1. SCOPE:

1.1 Title: Rotating Electrical Equipment; rewind

2. REFERENCES:

2.1 Standard Items

2.2 Equipment Technical Manual

2.3 S9086-DA-STM-010/CH-100, Hull Structures

2.4 S9086-KC-STM-010/CH-300, Electric Plant - General

2.5 S9086-KE-STM-010/CH-302, Electric Motors and Controllers

2.6 S9086-KN-STM-010/CH-310, Electric Power Generators and Conversion Equipment

2.7 S9086-HN-STM-010/CH-244, Propulsion Bearings and Seals

2.8 S6260-BJ-GTP-010, Electrical Machinery Repair, Electric Motor, Shop Procedures Manual

2.9 MIL-DTL-17060, MOTORS, ALTERNATING CURRENT, INTEGRAL-HORSEPOWER, SHIPBOARD USE

2.10 S9310-AC-HBK-010, Commutator/Slip Ring Maintenance Handbook

2.11 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety

2.12 407-5291780, Standard Electromagnetic Interference (EMI) Survey Procedures

3. REQUIREMENTS:

3.1 Disconnect equipment mechanically and remove, including rotating components connected directly to the shaft, using 2.2 for guidance.
3.1.1 Accomplish the following prior to disconnecting: measure air
gap readings; measure bearing clearances for sleeve bearing equipment only;
measure alignment readings; inspect couplings for cracks, broken segments,
wear, and misalignment in excess of tolerances specified in 2.2; measure
shaft thrust and run out readings; identify associated cables/wiring and
hook-up data. Record data

3.1.2 Matchmark, identify, and retain chocks, shims, shock mounts,
sound damping pads, and other accessories associated with equipment. Record
list of accessories.

3.1.3 Remove entire vaneaxial and tubeaxial fan assemblies from the
duct system and transport to the shop for repair.

3.2 Accomplish a structural inspection of each foundation in accordance
with 2.3. Record data.

3.2.1 Accomplishment of cleaning and painting requirements for
foundations of equipment shall be in accordance with NAVSEA Standard Items
(See 4.7).

3.3 Matchmark, disassemble, test, inspect, and measure the equipment
using 2.2 and 2.4 through 2.8 for guidance.

3.3.1 Accomplish a core loss test prior to winding removal in
accordance with Paragraphs 300-4.5.6 and 300-4.5.6.1 of 2.4. Inspect for hot
spots in accordance with the Core Loss Tester Instruction Ma
Record data.

3.3.1.1 Accomplish a loop test in accordance with Paragraph
300-4.5.6.1.2 of 2.4 when core indicates a marginal satisfactory reading or
when test equipment does not directly support equipment being subjected to
testing. Record data.

3.3.2 Remove each winding, using Paragraph 300-4.5.7.2 of 2.4 for
guidance for winding removal and 2.8 for core inspection. Verify the
temperature limitations of the core material prior to exercising the burnout
oven option. Record winding data. Verify conformance of recorded data to the
manufacturer's winding data.

3.3.2.1 Repeat core loss test and inspection described in
3.3.1 and loop test described in 3.3.1.1 after winding removal. Record data.

3.3.3 Dip core in a 20 percent solution of varnish MIL-I-24092 and
dry. In localities where MIL-I-24092 does not meet state and local Air
Pollution Control District (APCD) standards, spray the iron core with a clear
air-drying varnish.

3.3.4 Protect machined surfaces. Accomplishment of cleaning and
painting for equipment housing exterior, fan(s), core and interior and
exterior of each end bell shall be in accordance with NAVSEA Standard Items (See Note 4.7).

3.3.5 Inspect and test non-wound rotors for loose or cracked bars, localized overheating, and rubbing in accordance with 2.8. Inspect wound rotors, slip ring leads, and armatures for insulation damage and burns/hot spots. Inspect for loose coils and slot wedges. Inspect slip rings and commutators for damage and for wear limits, using 2.2 for criteria. Inspect brush rigging for cracks, chips, worn areas, distortion, spring condition, and insulating material for cracks and arc paths. Inspect leads and terminal lugs for damage and defects. Identify and tag leads with aluminum wrap-around bands with metal stamped or embossed markings. Record data.

