

1 SCOPE

This specification covers automatic circuit reclosers used on the Springfield Utility Board's 20.8 and 12.47 kV distribution system to provide automated sectionalizing control systems.

2 STANDARDS

- 2.1 The recloser covered by this specification shall be manufactured and tested in accordance with ANSI C37.60, ANSI C37.61, IEEE, IEC and NEMA Standards.
- 2.2 The manufacturing facility shall be independently certified to meet ISO 9001 Standards.

3 GENERAL CONSTRUCTION

Three-phase automatic circuit recloser with vacuum interrupters encapsulated in a solid dielectric insulated pole assembly.

3.1 RATINGS

Maximum Design Voltage, kV	27
Nominal Operating Voltage, kV	24.9
Basic Insulation Level (BIL), kV	125
60 Hertz Withstand Voltage, kV	
Dry, One Minute	50
Wet, Ten Seconds	45
Continuous Current Rating, Amps	630
RMS	
Interrupting Rating, Symmetric	12,500
Amps	
The recloser interrupting time will be	2.5 cycles.

- 3.2 Life: The unit shall be designed for 10,000 open/close mechanical or electrical operations.
- 3.3 Dielectric: A solid dielectric insulation shall be used. The recloser shall utilize an environmentally-safe solid polymer insulation system. The solid polymer insulation shall be highly resistant to ozone, oxygen, moisture, contamination and ultraviolet light. Oil and SF₆ gas are unacceptable as interruption or insulation mediums.



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3.4 Operating Mechanism

The operating mechanism shall be of the stored-energy type to assure positive tripping during loss of the auxiliary power supply. The operating of the circuit recloser shall be electrically and mechanically trip-free and anti-pumping.

- 3.4.1 The mechanism shall be operated from an internal 24 volts DC, maintenance-free battery and charging system. It shall also have an internal capacitor for capacitive-trip capability in case of battery failure.
- 3.4.2 The auxiliary power supply shall be designed for operation on the control voltage of 120/240 volts AC, single phase. It shall provide power to the battery and charging system, charging motors, space heaters, capacitive-tripping, and other mechanisms needing AC power.
- 3.4.3 The operating mechanism shall be capable of manual operation upon complete power failure.
- 3.4.4 The recloser will be capable of manual trip and manual close on a maximum fault. The manual trip of recloser will disable any electric close operation.
- 3.4.5 Each recloser shall be equipped with an operation counter.
- 3.4.6 A contact position indicator, clearly visible from ground level when pole mounted, will be provided.
- 3.4.7 The mechanism cabinet shall be designed to permit access for service.
- 3.4.8 Resistance-type heaters with a thermostat will be provided in the interrupter and operating mechanism cabinets, to prevent moisture condensation.
- 3.4.9 The unit shall have a minimum of six (6) auxiliary contacts that follow the main contact position. Auxiliary contacts shall be convertible from normally-open to normally-closed.

3.5 Bushings

- 3.5.1 Bushings shall be equipped with threaded stud type, 1 1/4-12 UNF2A. A standard two (2) hole NEMA stud connector shall be supplied by the manufacturer for each bushing.
- 3.5.2 Bushings will have a standard "wet" creepage distance of 17 inches.



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3.6 Vacuum Interrupters

- 3.6.1 A single break on each phase is accomplished by separating contacts inside the vacuum interrupter.
- 3.6.2 Current interruption shall occur in vacuum interrupters, providing long contact life while eliminating the production of toxic by-products.
- 3.6.3 It will be possible to replace one or all bushings without any re-alignment or adjustment of the vacuum interrupters or operating mechanism.
- 3.6.4 All three poles of the recloser will be operated simultaneously.
- 3.7 Operating temperature range shall be -40°C to +65°C.
- 3.8 Current sensing shall be provided by three epoxy-encapsulated current transformers.
- 3.9 Pole Mounting (Always provide with unit regardless of rack mounting)
 - 3.9.1 The recloser will be equipped with a pole mounting bracket.
 - 3.9.2 The recloser will have a ground pads which will accommodate two No. 2/0 to 250 MCM conductors.
- 3.10 Substation Rack (If required, see specific requirements)
 - 3.10.1 The recloser shall come mounted in a substation rack mounting frame constructed of heavy gauge steel.
 - 3.10.2 The recloser frame shall be adjustable from 8' up to 9' in 2" increments as measured from the distance from the bottom of the bushing.
 - 3.10.3 The recloser frame shall be designed to be used in a UBC Seismic Zone 5.
 - 3.10.4 The recloser frame shall be provided with two NEMA two hole type grounding pads for connection to the substation ground grid. The two pads shall be located on opposite sides of the frame.

