

**27 626 - AN - 02.1999**

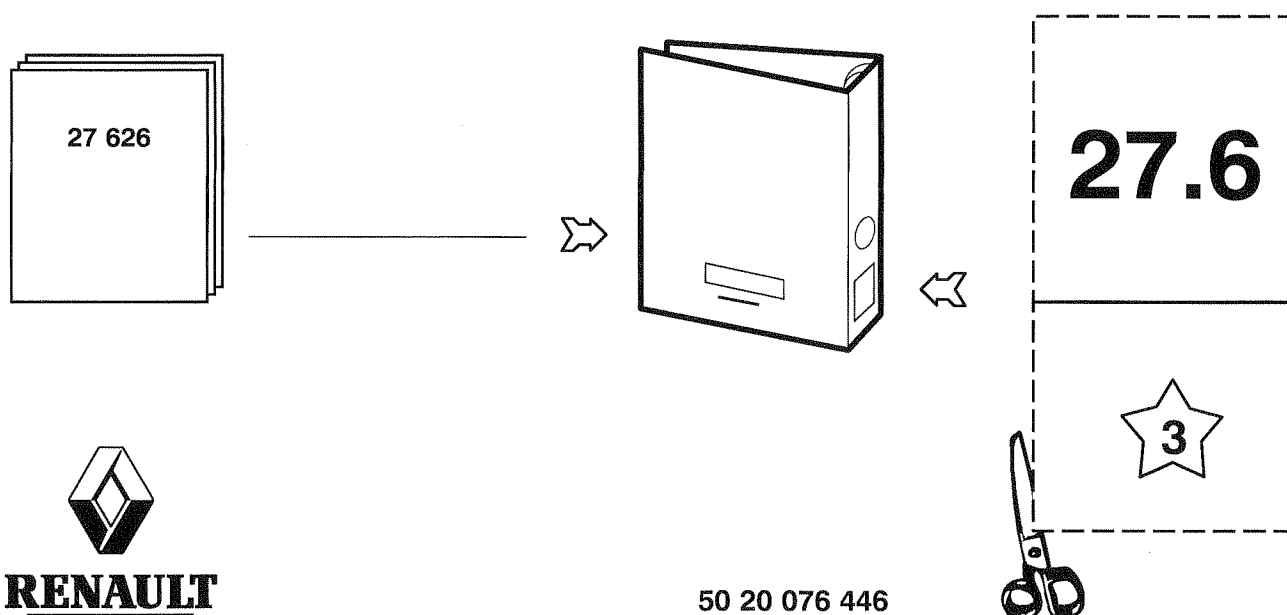
**MITSUBISHI ALTERNATOR**

ALTERNATOR	VEHICLES
MITSUBISHI	MIDLINER PREMIUM

**NOTE**

The above information may change in the course of time.

Only the "Consult" section of the workshop manuals repertory in standard N°10320 serves as reference.



**MITSUBISHI ALTERNATOR****DISASSEMBLY / TESTING / ASSEMBLY****CONTENTS**

<b>DESIGNATION</b>	<b>PAGE</b>
Characteristics	3
Description	4
Preliminary checks	5
Disassembly	6-7-8
Testing	9
Assembly	10
Bench testing	11
Annex	12-13-14

## CHARACTERISTICS

### Characteristics

Rotation direction:	Clockwise	
Rated voltage:	24 V	12 V
Rated current:	40A / 60A	70A
Pre-set Voltage :	28.5 +/- 0.5V	14.7+/-0.3V
Flashover speed:	1000 rpm	
Full load speed:	18000 rpm	

### Output

Voltage (V)	Speed (rpm)	Room temperature = 20°C			Room temperature = 100°C		
		Output 40A	Output 60A	Output 70A	Output 40A	Output 60A	Output 70A
27 / 13.5	1300	10	19	24	8	16	20
	2500	30	44	52	25	37	43
	5000	37	59	62	31	50	52

### Tightening torques for alternator terminals

TERMINAL	SCREW-THREAD	TORQUE (N.m)
B+	M8x1.25	6.0+/-20%
A	M6x1	3.0+/-20%
B-	M6x1	6.0+/-20%
W	M5x0.8	3.0+/-20%

Values refer to RENAULT V.I. presented to MITSUBISHI on 10th July 1997.

Any modification to these nuts on-vehicle will require tightening values to be revised.

