

SECTION : 414-02 Alternator and Regulator

VEHICLE APPLICATION : 2008.0 Falcon

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SPECIFICATIONS

General Specifications

Description	Specification
Mitsubishi 8-GM 6 Cylinder	
Current Output	130 Amps @ Ambient Temp
Set Voltage	Controlled by PCM
Alternator Speed (RPM) / Output Current (Amps) in Hot	1300/25 2500/106 5000/125
Earth Polarity	Negative
Mass	6.4 kg
Regulator Performance - Set voltage	Controlled by PCM
Regulator Performance - Temp Compensation	Controlled by PCM
Speed In Use	1000 - 19000 r / min
Rotor Inertia	3.1 x 10 ⁻³ kg m ²
Pulley Pitch Diameter	60 mm
Visteon 8 Cylinder	
Current Output	130 Amps @ Ambient Temp
Set Voltage	14.45 Volts @ 25°C
Alternator Speed (RPM) / Output Current (Amps) in Hot	1300/32 2500/81 5000/102
Earth Polarity	Negative
Mass	6.3 kg
Regulator Performance - Set voltage	14.45 +/- 10.3 mV/°C
Regulator Performance - Temp Compensation	14.45 +/- 10.3 mV/°C
Output Ramp Up Time	7 s
Max Speed In Use	19600 r / min
Max Ambient Temp	115 °C



DESCRIPTION AND OPERATION

Alternator

Description

Both the Mitsubishi (6 Cyl.) and Visteon (8 Cyl.) alternators are three phase alternating current (AC) generators with integrally mounted diodes that convert the AC into direct current (DC) suitable for charging the battery.

The alternator is inherently self current limiting and the diodes (shown in the circuit diagrams in Fig 2 & 4) prevent reverse current flow from the battery. The alternator consists of the following major parts:

The Stator: a laminated frame which carries the three phase star connected output winding in slots.

The Rotor: comprising the slip rings and field (exciter) windings. It is constructed of interfaced poles or fingers which form alternate north and south poles. The field winding is wound concentric with the shaft inside the claw and has its ends connected to the slip rings.

The rectifier pack contains eight output diodes on the six cylinder alternator (as shown in Fig 2), and six output diodes on the eight cylinder alternator (as shown in Fig 4). The diodes are arranged in a three phase bridge connection having three diodes of positive polarity and three diodes of negative polarity.

The two end heads carry the ball races. The drive end head incorporates the mounting lug, while the slip ring end head contains the brush gear, regulator and rectifier pack.

The electronic regulator is integrated with the alternator assembly. The regulator consists of a static compact assembly, consisting of a Hybrid circuit, transistor and diode, soldered to a printed circuit board.

The electronic voltage regulator and the brush gear are an integral assembly mounted on the slip ring end head. The regulator is not adjustable and if tested and found defective it must be replaced.

B+ Battery Connection

The B connection is used to connect the alternator to the Power Distribution Box (PDB) located in the front right hand side of the engine bay.

'I' Warning light (V8 only)

The 'I' circuit (or ignition circuit), is used to turn on the voltage regulator. This circuit is powered up by the PCM when the ignition key is in the ON position. The PCM can interpret the voltage on this output and can send a CAN message to the cluster to turn the indicator lamp on, if there is a fault in the charging system operation or associated wiring circuits. On I6 engines the warning light is also controlled directly by the PCM.

'A' Battery sense


The 'A' circuit (or battery sense circuit) is used to sense the battery voltage. This voltage is used by the regulator to determine the alternator output. This circuit is also used to supply power to the alternator field coil. This circuit is connected back to the load distribution point and is a protected circuit.

'RC' Alt Com (I6 only)

This circuit enables the PCM to communicate the desired voltage set-point to the alternator using pulse width modulation (PWM)

'LI' Alt Mon (i6 only)

This circuit communicates the alternator's rotor field duty cycle to the PCM using PWM. This line is also used by the alternator to communicate error states.

 **CAUTION: DO NOT reverse battery sense and I line connections as this will destroy the warning lamp regulator circuitry.**

Operation

With the ignition switch turned on and the engine running, the flow of current through the rotor field coil energises the twelve pole rotating electromagnet. The rotation of the energised rotor unit induces an A.C. voltage in the three phase stator winding. This is converted into D.C. voltage by the diode rectifiers and conducted to the B+ terminal.

The electronic regulator operation is similar to that of the conventional electro-mechanical regulator in that the field current is varied to maintain the output voltage within close limits. However, switching is performed by a transistor instead of vibrating contacts.

