SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J2075

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Superseding J2075 MAR2001

Alternator Remanufacturing/Rebuilding Procedures Includes Passenger Car, Heavy Duty, Industrial, Agricultural, and Marine

1. *Scope*

1.1 These remanufacturing procedures are recommended minimum guidelines (with the understanding that being more critical is acceptable) for use by remanufacturers/rebuilders of alternators to promote consistent reliability, durability, and safety of remanufactured alternators. Installation of remanufactured or rebuilt products is often an economical way to repair an application even though the products may not be identical to original equipment parts. Before processing any part, a remanufacturer/rebuilder should determine if the original design and present condition of the core are suitable for remanufacturing/rebuilding so as to provide durable operation of the part as well as acceptable performance when installed on the application. The remanufacturer/rebuilder should also consider the safety aspects of the product and any recommendations of the original manufacturers related to remanufacturing or rebuilding this product.

1.2 While these procedures are meant to be universal in application, various product types have unique features of dimension and design which may require special remanufacturing/rebuilding processes and tests that are either not covered by or are exceptions to these procedures.

1.3 **Rationale—**The Service Development Technical Committee requests that this document be re-classified as "Noncurrent." The reason for the change of designation is that we no longer have any members with expertise to maintain the document.

2. *References*

2.1 **Applicable Publications—**The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J56—Road Vehicles—Alternators with Regulators—Test Methods and General Requirements
SAE M-105—SAE Glossary of Automotive Terms, Edition 2, June 1992

2.1.2 FEDERAL TRADE COMMISSION PUBLICATION—Available from the Superintendent of Documents, U. S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

"Federal Trade Commission Guides for the Rebuilt, Reconditioned and Other Used Automotive Parts Industry" 16CFR20- 2/27/79 Para 20.0, 20.1, 20.2, 20.3

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3. Definitions—Drawings shown in this Recommended Practice are intended for illustration only and not meant to depict any specific unit manufacturer.

3.1 Heavy-Duty (Class 8) Trucks—A truck or tractor rated by the manufacturer and certified to the US federal government to be for operation at a gross vehicle weight or a gross combination weight of 14 969 kg (33 001 lbs) and over

3.2 Medium-Duty (Class 6 and 7) Trucks—A truck or tractor rated by the manufacturer and certified to the US federal government to be for operation at a gross vehicle weight or a gross combination weight of 8846 kg (19 501 lbs) to 14969 kg (33 000 lbs).

3.3 Primary Air Gap—In a magnetic circuit, primary air gap is defined as an air gap that is designed into the circuit, e.g.,- pole shoe to armature air gap.

3.4 Ground Test—This is a test to determine insulation integrity.

3.5 Proper Soldering Techniques—Make all soldered/welded connections using a non-corrosive method. Using any corrosive flux such as acid-core solder can cause deterioration of electrical connections and eventual failure of the alternator. A sound mechanical connection must be made prior to soldering.

3.6 DE: Drive End—This refers to the end of the alternator from which the rotor is driven. Typically the pulley or gear is at this end of the alternator.

3.7 RE: Rectifier End—This is typically the end of the alternator that the rectifier bridge resides at. Usually it is the opposite of the Drive End.

3.8 SRE: Slip Ring End—Usually the same as the RE.

3.9 Turns—Refers to the number of wraps of wire in a loop, around a spool.

3.10 Slot Fill—Refers to the volume of wire placed within any given slot of the stator.

3.11 Delta Wound—A manner of winding a stator such that either end of each of three (typical) stator legs is connected together. Each pair of ends are usually connected to the rectifier bridge. See Figure 1.

FIGURE 1—TYPICAL STATORS

3.12 Wye Wound—A manner of winding a stator such that one end of each of three (typical) stator legs is connected together. The remaining ends are typically connected to the rectifier bridge. The three ends that are connected together may or may not be connected to the rectifier bridge. See Figure 1.

3.13 Serpentine Pulley—A multi grooved pulley design that uses a flat belt designed with many small vees on the drive/driven surface. See Figure 2.

