No. SSIEC-PRC-00100

SHINSUNG

Polymer Recloser

SIREC SERIES
15kV, 27kV
400A, 630A

SHINSUNG INDUSTRIAL ELECTRIC

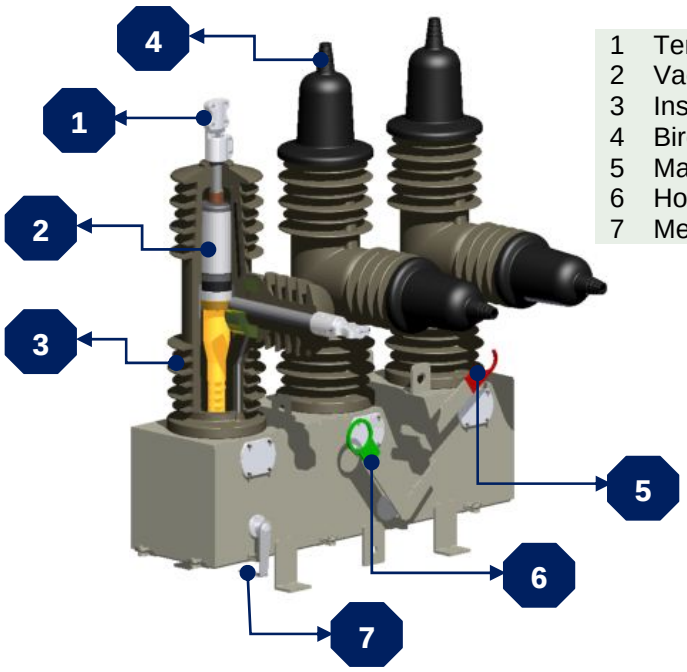
Introduction

SIREC(Solid Insulated Recloser) has newly developed polymer recloser with hydrophobic cycloaliphatic epoxy applied the latest technology that has many advantages of easy installation, compact, lightweight and environmentally friendly products comparing to the insulation media of SF6 gas or oil, and designed a simple magnetic actuator that has a benefit of maintenance free and more reliable operation by eliminating the components.
Controller built-in RTU can perform the self-operation and feeder automation with simple to control circuit, and also can be applied for the smart grid system in future.

Features

- **Live-Line Manual Closing/Open Trip**
  - Prompt and Effective Management of Distribution Line
- **HCEP (Hydrophobic Cycloaliphatic Epoxy)**
  - More Durability with Water-Resistance
  - Maintenance Free instead of Oil, SF6 gas
- **PMA Application (Permanent Magnetic Actuator)**
  - More reliable operation mechanism durability by applying PMA method
- **Applied Standard**
  - IEC62271-111
- **Maintenance Free**
  - Cost-effective maintenance of labor and time etc by cycloaliphatic Solid Insulation, reliable operation with PMA application.
- **Advanced Self Healing Scheme**
  - Source side fault lockout feature
  - Reduced trip shots to lockout when the fault is at load side
  - Normal open recloser lockout feature when the fault is at adjacent section (No forced fault making)
  - Automatic setting group change from normal to reduced load
  - Maintain the normal setting group of source side recloser during increased load condition through load encroachment logic.
  - Sympathetic trip restraint feature during source side faults.
  - Adaptive protection and measurements according to the power direction: VIT recloser control use the directional element and the polarity is automatically changed according to the power direction.

