

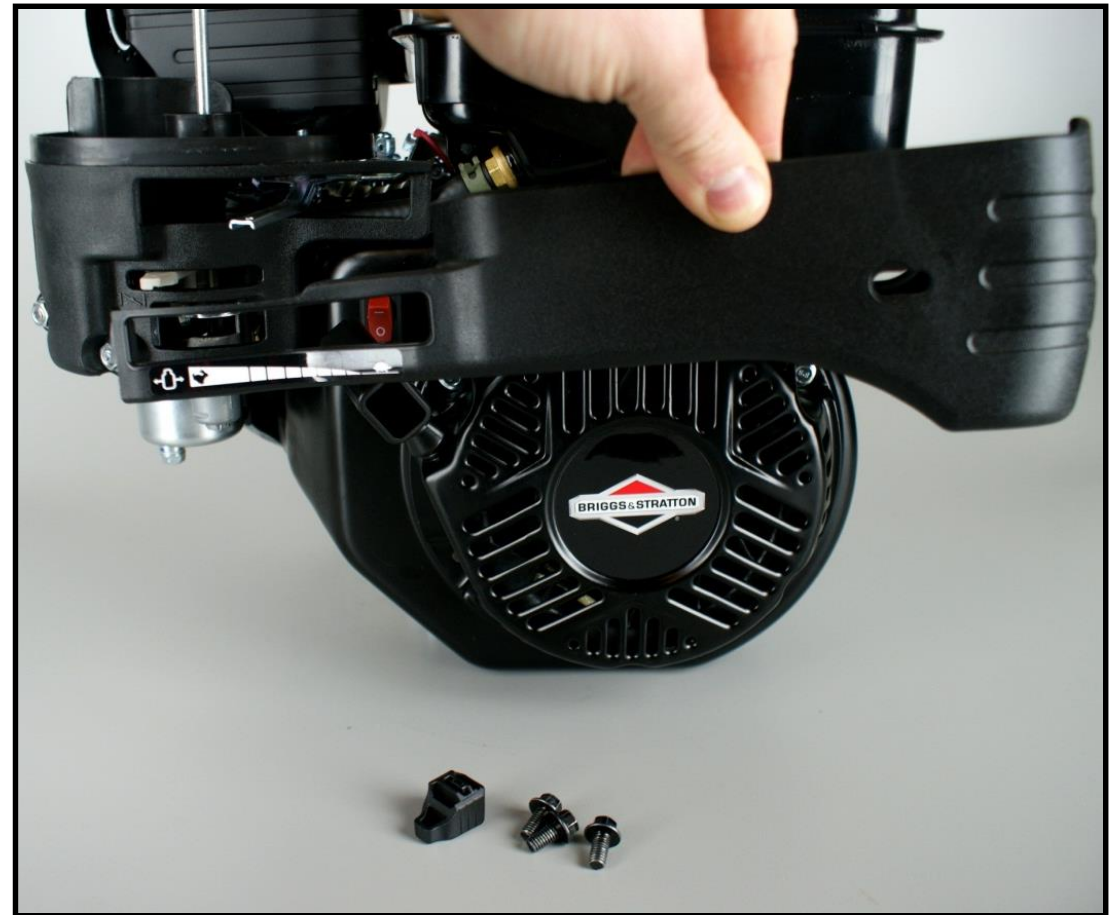
Remove Air Cleaner Cover and Filter

- Inspect paper filter for tears
- Foam pre-cleaner is washable if equipped
- Replace if necessary



Remove Trim Panel

- Pull throttle lever knob off
- Remove 3, 8mm screws



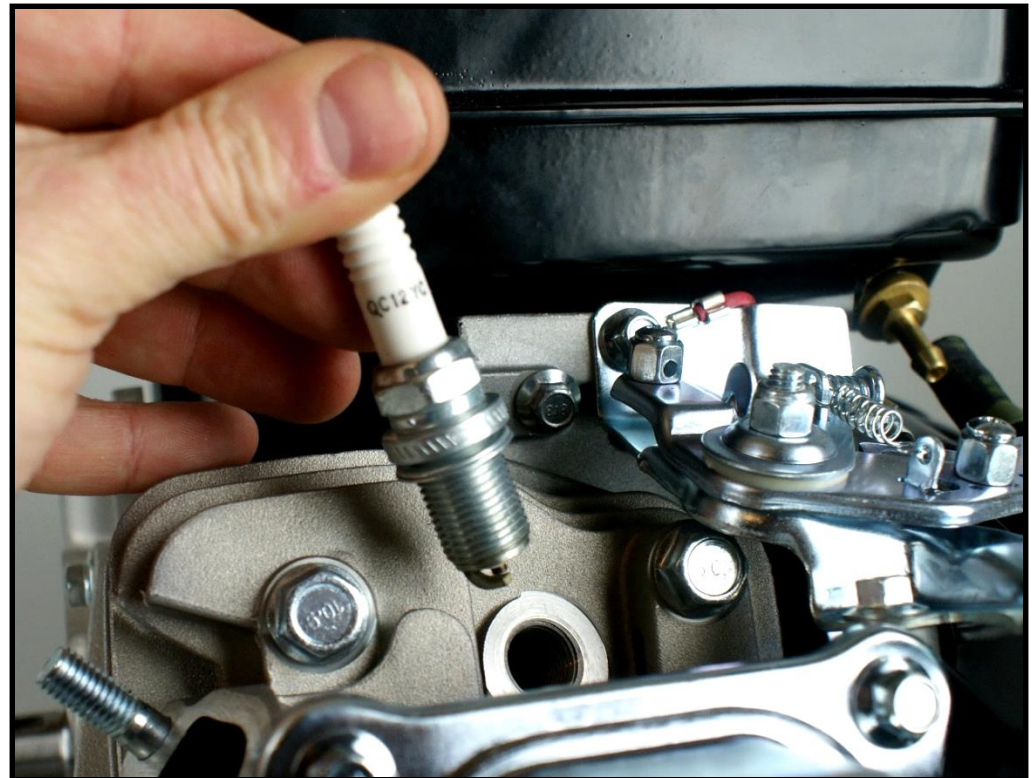
Remove Muffler

- Use 13mm socket



Remove Spark Plug

- Use 5/8 in. spark plug socket



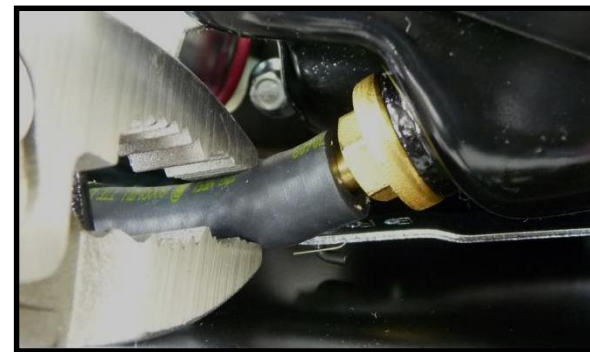
Remove Air Cleaner Backing Plate/Base

- Use 8 mm socket for top screw
- Use 10mm socket for nuts
- Disconnect breather tube at valve cover
- Inspect gasket for leaks or tears



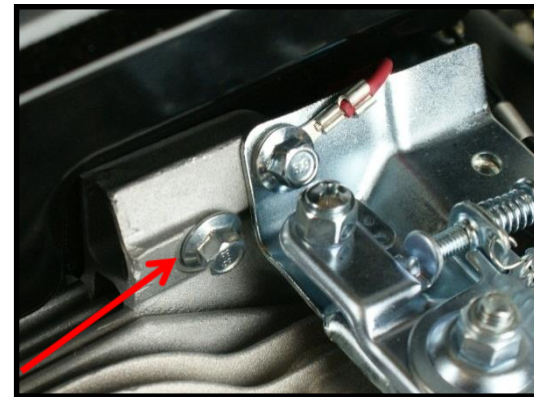
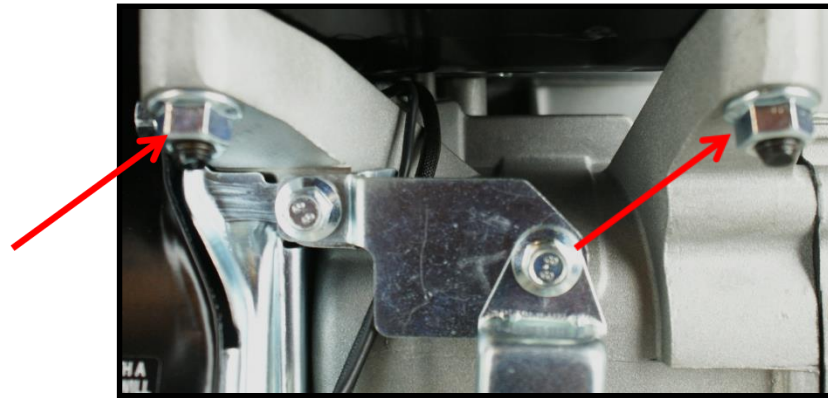
Disconnect Fuel Line

- Remove line from tank or carburetor
- Compress clamp and slide along line
- Remove line with 19620 tool



Remove Fasteners that Secure Fuel Tank

- Use 12mm socket for 2 nuts above low oil module
- Use 8mm socket for screw just above sparkplug



Remove Fuel Tank

- There may still be fuel in the fuel line. Watch for leaks when line is disconnected



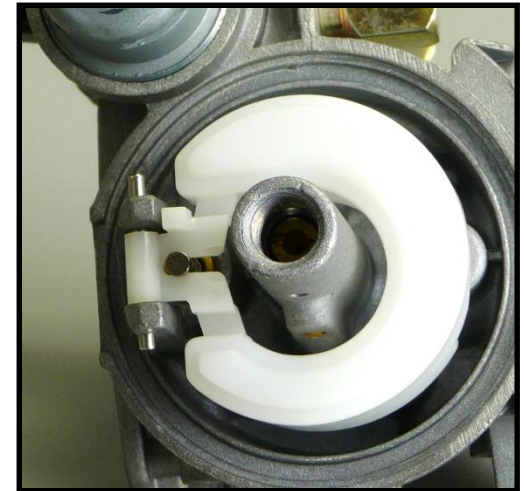
Remove Carburetor

- Slide carburetor along studs for an inch or two
- Pull upwards on governor link to disconnect
- Disconnect link spring
- Note fuel line routing



Remove Float Bowl

- Use 10mm tool
- Observe float and inlet needle movement



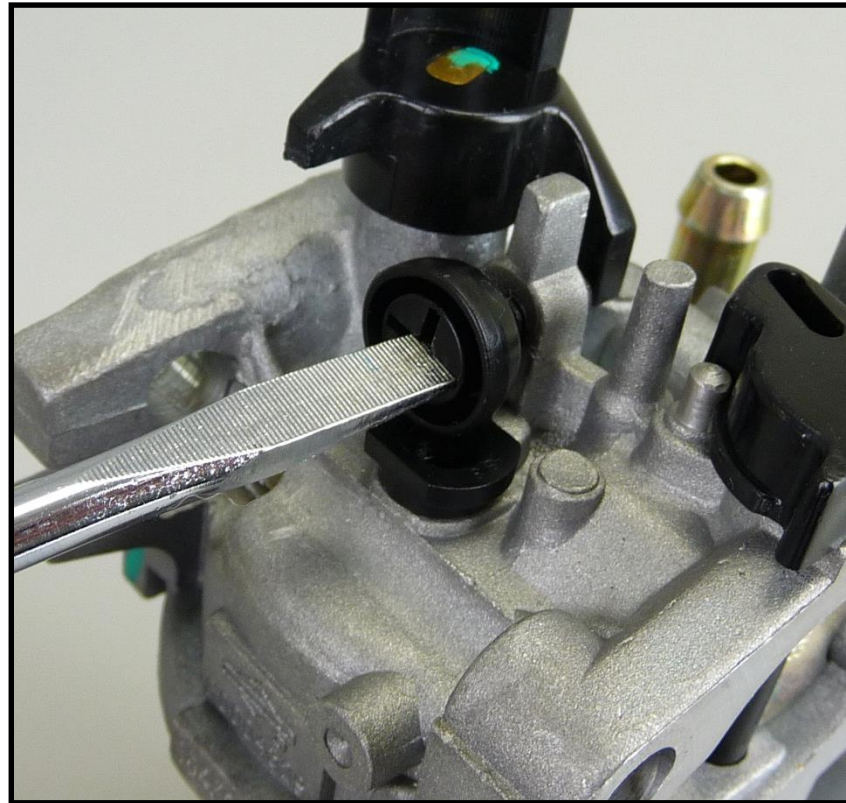
Remove Float and Needle Valve

- Use pliers to remove hinge pin
- Examine slot in float for inlet needle and orientation of spring
- Examine seat in carburetor body
- Inlet needle is spring loaded



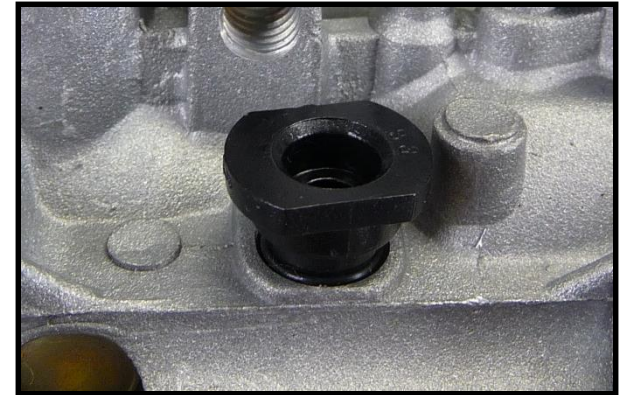
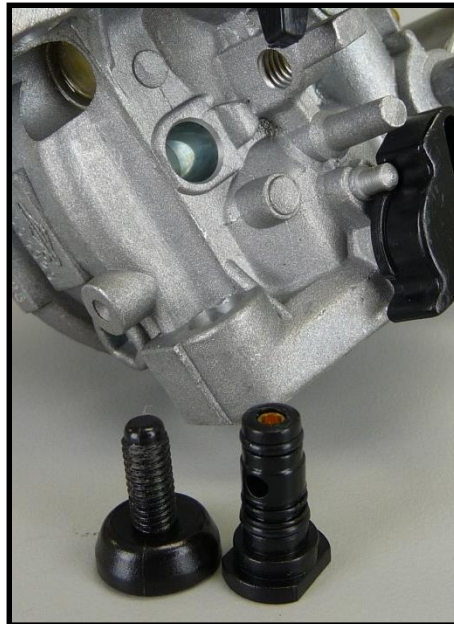
Remove Idle Stop Screw

- Count and record the number of turns required to remove



Remove Pilot Jet

- Gently pry up with screwdriver or pull out with pliers



Remove Main Jet and Emulsion Tube

- Unscrew jet with narrow, flat-blade screwdriver





Reassemble Carburetor

- Assemble the carburetor following the next few steps so it can be set aside as an assembly

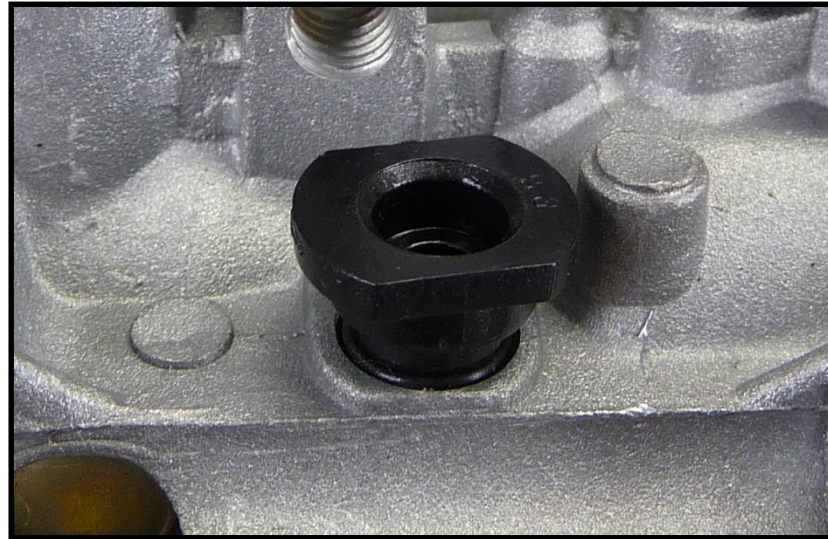
Install Main Jet and Emulsion Tube

- Slide emulsion tube into carburetor body
- Screw jet tight to emulsion tube
- Use a narrow screwdriver to prevent thread damage to carburetor body