The rectifiers, which only conduct current flow in the one direction through the alternator output diodes, prevent the battery (which is directly and permanently connected to the alternator output terminal) from discharging through the alternator. This characteristic of the rectifiers eliminates the need for a cut-out relay, (However, the battery must always be connected with the negative terminal to ground. Failure to connect a battery with the correct polarity will damage the alternator and regulator. Disconnect the negative battery lead when using a battery charger.)

As the speed of the rotor increases, the induced voltage in the stator winding increases, causing more current to flow to satisfy the load requirements. However, the inductive reactance of the stator winding provides an automatic self-regulating upper limit on the current output of the alternator.

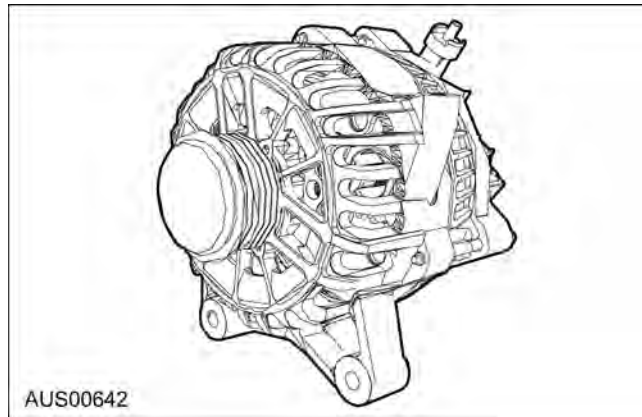
The regulator senses the battery voltage via the battery sense wire and controls this voltage by switching the alternator excitation field current on and off. If battery voltage is below regulated voltage, the power transistor is switched on. When the battery voltage exceeds the specified limit, the transistor is



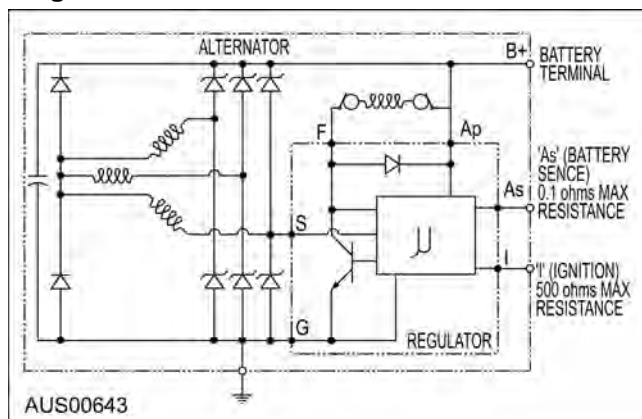
DESCRIPTION AND OPERATION (Continued)

switched off, causing output voltage to drop. A diode protects the transistor and regulator circuitry from voltage transients when the field is switched off by the transistor. Switching the regulator on and off ensures the output voltage is maintained constant at the required regulated level.

