

<b>PEARL Reconditioning Standards</b>			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	<b>2035</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 1: US Standard bus connection bolt torque values.
- 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 1200: Low Voltage Circuit Breakers
- Standard 1214 – Low Voltage Molded Case Switches  
(Non-Automatic Circuit Interrupters)

## **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 is required to perform the contact resistance testing requirements of this reconditioning standard:

1. Digital Low Resistance Ohmmeter (DLRO - 10 amp unit is sufficient.)
2. DC Current Source and a Millivoltmeter

PEARL Reconditioning Standards			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	<b>2035</b>	5	11-2008

## 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 frame/enclosure for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for rust and corrosion.
- 1.1.5 Inspect the fuse clips for proper connection and tension.
- 1.1.6 Inspect for signs of overheating at the fuse connections.
- 1.1.7 Inspect insulation structure for signs of overheating and deterioration.
- 1.1.8 Record results on an approved PEARL Evaluation Form.

#### 1.2 Operating Mechanism

- 1.2.1 Inspect for signs of rust and corrosion.
- 1.2.2 Inspect for excessive and inappropriate lubrication.
- 1.2.3 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.2.4 Manually operate bus duct switch three (3) times while checking for proper operation of the quick-make and quick-break feature.
- 1.2.5 Record results on an approved PEARL Evaluation Form.

#### 1.3 Interphase Barriers

- 1.3.1 Inspect for dust, dirt and foreign materials.
- 1.3.2 Inspect for chips, cracks and deterioration.
- 1.3.3 Inspect for overheating.
- 1.3.4 Record results on an approved PEARL Evaluation Form.

#### 1.4 Arc Extinguishers

- 1.4.1 Inspect for loose and missing parts.
- 1.4.2 Inspect for dust, dirt, foreign material, cracks, chips and signs of overheating.
- 1.4.3 Inspect for excessive deterioration and carbon buildup on the metal separator.
- 1.4.4 Inspect arc runners for excessive deterioration.
- 1.4.5 Record results on an approved PEARL Evaluation Form.

#### 1.5 Arcing Contacts

- 1.5.1 Inspect for excessive deterioration.
- 1.5.2 Inspect for cracks, chips and pitting.
- 1.5.3 Check for proper alignment/seating in the closed position.
- 1.5.4 Record results on an approved PEARL Evaluation Form.

<b>PEARL Reconditioning Standards</b>			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	<b>2035</b>	5	11-2008

- 1.6 Main Contacts**
  - 1.6.1** Inspect for excessive deterioration.
  - 1.6.2** Inspect for cracks, chips and pitting.
  - 1.6.3** Check for proper alignment/seating in the closed position.
  - 1.6.4** Record results on an approved PEARL Evaluation Form.
- 1.7 Molded Case Switch (if applicable)**
  - 1.7.1** Molded case switches will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1200.
  - 1.7.2** Record results on an approved PEARL Evaluation Form.
- 1.8 Current Carrying Components**
  - 1.8.1** Inspect line and load connections for signs of overheating.
  - 1.8.2** Inspect line and load connections for missing and defective parts.
  - 1.8.3** Inspect hinge/pivot joints for signs of overheating.
  - 1.8.4** Inspect hinge/pivot joints for missing and defective parts.
  - 1.8.5** Inspect any other current carrying components for signs of overheating.
  - 1.8.6** Inspect any other current carrying components for missing and defective parts.
  - 1.8.7** Record results on an approved PEARL Evaluation Form.
- 1.9 Interlocks**
  - 1.9.1** Inspect all interlocks for proper operation.
  - 1.9.2** Record results on an approved PEARL Evaluation Form.

PEARL Reconditioning Standards			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	2035	5	11-2008

## 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** Bus duct switch in the open position

**2.1.1.1.1** Line to load

**2.1.1.2** Bus duct switch in the closed position

**2.1.1.2.1** Phase to phase

**2.1.1.2.2** Phase to frame/enclosure

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

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

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

### 2.2 Contact Resistance

**2.2.1** Perform a contact resistance, millivolt drop test or watt-loss test from line to load on each phase of a closed switch with the test points at the line and load lug landings.

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

**2.2.3** Compare test results to manufacturer's recommendations.

**2.2.4** A PEARL recognized method is comparing the test results of each pole. Results should be within 50% for any of the poles. Any industrial standard used shall provide at least the same integrity as the PEARL recognized standard of comparing the test results of each pole and ensuring that they are within 50% of each other.

### 2.3 Molded Case Switch (if applicable)

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

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

<b>PEARL Reconditioning Standards</b>			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	<b>2035</b>	5	11-2008

### **III RECONDITION PROCEDURES**

The following procedures are in a recommended order and are required to recondition this product. PEARL recognizes that, based upon actual product design and/or 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 Operating Mechanism**

- 1.2.1 Disassemble operating mechanism, as necessary.
- 1.2.2 Clean operating mechanism.
- 1.2.3 Replace any defective parts.
- 1.2.4 Replate operating mechanisms parts, as necessary.
- 1.2.5 Assemble operating mechanism.
- 1.2.6 Apply proper lubrication.
- 1.2.7 Manually operate bus duct switch five (5) times while checking for proper operation of the quick-make and quick-break feature.