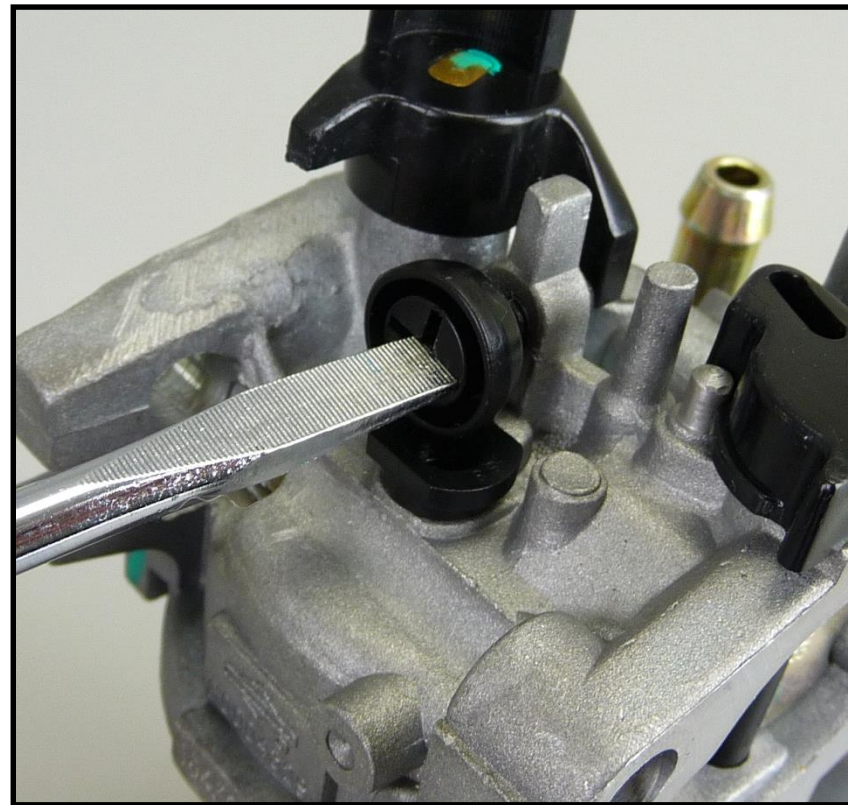
Install Pilot Jet

- Note orientation of flat sections
- Press jet by hand until it seats



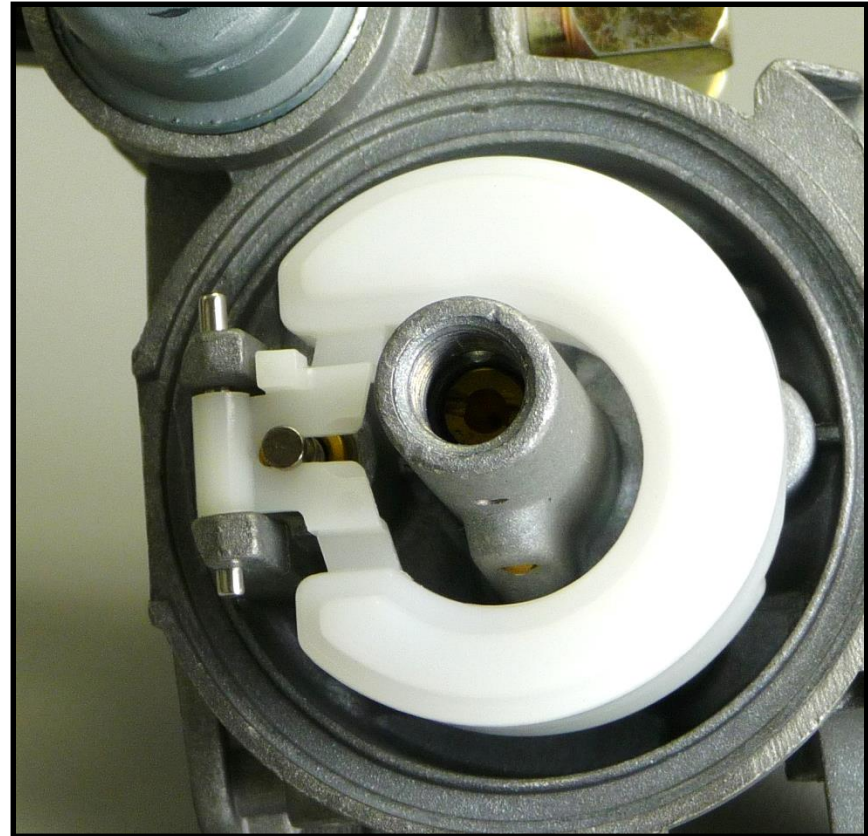
Install Idle Stop Screw

- Screw in the same number of turns it took to remove
- This should set the idle speed close to where it was originally



Install Float and Inlet Needle Valve

- Float should be level with gasket surface when held with the float up



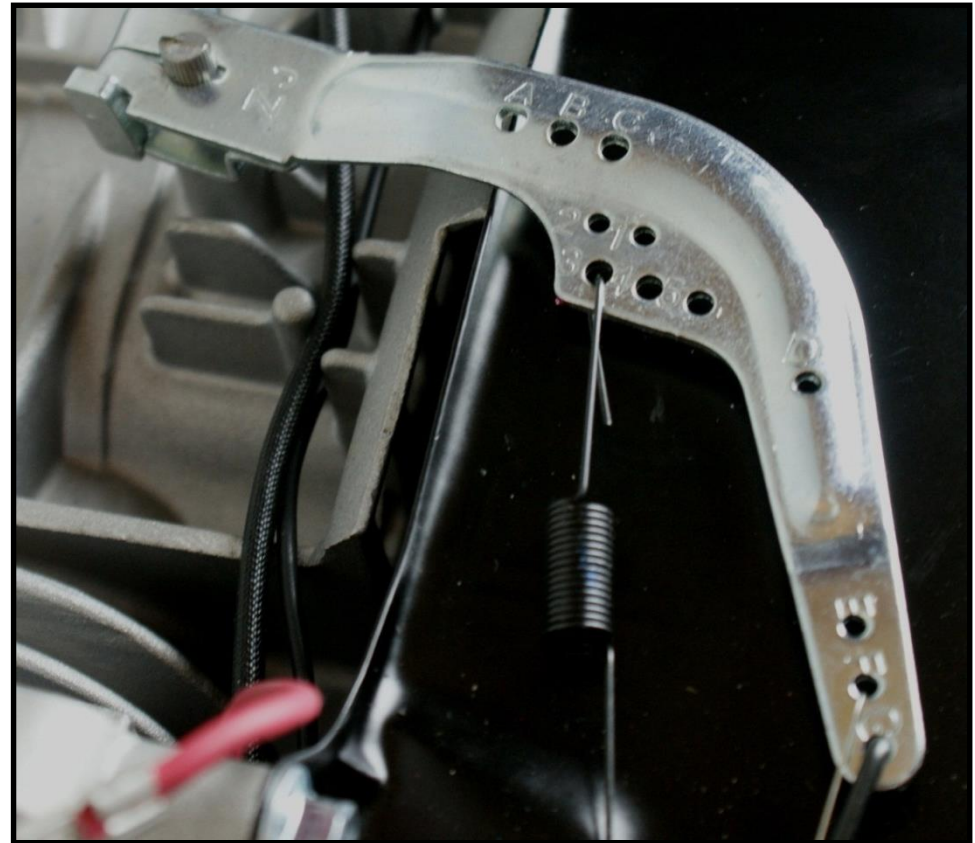
Attach Float Bowl

- Verify bowl gasket is properly installed
- Assemble bowl to carburetor
- Install bowl nut with 10mm tool
- Torque to 50 lbs in.



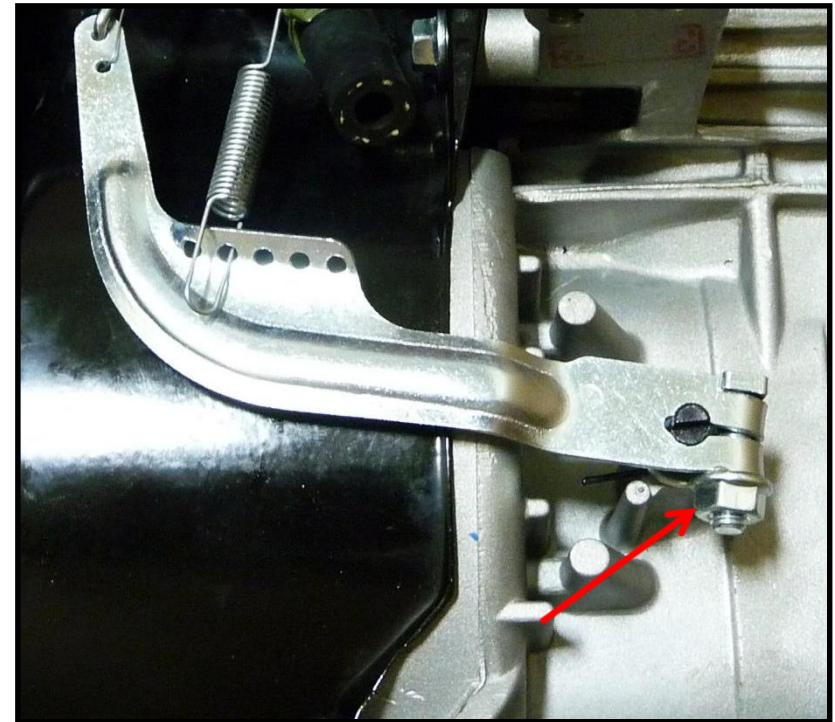
Identify Governor Parts

- Make a drawing of the governor mechanism, noting holes the linkage and springs are installed in and how they are oriented



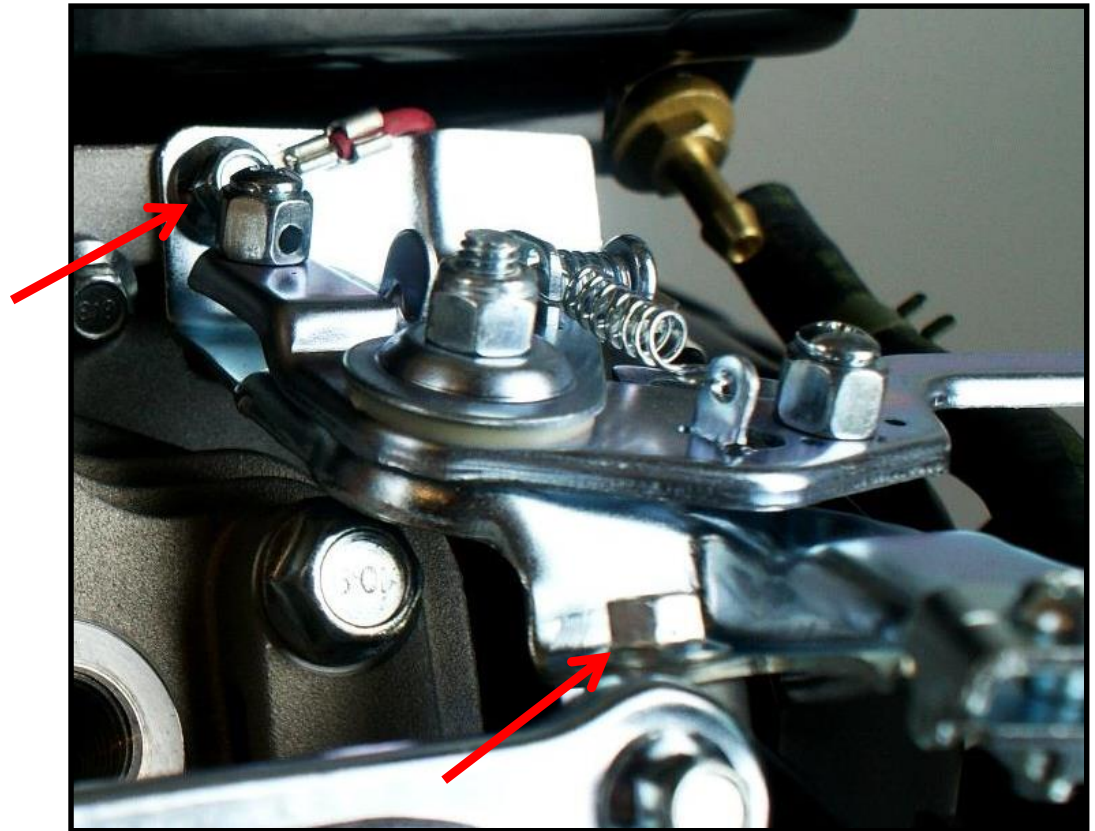
Remove Governor Control Lever

- Use a 10mm wrench
- Loosen pinch bolt nut, but do not remove
- Lift governor control lever off the governor shaft
- Disconnect governor spring and set aside



