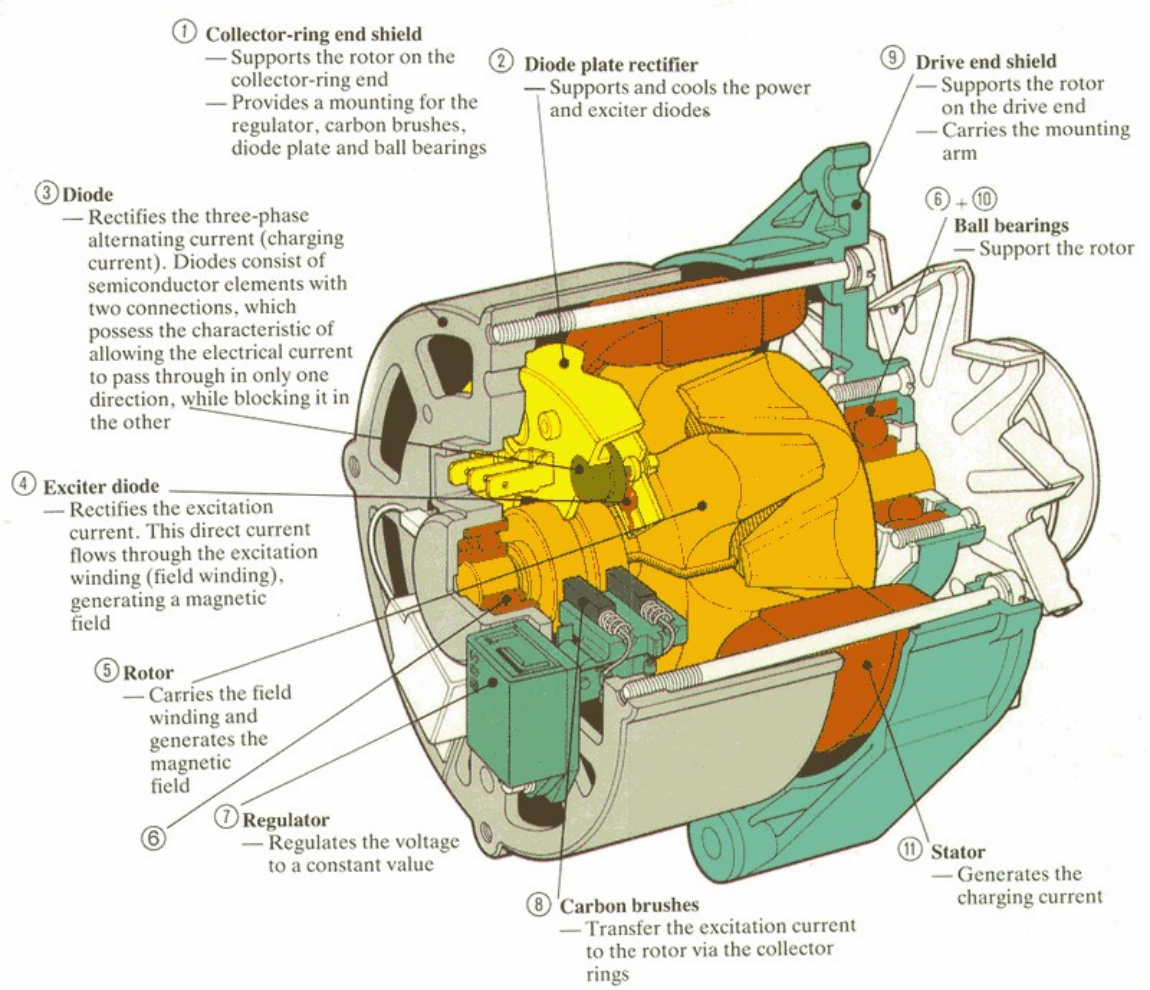


System Checks

Perform these tests first.

The battery must be fully-charged (specific gravity or electrolyte 1.28 g/cm³) in order for these tests to be valid.

To carry out the tests you will need the following:

- Electrolyte tester - Volt / ohmmeter - Test lamp.

Test:

- Check ground strap from the engine block to the frame - must have a good connection.
- If alternator is mounted in rubber grommets, check external ground strap from alternator.
- Check battery plus connection to the electrical system.
- Ambient temperature should be 20 - 30ºC. Temperatures outside this range will heavily affect results.
- Check tightness of V-belt according to manufacturer's specifications.
- Charging output test: start engine and run at approx. 2000 RPM. Create electrical load by turning on headlights and heater blower (vehicles). On stationary engines, crank engine for approx. 15 seconds with fuel supply off. Reconnect fuel supply and start engine. Measure regulating voltage from alternator battery terminal to ground:

Integrated regulator:	13.7 - 14.5 (12V systems)
	27.4 - 28.4 (24V systems)
External contact regulator:	13.9 - 14.8V (12V systems)
	27.2 - 28.3V (24V systems)

- *If regulator is cold, take readings after one minute of operation. The regulating voltage may be 0.5V lower if the engine is hot.*

Battery Test

The acid level must be along the plates and separators. OK?

No → Add distilled water up to the mark or above the plates and charge battery.

↓

Use a Volt meter to test the Battery.

Battery Condition:		
12.6 Volts	=	a fully charged battery 100%
12.4 Volts	=	75%
12.2 Volts	=	50%
12.0 Volts	=	25%
11.8 Volts	=	0%

Test specific gravity of electrolyte. Minimum value = 1.28 g/cm3 OK ?

No → Charge battery, check regulator voltage (see KTR Alternator test procedure). Replace defective battery.

Charge Indicator Lamp does not light with ignition on and Engine Stopped.

Test voltage at indicator lamp terminal on ignition switch. Approximately 12V (24V)?

No → Check plus lead from battery to ignition switch for continuity. Repair if defective.

Yes

↓

Alternators with integrated transistor regulator: remove cables from alternator terminal D + 61 and connect to ground. Turn on ignition. Does warning lamp light? Alternators with external regulator: connect test lamp between ignition switch terminal and alternator D +. Does warning lamp light?

No → Open circuit in wire from ignition switch to warning light, open circuit in wire from warning light to D+61 on alternator, or defective bulb. Repair open circuit or replace bulb. Defective lead or plug connecting alternator to regulator (external regulator). Repair or replace. Open circuit in regulator or alternator. Replace regulator or alternator.