##### **1.3 Arc Extinguishers**

- 1.3.1 Remove arc extinguishers.
- 1.3.2 Clean by company approved method.
- 1.3.3 Replace any defective arc extinguishers.
- 1.3.4 Assemble arc extinguishers.

##### **1.4 Arcing Contacts**

- 1.4.1 Remove and replace any defective arcing contacts.
- 1.4.2 Stationary arcing contacts.
  - 1.4.2.1 Clean and dress.
  - 1.4.2.2 Remove and replate, as necessary.
  - 1.4.2.3 Replace contacts.
- 1.4.3 Movable arcing contacts.
  - 1.4.3.1 Clean and dress.
  - 1.4.3.2 Remove and replate, as necessary.
  - 1.4.3.3 Replace contacts.
- 1.4.4 Check for proper wipe and alignment.
- 1.4.5 Check for proper torque on connections.

PEARL Reconditioning Standards			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	2035	5	11-2008

- 1.5 Main Contacts**
  - 1.5.1** Remove and replace any defective main contacts.
  - 1.5.2** Stationary main contacts.
    - 1.5.2.1** Clean and dress.
    - 1.5.2.2** Remove and replate, as necessary.
    - 1.5.2.3** Replace contacts.
  - 1.5.3** Movable main contacts.
    - 1.5.3.1** Clean and dress.
    - 1.5.3.2** Remove and replate, as necessary.
    - 1.5.3.3** Replace contacts.
  - 1.5.4** Check for proper wipe and alignment.
  - 1.5.5** Check for proper torque on connections.
- 1.6 Molded Case Switch** (if applicable)
  - 1.6.1** Molded case switches will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1200.
  - 1.6.2** Record results on an approved PEARL Reconditioning Test Form.
- 1.7 Fuse Assembly**
  - 1.7.1** Remove defective line side fuse clips.
  - 1.7.2** Remove defective load side fuse clips.
  - 1.7.3** Clean, replate or replace any defective fuse clips.
  - 1.7.4** Reinstall fuse clips.
  - 1.7.5** Check for proper tension of fuse clips.
- 1.8 Current Carrying Components**
  - 1.8.1** Line and load connections.
    - 1.8.1.1** Clean and degrease.
    - 1.8.1.2** Replate, as necessary.
  - 1.8.2** Hinge/pivot joints.
    - 1.8.2.1** Clean and degrease.
    - 1.8.2.2** Replate, as necessary.
  - 1.8.3** Other current carrying components.
    - 1.8.3.1** Clean and degrease.
    - 1.8.3.2** Replate, as necessary.
- 1.9 Checks and adjustments**
  - 1.9.1** Check arcing contacts for proper wipe, pressure and gap.
  - 1.9.2** Check main contacts for proper wipe, pressure and gap.
  - 1.9.3** Make all adjustments per manufacturer's instructions. In the absence of a manufacturer's instructions, these adjustments will be based upon procedures that will ensure the original manufacturer's design.
- 1.10 Torque**
  - 1.10.1** Check all screw and bolt connections for the proper torque per manufacturer's recommendations or industrial standards (Table 1).
  - 1.10.2** Record results on an approved PEARL Reconditioning Test Form.

PEARL Reconditioning Standards			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	<b>2035</b>	5	11-2008

**1.11 Final Assembly**

**1.11.1** Ensure that frame/enclosure is plumb and square.

**1.11.2** Cover any unused openings.

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

**1.12 Final Operation**

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

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

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

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

PEARL Reconditioning Standards			
<b>LOW VOLTAGE DISCONNECT SWITCHES BUS DUCT PLUG-IN FUSIBLE</b>	Revision		
	Standard	Number	Date
	2035	5	11-2008

## 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** Bus duct switch in the open position

**2.1.1.1.1** Line to load

**2.1.1.1.2** Line to frame/enclosure

**2.1.1.1.3** Load to frame/enclosure

**2.1.1.1.4** Phase to phase on line side

**2.1.1.1.5** Phase to phase on load side

**2.1.1.2** Bus duct switch in the closed position

**2.1.1.2.1** Phase to phase

**2.1.1.2.2** Phase to frame/enclosure

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

**2.1.3** Record results on an approved PEARL Reconditioning Test Form.

**2.1.4** Compare results to manufacturer's recommendations or Table 2 of Section 6000. The test results must be within the guidelines recommended in order for the product to become a PEARL labeled product.

### 2.2 Contact Resistance

**2.2.1** Perform a contact resistance, millivolt drop test or watt-loss test from line to load on each phase of a closed switch with the test points at the line and load lug landings.

**2.2.2** Record results on an approved PEARL Reconditioning Test Form.

**2.2.3** Compare test results to manufacturer's recommendations.

**2.2.4** A PEARL recognized method is comparing the test results of each pole. Results should be within 50% for any of the poles. Any industrial standard used shall provide at least the same integrity as the PEARL recognized standard of comparing the test results of each pole and ensuring that they are within 50% of each other.

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

## 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.