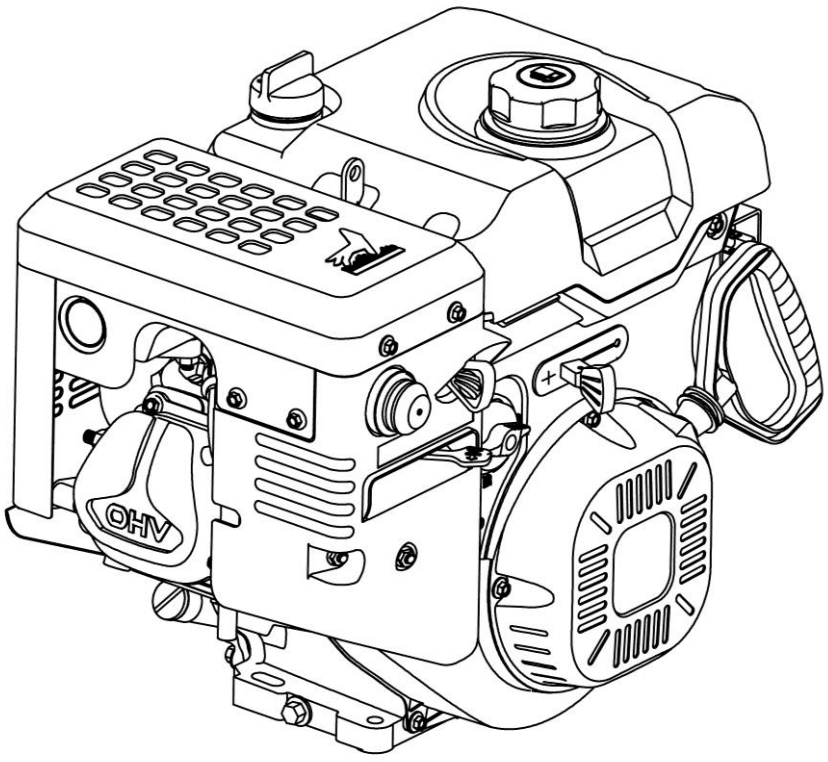
RESIDENTIAL PRODUCTS

TWO STAGE SNOW ENGINE SERVICE MANUAL

LC175FDS (265cc)

LC180FDS (302cc)



About this Manual

This service manual was written expressly for Toro service technicians. The Toro Company has made every effort to make the information in this manual complete and correct. Basic shop safety knowledge and mechanical/electrical skills are assumed. The Table of Contents lists the systems and the related topics covered in this manual. An electronic version of this service manual is available on the Toro Dealer Portal. We are hopeful that you will find this manual a valuable addition to your service shop. If you have any questions or comments regarding this manual, please contact us at the following address:

The Toro Company
Residential and Landscape Contractor Service Training Department
8111 Lyndale Avenue South
Bloomington, MN 55420

NOTES:

Chapter 1 – General Service Information

1

Safety

Safety Information

This symbol means **WARNING or PERSONAL SAFETY INSTRUCTION** – read the instruction because it has to do with your safety. Failure to comply with the instruction may result in personal injury or even death.
This manual is intended as a service and repair manual only. The safety instructions provided herein are for troubleshooting, service, and repair of the Toro engine. The Toro operator's manual contains safety information and operating tips for safe operating practices.

Avoid Unexpected Engine Start - Turn off engine and disconnect the spark plug before servicing engine.

Avoid Lacerations and Amputations - Stay clear of all moving parts while the engine is running.

Avoid Burns - Do not touch the engine, muffler, or other components which may increase in temperature during operation, while the unit is running or shortly after it has been running.

Avoid Fires and Explosions - Avoid spilling fuel and never smoke while working with any type of fuel or lubricant. Wipe up any spilled fuel or oil immediately. Never remove the fuel cap or add fuel when the engine is running. Always use approved, labeled containers for storing or transporting fuel and lubricants.

Avoid Asphyxiation - Never operate an engine in a confined area without proper ventilation.

Avoid Injury From Batteries - Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes, and clothing. Battery gases can explode. Keep cigarettes, sparks, and flames away from batteries.

