Solid insulated vacuum recloser for power distrbution system thru 15kV, 27kV, 38kV

ENTEC ENTEC
ELECTRIC & ELECTRONIC CO., LTD.

General features

We, ENTEC introduce a Solid Insulated Vacuum Recloser encapsulated with Hydrophobic cycloaliphatic epoxy materials.

The Solid Insulated Vacuum Recloser is designed for the inherently reliable, intelligent automation and environmentally friendly, completely oil free and gas free.

the mechanism is enclosed in a powder coated stainless steel and Hydrophobic cycloaliphatic epoxy resin bushing is bolted on to the stainless steel enclosure.

The Hydrophobic cycloaliphatic epoxy advantages are permanent flexibility, superior surface arc tracking resistance, hydrophobic preventing continuous track from forming leakage current paths, ultraviolet resistance and high tensile strength.
The control cubicle is heat insulated with polyurethane to minimize temperature variation and protected from solar heating as adopting sunshine cover to the outside and heat insulation inside of control cubicle.

Vents of the control cubicle are screened against vermin's entry and door is sealed with a rubber gasket.
Especially all electronic parts built in microprocessor control are fully protected from entry of moisture and condensation able to use any places where tropical, moderate and severe humidity area is located on.

The mechanism is operated by a magnetic actuator which the opening and closing solenoid is respectively equipped with.
As the actuator uses magnetic latching, the mechanical parts are drastically reduced, resulting from high reliability and maintenance free operation during the life time.

The operation of recloser uses a low-voltage power source supplying from low voltage distribution line by utility or potential transformer and a fully charged battery and trip and close capacitors provide recloser operation over hundreds of open-close operations as back-up upon loss of control power.

This allows relcloser operation independent of the high voltage supply, the low voltage supply and the battery and capacitor conditions with dead line operation capability required for SCADA and distribution automation.

A current transformer and a capacitive/resistance voltage divider are moulded in the epoxy housing.
These sensors provide to incorporate the functions of an overcurrent protection relay, a ground fault relay, a sensitive earth fault relay and to measure line current, voltage, real and reactive power, power factor, demand watts and VARs, frequency and so on.

All the measured values and event records are stored in the microprocessor control for transmission or off-line analysis.
The recloser functions, settings and data records are programmable and readable with PC or remote communication.
Personal computer based on software package supports on-line and off-line programming, monitoring, measuring and control of relcoser via RS232 port.
All telemetry communication can be supported with DNP3.0, MODBUS, IEC60870-5-101/104 communication protocols.

■ The advantages of Hydrophobic
 cycloaliphatic epoxy encapsulation

- Environmentally friendly, oil free and
  gas free
- Proven performance in outdoor use
- Compact, light weight, easy for
  transportation
- Superior surface arc tracking resistance
- Excellent hydrophobicity
- Highly resistant against moisture
  absorption
- Ultraviolet resistance
- Outstanding tensile characteristics

