

STARTER MOTORS

FITTING INSTRUCTIONS

Thank you for choosing this premium product.

This unit has been manufactured by fully trained specialists to OE-specifications.

Every unit is fully tested on state of the art computerized test equipment to simulate "on vehicle conditions" and ensure that all aspects of the OE-specifications are met.

For your information, a certificate is attached to your unit with the detailed results from this test compared to the OE-specifications.

For your complete assurance this unit is covered by a 24 months.

Note: Please return the old unit in the same box in which you received the new unit (Back-in-Box).



FAILURE TO FOLLOW INSTALLATION INSTRUCTIONS MAY INVALIDATE YOUR WARRANTY

Thank you for purchasing this premium product.
Please read the warnings and instructions to ensure a
successful installation.

COMPUTER TESTED STARTER

This specific unit was 100% load tested on automated
test equipment to ensure that it meets / exceeds OEM
specifications

Please read these instructions carefully

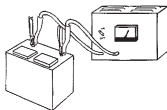
- **Never disconnect a battery cable with the engine running**

Removing a battery cable with the engine running causes voltage spikes which can damage the alternator, computer and other electrical components in your vehicle.



- **Make sure you have a good, fully-charged battery**

The starter motor will not work properly with a weak or defective battery. The voltage from the key contact should be a minimum of 9,5 V during starting

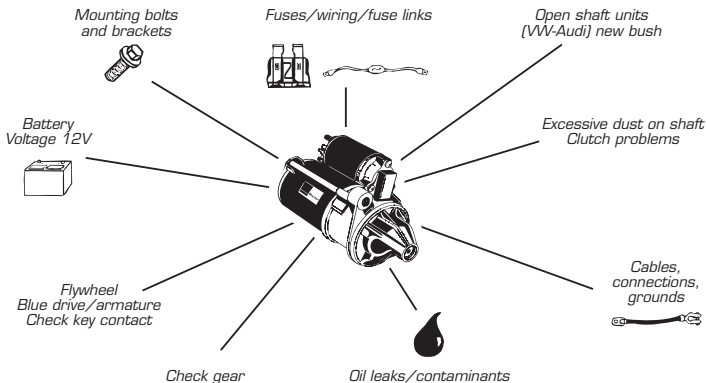


- **Do not use starter motor for ventilation of diesel motor**

After repairs to the injection system (changing filter, diesel pump, high pressure pipes, etc.). NEVER ventilate by using the starter motor. This can cause overheating of the starter motor especially with gear reduction starters.

- **Check other components of the starting system**

Components that can cause starting problems:



Starters - Installation

Perform these steps in the order shown

1. Review any additional information sheets

2. Remove negative battery cable

This prevents accidental shorts during starter replacement.



3. Charge and load test battery

A weak or defective battery will cause starting problems.

4. Remove wire connections from old starter motor

Make a note of each connection for the new starter installation. Remove fixing bolts.

5. Remove old starter motor and check condition of starter motor

Blue burned drive/shaft refers to a bad key contact (change). Excessive dust on the drive/shaft refers to clutch problems. Excessive oil refers to oil leaks on the car, so repair before mounting a new starter motor.

6. Check new starter

Does it have the same mounting holes and connections. Sometimes starters of different original brands are fitted on one particular type of car. In spite of the external difference, they are the same in terms of capacity, installation and connection. The reference numbers of these various manufacturers are included in the conversion list in our catalogue.

7. Install new starter motor

DOWEL BUSHING

Install bushing if old starter motor is provided with this bushing. Damaged or deformed bushes should be replaced by a new one which is needed for a good alignment of the starter motor. Be careful that the old bushing does not stay in the motorblock.

OPEN SHAFT UNITS (VW – Audi)

New bush to be fitted in motorblock

FIXING BOLTS

Tighten fixing bolts evenly to prevent bad alignment of the starter motor with the flywheel.

Starters - Installation

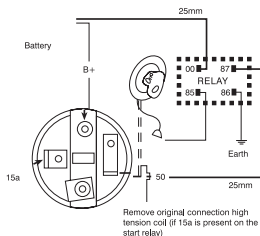
8. Check installation

Inspect wiring, connections and fuse links for worn insulation, breaks or corrosion. Repair broken or damaged connections. Make sure all wires have been connected correctly and there are no pinched wires or shorts to ground. Check and clean battery cable connections at battery, frame/chassis and engine block. Avoid breaking the plastic solenoid cap by carelessness or over-tightening of the battery cable.

9. Connect negative battery cable LAST

10. Start engine

Check voltage on solenoid contact 50 (key contact) during starting. This should be minimum 9,5 Volt. If necessary the voltage can be increased by installing an auxiliary solenoid (see diagram). The "click-click" noise when starting usually indicates this shortage of voltage.



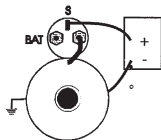
11. Double check your work

STOP engine and recheck fixing bolts and wire connections.

Starters - Troubleshooting

When a starting problem occurs after mounting the new starter motor, first check the following items. USE EXTREME CAUTION WHEN WORKING AROUND AN OPERATING VEHICLE ENGINE.

1. Check for proper voltage on vehicle
 - A. Install starter and fasten all electrical connections securely.
 - B. Connect a voltmeter to the starter as follows. Black lead to starter case; red lead to "S" terminal. Attempt to crank engine.



Starters - Troubleshooting

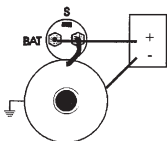
NO CRANK – VOLTAGE LESS THAN 12 VOLTS:

If the engine does not crank and voltage is less than 12.0 volts, check for defective neutral safety switch, bad ignition switch, weak battery or poor ground.

NO CRANK – VOLTAGE MORE THAN 12 VOLTS:

If the engine does not crank and voltage is MORE than 12.0 volts. Proceed to step C.

- C. Move red wire of voltmeter to starter BAT post.



- D. Turn the ignition key to the crank position.

- E. Observe the voltmeter:

NO CRANK – VOLTAGE LESS THAN 12 VOLTS:

Check for weak battery, loose or corroded cables.

CRANKS – VOLTAGE LESS THAN 9 VOLTS:

Cranking at less than 9 volts will damage the starter. This condition must be corrected to prevent a repeat failure. Check for weak battery, loose or corroded cables.

2. Test on the starter

A Earth connection on the nose housing of the starter motor

B Plus connection to connection number 1:

The solenoid must click and the drive move forward.

C Plus connection to connection number 4:

The starter motor must turn.

D Plus connection to connection 1 and 2:

The drive must move forward and the starter motor must turn.

