

Foster PEM Senior Lab Off-Site Learning Packet Day 8

Instructional Objective(s):

1. Student will be able to list three parts of the fuel system that need to be troubleshot in a no start condition to 100% accuracy
2. Student will be able to describe hunting and surging to 100% accuracy
3. Student will be able to describe black smoke out of the exhaust is an indication of when troubleshooting performance issues to 100% accuracy
4. Student will be able to describe what components can cause an engine overspeed condition to 100% accuracy
5. Student will be able to describe a method for confirming that you have a Governor spring causing harmonic hunting and surging to 90% accuracy
6. Student will be able to describe where fuel may be leaking in a carburetor causing performance problems to 100% accuracy

1. Today we will continue learning about troubleshooting. We will look at the fuel and Governor systems. The first item we will look at is a start problem. We know that for an engine to operate there must be compression of the charge and properly timed spark if the compression and ignition systems have been tested and are working to spec. we must look at the fuel system.
2. Fuel system items to look at are:
 - a. Fuel supply, the first thing we need to be sure to supply from the fuel tank. This can be done by clamping off the line to the carburetor then releasing the clamped off hose and watching the fuel flow.
 - b. If equipped with a primer bulb we need to make sure that it is functioning properly to force fuel out of the carburetor bowl the air inlet. Also at this point you want to check to be sure the choke is operating properly and restricting the airflow.
 - c. If the engine is equipped with an anti-afterfire solenoid the must make sure it is receiving 12 volts and opening to allow fuel flow. You can test the anti-after fire solenoid by using a 9 V battery connecting one post to the speed terminal and the other fault the solenoid case, this will tell you the solenoid is electronically working with you must be sure it also is mechanically opening.
 - d. Debris in the carburetor is another common cause of failure to start it all of the other preliminary checks are good you may need to disassemble the carburetor to remove you from the Jets.

2. Performance problems occur when the engine is operating. The most common performance problems are:

- a. Hunting which is the undesirable changing the engine RPM and set at a desired speed
- b. Surging is the undesirable slow changing the engine RPM in a cyclical pattern when set the desired speed.
- c. Hunting and surging at true idle may be caused by improper air fuel mixture related to an air leak for an obstruction in the idle circuit. At true idle the Governor spring applies no force on the throttle plate and has no effect on the idle characteristics of the engine.
- d. Hunting and surging at governed idle can be caused by a problem with the Governor assembly. A governor spring can be tested by holding the throttle my hand, if the hunting and surging go away the surge is a governor related problem.
- e. Hunting and surging at top no-load speed follow the same troubleshooting as above average the engine continues to surge there is a carburetor problem.
- f. Hunting and surging underload usually indicates a carburetor delivery system problem rather than a governor system problem.

3. For performance issues underload first requires eliminating compression component problems, if these components have been eliminated the most common cause would be debris in the main jet airbleeds. When investigating performance underload is helpful to observe the engine smoke if it is black and carboning there may be an obstruction in the intake not allowing enough air to the cylinder bore or a carburetor problem flowing much fuel into the cylinder.

4. Overspeeding problems are commonly caused by broken, missing, or inoperative governor system linkage components. To troubleshoot these you must inspect all of the governor system components and isolate which one is causing the problem.

5. Harmonic hunting and surging is the undesirable and/or slow changing of engine RPM in a cyclical duration caused by excessive governor spring vibration if this is found to be a problem one test you can do is put some pressure on the governor spring by placing a pencil eraser against it. If the hunting and surging disappears replace the Governor spring or if the application is not speed sensing you can adjust the top no-load speed to get away from the vibration.

6. You must also check the carburetor for leakage, any leak in the carburetor whether internal or external will cause performance issues.

You are working on a Kohler Courage model PS-SV740-30ZY serial#4210002483

The complaint is hard to start and has low power once started. What are you going to look for?

Hint : use Google to find out details about this engine and what fuel system it has.