Construction



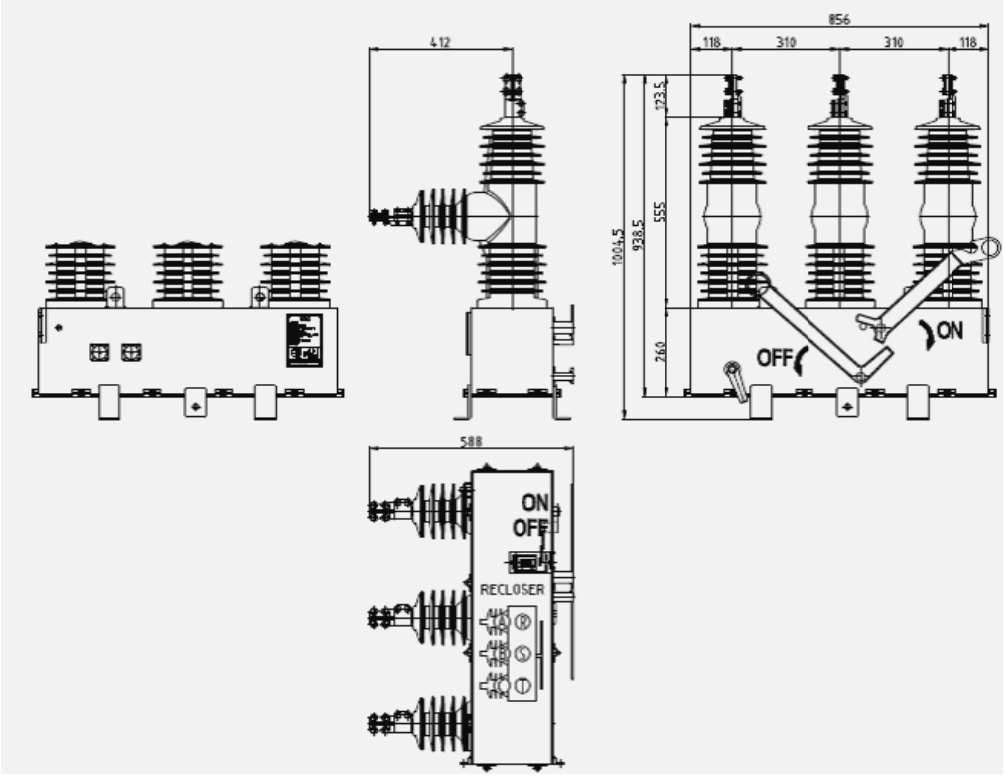
1 Terminal
2 Vacuum Interrupter
3 Insulation Rod
4 Bird Guard Cap
5 Manual Close Handle
6 Hook Stick- Operated manual trip and lockout control
7 Mechanical On/Off position indicator

Technical Data

Description	SIREC
Maximum System Voltage	27kV
Rated Continuous Current	630A
Rated Frequency	50/60Hz
Rated Interrupting Current	12.5kA
Lightning Impulse Withstand (BIL)	150 kV
Power Frequency Withstand Voltage (dry/1min)	60kV
Power Frequency Withstand Voltage (wet/10sec)	50kV
Short-Time Withstand Current	12.5kA/1sec
Recloser body/tank weight	120kg
Recloser control weight	63kg

