

NAVSEA  
STANDARD ITEM

FY-19 CH-1

ITEM NO: 009-75  
DATE: 06 MAR 2018  
CATEGORY: II

1. SCOPE:

1.1 Title: Circuit Breaker; repair

2. REFERENCES:

2.1 Equipment Technical Manual

3. REQUIREMENTS:

3.1 Identify and pull back associated cables and wiring. Mechanically remove each circuit breaker, using 2.1 for guidance.

3.1.1 Matchmark, **identify** and retain mounting hardware and fasteners.

3.1.2 Protect exposed terminal connections and internal switchboard parts from **foreign material including dirt and debris, and from** damage.

3.1.2.1 Each phase shall be isolated and protected from other phases.

3.2 Disassemble each circuit breaker, using 2.1 for guidance.

3.2.1 Inspect and test electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware to design characteristics and determine missing and defective components, circuitry, and hardware in accordance with 2.1.

3.2.1.1 Acceptance criteria for silver contacts is that wear shall be less than 50 percent of original thickness after dressing, contacts shall have no evidence of copper migration, and shall have no irregular, burnt, or pitted interface after dressing.

3.2.1.2 Acceptance criteria for non-silver contacts is that, after dressing, wear shall be less than 10 percent of original thickness and contacts shall have no irregular, burnt, or pitted interface after dressing.

3.2.2 Test internal wiring, coils, and transformers for open and short circuits and 500 volt megger insulation resistance to ground. Record readings. Minimum acceptable resistance to ground shall be one megohm.

**3.2.3 Shop test and inspect each motor operator and motor in accordance with 2.1.**

**3.2.4 Test and inspect molded and insulation parts in accordance with the following criteria:**

**3.2.4.1 Phase-to-phase dielectric strength 2,000 volts minimum.**

**3.2.4.2 Surface burn marks and hairline cracks are acceptable but shall not deteriorate the mold surface or impair physical strength. Cracks are not permitted in wall section between phase and a ground plane when there is a conducting part in contact with the wall section. Cracks should not exceed 0.75 inch in length, and in no case should be greater than 50 percent of the length of the surface in which the crack appears.**

**3.2.4.3 Surface cracks should not exceed 1.5 inches in length, and in no case should be greater than 50 percent of the length of the surface in which the crack appears.**

**3.2.5 Submit one legible copy, in approved transferrable media, of a report listing test and inspection results and missing and defective components, circuitry and hardware to the SUPERVISOR.**

3.3 Remove defective and install new electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware. Install new electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware where missing. New material shall conform to the requirements of 2.1 and shall be obtained from the Federal Stock System or the Original Equipment Manufacturer (OEM), except for non-restricted parts.

3.3.1 Clean each component free of dirt, lubricants, and other foreign matter.

3.3.1.1 Steam cleaning of circuit breakers is not authorized.

3.3.2 Resilver previously silver plated contacts in accordance with ASTM B 700.

3.3.3 Dress, burnish, adjust, and align arcing and main contacts (contacts that experience arcing in functional duty) in accordance with 2.1.

3.3.4 Replace existing cadmium-plated parts with zinc in accordance with ASTM A 153.

3.3.5 Dip and bake taped insulated coils and open transformers in varnish conforming to MIL-I-24092, Class 155.

3.3.5.1 Dip and bake insulated coils and open transformers in Dolph Varnish 1105, Epoxylite Esterlite 605, or Schenectady International Isolite 862M varnish in localities where MIL-I-24092 varnish does not meet state and local air pollution control district standards.

3.3.6 Remove **defective** existing and install new coil and transformer leads in place of those identified to be missing or defective. **Install new coil and transformer leads in place of those identified to be missing.**

3.3.7 Repair defective connections.

3.3.8 Free-up and adjust moving parts and latching mechanisms.

3.3.9 Lubricate the current-carrying parts (except for interrupting contacts) and sliding joints with lubricant conforming to MIL-L-87177, Type I, Grade B. Lubricate mechanical pivots, excluding latch roller face components, with high performance multi-purpose grease conforming to DOD-G-24508.

