cabinet. Both ends of the control cable are made in a form of male/female connectors making it easy to plug into the mechanism and control cabinet. The typical setup is shown in Figure 11.

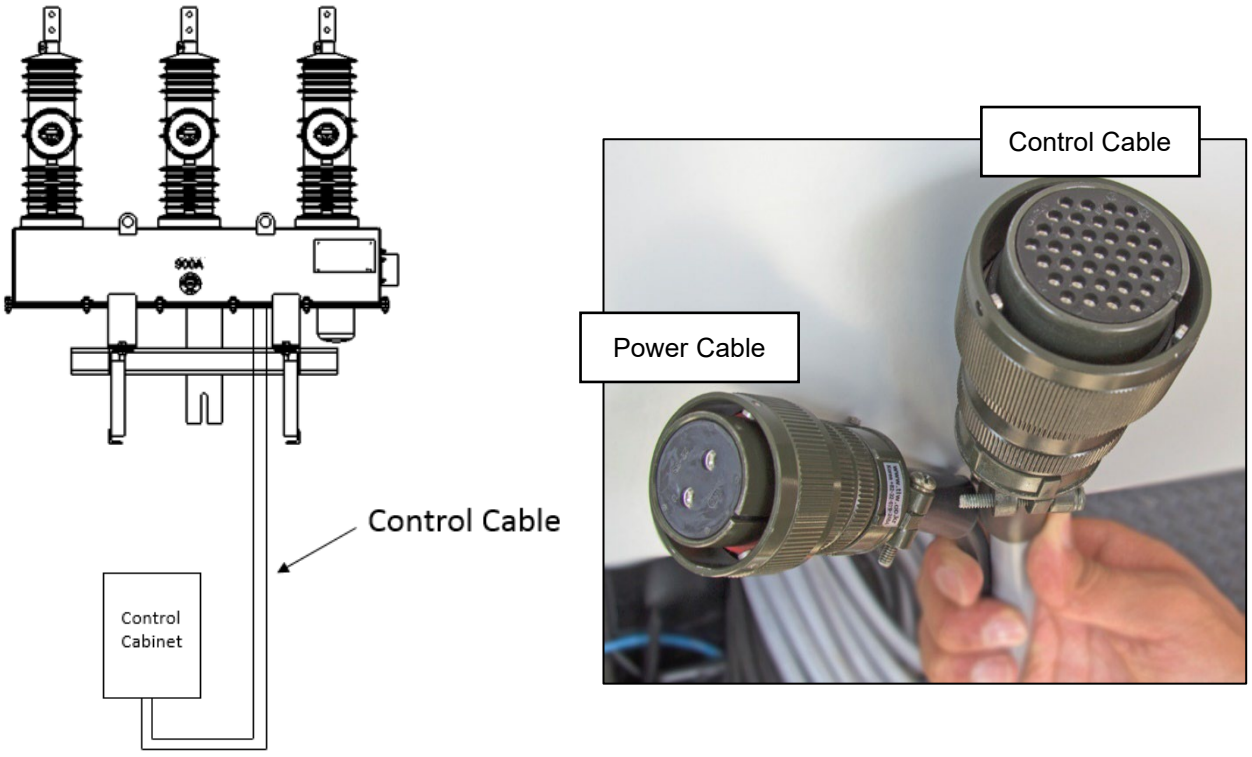


Figure 11: Typical Control System

Operation

Manual Operation

The recloser can be opened manually by pulling down the yellow “OPEN” handle on the side of mechanism using a properly insulated hook stick. Once the handle is pulled down, the recloser is open and in “lockout” mode, blocking any additional electrical control signals. To close the recloser, first push the yellow manual open handle up to be in the reset position, then initiate a close control from the control cabinet.

Electrical Operation

The recloser can be operated electrically via pushbuttons on the swing panel or by the third-party controller. The electrical open and close operations are available when the recloser is not mechanically locked (Manual Open Handle engaged).

Note: The recloser has capacitors in the mechanism which takes 2 minutes to charge upon first energization. After powering on the AC + DC Breakers in the control cabinet, wait for 2 minutes before the first operation.