3.3.6 Inspect and dimensionally measure end bells, frame, rabbet fits, shaft, sleeve and pedestal bearings, keyways, fan and running surfaces for wear, eccentricity, and other defects, using 2.2 for accept or reject criteria, and 2.7 for location and type of measurements to be taken. Record data.

3.3.7 Accomplish commutator pre-installation and post-installation test, using Table 300-3-9 of 2.4 for guidance. Record data.

3.4 Rewind the equipment in accordance with Original Equipment Manufacturers (OEM) "for Navy use" winding data. Connect windings permanently only after successful completion of testing of 3.5.1 and 3.5.3 through 3.5.5. Install new material conforming to: Magnet wire, National Electrical Manufacturers Association (NEMA) MW-1000, Table MW 16 (round wire), or NEMA MW-1000, Table MW 20 (rectangular wire), or equivalent to OEM original; Slot and phase insulation, NEMA FI-3-2004; Slot wedge-spacers and fillers, MIL-I-24768/17; Lead wire, stranded, MIL-DTL-16878 except for type EPDM, which may be commercial grade; Glass banding, MIL-I-24178; Temperature detectors in accordance with 2.2.

3.5 Test, inspect, and measure the rewound equipment.

3.5.1 Accomplish a 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.4 for guidance. Record data.

3.5.2 Disconnect solid-state devices and ground temperature-sensing leads prior to measuring insulation resistance of windings.

3.5.3 Accomplish a phase resistance balance test of windings, using a Wheatstone or Kelvin bridge, or with an ohmmeter capable of resolving one milliohm (0.001 ohm). Record phase balance for multi-phase equipment, using Paragraph 5.21 of 2.8 and 3.6.1 of 2.9 for guidance. Record data.

3.5.4 Accomplish a voltage surge test in accordance with Paragraphs 300-3.5.4 through 300-3.5.5 of 2.4. Record data.
3.5.5 Accomplish a DC HI POT test in accordance with Paragraph 300-3.5.2 through 300-3.5.2.3.4 of 2.4. Record data.

3.6 Connect the windings permanently.

3.6.1 Repeat tests described in 3.5.1 and 3.5.3 through 3.5.5. Record data.

3.6.2 Accomplish DC bar-to-bar test on commutators after making coil connections to the risers in accordance with Paragraph 300-4.7.11.3 of 2.4. Record data.

3.6.3 Accomplish a Polarization Index Test in accordance with Paragraph 300-3.4.12 of 2.4. Record data.

3.7 Select the proper insulating process based on winding insulation classifications and to meet state or local air pollution standards. Select varnish methods and material, using Paragraphs 300-4.5.8 through 300-4.5.8.9 of 2.4 for guidance. Maintain the varnish in accordance with Paragraphs 300-4.5.8.3 through 300-4.5.8.3.3 of 2.4 and the varnish manufacturer's instructions. Maintain a current revision of the varnish manufacturer's instructions on storage, maintenance, and use of the type of varnish to be applied. Maintain a record of varnish temperature, viscosity and, for solventless varnish, gel time tests. Tests must show varnish is within varnish manufacturer's recommendations and have been accomplished in the intervals specified by the varnish manufacturer. The record must also show that the varnish is being stored as recommended by the varnish manufacturer.

3.8 Varnish and bake windings in accordance with Paragraphs 300-4.5.8.4 of 2.4 and the varnish manufacturer's instructions. Do not immerse the leads. Wipe surfaces that affect assembly, such as rabbet fits and mounting flanges, with a cloth moistened with a solvent after draining and before baking. Remove excess varnish run-off from surfaces that affect assembly after baking. Apply a thin coat of air-dry varnish to metal surfaces exposed by the removal process in accordance with Paragraph 300-4.5.8.5 and 300-4.5.8.6 of 2.4.

