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.

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 1400: *Low Voltage Transformers*
Section 1700: *Protection Relays*

I TEST EQUIPMENT

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

1. Insulation Resistance Test Set (Megohmeter) 2500 Vdc minimum
2. DC Overpotential Test Set (Hipot)

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

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 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 all insulators for defects, cracks, chips and signs of tracking.
1.1.6 Inspect insulation structure for signs of overheating and deterioration.
1.1.7 Inspect viewing window for cracks and clarity.
1.1.8 Inspect glass weather stripping.
1.1.9 Record results on an approved PEARL Evaluation Form.

1.2 Interlocks

1.2.1 Inspect for proper door interlock operation.
1.2.2 Inspect for proper Kirk lock assembly as necessary.
1.2.3 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 and tracking.
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.
1.4.4 Inspect arc runners for excessive deterioration.
1.4.5 Record results on an approved PEARL Evaluation Form.

1.5 Arcing Contacts or Blades

1.5.1 Inspect for excessive deterioration.
1.5.2 Inspect for cracks, chips and pitting.
1.5.3 Inspect for signs of overheating.
1.5.4 Record results on an approved PEARL Evaluation Form.

1.6 Main Contacts or Blades

1.6.1 Inspect for excessive deterioration.
1.6.2 Inspect for cracks, chips and pitting.
1.6.3 Inspect for signs of overheating.
1.6.4 Record results on an approved PEARL Evaluation Form.

1.7 Fuse Assembly

1.7.1 Ensure the nameplate data is legible.

1.7.2 Check fuse for proper rating per switch.

1.7.3 Inspect for missing screws, defective parts, bolts, nuts, fasteners, retainers and keepers.

1.7.4 Inspect for rust and corrosion.

1.7.5 Inspect line and load clips for signs of overheating and missing and defective parts.

1.7.6 Inspect the fuse clips for proper tension.

1.7.7 Inspect all insulators for defects, cracks, chips and signs of tracking.

1.7.8 Record results on an approved PEARL Evaluation Form.

1.8 Operating Mechanism

1.8.1 Inspect for signs of rust and corrosion.

1.8.2 Inspect for excessive and inappropriate lubrication.

1.8.3 Inspect closing spring.

1.8.4 Inspect opening spring.

1.8.5 Inspect operating chain and belt.

1.8.6 Inspect close/open motor.

1.8.7 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.

1.8.8 Manually operate disconnect switch a minimum of five (5) times while checking for proper operation of the quick-make and quick-break feature.

1.8.9 Record results on an approved PEARL Evaluation Form.

1.9 Limit Switches

1.9.1 Inspect all limit switches for proper operation.

1.9.2 Check all terminal connections.

1.9.3 Inspect for chips, cracks and defective limit switch cases.

1.9.4 Record results on an approved PEARL Evaluation Form.

1.10 Control Circuits

1.10.1 Inspect all connections for proper torque.

1.10.2 Inspect all control wiring for signs of:

1.10.2.1 Deterioration

1.10.2.2 Overheating

1.10.3 Check all switches and control knobs for:

1.10.3.1 Damage

1.10.3.2 Proper ratings

1.10.4 Heater Circuit

1.10.4.1 Inspect wiring

1.10.4.2 Inspect heater(s) condition

1.10.4.3 Temperature control device

1.10.5 Verify accuracy and legibility of all applicable wiring schematics and drawings.

1.10.6 Record results on an approved PEARL Evaluation Form.

1.11 Control Power or Instrumentation Transformers

1.11.1 Control power or instrumentation transformers will be evaluated in accordance with applicable PEARL Reconditioning Standards found in Section 1400.

1.12 Current Transformers

1.12.1 Current transformers will be evaluated in accordance with applicable PEARL Reconditioning Standards found in Sections 1400.

1.13 Protective Relays

1.13.1 Protective relays will be evaluated in accordance with applicable PEARL Reconditioning Standards found in Section 1700.

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 Disconnect switch in the open position (unless a visual open air gap exists)

2.1.1.1.1 Line to load

2.1.1.2 Disconnect switch in the closed position

2.1.1.2.1 Phase to phase

2.1.1.2.2 Phase to ground

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 and/or watt-loss test from line to load on each phase of a closed switch as follows:

2.2.1.1 Switch

2.2.1.1.1 Line terminal of switch to load terminal of switch

2.2.1.2 Fuses, if fuses are included.

2.2.1.2.1 Load terminal of switch to load terminal of fuse

2.2.1.3 Overall (if fuses are included)

2.2.1.3.1 Line terminal of switch to load terminal of Fuse)

2.2.2 Record results on an approved PEARL Evaluation Form.

2.2.3 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 Operation

2.3.1 Electrically operate disconnect switch a minimum of five (5) times while checking for proper operation of the quick-make and quick-break feature.

2.3.2 Manually operate disconnect switch a minimum of five (5) times while checking for proper operation of the quick-make and quick-break feature.

2.3.3 Record results on an approved PEARL Evaluation Form.

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 requirements 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 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 mechanism parts, as necessary.
1.3.5 Assemble operating mechanism.
1.3.6 Apply proper lubrication.
1.3.7 Manually operate disconnect switch a minimum of ten (10) times while checking for proper operation of the quick-make and quick-break feature.

1.4 Arc Extinguishers

1.4.1 Remove arc extinguishers.
1.4.2 Clean arc extinguishers.
1.4.3 Replace any defective arc extinguishers.
1.4.4 Assemble arc extinguishers.

