



TECHNICAL SPECIFICATIONS

**For Rebuilding the Delco Remy
50DN 24 Volt Generator**





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SPEC NO: TS-50DN-1

Application:

All buses equipped with oil-cooled, 24 Volt DC, 50DN generators (belt or gear driven), originally manufactured by Delco Remy.

Scope:

This specification lists the requirements for rebuilding 50DN generator components when used either for module or whole generator purposes.

General Requirements:

Genuine Delco Remy parts, materials, and procedures shall be utilized in all rebuilding operations.

Specific Requirements:

1. Disassemble generator into sub-assemblies: field coil, stator, drive-end and diode-end housings, and rotor.
2. Thoroughly clean sub-assemblies with a suitable solvent and dry with compressed air. Remove all paint before rebuilding.
3. Inspect all cast and machined surfaces for damage, cracks, wear, scratches, and grooves. Reject any components that are not repairable. Any component that is rejected must be replaced with genuine Delco Remy components. Inspect and repair all threaded holes utilizing helicoils or equivalent.
4. To maintain proper internal bearing clearances, drive-end housing bearing bores must conform to OEM specifications.
 - Drive-end housing mounting pads must be upgraded with slots for keyed-mount applications.
5. All insulators, seals, gaskets, oil lines, and O-rings must be replaced. All hardware must be inspected for wear or damage and replaced as required. All hardware must be torqued to Delco Remy specifications. (Refer to Figure 5, page 10 for specific details.)

Details of Field Coil Assembly:

6. Inspect field coil for OEM dimensions and ensure assembly is clean and oil free.
7. If the field coil needs to be replaced, use only genuine Delco Remy field coils.
8. If the coil is to be re-wound, use only molded fiber-filled nylon insulator spools and 17 AWG Thermal Class 200C heavy build polyester (amide-imide top coat) wire.
9. Perform the following electrical tests for re-wound field coils:
 - Utilize an Ohmmeter to verify total resistance of 3.0 – 3.4 Ohms through coil windings.
 - Utilize a Hi-Pot tester (1000 Vrms AC) to inspect windings for ground condition to frame.
 - If the coil is acceptable, proceed to Step 10 below. If coil fails, determine cause and repair as required.



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10. Replace two (2) wire lead insulators with sleeving equivalent to that used on the OEM field coil. Clean terminal studs and wire ends with wire brush to ensure proper electrical connection during soldering process. Stake and solder (100% tin) wire ends to terminal studs.
11. Apply pure epoxy impregnating varnish to windings. Fully cure epoxy per manufacturer's recommendations.
12. Perform the following electrical test after coil impregnation (coil must cool to room temperature):
 - Utilize a 24 Volt DC power source to energize the field coil and verify current draw between 7.1 and 8.0 Amperes (adjusted to 80° F ambient temperature).
 - Repeat Hi-Pot (1000Vrms AC) test for grounded condition. If coil is acceptable, proceed to Step 13 below. If coil fails, determine cause and repair as required.
13. The following Delco Remy upgrades, if necessary, must be performed to each field coil:
 - Cross drill field coil frame to allow improved oil flow and cooling capabilities.
(Refer to Figure 1, page 6 for specific details.)

Details of Stator Assembly:

14. Stator windings cannot be reused. Using practices that protect the integrity of the housing and the lamination stack, remove the old windings.
15. When re-winding the stator, use only OEM size wire coated with heavy build, Thermal Class 220 polyimide (HML) insulation meeting the latest NEMA MW 1000 requirements. Use of glass sleeving will be minimal.
16. The inside diameter of the finished stator must be 6.457" – 6.461". This tolerance is to prevent excessive clearance between the rotor and the stator, which can result in loss of efficiency and output.
17. Coils and welds must be completely fused using brazing alloy (80% copper, 15% silver, 5% phosphorus) to prevent loss of electrical conductivity.
18. Coil ends must be unaffected when subjected to 350° F operating temperatures and submerged in multi-viscosity high detergent oil. Connections must be resistance welded. Coat all welded connections using a high grade 80%-20% tin-lead solder.
19. Using strict adherence to the manufacturer's recommendations, apply and fully cure pure epoxy impregnating varnish to windings.
20. Insert stator into heated frame to accomplish shrink fit. Drill frame for locking screws, and make final frame register and o-ring cuts, if needed. To ensure concentricity with frame registers, final bore cut is made last.
21. Terminals and flexible leads may be attached with silver solder or resistance welds.
22. Perform an insulation test utilizing a "High Potential" insulation test device (such as Slaughter AC Hi-Pot Tester – Model 1101-2.5) set at 1500 Vrms AC to ground (stator housing).



