



## TROUBLESHOOTING GUIDE

### General Starting Tips:

1. Start burnisher rocked back, so the pad is not in contact with the floor
2. During start, slightly advance the throttle, especially if unit has not been run recently and is cold
3. Only engage starter (crank engine) for 3 second duration. There is no need to crank for longer durations, and longer duration runs risk of damage to starter motor and will drain the battery.
4. Only engage starter (crank engine) 4-5 times. If engine still doesn't fire (ignition), then continue with troubleshooting. Additional cranking will risk damage to the starter motor, and will drain the battery.
5. Separate starting attempts by 5 seconds. This allows the self priming feature of carburetor to function.

### Troubleshooting Steps

1. Nothing happens when key is turned to start
  - a. Check battery cable connected
    - i. If no, connect it.
  - b. Check battery has voltage (normal is 13.3 +/- 0.5 V)
    - i. If no, charge/replace it.
  - c. Check starter solenoid lower post is constantly powered with +12 volts
    - i. If no, failed electrical connection at battery, or battery connector
  - d. Check starter solenoid "signal post" is receiving +12 volts during key start
    - i. if no, failed ignition switch, or failed electrical connection at ignition switch connector, or severed wire. Use multimeter and wiring diagram to determine cause.
  - e. Check starter solenoid top post is receiving +12 volts to output during start
    - i. If no, failed solenoid
  - f. If all of above checks out correctly, then the starter motor itself has failed, or the crankshaft is unable to be turned due to physical damage to flywheel or engine internal component.
2. A "click" or "hum" is heard when key is turned to start, but engine doesn't turn over (crank)

Note: this typically happens when the electrical power is insufficient to turn starter motor.

  - a. Check battery has voltage (normal is 13.3 +/- 0.5 V)
    - i. If no, charge/replace it

- b. If all of above checks out correctly, the starter motor itself has failed, or the crankshaft is unable to be turned due to physical damage to flywheel or engine internal component.
3. When key is turned to start, engine turns over (cranks) but no ignition.
- Note: this typically represents an issue with fuel flow
- a. Check cylinder is filled with propane
    - i. If no, have the cylinder filled according to proper procedures
  - b. Check cylinder service valve is opened. Note: make sure it can be both opened and closed
    - i. If no, open the service valve
  - c. Check that the hose fitting can fully thread on to the tank service valve. This fitting is a ACME thread and often called a "Rego" valve. To confirm proper connection, listen for the sound of pressurization of hose as you install the valve. You can also confirm the hose is being pressurized by pressing the plug in hose connection, it should be stiff when pressurized, and loose when not pressurized.
    - i. If hose is not being pressurized when fitting is tightened, the cylinder ACME/Rego fitting is faulty and needs replaced.
  - d. At this point, for the sake of troubleshooting, remove the starter solenoid "signal" wire, to disable starter motor. The rest of the electrical components will still function normally.
  - e. Check that the lockoff is "clicking" when key is turned to start. This clicking indicates normal lockoff function (it is opening to allow the flow of fuel). Additionally, check that after the lockoff clicks, there is a slow and slight bleed of propane fuel at the carburetor. This flow is the normal self-priming function of fuel system for the purpose of and assisting it to start.
    - i. If yes (the lockoff clicks and fuel flow is determined), then skip this entire sub-section.
    - ii. If no, check the two wire connector where lockoff is connected to harness is making contact at both spade terminals
      - 1. If no, then adjust the spade terminals to allow contact
    - iii. Check that the two wires that supply the lockoff (black and blue) are providing both +12V and ground during key in start.
      - 1. If yes, (and the lockoff is not opening/clicking during key start), then the lockoff valve is faulty and needs replacement.
    - iv. Check that the blue wire that provides the lockoff with +12V is being energized with +12V during key start.
      - 1. If no, there is an electrical malfunction preventing lockoff power supply. Potential causes could be a failed ignition switch, failed electrical connection at ignition switch connector, blown fuse on circuit board, failed electrical connection on circuit board. Use multimeter and electrical diagram to determine cause.
    - v. By definition, at this point, the lockoff ground wire is not making contact with common ground during key in start, which can be confirmed with multimeter continuity check. This can only happen by a faulty wire

connection at circuit board, or a faulty circuit board component. Use multimeter and electrical diagram to determine cause. Note: The ground connection in key start does not travel through oil pressure switch, emission monitor, or SAM, so those are not the issue.

