ZX Vacuum Auto Recloser
15.5kV,27kV and 38kV

Pomanique

AUTOMATIC VACUUM RECLOSER

Introduction & Benefits

Pomanique's ZX-Series three-phase, electronically controlled, vacuum- interrupting distribution automation switch provides reliable, economical switching, sectionalizing, advanced metering, and automation systems for distribution circuits rated up to 38 kV.

The ZX switch combines solid cycloaliphatic- epoxy vacuum interrupters with a reliable, lightweight operating mechanism that utilizes a magnetic actuator to provide a lifetime of trouble- free operation. The solid polymer system does not rely on a gaseous, liquid, or foam dielectric. The ZX switch is highly resistant to ozone, oxygen, moisture, contamination, and ultraviolet light.

Switch operations are programmed in an electronic control with accurate characteristics and a host of advanced features. When system requirements change, program settings are easily altered with no sacrifice of accuracy or consistency.

Pomanique's reclosers meet all the requirements for outdoor use in accordance with the IEEE C37.60 and IEC 62271-111.

Long life and low maintenance

Magnetic actuators and superior design allow pomanique's reclosers to operate for a rated 10,000 full load operations.
Less moving parts = less maintenance for 25 years.

High reliability

Pomanique designed a simple, magnetically actuated operating mechanism that could dependably operate with only one moving part.
Vacuum interrupter technology make ZX recloser with maximum reliability and minimal maintenance.
Environmentally friendly.

Optimized measurement

Reclosers are equipped with current transformer and voltage sensors in each bushings to measure current and voltage, It makes the recloser an ideal device for self-healing loop automation solutions.

Microprocessor based controller

Controller provides more enhanced functions in protection, monitoring, metering, communication and recorder, and can also support your power distribution system to be more reliable.

15.5kV & 27kV Switch unit

38kV Switch unit

Controller

Switch unit description

Recloser principle

Reclosers are used in overhead lines and in substations. Like circuit-breakers they are capable of switching normal and fault currents. They are equipped with sensors and controller being the protection and control device. In case of a temporary line fault, they can trip and reclose up to four times, thus avoiding longer network interruptions.

Recloser cycle

In case of a network fault, the recloser opens and recloses several times. In case of temporary faults, the automatic reclosing significantly reduces the outage times. While the trip settings for each operation can be set individually.

Design of switch unit

Each vacuum interrupter is embedded in a solid-insulated pole made of weather-proof cycloaliphatic epoxy-resin. The vacuum interrupter is vertically mounted inside the pole, providing a long service life. Each pole is equipped with an integrated current transformer and a resistive voltage sensor.

Operating mechanism

The recloser is operated by a magnetic actuator,the actuator is a bi-stable system, locked in the end positions by permanent magnets.If not in operation, the magnet coils do not consume any power.
The operating mechanism housing is made of stainless steel for outdoor applications. it also accommodates the position indicator and a mechanical operations counter.

Lockout handle-push in (close position)

Mechanical lockout

The recloser can be tripped manually. If the handle is pulled, the recloser opens and is simultaneously locked out electrically and mechanically. The handle stays extended, thus indicating the interlocked state.
To close the recloser again, the handle must first be pushed back to the operation position in order to release the lockout.Then the recloser can be closed electrically via the controller.

Lockout handle-pulled (open position)

Controller description

Controller

The Microprocessor Based controller provide protection, control, monitoring, instrumentation and metering with integrated input and output logic, data logging & fault reports.
Communication access to controller functionality is via electrical RS485 port for remote connection. Additional rear port options including RS232 port is available.
The controller is mounted in the control cubicle. Along with the controller, this cubicle also contains the auxiliary power supply with batteries for uninterruptible power supply, electronic boards and circuit breakers.
The controller contains a large number of protection functions (elements) which can be selected or deselected through the menu driven display.

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.
- 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 healthy section.
- Improved measuring accuracy
- Multi-Protocol support. (DNP3.0, MODBUS,IEC60870-5-101/104 & IEC61850).
- User programmable logic(PLC) support.

Cubicle

The cubicle includes the complete electronics, the protection relay and the UPS system of the recloser. Additional components and features can be selected via order.

General Protection Features

Operating sequence

Reclose times are selectable. The operating sequence is defined by:
O - 1st rt - CO - 2nd rt - CO - 3rd rt – CO

Reclose times

1st Reclose Time range:	0.3 - 600 sec
2nd Reclose Time range:	1.0 - 600 sec
3rd Reclose Time range:	1.0 - 600 sec
Timing resolution:	0.1 sec

Phase & Ground Fault

Pickup Level : 10~2000A (step:1A)
Fast TC Curve : 50 types (ANSI,IECmRecloser)
Fast Multiplier : 0.05~2.00 (step:0.01)
Fast Time Add : 0.00~1.00 (step:0.01sec)
Fast Min Responese : 0.00~1.00 (step :0.01sec)
Delay TC Curve : 50 types (ANSI,IECmRecloser)
Delay Multiplier : 0.05~2.00 (step:0.01)
Delay Time Add : 0.00~1.00 (step:0.01sec)
Delay Min Responese : 0.00~1.00 (step :0.01sec)

