

**Annex F**  
**SPECIFICATION**  
**FOR**  
**REBUILDING THE LEECE NEVILLE 7518 JA 60 AND 100 AMP ALTERNATOR (USED**  
**IN TRUCKS, UTILITY, LIGHT, 4 BY 4 MILITARY**  
**DESIGN ILTIS CDN SERIES)**  
**NSN 2920-21-896-1329 AND NSN 2920-21-896-1386**

**1. SCOPE**

1.1 Scope.- This specification covers the requirement for rebuilding the Leece Neville 60 and 100 Amp alternators used in Trucks, Utility, Light, 4 by 4 Military Design, Iltis Canadian Series used by the Canadian Forces. This specification includes rebuild standards, procedures, testing, packaging and quality assurance provisions.

1.2 Purpose.- The purpose of this specification is to establish high-quality standards for rebuilding the alternators to provide long trouble-free life.

1.3 Responsibility.- The contractor shall be responsible for meeting the requirements specified herein.

**2. APPLICABLE DOCUMENTS**

2.1 Government documents.- The following documents form part of this specification to the extent specified herein. Unless otherwise specified, the issue or amendment of documents effective for a particular contract shall be that in effect on the date of the request for proposal.

AQAP-4	NATO Inspection System Requirements for Industry
C-04-010-022/VP-001	Preservation for Storage and Shipment of Vehicles and Vehicular Components
MIL-B-131	Barrier Material, Water-Vapour Proof, Flexible, Heavy (36 inch wide roll)
D-84-010-001/SF-001	Enamel, Alkyd, Lustreless, Infrared Reflective, Camouflage

D-30-108-000/SF-001  
ANNEX F

3.1.7 The contractor shall ensure that all components are secured as per Torque Standards listed in Table IV.

3.1.8 Upon completion of rebuild, the alternator shall consist of all the components listed in Table I. Figures 1, 2 and 3 are provided for component identification and location within the alternator.

3.1.9 Upon completion of rebuild, the alternator shall be tested and must perform to the standards as listed in 3.5.

3.2 Alternator components.- The following Table lists all of the components comprising the Leese Neville 60 and 100 Amp alternator; see Figures 1, 2 and 3 for component identification and location within the alternator assembly.

**Table I Alternator components**

Figure	Item	NSN	MRN	Description	Qty
1	1	2920-21-896-1329	B 183 998 001	Alternator Assy (60 Amp)	1
1	1	2920-21-896-1386	B 183 998 155	Alternator Assy (100 Amp)	1
2	1	5310-00-276-8631	2771	Nut (1/4-20)	2
2	2	5310-00-775-5182	2523	Washer - Lock (1/4)	2
2	3	2920-21-896-1394	96225	Regulator Assy	1
2	4	5340-01-109-9818	78527	Cap	2
2	5	5310-00-429-3135	4340	Nut - Hex (10-24)	1
2	6	5310-00-775-5139	2434	Washer - Lock (ND-10)	1
2	7	5340-01-107-7039	77976	Plug	1
2	8	5977-00-764-5530	77302	Brush	2
2	9	5305-00-450-0464	58432	Screw - Terminal	1
2	10	5305-01-024-2204	78337	Screw (10-32 X 3/4)	2

**Table I Alternator components (cont'd)**

Figure	Item	NSN	MRN	Description	Qty
2	31	5310-00-032-1814	3231	Washer - Lock	1
2	32	5310-01-024-3109	2364	Nut (5/16-18)	1
2	33	5310-00-429-3156	59982	Nut (1/4-20)	1
2	34	5305-00-450-0461	73659	Screw - (10-32 X 1/2)	3
2	35	5970-00-472-4588	73635	Insulator	1
2	36	5961-01-129-1454	79026	Diode - Trio	1
2	37	5310-00-429-3453	75451	Washer - Belleville	3
2	38	5305-21-896-9749	96153	Screw - Pan Hd (10-32)	3
2	39	2920-21-896-1400	96235	Jumper	1
2	40	5940-01-103-8311	78705	Jumper	1
2	41	5330-00-406-0664	57611	Ring - Sealing	1
2	42	5977-01-105-2549	78524	Housing - Brush Holder	1
2	43	5305-00-984-6192	13622	Screw (8-32 X .44)	4
2	44	5310-01-024-3110	5622	Nut - Hex Hd (6-32)	2
2	45	5310-00-665-3803	Z 089 097 621	Washer - Lock (ND 6S Proof)	2
3	1	5310-21-896-9753	74107	Nut - Hex (1/2-20)	1
3	2	5315-00-616-5523	5399	Key - Woodruff	1
3	3	3020-21-897-5891	3482132-1	Pulley	1
3	4	2920-21-896-1385	75633	Fan Assy	1
3	5	5365-21-896-7218	59324	Spacer - Fan	1