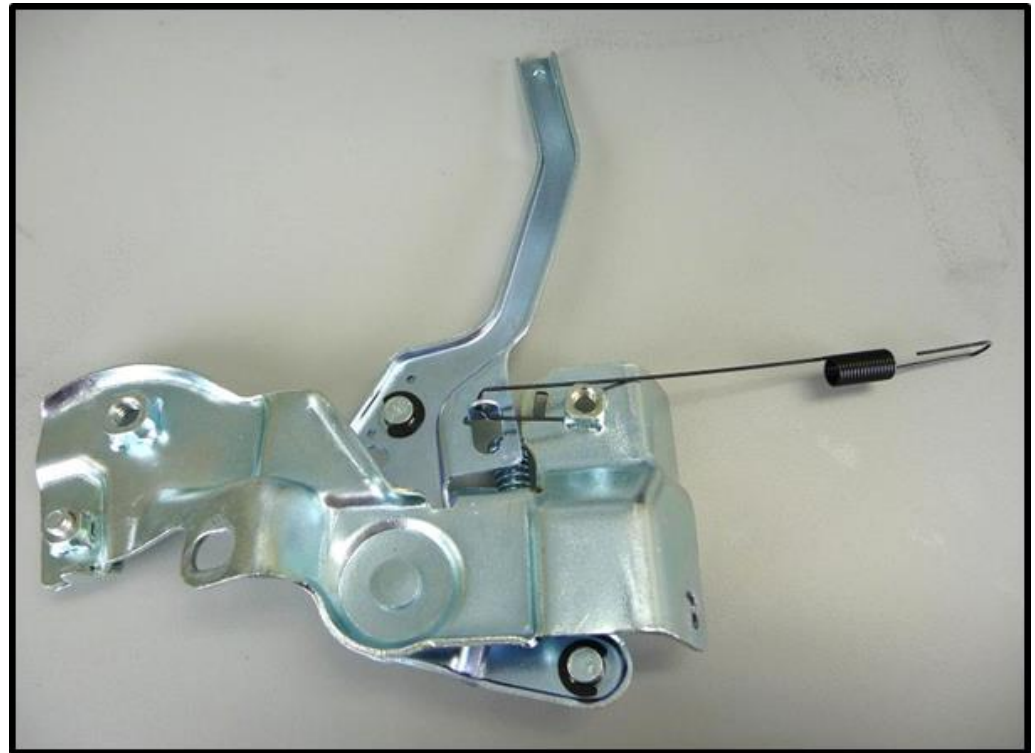
Remove Speed Control Bracket

- Remove 2 screws with 8mm socket



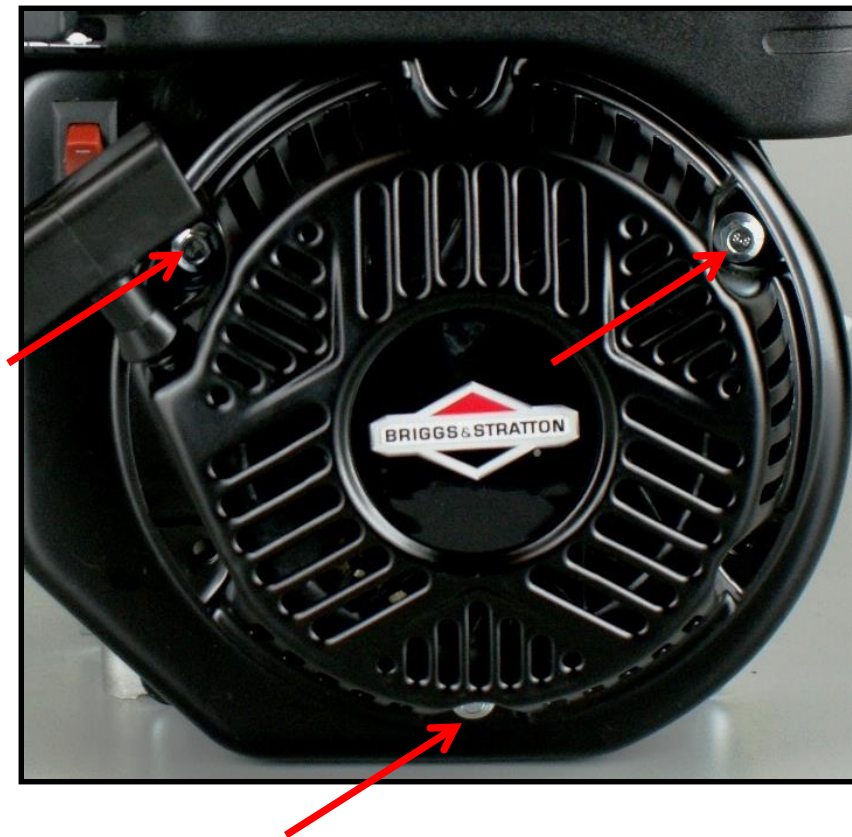
Disconnect Governor Spring

- Turn bracket over and disengage spring from tab



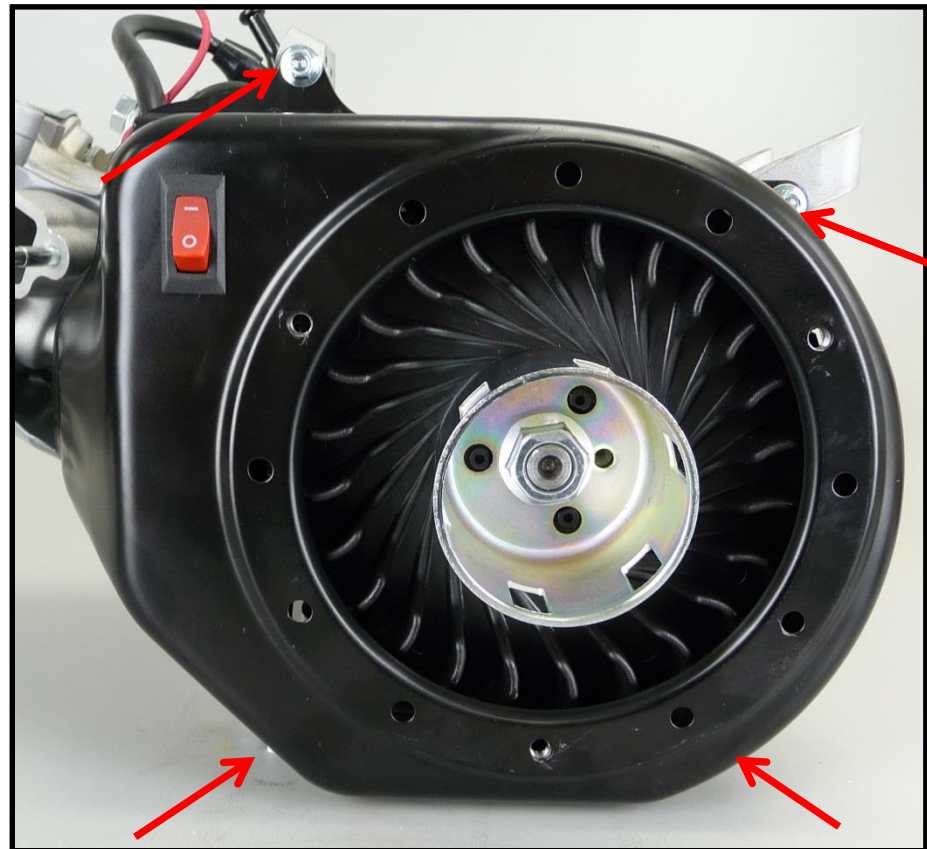
Remove Rewind Starter Assembly

- Use
8mm
socket

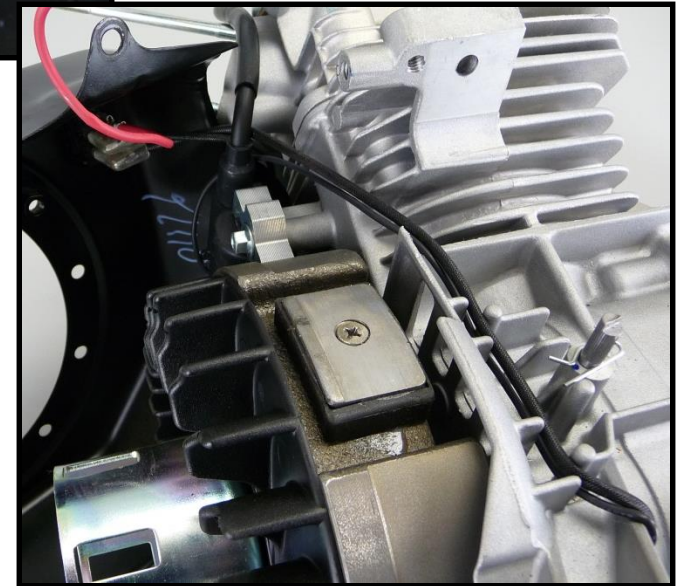
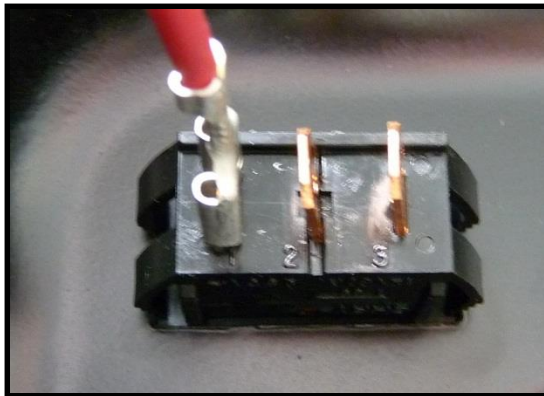
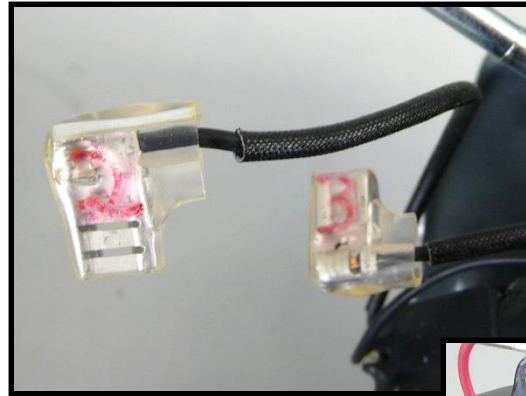


Remove Blower Housing

- Use 8mm socket

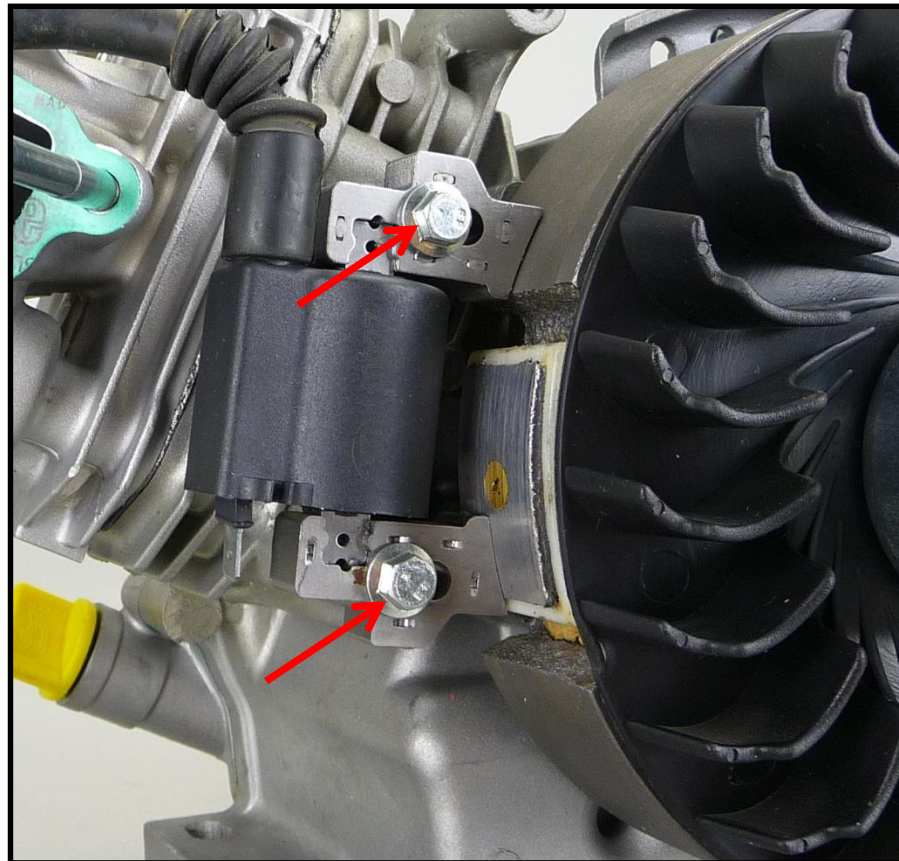


Disconnect Wiring from Switch



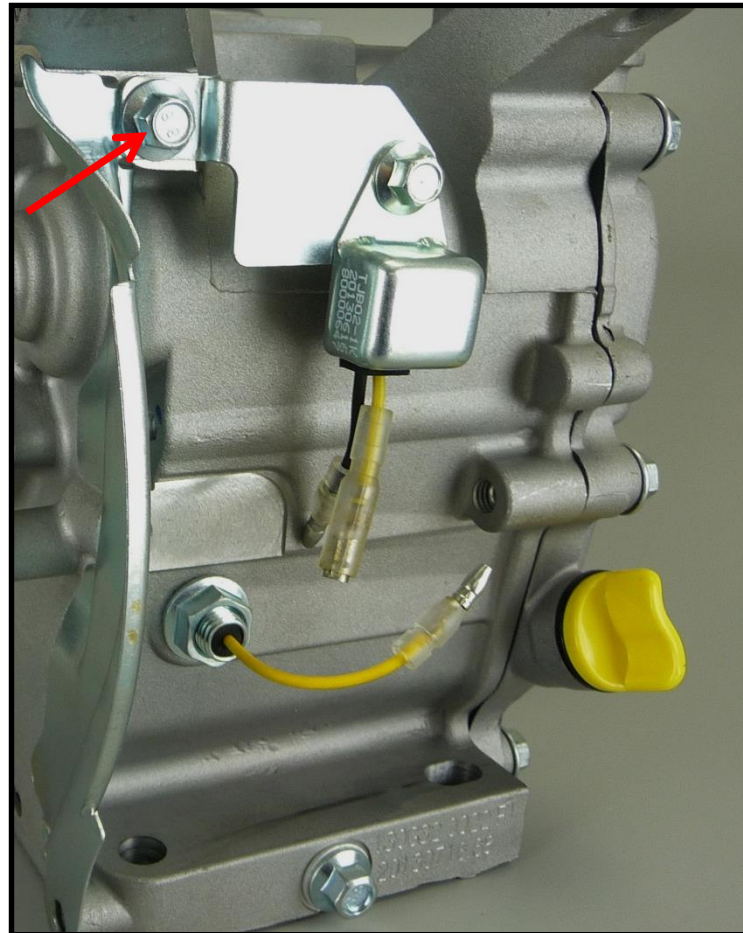
Remove Ignition Armature

- Use 10mm socket



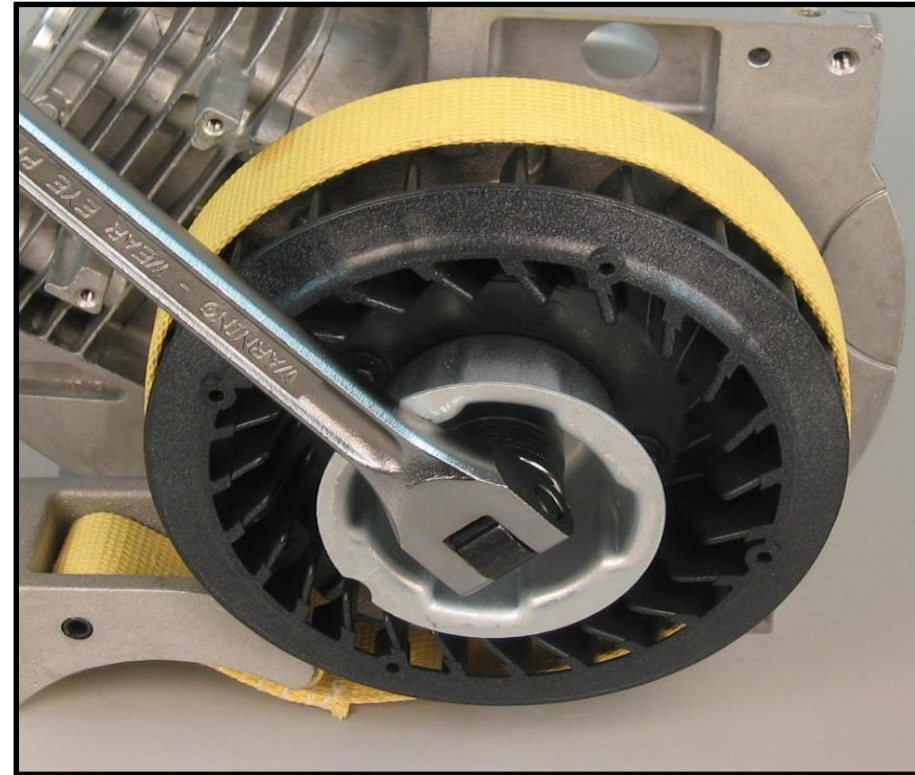
Remove Finger Guard

- Use 8mm socket



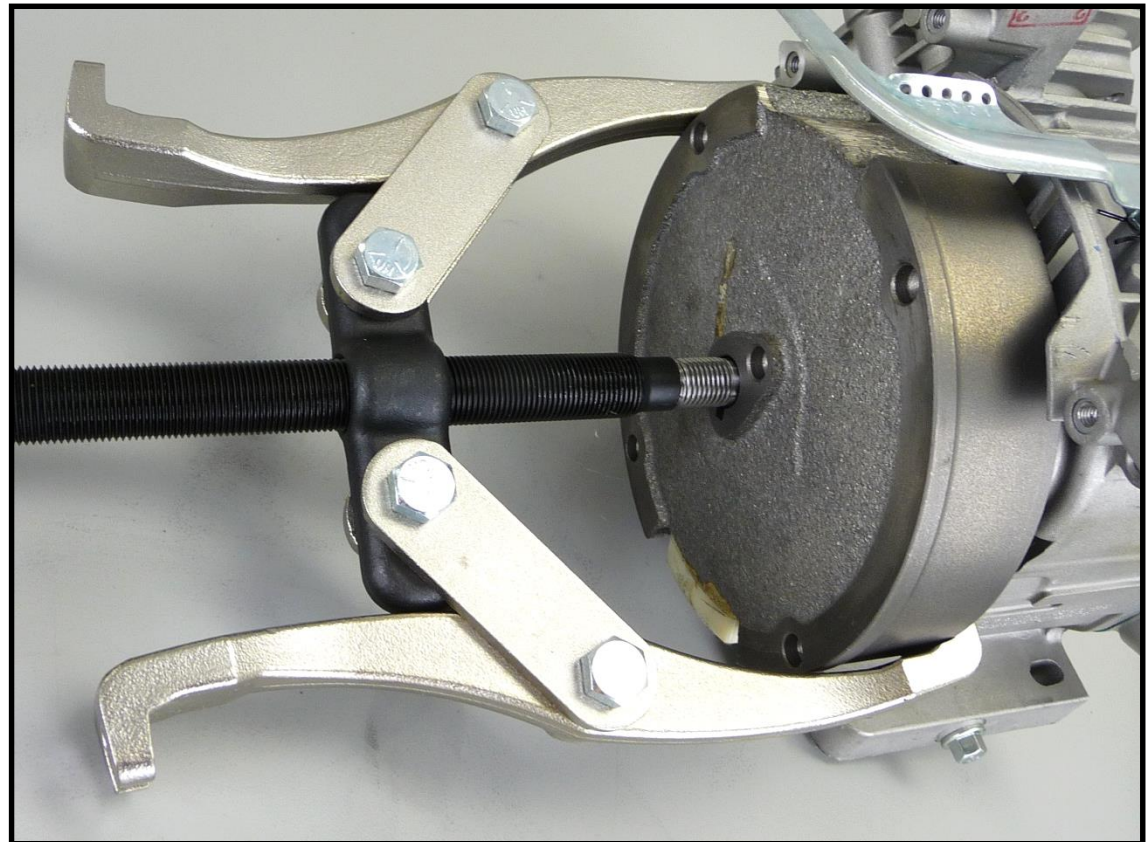
Remove Flywheel Nut

- Use 21 mm socket, breaker bar and 19433 strap wrench
- Lay handle of strap wrench to the left on work bench

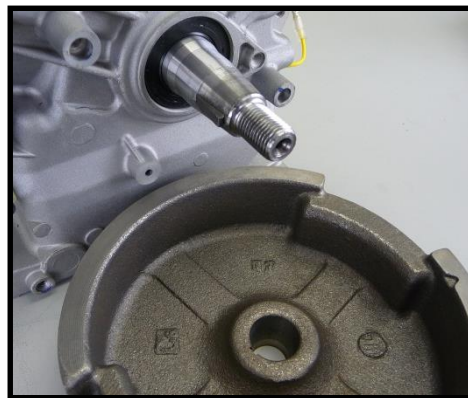
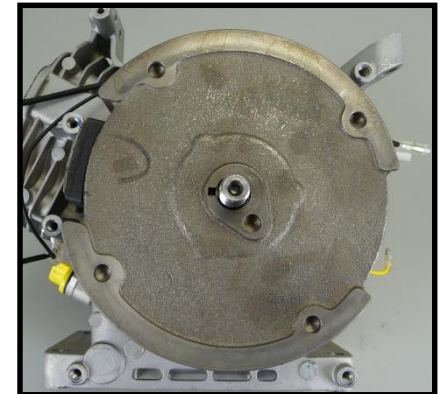


Remove Flywheel

- Use 8 or 9 inch Puller for earlier engines
- Use 19203 puller for current engines

