

PEARL Reconditioning Standards			
<b>LOW VOLTAGE MAGNETIC STARTERS OPEN</b>	Revision		
	Standard	Number	Date
	<b>1620</b>	5	11-2008

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

## REFERENCES

The following references are use in this standard. Each of these references can be found in their respective listed locations.

### Table References: Section 6000

Table 2: Insulation resistance and test values for electrical apparatus.

Table 11: Insulation resistance and test temperature conversion to 20°C values.

The Following PEARL Standards are referenced in this standard and should be followed if applicable.

### PEARL Standard References

Section 1400: *Low Voltage Transformers*

Standard 1440 – Low Voltage Transformers Instrumentation Current

Section 1700: *Protection Relays*

Standard 1750 – Low Voltage Thermal Overload Relay

Standard 1760 – Low Voltage Solid State Overload Relay

Standard 1765 – Low Voltage Solid State Overload Relay Multi Function

Section 1800: *Low Voltage Contractors and Relays*

Standard 1810 – Low Voltage AC Contactor

## 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 or more of the following pieces of test equipment may be required to perform the testing requirements of this reconditioning standard depending on the accessories:

1. AC or DC Voltage Supply
2. AC Current Supply with means to perform timing test
3. VOM (Digital or analog volt/ohmmeter)

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## II RECONDITION EVALUATION

These steps are required to determine if the product can be reconditioned and if so, establish what must be done to recondition the product.

### 1 INSPECTION

#### 1.1 Starter

- 1.1.1 Ensure that the nameplate data is legible.
- 1.1.2 Ensure that the third party listing service label is legible.
- 1.1.3 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for rust and corrosion.
- 1.1.5 Inspect sole/ mounting plate for rust, corrosion or damage.
- 1.1.6 Inspect for cracks, chipped or broken plastic moldings.
- 1.1.7 Inspect wires and buss or wire jumpers for cracks, proper sizing, overheating, loose terminals, missing or damaged insulation, frayed wires, and deterioration.
- 1.1.8 Check operation of operating mechanisms.
- 1.1.9 Check rectifiers for appropriate voltage output and current draw.
- 1.1.10 Check resistors for overheating, deterioration, cracks, sizing, loose terminals, damage and resistance value.
- 1.1.11 Check voltage suppressors and other like devices for overheating, deterioration, cracks, sizing, loose terminals, and damage.
- 1.1.12 Record results on an approved PEARL Evaluation Form.

#### 1.2 Devices

##### 1.2.1 Current Transformers (if applicable)

- 1.2.1.1 Current transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Sections 1400.
- 1.2.1.2 Record results on an approved PEARL Evaluation Form

##### 1.2.2 Protective Relay

- 1.2.2.1 Protective relay will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1700.
- 1.2.2.2 Record results on an approved PEARL Evaluation Form.

##### 1.2.3 Contactor

- 1.2.3.1 Contactor will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1800.
- 1.2.3.2 Record results on an approved PEARL Evaluation Form.

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

**2.1.1.1** Phase to ground

**2.1.1.2** Phase to phase

**2.1.1.3** Record results on an approved PEARL Evaluation Form.

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

### 2.2 Current Transformers (if applicable)

**2.2.1** Current transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400.

**2.2.2** Record results on an approved PEARL Evaluation Form.

### 2.3 Protective Relay

**2.3.1** Protective relay will be tested in accordance with PEARL Reconditioning Standards found in Section 1700.

**2.3.2** Record results on an approved PEARL Evaluation Form.

### 2.4 Contactor

**2.4.1** Contactor will be tested in accordance with PEARL Reconditioning Standards found in Section 1800.

**2.4.2** Record results on an approved PEARL Evaluation Form.

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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 Starter**

- 1.1.1** Disassemble.
- 1.1.2** Clean all parts of contamination and corrosion.
- 1.1.3** Prepare the back mounting for plating or painting to manufactures original specification.
- 1.1.4** Replace any defective springs, as necessary.
- 1.1.5** Replace any defective plastic moldings, as necessary.
- 1.1.6** Replace any pitted, worn, burnt or damaged contacts.
- 1.1.7** Ensure that the nameplate/label data is complete, correct and legible.
- 1.1.8** Record results on an approved Reconditioning Test Form.

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

- 1.2.1** Replace or repair any missing or defective components, wires, parts and hardware found during the inspection phase of this standard.
- 1.2.2** Record results on an approved Reconditioning Test Form

##### **1.3 Current Transformers** (if applicable)

- 1.3.1** Current transformers will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1400.
- 1.3.2** Record results on an approved Reconditioning Test Form

##### **1.4 Protective Relay**

- 1.4.1** Protective relay will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1700.
- 1.4.2** Record results on an approved Reconditioning Test Form

##### **1.5 Contactor**

- 1.5.1** Contactor will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1800.
- 1.5.2** Record results on an approved Reconditioning Test Form.

##### **1.6 Torque**

- 1.6.1** Check all screw and bolt connections for the proper torque per manufacturer's recommendations or industrial torque standards.
- 1.6.2** Record results on an approved Reconditioning Test Form.

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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. Correct for temperature, if necessary (Table 11)

**2.1.1.1** Phase to ground

**2.1.1.2** Phase to phase

**2.1.2** Record results on an approved Reconditioning Test Form

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

### 2.2 Operation

**2.2.1** Verify the proper operation of all electrical and mechanical components.

**2.2.2** Verify the proper electrical operation of all auxiliary switches.

**2.2.3** Verify the proper operation of all other accessories, including, but not limited to, auxiliary contacts.

**2.2.4** Verify the proper electrical operation of the assembly.

**2.2.5** Verify the protective function of overload relay.

**2.2.6** Record results on an approved Reconditioning Test Form

### 2.3 Current Transformers (if applicable)

**2.3.1** Current transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400.

**2.3.2** Record results on an approved Reconditioning Test Form

### 2.4 Protective Relay

**2.4.1** Protective relay will be tested in accordance with PEARL Reconditioning Standards found in Section 1700.

**2.4.2** Record results on an approved Reconditioning Test Form

### 2.5 Contactor

**2.5.1** Contactor will be tested in accordance with PEARL Reconditioning Standards found in Section 1800.

**2.5.2** Record results on an approved Reconditioning Test Form

### 2.6 Final Operation

**2.6.1** Ensure that all components, structures, devices and assemblies are complete and equipment is ready for service prior to beginning operations.

**2.6.2** Electrically operate switch a minimum of ten (10) times while checking for proper operation of the quick-make and quick-break feature.

**2.6.3** All devices must operate properly in order for the product to become a PEARL labeled product.

**2.6.4** Record results on appropriate PEARL Reconditioning Test Form.

## IV PEARL CERTIFICATION

This product has now been reconditioned under the PEARL Reconditioning Standard. The blue PEARL Reconditioning Quality Seal may now be placed on the device.