

ALL TEAM MEMBERS WILL WEAR APPROVED SAFETY GLASSES DURING THE TEAM ACTIVITY

**NATIONAL FFA ORGANIZATION
AGRICULTURAL TECHNOLOGY &
MECHANICAL SYSTEMS
CAREER DEVELOPMENT EVENT
2019
TEAM ACTIVITY INSTRUCTIONS**



2019 Team Activity Supporter

Event Description

Your team has been tasked to troubleshoot a Briggs & Stratton small gas engine for a customer. According to Briggs & Stratton, a systematic check of the engine can be performed in minutes and is an accurate method of helping to determine the source of the problem. Teams should check the Troubleshooting Section of the Small Engine Repair Manual (PDF) for helpful information.

What Teams Should Do:

Assign team members to perform tasks and activities:

1. Check the inventory of your tools.
 - a. spark plug wrench
 - b. spark plug gauge
 - c. 5/8" open end wrench
 - d. thickness gauge (feeler gauge)
 - e. flat blade screwdriver
 - f. 10 mm nut driver
 - g. hex key set-screw wrench (known as an Allen wrench)

2. Look up information about your two engines in the file folder(s) on this flash drive.
3. Locate and complete (or print out) the Team Response Form and provide answers to the questions.
4. Prepare a Team Written Report describing your team's activities performed today.
5. Attach the completed question response form to the back of the Team Written Report.

ACTIVITY

Located at your station are **TWO** Briggs & Stratton Small Engines. You will use one engine to look up parts and specifications. You will perform trouble-shooting activities on the second engine. Be sure you refer to correct information and the correct file folder on your flash drive!

Locate the engine with the following Model Number at your station: **21T212**. This engine will be used to look up information. Please see figure 1.

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Figure 1 Parts and Specifications Engine

Your second engine will require adjustments to meet factory specifications. You can have a type A engine or a type B engine. Look for the engine model number (*do not confuse it with the water pump number.*) Record the engine pump number in the box provided. See A/B engine types below:



Engine A



Engine B

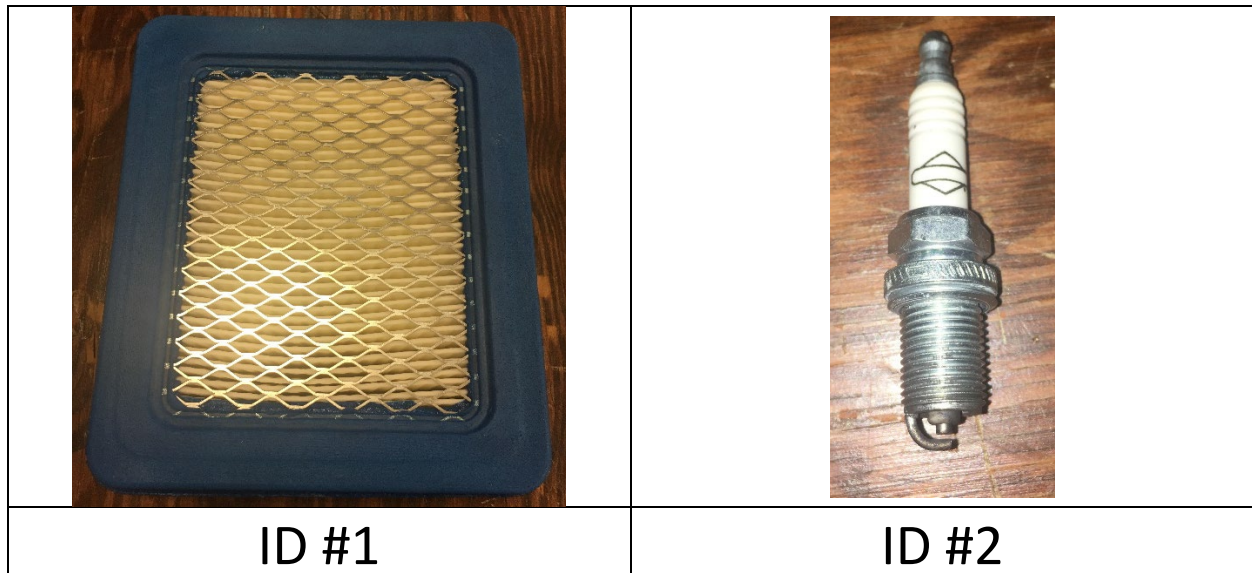
Which engine is at your station? Look on the side of the valve cover. Be sure you have the engine model number. Hint: Begins with a “1”. Record the model number below.

