

## STARTER MOTOR FUNCTION

- Starter Motors are like drones – they only have one function – to start the engine
- Later model large bore diesel engines (2007-Up) need to be spun at 100/120RPM
- These high RPM's are needed to cause the start up compression to ignite the fuel air mixture in the cylinder. This has to happen or the engine will not start.
- Older engines could start at lower 90/100 RPM's.
- Newer engines (2010-Up) due to emission control regulations, such as EGR (Exhaust Gas Recirculation designs) or UREA injected power (clean diesel technology) may need to spin faster to gain sufficient compression to ignite the fuel mix.

## STARTER MOTOR TROUBLESHOOTING

1. There are two primary tools needed to perform an analysis of the starter motor.

- A voltmeter (preferably digital)
- A wire brush



2. Inspect the battery posts for corrosion. They must be thoroughly cleaned with a battery post cleaning tool. Re-tighten the battery cables to the posts.



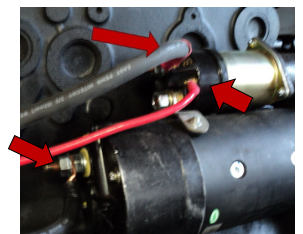
3. Using the voltmeter, check battery surface voltage, taking a read from the positive & negative posts. In a 12 volt system, it must read no less than 90% of 12.6 volts or 11.4 volts.

4. Using the voltmeter check the voltage reading at the starter motor's battery terminal & ground terminal.

- Both Battery post & starter terminal readings should indicate a perfect 12.6 volts



5. Check voltage at the starter motor's "S" terminal & ground terminal with the engine cranking (minimum 11.4 voltage output is required).



- Note: in a 24 volt system the rules for voltage power output are the same

6. If the voltage output at both the battery & starter motor is within the acceptable surface range – Min. 11.4 volts. The battery should then be load tested. In some cases the surface voltage may appear to be OK, but under stress (load) the internal plate structure within the battery may be damaged or sulfated & the battery may not be capable in producing sufficient amperage to turn the starter fast enough to start a diesel engine. If the battery voltage does not check out under load test to at least 11.4 volts, charge or replace the batteries.

7. Check all cables from the battery to the starter motor & the ignition wiring harness to ensure they are not damaged or corroded.

### Replace as necessary.

- Typical chaffed or damaged cable/wire



8. If everything checks out with the cables, wiring harnesses, battery & starter motor voltage, **the starter motor needs replacing.**