4 CONTROLS: The controls shall be a Schweitzer 351R Falcon, Model Number 0351R31281AA15X3A0.



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- 4.1 The recloser shall have microprocessor based recloser controls mounted in a NEMA 4 control panel. The control cabinet housing shall be weather tight, locking and be sufficient to prevent vandalism.
- 4.2 The recloser controls shall come with enough control cable to allow the controls to be pole mounted 40 feet below the recloser.
- 4.3 Resistance-type heaters with a thermostat will be provided in the control cabinet housing, to prevent moisture condensation.
- 4.4 Control Settings
- 4.4.1 Shall provide a programmable overcurrent protection curve selection of the standard ANSI TC curve sets including inverse, very inverse and extremely inverse curves.
- 4.4.2 Shall provide complete instantaneous overcurrent protection for all three phases and neutral. It shall provide a means for disabling instantaneous trip operations.
- 4.4.3 Shall provide complete time overcurrent protection for all three phases and neutral.
- 4.4.4 Shall provide for multishot reclosing, allowing independent programming of each recloser operation with up to four operations to lockout. It shall provide a means for blocking recloser operations.
- 4.4.5 Shall provide for operator-selectable tagging method to disable all local and remote closing capability for maintenance.
- 4.4.6 Shall provide cold-load pickup setting to override normal overcurrent settings for high inrush conditions.
- 4.5 Digital Metering
- 4.5.1 Provide digital metering for current on each phase and ground.
- 4.5.2 Provide digital metering for demand current on each phase and ground.
- 4.5.3 Provide digital metering for voltage on each phase.
- 4.5.4 Provide digital metering for three phase power (kW, kVAR, kVA), instantaneous and demand.



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4.5.5 Provide fault capturing capabilities with non-volatile storage of up to 500 events. Data stored shall be as a minimum, (Date, Time, Fault current values, Number of operations, Lockout Data).

4.6 Programming

4.6.1 Programming shall be via Windows XP software. Software shall be included with the unit at no additional cost. Any non standard serial communication cables or portable reader/programmer device used for programming shall be included at no additional cost.

4.6.2 Controller shall also offer a keypad on the front panel that allows operator to access all programming, recloser functions, metering data, recloser status, alarm and event reports.

4.7 Communications: The following communications shall be provided.

4.7.1 A front panel connection for RS-232 serial communications port for programming and downloading information.

4.7.2 A separate communications port for connecting ModBus or DNP 3.0 protocol and all associated hardware and software.

5 NAMEPLATE

A metal nameplate shall be provided and mounted on each recloser in accordance with ANSI C-37.04. The nameplate shall include at least the following information: (Voltage rating, Continuous current rating, Interrupting rating, Date of Manufacture)

6 DATA and ADDITIONAL INFORMATION

6.1 All quotations must include the data as indicated on the "Specific Information Required With Quotation" at the end of this Standard.

6.2 The manufacturer will submit an operational manual and outline drawing of the recloser with bid or quotation.

6.3 The manufacturer shall furnish two (2) complete printed sets of instruction books and engineering drawings (C.T. curves, outline, wiring drawings, etc.), to be received before circuit recloser delivery. Additionally, the manufacturer shall provide one complete set of instruction books and drawings in AutoCAD format on a CD or received via e-mail.

6.4 One set of instruction books and engineering drawings shall be supplied with the breaker upon delivery.



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- 6.5 Number of sets of special tools required and their associated cost.
- 6.6 Request for recommended spare parts list and price of spare parts.
- 6.7 This standard must be accompanied by the "Item Description" and a blank form entitled "Specific Information Required with Quotation" for the bidder to complete.

7 GUARANTEE

The vendor warrants the equipment furnished is free from defects in material and workmanship and agrees to repair or replace any unit unsuitable for operation or which fails during normal and proper operation. The guarantee shall be for a period of twelve (12) months from date of initial operation or eighteen (18) months from date of acceptance, whichever comes first.

8 TRAINING

Onsite training shall be provided by vendor.

9 REVISION TABLE

Number	Date	By	Description
0	10/2009	T. Weller	Earliest electronic version of document.
1	03/17/05	V. Luu	
2	11/25/09	N. Amann	Windows XP; SEL Falcon control; update requested document formats; control cable length.



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SPECIFIC INFORMATION REQUIRED WITH QUOTATION

(Submit separate sheets for each quotation item)

Vendor shall submit the following complete descriptive information and performance standard on this form with his proposal.

1. Type of installation Pole Mounting

2. Outline Dimensions
 - a. Overall height _____ inches
 - b. Height over bushings w/o terminals _____ inches
 - c. Pole spacing _____ inches
 - d. Length _____ inches
 - e. Width _____ inches
 - g. Ground pad bolt spacing _____ inches
 - h. Tap size _____ dia. & thd.

3. Weight
 - a. Complete with frame _____ pounds
 - b. For pole mounting _____ pounds

4. Bushings
 - a. Rating _____ kV
 - b. Rating _____ amperes
 - c. Withstand voltage 60 Hz
Wet _____ kV
Dry _____ kV
 - d. Impulse withstand (external only) _____ kV
 - e. Type _____
 - f. Manufacturer _____
 - g. Bushing stud size
Diameter _____ inches
Thread _____ threads per inch

5. Mechanism Life expectancy
 - a. Rated number of mechanical operations _____
 - b. Rated number of fault operations
@ 5000amps w X/R=2 _____

6. Include a separate page for all exceptions to this Standard.



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