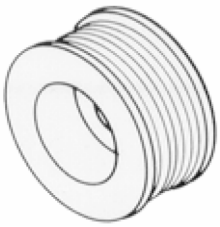

FIGURE 2—TYPICAL SERPENTINE PULLEY

3.14 Grooved Pulley—A typical Vee groove design. May have multiple grooves. See Figure 3.

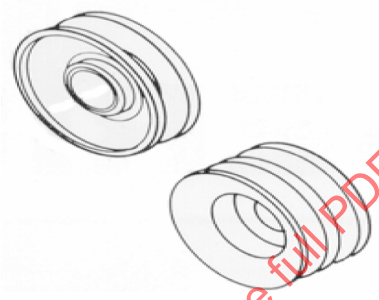

FIGURE 3—TYPICAL GROOVED PULLEY

3.15 Rebuilt/Remanufactured—See SAE Glossary for definitions.

3.16 Lateral Runout—Total Indication Movement (TIM) when measuring the movement of one face of the pulley groove in the axial direction of the pulley when the pulley is rotated one revolution.

4. Remanufacturing Procedure

4.1 This SAE Recommended Practice provides a procedure for remanufacturing/rebuilding alternators, similar to the alternator shown in Figure 4.

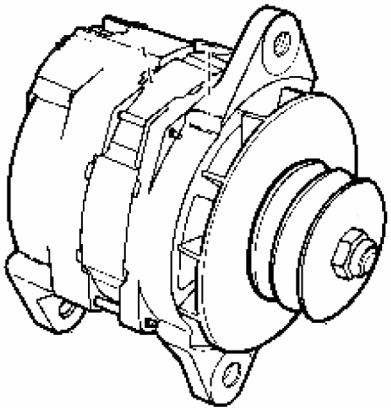

FIGURE 4—ALTERNATOR ASSEMBLY

4.2 The selection of replacement parts used in the remanufacturing/rebuilding process is critical to the quality, durability, and reliability of the end product. All replacement parts should be carefully evaluated prior to use.

5. Alternator Disassembly

5.1 The alternator is to be disassembled into components and sub-assemblies. Care should be taken to insure that these parts are not damaged by careless handling during the remanufacturing/rebuilding process.

5.2 Scrap the following parts:

a. Needle bearings
b. Brushes
c. Brush Springs

5.3 Clean all other components parts.

6. Rotor Assembly

6.1 Rotor Shafts

6.1.1 Inspect rotor shaft threads.

6.1.1.1 Threads must be capable of holding proper torque specifications.

6.1.1.2 Threads may be repaired to meet 6.1.1.1.

6.1.2 SHAFT STRAIGHTNESS

6.1.2.1 Bent shafts may be straightened to within 0.076 mm (0.003 in)

6.1.3 Inspect rotor shaft surface at bearing contact areas.

6.1.3.1 Surfaces to be free of grooves, scars, pits and signs of wear.

6.1.3.2 Gauge rotor shaft for proper bearing fit.

6.2 Rotor Body

6.2.1 Check OD as required.

6.2.2 Inspect fan, on body as required, for cracks/breaks.

6.3 Slip Ring

6.3.1 Check OD as required.

6.3.2 Inspect for acceptable slip ring runout 0.050 mm (0.002 in) maximum. New slipring may be installed if slip ring cannot be repaired by turning OD and polishing.

6.3.3 Maintain proper finish.

6.4 Electrical

6.4.1 Inspect rotor fin insulation integrity between wire, slip ring pole pieces and rotor shaft (Ground Test).

6.4.2 Verify rotor current and air gap.

6.5 If any component of rotor is changed; rotor must be balanced to original equipment standard.

7. Stators

7.1 Mechanical

7.1.1 Check OD, ID, and Thickness

7.1.2 The Phase Group should be firmly bonded to the other phases and the insulated stator stack.

7.1.3 Revarnished stators should be processed to the varnish manufacturer specifications to obtain maximum penetration.

7.1.4 Stators with distorted laminations from rotor drag should be scrapped.

7.1.5 ID should be wired brushed or sanded to insure proper rotor clearance. Keep in mind the effect of increased air gap on performance.

7.1.6 All rust should be removed.

7.1.7 The mating surface of the end frames must be finished to allow proper end frame seating.

7.1.8 The stator leads should be tinned with solder.

7.1.9 Connector eyelets should be correctly sized for both the wire and the mating component. All eyelets must be crimped to the stator leads. Some may be soldered after crimping depending on design.