Avoid Injury Due To Inferior Parts - Use only original equipment parts to ensure that important safety criteria are met.

Avoid Injury To Bystanders - Always clear the area of bystanders before starting or testing power equipment.

Avoid Injury Due To Projectiles - Always clear the area of sticks, rocks, or any other debris that could be picked up and thrown by the power equipment.

Avoid Modifications - Never alter or modify any part unless it is a factory approved procedure.

Service Rules

1. **Only use genuine Toro parts and lubrication products.**

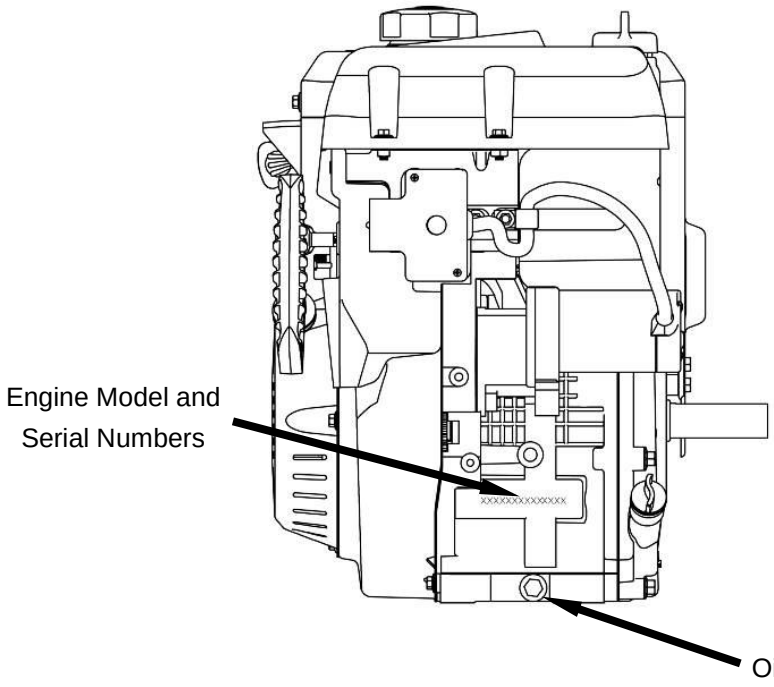
2. **Always install new gaskets, O-rings and seals when assembling engine.**

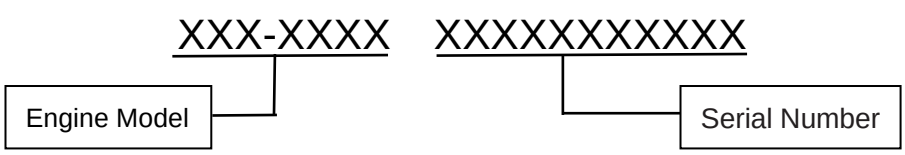
3. **Always torque fasteners to specification and in sequence.**

4. **Always lubricate friction components with clean engine oil or engine assembly lube when assembling engine.**

Engine Model / Serial Number Location

The engine model and serial number are stamped into the crankcase, above the oil drain.





Engine Fastener Torque Specifications

Item	Fastener Size	Torque Specification
Cylinder Head Bolts	M10	35 ft-lbs (48 Nm)
Connecting Rod Bolts	M8	14 ft-lbs (19Nm)
Flywheel Nut	M16	80 ft-lbs (109 Nm)
Valve Adjust Lock Nut	M6	11 ft-lbs (15 Nm)
Rocker Arm Studs	M8	22 ft-lbs (30 Nm)
Crankcase Cover Bolts	M8	22 ft-lbs (30 Nm)
Exhaust Studs	M8	6 ft-lbs (8 Nm)
Exhaust Pipe Nuts	M8	22 ft-lbs (30 Nm)
Air Cleaner Nuts	M6	7.5 ft-lbs (10 Nm)
Oil Drain Plug	M10	17 ft-lbs (23 Nm)
Oil Drain Tube	M12	22 ft-lbs (30 Nm)
Fuel Shut-off Knob Screws	M4	18 in-lbs (2 Nm)
Switch box screw	M4	12 in-lbs (1.5 Nm)
Valve Cover Bolts	M6	7 ft-lbs (10 Nm)
Start Motor Mounting Bolts	M8	19 ft-lbs (26 Nm)
Spark Plug	-	22 ft-lbs (30 Nm)
Fuel Drain Screw	M6	7.5 ft-lbs (10 Nm)
Standard Torque Values	M5 Bolt / Nut	4.5 ft-lbs (6 Nm)
	M6 Bolt / Nut	7.5 ft-lbs (10 Nm)
	M8 Bolt / Nut	19 ft-lbs (26 Nm)
	M10 Bolt / Nut	28 ft-lbs (38 Nm)
	M12 Bolt / Nut	41 ft-lbs (55 Nm)