Direction Detection

3V1 threshold : 0~100% (step:1%)
3I1 threshold : 0~100% (step:1%)
3I1 Angle : 0~359° (step:1°)

High Current Trip (HCT)

Phase-HCT Pickup Leve : 25~10000A (step:1A)
Phase-HCT Adder : 0.01~1 (step:0.01sec)
Ground-HCT Pickup Leve : 25~10000A (step:1A)
Ground-HCT Adder : 0.01~1 (step:0.01sec)

Delay Time Current Trip

Phase-HCT Pickup Leve : 25~10000A (step:1A)
Phase-HCT Adder : 0.01~2 (step:0.01sec)
Ground-HCT Pickup Level : 25~10000A (step:1A)
Ground-HCT Adder : 0.01~2 (step:0.01sec)

Sensitive Earth Fault (SEF)

Pickup I0 : 0.1~20A (step:0.1A)
V0 : 10~80% (step:1%)
Operating Angle : 0~345° (1°step)
Opearting Time : 0.1~30 sec (step:0.1sec)

Cold Load Pickup/Inrush Restraint

Cold Load Phase Pickup Multiplier : 1.0~10 (step: 1)
Cold Load Time Duration: 0~180 min (step: 1 min)
Inrush 2nd Harmonic Level: 1~50% (step: 1%)
Phase, Ground, SEF Inrush Block : 1 (yes) / 0(no)

Open Line (Loss of Phase) Detection

Voltage On Level: 50~90% (step: 5%) of rated voltage
Voltage Off Level: 35~75% (step: 5%) of rated voltage
Delay Time: 0.1~30.0 sec (step: 0.1 sec)

Synchronism Check

Sync Fail Phase Difference: 5~60°(step: 1°)
Delay time: 0.1~30.0 sec (step: 0.1 sec)

Under Frequency

Pickup level : 47.00~59.98Hz (step:0.01Hz)
Delay Time : 0.03~10.00sec (step:0.01sec)

Over Frequency

Pickup level : 52.02~63.00Hz (step:0.01Hz)
Delay Time : 0.03~10.00sec (step:0.01sec)

Negative Sequence Overcurrent(Broken conductor)

Pickup I2 / I1 level : 30.0 ~ 100.0 (step: 1%)
I2 / I1 delay time : 0.01 ~ 100.0 (step : 0.01sec)

4 Setting Groups

Each group saves individual setting values
for different situations.
Active Setting Group Selection: 1~4

Inter lock

Live Load block
Sync fail block

General Protection Features

Recording

Events
Totally more than 32,000 events are stored and listed.
I/O events (1024) / Functional events (1024,30000) / System events(256)
Fault events (256) /PQM event(256) / Demand profile I,P,Q (6144) /Maximum demand profile (1024)
Fault Waveform
Up to 4 faults are stored. (32 samples/cycle, 240 cycles/record)
Graphical Display in Analysis Tool : Ia, Ib, Ic, In, Va, Vb, Vc
Load Profiling
Demand & Daily Maximum Current: Ia, Ib, Ic, In
Demand & Daily Maximum Power: kW, kVAR (A/B/C/3-ph)
Averaging Interval: 5 / 10 / 15 min
Graphical Display in Analysis Tool

Local / Remote : Control Position (only locally changeable)
Open/Close : Switch Body Status Change Command
DO (Direct Operate) and SBO (Select Before Operate) are supported.
Reset : Annunciator Manual Reset Command
Battery Test : Battery & Charger Circuit Check
Protection Function Blocking
User Configurable DO Points (reserved) : 2

Others

RTC (Real Time Clock) : YYYY/MM/DD hh:nn:ss
SOE (Sequence of Event) Time Resolution : 1 msec
Digital Filtering & Dead-band Setting for Analog Inputs
Calibration (Correction Factor) : Factory Setting only
Ia, Ib, Ic, In, Va, Vb, Vr, Vs, Vt
Factor Magnitude: 0.500~1.500
Phase Angle: 0.000~359.9°

Commmunication Interface

RS 232C #1
On FRTU left-side (inside the inner door)
SCADA or DA System Communication Interface
Through Cable / Wireless / Fiber Optic Modems
Functions
Remote Operation (Control, Status Monitoring, Tele-metering)
Remote Setting (optional)
File Transfer (Event & Fault Data; DNP protocol only)
Protocols
DNP 3.0 (Level 2) or IEC60870-5-101 (optional)
Baud Rate
1200 ~ 19200 bps
Address
Master Address: 0 ~ 65534
Slave Address: 0 ~ 65534

RS 232C Port #2
On FRTU Front Panel
Setting & Configuration, Maintenance, Recorded Data Analysis Through Setting & Analysis Tool
Functions
Setting and Configuration Change (Batch Job)
Protocol Monitor (Communication Frame Check)
Real-time Display : Measurement and Status Data
Event List and Fault Oscillograph
Demand Load Profiling & Graphical Display
FRTU Firmware Download
Protocols
Modbus
Baud Rate
1200~19200 bps
Connector Type
DB9 Female