### Tightening torques for alternator assembly

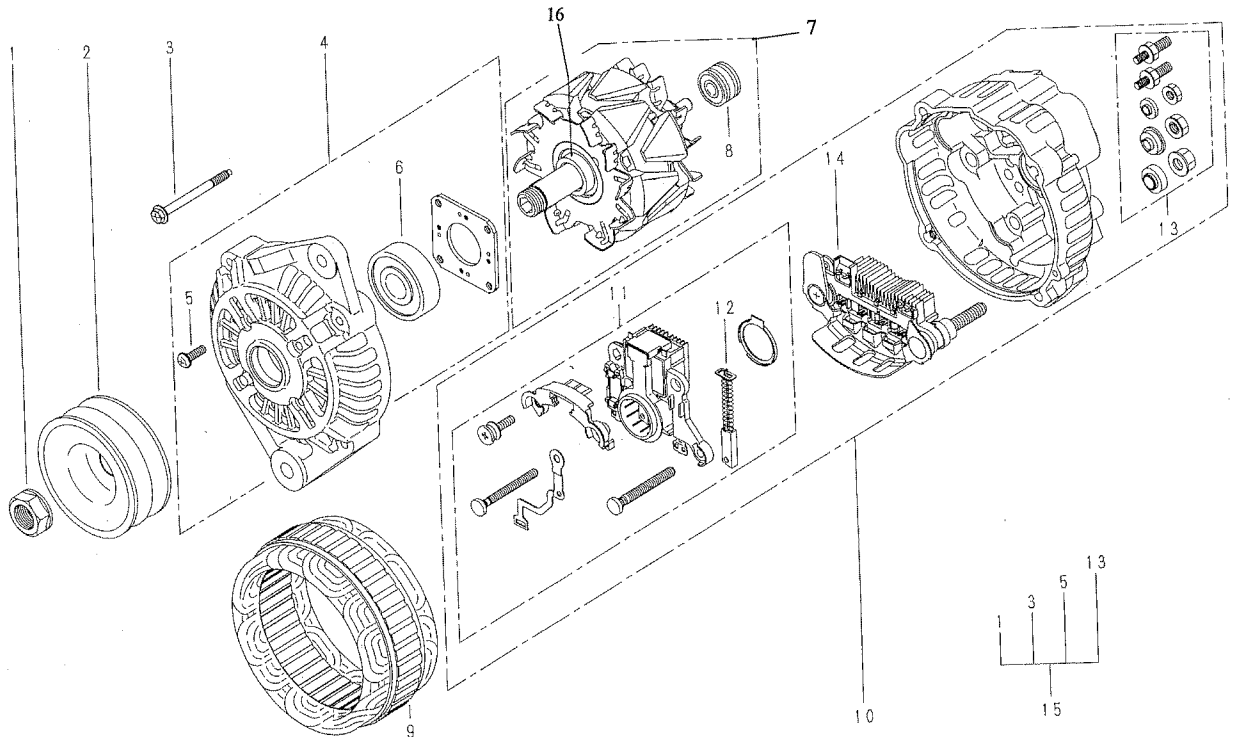
Part (page 4)	Type of screw	Torque (N.m)
1	Pulley nut	98 ~ 137
3	M5	3.5 ~ 5.3
5	M5	3 ~ 4.4
11	M5	4.9 ~ 6.9
	M6	5.9 ~ 7.8
13	M5 (M6)	6 ~ 7.8
14	M8	12.7 ~ 16.7

## Description

The alternator is composed of the following parts :

Part number	Description	Part number	Description
1	Pulley nut	10	Rear bracket assy
2	Pulley	11	Regulator
3	Setscrew	12	Brush </td
4	Front bracket assy	13	Screw
5	Screw	14	Rectifier bridge
6	Front bearing	15	Screw set
7	Rotor assy	16	Washer
8	Rear bearing		
9	Stator		

Exploded view of alternator part :



## Preliminary checks

Prior to any disassembly, check wiring of load circuit.  
Check on vehicle regulation of battery voltage.  
Voltage must be 14V for 12 V battery and 28V for 24V battery.

Those tests being done, if alternator is faulty, proceed as follows.

