

<i>PEARL Reconditioning Standards</i>			
LOW VOLTAGE MOLDED CASE SWITCH BUS DUCT PLUG-IN	PROPOSED STANDARD		
	<i>Standard</i>	<i>Number</i>	<i>Date</i>
	2050	5	11-2008

This standard is designed to verify that a low voltage bus duct plug-in molded case switch is in a safe and reliable operating condition. In the event that the switch is not in this condition then this standard will establish the reconditioning requirements. 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

One 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 Voltage Supply
2. 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 frame/enclosure for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for rust and corrosion.
- 1.1.5 Inspect insulation structure for signs of overheating and deterioration.
- 1.1.6 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 enclosed molded case 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 Current Carrying Components

- 1.3.1 Inspect line and load connections for signs of overheating.
- 1.3.2 Inspect line and load connections for missing and defective parts.
- 1.3.3 Inspect hinge/pivot joints for signs of overheating.
- 1.3.4 Inspect hinge/pivot joints for missing and defective parts.
- 1.3.5 Inspect any other current carrying components for signs of overheating.
- 1.3.6 Inspect any other current carrying components for missing and defective parts.
- 1.3.7 Record results on an approved PEARL Evaluation Form.

1.4 Molded Case Switch

- 1.4.1 Molded case switch will be evaluated in accordance with PEARL Reconditioning Standards 1214.
- 1.4.2 Record results on an approved PEARL Evaluation Form.

1.5 Interlocks

- 1.5.1 Inspect all interlocks for proper operation.
- 1.5.2 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 as follows:

2.1.1.1 Bus duct enclosed circuit breaker in the open position

2.1.1.1.1 Line to load

2.1.1.2 Bus duct enclosed circuit breaker in the closed position

2.1.1.2.1 Phase to phase

2.1.1.2.2 Phase to frame

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 Molded Case Switch

2.2.1 Molded case switch will be evaluated in accordance with PEARL Reconditioning Standards 1214.

2.2.2 Record results on an approved PEARL Evaluation Form.

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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. However 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 Cover any unused openings.
- 1.1.4 Ensure that the enclosure is plumb and square
- 1.1.5 Prepare the enclosure to paint, as necessary.
- 1.1.6 Paint enclosure, as necessary.
- 1.1.7 Replace door gasket or seal, as necessary.
- 1.1.8 Ensure door properly closes.
- 1.1.9 Ensure door interlock properly works.
- 1.1.10 Ensure that the nameplate/label data is complete, correct and legible.

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 Operating Mechanism

- 1.3.1 Disassemble operating mechanism, as necessary.
- 1.3.2 Clean operating mechanism.
- 1.3.3 Replace any defective parts.
- 1.3.4 Replate operating mechanisms parts, as necessary.
- 1.3.5 Assemble operating mechanism.
- 1.3.6 Apply proper lubrication.
- 1.3.7 Manually operate bus duct enclosed molded case switch five (5) times while checking for proper operation of the quick-make and quick-break feature.

1.4 Molded Case Switch

- 1.4.1 Molded case switch will be reconditioned in accordance with PEARL Reconditioning Standards 1214.
- 1.4.2 Record results on an approved PEARL Reconditioning Test Form.

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- 1.5 Current Carrying Components**
 - 1.5.1** Line and load connections.
 - 1.5.1.1** Clean and degrease.
 - 1.5.1.2** Replate, as necessary.
 - 1.5.2** Other current carrying components.
 - 1.5.2.1** Clean and degrease.
 - 1.5.2.2** Replate, as necessary.
- 1.6 Checks and Adjustments**
 - 1.6.1** Make all checks and adjustments per manufacturer's recommendations. In the absence of a manufacturer's recommendations, any check or adjustment made will be based upon procedures that will ensure the original manufacturer's design.
 - 1.6.2** All checks and adjustments must be within the guidelines recommended in order for the product to become a PEARL labeled product.
 - 1.6.3** Record results on an approved PEARL Reconditioning Test Form.
- 1.7 Torque**
 - 1.7.1** Check all screw and bolt connections for the proper torque per manufacturer's recommendations or Table 1 of Section 6000.
 - 1.7.2** Record results on an approved PEARL Reconditioning Test Form.
- 1.8 Final Assembly**
 - 1.8.1** Ensure that frame/enclosure is plumb and square.
 - 1.8.2** Cover any unused openings.
 - 1.8.3** Ensure that the nameplate/label data is complete, correct and legible.
- 1.9 Final Operation**
 - 1.9.1** Ensure that all components, structures, devices and assemblies are complete and equipment is ready for service prior to beginning operations.
 - 1.9.2** Manually operate the switch a minimum of ten (10) times while checking for proper operation of the quick-make and quick-break feature.
 - 1.9.3** All devices must operate properly in order for the product to become a PEARL labeled product.
 - 1.9.4** Record results on appropriate PEARL Reconditioning Test Form.

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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 Bus duct enclosed molded case 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 enclosed molded case switch in the closed position

2.1.1.2.1 Phase to phase

2.1.1.2.2 Phase to frame

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 molded case switch.

2.2.2 Record results on an approved PEARL Reconditioning Test Form.

2.2.3 A PEARL recognized method for evaluation of the current carrying path is comparing the test results of each pole. Results should be within 50% for any of the poles. Any other industrial standard used for evaluation of the current carrying path 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.

2.2.4 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.