Remote/Manual Override Switch & Pushbutton Operation

Unless removal is requested by the customer, a spring loaded Remote/Manual Override switch and open/close pushbuttons are located on the swing panel of the control cabinet. With the switch in the “remote” position, the open/close pushbuttons on the swing frame will not operate the device. Turning the switch from “remote” to “manual override” will allow the device to be controlled through the open/close pushbuttons on the swing frame.

Note: If the yellow manual open handle is in the down position, the recloser will not close. Make sure the manual open handle is in the up, or normal operating position, before operating electrically.

⚠ DANGER	When the recloser is energized, utilize an insulated hookstick to pull down the yellow manual operating handle.

⚠ WARNING	Hazardous Voltage. Do not rely on the position indicator or the manual handle. The position indicator does not ensure the line has been deenergized. Always establish a visible isolation of the distribution automation device before doing any work. Failure to follow proper safety precautions can result in contact with high voltage and lead to serious injury or death.

Real-Time Status Indication & Control

The recloser can continuously sense the following statuses of the system and send the real-time status feedback to customer 3rd party controller. Available inputs and outputs for the device are listed below.

Outputs	Digital Inputs	Analog Inputs
1) Open Device	1) Switch Close Status (52A)	1) Current Phase A
2) Close Device	2) Switch Open Status (52B)	2) Current Phase B
3) Set Fault Light	3) Loss of AC Power Status	3) Current Phase C
4) Clear Fault Light	4) Door Switch Status (Intruder Alarm)	4) Voltage Phase A
	5) Manual Override Toggle Status	5) Voltage Phase B
	6) Manual Pull Handle Status	6) Voltage Phase C
	7) Battery Voltage Status	7) Voltage Phase R
	8) Battery Charge Alarm	8) Voltage Phase S
		9) Voltage Phase T

Figure 12: Available Inputs & Outputs

Receiving, Handling, & Storage

⚠ CAUTION	Inspect all packaging material thoroughly prior to handling after storage. Handling of equipment in damaged or compromised packing materials can be dangerous or cause damage to equipment.

⚠ WARNING	Interrupting housing are fragile. Do not strike, shock, strain, or in any way damage the equipment. Such damage may cause the interrupter to malfunction. Improper handling may result in death, serious injury, or equipment damage.

Receiving

A typical delivery package consists of:

- (Qty.1) Recloser Mechanism in Tank
- (Qty.1) Control Cabinet with 3rd Party Control Device
- (Qty. 1) Power Cable
- (Qty. 1) Control Cable
- (Qty.1) Mounting Bracket
- (Qty. 6) Straight Terminal Pads
- (Qty. 1) 1 Small Packet of NO-OX-IDE

Documentation:

- (Qty. 1) Instruction Manual (Electronic Version Available)
- (Qty. 1) Quality Instruction Checkoff
- (Qty. 1) Outgoing Quality Control (OQC) Checkoff
- (Qty. 1) Unit Assembly Drawing (Including BOM, Wiring Diagram, and functional description of third-party controller configuration)
- Third Party Controller Documentation

Handling & Unpacking

Unpack the equipment and check for damages or material shortages immediately. The Bill-Of-Material (BOM) from the Unit Assembly Drawing should be used for this purpose. Inspect all parts and check for any damage or part shortages. If damage or a shortage is noted, file a claim with the shipping carrier immediately and contact Southern States.

Storage

After the receiving inspection, if immediate installation is not intended, the equipment should be repacked and stored. To maintain the crate condition “as new” condition, the components, accessories, and spare parts should be stored indoors in a dry, clean area. Care should be taken to avoid corrosion, degradation of packaging, etc. Inspect all packing material thoroughly prior to storage and handling. Handling of equipment in damaged or compromised packing materials can be dangerous or cause damage to equipment.

Short Term Storage (Less than 3 Months)

Protect unit from being immersed in water at all times. Do not allow moisture or dust to enter the interrupter control cabinet. Contact Southern States if any parts have been exposed.

All operating mechanisms and control enclosures should be protected from moisture and corrosion by keeping the cabinet door closed and vents sealed.