**Table II Mandatory parts replacement**

Figure	Item	NSN	MRN	Description	Qty
2	1	5310-00-276-8631	2771	Nut (1/4-20)	2
2	2	5310-00-775-5182	2523	Washer - Lock (1/4)	2
2	4	5340-01-109-9818	78527	Cap	2
2	5	5310-00-429-3135	4340	Nut - Hex (10-24)	1
2	6	5310-00-775-5139	2434	Washer - Lock (ND-10)	1
2	7	5340-01-107-7039	77976	Plug	1
2	8	5977-00-764-5530	77302	Brush	2
2	9	5305-00-450-0464	58432	Screw - Terminal	1
2	10	5305-01-024-2204	78337	Screw (10-32 X 3/4)	2
2	11	5310-00-775-5139	2434	Washer - Lock (ND-10)	2
2	12	5310-00-361-9897	2385	Washer - Guard	2
2	13	5310-01-023-8927	52066	Washer - Insulation	2
2	15	5305-00-451-1623	73543	Screw - Hex (6-32)	3
2	16	5340-00-431-7066	73760	Clamp	1
2	19	5970-21-897-0353	73547	Bushing - Insulation	2
2	20	5970-00-160-4001	73546	Bushing - Insulation	2
2	21	5310-21-896-9757	99133	Washer - Guard	4
2	22		78336	Screw - Terminal	1
2	23	5970-21-897-0354	97379	Bushing - Insulation	2
2	25	5330-00-019-0635	57597	O Ring	1
2	26	5305-00-777-2284	5179	Screw - (10-32 X 1/2)	2

D-30-108-000/SF-001  
ANNEX F

**Table II Mandatory parts replacement (cont'd)**

Figure	Item	NSN	MRN	Description	Qty
2	30	5310-00-429-2686	73009	Nut (5/16 X 18)	1
2	31	5310-00-032-1814	3231	Washer - Lock	1
	32	5310-01-024-3109	2364	Nut - (5/16-18)	1
2	33	5310-00-429-3156	59982	Nut - (1/4-20)	1
2	34	5305-00-450-0461	73659	Screw - (10-32 X 1/2)	3
2	35	5970-00-472-4588	73635	Insulator	1
2	37	5310-00-429-3453	75451	Washer - Belleville	3
2	38	5305-21-896-9749	96153	Screw - Pan Hd (10-32)	3
2	41	5330-00-406-0664	57611	Ring - Sealing	1
2	43	5305-00-984-6192	13622	Screw - (8-32 X .44)	4
2	44	5310-01-024-3110	5622	Nut - Hex Hd (6-32)	2
2	45	5310-00-665-3803	Z 089 097 621	Washer - Lock (ND 6S Proof)	2
3	1	5310-21-896-9753	74107	Nut - Hex (1/2-20)	1
3	2	5315-00-616-5523	6399	Key - Woodruff	1
3	6	5310-00-429-3453	75451	Washer - Belleville	3
3	7	5305-00-450-0462	59972	Screw - (10-32 X 5/8)	3
3	8	3120-21-897-5886	96224	Insert - Mounting	2
3	10	3110-00-464-2614	57166	Bearing - (304)	1
3	12	5305-00-450-0463	58754	Screw - (10-32 x 7/16)	4
3	14	6150-00-504-1822	30300	Wedge - Slot	1

(b) Output voltage load test

- i Run the alternator at approximately 3000 RPM with a load not exceeding output rating placed on it.
- ii Measure the output voltage; it should be a minimum of 27 Vdc.
- iii If output voltage is less than 27 volts, perform the alternator full-fielded output voltage test.
- iv If output voltage is 27 volts or higher, all major components of the alternator are serviceable; disassemble, clean, and rebuild the alternator using mandatory replacement parts only.