3.3.9.1 Apply new lubricant sparingly and wipe off excess.

(V) "SETTINGS AND MILLIVOLT DROP TEST" |

3.4 Reassemble each circuit breaker and accomplish adjustments and settings in accordance with 2.1. **Record readings.**

3.4.1 Align and true each set of stationary and movable contacts to the manufacturer's specifications. **Record readings.**

3.4.2 Accomplish millivolt drop test to each set of contacts in accordance with 2.1 or Original Equipment Manufacturer (OEM) requirements. **Record readings.**

(V) "TEST, CALIBRATION, AND ADJUSTMENT"

3.5 Test, calibrate, adjust, and certify the trip units of each circuit breaker for time delay and instantaneous trip settings in accordance with 2.1. **Record readings.**

3.5.1 Accomplish a heat run test for repaired type ACB and AQB circuit breakers.

3.5.1.1 Connect each ACB type circuit breaker to a test set and apply rated current to each individual phase of the circuit breaker for 30 minutes. After 5 minutes, measure the voltage across the line to load contacts of each pole and calculate the contact impedance. Satisfactory impedance: **1,600-4,000 ampere ACB's, below 225 microhms; 600-900 ampere ACB's, below 1,050 microhms.**

3.5.1.2 Connect each AQB-type molded case circuit breaker to a test set and apply rated current to each phase simultaneously for one hour. The AQB shall not trip within that hour.

3.5.2 Attach a calibration label to the face of each circuit breaker denoting the name and location of the calibration facility and date of calibration. In the event there is insufficient room on the face of the circuit breaker, attach the calibration label to the right hand side of the breaker as viewed from the front.

**3.6 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.4, 3.5, and a list of new components, assemblies, subassemblies, internal circuitry, and hardware installed to the SUPERVISOR.**

3.7 Install and connect each circuit breaker, **using retained mounting hardware and fasteners.**

(V) (G) "OPERATIONAL TEST"

3.8 Accomplish final adjustments and test operate each circuit breaker, including control and safety devices.

3.8.1 Close and trip each circuit breaker electrically from local and remote stations. Three consecutive successful times required.

3.8.1.1 Ensure generator heater interlock is de-energized by the generator circuit breaker.

3.8.2 Repeat the requirements of 3.8.1 manually.

#### 4. NOTES:

4.1 Equipment technical manual will be listed in the invoking Work Item.

4.2 Repair and overhaul will be accomplished by the Navy Designated Overhaul Point (DOP) at Puget Sound Naval Shipyard, the OEM, or a commercial repair facility that has demonstrated to the SUPERVISOR the capability to perform the work. Capability to perform circuit breaker overhaul and repair work includes having the facilities, trained mechanics, and access to the OEM's qualified parts and repair procedures. Use of non-qualified restricted parts violates the integrity of the circuit breaker, nullifying the breakers prior qualification under the QPL process. Restricted parts must be obtained from the OEM either directly or via (if available) the Federal stock system. If a restricted part is replaced with an unqualified part, the qualification of the particular circuit breaker is revoked until the full set of QPL required tests are repeated and submitted to NAVSEA for approval.

4.3 Non-restricted parts are defined as nuts, bolts, screws, washers, lockwashers, cotter pins, O-rings, indicator lights, and indicator light globes (colored and clear) only.

4.4 The following ACB circuit breakers listed by manufacturer contain non-friable asbestos arc chutes:

4.4.1 SPD, ITE, ITE/Gould: 640R, 900RC, 901R, 1600R, 1600HR, 1600HRC, 2000HR, 2000RC (450V), 2601R, 2801R, 3200HR, 4000HR.

4.4.2 General Electric: all types.

4.4.3 Westinghouse: All DBN types.