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Note: Care should be taken to limit duration of test to prevent excessive heat that may damage the properties of the insulation.

- If stator is acceptable, proceed to Step 23 below. If stator fails, determine cause and repair as required.
23. The following Delco Remy upgrades, if necessary, must be performed to each stator if not the most recent design:
- Stator frames must be drilled and tapped to accommodate front bearing oil line clamp.
 - Rigid electrical leads must be upgraded to new flexible lead design.
 - Update stator-locking process by drilling holes through stator housing into stator lamination stack. The latest Delco Remy configuration is three (3) screws equally spaced at 120° intervals. (Refer to Figure 2, page 7 for specific details.) Drill holes and install thread forming M8 x 1.25 x 18mm flange head screws. Seal threads with anaerobic single component adhesive with – 65° to + 400° F temperature range. (Refer to Figure 3, page 8.) Torque to 70-80 in-lb.
 - Update oil slots in stator lamination stack. The latest Delco Remy configuration is four (4) oil slots. (Refer to Figure 4, page 9 for specific details and orientation.) All machine work must meet latest Delco Remy standards to allow free oil flow through stator laminations. Minimum required oil flow rate through generator is 2.0 gal./min.

Details of Diode-End Housing Assembly:

24. The diode brackets must be inspected for wear or damage. If necessary, replace parts as required. All diodes must be replaced with new Delco Remy part number 1894867. All insulators, including stand-off studs, must be removed and replaced. Diodes, studs and lead connections must be torqued to Delco Remy specifications.
25. The following Delco Remy upgrades, if necessary, must be performed to diode-end housing:
- Enlarge inlet oil port to I.D. of 0.136" to allow improved oil flow and cooling capabilities. Stamp housing next to port with ¼" "X" impression when making this upgrade.
 - Discard steel plate end cover and replace with Delco Remy trademarked cast aluminum plate, o-ring seal and longer screws.

Details of Rotor Assembly:

26. Inspect rotor and shaft for signs of damaged threads or splines, cracks, distortion, and signs of overheating. If shaft is damaged, replace rotor assembly.
27. Non-conforming parts should be replaced with Delco Remy approved components. Maximum height of shaft weld must not exceed 0.080" above end of shaft.
28. The finished dimensions of the inner and outer diameters of the rotor must meet the following tolerances:
- Inner Diameter: 4.584" – 4.588"
 - Outer Diameter: 6.416" – 6.420"
 - Total indicated run-out (T.I.R.) between the inner and outer diameters with respect to the central axis of shaft must not exceed 0.004".
29. The following OEM upgrades, if necessary, must be performed to the rotor:



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- Upgrade the metallic ring between the fingers of the rotor to latest Delco Remy configuration, which utilizes a 304 stainless steel ring, pressed into place and T.I.G. welded. Utilize the improved rotor welding process as defined by Delco Remy. (Fully automated T.I.G. welding process which ensures even penetration and eliminates flashing at start of weld by utilizing pulse and ramp-up controllers.)
 - Machine clearance step on rotor O.D. to facilitate installation of rotor in stator.
30. Balance rotor to OEM specifications of 0.125 inch-ounces (dynamic balance). If necessary, drill holes at root of rotor fingers to remove weight during balancing process. Balance holes shall not penetrate rotor I.D.