■ The advantages of magnetic actuator

- Elimination of mechanical latches and
  associated linkage provide reliable,
  trouble free operation
- Dramatic reduction in moving parts provides
  maintenance free and ten thousand
  operations without periodic maintenance
- Compact, light weight and minimum
  mounting space
- High response time in instantaneous
  reclose
- Reduced installation and operating cost
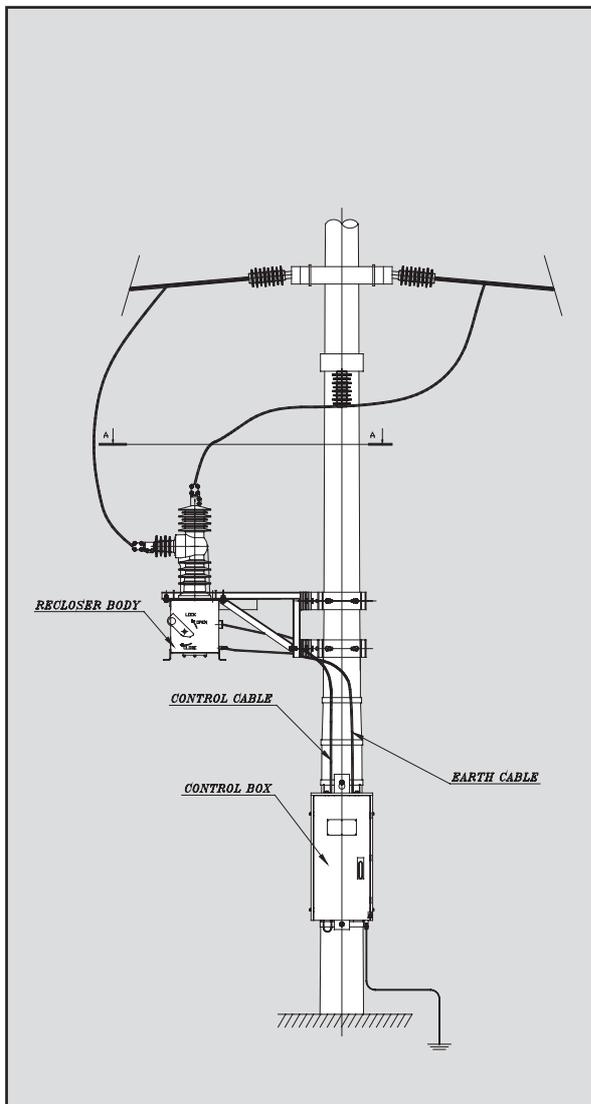
Pole Installation
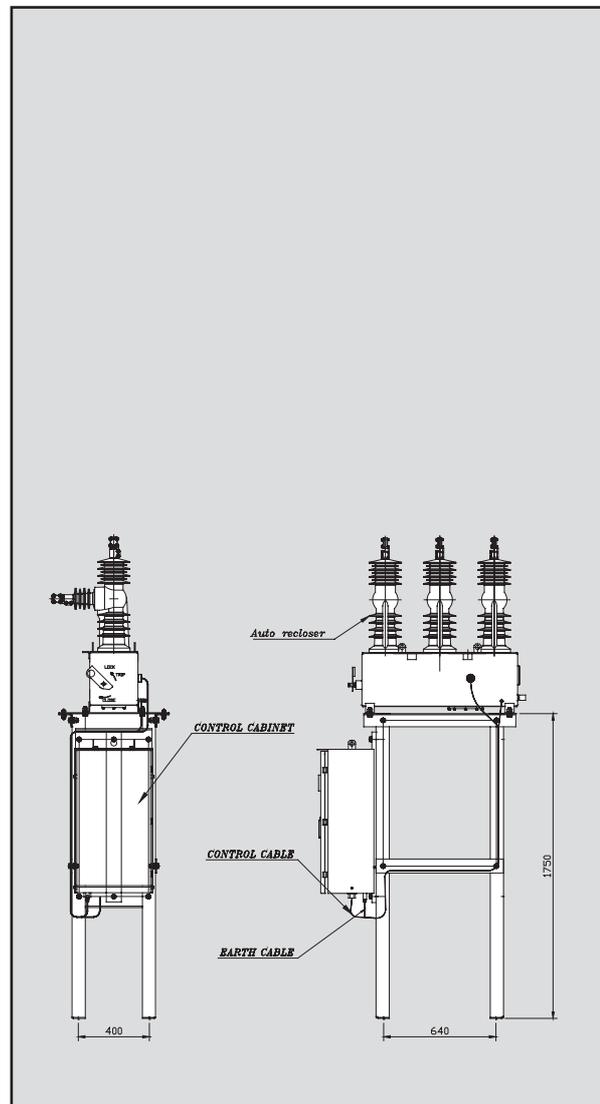
Substation Installation

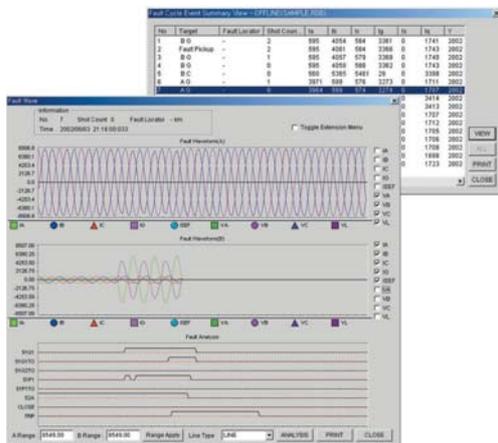# Microprocessor Based Recloser Control EVRC2A