Long Term Storage (More than 3 Months)

For long-term storage, take the battery/batteries out of the control cabinet and place into a battery trickle charger/maintainer so it does not discharge over time. If the battery discharges completely, it may damage the battery and prevent it from recharging. Energize the heater in the control cabinet to maintain the interior as dry and free from corrosion. Failure to do so can void the warranty.

Note: To energize heater plug in the female end of the 2 pin AC power connector to the power cable receptacle on the bottom of the control cabinet. Connect the red and black wires of the opposite end to a 120VAC source. After the power cable is connected, to activate the heater, turn on the AC breaker (down position). The hygrotherm temperature and humidity setting are set at Southern States facility to 20C and 70% humidity. The heater is active if the red LED light below the heater is illuminated. If the heater is not energized the conditions are such that temperature is greater than 20C and humidity is below 70%. To test the heater, press the <> button on the hygrotherm to cycle the heater on/off. This button will override the temperature and humidity settings in the hygrotherm and automatically power the heater. Heater will stay powered until the <> on the hygrotherm is pressed again.

Installation & Maintenance

Before installing the recloser, check the following to ensure proper functionality:

- Check the terminal bushings on mechanism for damage that may have occurred during shipping.
- Check the epoxy bushing for damage that may have occurred during shipping.
- Check the manual operation handle for damage that may have occurred during shipping.
- Check to ensure the glass dome located on the bottom of the mechanism enclosure is not damaged during shipping.
- Check the mechanism enclosure and control enclosure for any other damage.
- Check to ensure the voltage between battery terminals are between 24VDC-27.5VDC.

Test Manual Operation

With the recloser closed, pull down the yellow manual open handle on the side of the recloser using a hook stick (an insulating stick) to open the recloser. When the manual pull handle is in the down position the recloser will be in a “lockout” state and electrical open or close operation will not be possible. Confirm the contacts have opened by:

- The OPEN/CLOSE position indicator (located inside glass dome on the bottom of recloser). GREEN indicates the recloser is open, RED indicates the recloser is closed. OR
- By performing continuity check between the recloser terminals.

Test Electrical Open & Close Operation

First, push the yellow manual open handle to the up position. Returning the pull handle to the up position will take the recloser out of “lockout” state and open or close operation will be possible.

Open and close the device contacts using the Open/Close pushbuttons on the third-party controller or by using the manual override Open/Close pushbuttons located on the swing panel. Confirm that the contacts have opened and closed by:

- The OPEN/CLOSE position indicator (located inside glass dome on the bottom of recloser). GREEN indicates the recloser is open, RED indicates the recloser is closed. OR
- By performing continuity check between the recloser terminals.

Lifting

Ensure the bolts are tightened between the recloser and the mounting frame before lifting. Typically, the recloser is shipped assembled to the mounting bracket. Lift the entire assembly from the four lifting lugs on the mechanism enclosure of the recloser.

⚠ WARNING	Be careful when lifting the recloser. Use all four lifting lugs to lift the recloser. Use extreme caution to prevent the assembly from falling over.

⚠ WARNING	Bushings and mounting frame may have sharp edges. Wear protective gloves when handling the unit. Failure to do so can result in personal injury.

⚠ WARNING	The horizontal wood connecting all upper terminal bushings on mechanism prevents the assembly from tilting. Keep the wood on the top bushings when lifting the recloser. Remove the wood only after the recloser is mounted/secured onto the pole.

Horizontal Recloser Lifting

Follow all approved safety practices when lifting the equipment. All lifting lugs must be used when lifting. Lift the unit smoothly and do not allow the unit to shift. Use proper equipment to obtain a vertical lift without damaging the unit (see nameplate for the approximate weight).