- f. Reconnect the starter solenoid signal wire, which allows engine to turn.
  - g. Check the spark plug is producing spark during cranking
    - i. If not, replace spark plug and/or ignition coil
  - h. At this point, the carburetor/regulator is either severely out of adjustment, or an internal component failure is preventing the flow of fuel. Service and/or replace the carburetor/regulator component.
4. The engine starts and fires when key is turned to start, but shortly after key is returned to "run" (after only 2-4 seconds) the engine will die.

Note: this is almost certainly an electrical issue.

- a. Bypass Sam or Emission Module, if equipped. To do this: locate two wires coming out of SAM/Emission Module: a Green wire and a Black wire. Note where each of those wires connects. The best way to express this is like this: The green wire goes to "Green Destination" and the black wire goes to the "Black Destination". Disconnect both of those connections, and then directly connect the "Green Destination" to the "Black Destination". This will effectively bypass SAM/Emission Module.
  - i. If this allows the engine to stay running normally, then either:
    - 1. SAM/emission module is not receiving +12V to its red wire due to a loose or faulty connection which needs to be fixed, or...
    - 2. SAM/emission module is faulty and needs to be replaced.
  - ii. Note: for the duration of troubleshooting, continue with this setup which bypasses SAM/emission module.
- b. Bypass the oil pressure switch, by disconnecting the two wires from the oil pressure switch, and connecting those two wires to each other with a short jumper wire.
  - i. If this allows engine to stay running normally, then either:
    - 1. The oil pressure switch is faulty (stuck in the open position) and needs replaced. Or,
    - 2. The engine is not creating engine oil pressure due to internal engine component failure, an issue that must be resolved at approved engine service center.
  - ii. Note, for the duration of troubleshooting, continue with this jumper wire installed, to bypass the oil pressure switch.
- c. With both SAM/emission module AND oil pressure switch bypassed, simply turning the key from "off" to "run" (without starting the engine) should energize the lockoff. Check that the lockoff is making a clicking sound when the key is turned from "off" to "run".
  - i. It is unlikely that the lockoff is clicking, but if it is, then the lockoff is faulty and not fully opening and is restricting flow. The lockoff should be replaced.

- ii. Most likely, the lockoff is not clicking, in which case continue with next steps.
  - d. Check that the two wires that supply the lockoff (black and blue) are providing both +12V and ground during when key is in "run".
    - i. If yes, (and the lockoff is not clicking during key in "run"), then the lockoff valve is faulty and needs replacement.
  - e. Check that the blue wire that provides the lockoff with +12V is being energized with +12V during key start.
    - i. If no, there is an electrical malfunction preventing lockoff power supply. Potential causes could be a failed ignition switch, failed electrical connection at ignition switch connector, blown fuse on circuit board, failed electrical connection on circuit board. Use multimeter and electrical diagram to determine cause.
  - f. By definition, at this point, the lockoff ground wire is not making contact with common ground during key in run, which can be confirmed with multimeter continuity check. This can only happen by a faulty wire connection at circuit board, or a faulty circuit board component, or by a faulty wire or connection in the path to common ground. Use multimeter and electrical diagram to determine cause.
- 5. The engine starts and fires normally, and runs normally in idle speed, but when throttle is increased and/or when the machine is being loaded by normal application, engine runs abnormally as if underpowered. Possible causes & solutions below:
  - a. Engine has not properly warmed up. Allow 30 seconds to 1 minute of warmup.
  - b. Lockoff is restricting flow, and needs replacement.
  - c. ACME/Rego connection at cylinder is not allowing full engagement, and is restricting flow. Cylinder fitting needs replacement.
  - d. Carburetor/Regulator is out of adjustment, and needs adjustment and/or replacement
- 6. The engine starts and fires normally, and initially runs normally, but after a period of time typically greater than 5 minutes, the engine starts to run abnormally or stops running. Possible causes & solutions below:
  - a. Propane cylinder is near empty, and losing pressure quickly. Have cylinder filled according to proper procedures
  - b. Lockoff is faulty, and when it heats up, it restricts the flow of fuel. Replace lockoff.