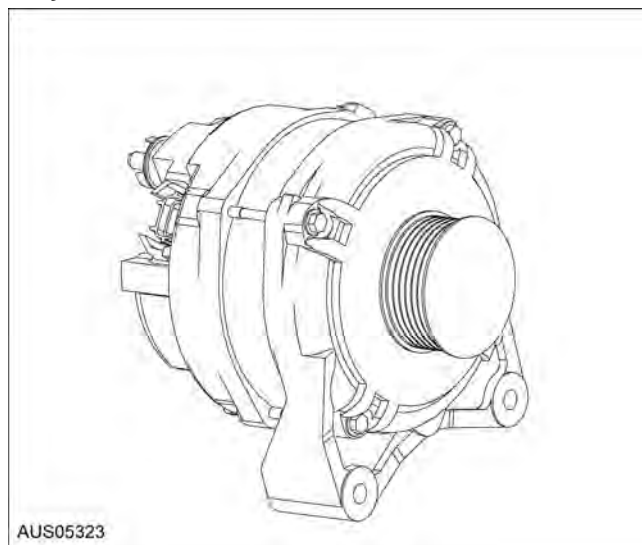
8 Cylinder Visteon Alternator



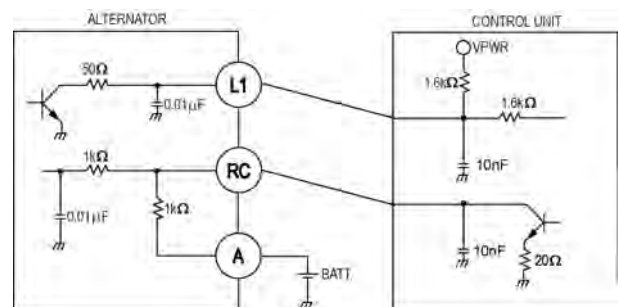
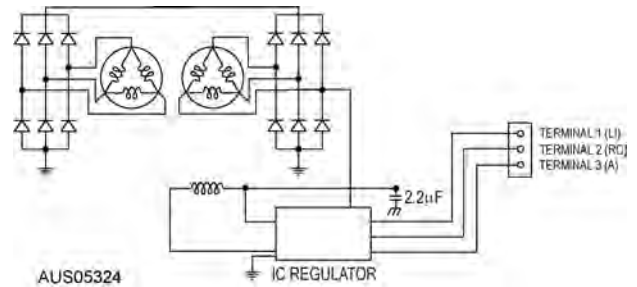
8 Cylinder Visteon Alternator Regulator Circuit Diagram



6 Cylinder Mitsubishi Alternator



6 Cylinder Mitsubishi Alternator Regulator Circuit Diagram




PCM INTERFACE INFORMATION





DIAGNOSIS AND TESTING

Alternator and Regulator

Inspection and Verification

 **WARNING:** Batteries contain Sulphuric Acid. Avoid contact with skin, eyes, or clothing. Also, shield your eyes when working near batteries to protect against possible splashing of the acid solution. In case of acid contact with skin or eyes, flush immediately with water for a minimum of 15 minutes and get prompt medical treatment. If acid is swallowed, call a physician.

 **WARNING:** Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks or lighted substances to come near the battery. When charging or working near a battery, always shield your face and protect your eyes. Always provide ventilation.

 **WARNING:** When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to spew through the vent caps resulting injury or damage to the vehicle or to the battery. Lift with a battery carrier or with your hands on opposite corners.

1. Verify the customer's concern by operating the vehicle to duplicate the concern.
2. Inspect to determine if one of the following mechanical or electrical concerns applies:

Visual Inspection Chart

Mechanical	Electrical
<ul style="list-style-type: none"> • Battery • Alternator drive belt • Alternator pulley 	<ul style="list-style-type: none"> • Battery charge • Main Fuse (140A) • Electrical connectors • Electrical connections • Battery charge warning indicator • Other electrical systems malfunctions

3. If the inspection reveals obvious concern(s) that can be readily identified, service as required.
4. Measure the open circuit battery voltage. If the battery voltage is less than 12.4 volts, test and recharge the battery before continuing with diagnosis.
5. Observe charging system warning indicator status against the following conditions:
 - The charging system warning indicator will illuminate with the ignition switch in RUN and the engine OFF.
 - The charging system warning indicator will be OFF with the engine running. The charging system warning indicator will be OFF with the ignition switch OFF.
6. Check the battery voltage before and after starting the engine to determine if the battery voltage increases. Refer to the Normal Charging System Voltages chart.



DIAGNOSIS AND TESTING (Continued)