* Other ratings are available upon request

Layout



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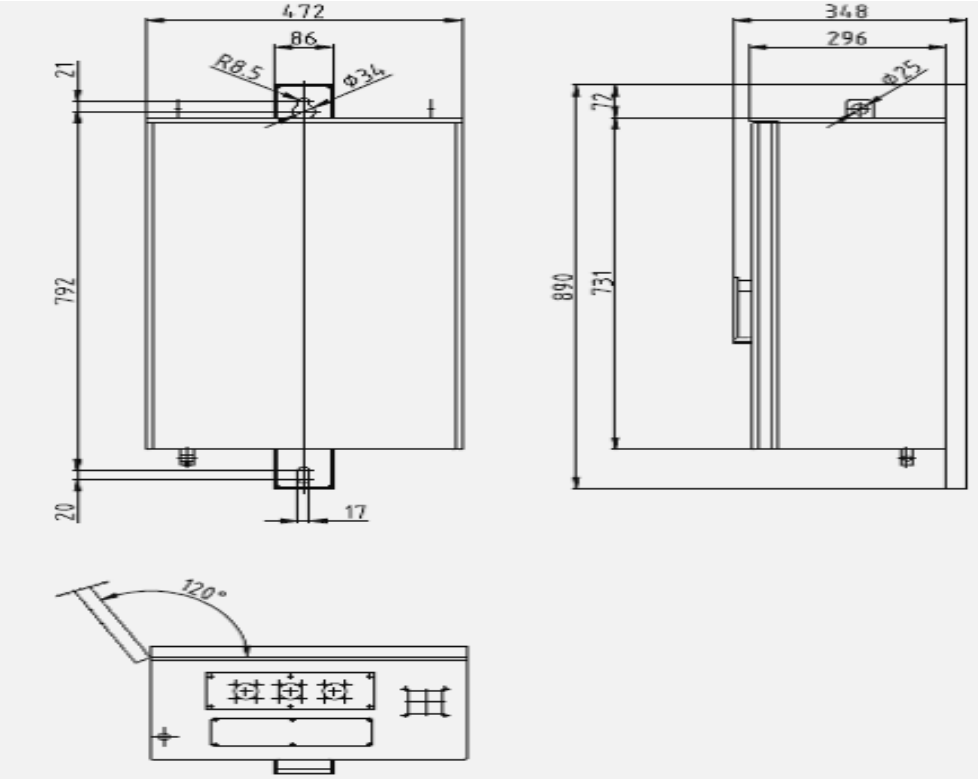
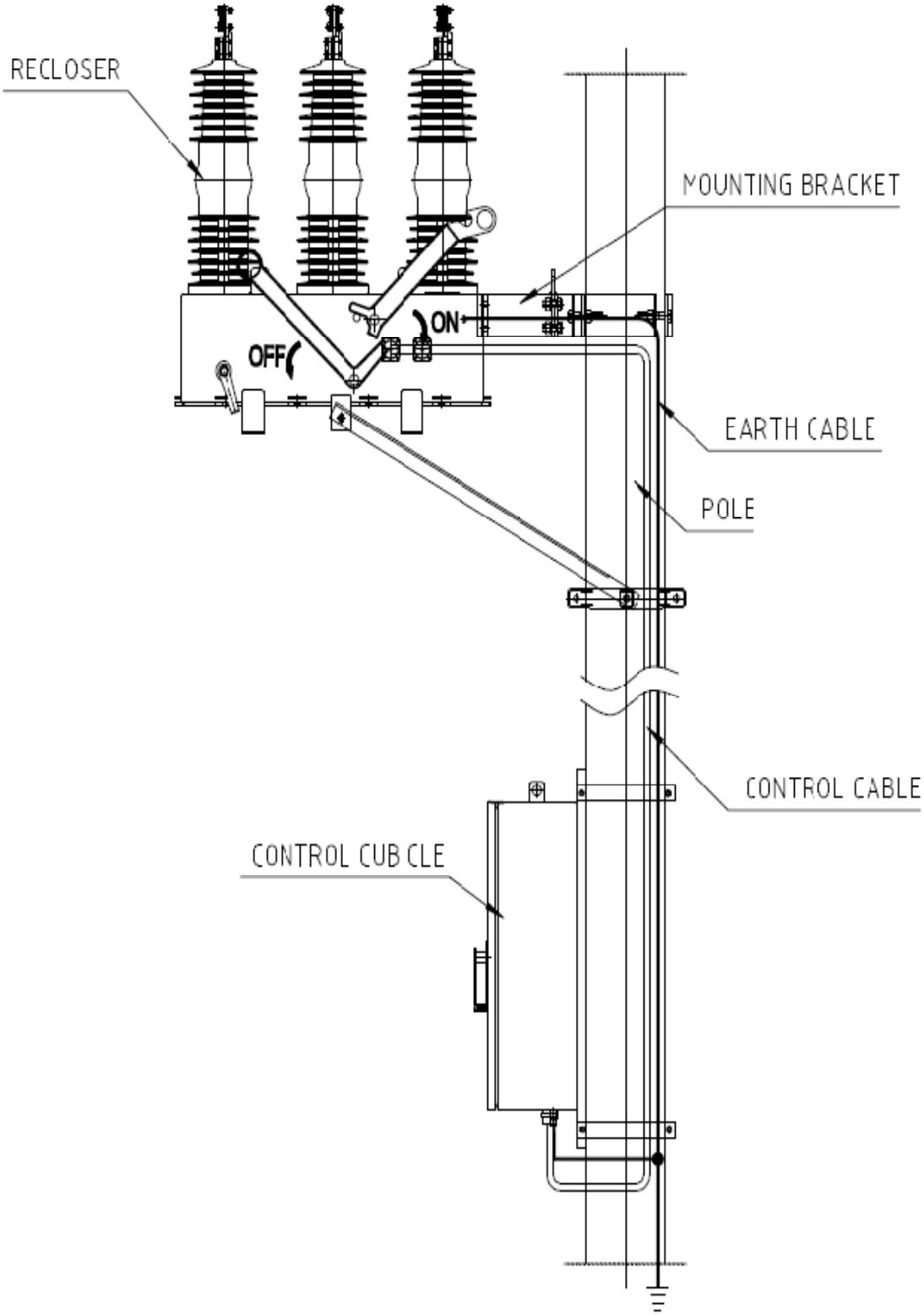


< Recloser Control>

Typical Pole-Mounting Installation



VIT R6 Recloser Control

◆ Overview

The VIT Recloser control is designed and developed specially for loop system protection but it also can improve the radial protection.
It has many advanced features compared with conventional current controlled recloser and as powerful self-restoration system it is best matched with VIT LBS.
When the VIT Recloser is used with VIT LBS, it can identify and isolate the faulted section without limitation of sectionalizing points, and can restore the service by itself without any communication-assisted computer system.
It can be used at radial system, loop system and also radial-loop mixed system. There are loop system using 3 or 5 reclosers, but the limitation are limited sectionalizing points, limited setting group change and forced fault making when the fault is at the adjacent section of normally open recloser.