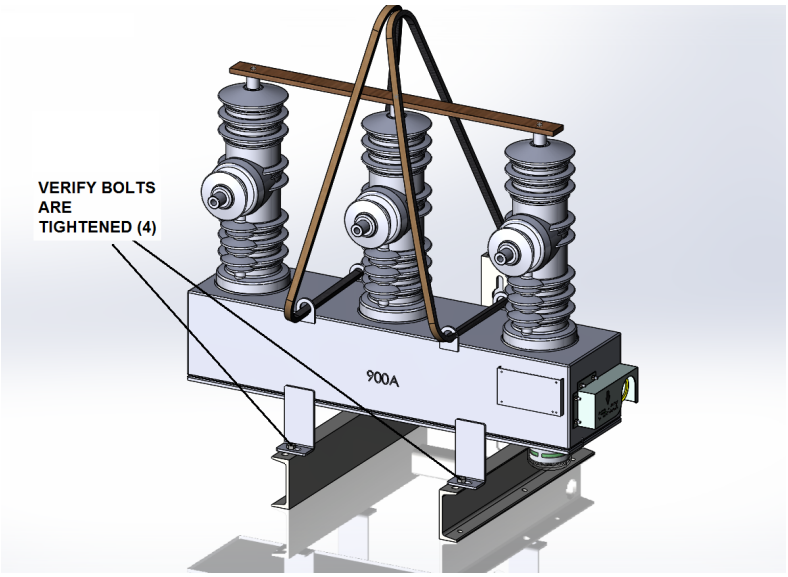


Figure 13: Recommended Lifting for Horizontal Mounted Recloser

⚠ WARNING	Do not lift or handle recloser by the bushings. Doing so may result in damage to the recloser and possible injury or death to personnel.

Vertical Recloser Lifting

Follow all approved safety practices when lifting the equipment. All lifting lugs must be used when lifting. Lift the unit smoothly and do not allow the unit to shift. Use proper equipment to obtain a vertical lift without damaging the unit (see nameplate for the approximate weight).

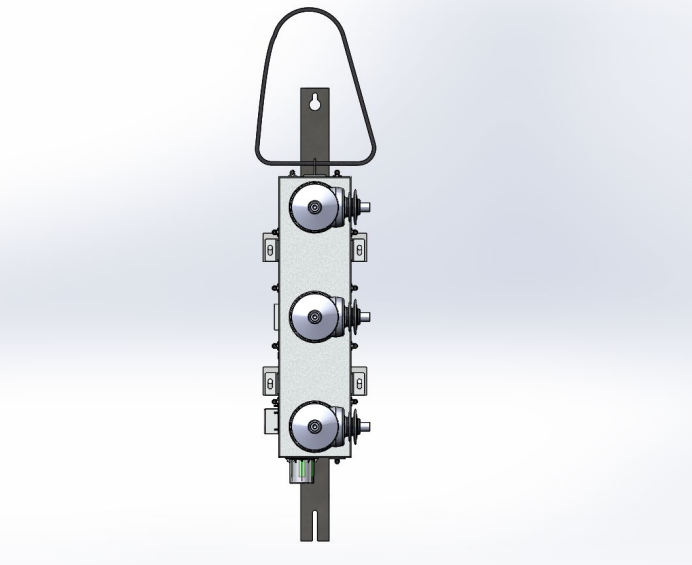


Figure 14: Recommended Lifting for Vertical Mounted Recloser

⚠ WARNING	Do not lift or handle recloser by the bushings. Doing so may result in damage to the recloser and possible injury or death to personnel.

Mounting

Horizontal Recloser Mounting

The horizontal pole mounting bracket supplied has two mounting holes (See Figure 15). Measure the distance between the holes and drill the pole to the desired position. Position proper sized bolt with flat washer through the top hole and secure with a flat washer, lock washer, and nut on the back of the pole such that the front bolt head extends from the pole approximately 3 – 4 inches. Slowly lift the bracket and recloser assembly. Position the top slotted mounting hole of the bracket over the front bolt and washer installed in the pole. Slowly lower the unit such that the top bolt seats itself through the slot on the bracket. Do not remove lifting equipment until the unit is completely secured to the pole. Tighten the top bolt and hardware. Insert the bottom bolt, with the same hardware as the top, through the bottom hole of the bracket and secure to the pole. Use caution when removing the lifting equipment as to not damage the recloser.