Features

- Reduced distribution automation costs
- RTU and control mounted in one control cubicle with space for modem
- DNP 3.0, MODBUS, IEC60870-5-101/104 communication protocols and SCADA capability
- 12Vdc ~ 24Vdc auxiliary power available for modem
- Voltage, current and power metering
- Record of operation, fault waveform data for line
- and load profile data
  Un-interruptable power supply with trip and close
- Inner heat insulation for polyurethane foaming
- Microsoft Windows-based EVRC2A interface software
- DynSync Software that can monitor and control a remote controller
- (EVRC2A/ETR300R) in PC based on Window

EVRC2A cubicle
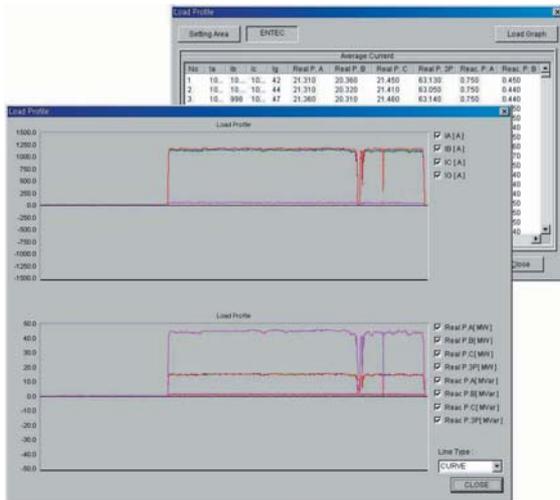
Average load profile & waveform

Protections

- User TCC construction capability
- Three curve standards: IEEE, IEC and 37non-standard inverse time curves
- Protective settings in nonvolatile memory during power failure
- Delay time overcurrent protection(51P, 51G)
- Instantaneous overcurrent protection(50P, 50G)
- Negative sequence overcurrent protection(46)
- SEF protection
- Source and load side synchronism check
- Cold load pickup and sequence coordination
- Under/Overfreguency and load shedding(81)
- Under/Overvoltage, detection and alarm(27,59)
- Directional controls(67)

Fault events & 15 Cycles waveform
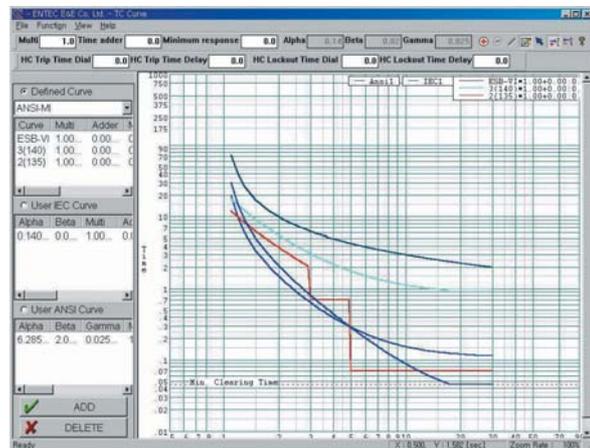
Editor for TCC modification

Mutli-metering

- Current
- Voltage
- Measures KW and KWH, power factor,
  demand Watts and VARs and frequency
- Load profile data & oscillogram

Remote Communication

- RS‑232 & 485 ports, RJ45(TCP/IP)
- DNP3.0, MODBUS, IEC60870-5-101/104
   Communication protocols
- Built in RTU
- Complete remotely access for recloser
 functions, settings metering and data records

Microprocessor Based Recloser Control ETR300‑R

ETR300-R includes common features associated with EVRC2A and provides more enhanced functions in protection, monitoring, metering, communication and recorder.
ETR300-R can also support your power distribution system to be more reliable with power quality management (PQM) function.