Final Assembly:

31. Thoroughly blowout and clean all passages and surfaces.
32. Assemble module components or generator per OEM standards.
33. The exterior of stator, drive-end and diode-end shall be painted using corrosion resistant coatings. Care must be taken not to over-spray the internal components.
34. The reclaimed unit shall be free of nicks, sharp edges, previous defects and shall conform to latest Delco Remy specifications.
35. Generator, or module and rotor, shall be sealed and boxed as a set to prevent water and dirt from entering the assembly during shipping and storage. For module and rotor packages, a separate kit must be placed inside the box. The kit contains the following parts that conform to the latest Delco Remy standards.

Gear Drive Kit – Part No. 10459565

Roller bearing
10-Ball bearing
6 Screws for inner bearing retainer clamp
Outer bearing O-ring clamp
Bearing space collar
Rectifier end cover O-ring
Stator/drive end O-ring

Belt Drive Kit – Part No. 10459566

Roller bearing
13-Ball bearing
6 Screws for inner bearing retainer clamp
Outer bearing O-ring clamp
Bearing space collar
Rectifier end cover O-ring
Stator/drive-end O-rings
Outer bearing plate retainer gasket
Outer bearing plate seal
Rotor shaft washer
Rotor shaft nut
Rotor shaft O-ring



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FINAL REQUIREMENTS

1. All reclaimed module and rotor sets shall conform to latest Delco Remy upgrades and improvements.
2. Upon final assembly of module, rotor and drive-end frame, the generator must meet the following criteria:

Output Specifications*

1800 Generator RPM – 175 Amps @ 28 Volts DC

3000 Generator RPM – 250 Amps @ 28 Volts DC

Rated Hot Output**

5000 Generator RPM – 270 Amps @ 28 Volts DC

Output Endurance Test***

4000 Generator RPM – 260 Amps @ 28 Volts DC
for 7 minutes

* If generator output is checked without a regulator, output should be 5-10% higher.

** Rated hot output is at 5000 RPM and oil temperature between 180-200° F.

*** During performance tests, allow oil to gravity drain from generator. Vacuum assisted draining may mask improper assembly or components.



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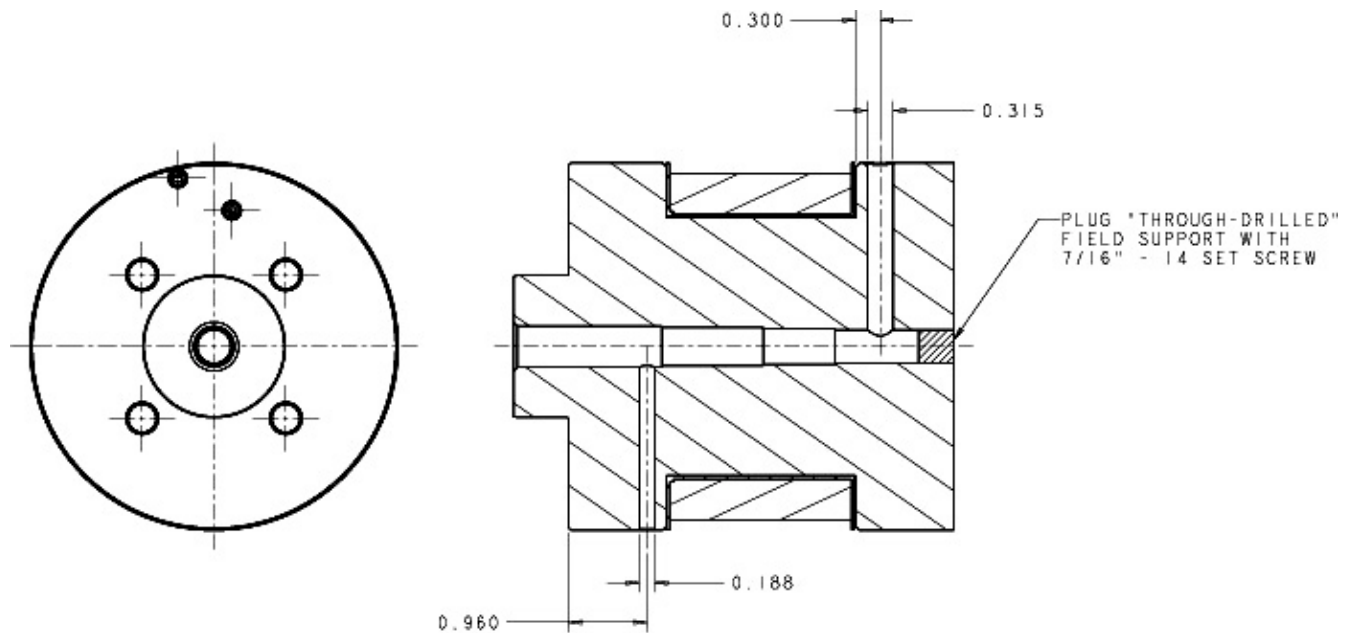