Symptom Chart

Condition	Source	Action
<ul style="list-style-type: none"> Charging system warning indicator is ON with the engine running (the battery voltage does not increase) NOTE: DTC P0622 may be stored for I6 only	<ul style="list-style-type: none"> A Circuit 36 (Y/W). Main Fuse (140 A). I Circuit 904 (GY/R). (V8) Alt Com, Alt Mon wires. (I6) Voltage Regulator. Alternator PCM 	<ul style="list-style-type: none"> GO to Pinpoint Test A.
<ul style="list-style-type: none"> Charging system warning indicator is OFF with the ignition switch in the RUN position and the engine OFF (battery voltage does not increase) NOTE: DTC P0622 may be stored for I6 only	<ul style="list-style-type: none"> Voltage Regulator connector. I Circuit 904 (GY/R). (V8) Main Fuse (140 A). Voltage Regulator. Loose or damaged Alternator. Harness connector PCM Cluster globe 	<ul style="list-style-type: none"> GO to Pinpoint Test B.
<ul style="list-style-type: none"> Charging system warning indicator is ON with the engine running and the battery voltage increases NOTE: DTC P0622 may be stored for I6 only	<ul style="list-style-type: none"> Alternator. Voltage Regulator Alt Com, Alt Com (I6) PCM 	<ul style="list-style-type: none"> GO to Pinpoint Test C.
<ul style="list-style-type: none"> Charging system warning indicator is OFF with the ignition switch in the RUN position and the engine OFF (battery voltage increases) 	<ul style="list-style-type: none"> Charging system warning indicator lamp bulb. Instrument cluster. Alternator. Voltage Regulator. 	<ul style="list-style-type: none"> GO to Pinpoint Test D.
<ul style="list-style-type: none"> Charging system warning indicator operates correctly but the battery voltage does not increase. 	<ul style="list-style-type: none"> Circuit 36 (Y/W). Main Fuse (140A). Loose or damaged harness connector. Battery cables. Alternator. Voltage regulator 	<ul style="list-style-type: none"> GO to Pinpoint Test E.
<ul style="list-style-type: none"> The battery is dead or will not stay charged or low battery or alternator voltage 	<ul style="list-style-type: none"> Corroded terminal(s). Loose connection(s). High key-off load. Alternator. Voltage Regulator 	<ul style="list-style-type: none"> GO to Pinpoint Test F.
<ul style="list-style-type: none"> Charging system warning indicator flickers/is intermittent. NOTE: DTC P0622 may be stored for I6 only	<ul style="list-style-type: none"> Loose connection(s). I Circuit loose. (V8) A Circuit loose. Alternator. Voltage regulator PCM 	<ul style="list-style-type: none"> Replace/Repair as required.
<ul style="list-style-type: none"> The system overcharges (battery voltage greater than 15.5 volts) 	<ul style="list-style-type: none"> A Circuit 36 (Y/W). Alternator (low output). Voltage regulator. I Circuit 904 (GY/R) 	<ul style="list-style-type: none"> GO to Pinpoint Test G.
<ul style="list-style-type: none"> Battery leakage or damage 	<ul style="list-style-type: none"> A Circuit 36 (Y/W). Alternator. Voltage regulator. Battery 	<ul style="list-style-type: none"> GO to Pinpoint Test H.
<ul style="list-style-type: none"> The voltage gauge reads high or low 	<ul style="list-style-type: none"> Alternator (low output). Voltage regulator. Voltage gauge. Instrument cluster/wiring 	<ul style="list-style-type: none"> GO to Pinpoint Test I.



DIAGNOSIS AND TESTING (Continued)

<ul style="list-style-type: none"> The alternator is noisy 	<ul style="list-style-type: none"> Loose bolts/brackets. Drive belt. Alternator/Pulley 	<ul style="list-style-type: none"> GO to Pinpoint Test J.
<ul style="list-style-type: none"> Radio interference 	<ul style="list-style-type: none"> Alternator. Wiring/routing. In-vehicle entertainment system 	<ul style="list-style-type: none"> GO to 413-08.

Component Tests

Alternator Tests

Perform an alternator output test before testing the Voltage Regulator. Use care when connecting any test equipment to the alternator system, as the alternator output terminal is connected to the battery at all times.

Alternator Output Test-Off Engine When the alternator output test is conducted off the vehicle, a test bench must be used. Follow the procedure given by the test bench equipment manufacturer. When the alternator is removed from the vehicle for this purpose always disconnect a battery cable as the alternator output connector is connected to the battery at all times.

On Engine

A variable load such as a Carbon pile rheostat must be available to place across the battery. A switched lamp bank of 800 Watt capacity is a suitable substitute for a carbon pile. All output testing is to be made with the alternator warm. Run alternator on full load for 5 minutes prior to making tests. The regulator cannot be isolated from the circuit when carrying out this test. If rated output is not achieved, the alternator must be removed from the engine for testing of the regulator.

1. Ensure that the ignition is switched off.
2. Disconnect the battery earth cable.
3. Remove the leads from the alternator main (B+).
4. Connect the + lead of a moving coil 100 amp ammeter to the B + terminal of the alternator. Connect the - lead to the B + terminal in the wiring harness.
5. Connect the positive lead of a good quality voltmeter to the alternator B+ terminal. Connect the negative lead to ground.
6. Connect the battery earth cable.
7. Connect the carbon pile rheostat or the switched lamp bank to the battery terminals. (Ensure that the load control is in the off position).
8. Connect a tachometer to the engine.
9. Start the engine and slowly increase engine speed to obtain 6000 rpm alternator speed. (This is approximately 2200 rpm engine speed for the I6 and 1800 rpm engine speed for V8)
10. Adjust the carbon pile or lamp bank until a constant voltage of 14.0 is achieved.
11. The ammeter should now register the rated output.

12. Reduce engine speed to idle rpm and remove the battery load.



CAUTION: Never remove the battery load while the engine is running at speed.

13. Switch off the engine and remove the battery earth cable.
14. Remove the test meters and replace the original wiring to the alternator.
15. Replace the battery earth cable. Should the alternator fail to produce the rated output it must be removed from the vehicle for further tests and repairs.

Voltage Regulator

NOTE: The alternator must always be connected to the battery during testing otherwise the diodes might be damaged.