General Specifications

1

MODEL	265cc / LC175FDS	302cc / LC180FDS
Engine Type	OHV Single Cylinder, Four Stroke, Forced Air Cooling	
Displacement (cc)	265	302
Bore × Stroke (mm)	75×60	80×60
Compression Ratio	8.2:1	8.9:1
Dry Weight	66.1 lbs. (30Kg)	70.5 lbs. (32Kg)
Engine Idle RPM	1700 - 2000 RPM	
Engine Operating RPM	3200 – 3400 RPM	
Oil Capacity	30 - 32 oz. (0.89 - 0.95 l)	
Fuel Type	Unleaded Gasoline, 87 Octane	
Fuel Capacity	1.05 Gallons (4l)	
Engine Rotation	Counter-clockwise (from P.T.O. side)	
Ignition System	T.C.I Transistorized Magneto	
Lubrication System	Splash	
Starting System	Recoil and Electric	
Cylinder	Aluminum with Cast Iron Bore	

Engine Specifications - 265cc / 175FDS

Part	Item	Standard	Service Limit
Cylinder	Sleeve Inside Diameter	2.953 - 2.954” (75.015-75.025 mm)	2.959” (75.17 mm)
Piston	Skirt Outside Diameter	2.951 - 2.952” (74.970-74.980 mm)	2.939” (74.65 mm)
	Clearance to Cylinder	0.00059 - 0.002” (0.015-0.052 mm)	0.0047” (0.12 mm)
	Piston Pin Bore Inside Diameter	0.7087 - 0.7089” (18.002-18.008 mm)	0.7103” (18.042 mm)
	Piston Pin Clearance	0.000078 - 0.00055” (0.002-0.014mm)	0.0031” (0.08 mm)
Piston Pin	Outside Diameter	0.7083 - 0.7085” (17.992-17.998 mm)	0.7067” (17.95 mm)
Piston Rings	Ring To Groove (Top and Middle)	0.00059 - 0.00177” (0.015-0.045 mm)	0.0059” (0.15 mm)
	End Gap (Top and Middle)	0.0079 - 0.0157” (0.2-0.4 mm)	0.0394”(1.0 mm)
	End Gap (Oil Ring)	0.0079 - 0.0275” (0.2-0.7 mm)	0.0394” (1.0 mm)
	Width (Top and Middle)	0.077 - 0.078” (1.97-1.99 mm)	0.069” (1.75 mm)
Connecting Rod	Small End Inside Diameter	0.7088 - 0.7093” (18.006-18.017 mm)	0.7114” (18.07 mm)
	Big End Inside Diameter	1.3 - 1.3003” (33.02-33.03 mm)	1.3019” (33.07 mm)
	Big End Oil Clearance	0.00157 - 0.00259” (0.04-0.066 mm)	0.00472” (0.12 mm)
	Big End Side Clearance	0.0039 - 0.0275” (0.1-0.7 mm)	0.0394” (1.0 mm)
Crankshaft	Crankpin Outside Diameter	1.2979” - 1.2984” (32.966-32.981 mm)	1.296” (32.92 mm)
Valves	Clearance (cold) (intake)	0.0059” (0.15 mm)	—
	Clearance (cold) (exhaust)	0.0078” (0.20 mm)	—
	Stem Diameter (intake)	0.258 - 0.259” (6.565-6.580 mm)	0.2535” (6.44 mm)
	Stem Diameter (exhaust)	0.2576 - 0.2582” (6.545-6.560 mm)	0.252” (6.40 mm)
Valve Guides	Inside Diameter (intake, exhaust)	0.2598 - 0.2604” (6.60-6.615 mm)	0.2624” (6.66 mm)
	Stem to Guide Clearance (intake)	0.00039 - 0.00145” (0.01-0.037 mm)	0.000393” (0.10 mm)
	Stem to Guide Clearance (exhaust)	0.00197 - 0.00303” (0.05-0.077 mm)	0.0047” (0.12 mm)
Valve Seats	Seat Width	0.0315 - 0.0394” (0.8-1.0 mm)	0.0787” (2.0 mm)
Valve Springs	Free Length	1.535” (39 mm)	1.476” (37.5 mm)
Camshaft	Height (intake)	1.2455 - 1.2501” (31.636-31.754 mm)	1.234” (31.35 mm)
	Height (exhaust)	1.2470 - 1.2533” (31.674 -31.834 mm)	1.2342” (31.35 mm)
	Outside Diameter (bearing)	0.6285 - 0.6292” (15.966-15.984 mm)	0.6267” (15.92 mm)
Crankcase Cover	Camshaft Hole Diameter	0.6299 - 0.6306” (16.0-16.018 mm)	0.6318” (16.05 mm)
Spark Plug	Gap	0.0275 - 0.0314” (0.7-0.8 mm)	—
Stator (12V-37.5W)	Resistance	0.21-0.31Ω	—
Ignition Coil	Resistance (primary)	1.0-1.6Ω	—
	Resistance (secondary)	10.5 KΩ +/- 15%	—
	Gap to Flywheel	0.011- 0.019” (.3-.5 mm)	—
Carburetor	Float Height	0.539” (13.7mm)	