Figure 1
(Detail – Field Coil)

[Note: Tap “through-drilled” oil hole to 7/16” – 14 thread. Install 7/16” – 14 plug. Stake threads after installation. Cross drill field coil frame using 3/16” and 5/16” drill bits as shown above. Holes must intersect with center hole. Deburr edges of hole and carefully wash or blow out chips. Orientation of holes should be at 12:00 and 6:00 positions with reference to the wire leads. If other holes are found, indicating attempted Delco Remy upgrade, tap holes and plug as required.]



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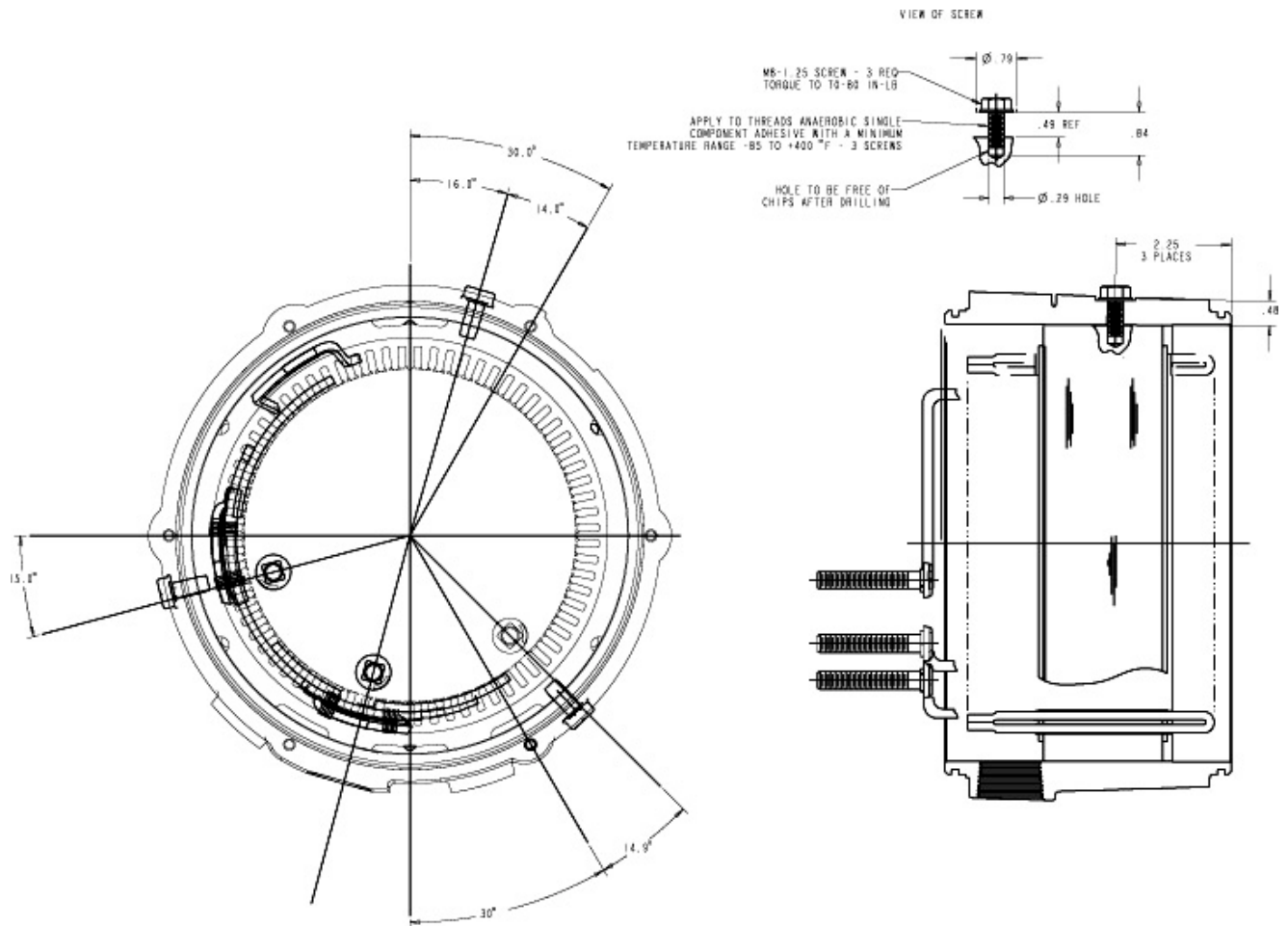
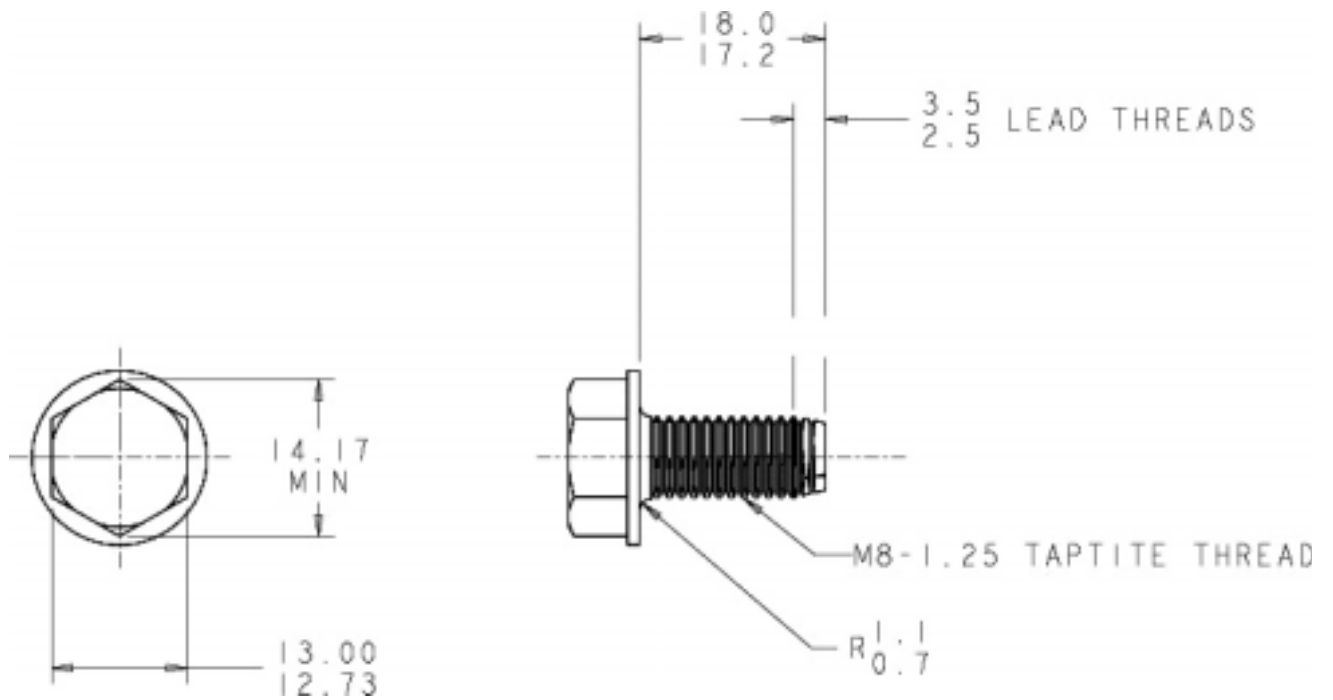


