

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1144-I	3	6-2009

This standard is designed to verify that a low voltage electrically operated air type fusible disconnect switch is in a safe and reliable operating condition based upon the design of the original manufacturer at the time of manufacturing. PEARL testing does not verify the claims of the original equipment manufacturer as to the validity of its design criteria. In the event that the device is not in this condition then this standard cannot be used and the PEARL Reconditioning Standard needs to be followed.

NOTE: This standard pertains disconnects that are typically found as service entrance disconnects or feeder disconnects that provide power to other downstream panelboard, switchboard or equipment. Some of examples of these disconnects are Boltswitch, Bolt-Loc, BP Switch, General Electric THPC and Pringle.

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.

PEARL does not warrant, guarantee or make any representation regarding the correctness of specifications, use for any particular purpose, quality or extent of testing, accuracy, or reliability as to any equipment, products or documentation referenced herein.

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.

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1144-I	3	6-2009

I TEST EQUIPMENT

The following test equipment is required to perform the testing requirements of this 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 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 other testing requirements of this standard depending on the accessories:

1. AC Voltage Supply
2. DC Voltage Supply

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1140-I	3	6-2009

II EVALUATION

The following procedures shall be used to determine the condition a low voltage electrically operated air type fusible disconnect under this standard.

1 INSPECTION

1.1 Frame

- 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 for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for rust and corrosion.
- 1.1.5 Inspect for signs of overheating at the fuse connection.
- 1.1.6 Inspect insulation structure for signs of overheating and deterioration.
- 1.1.7 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 disconnect 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.

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
		1140-I	3

- 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 Current Carrying Components**
 - 1.7.1 Inspect line and load connections for signs of overheating.
 - 1.7.2 Inspect line and load connections for missing and defective parts.
 - 1.7.3 Inspect line and load fuse connections plates for signs of overheating.
 - 1.7.4 Inspect hinge/pivot joints for signs of overheating.
 - 1.7.5 Inspect hinge/pivot joints for missing and defective parts.
 - 1.7.6 Inspect any other current carrying components for signs of overheating.
 - 1.7.7 Inspect any other current carrying components for missing and defective parts.
 - 1.7.8 Record results on an approved PEARL Evaluation Form.
- 1.8 Fuse Assembly**
 - 1.8.1 Inspect fuse clips or terminal pads for signs of overheating.
 - 1.8.2 Inspect fuse clips or terminal pads assemblies for missing and defective parts.
 - 1.8.3 Inspect the fuse clips or terminal pads for proper connection and tension.
 - 1.8.4 Record results on an approved PEARL Evaluation Form.
- 1.9 Control Wiring**
 - 1.9.1 Inspect for overheating.
 - 1.9.2 Inspect for damage and deteriorated insulation.
 - 1.9.3 Check for loose and defective terminal connectors.
 - 1.9.4 Record results on an approved PEARL Evaluation Form.
- 1.10 Interlocks**
 - 1.10.1 Inspect all interlocks for proper operation.
 - 1.10.2 Record results on an approved PEARL Evaluation Form.
- 1.11 Shunt Trip Devices**
 - 1.11.1 Inspect shunt trip unit for missing and defective screws, bolts, nuts, fasteners and keepers.
 - 1.11.2 Inspect shunt trip unit for signs of overheating and deteriorated insulation.
 - 1.11.3 Check shunt trip unit for loose and defective terminal connectors.
 - 1.11.4 Record results on an approved PEARL Evaluation Form.
- 1.12 Blown Fuse Indicator Devices**
 - 1.12.1 Inspect blown fuse indicator trip unit for missing and defective screws, bolts, nuts, fasteners and keepers.
 - 1.12.2 Inspect blown fuse indicator trip unit for signs of overheating and deteriorated insulation.

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1140-I	3	6-2009

1.12.3 Check blown fuse indicator trip unit for loose and defective terminal connectors.

1.12.4 Record results on an approved PEARL Evaluation Form.

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 Switch in the open position

2.1.1.1.1 Line to load

2.1.1.2 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 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 Shunt Trip Test

2.3.1 Close switch.

2.3.2 Connect appropriate voltage source to shunt trip input leads.

2.3.3 Increase voltage until shunt trip unit operates. Verify that the device operates properly at its minimum rated voltage recommended by the manufacturer.

2.3.4 Record results on an approved PEARL Evaluation Form.

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1140-I	3	6-2009

2.4 Blown Fuse Indicator Device

- 2.4.1** Connect voltage source to fuse trip indicator input leads for A phase (left pole).
- 2.4.2** Close switch.
- 2.4.3** Apply rated voltage to the fuse trip indicator unit for A phase.
- 2.4.4** Ensure that switch trips (opens) and fuse indicator trip unit for A phase shows proper trip indicator, attempt to close tripped switch (Note - switch should not close).
- 2.4.5** Repeat for B phase (center pole) and C phase (right pole).
- 2.4.6** Record results on an approved PEARL Evaluation Form.
- 2.4.7** Compare results to manufacturer's recommendations.

2.5 Checks and Adjustments

- 2.5.1** 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.
- 2.5.2** All checks and adjustments must be within the guidelines recommended in order for the product to become a PEARL labeled product.
- 2.5.3** Record results on an approved PEARL Evaluation Form.

2.6 Torque

- 2.6.1** Check all screw and bolt connections for the proper torque per manufacturer's recommendations or Table 1 of Section 6000.
- 2.6.2** Record results on an approved PEARL Evaluation Form.

2.7 Final Operation

- 2.7.1** Ensure that all components, structures, devices and assemblies are complete and equipment is ready for service prior to beginning operations.
- 2.7.2** Manually operate the device a minimum of ten (10) times while checking for proper operation of the quick-make and quick-break feature.
- 2.7.3** All devices must operate properly in order for the product to become a PEARL labeled product.
- 2.7.4** Record results on appropriate PEARL Evaluation Form.

3 EVALUATION REVIEW

In order for the device to be eligible for the Inspect & Test Quality Seal, the device needs to have passed all of the preceding Inspection (1) and Testing (2) points. Any failures in the process will require that the device be "Reconditioned" at which time the PEARL Reconditioning Standard needs to be followed.

PEARL Inspect & Test Standards			
LOW VOLTAGE DISCONNECT SWITCHES ELECTRIC TRIP POWER FUSIBLE	Revision		
	Standard	Number	Date
	1140-I	3	6-2009

III PEARL CERTIFICATION

This product has now been inspected and tested and has passed all tests under the PEARL Inspect & Test Standard. The green PEARL Inspect & Test Quality Seal may now be placed on the device.