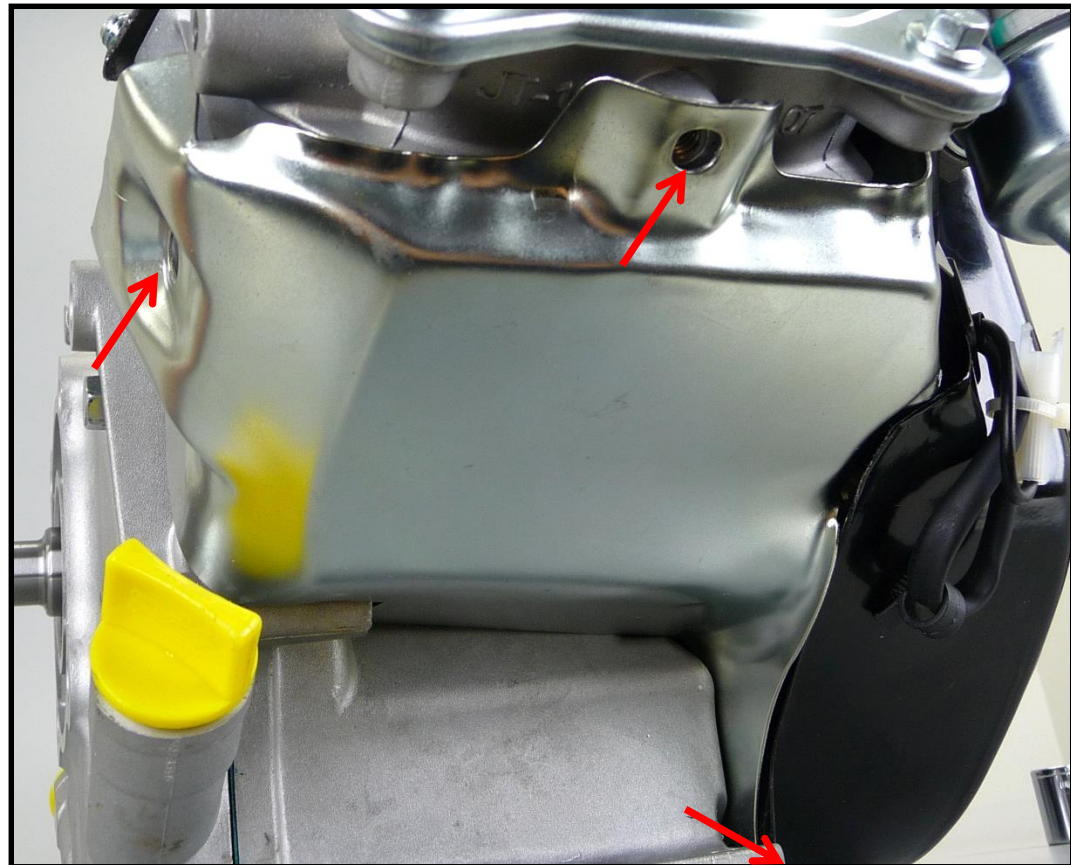


Flywheel Images



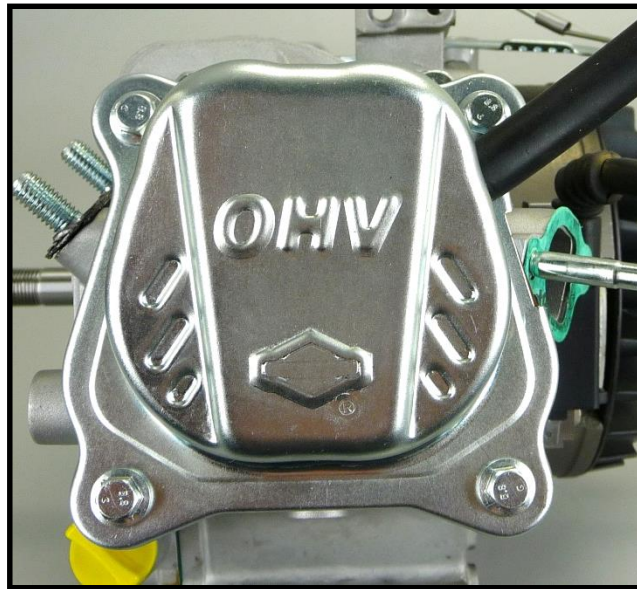
Remove Cylinder Air Guide

- Use 8mm Socket



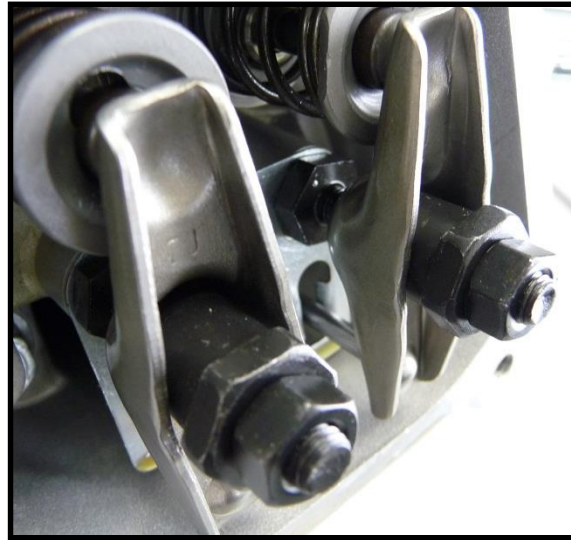
Remove Valve Cover

- Use 8mm socket
- Cover is also the breather



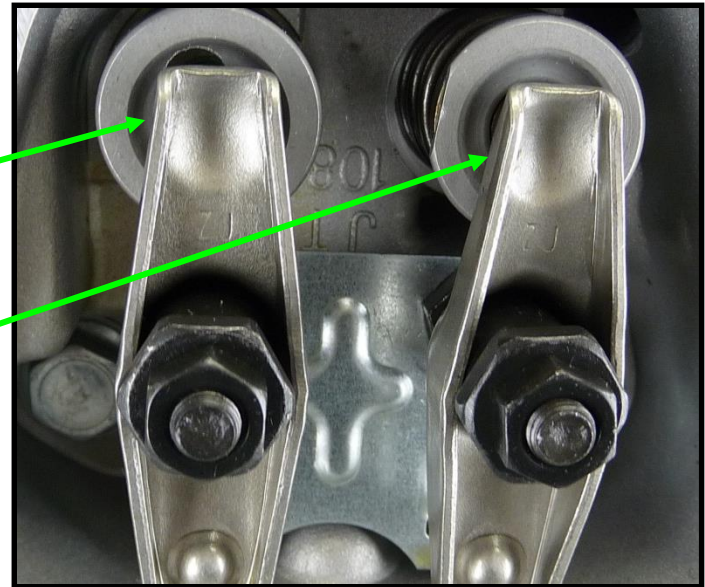
Observe Valve Movement

- Pull on starter rope through all 4 strokes
- Observe movement of both valves



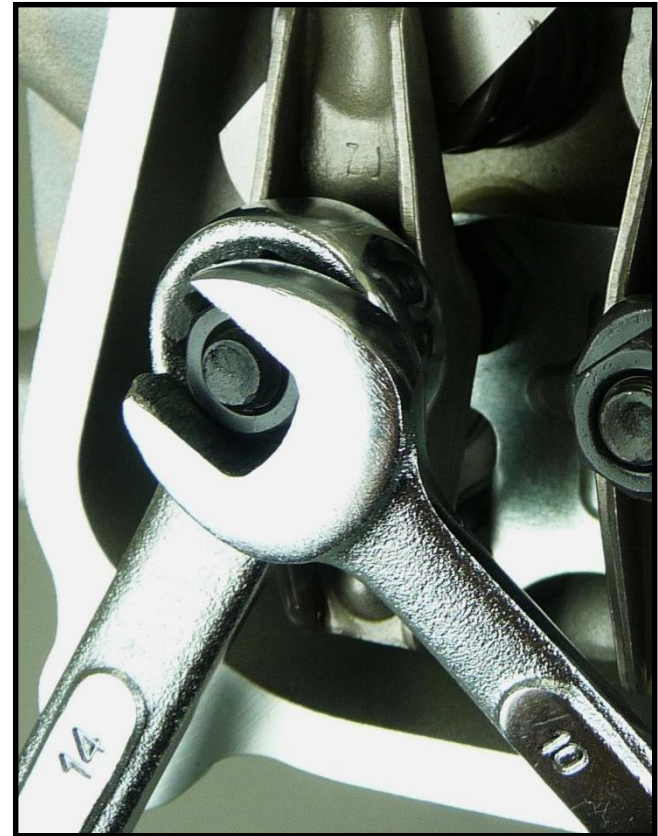
Measure Valve Clearance

- Bring piston to just past TDC on compression stroke (1/4 in.)
- Exhaust clearance .006-.008 in.
- Intake clearance .004-.006 in.
- Measure between rocker arm and valve stem cap



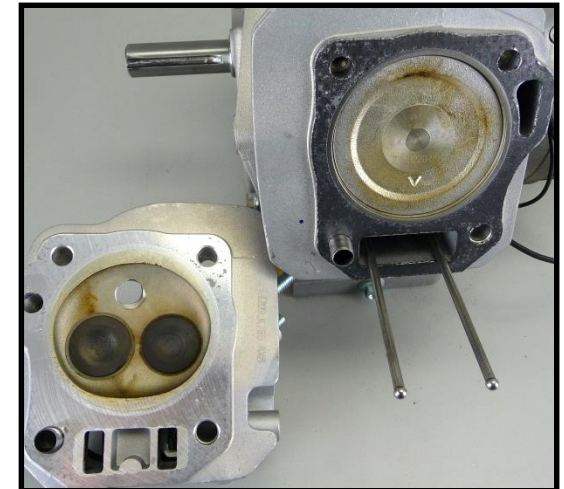
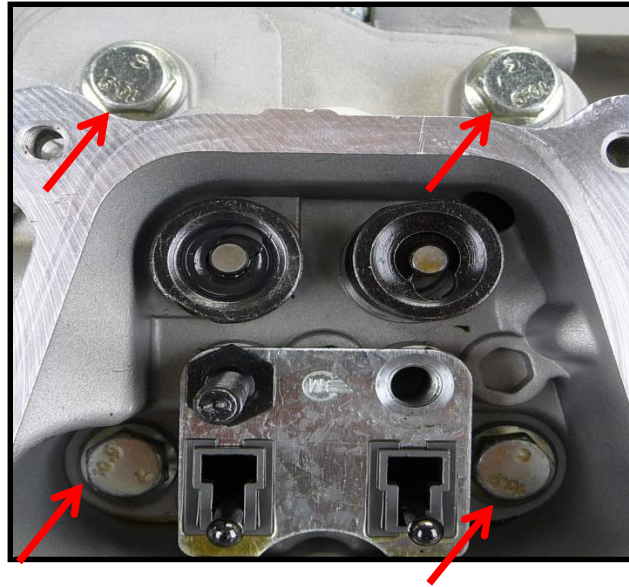
Loosen Rocker Arm and Jam Screw

- Use 14mm wrench and 10mm wrench
- Loosen 10mm nut then 14mm nut about 2 turns
- Turn both rocker arms to the side and remove push rods



Remove Cylinder Head

- Use 13mm socket
- Cylinder head gasket will probably be damaged during removal



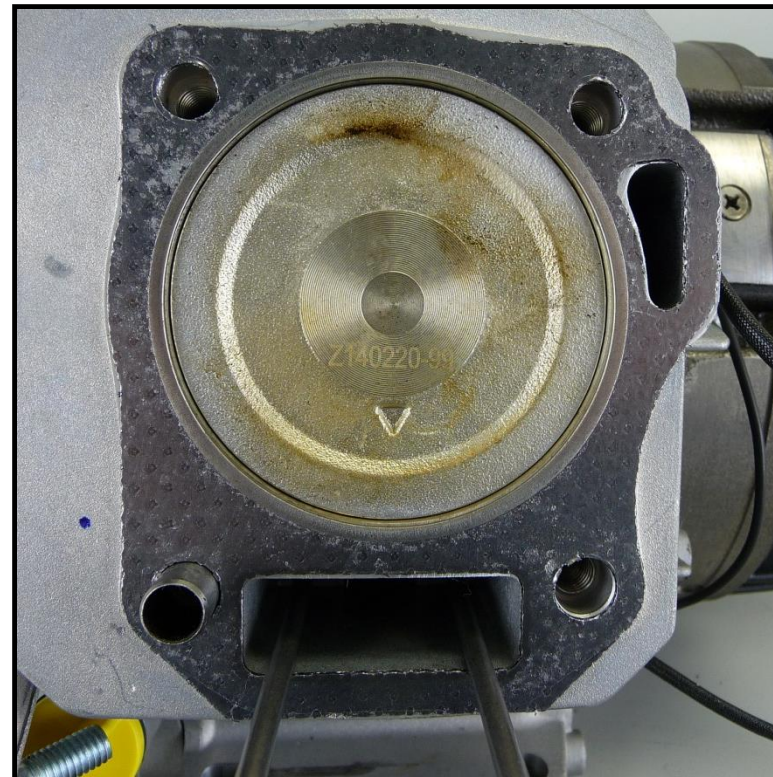
Piston Movement

- Pull on recoil rope
- Observe piston movement in cylinder



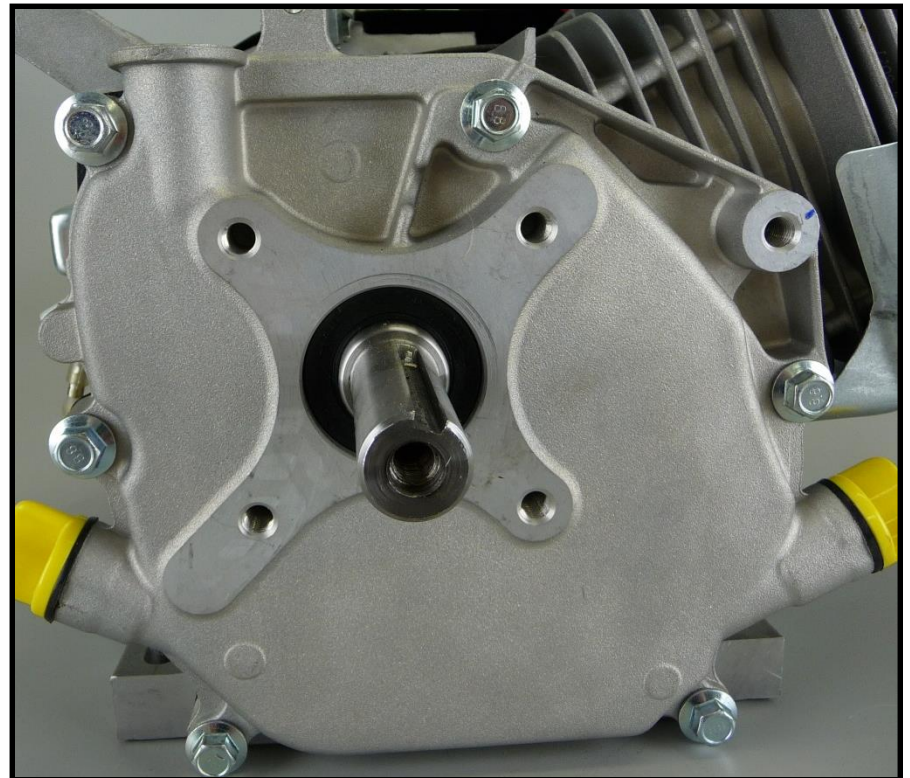
Bring Piston to TDC on Compression Stroke

- Valve tappets will be at the bottom of their travel



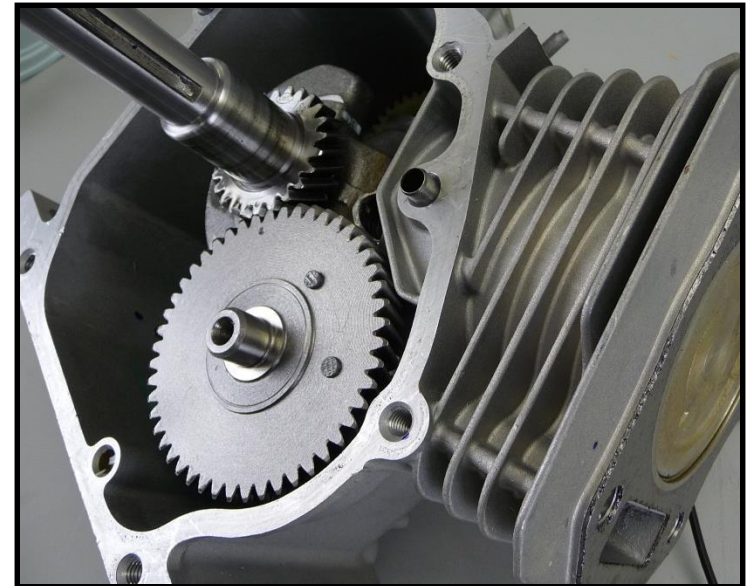
Remove Crankcase Cover

- Use 10 mm socket
- Case cover gasket will probably be damaged during removal
- Do not pry off cover – It will come off by hand