Engine Specifications - 302cc / 180FDS

1

Part	Item	Standard	Service Limit
Cylinder	Sleeve Inside Diameter	3.4651 - 3.4655” (80.015-80.025 mm)	3.4712” (80.17 mm)
Piston	Skirt Outside Diameter	3.1484 - 3.1488” (79.97-79.98 mm)	3.1437” (79.85 mm)
	Clearance to Cylinder	0.00059 - 0.002” (0.015-0.052 mm)	0.0047” (0.12 mm)
	Piston Pin Bore Inside Diameter	0.7087 - 0.7089” (18.002-18.008 mm)	0.7103” (18.042 mm)
	Piston Pin Clearance	0.000078 - 0.00055” (0.002-0.014mm)	0.0031” (0.08 mm)
Piston Pin	Outside Diameter	0.7083 - 0.7085” (17.992-17.998 mm)	0.7067” (17.95 mm)
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	End Gap (Oil Ring)	0.0079 - 0.0275” (0.2-0.7 mm)	0.0394” (1.0 mm)
	Width (Top and Middle)	0.077 - 0.078” (1.97-1.99 mm)	0.069” (1.75 mm)
Connecting Rod	Small End Inside Diameter	0.7088 - 0.7093” (18.006-18.017 mm)	0.7114” (18.07 mm)
	Big End Inside Diameter	1.3 - 1.3003” (33.02-33.03 mm)	1.3019” (33.07 mm)
	Big End Oil Clearance	0.00157 - 0.00259” (0.04-0.066 mm)	0.00472” (0.12 mm)
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	Stem to Guide Clearance (intake)	0.00039 - 0.00145” (0.01-0.037 mm)	0.000393” (0.10 mm)
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Valve Seats	Seat Width	0.0315 - 0.0394” (0.8-1.0 mm)	0.0787” (2.0 mm)
Valve Springs	Free Length	1.535” (39 mm)	1.476” (37.5 mm)
Camshaft	Height (intake)	1.257 - 1.264” (31.953-32.113 mm)	1.244” (31.60 mm)
	Height (exhaust)	1.246 - 1.253” (31.66 -31.82 mm)	1.232” (31.30 mm)
	Outside Diameter (bearing)	0.6285 - 0.6292” (15.966-15.984 mm)	0.6267” (15.92 mm)
Crankcase Cover	Camshaft Hole Diameter	0.6299 - 0.6306” (16.0-16.018 mm)	0.6318” (16.05 mm)
Spark Plug	Gap	0.0275 - 0.0314” (0.7-0.8 mm)	—
Stator (12V-37.5W)	Resistance	0.21-0.31Ω	—
Ignition Coils	resistance (primary)	1.0-1.6Ω	—
	resistance (secondary)	10.5 KΩ +/- 15%	—
	gap to flywheel	0.011- 0.019” (.3-.5 mm)	—
Carburetor	Float Height	0.539” (13.7mm)	