↓

Defective power diode in alternator. Replace alternator.

Alternator Warning Lamp on with ignition switch off.

Defective power diode in alternator. Replace alternator.

Warning Lamp glows with engine running.

Check regulating voltage between alternator B + and ground as described above. If not within specification, alternator or regulator is defective. Replace alternator and / or regulator.

↓

After replacement of alternator and / or regulator, check charging system with engine running as described above.

Low battery voltage (starting difficulties)

Overcharging of battery (boiling over or gas formation). Check charging system with engine running as described above. If regulating voltage out of specification, replace regulator or alternator.

Testing Alternators – Then and Now:

Issue:

Testing the charging system on the 2 vehicles shown below cannot be done in the same way.

PRE 1960'S VEHICLE

The electrical system contained a battery, some switches, some coils, points and a generator that would typically produce a 15/30 Amps.
No computers, no electronic devices and no OBD plug to get trouble codes from.

A typical practice to see if the generator was working was to start the engine and disconnect battery.

This resulted in some arcing but caused no major issues, as there were no electronic parts in the vehicle.

POST 1970'S VEHICLE

The electrical system consists of numerous computers linked together with a data line that requires specialized computer diagnostic tools to access and alternators that are rated Up to 350 Amps. If the battery is disconnected with the engine running the following issues may occur :

The Alternator regulator or rectifier may blow, as well as the ECU and other inline electronic components. Costing a lot of money to repair.
The voltage regulator senses no voltage and boosts the output to compensate in an uncontrolled manner and can damage the alternator.

When the battery is reconnected the arcing sends a voltage spike through the system and can damage any of the computer modules.

Some vehicles record the spike as a system error and require flashing or calibrating the memory to correct.
Some vehicles, if the voltage goes above (or below) a certain point require all electronic devices to be reset. This includes the sunroof, power windows, power locks, power doors etc. as the vehicle will go into Limp mode

Important!

In order to avoid wasting money & time, as well as voiding your warranty on parts installed, always follow the manufacturer's recommended procedures for testing the charging system.

Alternator Installation Guide:

Before installing the Alternator check the following related Items:

1. Before removing the alternator, please perform the necessary diagnostic tests to ensure that the alternator requires changing.

    - Ensure that the battery is fully charged and in good condition, do a load test on the battery and if possible check the specific gravity (should be 1.260)
    - Check that all wires and connections are in good condition. Do a voltage drop test under load, anything over 0.2V could be an issue that needs correcting.

2. In addition to the above tests, make sure that the alternator drive belt is in good condition. Also make sure that the belt is not cracked or glazed. Also check the alternator clutch or de-coupling pulley, used on many later applications as they have a short life expectancy.

3. Before disconnecting the battery follow the manufacturers recommended procedures to ensure that the system memory is not compromised. Some vehicles will have to have the on-board computer re-calibrated if power is lost. Some vehicles have specific window positions and if not done correctly will cause damage to the vehicle or will take additional time to correct. Disconnect the negative battery cable first to prevent short circuits to ground.

4. Remove the wires (and wiring harness, if required) from the alternator. Use extreme care and mark the location and note the routing of the wires.

5. Depending on how the belt tension is achieved, either disengage the automatic belt tensioner and/or loosen the mounting bolts and remove the alternator.

6. Make sure that the replacement alternator has the same number of grooves as the old unit. In addition, locate the electrical connections to be sure that they are the same as the old one. In some cases the connections may be in different locations as the vehicle manufacturer may have used more than one alternator manufacturer.

7. Inspect wires for swelling, “green” oxide and fraying. Replace as required, if the wires are good, clean the wire terminals and/or plugs to ensure proper connections to the replacement unit. Remove any covers, shrouds or condensers from the old unit and install them on the new unit, if not provided.

8. Hold the placement unit in position and replace the mounting bolts by hand. Install the alternator belt, then torque the bolts to the manufacturer’s specifications. On vehicles with an automatic belt tensioner the bolts can be torqued after they are all installed by hand.

9. Use a belt tension verification tool to ensure that the belt tension is to the manufacturer’s specifications. If the application is with an automatic belt tensioner ensure that it is operating correctly.

10. Reconnect the wires and wiring harness.

11. Reconnect the negative battery cable.

12. Start the engine and test for proper charging after the engine has run for a few minutes to allow the battery to stabilize.

13. The Alternator needs to put out 14,2 volts in 12 volt systems and 28,4 volts in 24 volt systems.

Alternator pre-installation check (Summary):

- **65%** of all alternator failure is due to a faulty or weak *battery* (batteries should be replaced every 3 years with the required correct cold cranking amps**). Alternators fitted to cars with a discharged / flat battery will fail within 30 minutes. The alternator is not designed to and cannot cope with the demand of handling the vehicles electrics and charging a flat battery.**
- **The likely result is an overloaded alternator which will blow the rectifier, rendering the unit useless. NOT a valid claim reason.**

- **15%** of all alternator failure is due to *poor electrical connections, fuseable links, bad battery cables and bad grounds* (Cables can be tested by verifying that the voltage drop doesn't exceed ½ volt from end to end).

- **10%** of all alternator failure is due to belt wear or improper adjustment (check for cracks, polished wear on belts and proper tension on belts).

- **5%** of all alternator failure is due to jump starting another car improperly (failure to disconnect on alternator may cause voltage spikes).

Note: Before installing alternator you must be certain of a fully charged battery.
Note: Never remove battery cable from battery to check charging system. This will cause damage to the alternator and computer system.

Common General Alternator Faults (Summary):

- **No charge:**
  Loose or missing fan belt.
  Break in wiring.
  Blown / corroded fuse or fuse link.
  Blown rectifier diodes, (often caused by jumpstarting a vehicle without first disconnecting the Alternator).
- **Low charge:**
  Loose fan belt.
  Poor wiring connections.
- **Overcharging:**
  Poor battery condition.
  Failed Regulator or Rotor.
- **Noisy:**
  Loose or damaged fan belt.
  Loose pulley.
  Worn Alternator bearing, (often caused by an over tightened fan belt).
- **No warning light:**
  Blown warning light bulb.
  Poor Alternator earth connection or broken wire.
  Relay problem.
- **Dim warning light:**
  Loose fan belt.
  Loose wiring plug.
- **Continuous light:**
  Poor wiring connection (common mistake when plugging in the A127 series is the small warning light terminal gets bent over touching earth).
  Loose fan belt.
  Defective alternator.