1. Connect a voltmeter between the B + terminal and the alternator housing.
2. Increase the alternator speed to 6000 rpm. Set the load current to 5 amps. (This is approximately 2200 rpm engine speed for the I6 and 1800 rpm engine speed for V8)
3. Readjust the alternator speed if necessary.
4. Read the regulator output voltage within one minute and compare with specifications. The electronic regulator on the Visteon (V8) alternator is temperature compensated and a decrease in regulated voltage of 0.07V will occur.

Terminal	A	I	Alt B+	Batt	Eng To Bat Gnd
Key OFF	12V	0V	12V	12V	0V
Key ON - Engine OFF	12V	1-3V	12V	12V	0V
Engine running	12-15V	12-15V	12-15V	12-15V	0V



DIAGNOSIS AND TESTING (Continued)

Pinpoint Tests



CAUTION: Do not make jumper connections except as directed. Improper connections may damage the voltage regulator test terminals.



CAUTION: Do not allow any metal object to come in contact with the alternator housing and internal diode cooling fins.

PINPOINT TEST A : THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING (THE BATTERY VOLTAGE DOES NOT INCREASE)

Test Step		Result / Action to Take
A1	CHECK CIRCUIT 36 (Y/W)	
	<ul style="list-style-type: none"> Measure the voltage between the B+ terminal on the alternator Circuit 36 (Y/W). Is the voltage equal to battery positive voltage (B+)? 	<p>Yes Go to A2</p> <p>No REPAIR Circuit 36 (Y/W). Test the system for normal operation.</p>
A2	CHECK CIRCUIT 36 (Y/W)	
	<ul style="list-style-type: none"> Key in OFF position. Disconnect Alternator connector C161. Measure the voltage between alternator connector Pin C161-A Circuit 36 (Y/W) and ground. Is the voltage equal to battery positive voltage (B+)? 	<p>Yes Go to A3</p> <p>No REPAIR Circuit 36 (Y/W). Test the system for normal operation.</p>
A3	CHECK I CIRCUIT 904 (GY/R) FOR AN OPEN	
	<ul style="list-style-type: none"> Connect Alternator connector C161. Check C390. Key in ON position. Measure the voltage between the alternator I - terminal, Circuit 904 (GY/R) and ground. Measure the voltage between the alternator I - terminal, Circuit 904 (GY/R) and ground. 	<p>Yes Go to A4</p> <p>No Repair Circuit 904 (GY/R) for an open or short. Test the system for normal operation.</p>
A4	CHECK THE ALTERNATOR OUTPUT	
	<ul style="list-style-type: none"> With the engine running, ground the F pin on the alternator regulator. Does the battery voltage increase and the charging system warning indicator turn off? 	<p>Yes REPLACE the voltage regulator. Test the system for normal operation.</p> <p>No REPLACE the alternator. Test the system for normal operation.</p>



DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST B : THE CHARGING SYSTEM WARNING INDICATOR IS OFF WITH THE IGNITION SWITCH IN THE RUN POSITION AND THE ENGINE OFF (BATTERY VOLTAGE DOES NOT INCREASE)

Test Step		Result / Action to Take
B1	INSPECT ALTERNATOR CONNECTOR C161	Yes Go to B2 No Test the system for normal operation. REPAIR Connector C161 as necessary.
	<ul style="list-style-type: none"> Disconnect Alternator connector C161. Check alternator connector for bent or damaged pins. Ensure connector C390 is installed in PDB. Is the connector OK? 	
B2	CHECK THE ALTERNATOR GROUNDS	Yes Go to B3 No REPAIR Connections as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Check all ground connections between the alternator voltage regulator and the battery. Are the ground connections OK? 	
B3	CHECK I CIRCUIT 904 (GY/R)	Yes REPLACE the voltage regulator. No Repair Circuit 904 (GY/R) for an open. Test the system for normal operation.
	<ul style="list-style-type: none"> Connect Alternator connector C161. Check C390. Key in ON position. Measure the voltage between the alternator I - terminal, Circuit 904 (GY/R) and ground. Is the voltage greater than 1 volt? 	

PINPOINT TEST C : THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING (THE BATTERY VOLTAGE INCREASES)

Test Step		Result / Action to Take
C1	CHECK CONNECTOR C161	Yes Go to C2 No REPAIR connector C161 as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Make sure that connector C161 is correctly mated to the alternator and making contact. Is the connection OK? 	
C2	CHECK THE ALTERNATOR OUTPUT VOLTAGE	Yes REPLACE voltage regulator. Test the system for normal operation. No Go to H1
	<ul style="list-style-type: none"> With the engine running at 2000 rpm, measure the voltage output at the alternator B+ terminal. Is the voltage output less than 16 volts? 	



DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST D : THE CHARGING SYSTEM WARNING INDICATOR IS OFF WITH THE IGNITION SWITCH IN THE RUN POSITION AND THE ENGINE OFF (THE BATTERY VOLTAGE INCREASES)

Test Step		Result / Action to Take
D1	CHECK THE CHARGING SYSTEM WARNING INDICATOR OPERATION	Yes Go to D2 No REPAIR connector C161, I Circuit 904 (GY/R) as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Key in ON position. Disconnect The alternator connector C161. Ground the alternator connector C161 I circuit with the ignition switch in the RUN position and the engine OFF. Ensure connector C390 is correctly assembled. Is the warning indicator ON? 	
D2	CHECK THE ALTERNATOR	Yes REPLACE the alternator. Test the system for normal operation. No REPLACE the voltage regulator. Test the system for normal operation.
	<ul style="list-style-type: none"> Connect C161 connector. Observe the warning indicator. Is the warning indicator ON? 	

PINPOINT TEST E : THE CHARGING SYSTEM WARNING OPERATES CORRECTLY BUT THE BATTERY VOLTAGE DOES NOT INCREASE.

Test Step		Result / Action to Take
E1	CHECK CIRCUIT 36 (Y/W)	Yes Go to E2 No REPAIR Circuit 36 (Y/W) as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Key in ON position. Measure the voltage between the B+ terminal on the alternator Circuit 36 (Y/W). Is the voltage equal to battery positive voltage (B+)? 	
E2	CHECK THE ALTERNATOR CONNECTORS	Yes Perform the Alternator On-Vehicle Tests; REFER to Component Tests in this section. No REPAIR the connectors as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Check the battery terminals and alternator connectors C161 & C390 for corrosion and tightness. Are all the connectors clean and tight? 	

PINPOINT TEST F : THE BATTERY IS DEAD OR WILL NOT STAY CHARGED OR LOW BATTERY OR ALTERNATOR VOLTAGE

Test Step		Result / Action to Take
F1	CHECK THE BATTERY DRAIN	Yes PERFORM Battery - Drain Testing. REFER to Component Tests in this section. No Go to F2
	<ul style="list-style-type: none"> Key in OFF position. Make sure that all interior and exterior lamps and switches are off. Check the battery drain. Is the drain greater than 0.5 amps? 	



DIAGNOSIS AND TESTING (Continued)

Test Step		Result / Action to Take
F2	CHECK THE ALTERNATOR OUTPUT	Yes Go to F3 No REPLACE the alternator. Test the system for normal operation.
	<ul style="list-style-type: none"> Check that all wiring connections are made securely including the B+ wiring, communications connector (at PDB and alternator), and engine earth strap. Check the alternator output. Perform Alternator On-Vehicle Tests; refer to Component Tests in this section. Is the alternator OK? 	
F3	CHECK THE BATTERY CONDITION	Yes Go to F4 No REPLACE the battery. Test the system for normal operation.
	<ul style="list-style-type: none"> Check the battery capacity with the Midtronic handheld battery tester. Is the battery OK? 	
F4	CHECK OTHER ELECTRICAL SYSTEMS FOR DRAINS	Yes RECHARGE the battery. Test the system for normal operation. No REPLACE the module or REPAIR the circuit causing the electrical drain as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Check the drains from electronic modules. Perform the test for Battery-Electronic Drains Which Shut Off When the Battery Cable is Disconnected; refer to Component Tests in this section. Are the electronic modules OK? 	

PINPOINT TEST G : THE SYSTEM OVERCHARGES (BATTERY VOLTAGE IS GREATER THAN 15.5 VOLTS)

Test Step		Result / Action to Take
G1	CHECK FOR A VOLTAGE DROP	Yes Go to G2 No REPAIR Circuit 36 (Y/W) for high resistance as necessary. Test the system for normal operation.
	<ul style="list-style-type: none"> Key in ON position. Check for voltage drop from the battery positive post and the voltage regulator 'A' terminal. Is the voltage drop less than 0.5 volts? 	
G2	CHECK THE BATTERY VOLTAGE	Yes Go to G3 No Go to G6
	<ul style="list-style-type: none"> With the engine running, turn off all accessories. Increase the engine speed and monitor the voltage at the battery. Does the battery voltage remain less than 15 volts? 	
G3	CHECK THE ALTERNATOR FOR LOW VOLTAGE	Yes Go to G5 No Go to G4
	<ul style="list-style-type: none"> Key in OFF position. Measure the voltage at the voltage regulator F terminal. Does the voltage equal battery voltage? 	