Troubleshooting

Hard Starting / Poor Running

- Incorrect Fuel (Level, Age, Octane, Ethanol Content)
- Fuel System Contamination and / or Carburetor Debris
- Primer System Incorrect Function
- Incorrect Oil Level
- Spark Plug (Incorrect Gap, Fouled, Loose or Faulty)
- Air Intake Restriction
- Air Intake System Leaks
- Ignition Coil to Flywheel Gap Incorrect
- Weak / No Spark
- Choke / Linkage
- Operating RPM Incorrect
- Governor Adjustment Incorrect
- Engine Valve Clearance out of Specification
- Low Compression or Excessive Leakdown

Overheating

- Incorrect Oil Level
- Cylinder Head Gasket Leak
- Debris Build-Up Restricting Air Flow

Chapter 2 - Engine Service / Maintenance

2

Engine Oil Change Procedure

1. Run engine to warm engine oil.
2. Remove the ignition key.
3. Remove oil dipstick.
4. Position oil drain pan under oil drain plug.
5. Firmly hold the oil drain tube (A) in position. Remove the oil drain plug (B).
6. Completely drain the engine oil.
7. Firmly hold the oil drain tube (A) in position. Install the oil drain plug (B) - torque to **17 ft-lbs (23 Nm).**
8. Add oil through the dipstick tube. Wipe the dipstick clean and fully insert it into the dipstick tube.
9. Remove the dipstick and check the oil level – Add oil if needed until the proper oil level is reached

NOTE: DO NOT overfill the engine oil

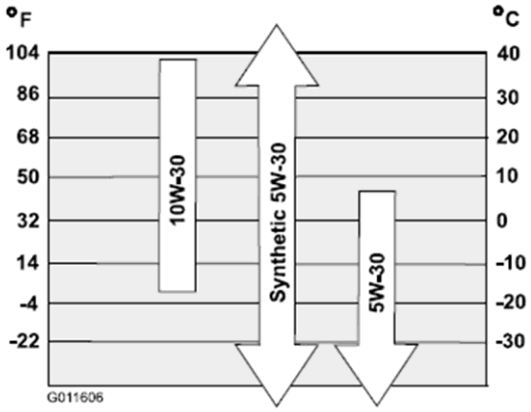
10. Fully install the dipstick.
11. Properly dispose of the used engine oil.

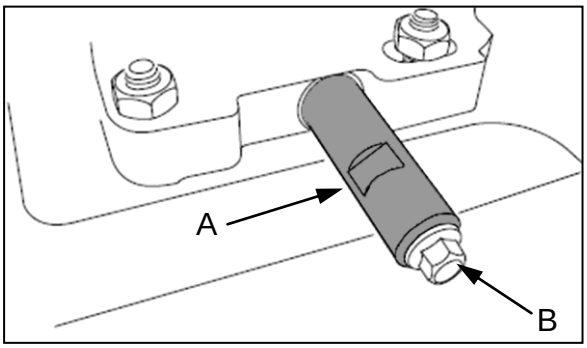
Engine Oil Capacity:

30 to 32 oz. (0.89 to 0.95 l)

Engine Oil Type:

API classification of SF,SG, SH, SJ, SL, or higher.