Enhanced features

- Analysis of current/voltage normal & negative
  sequence for power quality monitoring.
- Recording of PQM with fault waveform of
  128 sampling and 20 cycles.
- Harmonics analysis of electric data.
  (THD/TDD content ratio)
- monitoring of Sag, Swell, Interruption, over &
  low voltage, unbalance and etc.
- Improvement of fault detection algorithm
- Automatic isolation of faulted section site and
  interconnection with other healty section.
- Improved measuring accuracy
- Time synchronization and Position Information
  by GPS support
- Multi-Protocol support. (DNP3.0, MODBUS,
  IEC60870-5-101/104 & IEC61850)
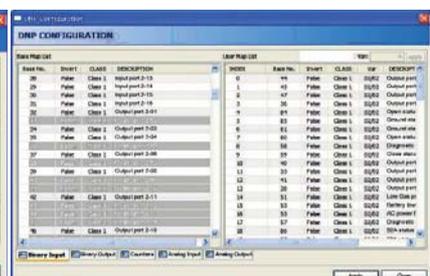- User programmable logic(PLC) support
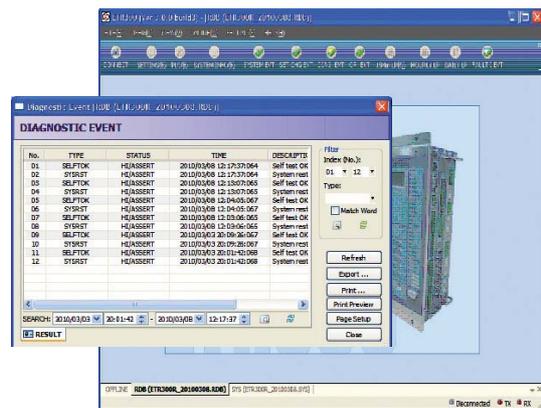
Interface Software
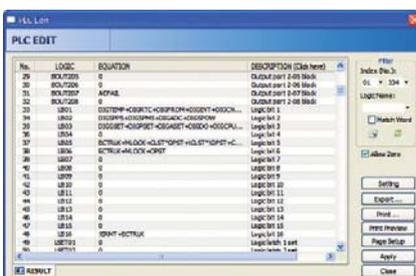
PLC Editor
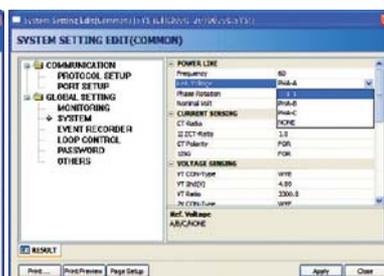
Setting Configuration

DNP Index Reconfiguration

Technical Control Specifications

RATINGS

Rated frequency	50 or 60 Hz
Control voltage	110-240VAC / 125VDC(Option)

ENVIRONMENTAL

Ambient temperature range	Storage -40℃ to +85℃
	Operation -25℃ to +70℃
Humidity	100%
Degree of protection	IP55
Insulation test voltage	2kV 50/60Hz, One minute
Impulse voltage withstand	6kV Peak, $1.2/50\mu s$ ANSI C62.45, IEC 61000-4-5
Interference test withstand	SWC ANSI C37.90.1, IEC 61000-4-4
Radio frequency interference	IEC 255-22-3 Class Ⅲ, ANSI C37.90.2

GENERAL PROTECTION (CT ratio 1000:1A)

Phase time overcurrent	
Phase instantaneous overcurrent	
Ground time overcurrent	
Ground instantaneous overcurrent	
Sensitive earth fault	
Phase and ground time curves	IEEE C37.112, IEC255-3, User programmable curves 37 non standard inverse time curves

RECLOSE

Reclose times	Programmable from 1 to 4
Reclosing(Dead) times	1st reclose : 0.5-600 sec in 0.01sec steps
	2nd reclose : 1.0-600 sec in 0.01sec steps
	3rd reclose : 1.0-600 sec in 0.01sec steps
	4th reclose : 1.0-600 sec in 0.01sec steps
Reset (Reclaim) times	1-600 sec in 1sec steps

METERING (At rated voltage and current)

