Functional specification for Type V4L single-phase vacuum recloser

1. Standards
   1.1. The recloser covered by this specification shall be manufactured and tested in accordance with applicable ANSI, IEEE and NEMA Standards.

2. Quality
   2.1. The manufacturing facility shall be independently certified to meet ISO 9001 Standards.

3. Ratings
   3.1. Ratings as a minimum shall be as follows:
      3.1.1. Maximum Design Voltage, kV 15.5
      3.1.2. Nominal Operating Voltage, kV 14.4
      3.1.3. Basic Insulation Level (BIL) 110
      3.1.4. Low frequency withstand voltage
         3.1.4.1. Dry, One Minute, kV 50
         3.1.4.2. Wet, Ten Seconds, kV 45
      3.2. Radio influence voltage measured at 1.0 MHz, 23.4 kV, shall not exceed 100 microvolts.

4. Load and interrupting ratings RMS Symmetrical Amperes
   4.1.

<table>
<thead>
<tr>
<th>Trip Coil Ratings</th>
<th>Minimum Trip Rating Amps</th>
<th>Interrupting Ratings Amps</th>
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<tbody>
<tr>
<td>Continuous Amps</td>
<td>30</td>
<td>900</td>
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<tr>
<td>15</td>
<td>50</td>
<td>1500</td>
</tr>
<tr>
<td>25</td>
<td>70</td>
<td>2100</td>
</tr>
<tr>
<td>35</td>
<td>100</td>
<td>3000</td>
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<td>280</td>
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5. Duty cycle
<table>
<thead>
<tr>
<th>PERCENT OF INTERRUPTING</th>
<th>NUMBER OF UNIT</th>
<th>MAXIMUM CIRCUIT</th>
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Type V4L Single-Phase Vacuum Recloser

<table>
<thead>
<tr>
<th>RATING</th>
<th>OPERATIONS</th>
<th>X/R VALUE</th>
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<tbody>
<tr>
<td>15-20</td>
<td>88</td>
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<tr>
<td>45-55</td>
<td>112</td>
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<td>90-100</td>
<td>32</td>
<td>15</td>
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<tr>
<td>total:</td>
<td>232</td>
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6. **Mechanical Life**
   6.1. Minimum of 2500 operations

7. **Operating Requirements**
   7.1. Tripping shall be accomplished by series coils, available from 15 to 280 amp rating. These coils shall be interchangeable in the field.
   7.2. The recloser shall be available with 1, 2, 3 or 4 operations to lockout. The selection of the number of operations to lockout shall be adjustable in the field.
   7.3. Three different delay time-current curves shall be available: B, C and D.

8. **Operating Features**
   8.1. The recloser shall be operated by a solenoid-spring operating mechanism.
   8.2. The recloser shall be mechanically and electrically trip free.
   8.3. The recloser shall be completely self-contained. No auxiliary power source shall be required.
   8.4. Non-reclosing operation shall be provided by a hotstick operable handle located under a sleet hoot. When operated, the recloser will be programmed for one operation to lockout on the first timing curve selected.
   8.5. Recloser operations shall be recorded by a 4-digit mechanical counter located under a sleet hoot.
   8.6. Phase minimum trip values shall have a tolerance of plus or minus 10%. The tolerance for the fast time-current characteristic shall be minus.
   8.7. The tolerance for delayed time-current characteristics shall be plus or minus 10%.
   8.8. The nominal reclosing time shall be 2 seconds.
   8.9. After operation to lockout, the recloser shall be reset to the first operation by the manual control lever.

9. **Tank and Oil**
   9.1. Reclosers shall be of single tank construction with ground connector to accommodate 2 No. 10 SOL through No. 2 STR conductors.
   9.2. An O-ring gasket shall be used in a groove in the head casting to provide controlled compression.
   9.3. Reclosers shall be shipped with oil filled to the proper level.
   9.4. The recloser tank shall be constructed with captive hardware for securing the tanks to the head casting.

10. **Bushings**
    10.1. Bushings shall be of wet-process porcelains, not oil filled.
    10.2. Bushing terminals shall be universal clamps type to accommodate No. 6 through 350 MCM stranded copper or aluminum conductors in horizontal or vertical position.

11. **Arc Interruption**
    11.1. Vacuum interrupter should provide minimal contact erosion with no maintenance required.
    11.2. Current interruption shall occur in vacuum interrupters, providing long contact life.
    11.3. Each vacuum interrupter shall be serialized.

12. **Solenoid-Spring Operating Mechanism**
12.1. A solenoid-spring operating mechanism shall be located inside the recloser.
12.2. The solenoid shall provide energy for closing and tripping the main contacts.

13. **Manual Control Lever**
13.1. Recloser lockout shall be indicated by an external manual control lever on the recloser located under a sleet hood.
13.2. Manual lockout of the recloser shall be obtained by operation of the manual control lever.
13.3. The recloser shall be reset and closed by operation of the manual control lever.

14. **Optional Accessories**
14.1. The following shall be available as optional accessories:
   14.1.1. Lock-out indicating switch
   14.1.2. Shunt lock-out mechanism
   14.1.3. 17" creepage bushings
   14.1.4. Crossarm mounting hanger
   14.1.5. Two-bolt flat pad connectors
   14.1.6. Slip-on bushing current transformers

15. **Approved Manufacturers**
   Eaton