Alternator Trouble Shooting Guide:

Listed below are some of the more common problems that occur in alternators and charging systems, along with some of the likely causes and remedies. Due to the number of types of units and systems that exist this is only a general listing of the most common problems, possible causes and remedies that are possible.

SYMPTOM:
Low output from the alternator (seen as dim headlights, slow blinking turn signals, etc)

Possible Causes:
- Worn, cracked, glazed or loose belt
- Bad battery
- Battery low on electrolyte
- Bad battery connection
- High voltage drop on wires
- Voltage regulator not adjusted properly (when applicable)
- Bad wiring harness or fusible links
- Bad Alternator

Remedy:
- Adjust or replace belt and/or tensioner
- Replace battery
- Fill battery to proper level
- Replace Battery terminals
- Repair or replace connections or cables
- Adjust or replace regulator as necessary (or replace alternator if internally regulated)
- Isolate the problem and repair or replace as necessary.
- Replace the Alternator

SYMPTOM:
Output from the Alternator is too high
(seen as over bright headlights, fast-blinking turn Signals, burnt out bulbs, etc)

Possible Causes:
- Bad battery
- Bad/maladjusted voltage regulator
- Bad battery connections or main fusible link
- Bad wiring harness connections

Remedy:
- Replace battery
- Adjust the regulator (when applicable) or replace.
- Repair or replace connections or cables
- Isolate the problem and repair or replace as necessary

SYMPTOM
Alternator is noisy

Possible Causes:
- Worn, cracked, glazed, loose, misaligned belt
- Faulty belt tensioner
- Alternator mounting bolts are loose
- Bad Alternator bearings
- Grounded stator/brown diode
- Loose Alternator pulley
- Loose or Worn Alternator pulley or faulty Clutch pulley

Remedy:
- Repair or replace as necessary
- Replace, as a wearing part
- Tighten as necessary
- Replace Alternator, or bearings.
- Replace Alternator
- Tighten with correct special tools and to correct torque, or pulley could come off during use
- Replace as necessary

Alternator Types – External Fan & Internal Fan:

External Fan

Fan mounted outside alternator

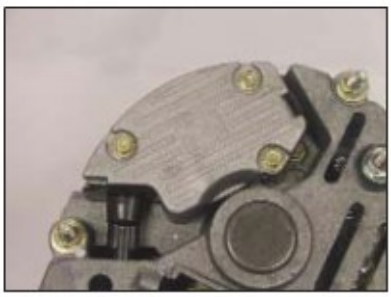
FAN

Internal Fan

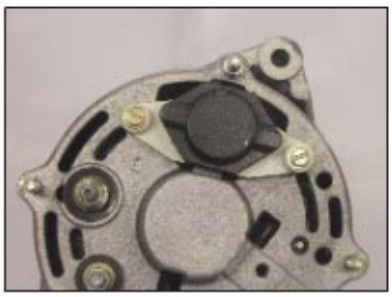
Fan mounted inside alternator

Internal Regulator:

98% of vehicles on the road today have an internally regulated alternator; the regulator is either inside the alternator or bolted to the back of the unit.



A127 TYPE



BOSCH TYPE

Internal Regulator differences: PD

Always try to get the OE part number, off the old unit, fitted on the vehicle, never work on visually trying to compare units, as the internal components such as regulators could be different.
KTR291060140 – A2TB0091 - Field control unit instead of regulator (PD connection)
KTR291012180 – A2T33191 - (L-S connection)
The below two KTR units look 100% the same, but they have different connections.
Installing the incorrect unit on a vehicle can cause damage to the Vehicles ECU and also can blow the Regulator or Rectifier on the Alternator, making the warranty Null and Void.

KTR291060140 **KTR291012180**

Can you tell which is PD and which is L & S ???

PD Connection type Alternators:

A PD connector is a Field control unit, and not a traditional regulator. Therefore the regulation will take place externally to the Alternator, the regulation takes place in the ECU of the vehicle. Connecting a PD type Alternator to a non PD vehicle will cause major damage and is NOT covered under any warranty.

P=Phase or W terminal and should always be half of the charging voltage and puts out a frequency signal in HZ.
Example: 14V=> 7V signal / 28V=> 14V signal
The higher the RPM more pulses will show in the same time frame, which on a RPM gauge will show higher RPM.

D=Drive and is a 5 Volt sinus signal to the regulator which is necessary to control the voltage set point, which is in turn controlled by the car ECU (Electronic Control Unit).
By changing the wave output the output voltage of the alternator will be changed to what the ECU requires at that moment during charging.

NOTE! The same plug is used for a L,S connection, they are **NOT** interchangeable, see attached.

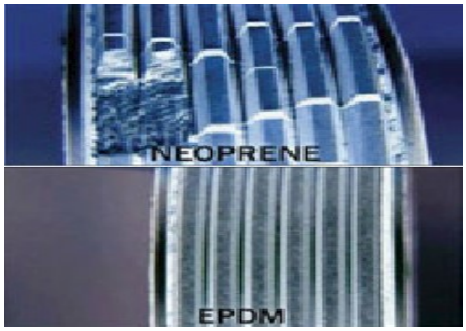
Terminal Markings Reg. Type

Plug : P303			
L	Trio (Lamp)	S	Sense (+)

Fan Belts and Belt Tension:

The alternator and battery are part of a complete system, and if one part is not working then other parts have to compensate, and in extreme cases result in catastrophic failure. Often overlooked are the drive belt and the belt tension.

Here are details regarding the newer belts. Since the 1990's the OE manufacturers have changed the belt material away from neoprene to ethylene propylene diene monomer = EDPM. The new **EDPM** belts do not crack and breakdown over time as the neoprene ones did (see pictures below). The grooves on the EDPM belts simply wear away from the pulley. To the technician this poses a problem. How to determine when to replace the belt?