Figure 2
(Detail – Stator Locking Process)

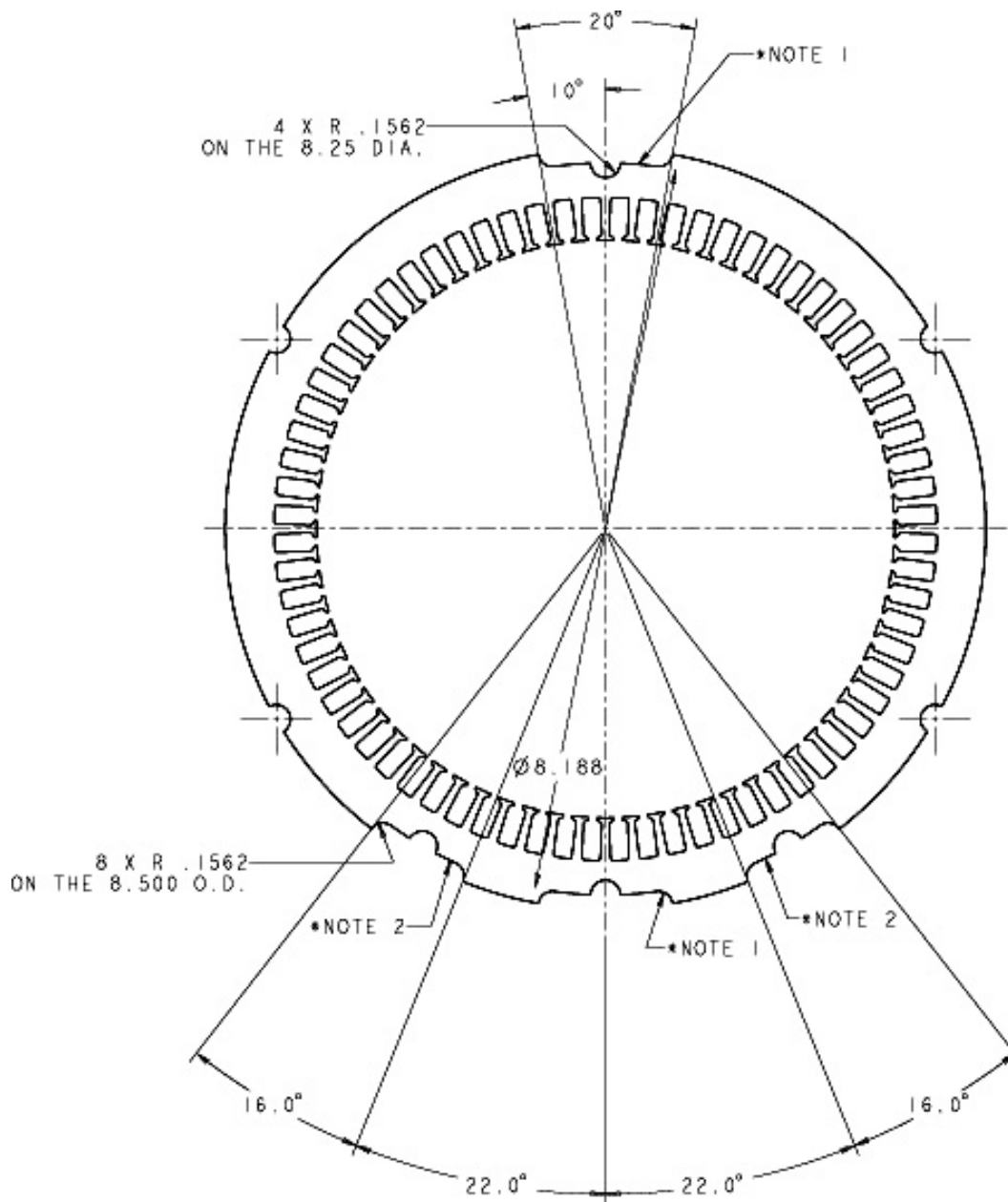


THREAD FORMING TRI-LOBE



SAE Grade 8 – Zinc & Dichromate Plated

Figure 3
(Detail – Screw)