(c) Alternator full-fielded output voltage test

- i Connect a jumper wire to the alternator negative terminal.
- ii Attach a short piece of wire (eg, a paper clip) to the other end of the jumper cable and insert the wire into the small hole in the end of the brush holder so that the wire contacts the outer brush terminal, see Figure 4.
- iii Run the alternator at approximately 1200 RPM and observe the output voltage.
- iv If the voltage does not rise, the fault is within, the alternator and further tests must be conducted at time of disassembly.
- v If the voltage rises, the voltage regulator or diode trio are at fault and must be tested.

3.4.2 Disassembly.- To disassemble the alternator, see Figure 5 and proceed as follows.

**NOTE**

All nuts and bolts are standard size.

- (a) Hold the pulley (22) with a strap wrench and remove the shaft nut (19) and washer (20).
- (b) Remove the pulley, fan (23), woodruff key (21), and fan spacer (26).

- (p) Remove the nut from the negative output terminal bolt (13) and remove the bolt, two guard washers (41) and two fibre bushings (40).
- (q) Remove the capacitor (16) connected between the positive rectifier (11) and the negative rectifier (12).
- (r) Remove the two screws, lock washers, guard washers and insulating washers (15) that retain the lower end of the heat sinks.
- (s) Remove the heat sinks and note the location of the insulating washers.
- (t) Using a press or puller, remove the drive end housing (27) and bearing assembly (28) from the rotor (31).
- (u) Remove the four screws (30) and bearing retainer (29).
- (v) Press the bearing (28) from the drive end housing.

3.4.3 Tests and inspections.- If during pre-disassembly tests, the alternator proved to be faulty, carry out the following tests.

- (a) Positive and negative rectifier diode tests

#### NOTE

It is not necessary to remove the rectifier assemblies from the end housing or disconnect the rectifier leads in order to test the assemblies. If the assemblies are not removed, ensure the stator is removed. Ensure the diode trio has been removed from the terminal board and disconnect the capacitor connected between the lower end of the rectifier assemblies. Rectifier diodes are tested to ensure that the diodes pass current in one direction only. Diodes should be tested with a diode tester, but an analog ohmmeter or batter-powered test light can be used as a substitute. Diodes that allow current to flow in either direction are shorted. Diodes that do not allow current to flow in one direction Only are open.

- i Connect one lead of the test device to a diode lead and the other lead to the heat sink of that diode, see Figure 6. Note the reading.
- ii Reverse the test leads on that same diode and heat sink and note the reading. The ohmmeter or test light must indicate

- iii If resistance is now within the specified range, resolder the rotor coil solder connections.
- iv If resistance is still not within the specified range, replace the rotor assembly.

(e) Stator grounding test

**NOTE**

If the stator windings appear to be charred, burned, or insulation is missing and bare copper wire is visible, replace the stator.

- i Using an ohmmeter, check for grounds between the stator frame and each of the stator leads.
- ii If grounding is indicated, replace the stator.

(f) Stator phase resistance test

- i Using an ohmmeter that is capable of reading 1/1000 of an ohm or a Wheatstone Bridge, check the stator phase resistance across pairs of terminals checking the three possible combinations.
- ii Resistance should be about the same for each of the three phases, replace the stator if there is much variation in the resistance.

(g) Regulator test

- i If during pre-disassembly tests, it was indicated that the regulator may be faulty, install it in a known serviceable alternator and perform voltage output tests.
- ii If test results indicate that the regulator is faulty, replace the regulator.

(h) Diode trio test

- i If during pre-disassembly tests, it was indicated that the diode trio was faulty, test the diode trio with an ohmmeter set on the RX1 ohm scale.
- ii Connect the meter negative lead to the diode trio output lead.

**Table III Components requiring Inspection (cont'd)**

Figure	Item	NSN	MRN	Description	Qty
3	11	3110-00-451-1534	59234	Retainer - Bearing	1

3.4.5 Assembly.- To assemble, proceed as follows:

- (a) Replace the slip ring and bearing.

**NOTE**

Place the new slip ring in a warm place so that it will press on easily without cracking.

