

## Installation Instructions for 10005-08 & 10045 Ford Starters

**IMPORTANT:** Properly mounting the starter is important because this determines whether the starter pinion will engage properly with the ring gear. When the starter is positioned correctly, the starter pinion will engage the ring gear without binding and there will be no chance of starter pinion and/or ring gear damage.

### INSTALLATION:

**1) Mount Starter.** Make sure the mounting surface of the bellhousing is smooth, flat and free of paint buildup. Torque starter mounting bolts to engine manufacturer's specifications, typically 32 ft.-lbs.

**2) Attach Battery Cable and Switch Wire.** The switch wire should be capable of handling 15A, typically a 14AWG wire. The battery cable must be the proper size for the length of the cable (see chart). All connections should be clean and tight and terminals should be soldered if possible. The ground cable to the frame should be the same size as the starter cable. Also, a ground strap should be installed from the frame to the motor. Install a jumper wire (14-gauge) from the "BAT" terminal connection on the starter solenoid to the "IGN" terminal.

| DISTANCE | 3' | 5' | 7' | 10' | +10' |
|----------|----|----|----|-----|------|
| AWG      | 4  | 2  | 1  | 0   | 00   |

(See Figure 1). (Optional: Run the "switch" wire from the starter relay to the "IGN" terminal on the starter solenoid.) Connect the positive battery wire to the "BAT" terminal on the starter solenoid.



Figure 1

**3) Operate Starter.** It should operate quietly. Any loud grinding noises must be corrected. If the starter makes a high pitched whine during cranking the pinion to ring gear engagement is too great. If the starter makes a high pitched whine after cranking as the button or key is released, the clearance is too small. The cables and connectors themselves should be checked for voltage drop with a voltmeter. To check any wire or cable for voltage drop, connect one side of the voltmeter to one end of the cable and the other side of the voltmeter to the other end. OPERATE THE CIRCUIT and simultaneously measure the volt drop. It should be 0.5VDC or less. High voltage drops indicate a bad connector or undersized cable. The ground circuit can be checked in the same manner. Measure input voltage by connecting the positive probe of a voltmeter to the "MOTOR" terminal of the solenoid and connecting the negative to the starter housing (should be 9.0V minimum while cranking).

**CAUTION:** Never operate a starter more than 30 seconds at a time without allowing time to cool (at least 2 minutes). Overheating will damage the starter.

## ***Installation Instructions for 10005-08 & 10045 Ford Starters - continued***

### **COMMON QUESTIONS**

**1) Why does the starter crank slowly?** This condition can be caused by several things. The most common cause is excessively low input voltage, which can be caused by undersized starter cables, high resistance or defective batteries, high resistance battery disconnect switches or poor connectors. If the input voltage to the starter is satisfactory (9 volts or higher), then a second possible cause could be an underpowered starter. It is important that the starter have the torque characteristics to handle the load of the engine. If the engine turns too slow, it may require a higher torque starter.

### **ADDITIONAL NOTES ON INSTALLATION**

**1) A note about ring gears.** There is a lot of variation in the quality of the flexplates/flywheels on the market today and in the ring gears that are installed on them. It is important for long starter life that the ring gear be round and true. Check the ring gear in at least six places verifying that the clearance for the starter is the same in all locations. If not, remove the ring gear and make sure the mounting surface of the crankshaft is clean and free of paint buildup or rust. Reinstall the ring gear and properly torque the mounting bolts. If this does not correct the problem, replace the ring gear.

**2) Disconnect switches.** The switch used for a battery disconnect is very important. All of the starter current will go across this switch during cranking; which, depending on the starter, can be as high as 700A! After the engine is running, all of the current from the alternator will be running across this switch. Therefore, make sure that the switch that is being used can handle these amounts of current. Switches are rated in intermittent amps and continuous amps. The intermittent rating should match or exceed the amount the starter will pull, and the continuous rating should match or exceed the amount the alternator can produce. Using a switch that is too small will result in voltage loss and possible switch failure.



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