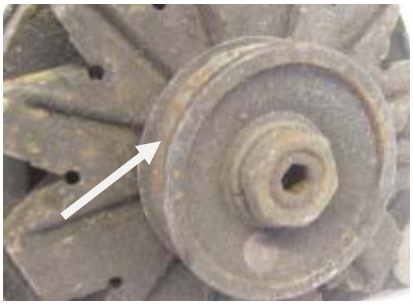
In addition to belt wear the belt tension is critical and must be checked according to the manufacturer's specifications. A belt with too much tension can destroy the alternator, air conditioner compressor, water pump and any other device driven by the belt as the load capacity may or the devices.

The same is true of a belts with insufficient tension as it will slip and grab over and the resulting shock load damages the components in the belt system. **If there is an automatic belt tensioner it must be considered as a wear item that does require replacement over time**. The tensioner should be checked with the engine and accessories on, and if the arm can visibly be seen moving, the tensioner requires replacement. Below is a picture of the resulting damage when the belt tensioner has a problem.

Lastly, the pulleys and bearing must be checked on items like the belt tensioner or idler pulleys to ensure that they are turning freely and spin smoothly and that there is no excessive wear on the pulley surfaces.

Slipping fan belt:

Most Fiat Marelli alternators, amongst others suffer from a slipping fan belt; this is incorrectly diagnosed as an alternator fault when correct tension or a replacement fan belt is required.



The photo shows heat marks on the alternator pulley. A slipping fan belt has caused the pulley to become hot and causing the pulley to become red rusty looking. Contrary to a popular misconception not all slipping fan belts squeal. Most slip quietly.

Alternator Pulley fitting:

When fitting the pulley from the old unit to a new unit it is important NOT to drag the bearing. This is caused by over tightening the main nut on the rotor shaft, where possible it is advised to use an air tool for this procedure.

Regulator brushes can be damaged when a customer attempts to change the hand of a unit from left to right hand or vice versa. It is very important to first remove the regulator from the back by undoing the three 6mm bolts, you are then free to undo the through bolts and turn the front bracket **ONLY** 180 degrees before reassembling.

Clutch/Freewheel pulley:

The Alternator Clutch Pulley was pioneered by Audi, BMW, Mercedes and Volkswagen.
The idea of which was to reduce possibility of sudden snatch when coming down from high revs such as motorway driving to a standing stop thus prolonging the life of expensive automatic tensioners.
KTR supplies certain products with Clutch Pulleys, in the box. The clutch type pulley needs to be fitted or it can lead to damage of the alternator. Do not fit a standard pulley if a Clutch type pulley is required or supplied, this will lead to damaging the alternator.
Certain Renault/Citroen/Peugeot vehicles have special rubberised pulleys fitted to them to ensure that vibration is minimal on the alternator; if this rubberised clutch pulley is not fitted it will lead to failure of the alternator, and an invalid claim. KTR1151142196

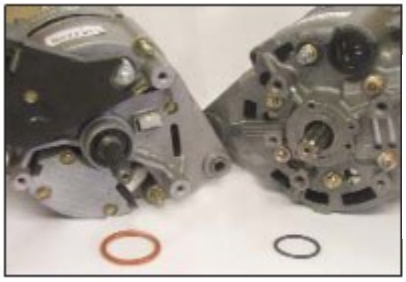
Alternators and Starters with Coolant, Fuel and Oil contamination:

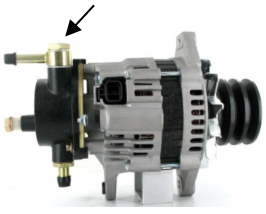
Alternators and Starter Motors do not like contamination by liquids, It gets between the brushes and the slip rings or armature, causing them to shred and turn to paste.
The oil also impregnates the stator or armature and prevents the heat generated from dissipating therefore causing the unit to overheat and fail.

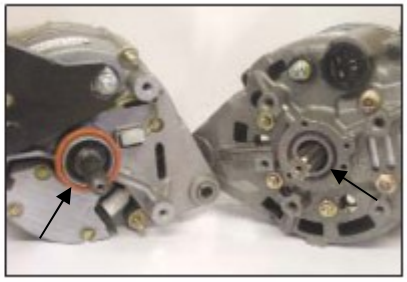
When you sell a unit, and your customer gives you the old unit with evidence of such a leak, please suggest the leak is repaired before fitting the new unit; after all it is in his interests.
The most common vehicles that seem to suffer with this problem are Ford 1.8 diesel engines and Volkswagen petrol engines.

Diesel Alternators with a vacuum pump fitted:

All diesel alternators fitted with a brake vacuum pump have a seal fitted in the pump or into a recess in the rear bracket.
When refitting the old pump to the new alternator, please check the condition of this seal and if necessary replace it when changing the pump.
Failure to do this is likely to cause an oil leak and damage to the new unit, and a rejected claim.







MINI Alternator - Technical update V.1 KTR891010240:

1.) COOLING FAN CONTINOUSLY RUNS:

There is a known fault with some vehicles that this alternator is fitted to which cause the cooling fan to continuously run on after a replacement alternator is fitted.
The cause of the fault is the multi plug for the water pump which has either not been plugged in or is not connected correctly. Please ensure that the plug is fitted and secured.
Once the plug has been connected further re-programming or fault code clearing may be required.

Failure to rectify the above fault will result in the battery discharging and causing excessive load to be exerted to the alternator and resulting in the premature failure of the unit.

2.) CHARGING FAULT AND/OR NOISY DUE TO BELT SLIP AND COOLANT LEAK:

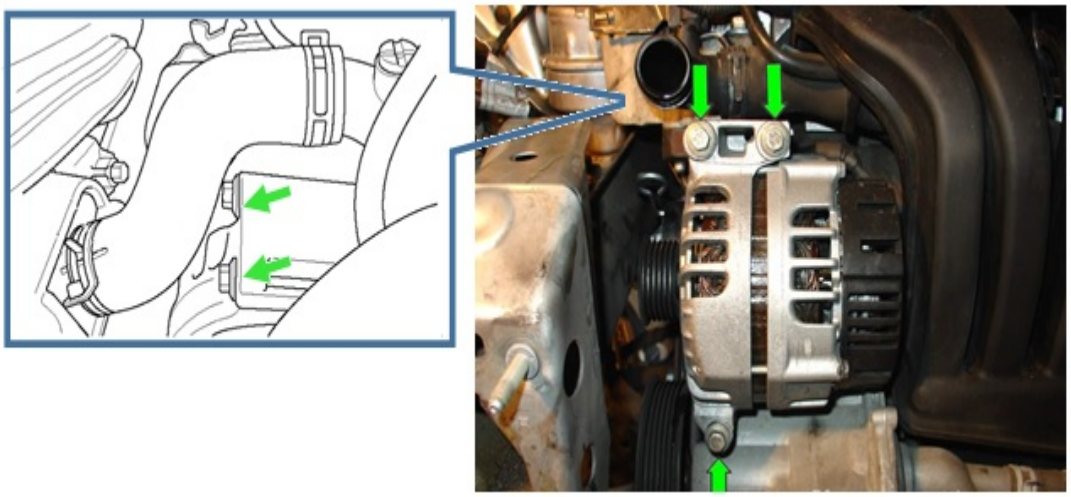
Fitting error causing engine coolant to leak onto alternator creating belt slippage:

Mini R50/R52/R53 1.6 &1.4 Petrol 2001-2009.
All vehicles with W10 engine code are affected from 2003 onwards.

Alternators fitted to the above vehicle are being returned under warranty after replacement due to the drive belt slipping. Upon inspection there were signs of engine coolant on the drive bracket.

We have found that there is a coolant pipe which runs directly above the alternator and across the mounting brackets. When the original alternator has been removed the pipe has not been detached or moved into a safe position, perhaps to save time. By doing this the pipe chafes against the alternator mounting bolts causing leakage of coolant on to the alternator and the drive belt. This results in the drive belt slipping resulting in a charging fault/ low charge fault.

In all cases when replacing the alternator on this vehicle the fitter must ensure that the pipe is clear from the mounting bolts when removing the alternator. If the pipe has been damaged it must be replaced.



Failure to avoid the above fitting faults or rectify the failure caused by the fitting fault may result in your warranty being void.

Land Rover common faults:

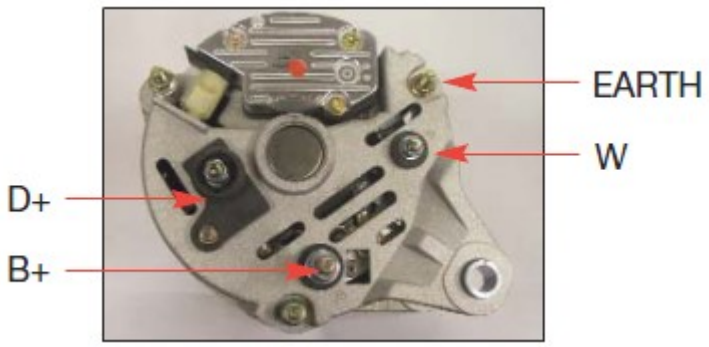
Most Land Rover Defender, Discovery and Range Rover 2.5 diesel models regardless of year of manufacture all seem to suffer from the same problem **BAD EARTHS** on both Alternators and Starter Motors.
Before installing the replacement unit on a vehicle with a discharged (flat) battery, non-start or non-charging please check the condition of all earth connections within the engine bay and if corroded replace.

Another Land Rover fault is quite an unusual one:
On the Defender and Discovery TD5 models the alternator is fused through the brake / stop light circuit.
Should the fuse for the brake lights blow the alternator will not charge, always check this fuse before replacing what appears to be a faulty alternator.

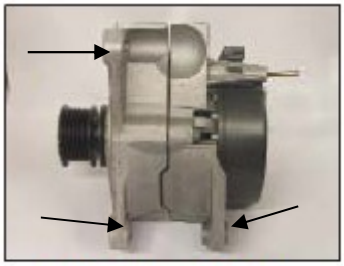
Affected part number is **KTR911404240** - ALT6096 - 100213-2530.

Wiring warning on Nissan Primera Alternator: (KTR330018134)

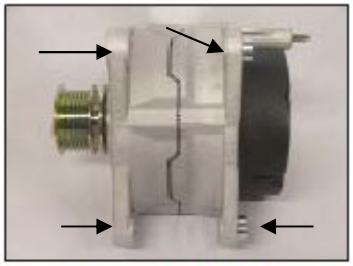
The wiring on this alternator can be confusing.
When connecting the wiring on this type of alternator (**KTR330018134)** please ensure the earth terminal is connected to the tagged through bolt, do not connect to the W (phase) terminal.
Connection of earth to the W (phase) terminal will short circuit the unit and render it useless.



Wiring differences on late Audi, Ford and VW Alternators fitted with the three and four bracket Volkswagen alternators:



3 bracket VW

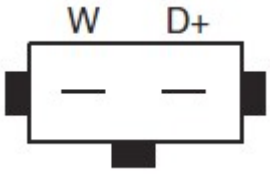


4 bracket VW

There are basically three different types of wiring:

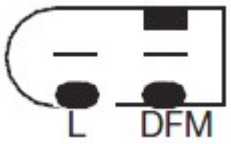
Type 1 : W / D+

This is the earliest type of wiring used from 1992 to1997; the terminals are very straight forward.
The **W** is the phase terminal this operates the rev counter or a glow plug relay on diesel vehicles.
The **D+** is the battery warning light terminal.



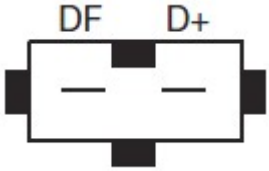
Type 2 : L / DFM

This wiring is the later type used from 1997 onwards, and is widely used across other manufactures.
The **DFM** terminal is a **Digital Field Monitor** terminal that cannot be tested without correct knowledge and equipment.
The L terminal is the later version of a **D+** terminal and as in the earlier version is the battery warning light terminal.



Type 3 : DF / D+

This type of wiring is also used from 1992 to 1997, unlike the W / D+ it is very rare.
The **DF** terminal is a **Digital Field** terminal that cannot be tested without correct knowledge and equipment.
The **D+** as in the earlier type is the battery warning light terminal.



All the above types also have a main battery stud marked: B+.

Alternator Plug types: (COM / DF(M) / C / RLO / PCM)

COM Plug connector:

Modern type alternators have a COM connection / plug.

What is COM:

COM stands for Communication or Computer and is a digital communication signal, referred to in bytes.

Functions:

- These connections are developed to save fuel.
- These connections use a digital signal, one faster than the other.
- The faster the alternator reacts to the car computers commands, the faster fuel will be saved.
- The communication speed is called Baud Rate.