- i Using a soldering iron, remove the wire that connects the rotor to the outside slip ring.
- ii Bend the unsoldered wire until it is parallel to the shaft.
- iii Unsolder the wire from the inside slip ring.
- iv Using a gear puller or arbor press, remove the slip ring assembly and the insulation washer.
- v Using a gear puller or an arbor press with fixture plates behind the bearing, remove the bearing from the rotor shaft. Do not lose the slot wedge.
- vi Install the slot wedge in the shaft slot and place the new bearing over the rotor shaft. Using a sleeve that contacts the inner bearing race, press the bearing on, ensuring the wedge remains in place.
- vii Place a new insulation washer and slip ring assembly on the rotor shaft. Ensure the wire slots align with the slot in the shaft.

**NOTE**

When installing the slip ring assembly, use only enough pressure to prevent the insulation washer from turning.

D-30-108-000/SF-001  
ANNEX F

- (m) Place a rectifier terminal on each of the three terminal screws of the terminal board. When installing replacement rectifiers, remove paint from the terminals and install a positive and negative rectifier terminal on each terminal board screw.
- (n) Install a new O ring in the bearing bore of the slip ring end housing.
- (p) Remove the paint from the terminals and install the stator on the slip ring end housing. Place the stator leads on the three terminal board screws. Ensure the assembly screw holes in the stator and the slip ring end housing are aligned.
- (q) Ensure there is clearance between the rotor and rectifier and clearance between the rotor and stator leads.
- (r) Secure the rectifier and stator leads with self-locking nuts.
- (s) Support the slip ring end housing on flat plates in an arbor press, ensuring clearance is provided for the slip ring to pass through the housing, and press the slip ring end bearing into the slip ring end housing by pressing on the rotor shaft.

**NOTE**

Ensure the housing marks and the assembly screw holes are aligned in the slip ring end housing, stator and drive end housing.

- (t) Install the three through bolts and washers through the slip ring end housing, stator and drive end housing.
- (u) Install the elastic lock nuts on the through bolts and torque to 565 to 678 Ncm (50 to 60 in lb).
- (v) Ensure the sealing ring is properly installed in the brush holder housing.
- (w) Apply Loctite No. 242 to the threads and install the brush holder housing with the four No. 8 round head screws. Remove the tape from the housing.
- (x) Insert the outer brush and spring assembly into the housing and compress the brush spring with a small screwdriver. While holding the spring compressed, insert a stiff piece of wire through the top hole in the rear of the housing so that the spring will be held in the compressed position.

3.5 Rebuild standards.- The following standards will be strictly adhered to when determining the serviceability of the components. For standards not listed herein, the contractor shall use good judgement to the minimum of SAE Standards and Practices. If the serviceability of a component is in doubt, the component shall be replaced and held for QA inspection and decision.

<u>Description</u>	<u>Standards</u>
Rectifier Assy - Negative	Pass current in one direction only
Rectifier Assy - Positive	Pass current in one direction only
Capacitor Assy	Minimum 0.5 MFD and 200 working volts DC
Rotor and Slip Rings	Not Grounded
Rotor Coil	7.2 to 7.8 ohms resistance
Stator Assy	Not Grounded
Resistance	Approximately the same for all three phases
Regulator Assy - Brush Length	Minimum 4.7 mm (3/16 in.)
Diode Trio	Pass current in one direction only Approx same resistance in all three diodes
Slip Ring to Bearing Surface Concentricity	Max 0.002 in.

3.6 Torque standards.- The following Table lists the torque standards that shall be used when rebuilding the alternator assembly.

5.2.1 The alternator shall be properly supplied with:

- (a) CF 942 - NSN 8135-21-872-2435 - Identity and Condition Tag.
- (b) The applicable NSN for the alternator.

5.2.2 The alternator shall be wrapped in barrier material MIL-B-131 and sealed with tape pressure sensitive 43-GP-3M.

5.3 Packaging.- The wrapped alternator shall then be placed in its shipping and storage container and sealed.

5.3.1 The shipping and storage container shall contain sufficient packing material to prevent movement and damage to the alternator and sufficient new dessicant bags to prevent condensation.

5.3.2 Prior to use, the container shall be placed in Class "S" condition by replacing hardware for the lid, patching holes as required, and applying one coat of primer to 1-GP-84 and one coat of enamel paint to D-84-010-001/SF-001, the colour shall conform to 1-GP-12C olive drab No. 503-321..