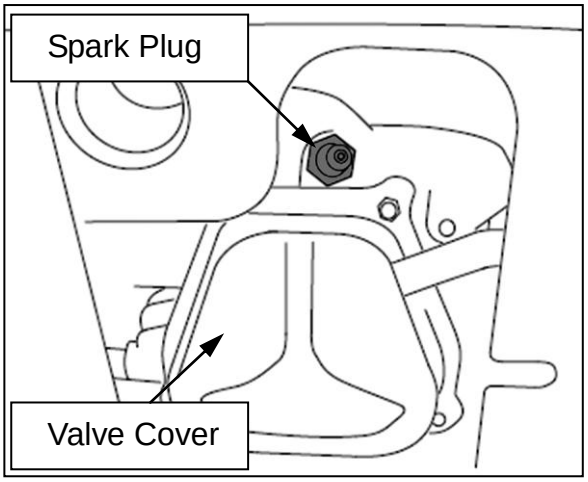
Spark Plug Service

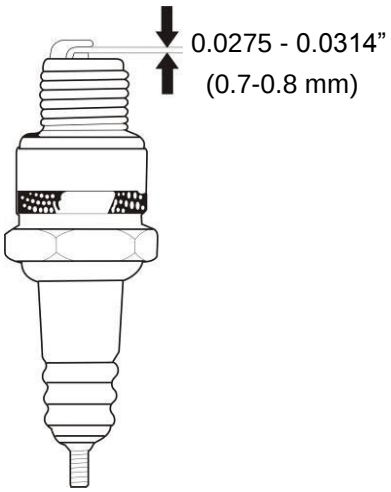
2

NOTE: Spark plugs of the wrong size or incorrect heat range can cause severe engine damage.

High Voltage Ignition Systems can be Dangerous - Use Caution when Servicing Ignition Systems

1. Disconnect the spark plug boot and thoroughly clean the spark plug area.
2. Remove the spark plug from the engine.
3. Inspect the spark plug for excessively worn electrodes, chips or cracks in the insulator, or excessive deposits.
4. Measure the electrode gap and adjust if necessary. **Spark Plug Gap: 0.0275 - 0.0314" (0.7-0.8 mm)**
5. Install spark plug and torque to specification - **22 ft-lbs (30 Nm).**
6. Fully install the spark plug boot on the plug.





Valve Clearance Inspection and Adjustment

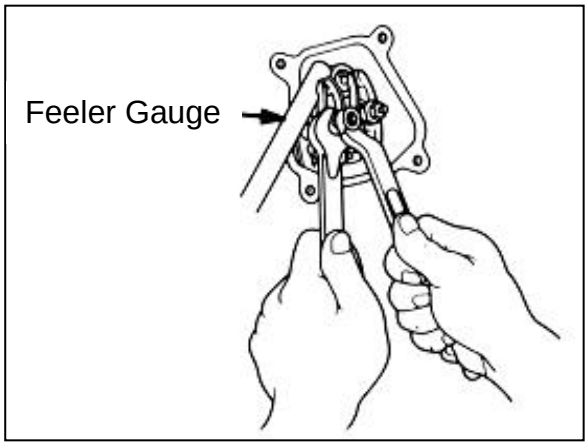
NOTE: Valve clearance inspection and adjustment must be done with the engine cold.

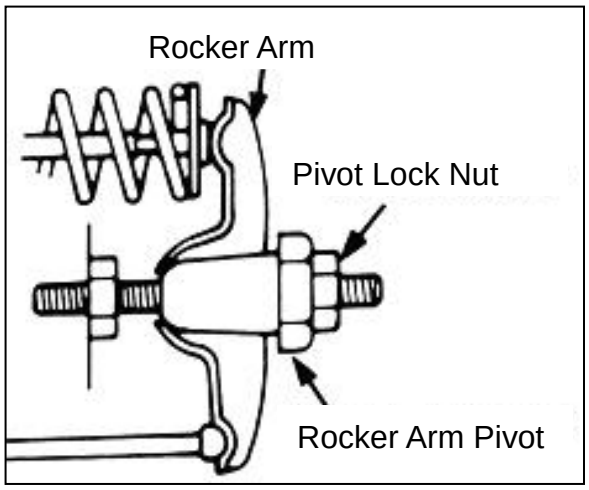
1. Rotate engine to TDC (top-dead-center) of the compression stroke.
2. Remove the valve cover. Be sure both valves are completely closed and the decompression arm is not holding the valve open.
3. Measure the clearance between the rocker arm and the valve stem with a feeler gauge.