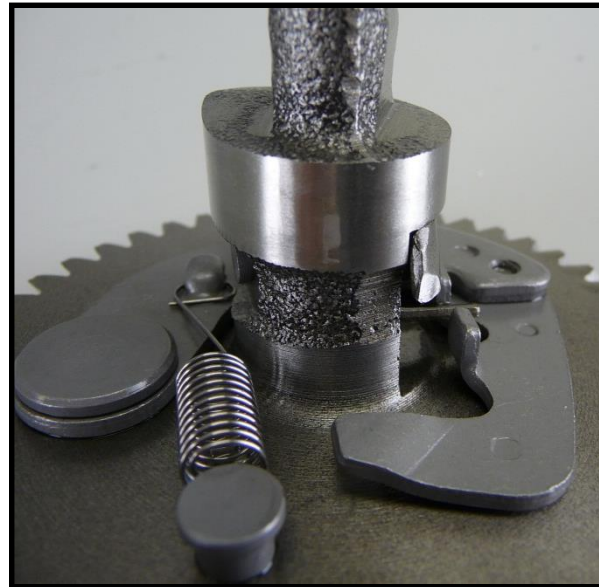
Inspect Cam Gear

- Timing marks of cam gear and crankshaft gear should align
- Draw diagram



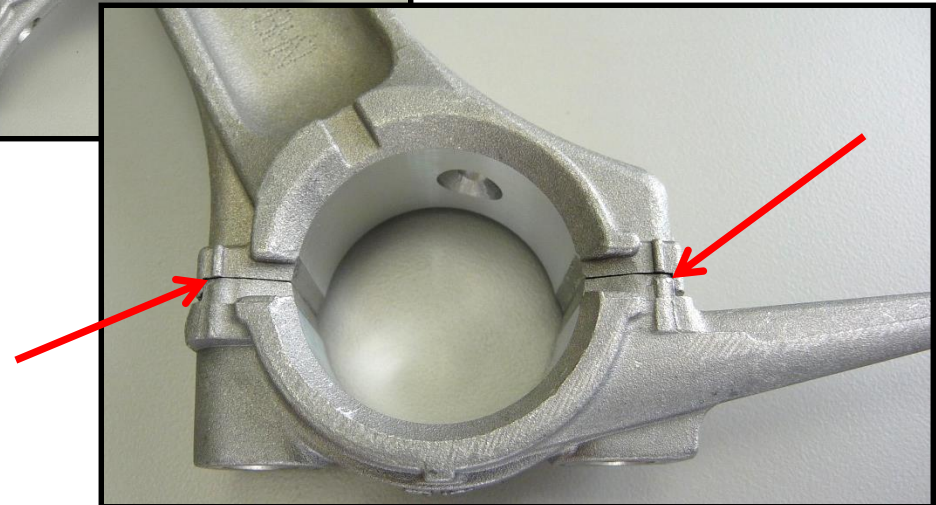
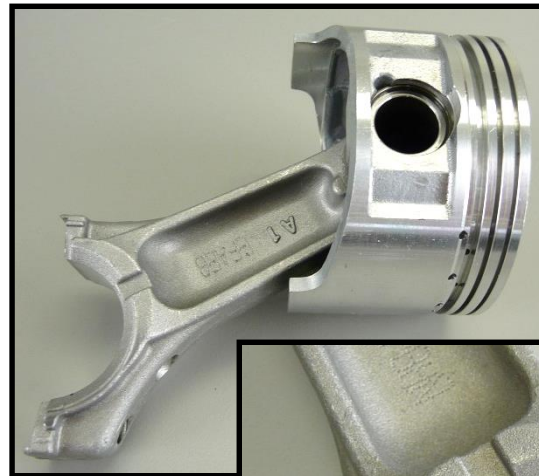
Remove Cam Gear and Tappets

- Tilt block
- Remove cam gear by hand
- Remove tappets by hand
- Note compression release



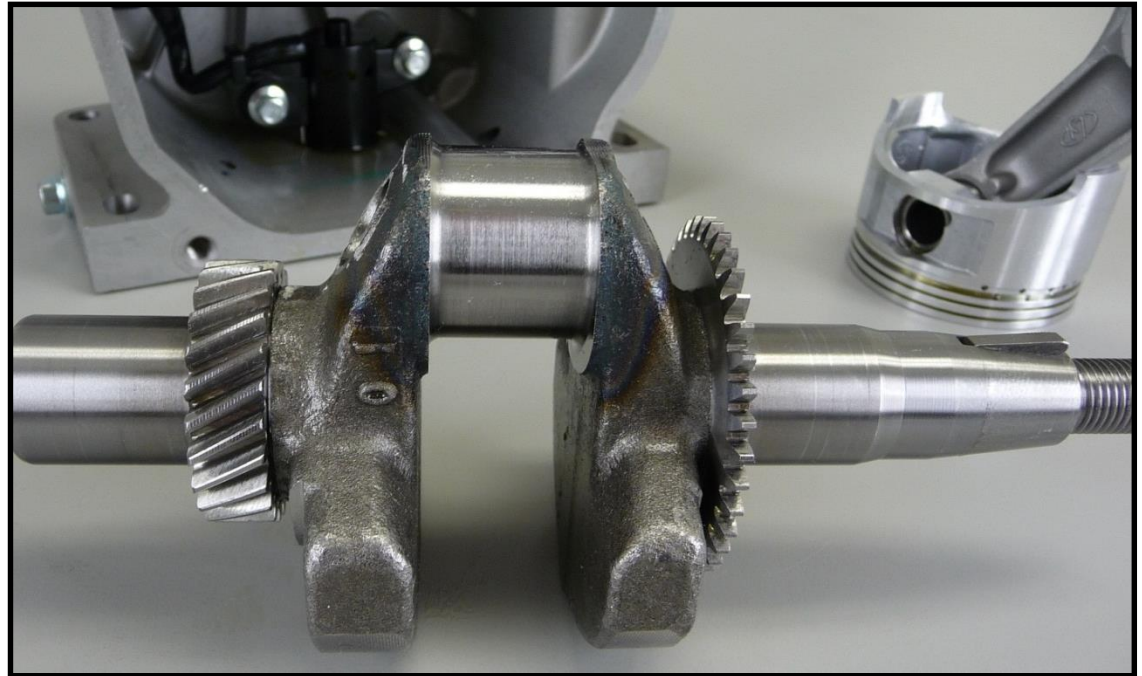
Remove Piston/Connecting Rod Assembly

- Use 8 mm socket
- Piston and rod have alignment marks called "match marks"



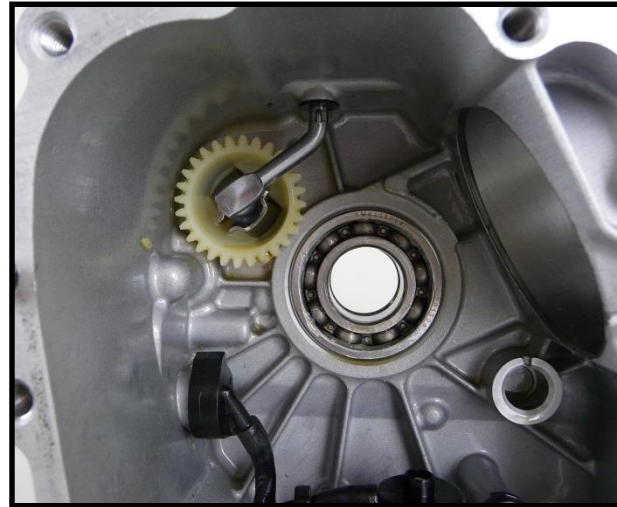
Remove Crankshaft

- Pull out crankshaft by hand
- Use caution!
Do not scratch bearing surface in crankcase



Discuss Crankcase

- Wipe up any remaining oil in case
- Clean all gasket surfaces with gasket scrapper
- Note governor gear and shaft and low oil sensor

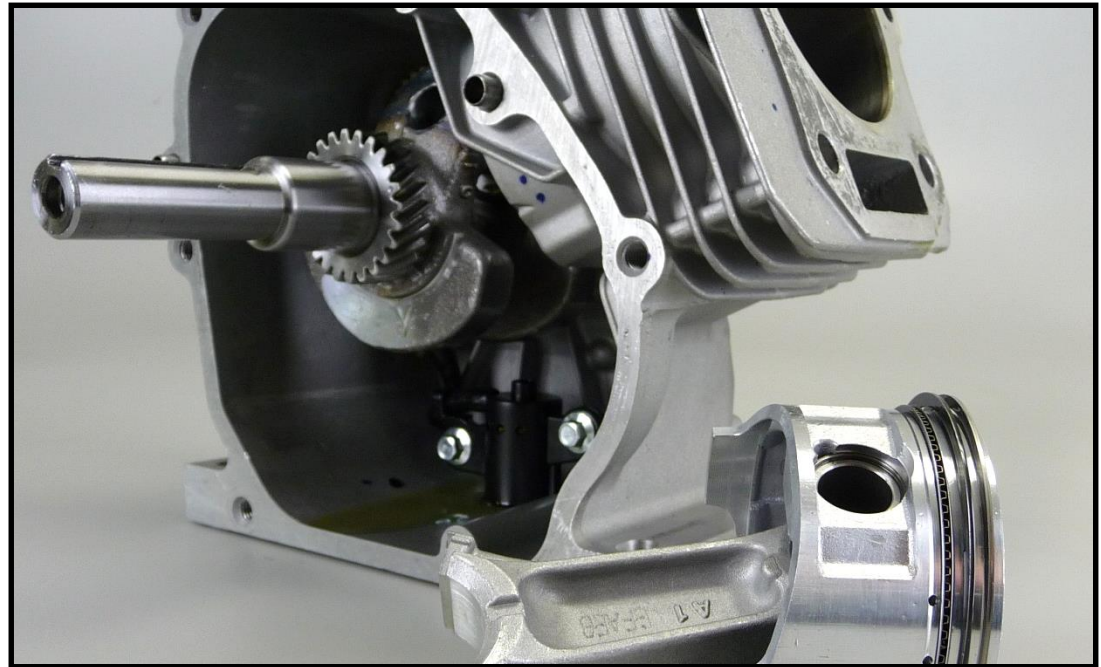


Reassembly

- This is a step-by-step reassembly process. It is not a race. Take your time when assembling the engine and listen for direction from the instructor
- Do not work ahead!
- Fasteners must be torqued to the proper torque value
- Special procedures will be explained

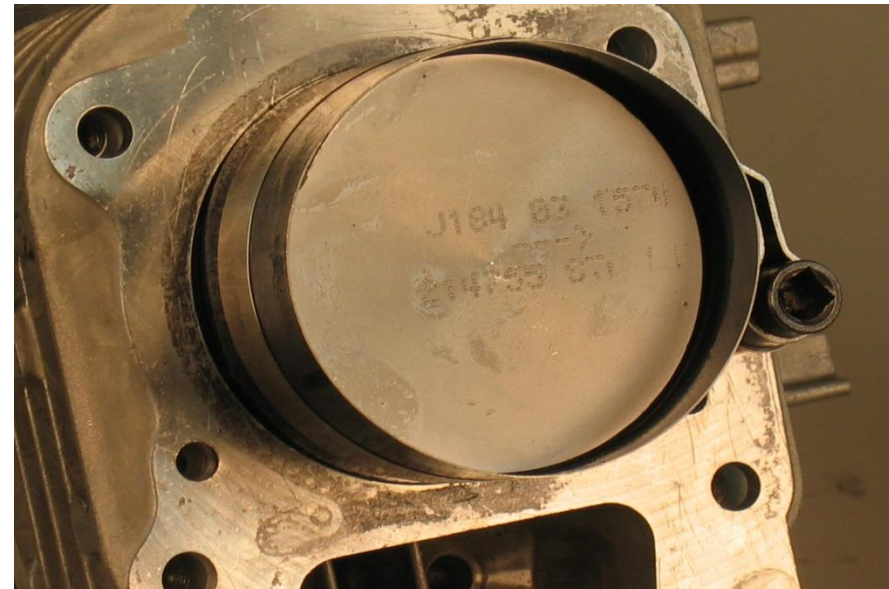
Install Crankshaft

- Lubricate governor gear
- Install crankshaft by hand into cylinder block
- Be careful not to damage bearing
- Position crankpin to 7 o'clock



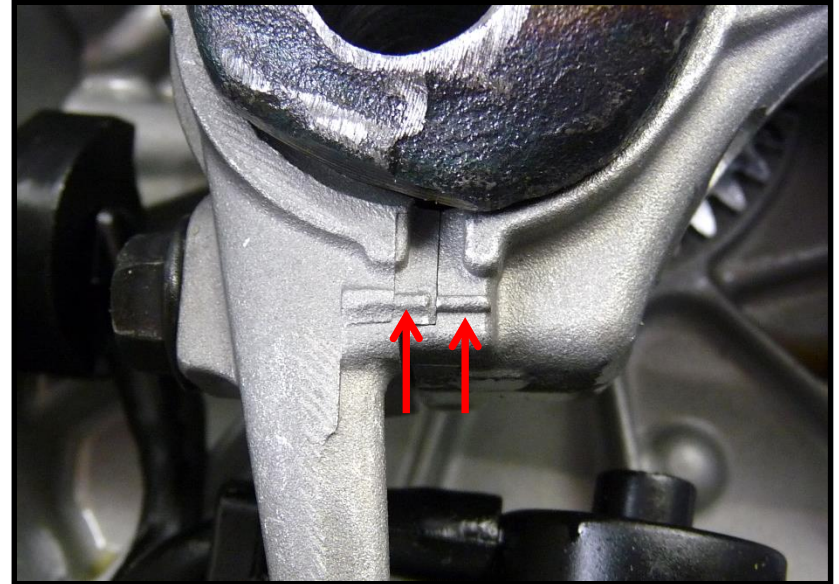
Install Piston Assembly

- Use ring compressor
- Coat piston assembly and cylinder bore with oil
- Check orientation marks
- DO NOT hammer or force piston assembly into block!



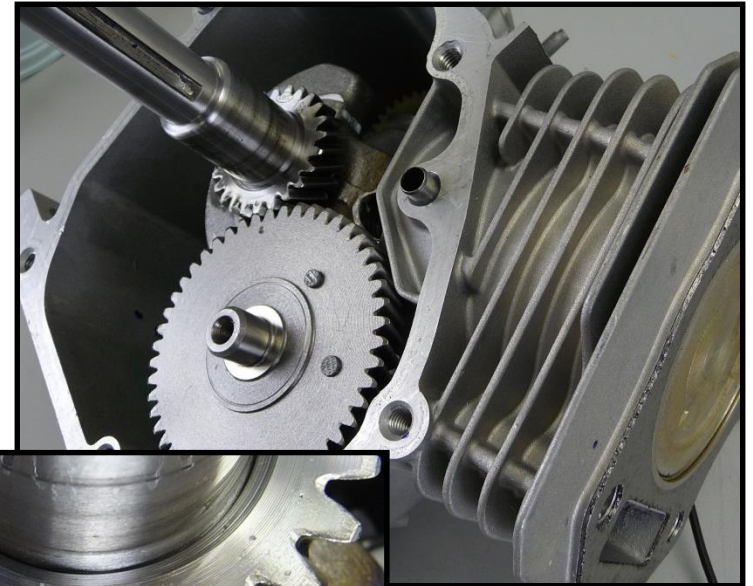
Attach Rod to Crankshaft

- Use 8 mm socket
- Torque fasteners to 125 lbs in.
- Make sure “match marks” align
- Rotate crankshaft and check for free movement



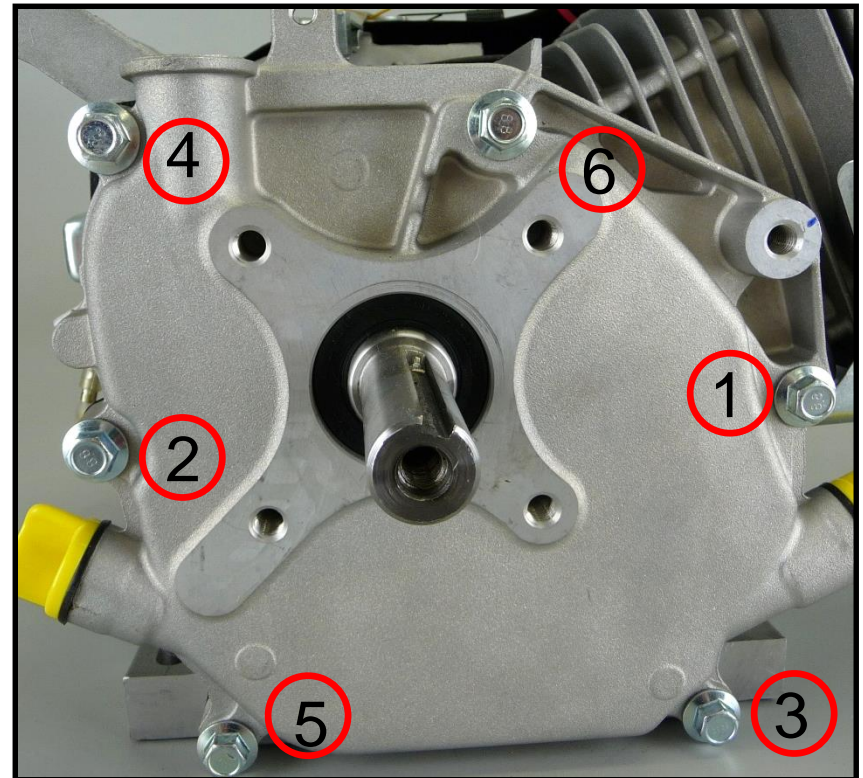
Install Cam Gear

- Install tappets
- Make sure timing marks of cam gear and crankshaft gear are aligned



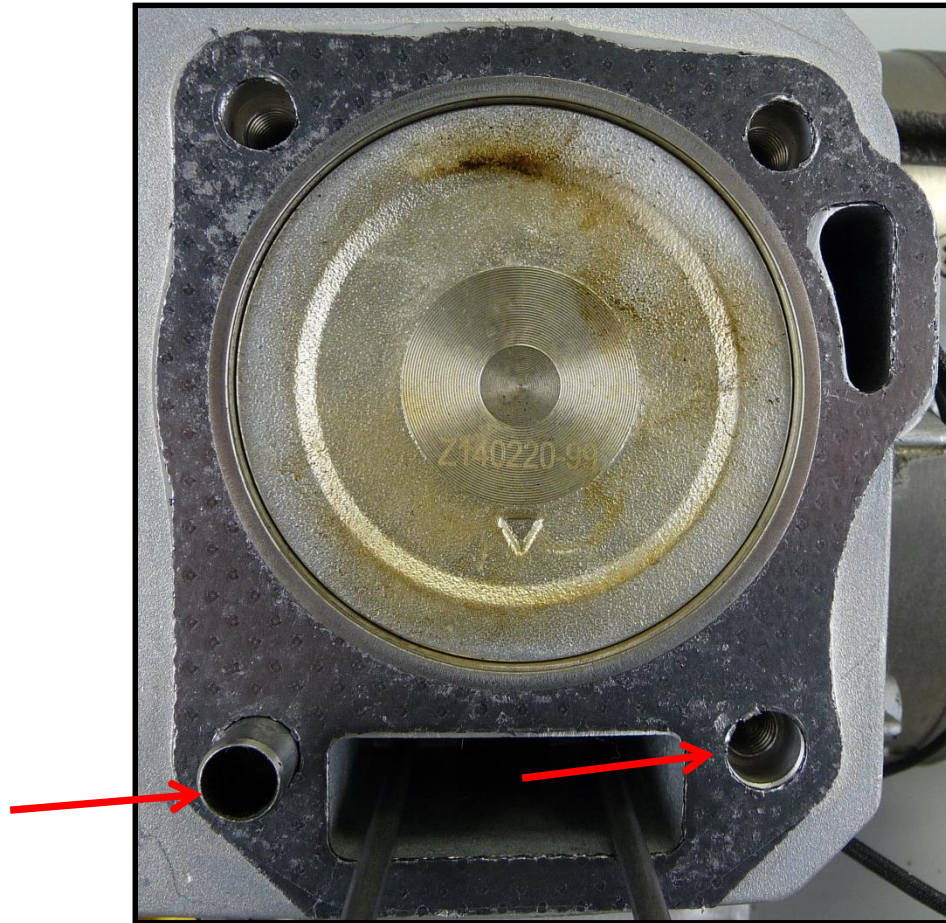
Install Crankcase Cover

- Lubricate cover bearing
- If difficult to install, check that gasket surfaces are parallel with each other
- Use 10 mm socket
- Torque fasteners in sequence to 210 lbs in.