Model: _____ Type: _____ Code: _____

PARTS SEARCH ACTIVITY:

In this section, you will need to correctly identify small engine parts components (see figure 1), and using an Illustrated Parts List (IPL), look up and record the PARTS number to order possible replacement.

1. View the pics of following parts taken from the Model 21T212 engine.



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ID #3



ID#4



ID #5



ID #6

2. Using the **Illustrated Parts List (IPL)** file located in the file folder for the **Model 21T212** engine, locate the description of the parts, and record the **REFERENCE** and **PARTS** number:

ID #	Description	Ref #	Part #
1			
2			
3			
4			
5			
6			

TASKS

NOTE: *Be sure you have a CDE Volunteer at your station observe you performing each of the following tasks. They will be documenting your progress!*

As you perform each task, have one member of your team record the amount of time it takes to complete the task.

TASK #1 – Use the large screwdriver to remove and inspect the condition of the air cleaner (What condition is the air cleaner on your engine: (1) Needs replacement; or (2) Clean & Re-use)

What is your Air Cleaner Condition? _____

TASK #2 – Disconnect the Spark Plug Boot from the Spark Plug.

TASK #3 – Remove the spark plug from the engine with spark plug wrench and check the gap with the spark plug gauge.

- *What is the actual measured spark gap?*

- *What is the manufacturer's recommended spark gap?* _____

TASK #4 – Remove the valve cover (use the 10 mm nut driver) and check the condition of the rocker arm nuts and jam screw.

Use the engine spec sheet (found in your thumb drive folder) to look up the Intake Valve and Exhaust Valve Clearances.

Record YOUR engine model, and the manufacturer's recommended valve clearance in the box below:

YOUR ENGINE MODEL:	_____
Valve	Clearance Specs
Intake Valve	
Exhaust Valve	

TASK #5 – Piston Location. Before setting the correct valve clearance, the piston must be in the correct position in the cylinder with the valves operating in correct sequence.

1. *Where should the piston be in the cylinder when setting the valve clearance on your engine?*

2. *During what stroke should the valve clearance step occur?* _____

- Using the wooden dowel, carefully insert one end of the wooden dowel into the spark plug hole to identify the location of the top of the piston.
- Hold onto the other end of the wooden dowel.
- **CAREFULLY** and **SLOWLY**, pull on the starter handle to rotate the crankshaft.
- Observe the movement of the dowel. The dowel should be moving upward.
- Watch the action of your valves open and close.
- Locate the Intake Valve.

- When the piston is in the correct position, and the valves are in the correct cycle or stroke carefully insert the correct feeler gauge between the Intake valve cap and the rocker arm.
- While holding the feeler gauge in place, slowly tighten the rocker arm wrench using the 5/8" combination wrench. Hold the nut so it does not move.
- Use the 1/8" Allen wrench to tighten the Jam Screw in the Rocker Arm nut so it does not rotate. There should be a little resistance on the feeler gauge. Refer to illustration below.