   Intake: 0.0059" (0.15 mm)

   Exhaust: 0.0078" (0.20 mm)

4. To adjust valve clearance:
   - Hold the rocker arm pivot and loosen the pivot lock nut.
   - Turn the rocker arm pivot to obtain the specified clearance.
   - Hold the rocker arm pivot and tighten the pivot lock nut to specification - **11 ft-lbs (15 Nm).**
5. Recheck the clearance and readjust if necessary.
6. Inspect the valve cover gasket and replace if necessary. Install the cylinder head cover and torque fasteners to specification - **7.5 ft-lbs (10 Nm).**



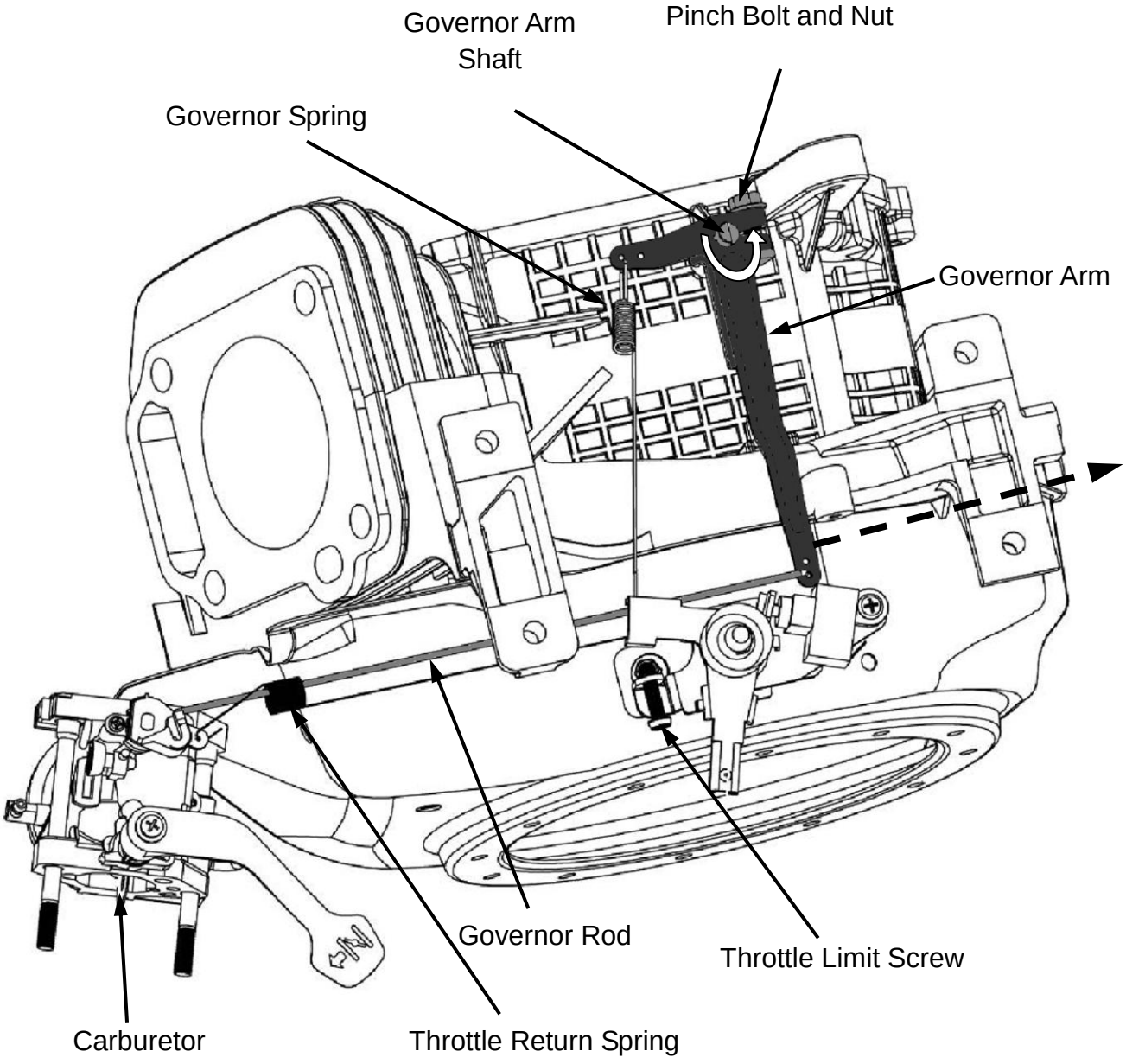


Engine Governor – Zero Point Setting

2

1. Remove the front and rear panel to gain access to the governor arm and throttle limit screw.
2. Loosen but do not remove the governor arm pinch bolt and nut.
3. Move the governor arm away the carburetor to fully open the throttle valve. Firmly hold the governor arm in this position.
4. Rotate the governor arm shaft fully counterclockwise and secure it in this position with a pair of pliers.
5. Tighten the governor arm pinch bolt and nut to Specification - **7.5 ft-lbs (10 Nm).**
6. Start and warm engine.
7. Run Engine at MAX RPM. Adjust throttle limit screw until MAX engine speed is set to **3200 – 3400 RPM.**