7.1.10 If strapping star lead is required, it should be done prior to varnishing and baking and it should also meet height and side clearance requirements.

7.1.11 On press in stators the OD must be finished to allow proper housing fit.

7.1.12 Lead extensions should meet all dimensional characteristics with all connections being crimped and soldered using proper soldering techniques.

7.1.13 Units with wire rubs or corrosion indications should be replaced.

7.1.14 Units with burned or discolored wires in single-phase groups or phases should be scrapped. If any wire indicated varnish flaking or flake when scratched with a metal surface they should be replaced.

7.2 Electrical

7.2.1 Inspect stator for insulation integrity between wire and stator lamination. (Ground Test).

7.3 Check for phase balance

8. Rectifier

8.1 Mechanical

8.1.1 Clean the rectifier assembly with a non-destructive, static free method.

8.1.2 Inspect rectifier assembly for any defects such as distortions, corrosion or cracks which would affect the functionality of the part. Scrap rectifiers that cannot be restored to an acceptable condition.

8.1.3 Check the ID of all mounting holes. Check the integrity of all other functional holes and machined surfaces on the rectifier. Threaded holes should be visually inspected, gauged, and re-tapped to the same size if necessary. Threads that are not the proper size can be restored by using a thread insert of the same size.

8.1.4 Visually check all solder joints for any voids or other signs of over heating.

8.2 Electrical

8.2.1 Assure that the component is compatible with the original equipment application.

8.2.2 At rated voltage[1], check for reverse leakage and short.

8.2.3 At rated current[1], check for forward voltage drop and open circuit.

8.2.4 Check avalanche set point[1] as required by application.

9. Regulator

9.1 Mechanical

9.1.1 Clean the regulator assembly with a non-destructive, static free method.

9.1.2 Inspect regulator assembly for any defects such as distortions, corrosion or cracks which would affect the functionality of the part. Scrap regulators that cannot be restored to an acceptable condition.

9.1.3 Check the ID of all mounting holes. Check the integrity of all other functional holes and machined surfaces on the regulator. Threaded holes should be visually inspected, gauged and re-tapped to the same size if necessary. Threads that are not the proper size can be restored by using a thread insert of the same size.

9.2 Electrical

9.2.1 Assure that the component is compatible with the original equipment application.

9.2.2 Check voltage set point[1].

9.2.3 Check voltage saturation[1].

9.2.4 Check applicable regulator functions[1].

9.2.4.1 Load response.

9.2.4.2 Over/under voltage indications.

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1. Refer to the component manufacturer for performance specifications.

9.2.4.3 Choke circuit.

9.2.4.4 Secondary regulations.

9.2.4.5 Light circuits.

9.2.4.6 Any other input/output circuits.

9.2.4.7 Time delay.

9.2.4.8 Secondary sense circuits.

9.2.5 Check regulator [2] parasitic draw.

10. RE/DE Housings

10.1 Inspect housings for any defects such as distortions, corrosion or cracks which would affect the functionality of the part. Scrap frames that cannot be restored to an acceptable condition.

10.1.1 A cracked housing in a non-stressed area can be repaired, depending on the extent and location of the crack or damage.

10.2 Check ID of bearing bore for excessive wear. Repair as necessary to original dimensions.

10.3 Check the ID of all mounting holes. Check the integrity of all other functional holes and machined surfaces in the housing. Threaded holes should be visually inspected, gauged, and re-tapped to the same size if necessary. Threads that are not the proper size can be restored by using a thread insert of the same size.

10.4 Installation of new bearings is recommended.

11. Fans and Pulleys

11.1 For alternators furnished without fan/pulley, a suitable spacer and nut should be installed on the shaft to restrain the rotor from axial movement during shipment and handling.

11.2 Pulleys

11.2.1 Pulley grooves must be free of wear, nicks, and dents. Outer shoulder of serpentine pulleys must not be dented.

11.2.2 Inspect for cracks or other defects which may affect the functionality of the part. Replace if necessary.

11.3 Fans

11.3.1 Press on pulley styles should be checked for correct shaft hole ID.

11.3.2 Fans should be checked for lateral runout, cracks, damage, and missing parts.

2. Refer to the component manufacturer for performance specifications.