Main Features of VIT Recloser control

Conventional recloser functions

- Directional ground fault protection
- Fast, delay curve combination
- Sequence coordination
- Cold load pick up / Directional SEF protection
- Directional negative sequence current protection
- Sympathetic trip restraint feature
- Event reports / Measurements
- Load profile
- CB wear monitoring function / DNP3.0

Additional functions

- Source side fault lockout feature
- Reduced trip shots to lockout when the fault is at load side
- Normal open recloser lockout feature when the fault is at adjacent section (No forced fault making)
- Automatic setting group change from normal to reduced load
- Maintain the normal setting group of source side recloser during increased load condition through load encroachment logic.
- Sympathetic trip restraint feature during source side faults.
- Adaptive protection and measurements according to the power direction:

VIT recloser control uses the directional element and the polarity is automatically changed according to the power direction.

◆ Hybrid Feeder Automation System using VIT Recloser

Even in communication-assisted feeder automation system, the CB-Recloser coordination scheme can reduce the outage area during temporary and permanent fault.
So the large section is protected first by conventional CB-recloser scheme and the small section can be isolated through the FTU of the load break switch. After deciding and isolating the faulted section, it send close command to the normal open switch to restore the service.

Automatic setting group change

During loop operation the recloser of the unfaulted feeder (source side recloser) should supply more current and the recloser of faulted feeder (load side recloser) may supply reduced current.
If the correct setting group can not change automatically, then the computer system has to change the source side, load side recloser settings before sending close command to the normal open switch.

The VIT recloser control uses the load encroachment logics for source side recloser and changes the setting group of load side recloser according to the power direction. The load encroachment logics qualify not only current amplitude, but also the power factor, so even the load current exceeds the pickup level, still it can supply the power but if there is actual fault, it trips and protects the distribution line.
From the normal load pickup current (1st level) to the increased load pickup current (2nd level) the load encroachment logic qualifies the fault and after increased load pickup current, the fault current amplitude qualifies the fault.

◆ Self Restoration System using VIT Recloser and VIT LBS

The self restoration system can achieve the same or better result than the communication assisted hybrid feeder automation system in the aspect of speed, reliability, expandability, cost, etc.

The large section is protected by substation circuit breaker and distribution line recloser and if the fault is permanent after one or two trip of CB, recloser, the VIT LBS open simultaneously and close one by one to identify and to isolate the fault.
It can isolate the faulted and can restore the service by itself without communication.

The additional functions of VIT recloser are designed to achieve the best performance of the self restoration system matched with VIT LBS but even without the VIT LBS it solve the problem of conventional loop system using recloser likes forced fault making and lockout, non automatic setting group change, difficulty of directional protection during reverse power flow etc.

◆ Operation Mode

Normal Recloser Mode

- In normal recloser mode, the operation is exactly the same with conventional recloser.
- If the load side of recloser just has sectionalizers, the recloser should operate according to normal recloser mode.

Radial Line Mode

- Basic functions are the same with normal recloser mode
- If the recloser is coordinated with 2 or 3 sectionalizers, then the radial line mode is not necessary
- If the down stream of recloser use more than 2 or 3 sectionalizers, the VIT LBS is recommended
- The radial line mode will be best matched with VIT LBS self restoration scheme
- Unlike conventional recloser, if the adjacent load side of recloser is a faulted section, then the recloser goes to lockout with one reduced trips.

Loop Line Mode

- Basic functions are the same with normal recloser mode
- Source side fault lockout feature
- Load side fault lockout feature with reduced number of trips
- Loss of voltage lockout feature
- Normal open (Tie) recloser adjacent fault lockout feature
- Tie recloser close function during one side voltage lost
- Automatic setting group change from normal setting group to load side setting group and vice versa according to power direction
- The normal setting group can supply more current without tripping, without scarifying the sensitivity during loop operation.

The load encroachment logics current amplitude and also power factor together. So even the current increased more than min pick up current during loop operation, the control will not start the trip timer until the power factor is out of load zone.

Worldwide Sales Location

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