DIAGNOSIS AND TESTING (Continued)

Test Step		Result / Action to Take
G4	CHECK FOR GROUNDED SLIP RINGS	Yes REPLACE the alternator. Test the system for normal operation. No REPLACE the voltage regulator. Test the system for normal operation.
	<ul style="list-style-type: none"> Key in OFF position. Disconnect The alternator connector C161. Remove the voltage regulator from the alternator. Measure the resistance from both alternator slip rings to ground. Is the resistance greater than 1K ohms? 	
G5	CHECK THE WARNING SYSTEM INDICATOR OPERATION	Yes REPAIR circuit 904 (GY/R) as necessary. Test the system for normal operation. No REPLACE the alternator. Test the system for normal operation
	<ul style="list-style-type: none"> With the engine running, increase the engine speed, check the indicator operation and check for a battery voltage increase. Does the battery voltage increase above 15 volts or does the indicator flicker? 	
G6	CHECK THE WARNING SYSTEM INDICATOR OPERATION	Yes REPAIR circuit 904 (GY/R) as necessary. Test the system for normal operation. No REPLACE the alternator. Test the system for normal operation.
	<ul style="list-style-type: none"> With the engine running, increase the engine speed, check the indicator operation and check for a battery voltage increase. Does the battery voltage increase above 15 volts or does the indicator flicker? 	

PINPOINT TEST H : BATTERY LEAKAGE OR DAMAGE

Test Step		Result / Action to Take
H1	CHECK FOR ACID LEAKAGE OR DAMAGE	Yes REPAIR the damaged areas as necessary. No Go to H2
	<ul style="list-style-type: none"> Check for acid damage to the vehicle harnesses and to the body. Is there acid damage? 	
H2	CHECK THE CHARGING SYSTEM FOR OVERCHARGING	Yes Go to G1 No Go to H3
	<ul style="list-style-type: none"> With the engine running, turn off all the accessories. Increase the engine speed and monitor the voltage at the battery. Does battery voltage increase more than 15 volts? 	
H3	CHECK THE BATTERY MOUNTING	Yes Go to H4 No Install the battery. Test the system for normal operation.
	<ul style="list-style-type: none"> Make sure the battery is properly mounted and level in the battery tray. Is the battery properly mounted? 	



DIAGNOSIS AND TESTING (Continued)

Test Step		Result / Action to Take
H4	CHECK FOR BATTERY CONTACT	Yes REMOVE or REPOSITION these items as necessary. Test the system for normal operation. No Go to H5
	<ul style="list-style-type: none"> Make sure that there are no fasteners or other parts contacting the battery case causing excess pressure. Is there anything contacting the battery case? 	
H5	CHECK THE BATTERY LEAKAGE OR DAMAGE	Yes The charging system is OK. Test the system for normal operation. No REPLACE the battery. Test the system for normal operation.
	<ul style="list-style-type: none"> Check the battery case for damage such as cracks or poor seals. Is the battery OK? 	

PINPOINT TEST I : THE VOLTAGE GAUGE READS HIGH OR LOW

Test Step		Result / Action to Take
I1	CHECK THE BATTERY VOLTAGE	Yes Go to G1 No Go to I2
	<ul style="list-style-type: none"> With the engine running, turn off all accessories. Increase the engine speed and monitor the voltage at the battery. Is the battery voltage more than 15 volts? 	
I2	CHECK THE VOLTAGE GAUGE OPERATION	Yes The charging system is operating normally. No Check Instrument Cluster section to continue diagnostics.
	<ul style="list-style-type: none"> With the engine running, monitor the voltage gauge reading and the battery voltage. Are the voltage readings consistent? 	

PINPOINT TEST J : THE ALTERNATOR IS NOISY

Test Step		Result / Action to Take
J1	CHECK FOR ACCESSORY DRIVE NOISE	Yes Go to J2 No For further diagnostics, refer to the Accessory Drive System section.
	<ul style="list-style-type: none"> Check the drive belt for damage and verify the installation. Check the alternator mounting for loose bolts or misalignment. Check for a bent alternator pulley. Is everything OK? 	
J2	SUBSTITUTE A KNOWN GOOD ALTERNATOR	Yes INSTALL the original alternator and CHECK other accessories to FIND the cause of the noise. No REPLACE the alternator. RETEST the system for normal operation.
	<ul style="list-style-type: none"> Key in OFF position. Disconnect The alternator connector C161. Install a known good alternator. Start up the engine. Is the noise present with a known good alternator? 	