## Bench test

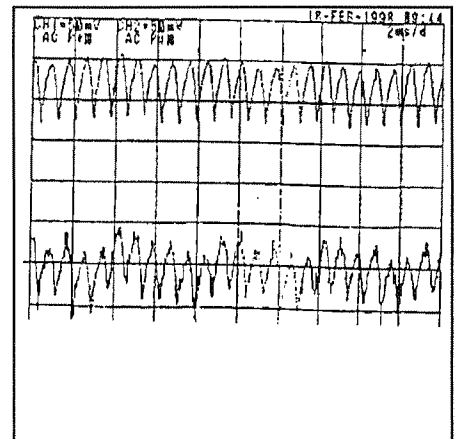
Test with oscilloscope.  
With oscilloscope, it is possible to see the curve of power to  
define trouble concerning stator coil and diodes.

Test alternator at 2000 rpm.

Connect alternator terminal B+ with oscilloscope and observe the  
wave form. It should be identical to this :

Batterie OFF  
Without load  
R=1k $\Omega$

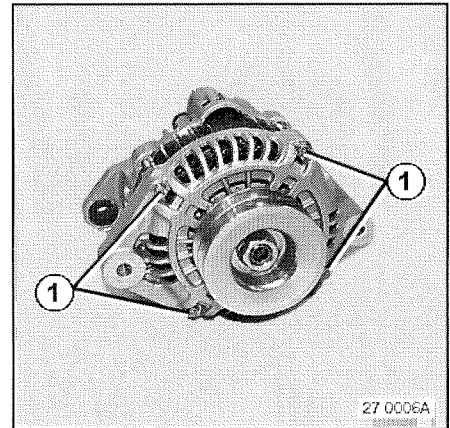
If wave on oscilloscope is different from the correct one, disassemble  
the alternator and inspect the components.



## DISASSEMBLY

### Front/Rear bracket assembly

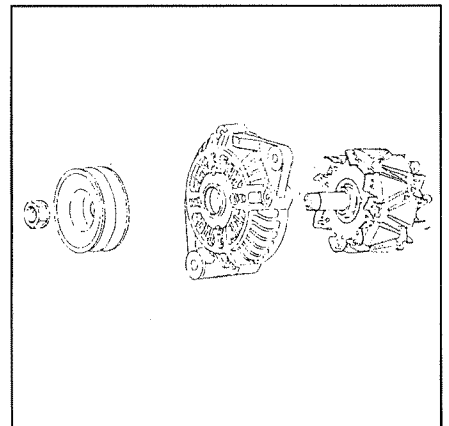
Unscrew the 4 screws (1) and disassemble both sub-assemblies : front bracket/stator and rear bracket



### Disassembly of rotor, pulley, and front bracket

Remove rotor, pulley and front bracket.

If using a bench vice, pay attention not to damage the rotor.



### Brush

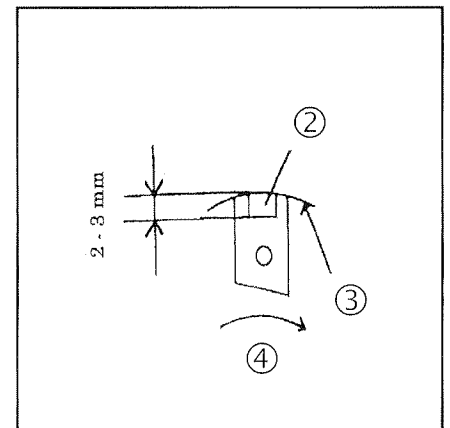
Check brush length and change brushes if necessary.

Remove tin solder brush wire.

When soldering, 9° 2 or 3 mm past the wear limit of the brush at the top of the brush holder.

Caution : Solder as indicated in the figure to ensure the correct direction of the brush operation during rotation.

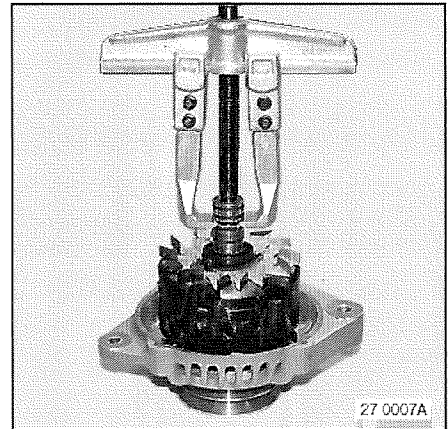
- (2) Max wear
- (3) Top of brush-holder
- (4) Rotation direction



## Bearings

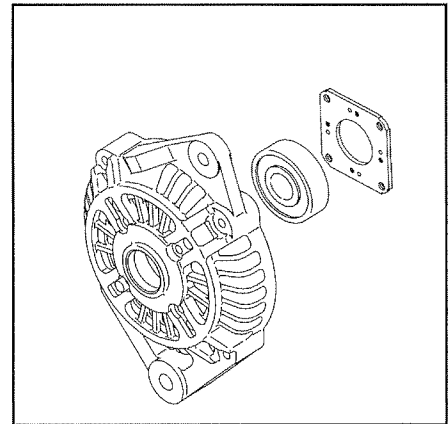
Use extractor (Ref. **5000260954**) to extract the rotor bearing.