3.9 Repeat tests described in 3.5.1 and 3.5.3 through 3.5.5. Record data.

3.10 Accomplish an AC HI POT test in accordance with Paragraphs 300-3.5.3 through 300-3.5.3.2.9 of 2.4. Record data.

3.11 True the commutator or collector rings. Eccentricity shall not exceed the requirements of 2.10. Resurface or machine each individual collector ring to the same exact diameter to allow symmetrical brush holder to ring clearance spacing. Ensure metal shavings are not permitted to contaminate the rotor or stator assembly. Each cut shall not exceed 0.010 inch. Finish thickness shall not be less than design wear tolerance as shown in 2.2. Undercut the mica between the commutator bars with the edge of the mica not exceeding a depth of 5/64-inch below the bars. Chamfer the bar edges
and remove rough surfaces in accordance with Paragraph 7-4.1.3 of 2.10. Burnish the commutator with a very fine commercial burnishing stone conforming to A-A-58052. Polish collector rings to a mirror finish. Record data.

3.12 Accomplishment of the balancing requirement for each rotating assembly shall be in accordance with NAVSEA Standard Items (See Note 4.6).


3.14 Install identification markers on wiring in the external connection box.

3.14.1 Markers shall be aluminum wrap-around type with metal stamped or embossed markings.

3.15 Repair lightly scored areas of frame, end bells, and shaft by manual methods. Recondition threads and fit key to keyway. Visually inspect keyway for deformed, cracked or chipped edges or high spots. Verify that fit between key and key-seat sides has a minimum clearance of 0.002 inch or maximum interference of 0.0005 inch. High spots in keyway may be removed by machining or grinding. Do not unnecessarily repair any keyway; instead, use a step key up to a maximum of 0.010 inch oversize and, where possible, include a radius in step. If key tightness cannot be corrected with a step key, re-machine worn/damaged keyways to recommended oversizes as follows: Maximum of 0.015 inch oversize for a 1/8-inch key and increasing oversize allowance of 0.010 inch for each 1/8-inch increase in key size up to a maximum of 0.075 inch. If key tightness cannot be corrected by keyway repair, replace part involved. Apply a thin coat of petrolatum to unpainted mating surfaces except for explosion-proof motors, which shall have clean, dry mating surfaces.

3.16 Prepare and refinish equipment. Protect machine surfaces, windings, and nameplates from being painted or otherwise damaged.

3.16.1 Accomplishment of cleaning and painting for housing, fan, and interior and exterior of each end bell shall be in accordance with NAVSEA Standard Items (See Note 4.7).

3.17 Accomplish the following on equipment having other than sleeve-type bearings unless otherwise specified in the invoking Work Item, using 2.8 for guidance.

3.17.1 Install new bearings, seals, fittings, lock washers, and locknuts conforming to 2.2, using 2.7 and Chapter 6 of 2.8 for guidance, except as indicated in 3.17.1.1 (utilizing Attachment A for guidance).
3.17.1.1 Install Type III, Class 8 (double seal) bearings in motors meeting the criteria identified in Chapter 6 of 2.8. Only double seal bearings identified in Chapter 6 of 2.8 are acceptable for this use.

3.17.1.2 Install Type III, Class 8 (double seal) bearings with a C3 (greater than normal) radial internal clearance, if not originally furnished or already accomplished during previous repair, in place of the Type III bearing originally furnished, for vaneaxial and tubeaxial fan motors not meeting the criteria of Chapter 6 of 2.8. Install Type 120 bearings in vaneaxial and tubeaxial fan motors originally furnished with Type 120 bearings.

3.17.1.3 Install new label plates with the inscription "DO NOT LUBRICATE" on equipment using double seal bearings (Type III, Class 8 or Type 120).

