

PEARL Reconditioning Standards			
<b>LOW VOLTAGE MOTOR CONTROL CENTERS</b>	Revision		
	Section	Number	Date
	<b>1330</b>	3	2-13-03

The term "reconditioning" is defined as "the process of returning electrical equipment to safe and reliable operating condition based on the design of the original manufacturer at the time of manufacturing."

**NOTE:** If fuses are installed, they are to be properly designed and rated with respect to voltage and interrupting rating for the device and specific application for which they are intended, and must be approved by the customer for said purpose. The final determination is ultimately the responsibility of the end user.

## **I TEST EQUIPMENT**

The following test equipment is required to perform the testing requirements of this reconditioning standard:

1. Insulation Resistance Test Set (Megohmmeter) 1000 Vdc minimum

One of the following pieces of test equipment may be required to perform the testing requirements of this reconditioning standard:

1. AC Voltage Supply
2. AC Current Supply
3. AC 3-Phase Voltage Supply
4. DC Voltage Supply

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## II RECONDITION EVALUATION

These steps are used to determine what will be required to recondition this product under this standard.

### 1 INSPECTION

#### 1.1 Frame/Enclosure

- 1.1.1 Ensure that the nameplate/label data is legible.
- 1.1.2 Ensure that the third party listing service label is legible.
- 1.1.3 Inspect the overall exterior for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for unused openings.
- 1.1.5 Inspect for improper covers.
- 1.1.6 Inspect for rust and corrosion.
- 1.1.7 Inspect main lugs for signs of overheating and missing and defective parts.
- 1.1.8 Inspect insulation structure for signs of overheating and deterioration.
- 1.1.9 Inspect for proper alignment of each section.
- 1.1.10 Check that cabinets are plumb and square.
- 1.1.11 Record results on appropriate PEARL Inspection and Test Form.

#### 1.2 Phase Bus

- 1.2.1 Inspect for signs of overheating.
- 1.2.2 Inspect for rust and corrosion.
- 1.2.3 Inspect for missing and defective parts.
- 1.2.4 Inspect all connection points.
- 1.2.5 Inspect insulation structure for signs of overheating and deterioration.
- 1.2.6 Inspect for loose connections.
- 1.2.7 Record results on appropriate PEARL Inspection and Test Form.

#### 1.3 Ground Bus

- 1.3.1 Inspect for signs of overheating.
- 1.3.2 Inspect for rust and corrosion.
- 1.3.3 Inspect all connection points.
- 1.3.4 Inspect for missing and defective parts.
- 1.3.5 Inspect for loose connections.
- 1.3.6 Record results on appropriate PEARL Inspection and Test Form.

#### 1.4 Panel Indicators

- 1.4.1 Check all lens covers.
- 1.4.2 Check all light bulbs for operation.
- 1.4.3 Inspect all control wiring.
- 1.4.4 Record results on appropriate PEARL Inspection and Test Form.

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- 1.5 Instrumentation**
  - 1.5.1 Check all function switches.
  - 1.5.2 Inspect all meters.
  - 1.5.3 Inspect all control wiring.
  - 1.5.4 Record results on appropriate PEARL Inspection and Test Form.
- 1.6 Bus Support**
  - 1.6.1 Inspect for signs of overheating.
  - 1.6.2 Inspect for signs of deterioration.
  - 1.6.3 Inspect for chips, cracks, and broken insulators.
  - 1.6.4 Record results on appropriate PEARL Inspection and Test Form.
- 1.7 Control Circuits**
  - 1.7.1 Inspect all control wiring.
  - 1.7.2 Inspect for signs of deterioration.
  - 1.7.3 Inspect for signs of overheating.
  - 1.7.4 Inspect for loose connections.
  - 1.7.5 Check all interconnecting wiring terminal blocks.
  - 1.7.6 Verify accuracy and legibility of all applicable wiring schematics and drawings.
  - 1.7.7 Record results on appropriate PEARL Inspection and Test Form.
- 1.8 Interlocks**
  - 1.8.1 Check all cabinets for interlock function.
  - 1.8.2 Check all Kirk-key systems.
  - 1.8.3 Record results on appropriate PEARL Inspection and Test Form.
- 1.9 Cabinets/Cubicles**
  - 1.9.1 Check operation of all racking mechanisms.
  - 1.9.2 Check all cell switches for proper operation.
  - 1.9.3 Record results on appropriate PEARL Inspection and Test Form.
- 1.10 Molded Case Circuit Breakers**
  - 1.10.1 Molded case circuit breakers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1200.
- 1.11 Control Power Transformers**
  - 1.11.1 Control power transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400.
- 1.12 Instrumentation Transformers**
  - 1.12.1 Instrumentation transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400.
- 1.13 Current Transformers**
  - 1.13.1 Current transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400 and 2400.
- 1.14 Protective Relays**
  - 1.14.1 Protective relays will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1700.
- 1.15 Control Relays**
  - 1.15.1 Control relays will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1800.