When assembling a new bearing, push it as far as its stop position.



To gain access to front bearing.

- Extract the pulley.
- Extract the rotor assy (pay attention to washer **16**, refer page **4**).
- Unscrew the bearing plate.



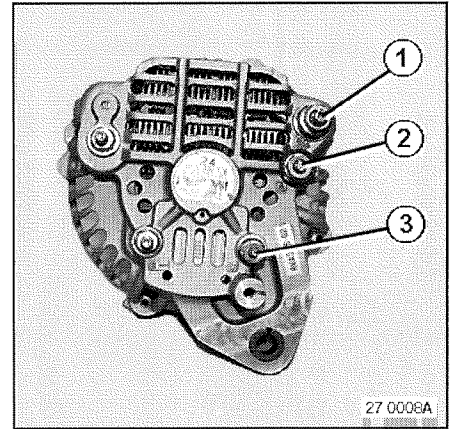
## Stator

Remove solder between stator coil and rectifier.

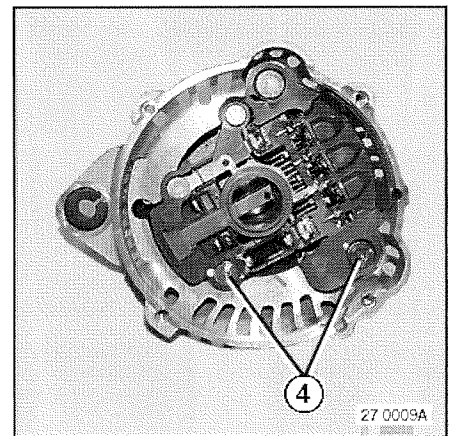
Remark : Use a 180-270 W soldering iron.

## Regulator

Unscrew nuts (1), (2), (3).



Loosen both screws (4) inside regulator.





## TESTING

### Stator

Test continuity between each coil inductor wire.

Make a ground test to check no continuity between the coil and the armature core.

### Rotor

Test continuity between alternator collector rings as well as ground test to check there is no continuity between alternator collector ring and armature core.

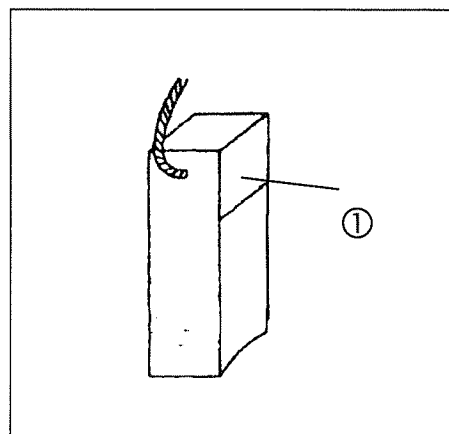
Also check wear of alternator slip ring.

### Brush

Check wear of brush.

Check if wear is near limit (1).

Change if necessary.



### Bearing

Any bearing showing anormal function follows, bearing must be changed.

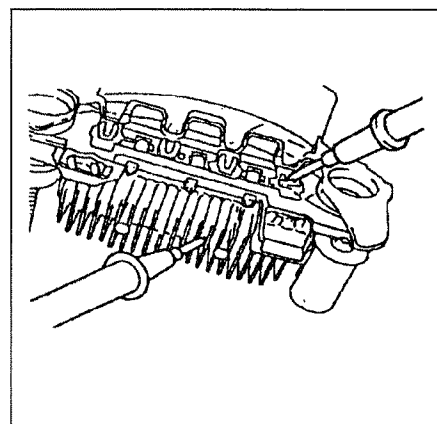
- anormal noise
- anormal vibrations
- rust or grease leaks

To detect possible troubles on bearing, check bearing when still assembled on shaft and bracket.

### Bridge rectifier

If a short-circuit shows in diode, use oscilloscope to detect prior to alternator disassembly.