5.4 Marking.- The shipping and storage container shall have the following stencilled on each end.

- (a) The applicable NSN for the alternator.
- (b) The description.
- (c) The applicable MRN.
- (d) Qty.
- (e) Weight.
- (f) Date of rebuild.

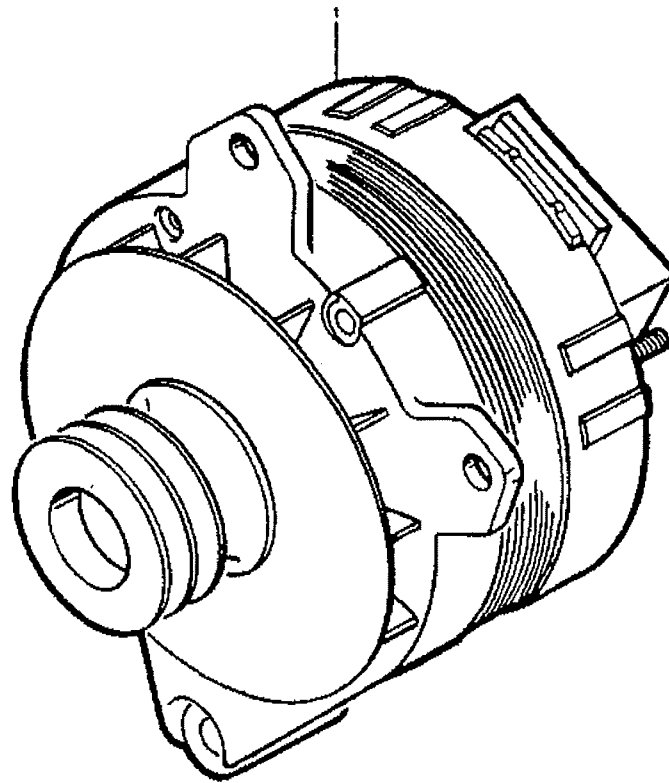
5.4.1 The following shall be stencilled on both sides:

"REUSABLE CONTAINER DO NOT DESTROY CF PROPERTY".

5.4.2 A CF 941A, NSN 7690-21-868-6739, Identity and Condition Label properly filled out will be stapled to the container.

