

DISCLAIMER: These Standard Operating Procedures (SOP's) are for the exclusive use of Navy Public Works Center (PWC) Norfolk. They are promulgated as guidance for their NAVFAC Commands. If intended to be used by other activities, they must be tailored to each activity's particular requirements and must be reviewed/approved by the activity's safety professionals prior to use.

# **NAVY PUBLIC WORKS CENTER**

## **NORFOLK, VIRGINIA**

### **UTILITIES**

#### **STANDARD OPERATING PROCEDURE / JOB HAZARD ANALYSIS**

**TITLE**

**SHORE POWER LOW VOLTAGE**  
**CIRCUIT BREAKER MAINTENANCE**  
**5 YEAR MAINTENANCE**

**PROCEDURE NUMBER**

**622.4 ELE 13**

---

**SIGNED:** \_\_\_\_\_

**(DATE)**

**APPROVED:** \_\_\_\_\_

**(DATE)**

**SAFETY PROFESSIONAL:** \_\_\_\_\_

**(DATE)**

**MANAGEMENT OFFICIAL:** \_\_\_\_\_

**(DATE)**

**REVISION**

**A**

SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE  
5 YEAR MAINTENANCE

**DISTRIBUTION**

CODE	REV/DATE						
620							
622							
610							
610.E1							
601A							
30A							
09A							
216							
226							
236							
622.4							
L. Agee							



SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE  
5 YEAR MAINTENANCE

**Purpose:**

Procedure to perform five(5) year maintenance on pier low voltage shore power breakers.

**Potential Energy Sources:**

1. Circuit breaker 120 or 240 volt control power.
2. When testing, applied low voltage of test unit to power current path of circuit breaker.
3. Breaker operating mechanism.

**Tools and PPE:**

Tools: Combination wrenches, open end, box; screwdrivers, flat tip and phillips(#1, 2, 3, and 4); pliers, channel lock, side cutter, long nose, standard, snap ring(inside and out); socket sets: 3/8" and 1/2" drive sockets with ratchet, universal and extensions; allen wrench set; machinist rule; thin line feeler gauges; torque wrenches: one each ft/lbs and in/lbs, 3/8" or 1/2" drive; fine file; burnishing tool; cleaning brush; manufacture special tools as per instruction book; high current-low voltage circuit breaker test set, 2500 volt insulation resistance test set; 1000 volt insulation resistance test set; Micro-Ohmmeter. PPE: Work gloves, back brace if required to wear one by back injury and control program, safety shoes, safety glasses.

**References:**

1. Pertinent circuit breaker maintenance manual.
2. PWC Occupational Safety and Health Program Manual, PWCNORVAINST 5100.33E
3. Occupational Safety and Health Standards for General Industry (29 CFR PART 1910): Subpart I, Personnel Protective Equipment; Subpart R, Electrical Power Generation / Transmission / Distribution; Subpart S, Electrical
4. NFPA 70 E approach distances to exposed, energized, electrical conductors and circuit parts.

**Procedures:**

Note: Note all steps completed and record all data on Annual Maintenance Form

1. Place circuit breaker on work bench.

SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE  
5 YEAR MAINTENANCE

2. Record circuit breaker's nameplate data, PWC number, and trip device data.
3. Remove, inspect and clean the circuit breaker's arc chutes.
4. Disassemble the circuit breaker. Separate the backboard from the operating mechanism portion. Remove backboard components.
5. Clean the entire circuit breaker.
6. Clean the main and arcing contacts.
7. Clean main stabs and auxiliary contacts.
8. Clean current pathway conductors.
9. Inspect circuit breaker's condition. Repair all discrepancies found.
10. Lubricate the circuit breaker per manufacturer's instruction book.
11. Re-assemble the circuit breaker.
12. Check manual fast close operation.
13. Check electrical close operation.
14. Check slow close operation.
15. Check electrical trip operation.
16. Check trip free safety feature.
17. Perform contact print check using bond and carbon paper.
18. Refer to circuit breaker's instruction manual for any mandatory adjustments, mandatory adjustment checks, and required adjustments based on deficiencies noted in Steps 12-17.
19. Place arc chutes back on circuit breaker and complete reassembly the circuit breaker if not already completed.

SHORE POWER LOW VOLTAGE CIRCUIT BREAKER MAINTENANCE  
5 YEAR MAINTENANCE

20. Electrically operate the breaker 5 times.
21. Perform the following electrical tests:
  - a) Contact resistance
  - b) 2500 volt DC insulation resistance tests:
    - . Breaker Open - line stab to ground
    - . Breaker Open - load stab to ground
    - . Breaker Open - line stab to same phase load stab
    - . Breaker Closed - each phase to ground
    - . Breaker Closed - phase to phase; A-B, B-C, A-C
  - c) 1000 volt DC insulation resistance test on circuit breaker control wires.
  - d) Determine the following trip unit pick ups and delays;
    - . Long Time Pick Up
    - . Long Time Delay
    - . Long Time Delay at 3X Long Time Pick Up setting
    - . Short Time Delay
    - . Short Time Delay at
    - . Short Time Pick Up 1.5X Short Time Pick Up setting.
    - . Instantaneous Pick Up
22. Record as left trip unit settings.
23. Place breaker in proper storage location.

END