Remove rectifier, make a continuity test between inductor wire and heat sink. If there is no continuity in both directions, circuit is open.



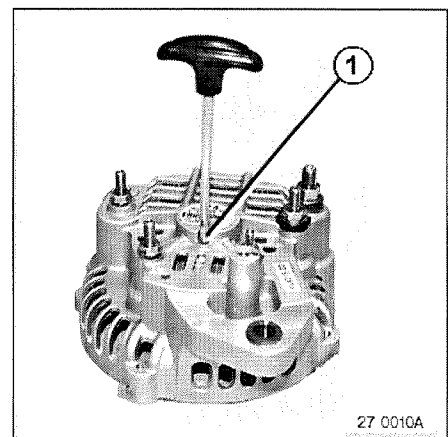
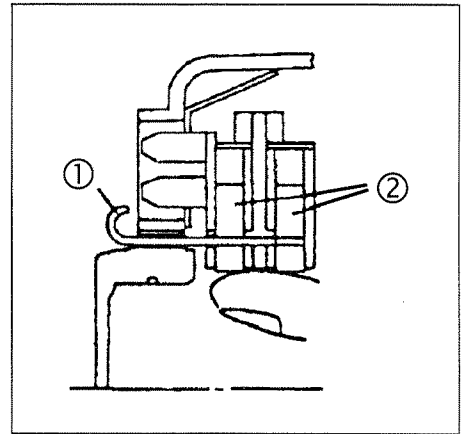
## ASSEMBLY

To assemble the alternator proceed in the reverse sequence to disassembly.

### Brush

Push brush to brush holder end (2) and stop it by inserting a pin (1).

Do not forget to remove the pin after assembly to ensure correct operation of alternator.