1.5 Arcing Contacts or Blades

1.5.1 Remove and replace any defective arcing contacts/blades.
1.5.2 Stationary arcing 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 arcing contacts or blades.
1.5.3.1 Clean and dress.
1.5.3.2 Remove and replate, as necessary.
1.5.3.3 Replace contacts or blades.
1.5.4 Check for proper wipe and alignment.
1.5.5 Check for proper torque on connections.

1.6 Main Contacts or Blades

1.6.1 Remove and replace any defective main contacts.

1.6.2 Stationary main contacts.

1.6.2.1 Clean and dress.

1.6.2.2 Remove and replate, as necessary.

1.6.2.3 Replace contacts.

1.6.3 Movable main contacts or blades.

1.6.3.1 Clean and dress.

1.6.3.2 Remove and replate, as necessary.

1.6.3.3 Replace contacts or blades.

1.6.4 Check for proper wipe and alignment.

1.6.5 Check for proper torque on connections.

1.7 Current Carrying Components

1.7.1 Hinge/pivot joints.

1.7.1.1 Clean and degrease.

1.7.1.2 Replate, as necessary.

1.8 Fuse Assembly

1.8.1 Remove defective line side fuse clips.

1.8.2 Remove defective load side fuse clips.

1.8.3 Clean, replate or replace any defective fuse clips.

1.8.4 Replace any defective fuse clips.

1.9 Control Power or Instrumentation Transformers

1.9.1 Control power or instrumentation transformers will be reconditioned in accordance with applicable PEARL Reconditioning Standards found in Sections 1400.

1.10 Current Transformers

1.10.1 Current transformers will be reconditioned in accordance with applicable PEARL Reconditioning Standards found in Sections 1400.

1.11 Protective Relays

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

1.12 Checks and adjustments

1.12.1 Arcing contacts or blades

1.12.1.1 Check and adjust for proper wipe, pressure and gap.

1.12.1.2 Check and adjust for proper alignment/seating in the closed position.

1.12.1.3 Check and adjust for proper sequence.

1.12.2 Main contacts or blades

1.12.2.1 Check and adjust for proper wipe, pressure and gap.

1.12.2.2 Check and adjust for proper alignment/seating in the closed position.

1.12.2.3 Check and adjust for proper sequence.

1.12.3 Hinge/Pivot

1.12.3.1 Check for proper adjustment based on manufacturer's recommendations.

1.12.4 Make all checks and adjustments per manufacturer's instructions. In the absence of a manufacturer's instructions, these adjustments will be based on procedures that will ensure the original manufacturer's design.

1.12.5 Record results on an approved PEARL Reconditioning Test Form.

1.13 Torque

1.13.1 Check all screw and bolt connections for the proper torque per manufacturer's recommendations or industrial standards (Table 1).

1.13.2 Record results on an approved PEARL Reconditioning Test Form.

1.14 Final Assembly

1.14.1 Ensure that the frame/enclosure is plumb and square.

1.14.2 Cover any unused openings.

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

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 Disconnect switch in the open position (unless a visual open air gap exists)

2.1.1.1.1 Line to load

2.1.1.2 Disconnect switch in the closed position

2.1.1.2.1 Phase to phase

2.1.1.2.2 Phase to ground

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 test 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 Overpotential Test

2.2.1 Perform an overpotential test at test voltage specified in Table 5 of Section 6000 as follows:

2.2.1.1 Disconnect switch in the open position (unless a visual open air gap exists)

2.2.1.1.1 Line to load

2.2.1.2 Disconnect switch in the closed position

2.2.1.2.1 Phase to phase

2.2.1.2.2 Phase to ground

2.2.2 Record results on an approved PEARL Reconditioning Test Form.

2.2.3 Compare results to manufacturer's recommendations or industrial standards.

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

2.3 Contact Resistance

2.3.1 Perform a contact resistance, millivolt drop test, and/or watt-loss test from line to load on each phase of a closed switch as follows:

2.3.1.1 Switch

2.3.1.1.1 Line terminal of switch to load terminal of switch

2.3.1.2 Fuse, if fuses are included

2.3.1.2.1 Load terminal of switch to load terminal of fuse

2.3.1.3 Overall, if fuses are included

2.3.1.3.1 Line terminal of switch to load terminal of fuse

2.3.2 Record results on an approved PEARL Reconditioning Test Form.

2.3.3 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.

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

2.4 Operation

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

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

2.4.3 Record results on an approved PEARL Reconditioning Test Form.

2.5 Control Wiring

2.5.1 Perform an insulation resistance at test values specified in Table 2.

2.5.2 Record results on an approved PEARL Reconditioning Test Form.

2.6 Instrumentation and Controls

2.6.1 Verify the electric operation of all control lights.

2.6.2 Verify the electric operation of all control switches.

2.6.3 Verify the electric operation of all push buttons.

2.6.4 Verify the operation of any control relays.

2.6.5 Verify the operation of heaters and controls.

2.6.6 Verify the protective function of any protective relays.

2.6.7 Test all meters and monitors for proper operation.

2.7 Control Power or Instrumentation Transformers

2.7.1 Control power or instrumentation transformers will be tested in accordance with applicable PEARL Reconditioning Standards found in Sections 1400.

2.8 Current Transformers

2.8.1 Current transformers will be tested in accordance with applicable PEARL Reconditioning Standards found in Sections 1400.

2.9 Protective Relays

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

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.