- * ADDITIONAL OIL SLOTS REQUIRED – 4 LOCATIONS
- 1) 1-15/32" W x 1/8" H x 1/8" RADIUS CURVE
 - 2) 1-6/32" W x 1/8" H x 1/8" RADIUS CURVE

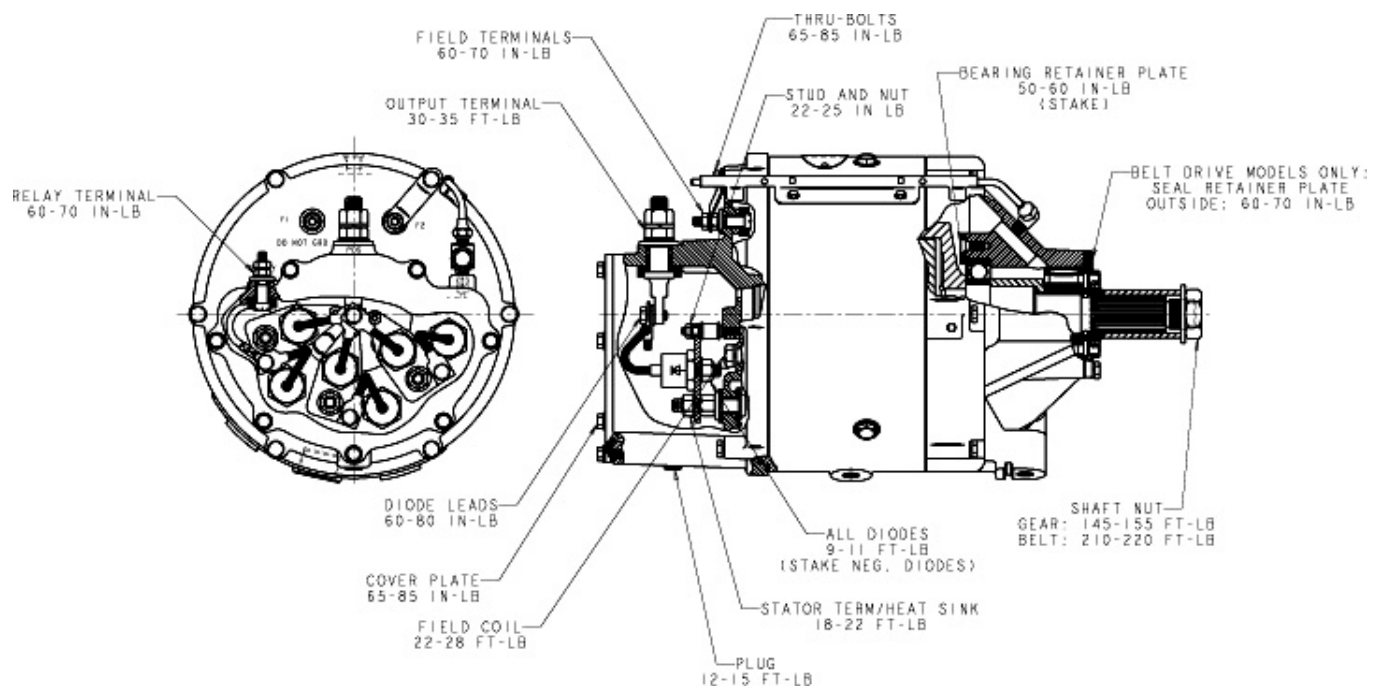
FIGURE 4
(Detail – Oil Slots)



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**FIGURE 5
(Torque Specs)**



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