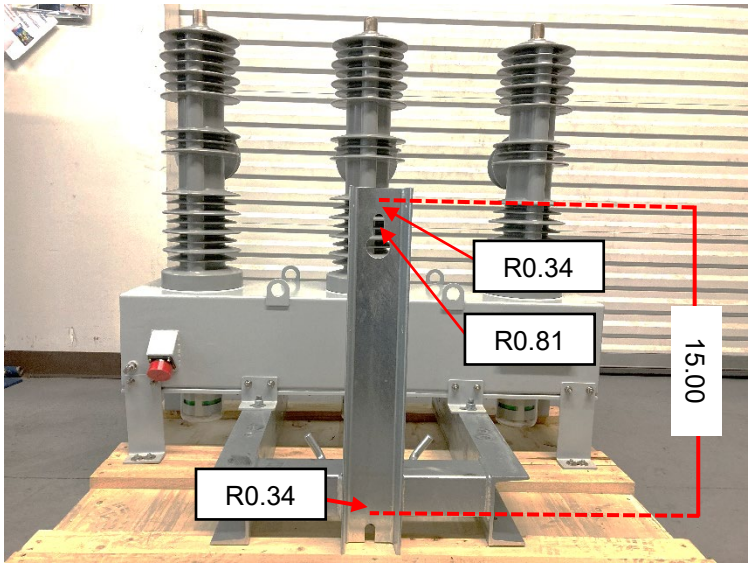


Figure 15: Mounting Bracket Hole Dimensions

Check that the recloser device, in its installed position, is secured and mounting is adequate to support the weight of the device.

Vertical Recloser Mounting

The vertical pole mounting bracket supplied has two mounting holes (See Figure 15). Measure the distance between the holes and drill the pole to the desired position. Position proper sized bolt with flat washer through the top hole and secure with a flat washer, lock washer, and nut on the back of the pole such that the front bolt head extends from the pole approximately 3 – 4 inches. Slowly lift the bracket and recloser assembly. Position the top slotted mounting hole of the bracket over the front bolt and washer installed in the pole. Slowly lower the unit such that the top bolt seats itself through the slot on the bracket. Do not remove lifting equipment until the unit is completely secured to the pole. Tighten the top bolt and hardware. Insert the bottom bolt, with the same hardware as the top, through the bottom hole of the bracket and secure to the pole. Use caution when removing the lifting equipment as to not damage the recloser.