5.5 Any further preservation, packaging or marking instructions will be stipulated in the contract.

D-30-108-000/SF-001  
ANNEX F



**Figure 1** Alternator assembly

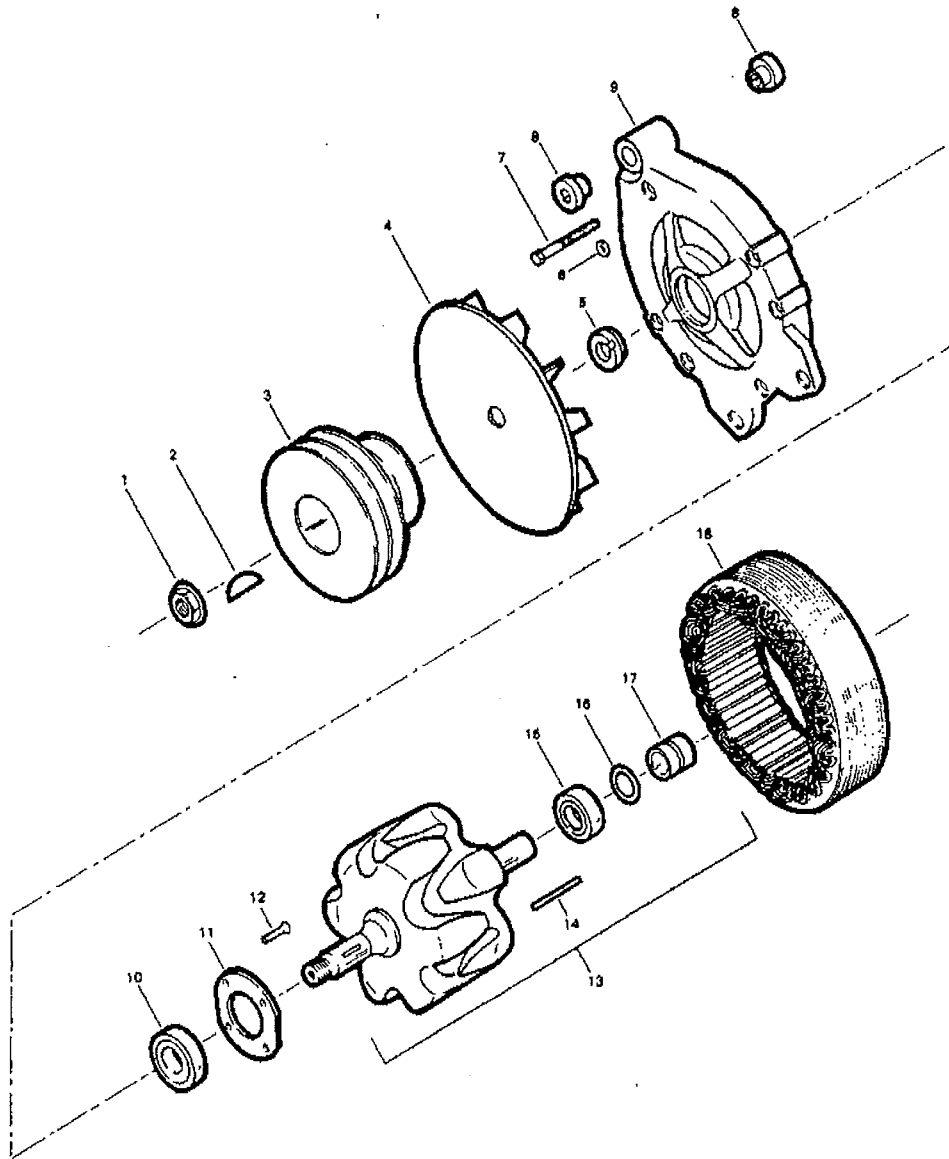


Figure 3 Alternator parts

D-30-108-000/SF-001  
ANNEX F