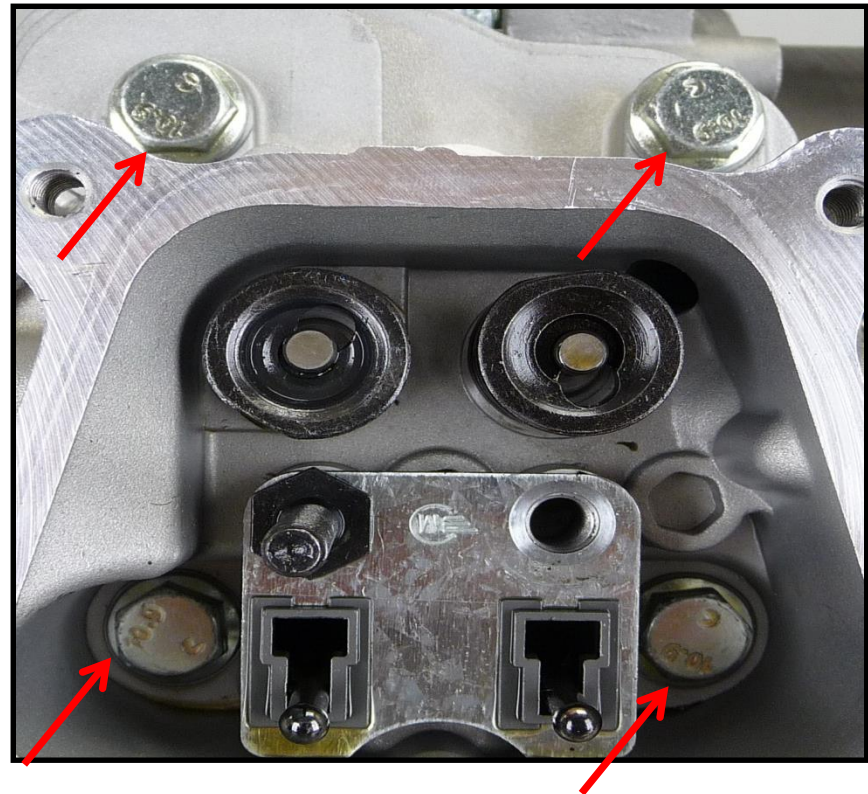
Install Head Gasket

- Gasket only goes on one way
- Note 2, dowel pin locations and install



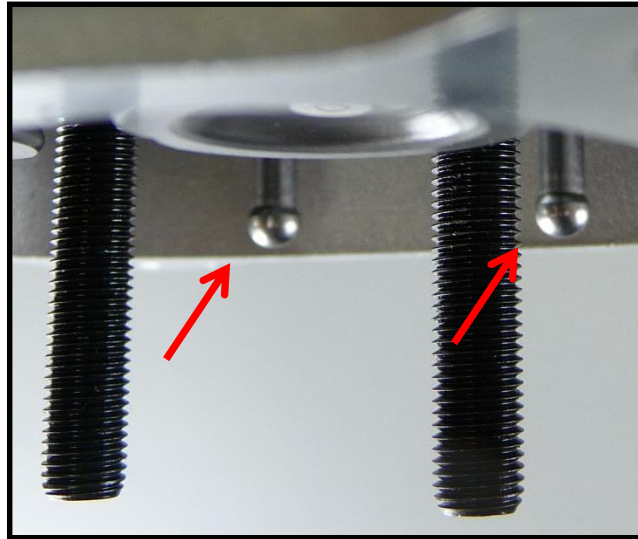
Install Cylinder Head and Pushrods

- Use a 13mm socket
- Step-Torque and sequence 75-150-210 lbs in.
- Install push rods in slots
 - Insure that tips rest in recess of tappets

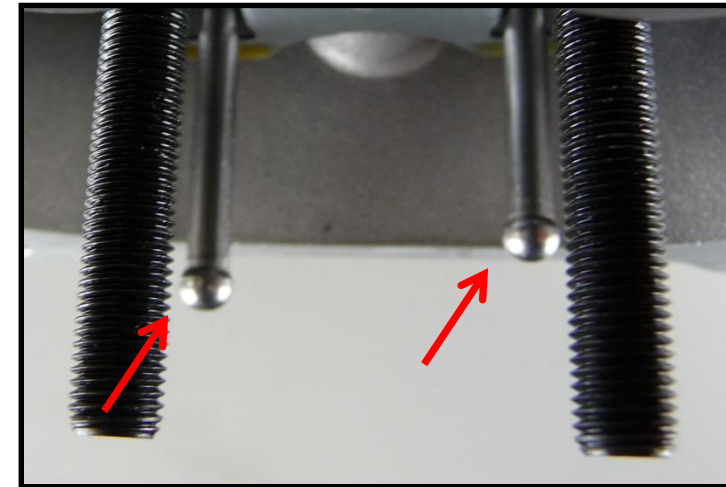


Level Pushrods

- Rotate engine until pushrods are level and piston at TDC

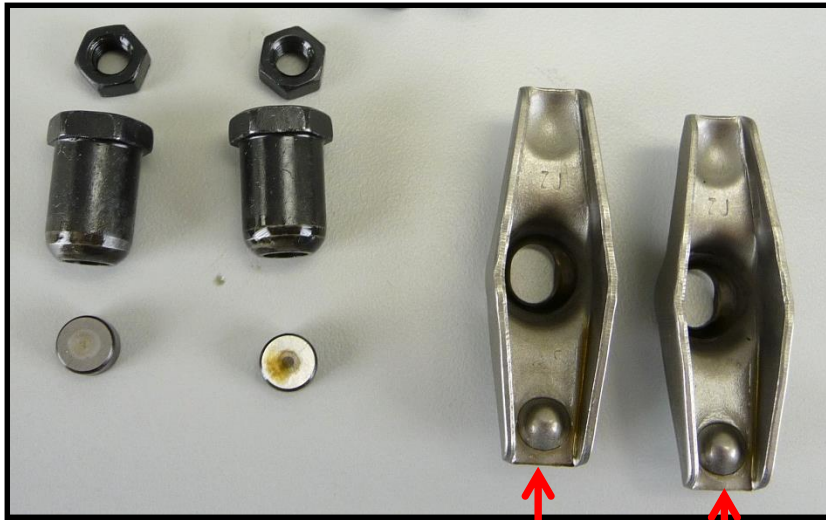


Level



Not Level

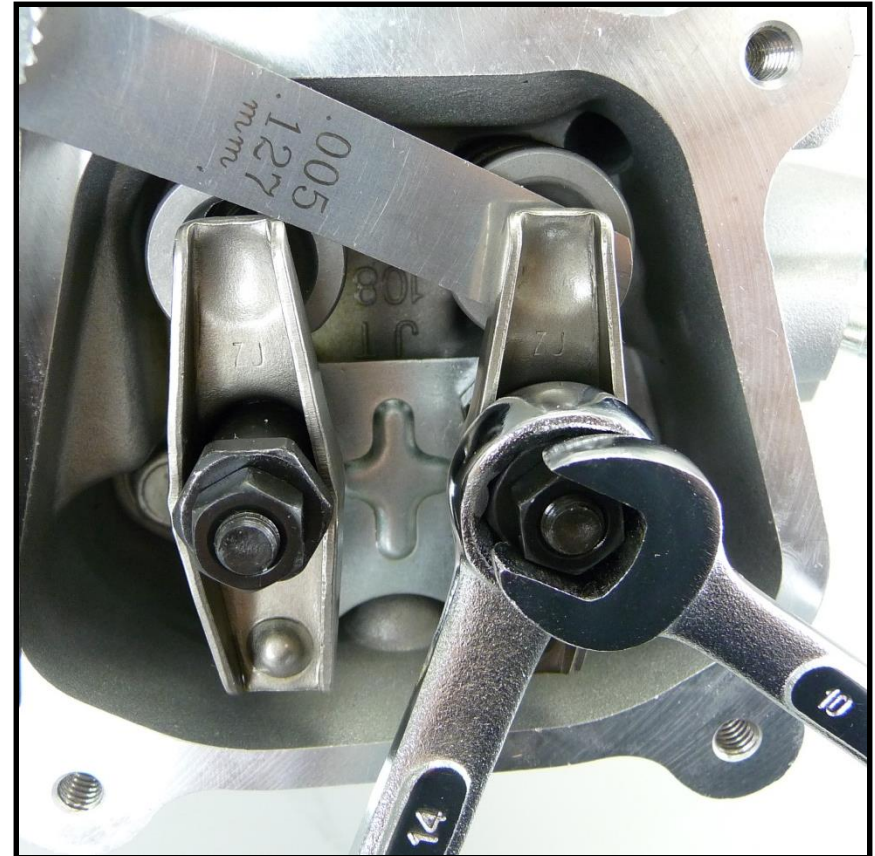
Install Rocker Components



Pushrod Cup

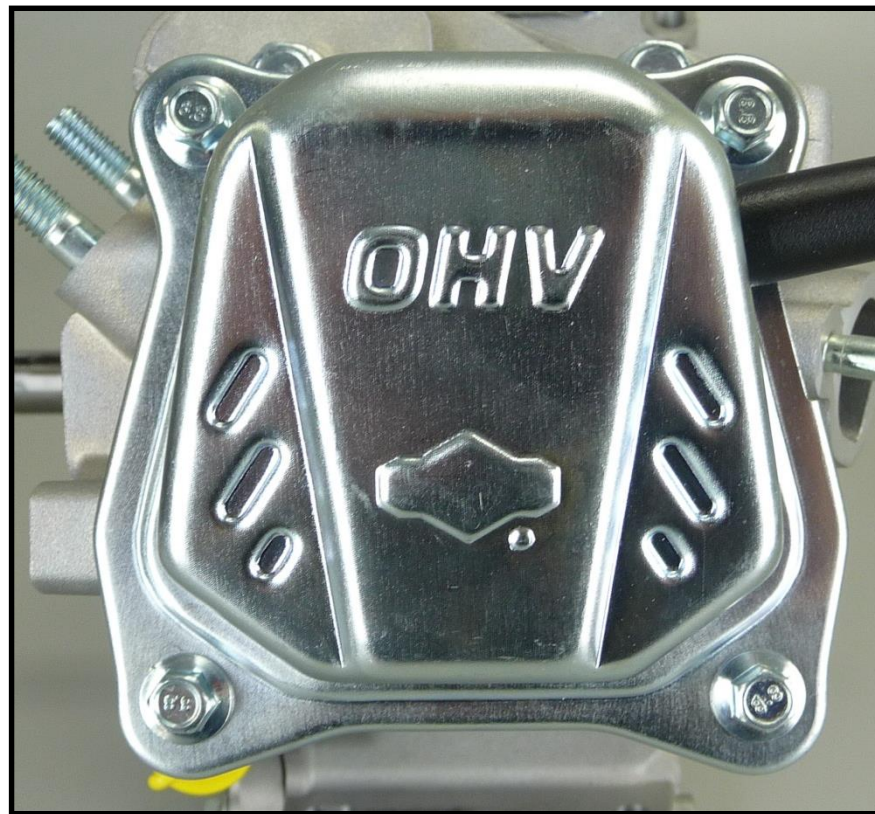
Adjust Valve Lash

- Piston needs to be at $\frac{1}{4}$ in. past TDC
- Install valve caps on valve stems
- Properly orientate rocker arms
- Intake valve .004-.006 in.
- Exhaust valve .006-.008 in.



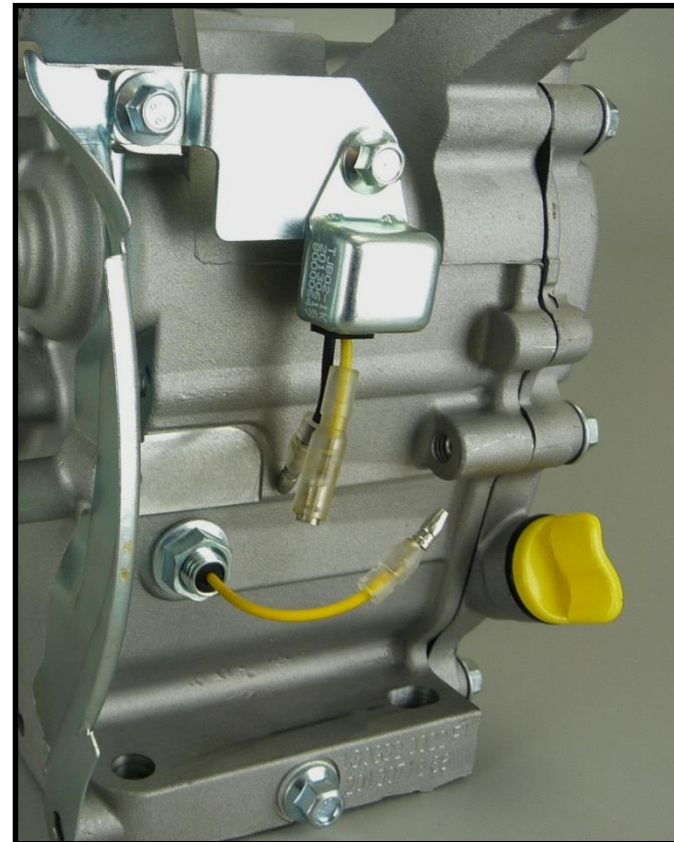
Install Valve Cover

- Check gasket
- Use 8mm socket
- Torque to 80 lbs in.



Install Finger Guard and Module

- Use 8mm socket
- Torque to 85 lbs in.



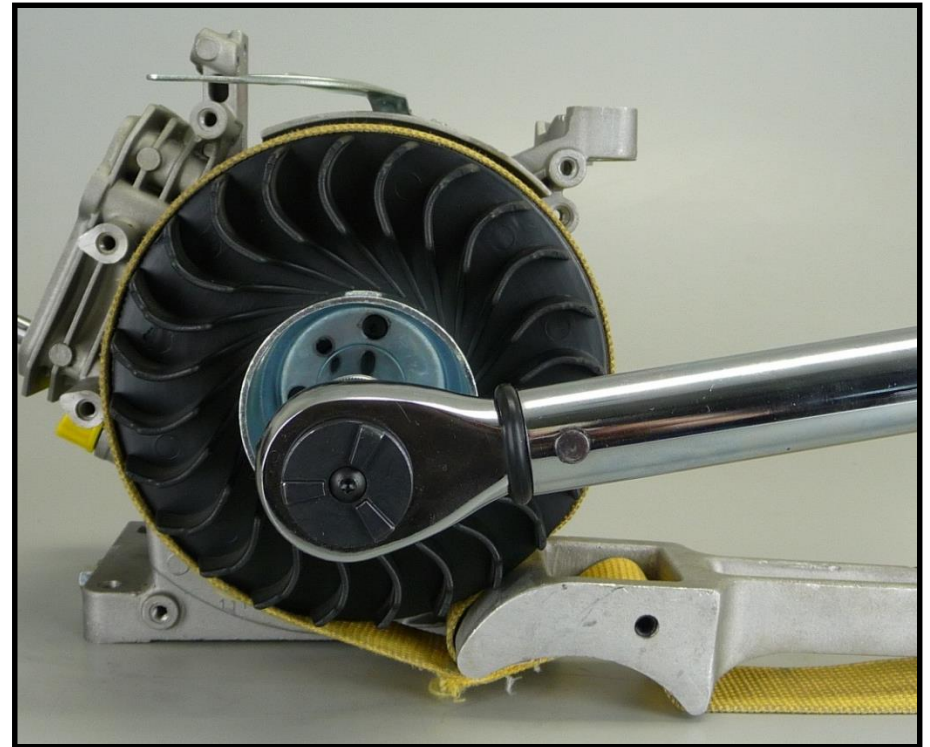
Install Cylinder Heat Shield

- Use 8mm socket
- Torque to 50 lbs in.