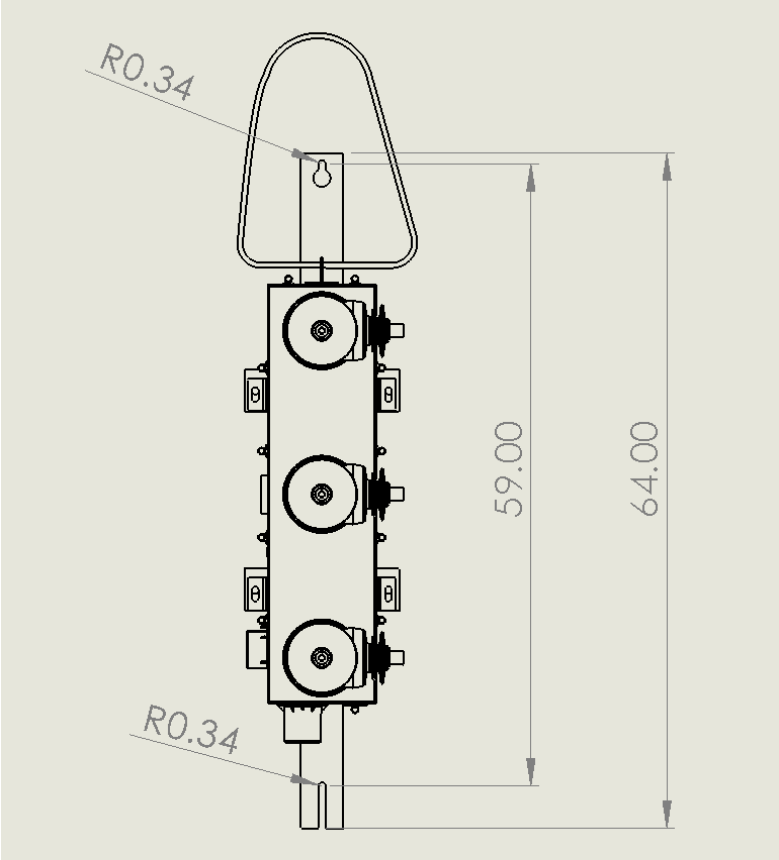


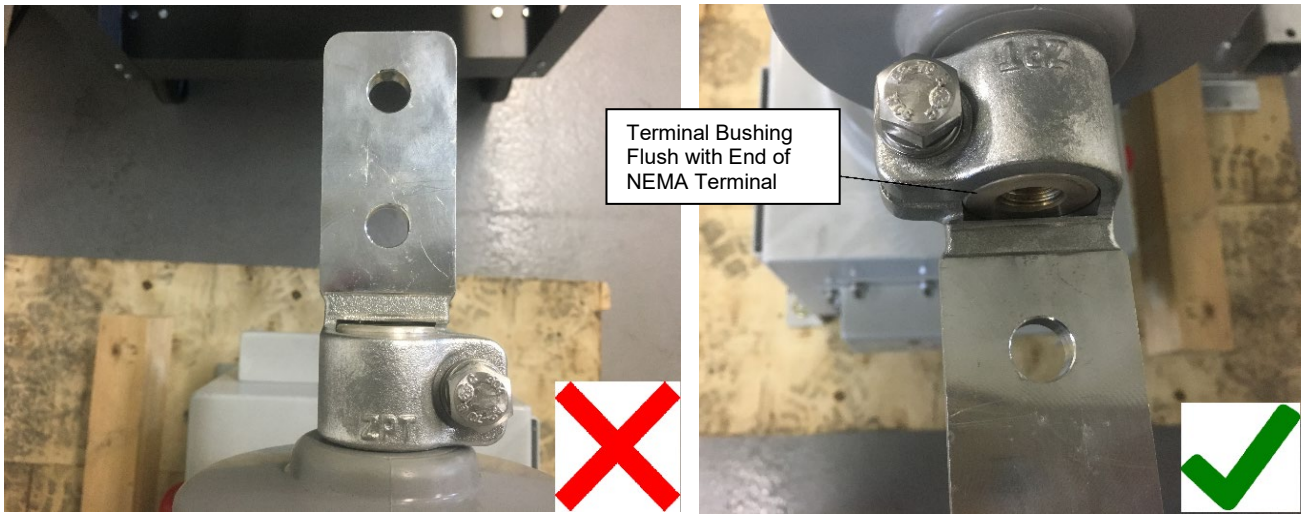
Figure 16: Vertical Mounting Bracket Hole Dimensions

Check that the recloser device, in its installed position, is secured and mounting is adequate to support the weight of the device.

Proper Terminal Pad

Terminal pads are recommended when connecting high voltage lines to the recloser. To connect the terminal pads, apply NO-OX-IDE to the terminal bushings and terminal pads. Brush through the grease with a stainless-steel brush. Bushings are not intended to provide strain relief.

Secure the NEMA terminal pad to the terminal bushing by sliding the terminal over the bushing and tightening to 11ft-lbs. The end of the terminal should be flush with the terminal bushing. See pictures below for correct installation.



⚠ WARNING	Do not terminate the overhead conductor directly to the bushing without use of a separate strain relief device. Failure to use a strain relief may result in damage to the recloser.

Control Cabinet

Mount the control cabinet to the desired position using proper sized bolts. Use the same procedure performed for mounting the recloser. Connect the female end of the control cable to the male pin connector on the bottom of the control cabinet. Connect the female end of the power cable to the male pin connector on the bottom of the control cabinet. (See Figure 17) Rotate connectors clockwise to lock.