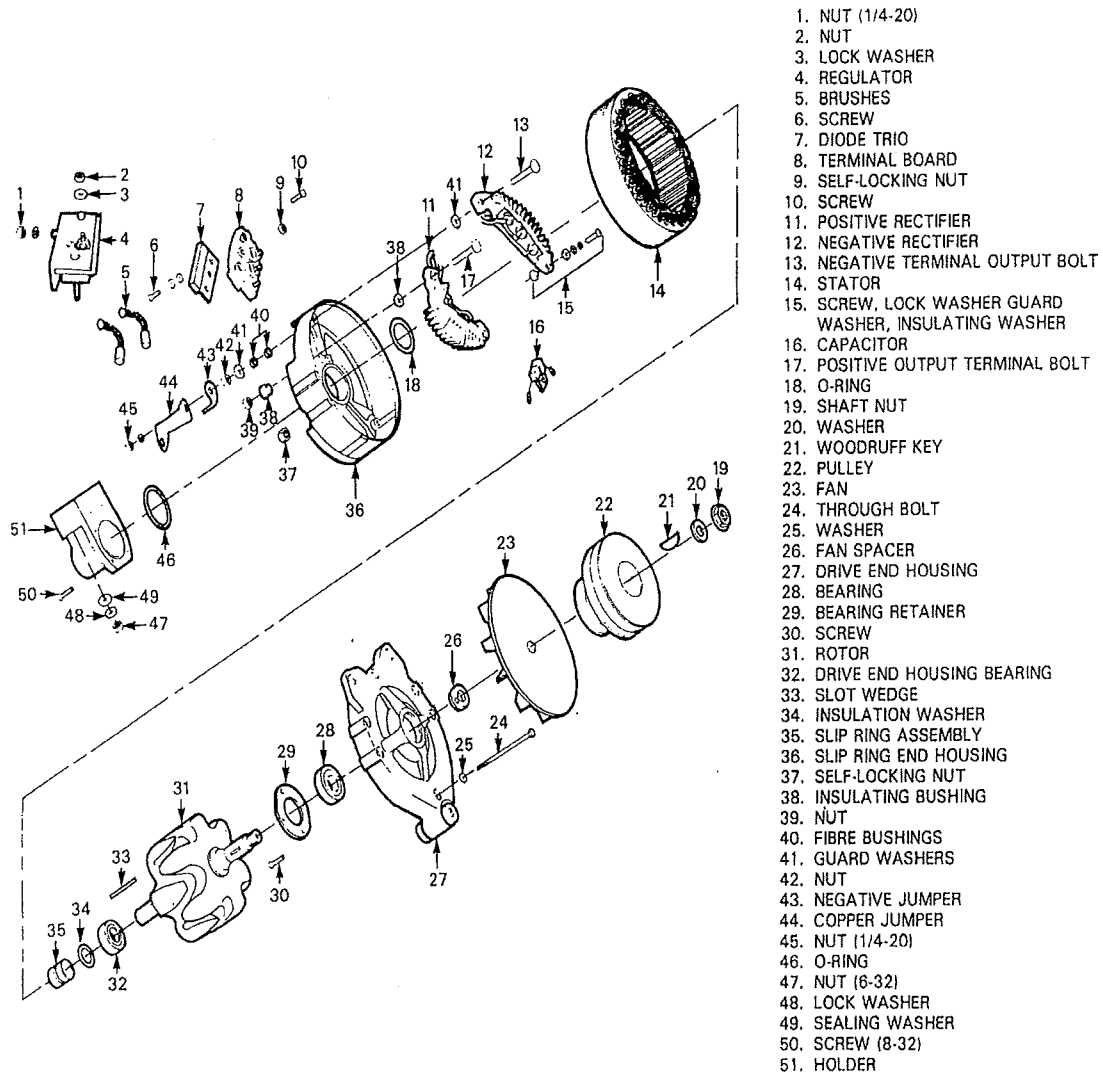


Figure 5 Alternator

D-30-108-000/SF-001  
ANNEX F

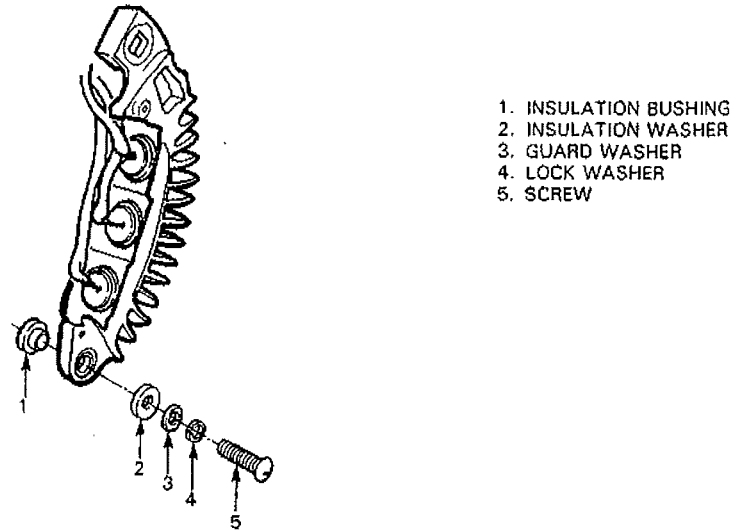


Figure 8 Installation of rectifier assembly

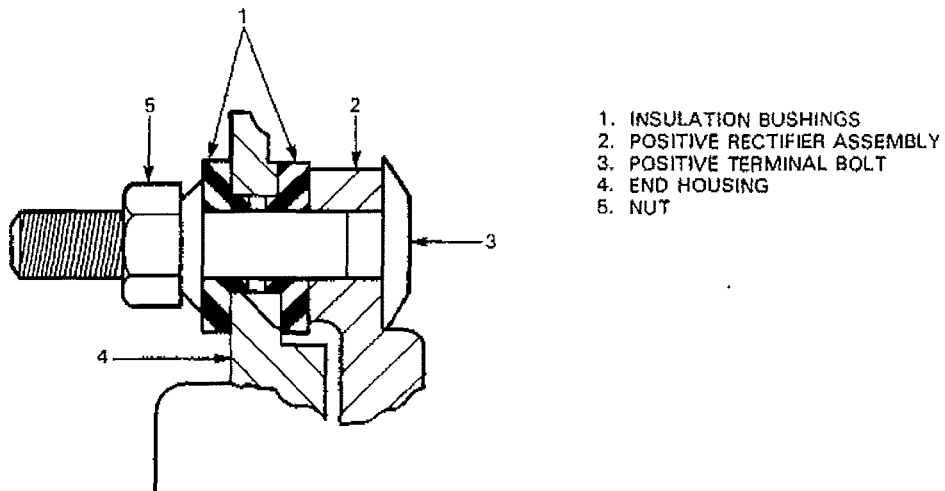


Figure 9 Positive terminal assembly