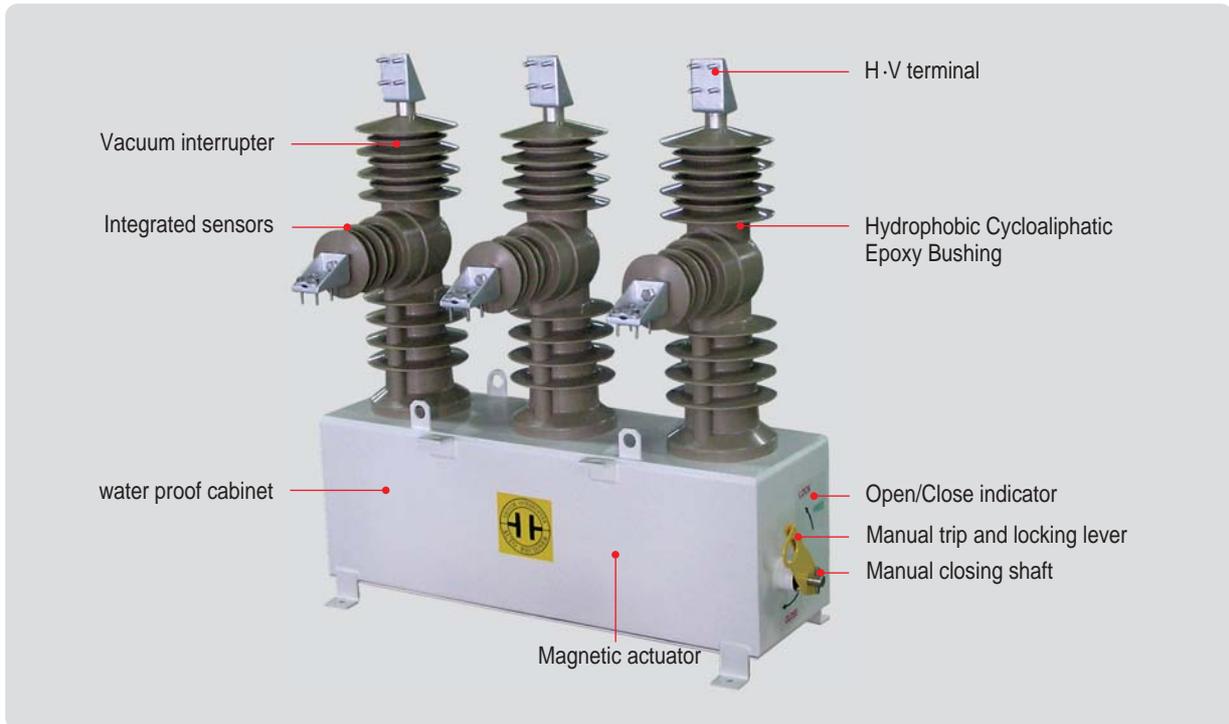|	CVD	RVD
Current	±1%	±1%
Voltage	±2.5%	±1%
Watt hours	±5%	±2%
Vars hours	±3%	±2%
Demands	±3%	±2.5%
Power factor	±0.05	±0.02
Frequency	±0.05Hz	±0.02Hz

RECORDING

	EVRC2A	ETR300-R
Waveform capture	Last 32 events with 15 cycles & 16 samples	Last 32 events with 20 cycles & 128 samples
System event	Last 2048 events	Last 2048 events
Diagnostic event	Last 512 events	Last 512 events
Load profile	Last5120events,42days/60Min. (5,10,15,20,30,60, min interval)	Last1024events,42days/60Min. (5,10,15,20,30,60min interval)
Counter	Trip, fault, system restart	Trip, fault, system restart, PQM
Recloser wear	Phase A,B,C	Phase A,B,C
PQM		Last 100 events

Construction

- H·V terminal
- Vacuum interrupter
- Integrated sensors
- Hydrophobic Cycloaliphatic Epoxy Bushing
- water proof cabinet
- Open/Close indicator
- Manual trip and locking lever
- Manual closing shaft
- Magnetic actuator

Electrical ratings

Description	Unit	EPR-1	EPR-2	EPR-3
Rated maximum voltage	kV rms	15.5	27	38
Continuous current	A rms	630	630	630/800
Frequency	Hz	50/60	50/60	50/60
Short circuit interrupting current	kA rms	16	12.5	12.5/16
Short time withstand current. 3sec	kA rms	16	12.5	12.5/16
Making current	kA peak	40	32.5	32.5/40
Cable charging interrupting current	A rms	5	5	5
Transformer magnetizing interrupting current	A rms	22	22	28
Basic impulse withstand voltage($1.2 \times 50 \mu s$)	kV crest	110	150	170
Power frequency withstand voltage, dry	kV	50	60	70
Power frequency withstand voltage, wet	kV	45	50/60	60/70
- Operating control voltage		110-240VAC/125VDC(Option)		
- Ambient temperature	℃	-25 to 70		
- Degree of protection		IP55		
- Maximum mechanical and electrical operations(c-o)	No	10,000		

- Other ratings is available upon request.
- ENTEC reserves the right to change the design and specification without notice.

Distributor :