Technical data

15.5kV 50/60Hz	Rated continuous current Ir A	Rated duration of short-circuit Tk s	Rated short-circuit breaking current Isc kA	Rated short-circuit making current Ima kA	Rated lightning impulse withstand voltage Up kV	Rated short-duration P.F. withstand voltage Ud kV	Impedance μΩ between connections μΩ	Creepage distance, phase-to-earth mm	Clearance, phase-to-phase mm	Minimum clearance, phase-to-earth mm	Weight kg	Line charging current A	Cable charging current A	Max. interrupting time / max. closing time ms
ZX15-400-16-H	400	3	16	40	110	50	60	850	320	270	130	2	10	40/60
ZX15-800-12-N	800	3	12.5	31.5	110	50	60	850	320	270	130	2	10	40/60
ZX15-630-16-N	630	3	16	40	110	50	60	850	320	270	130	2	10	40/60
ZX15-800-16-N	800	3	16	40	110	50	60	850	320	270	130	2	10	40/60

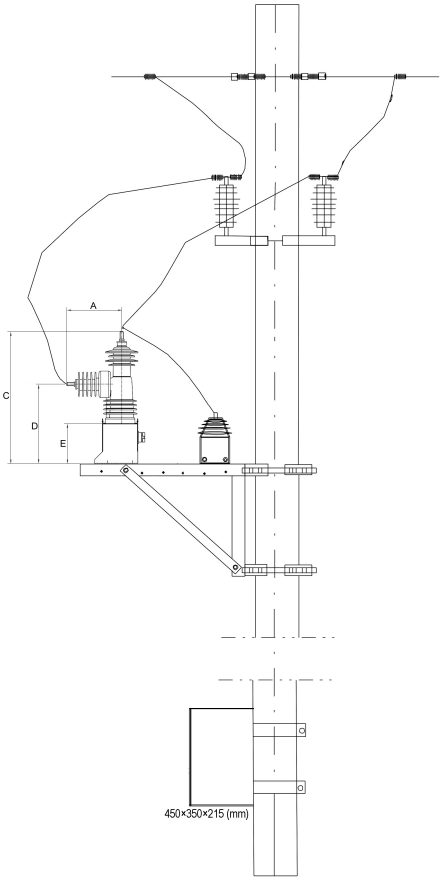
27kV 50/60Hz	Ir A	Tk s	Isc kA	Ima kA	Up kV	Ud kV	μΩ	mm	mm	mm	kg	A	A	ms
ZX27-630-12-N	630	3	12.5	31.5	125	60	60	850	320	270	140	5	25	40/60
ZX27-800-12-N	800	3	12.5	31.5	125	60	60	850	320	270	140	5	25	40/60
ZX27-630-16-N	630	3	16	40	125	60	60	850	320	270	140	5	25	40/60
ZX27-800-16-N	800	3	16	40	125	60	60	850	320	270	140	5	25	40/60
ZX27-630-16-H	630	3	16	40	170	70	60	1290	320	350	150	5	25	40/60
ZX27-800-16-H	800	3	16	40	170	70	60	1290	320	350	150	5	25	40/60

38kV 50/60Hz	Ir A	Tk s	Isc kA	Ima kA	Up kV	Ud kV	μΩ	mm	mm	mm	kg	A	A	ms
ZX38-630-12-N	630	3	12.5	31.5	170	70	60	1290	320	350	150	5	40	40/60
ZX38-800-12-N	800	3	12.5	31.5	170	70	60	1290	320	350	150	5	40	40/60
ZX38-630-16-N	630	3	16	40	170	70	60	1290	320	350	150	5	40	40/60
ZX38-800-16-N	800	3	16	40	170	70	60	1290	320	350	150	5	40	40/60

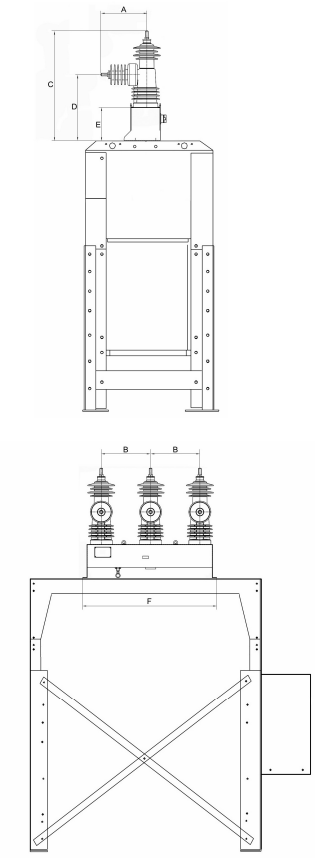
AUTOMATIC VACUUM RECLOSER

Dimension drawings

		A	B	C	D	E	F
15.5kV	mm	460	380	850	508	270	970
27kV	mm	460	380	850	508	270	970
38kV	mm	512	380	970	590	270	970



Pole mount



Substation mount

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