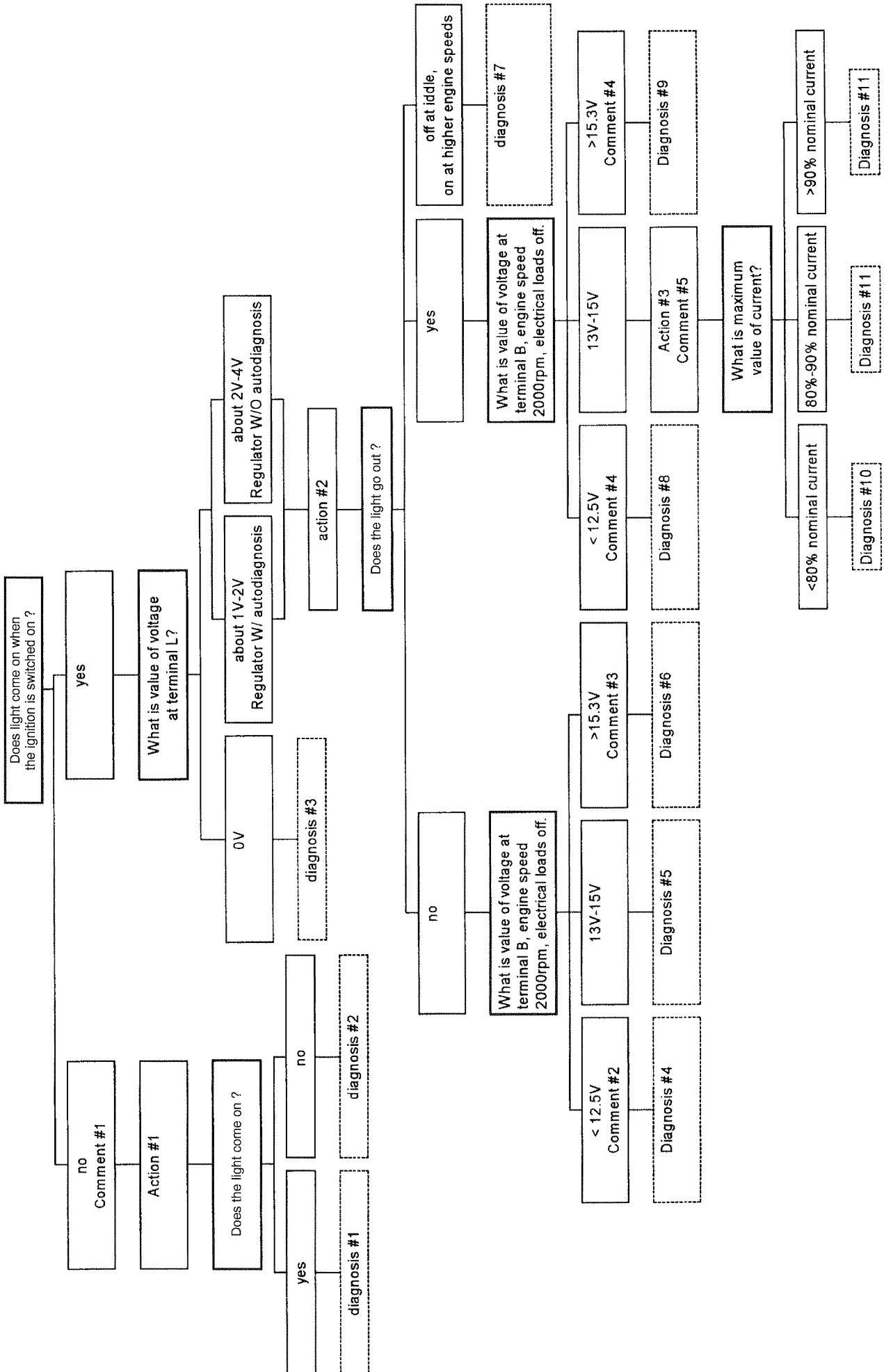
### Front bracket and rear bracket

During assembly of front bracket and rear bracket, tighten screws (1) in diagonally opposed sequence to correct torque (see page 3) and do not forget to fit screws (1) (see page 6).

## BENCH TESTING

Mount alternator on test bench and test functions as follows:

- Functioning of load diode.
- Alternator output (various speeds).
- Alternator regulation.



**Action #1 :**

Disconnect S & L terminals. Connect L terminal of vehicle connector to the ground.

**Action #2 :**

Start engine and let it run at idle speed for 3 minutes.

**Action #3 :**

Power current control. Engine running at idle, switch on as many current loads as possible. Increase engine speed up to 2500rpm-3000rpm. Measure immediately.

**Comment #1 :**

If induction wiring is disconnected, light does not come for alternator W/O autodiagnosis regulator, light comes on for alternator W/ autodiagnosis regulator.

**Comment #2 :**

When induction wiring is disconnected, alternator outputs no current and B terminal voltage decreases at 12.5V, because of auto diagnosis lamp coming on. In case of stator coil disconnected, or in case of short circuits in diodes, light comes on, as with regulator W/O autodiagnosis.

**Comment #3 :**

When regulator does not work and induction current is not cut off, voltage at B terminal increases, battery is over loaded : this is 'no-control state'. When S terminal (detecting voltage) is disconnected, regulator works, 'no-control state' does not occur, regulation voltage increases by 1V.

**Comment #4 :**

In that case, because of autodiagnosis, light should come on. Regulator is then assumed to be faulty.

**Comment #5 :**

To make sure that alternator outputs current, slightly unload battery, and measure current immediately.

**Diagnosis #1**

< Regulator W/ autodiagnosis >

- B terminal disconnected, or
- Short circuit in positive diode, or
- Faulty regulator.

< Regulator W/O autodiagnosis >

- Induction wiring disconnected, or
- Brush bad contact, or
- Short circuit in positive diodes, or
- Faulty regulator.

**Diagnosis #2**

- Vehicle electrical harness faulty.

**Diagnosis #3**

- Problem on vehicle electrical harness, or
- Regulator faulty (in that case, light comes on, even at idle speed).

**Diagnosis #4**

- Alternator faulty (induction circuit open), or
- Regulator faulty.

**Diagnosis #5**

- Alternator faulty, or
- Autodiagnosis faulty (transistor driving lamp is always on).

**Diagnosis #6**

- < Regulator W/ autodiagnosis >
- 'No-control state', or
- S terminal disconnected

**Diagnosis #7**

- Driving belt slipping, or
- Alternator faulty, or
- Regulator faulty.

**Diagnosis #8**

- Alternator faulty, or
- Battery faulty.

**Diagnosis #9**

- 'No-control state',
- S terminal disconnected.

**Diagnosis #10**

- Clamping of battery terminal faulty, or
- Clamping of B terminal faulty, or
- Electrical harness battery/alternator faulty, or
- Battery faulty, or
- Alternator faulty.

**Diagnosis #11**

- Current measurement has no meaning, slightly unload battery and measure again.

**Diagnosis #12**

- No trouble on alternator.