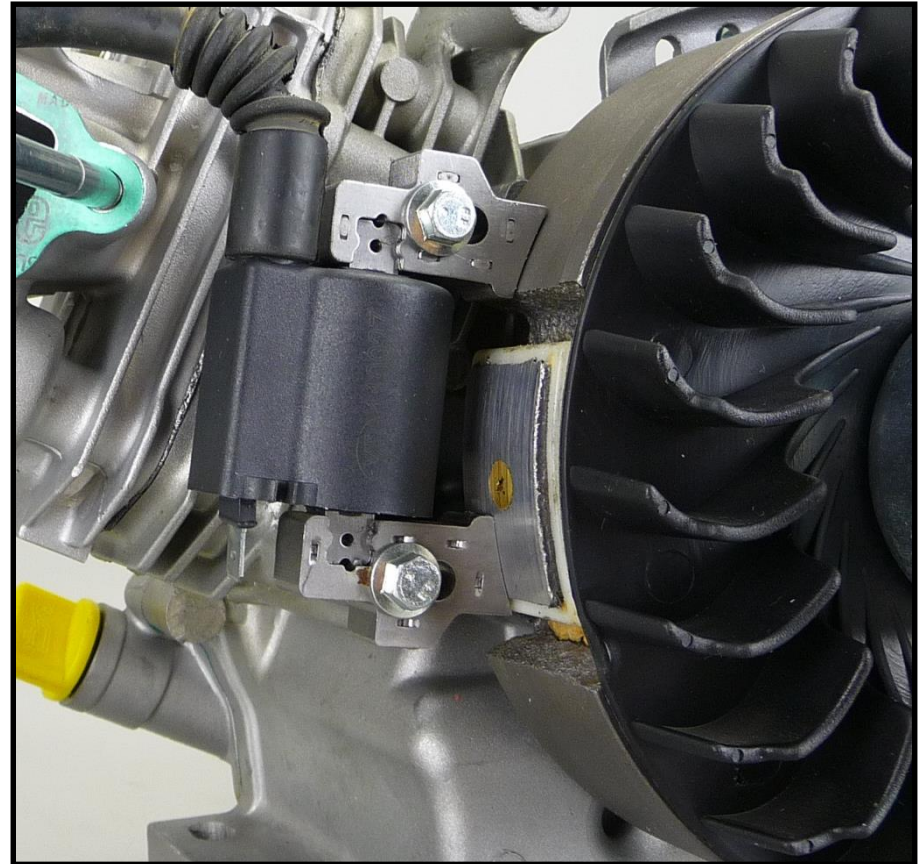
Install Flywheel, Key, Starter Cup, Fan and Nut

- Align flywheel and crankshaft keyways. Slide flywheel onto crankshaft
- Use strap wrench
- Use 21 mm socket
- Torque to 65 lbs **ft.**



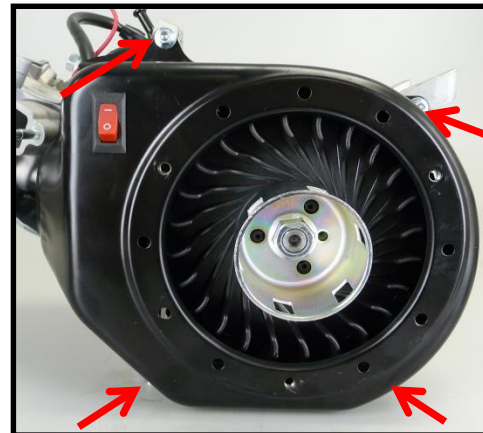
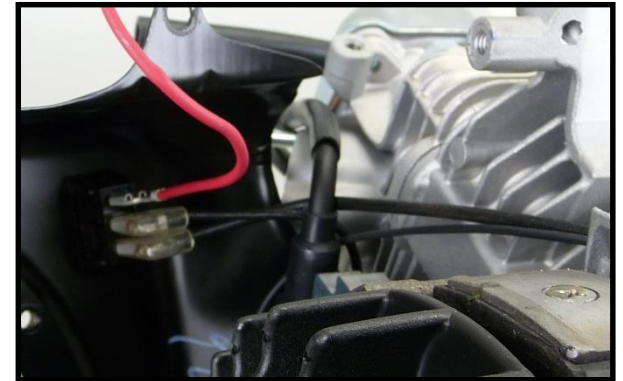
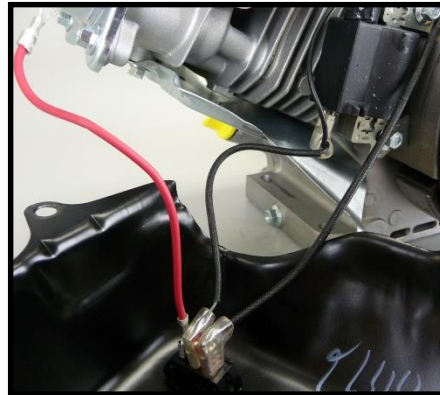
Install Ignition Armature

- Verify proper armature orientation
- Use long .010 in. flat gage or CE5121 gage for gap clearance
- Use 10 mm socket
- Torque to 95 lbs in.



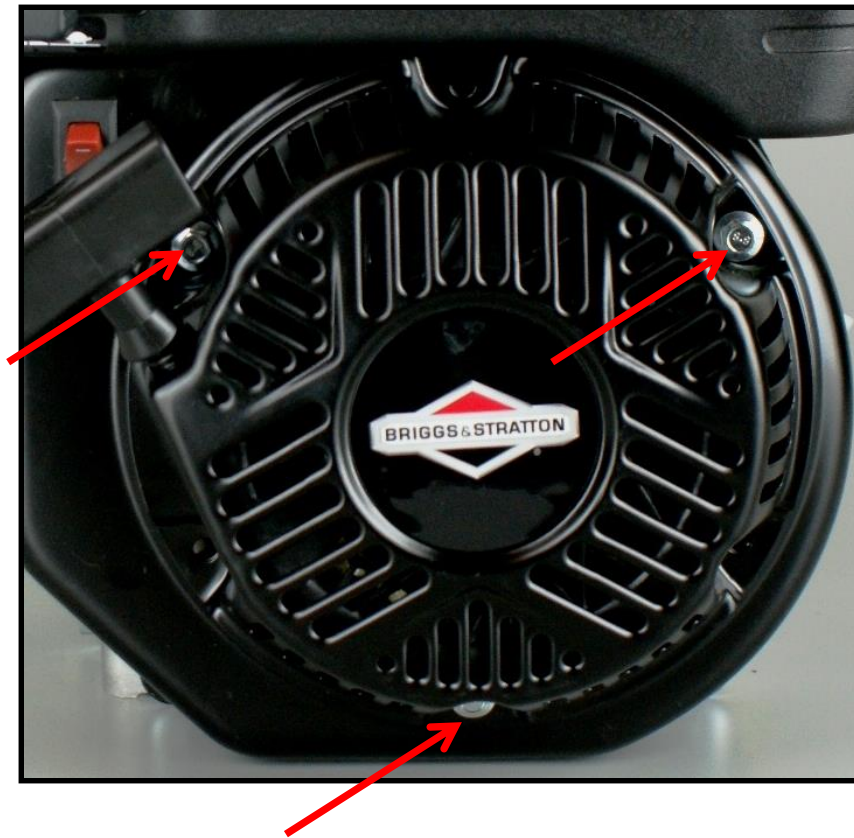
Install Ignition Wiring and Blower Housing

- Install wiring based on switch installed and your notes
- Torque 8mm screws to 85 lbs in.



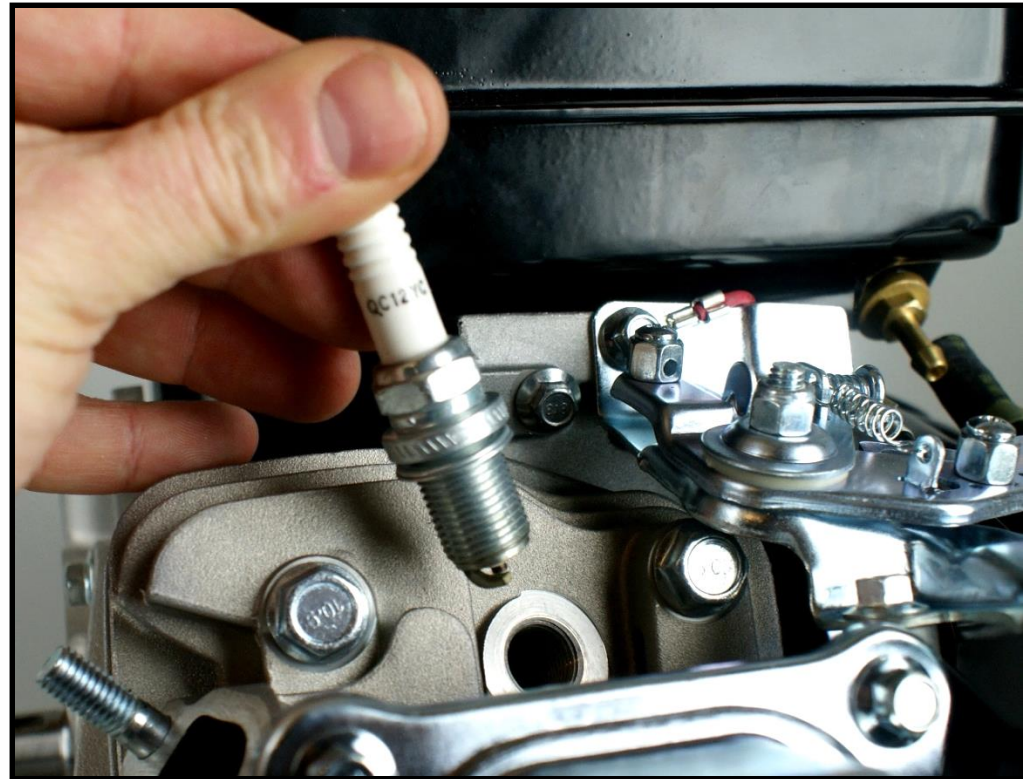
Install Rewind Starter Assembly

- Use 10 mm socket
- Torque to 30 lbs in.



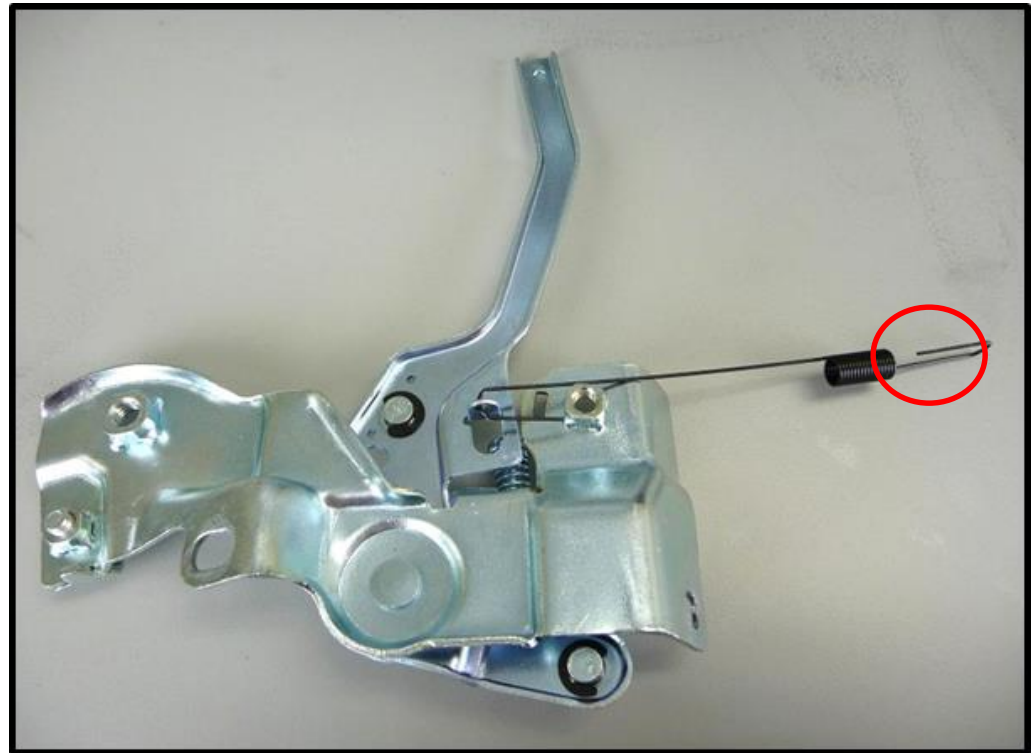
Install Spark Plug

- 5/8 in spark plug socket
- Torque to 180 lbs in.



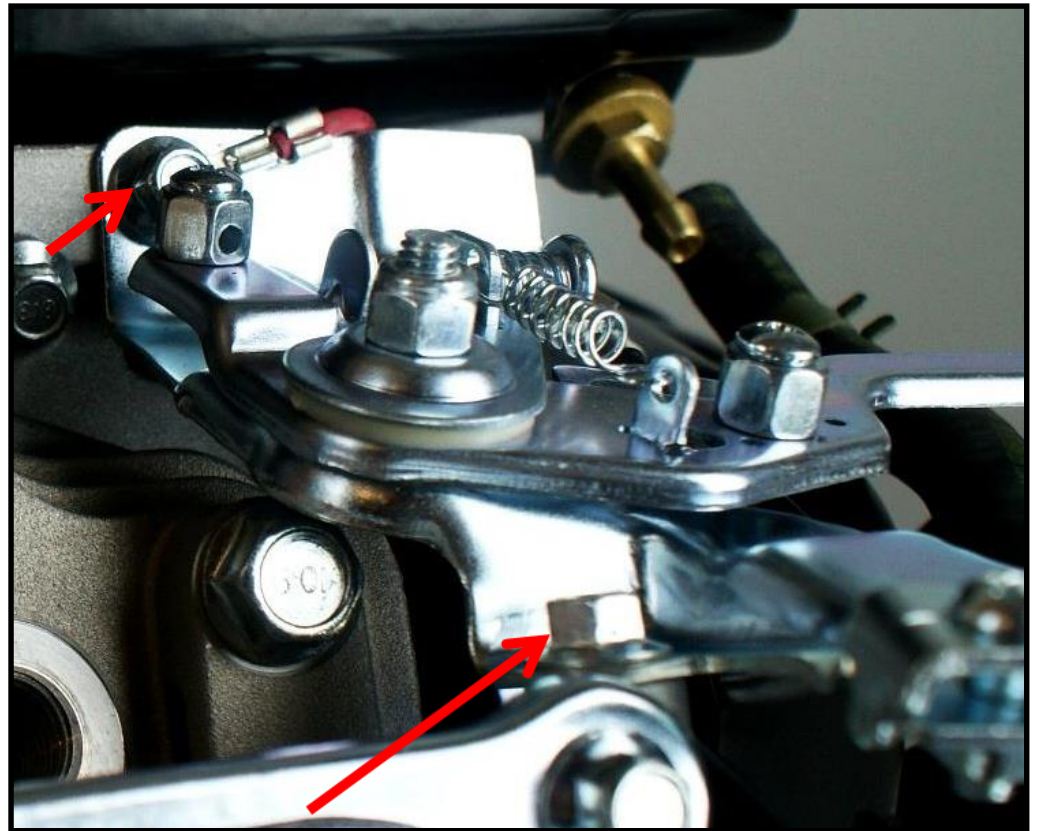
Reconnect Governor Spring

- Re-engage spring with tab
- Note orientation of the spring



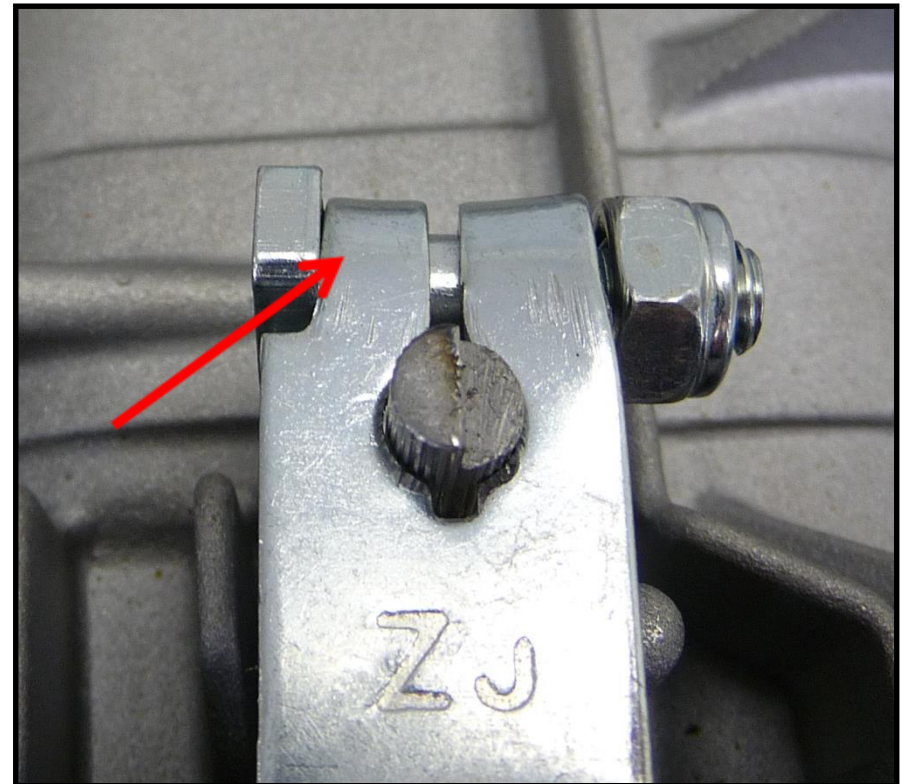
Mount Speed Control Bracket

- Install 2, 8mm screws
- Install longer screw nearest cylinder head
- Torque both to 85 lbs in.
- Position red wire eye under screw



