



Troubleshooting No Start Engine- Spark Plug and Air Filter

These instructions will provide guidance on troubleshooting no start or rough running issues involving spark plugs and air filters. Please keep these instructions with your Safety and Operating Instructions Manual for future reference.

For a combustion engine to function properly, it requires three key components: fuel (air and gas), ignition, and compression. A no start or rough running 4-cycle engine sometimes points to issues with its ignition (spark plug) or air delivery (air filter).

Tools and Supplies Needed:

- Safety Glasses
- Spark Plug Tester DR #200531
- Spark Plug Wrench DR #200541 or Socket Wrench
- Spark Plug Gap Tester
- Spark Plug



WARNING

Always ensure the engine is cool and disconnect the spark plug wire before performing any work unless using the tester.

Wear appropriate personal protective equipment (PPE).

Be sure that all tests are done in a safe, and ventilated environment away from flammable materials such as gas, oil, or any liquids or chemicals with open containers.

HIGH VOLTAGE: Ignition systems produce extremely high voltage. **NEVER** touch the metal ends of the tester, spark plug, or spark plug wire/coil while the engine is cranking or running.

Spark Plug Troubleshooting

Spark plugs play a crucial role in the ignition process, igniting the air and fuel mixture to start the engine. A faulty spark plug is a common cause of a no-start condition.

Symptoms of a Spark Plug Issue:

- Engine cranks but does not "catch" or start.
- Engine sputters or briefly attempts to start, then dies.



- Presence of a fuel smell from the exhaust (indicating unburnt fuel)

Removing Spark Plug for Inspection

1. Disconnect the spark plug boot from the spark plug (**Figure 1**).
2. Remove the spark plug using a Socket Wrench and appropriate Socket (extension may be useful) or Spark Plug Wrench.
3. Once removed, conduct a visual inspection of the spark plug.



Figure 1

Visual Inspection (Figure 2):

- **Good Plug:** Exhibits a light tan or grayish-brown color on the insulator tip or electrode.
- **Faulty Plug:** May appear dirty or fouled. The insulator tip or electrode can be broken, worn, covered in oil residue, or show carbon (black soot) build-up. This can stem from the engine running too hot or too rich, a dirty air filter, or simply an old, worn plug.
- **Wet with No Color:** Indicates a flooded engine or complete lack of spark because gas may contain contaminants such as water.
- **Wet with Black Fluid:** Indicates there is oil in the combustion chamber.
- **Spark Plug Gap:** Using a gap tool #200551 (**Figure 3**), confirm space between electrode and the center electrode.



Figure 2

Note: We recommend checking the specs for your spark plug gapping found in your engine manual and adjusting if needed.



Figure 3

Testing Ignition System

Note: Be sure the spark plug has been reinstalled into the engine. To perform this test, a helper is recommended.

1. Inspect the inside of the spark plug boot (cover) & ignition wire it connects to for damage or frayed wires before testing.
2. Place the closed end of the Spark Plug Tester on the spark plug and seat. Place the open end of the tester in the spark plug wire boot and seat (**Figure 4 & 5**).
3. View the Spark Plug Tester window. Note if there is no light, flashes of light, and the color of light as the engine is attempted to be started.
4. Using the Recoil pull or Key switch, try to start your engine.



Figure 4

Interpret Results

- **Strong, consistent blue or white spark:** Indicates the ignition system (coil, wires) is likely providing sufficient voltage. This indicates the problem isn't in the ignition system but more likely with the fuel, compression, or a faulty spark plug.
- **Weak or intermittent spark:** The spark might be yellowish/orangish or irregular. Suggests a problem with a bad spark plug, ignition coil, spark plug wire, or other ignition components
- **No spark:** Indicates there could be a few different things happening. It could be a kill switch, low oil sensor, or a neutral safety switch is activated. There could be damage to the spark plug wires or the ignition coil or spark plug has failed.



Figure 5

Action

- If spark is good, **replace** spark plug with a new one. If that does not work, investigate other possibilities such as dirty carburetor, contaminated fuel, or compression issues.
- If the spark plug is broken or excessively worn, **replace** with a new one.
- If the plug is only dirty or fouled but not broken or worn, it can be **cleaned** with a rag, wire brush, or sandpaper. Confirm the gap with the gap tool. However, **replacement is generally recommended for optimal performance.**
- If there is no spark, check to see if neutral safety switches, low oil sensors, or kill switches are activated thereby preventing the engine from starting.

- Once the switches and sensors have been confirmed inactive, it is possible the ignition coil needs to be replaced.

Air Filter Troubleshooting

Clean air filters and pre-filters are vital for optimal engine performance and longevity. They remove dust, dirt, and particles, preventing them from entering the engine, which allows for smoother running, better performance, and greater fuel efficiency. Dirty filters can constrict airflow, leading to poor combustion, internal engine damage or wear, and even carbon build-up on spark plugs.

Symptoms of an Air Filter Issue:

- Engine cranks but struggles or fails to start.
- Black smoke from the exhaust (due to rich fuel mixture from restricted air).

Inspection:

1. **Access:** Locate the air filter housing. Open it by releasing clips or unscrewing fasteners to remove the air filter.
2. **Filter Inspection:** Remove the air filter and pre-filter being careful not to allow dirt and debris to fall back into the opening. Visually inspect for debris.
 - **Clean:** Light easily passes through the pleats.
 - **Dirty:** Light is heavily obscured. Pleats are filled with excessive dust, debris, or oil saturation.

Action:

- **Paper Filters:** Most 4-cycle air filters are paper. These **cannot be cleaned effectively** and must be replaced if dirty.
- **Pre-Filters:** Pre-filters are generally thin foam that wrap around or sit in front of the paper air filter. They catch larger materials to extend the life of the main filter. These pre-filters are often designed to be cleaned by washing them in warm, soapy water, and allowing them to dry completely.
- **Temporary Test:** If the engine fails to start due to a suspected dirty filter, temporarily remove the air filter and pre-filter from the housing and attempt to start and briefly run the machine. **If the engine starts and runs, replace the air filter with a new one and wash the pre-filter** if it is undamaged.
- **Reinstallation:** Install the clean or new filter(s) correctly and securely close the housing to prevent unfiltered air entering the engine.