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**1.16 Motor Control Buckets**

**1.16.1** Motor control buckets will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1500.

**1.17 Meters**

**1.17.1** Meters will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1900.

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## **2 TESTING**

### **2.1 Insulation Resistance**

**2.1.1** Perform an insulation resistance test at test values specified in Table 2 of Section 6000 as follows:

**2.1.1.1** Phase to ground

**2.1.1.2** Phase to phase

**2.1.2** Correct for temperature, if necessary (Table 11).

**2.1.3** Record results on appropriate PEARL Inspection and Test Form.

**2.1.4** Compare test results to manufacturer's recommendations or Table 2 of Section 6000.

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### III RECONDITIONING PROCEDURES

The following procedures are in a recommended order and are required to recondition this product. PEARL recognizes that, based on actual product design and as found condition, some of these procedures may not be applicable. The testing requirement must be completed before the product can be labeled as a PEARL reconditioned product.

#### 1 RECONDITIONING

##### 1.1 Frame/Enclosure

- 1.1.1 Disassemble to clean.
- 1.1.2 Clean all parts of contamination and corrosion.
- 1.1.3 Prepare the frame/enclosure to paint, as necessary.
- 1.1.4 Paint frame/enclosure.

##### 1.2 Missing or Defective Components, Parts and Hardware

- 1.2.1 Replace or repair any missing or defective components, parts and hardware found during the inspection phase of this standard.

##### 1.3 Phase Bus

- 1.3.1 Ensure that all bus connection points are clean.
- 1.3.2 Replate connection points or bus (silver or tin, depending on the application).

##### 1.4 Neutral Bus

- 1.4.1 Ensure that all bus connection points are clean.  
Replate connection points or bus (silver or tin, depending on the application).

##### 1.5 Ground Bus

- 1.5.1 Ensure that all bus connection points are clean.

##### 1.6 Molded Case Circuit Breakers

- 1.6.1 Molded case circuit breakers will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1200.

##### 1.8 Control Power Transformers

- 1.8.1 Control power transformers will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1400.

##### 1.9 Instrumentation Transformers

- 1.9.1 Instrumentation transformers will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1400.

##### 1.10 Current Transformers

- 1.10.1 Current transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400 and 2400.

##### 1.11 Protective Relays

- 1.11.1 Protective relays will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1700.

##### 1.12 Control Relays

- 1.12.1 Control relays will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1800.

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**1.13 Motor Control Buckets**

**1.13.1** Motor control buckets will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1500.

**1.14 Meters**

**1.14.1** Meters will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1900.

**1.15 Lubrication**

**1.15.1** Lubricate hinges.

**1.16 Torque**

**1.16.1** Check all screw and bolt connections for the proper torque per manufacturer's recommendations or Table 1 of Section 6000.

**1.17 Final Assembly**

**1.17.1** Ensure that frame is plumb and square.

**1.17.2** Cover any unused openings.

**1.17.3** Ensure that the nameplate/label data is complete, correct and legible.

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## 2 TESTING

### 2.1 Insulation Resistance

2.1.1 Perform an insulation resistance at test values specified in Table 2 of Section 6000 as follows:

2.1.1.1 Phase to ground

2.1.1.2 Phase to phase

2.1.2 Correct for temperature, if necessary (Table 11).

2.1.3 Record results on appropriate PEARL Inspection and Test Form.

2.1.4 Compare results to manufacturer's recommendations or Table 2 of Section 6000.

2.1.5 The test results must be within the guidelines recommended in order for the product to become a PEARL labeled product.

### 2.2 Instrumentation and Controls

2.2.1 Verify the electric operation of all control lights.

2.2.2 Verify the electric operation of all control switches.

2.2.3 Test all meters and monitors for proper functioning.

2.2.4 Perform an insulation resistance to the control wiring at 500 Vdc to ground.

2.2.5 Record results on appropriate PEARL Inspection and Test Form.

### 2.3 Molded Case Circuit Breakers

2.3.1 Molded case circuit breakers will be tested in accordance with PEARL Reconditioning Standards found in Section 1200.

### 2.4 Control Power Transformers

2.4.1 Control Power transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400.

### 2.5 Instrumentation Transformers

2.5.1 Instrumentation transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400.

### 2.6 Current Transformers

2.6.1 Current transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400 and 2400.

### 2.7 Protective Relays

2.7.1 Protective relays will be tested in accordance with PEARL Reconditioning Standards found in Section 1700.

### 2.8 Control Relays

2.8.1 Control relays will be tested in accordance with PEARL Reconditioning Standards found in Section 1800.

### 2.9 Motor Control Buckets

2.9.1 Motor control buckets will be tested in accordance with PEARL Reconditioning Standards found in Section 1500.

### 2.10 Meters

2.10.1 Meters will be tested in accordance with PEARL Reconditioning Standards found in Section 1900.

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#### **IV PEARL CERTIFICATION**

This product has now been reconditioned under the PEARL Reconditioning Standard. The PEARL label and/or seal may be placed on it.