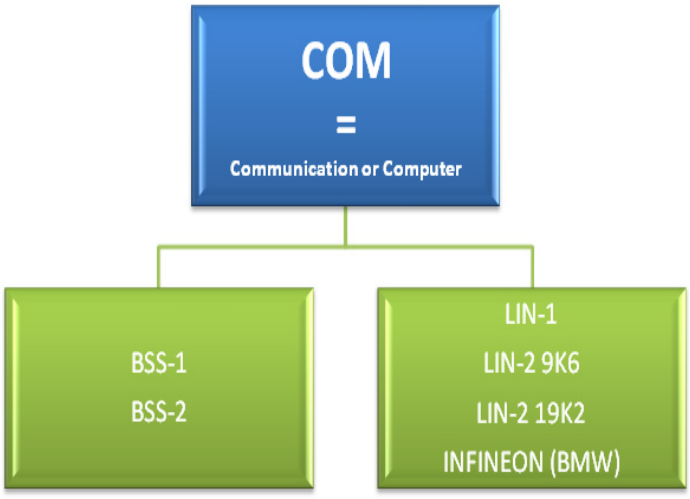
Baud-Rate:

Transfer rate of a serial connection, the amount of bits per second over a serial channel can be sent. A measurement of the speed at which a modem transmits data. Often confused with bps (the number of bits per second that is sent), the baud-rate measurement is in fact the number of events, or signal changes, that occur in one second. An event in digital communication with the high speed in fact can encode more than one bit, and baud rate is not necessarily synonymous bps, the last one is a more accurate unit which is applicable to modems. A 9600-baud modem for example, that 4 bits per event encodes actually works with 2400 baud, but transmits at 9600 bps (2400 event times 4 bits per event) and would be named a 9600 bps modem.

Protocols:

There are numerous kinds of protocols.

Below you will find an overview of the most common protocols and on which applications they are used on:



BSS-1	Mercedes / Audi / BMW / VW / MINI / Rolls Royce / Renault
LIN-1	Ford / Volvo
LIN-2 9K6:	Ford / Volvo
LIN-2 19K2	Mercedes / Chrysler / Toyota / Fiat / Audi / VW / Porsche / Citroen / Peugeot
NEW: Infineon VDA	Until now only used on BMW (2012)

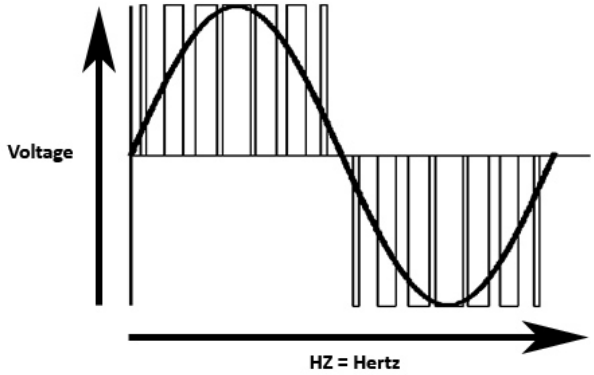
DFM Plug connector:

DF(M) stands for **Digital Field Monitor**.

Every alternator brand has a different abbreviation for the DF(M) connection, for example: FR(Field Return), DF(Digital Field) , DFM(See above), M(Monitor), LI(Load Indicator).

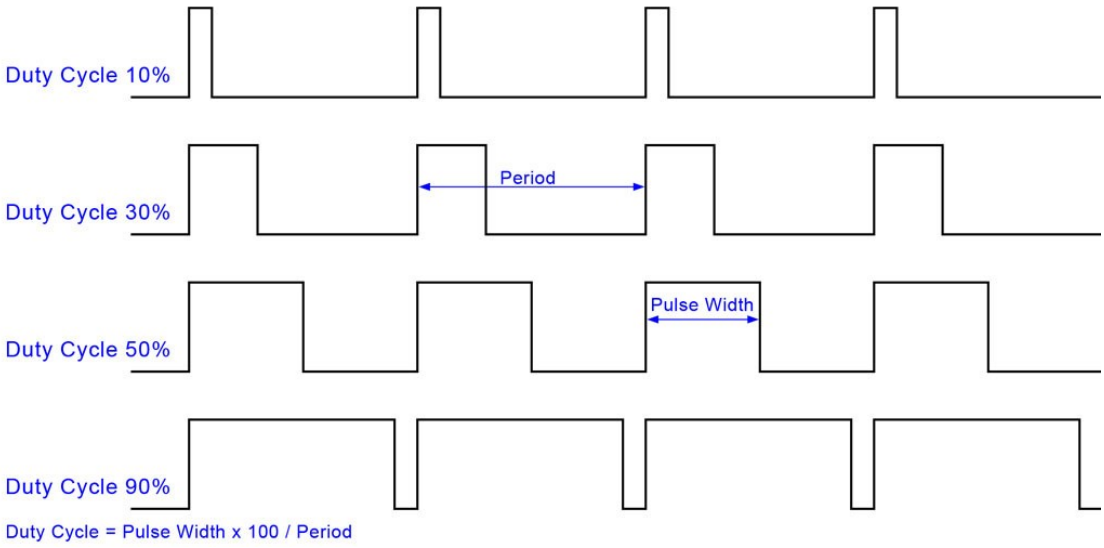
They all function in the same way.

Function:
About the DFM connection there is a positive and negative measurement and both work with a block pulse.
When the alternator load increases the block pulse depending on the car application becomes wider or smaller. This is measured in % also called PWM (Pulse Width Modulation).
The car ECU then knows what the load is at a specific moment during charging. If the load is to high the car ECU can shut down some car accessories and or increase the idle speed.