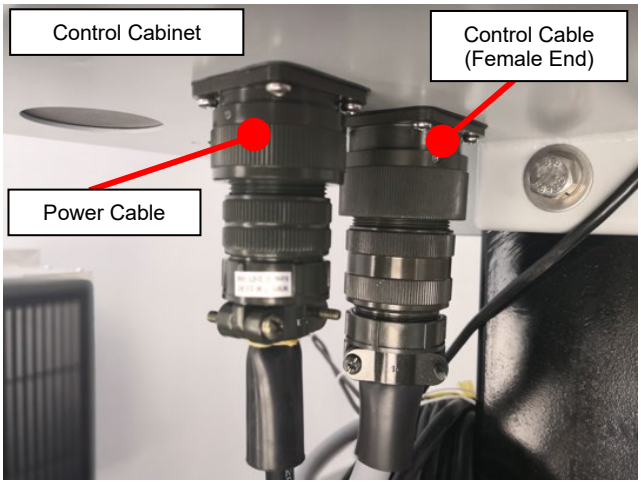


Figure 17: Power & Control Cable Connections

Connect the male end of the control cable to the female pin connector on the back of the Automation Device mechanism and rotate clockwise to lock. (See Figure 18)

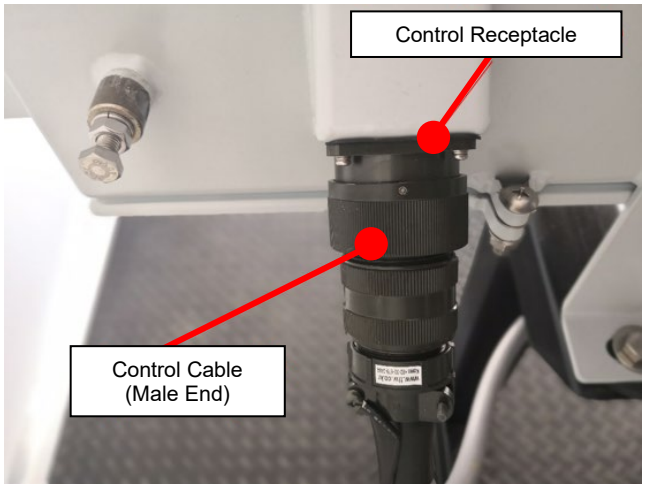


Figure 18: Control Cable Connection

Connect the leads of the power cable to a 120VAC source. **Ensure the control cabinet is grounded through its grounding terminal on the bottom of cabinet.**

Grounding

Make the ground connection to the ground terminal on the mechanism and control cabinet. The mechanism ground terminal is located on the rear of the mechanism enclosure. If ordered with mounting bracket, mounting lug will be supplied with bracket. The control cabinet ground terminal is located on the bottom of the control cabinet. See Figure 19 for the required grounding configuration for the Distribution Automation Device. (No control cable or power cable is shown in Figure 19).

The mechanism tank, mounting bracket, and control must be attached at a common grounding point located at the base of the pole or substation rack.