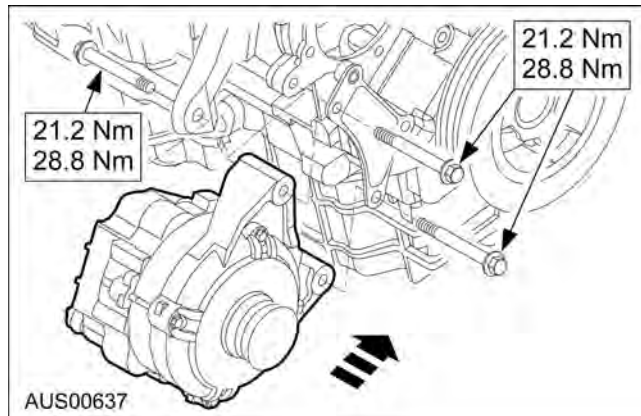


REMOVAL AND INSTALLATION

Alternator Installation — 6 Cylinder

Removal

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01.
2. Remove the Front End Accessories Drive belt, For additional information; refer to Section 303-05.
3. Remove all wiring from alternator.
4. Remove the 3 M8 Bolts holding the Alternator in place.



5. Remove the Alternator.

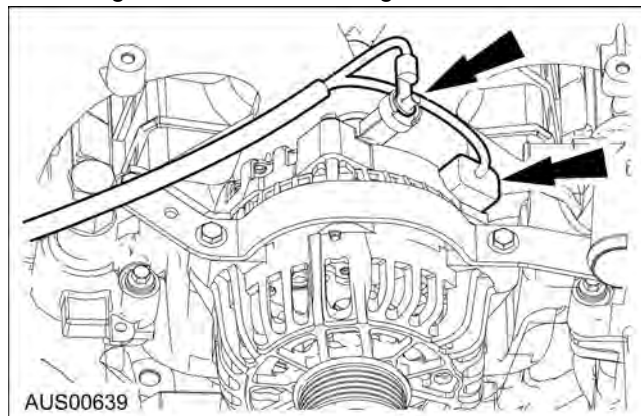
Installation

1. To reinstall, reverse the Removal Procedure. Ensure that the correct hardware is used (i.e. rear bolt is different to the front two)

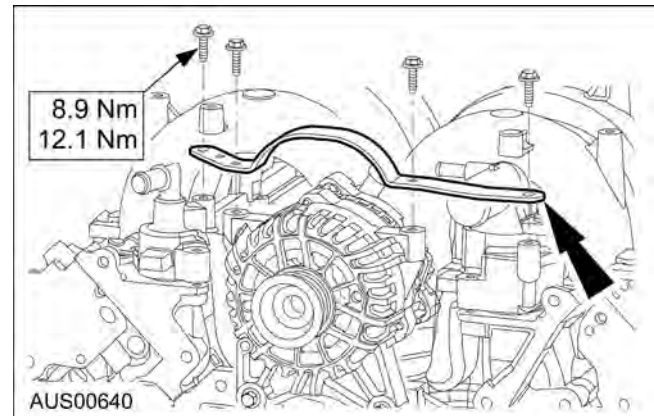
Alternator Installation — 8 Cylinder

Removal

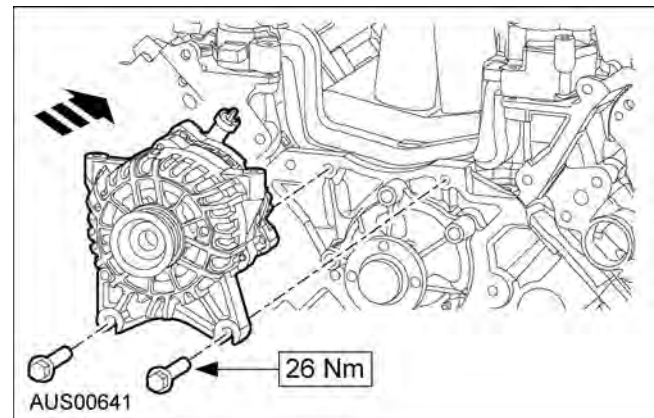
1. Disconnect the battery ground cable. For additional information, refer to Section 414-01.
2. Remove the Front End Accessories Drive belt, For additional information; refer to Section 303-05.
3. Remove the Nut on the B connector and remove wiring from Alternator Wiring Harness.



4. Remove the 4 Upper Bracket bolts.



5. Remove the 2 lower retaining bolts and remove the alternator.



Installation

1. To reinstall, reverse the Removal Procedure.