3.17.1.4 Install pipe plugs on all grease fills and drains for equipment converted from re-lubricable bearings to double seal bearings.

3.17.1.5 Prepare a report that reflects the change in the maintenance requirements for the converted motor, for equipment converted from lubricated bearings to double seal bearings.

3.17.2 Lubricate bearings with grease conforming to DOD-G-24508 in accordance with Paragraphs 244-1.7.7.2 and 244-1.7.7.3 of 2.7, for equipment not using double seal bearings.

3.18 Assemble the equipment using 2.2 and 2.4 through 2.8 for guidance. Do not use materials containing silicone in the repair and assembly of equipment with commutator or collector rings. Install new gaskets on covers, inspection plates, and between the external connection box and the frame. Gaskets shall conform to MIL-PRF-1149 unless otherwise specified in 2.2. Set brush holders not less than 1/16-inch or more than 1/8-inch from commutator or collector rings unless otherwise specified in 2.2; set in electrical neutral plane and stagger brushes for maximum coverage of the commutator, in accordance with Paragraph 300-4.7.7.1.10 of 2.4; center over the collector rings; ensure the brushes do not extend beyond the edge of the collector rings; install new brushes in accordance with 2.2; sand new brushes to fit curvature of the commutator or collector rings in accordance with Paragraph 6-3.5 through 6-3.5.4 of 2.10; ensure brushes have a surface contact of 100 percent and are not chipped, cracked, or broken; remove sand, carbon, and other foreign matter resulting from fitting new brushes; adjust spring tension of brushes in accordance with 2.2. Adjust air gap as specified in 2.2, plus or minus 10 percent. Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of rotating assembly shall not be allowed. Record data.

3.18.1 Install label plates conforming to MIL-DTL-15024 for those identified to be missing or damaged.
3.18.2 Inspect equipment for applicable electromagnetic interference (EMI) fixes using Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) Technical Assistance Network (STAN) in accordance with 2.12. Record results.

3.19 Accomplish a no-load shop test of the equipment for a minimum of one-half hour. Verify proper direction of rotation. After one-half hour, measure current and voltage in each phase, speed and bearing temperature rise measured on the equipment's exterior near each bearing. Record data.

3.20 Accomplish an operational test, with the vaneaxial/tubeaxial fan reassembled, for one hour after bearing and stator temperatures stabilize within one degree Celsius for 3 consecutive 15-minute intervals. Verify proper direction of rotation. Measure current, voltage, frame and bearing temperature rise and speed at 15-minute intervals. Bearing temperatures shall not exceed 180 degrees Fahrenheit, unless otherwise specified in the invoking Work Item or equipment technical manual. Measure hot insulation resistances of winding to ground immediately upon completion of the operational shop test, using a 500-volt megger. Record data.

3.21 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.1.1, 3.1.2, 3.2, 3.3.1 through 3.3.2.1, 3.3.5 through 3.3.7, 3.5.1, 3.5.3 through 3.5.5, 3.6.1 through 3.6.4, 3.9, 3.10, 3.11, 3.17.1.5, 3.18, 3.19, and 3.20 to the SUPERVISOR.

3.22 Install equipment. Install new gaskets conforming to MIL-PRF-900 on disturbed ventilation. Align in accordance with 2.2. Measure facial and peripheral coupling data. Install chocks, shims, shock mounts, sound damping pads, and other accessories. Connect electrical cables/wiring. Bond and ground equipment in accordance with 2.11, using new ground straps. Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of rotating assembly shall not be allowed. Measure the air gap and bearing clearance (sleeve bearing equipment only), insulation resistance (at 500 volts DC), and thrust. Record data.