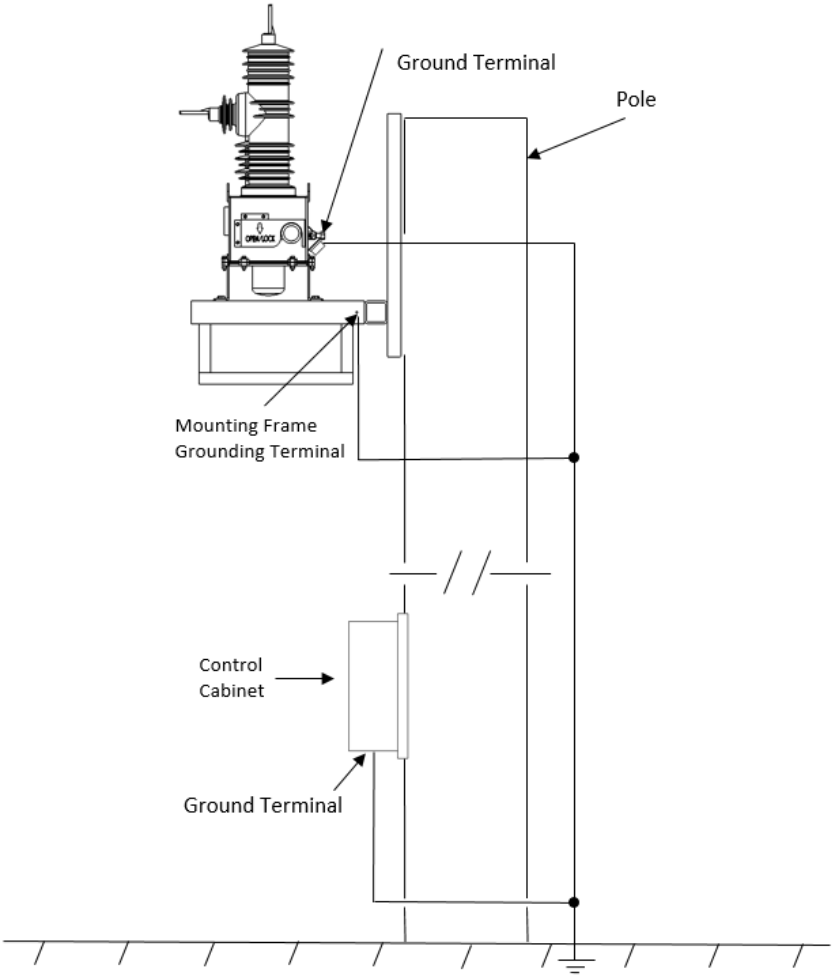


Figure 19: Recommended Grounding Method

Itemized Post Installation Checklist

Date of Installation: _____

A. Substation Information:

Location:		
Address:	City:	State:

B. Ratings Information:

System Voltage	kV
Control Voltage	

C. Receiving Inspections: Check for damage or shortages

Material	Comments
Insulators	
Mechanism enclosure	
Control Cabinet	
Other	

D. Record:

Record Initial Mechanical Operation Counter Number:	
Ambient Air Temperature:	°F / °C

E. Cabinet Check:

Item	Done (√)
Cabinet Wiring Secure	
Check for damage to any components	
Note any parts on the floor of the cabinet.	
Inspect Mechanism for loose parts	
Is HygroTherm on when energized?	

Appendix

Appendix A: Troubleshooting

If the recloser does not perform as described in the 'Operation' section of this manual, check the following to troubleshoot:

If unit will not close:

- Ensure the yellow manual open handle is in reset position (pulled up).
- Verify the recloser has power and both AC & DC breaker are closed.
- Check all cables for proper connection.
- If no AC power is connected, check the battery level is between 24VDC and 27.5 VDC.

If unit will not open electrically:

- Verify the recloser has power and both AC & DC breaker are closed.
- Check all cables for proper connection.
- Check that the battery voltage is between 24VDC and 27.5 VDC

NOTE: For additional troubleshooting, contact Southern States After Sales & Service Department for assistance at 770-946-4562.

Appendix B: HygroTherm Controller Settings

The recloser comes with a HygroTherm controller inside of the control cabinet to help maintain the temperature & humidity at an acceptable level. The HygroTherm controller is pre-set at the factory to 20C and 70% Humidity.

If it is necessary to change the settings, please follow the steps:

1. Ensure the power cable is connected to a 120VAC source.
2. Turn on the AC breaker inside of the control cabinet, the HygroTherm controller should turn on.
3. Press ‘SET’ button on the HygroTherm controller until the ‘out’ LED light & the number next to ‘%’ symbol blinks. Then press ‘Up’ and ‘Down’ button to set the desire humidity level.
4. Once step 3 is complete, press ‘SET’ button until the heater LED light & the number next to ‘%’ symbol blinks. Then press ‘Up’ and ‘Down’ button to set the desired temperature (Celsius).
5. Once both humidity & temperature settings are set. Press ‘SET’ button few times until nothing is blinking on the panel of the HygroTherm controller.

This Page Intentionally Left Blank

The Quality Name in High Voltage Switching

30 Georgia Avenue
Hampton, Georgia 30228
Phone: 770-946-4562
Fax: 770-946-8106
E-mail: support@southernstatesllc.com
http://www.southernstatesllc.com

IB-1513-GangedRecloser-R4 10/18/2023 Printed U.S.A.