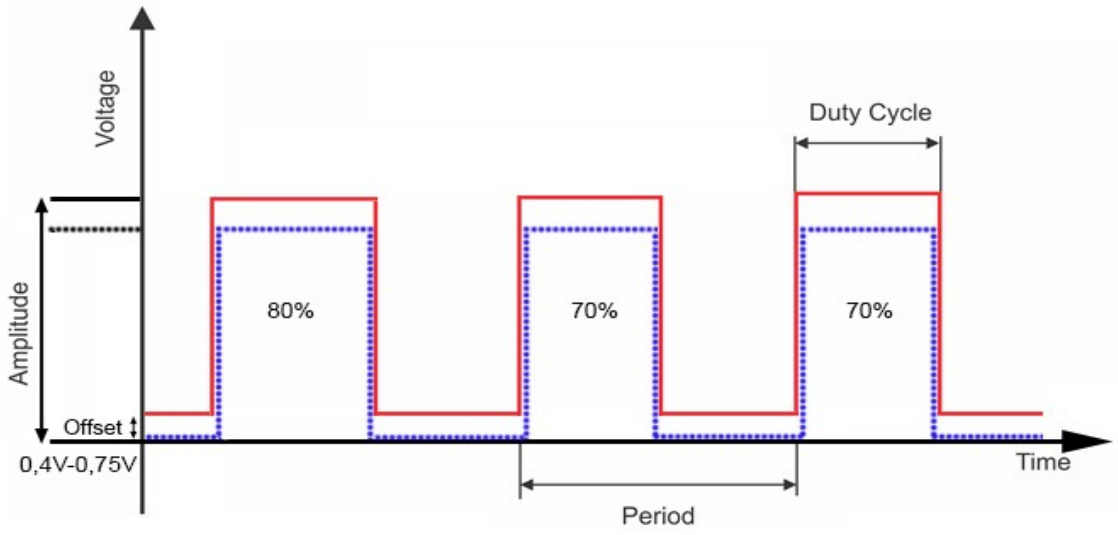
DFM (M, FR, DF, LI, F) is a block signal (information) that is sent from the alternator to the car ECU.
It shows the load level of the rotor of the alternator, also known as electromagnetic force.
This has a direct influence on the produced energy of the alternator.
The voltage is regulated by turning on the rotor current with a frequency of eg.150HZ, which changes the electromagnetic force.
The longer the duration time of the current, the wider the duty cycle will be.

Below you see a diagram as an example to show you what the signal looks like when connected to an oscilloscope:



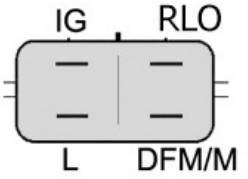
When looking at the structure of the transistor, an off-set of the DFM signal could show up and will vary in voltage somewhere between 0,1V-1,2V.

The actual diagram on the oscilloscope will look like the drawing below:



If the off-set were to exceed 0,75V, the ECU probably won't recognize the signal and because of that could calculate the wrong load of the alternator at that specific time.
The tester will show three results of the signal:
1. The frequency eg.150HZ
2. The width depending on the alternator load at that specific moment from 0-99 %.
3. Offset - from 0,1 t/m 1,2Volts
The best testing method is to compare the DFM signal to another alternator with the same OE number.
To check this, place an alternator with a DFM connection on the test bench and connect the DFM connection to the VC-17F and change the RPM's to 1500, 2500 and 3500 RPM.
During the test put three different increasing loads on the alternator and write them down.
Now replace the OE alternator with a rebuild or aftermarket version and repeat the test above.
Compare the values and if the results are the same, the alternator will function well on the car.
If the results are different (especially the width in percentages), the best thing to do is to replace the regulator.
If the width changes like the OE version, the alternator is tested ok and if it doesn't the alternator is faulty. This test is 100% reliable!

RLO Plug connector:



Plug : P725			
DFM	Feedback	L	Lamp
IG	Ignition	RLO	Temp. Meter Accu

The RLO terminal is used on Toyota applications, for example the 104210-4521.

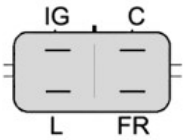
About the RLO terminal, this connection is connected to the car ECU that is then connected to a sensor near or on the battery. This sensor continuously measures the state of the battery and this signal has a block pulse with a very low Herz frequency (7,5Hz).
Also this signal depending on the PWM will change the VSP.
The wider the block pulse the lower the VSP will be.

C Plug connector:

The C-connection you can find on alternators from car brands like Toyota and Honda.
Mostly you can recognize the C-connection by the square and oval shape plug.

The connection definitions are as follows: (D&V plug 296)

- **L=Lamp**
- **IG=Ignition**
- **C=Computer**
- **FR=Feedback**

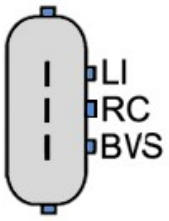


Plug : P710			
FR	Computer (Field)	L	Lamp
IG	Ignition (+)	C	Computer

The C-connection may seem hard to test, but this is definitely not the case.

Just connect the C-terminal to ground and you will notice that the VSP drops to 12.8Volts.
For example during acceleration of the car the terminal is connected to ground by the ECU and the alternator is temporarily disabled.
This is helps with fuel saving!

PCM Plug connector:



Plug : P732			
LI	Feedback	RC	Remote Control
BVS	Battery voltage sense		

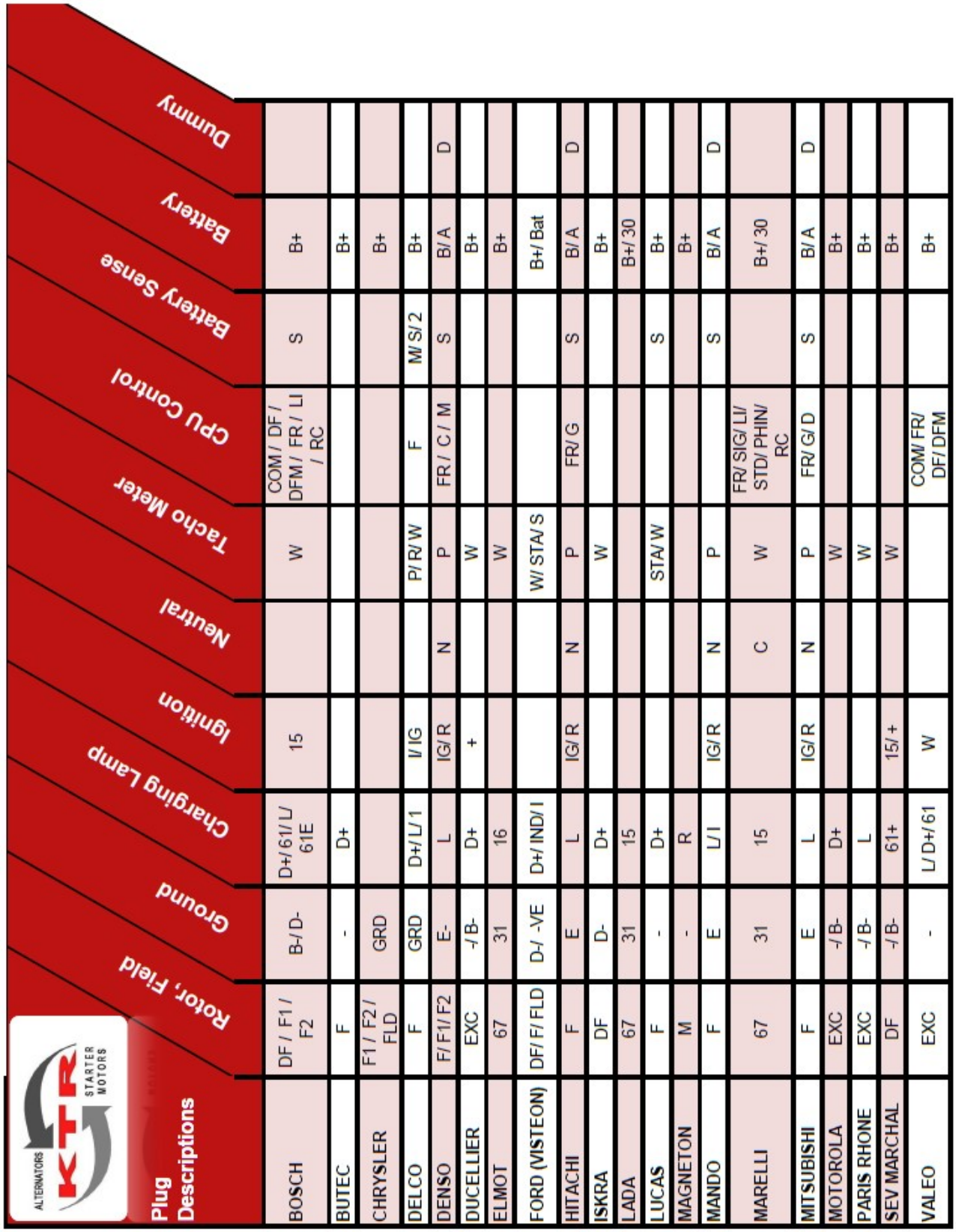
The **PCM (Powertrain Control Module)** is used in Europe on Ford and Landrover applications.

The signal works in the same way as the DFM signal, but now the car ECU is sending this signal to the regulator to change the VSP(Voltage Set Point) depending also on the battery state(AS) and the load(LI) at that specific moment.

The wider the pulse is, the higher the VSP will be and vice versa.

This signal has a standard setting of 5volts, 125Hz and 55% PWM to get a VSP of about 14,2 volt.

Alternator Plug Descriptions:



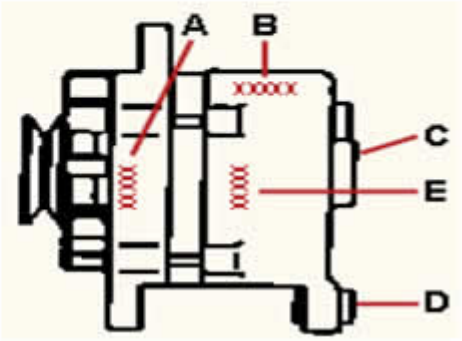
Plug Descriptions	Rotor, Field	Ground	Charging Lamp	Ignition	Neutral	Tacho Meter	CPU Control	Battery Sense	Battery	Dummy
BOSCH	DF / F1 / F2	B-/ D-	D+/ 61/ L/ 61E	15		W	COM/ DF / DFM/ FR / LI / RC	S	B+	
BUTEC	F	-	D+						B+	
CHRYSLER	F1 / F2 / FLD	GRD							B+	
DELCO	F	GRD	D+/ L/ 1	I/ IG		P/ R/ W	F	M/ S/ 2	B+	
DENSO	F/ F1/ F2	E-	L	IG/ R	N	P	FR / C / M	S	B/ A	D
DUCELLIER	EXC	-/ B-	D+	+		W			B+	
ELMOT	67	31	16			W			B+	
FORD (VISTEON)	DF/ F/ FLD	D-/ -VE	D+/ IND/ I			W/ STA/ S			B+/ Bat	
HITACHI	F	E	L	IG/ R	N	P	FR/ G	S	B/ A	D
ISKRA	DF	D-	D+			W			B+	
LADA	67	31	15						B+/ 30	
LUCAS	F	-	D+			STA/ W		S	B+	
MAGNETON	M	-	R						B+	
MANDO	F	E	L/ I	IG/ R	N	P		S	B/ A	D
MARELLI	67	31	15		C	W	FR/ SIG/ LI/ STD/ PHIN/ RC		B+/ 30	
MITSUBISHI	F	E	L	IG/ R	N	P	FR/ G/ D	S	B/ A	D
MOTOROLA	EXC	-/ B-	D+			W			B+	
PARIS RHONE	EXC	-/ B-	L			W			B+	
SEV MARCHAL	DF	-/ B-	61+	15/ +		W			B+	
VALEO	EXC	-	L/ D+/ 61	W			COM/ FR/ DF/ DFM		B+	

OE Part number location:





Depending on the manufacturer, the Original Part number can be found in various places on the unit. OE names and part numbers are used for reference only, and educational purposes.



Manufacturer	Label Position	Example of Part no.
Bosch	B / E	0 120 489 270
Delco Remy	A	10479947
Ducellier	B	514014
Elmot	B	A115-43-14V43A
Femsa	C / D / E	ALD12N-40
Hitachi	A / E	LR 170-420
Iskra	A / E	AAK1119
Lucas	B / C	23802
Marelli	B / C	633 200 58
Mitsubishi	E	A2TB1272
Motorola	E	9AR2828G
Nippondenso	E	100211-2071
Paris Rhone	B / C	A 13 N 95
SEV	B / C	70230302
Valeo	B / C	A 13 N 38

For the latest Technical info visit
www.ktr-sa.co.za
under the Technical menu.

KTR Kalundu Trading

KTR PART NUMBERS CAN BE FOUND ON ELECTROLOG.

Users of the electrolog