

| PEARL Reconditioning Standards | | | |
|-------------------------------------------------------|-------------|--------|---------|
| LOW VOLTAGE MAGNETIC STARTERS ENCLOSED | Revision | | |
| | Section | Number | Date |
| | 1520 | 3 | 2-11-03 |

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."

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 Voltage Supply
2. AC Current Supply with means to perform timing test
3. AC 3-Phase Voltage Supply
4. DC Voltage Supply
5. Digital Low Resistance Ohmmeter (DLRO - 10 amp unit is sufficient.)

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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 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** Check for plumb and square.
- 1.1.6** Inspect for unused openings.
- 1.1.7** Check operation of operating mechanisms.
- 1.1.8** Record results on appropriate PEARL Inspection and Test Form.

1.2 Instrumentation and Controls

- 1.2.1** Inspect all indicator lights, push buttons, switches and control devices for:
 - 1.2.1.1** Damage
 - 1.2.1.2** Proper ratings
 - 1.2.1.3** Loose connections
- 1.2.2** Inspect all control wiring for signs of:
 - 1.2.2.1** Deterioration
 - 1.2.2.2** Overheating
 - 1.2.2.3** Loose connections
- 1.2.3** Verify accuracy and legibility of all applicable wiring schematics and drawings.
- 1.2.4** Record results on appropriate PEARL Inspection and Test Form.

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- 1.3 Devices**
 - 1.3.1 Control Power Transformers**
 - 1.3.1.1** Control power transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400.
 - 1.3.2 Instrumentation Transformers**
 - 1.3.2.1** Instrumentation transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1400.
 - 1.3.3 Current Transformers**
 - 1.3.3.1** Current transformers will be evaluated in accordance with PEARL Reconditioning Standards found in Sections 1400.
 - 1.3.4 Control Relays**
 - 1.3.4.1** Control relays will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1800.
 - 1.3.5 Protective Relays**
 - 1.3.5.1** Protective relays will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1700.
 - 1.3.6 Contactors**
 - 1.3.6.1** Contactors will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1800.
 - 1.3.7 Meters**
 - 1.3.7.1** Meters will be evaluated in accordance with PEARL Reconditioning Standards found in Section 1900.
 - 1.3.8 Fuse Assembly**
 - 1.3.8.1** Verify the accuracy and legibility of all markings.
 - 1.3.8.2** Inspect line and load connections for signs of overheating.
 - 1.3.8.3** Inspect for missing and defective parts.
 - 1.3.8.4** Inspect insulation structure for signs of overheating and deterioration.
 - 1.3.8.5** Inspect fuse clips for signs of damage or deterioration.
 - 1.3.8.6** Inspect for corrosion.
 - 1.3.8.7** Record results on appropriate PEARL Inspection and 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 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.

2.2 Control Power Transformers

2.2.1 Control power transformers will be tested in accordance with PEARL Reconditioning Standards found in Section 1400.

2.3 Instrumentation Transformers

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

2.4 Current Transformers

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

2.5 Protective Relays

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

2.6 Control Relays

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

2.7 Contactors

2.7.1 Contactors will be tested in accordance with PEARL Reconditioning Standards found in Section 1800.

2.8 Meters

2.8.1 Meters will be reconditioned in tested with PEARL Reconditioning Standards found in Section 1900.

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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 Instrumentation and Controls

1.3.1 Repair or replace missing or defective indicator lights, push buttons, switches and control devices.

1.3.2 Replace or repair missing or defective control wiring.

1.4 Control Power Transformers

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

1.5 Instrumentation Transformers

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

1.6 Current Transformers

1.6.1 Current transformers will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1400.

1.7 Protective Relays

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

1.8 Control Relays

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

1.9 Contactors

1.9.1 Contactors will be reconditioned in accordance with PEARL Reconditioning Standards found in Section 1800.

1.10 Meters

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

1.11 Lubrication

1.11.1 Lubricate hinges.

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1.12 Torque

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

1.12.2 Record results on appropriate PEARL Inspection and Test Form.

1.13 Final Assembly

1.13.1 Ensure that frame/enclosure is plumb and square.

1.13.2 Cover any unused openings.

1.13.3 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 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.

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 Operation

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

2.2.2 Verify the proper electrical operation of all indicator lights.

2.2.3 Verify the proper electrical operation of all control switches.

2.2.4 Verify the proper electrical operation of all push buttons.

2.2.5 Verify the proper operation of all other accessories, including, but not limited to, auxiliary contacts, power poles and timers.

2.2.6 Verify the proper electrical operation of any control relay.

2.2.7 Verify the protective function of any protective relay.

2.2.8 Record results on appropriate PEARL Inspection and Test Form.

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.