3.22.1 Accomplishment of pump and driver shaft alignment shall be in accordance with NAVSEA Standard Items. (See 4.8)
3.23 Accomplish an operational test of the assembled equipment at full system capacity for one hour after bearing and stator temperatures stabilize within one degree Celsius for 3 consecutive 15-minute intervals, unless otherwise specified in the invoking Work Item. When temperatures do not stabilize in four hours, stop test and contact the SUPERVISOR. Verify proper direction of rotation. Verify/establish oxide film coating of the commutator/collector rings, using 2.10 for guidance. Measure current, voltage, frame and bearing temperature rise, and speed at 15-minute intervals. Frame and bearing temperature rise and speed is not required for vaneaxial and tubaxial fan assemblies. Bearing temperatures shall not exceed 180 degrees Fahrenheit, unless otherwise specified in the invoking Work Item or equipment technical manual. Record data.

3.23.1 Accomplish the requirements of 3.23 twice for two speed motors, once while operating at low speed, and once while operating at high speed. Record data.

3.23.2 Accomplish the requirements of 3.23 for limited duty motors, for a period of time equal to the duty cycle of the motor. For motors with a duty cycle equal to or less than 30 minutes, measure data every 10 minutes. Record data.

3.23.3 Measure hot insulation resistances of windings to ground immediately upon completion of test, using a 500-volt megger. Record data.

3.24 Submit one legible copy, in hard copy or approved transferrable media, of a report listing data recorded in 3.22 and 3.23 through 3.23.3 to the SUPERVISOR.

4. NOTES:

4.1 Equipment technical manual, Allowance Parts List (APL) (if applicable) and drawings will be listed in the invoking Work Item.

4.2 Shop test of generator will be addressed in the invoking Work Item.

4.3 Utilize Attachment A for determination if the Navy’s motor bearing conversion program for Extended Life Double Seal (ELDS) ball bearings is permissible.

4.4 Data received in 3.17.1.5 shall be forwarded to the SUPERVISOR for the purpose of initiating action ensuring shipboard databases such as the Equipment Guidance List (EGL) are updated to reflect the change in maintenance requirements for converted motors. Additionally, where APL changes are initiated to convert to ELDS bearings, a COSAL feedback report will be submitted, providing the NSN and part number for the ELDS bearing. The following website to initiate changes to Technical Manuals, APLs, etc.: http://www.navy311.navy.mil.
4.5 MIL-B-17931 (Bearings, Ball, Annular, For Quiet Operation) bearings are considered to be Long Lead Time (LLT) material. It is recommended these bearings be provided as Government Furnished Material (GFM).

4.6 If balancing of rotating equipment of 3.12 is required; the use of Category II Standard Item 009-15 "Rotating Machinery; balance" of 2.1 will be specified in the Work Item.

4.7 If cleaning and painting of 3.2.1, 3.3.4, or 3.16.1 is required; the use of Category II Standard Item 009-32 "Cleaning and Painting Requirements; accomplish" of 2.1 will be specified in the Work Item.

4.8 If pump and driver shaft alignment of 3.22.1 is required; the use of Category II Standard Item 009-58 "Pump and Driver Shaft Alignment; accomplish" of 2.1 will be specified in the Work Item.

4.9 Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) Technical Assistance Network (STAN) referred to in 3.18.2 is available at https://semcip.nswc.navy.mil/stan/modules/stan/default.asp.
ATTACHMENT A

1. To reduce motor maintenance and repair costs, the NAVY has implemented a program that allows for the use of Extended Life Double Seal (ELDS) bearings.

2. LIMITATIONS: The ELDS program does NOT apply to motors that are under the cognizance of NAVSEA 08.

3. APLs for motors meeting the conversion criteria requirements have been modified to identify ELDS bearings. In these cases, the APL bearing criteria will override any specifications delineated in the equipment technical manual or the motor "Original Equipment Manufacturer (OEM)" drawings. If ELDS bearings are not indicated in an APL, the following motor criteria must meet the applicability specifications for motors to undergo conversion to ELDS bearings:

   3.a Motor must be installed on a surface ship and must NOT be under the cognizance of NAVSEA 08.