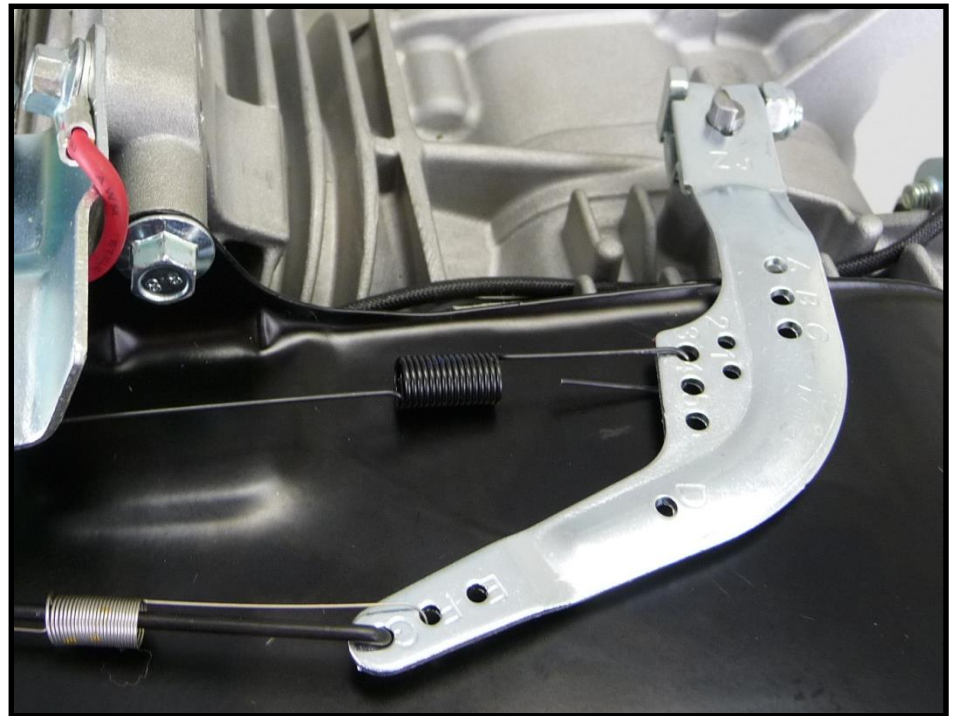
Install Governor Lever

- Back off the 10mm nut on the lever 1 to 2 turns
- Spread the slot at the end of the lever slightly
- Set the lever back on the governor shaft. Do not tighten nut



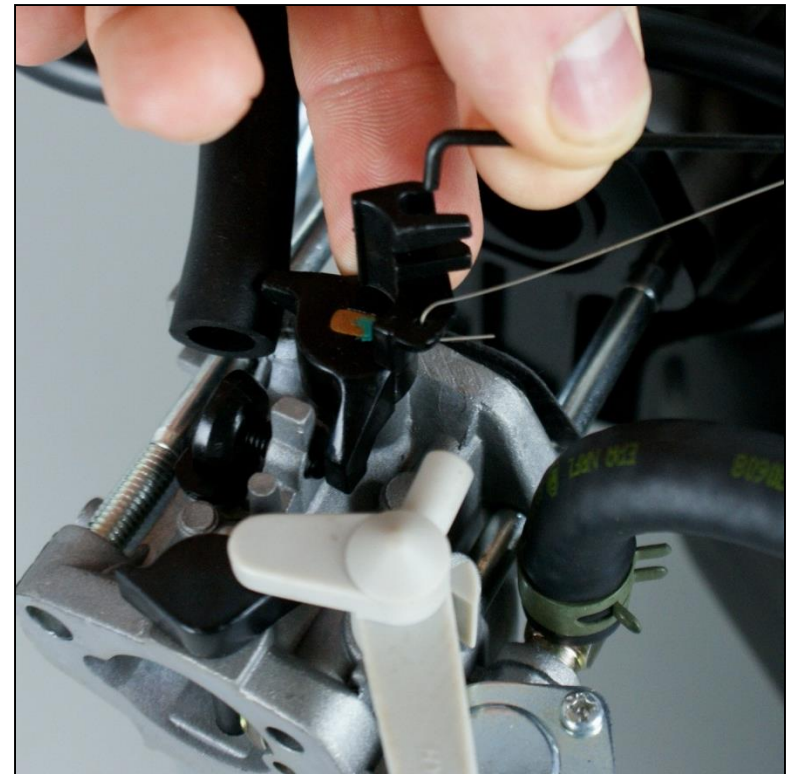
Attach Governor Springs and Link to Governor Lever

- Install governor spring, link and link spring



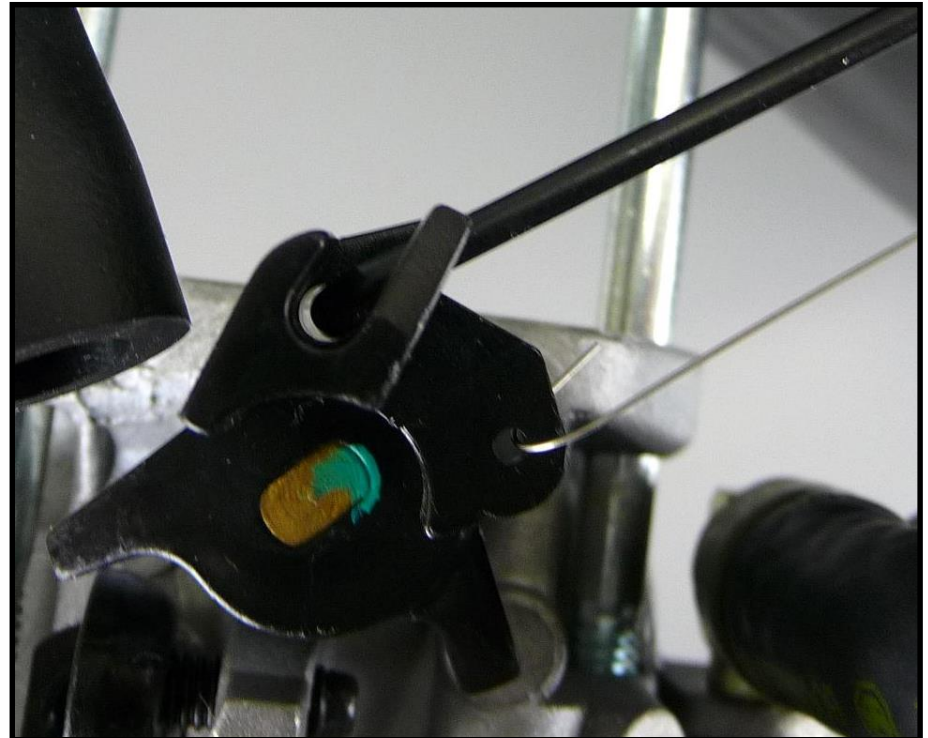
Install Carburetor

- Slide carburetor along studs until the governor link can be installed
- Check fuel line routing



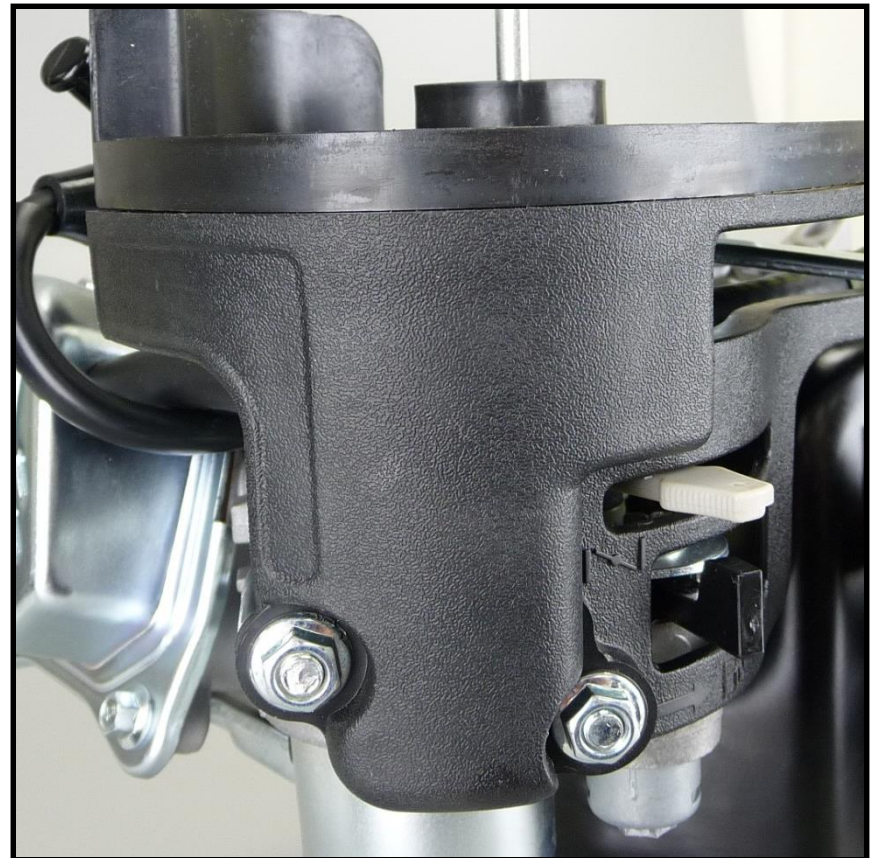
Attach Governor Link and Link Spring to Governor Lever

- Install governor link and link spring to throttle shaft at carburetor



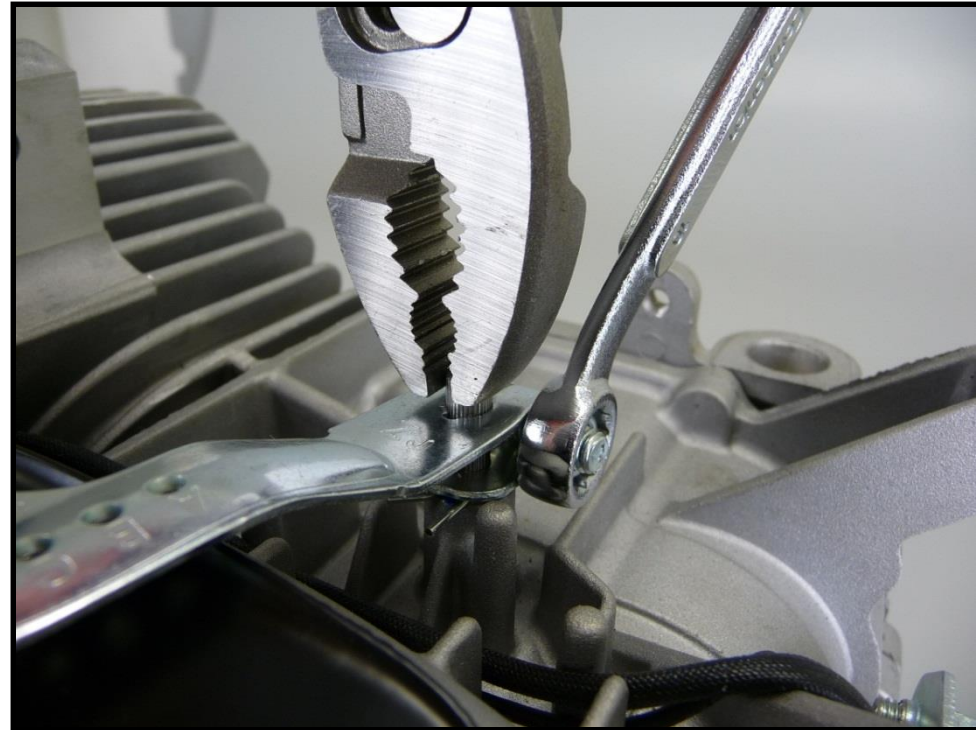
Install Air Cleaner Base

- Install gasket and air cleaner base
- Tighten nuts then screw
- Install screw – 50 lbs in.
- Install nuts – 40 lbs in.



Perform Static Governor Adjustment

- Rotate throttle plate from idle to wide open
- Watch rotation of governor lever on shaft
- Move throttle to fast
- Turn governor shaft in same direction
- Use 10mm socket
- Torque to 30 lbs in.



Install Air Cleaner Cover and Filter

- Install round rubber gasket first



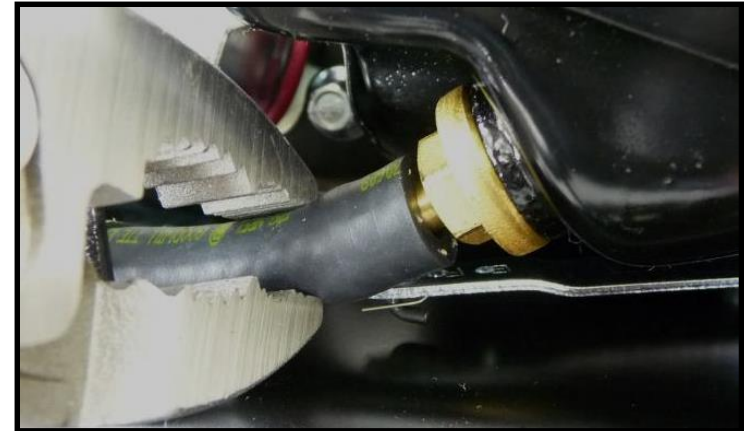
Install Fuel Tank

- Use 12mm socket for 2 nuts above low oil module
-100 lbs in.
- Use 8mm socket for screw just above sparkplug
-85 lbs in.



Connect Fuel Line

- Reinstall line to tank or carburetor
- Compress clamp and slide along line



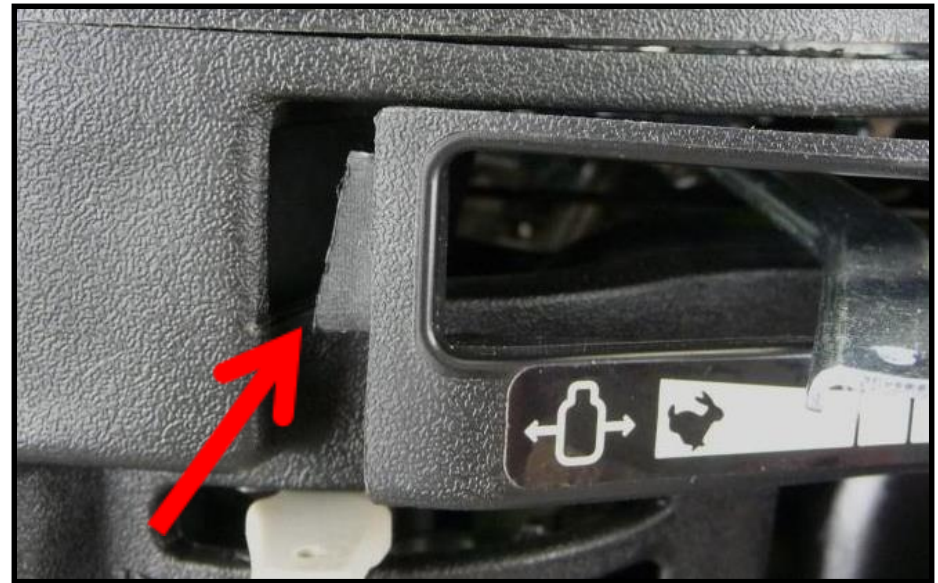
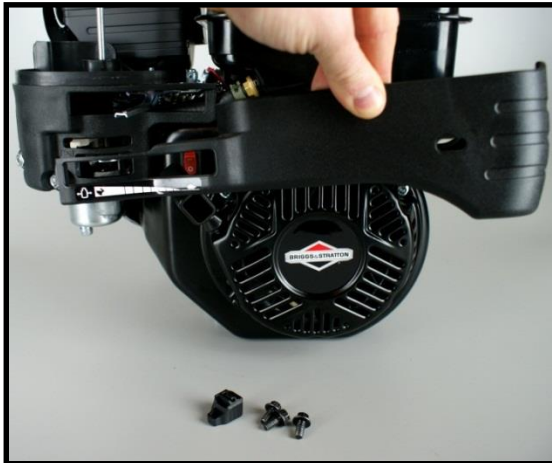
Install Muffler

- Use 13mm socket
- Torque to 95 lbs in.



Install Trim Panel

- Engage tab on left side of panel with base
- Install 3, 8mm screws -30 lbs in.



Install Knob



Success!

- Do you have any extra parts?
- Do you have any questions?