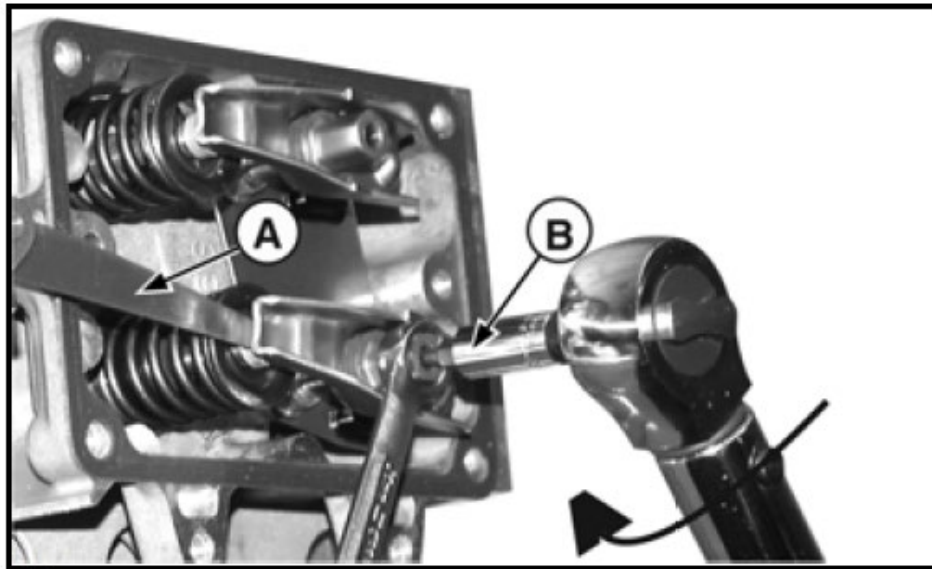


Figure 41

A = Feeler Gauge B = Allen Wrench

TASK #6 - Replacement Parts. Using your small engine folder on your flash drive, look up the replacement parts numbers in the **Illustrated Parts List (IPL)** for the following parts. Using the **Operator's Manual**, record the **Recommended Inspection and Replacement Times**

	PARTS	PARTS #	INSPECT	REPLACE
1.	Pre-Air Filter			
2	Spark Plug			

Indicate when the following Maintenance Tasks are to occur: *(Place a check in the correct box)*

TASKS	5H	8H	25H	50H	100H	SE
Change Oil						
Clean around Muffler						
Service Air Pre-Cleaner						
Clean/remove Spark Plug						
Perform valve adjustment						

Note: 5H = First 5 hours; 8H = Every 8 hours or daily; 25H = Every 25 hours; 50H = every 50 hours; 100H = Every 100 hours; SE = Seasonally

Task #7 – Replace the Valve Cover. Use the three screws to attach the valve cover (leave the top-hole empty).

Task #8 – Re-install the Air Filter and Cover.

Task #9 – Return tools to the tool box.

--- END OF TASK ---

TEAM WRITTEN REPORT

Your team will need to use your laptop computer to create and print a report as part of this Team Activity. Review the components of the report.

Team Activity Written Report Details

- Each team will prepare and submit a typed report.
- The report format will be double-spaced, using 12-size font (Times New Roman).
- Left justify your paragraphs.
- Single-space between paragraphs.
- Use correct grammar and punctuation.
- Write in complete sentences.
- Use the following section headings:
 - *Introduction –*
 - *Delegation of tasks – Who did what?*
 - *Description of the Project – What was the Activity?*
 - *Steps to Complete the Activity/Tasks*
 - *Recommended Maintenance Plan for Customer to Follow using this Small Engine*
 - *Discussion / Success or Challenges*
 - *Safety Practices followed by Team Members*
 - *Conclusion*

- The report will have a cover sheet with the following information:
 - *State Name*
 - *Name of Team Members*
 - *2019 National FFA Agricultural Technology & Mechanical Systems Career Development Event Team Activity*
- Each page will be numbered.
- A hardcopy of your report will be printed out and turned in as part of the completed project.
- A digital copy of your report will be saved to the flash drive and returned to the CDE Staff at the completion of the event.

Report Assessment – Your report will be evaluated for the following.

- 1. Cover page – With required information**
- 2. Introduction**
- 3. Delegation of Tasks**
- 4. Discussion/Success or Challenges**
- 5. Steps to Identifying Problem**
- 6. Steps to Solving Problem**
- 7. Team Activity Details**
- 8. Safety**
- 9. Conclusion**

Attach the Team Question Response Form behind the last page of your Team Written Report