   3.b Commercial motors are not eligible. Motors must have been furnished to the NAVY in accordance with MIL-DTL-17060 (Motors, Alternating Current, Integral Horsepower, Shipboard use), MIL-M-17413 (Motors, Direct Current, Integral H.P., Naval Shipboard [NAVY]) or MIL-M-17059 (Motors, 60 Cycle, Alternating Current Fractional H.P. [Shipboard Use]).

   3.c Motors using one or more noise-quiet bearings per MIL-B-17931 (Bearings, Ball, Annular, For Quiet Operation) are NOT eligible for ELDS conversion.

   3.d Bearings originally furnished with the motor must be type 111 bearings per FF-B-171. Motors are NOT to be considered as candidates for ELDS conversion in situations where the equipment technical manual and/or the OEM motor drawings originally specified FF-B-171 bearings but have notes indicating that replacement bearings are to be in accordance with MIL-B-17931 (Bearings, Ball, Annular, For Quiet Operation).

   3.e The use of ELDS bearings is limited to motors where the full load speed and the size of both bearings are as follows:

      1. Maximum bearing size 306 or 206 and full load rpm between 1,801 and 3,600 rpm.
      2. Maximum bearing size 313 or 213 and full load rpm between 1,201 and 1,800 rpm.
      3. Maximum bearing size 318 or 218 and full load rpm less than 1,200 rpm.

4. The repair process using ELDS bearings includes the following requirements:

   4.a Only ELDS bearings, in accordance with the following table (Attachment A / Table 1), can be used. Other double seal bearings will not provide an acceptable bearing life.
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4.b Both bearings of each converted motor must be ELDS bearings.

4.c A label plate must be permanently attached to the motor indicating "Do Not Lubricate".

4.d Grease fills and drains, if present, must be fitted with a pipe plug, securely fastened. Fittings to accommodate grease guns must be replaced with pipe plugs."
### SECTION 1. NAME PLATE DATA

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### SECTION 2. INPLACE INSPECTION

**Caution:** Observe applicable safety procedures

**Satisfactory**

**Unsatisfactory**

- Insulation Resistance in Megohms (Refer to Table 3-2)
- Polarization Index Test 1 Min, 10 Min, Ratio
- Mechanical Condition (Refer to Paragraph 3-6)
- Continuity of Windings (Refer to Paragraph 3-5.1)
- Current Balance (Use limits prescribed in Paragraph 3-10)
- Condition of Brushed and Commutator
- Condition of Cables and Controller to Motor
- Condition of Controller

### SECTION 3. INCOMING INSPECTION (GENERAL)

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- Insulation Resistance to Ground
- Resistance Balance
- With Digital Ohmeter

**Action**

- Recondition
- Rewind

13 of 15

Item No: 009-33

FY-19 CH-4
### SECTION 4. RECONDITIONING

**AFTER STEPS OF:**

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**ACTION**

VARNISH

**REWIND**

### SECTION 5. AFTER RECONDITIONING OR REWINDING AND VARNISHING

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<td>NO-LOAD TEST</td>
<td>SAT/UNSAT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE A</th>
<th>AMPERES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHASE B</td>
<td>AMPERES</td>
</tr>
<tr>
<td>PHASE C</td>
<td>AMPERES</td>
</tr>
</tbody>
</table>

14 of 15
### HOUSING DIAMETERS

<table>
<thead>
<tr>
<th>DRIVE END</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTER END</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*FOR BEARING JOURNAL WIDTH LESS THAN 1 INCH ONLY SIX READINGS ARE REQUIRED.*

### SHAFT DIAMETERS

#### DRIVE END

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### OUTER END

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MECHANICAL CONDITION

(LOSS OF LUBE, BURNED ETC.)

---

**A** SHAFT RADIAL RUNOUT

**B** FACE RUNOUT, BEARING INNER RING

- DRIVE END
- OUTER END

**C** FACE RUNOUT, BEARING OUTER RING

- DRIVE END
- OUTER END

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ITEM NO: 009-33

FY-19 CH-4