8. Verify engine idle speed is **1700 - 2000 RPM** and adjust if necessary.
9. Verify that the governor arm and throttle valve move freely.

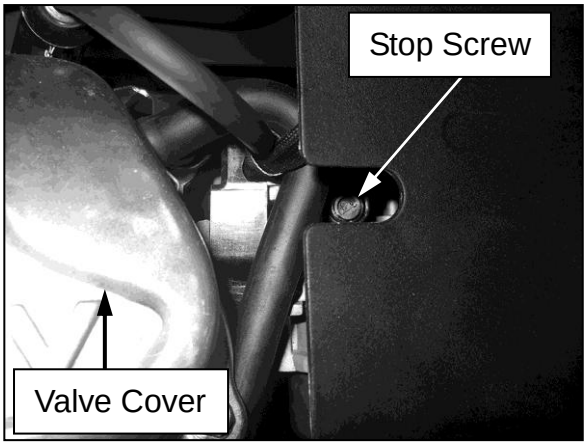
NOTE: The Illustration below has additional parts removed to show governor linkage detail.



Engine Idle Speed

1. Start the engine and allow it to warm to normal operating temperature.
2. With the engine at low idle, just before the kill switch is activated, adjust the throttle stop screw to achieve the recommended engine idle speed.

   Recommended Idle Speed: 1700 - 2000 RPM



Fuel Filter and Hose Replacement

2

- **Fuel is Extremely Flammable** - Use Extreme Caution When Servicing Fuel System

1. Drain the fuel tank into an approved container.

   NOTE: Ensure fuel system contains no fuel to prevent leak when the fuel filter is replaced.

2. Release the fuel filter / fuel hose clamps (A) and slide them away from the fittings.

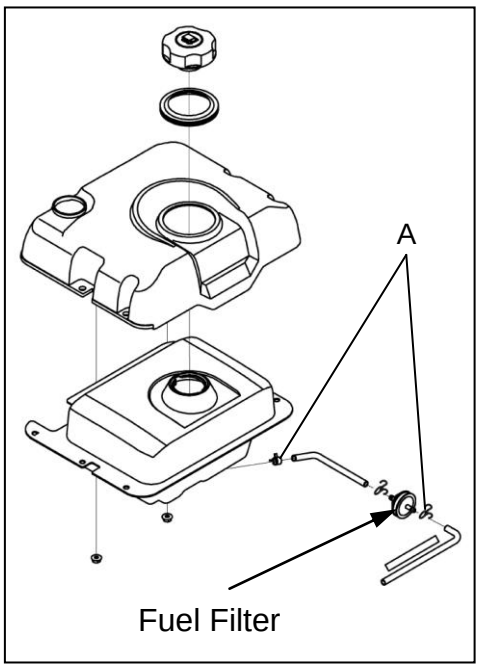
3. Remove the fuel filter / hose asm. from the engine.

4. Properly install new fuel filter / hose asm. and clamps (A).

5. Re-fill tank with fresh fuel.

6. Verify hose routing and check for leaks.

7. Properly dispose of any unused fuel.



Fuel Filter

NOTES:

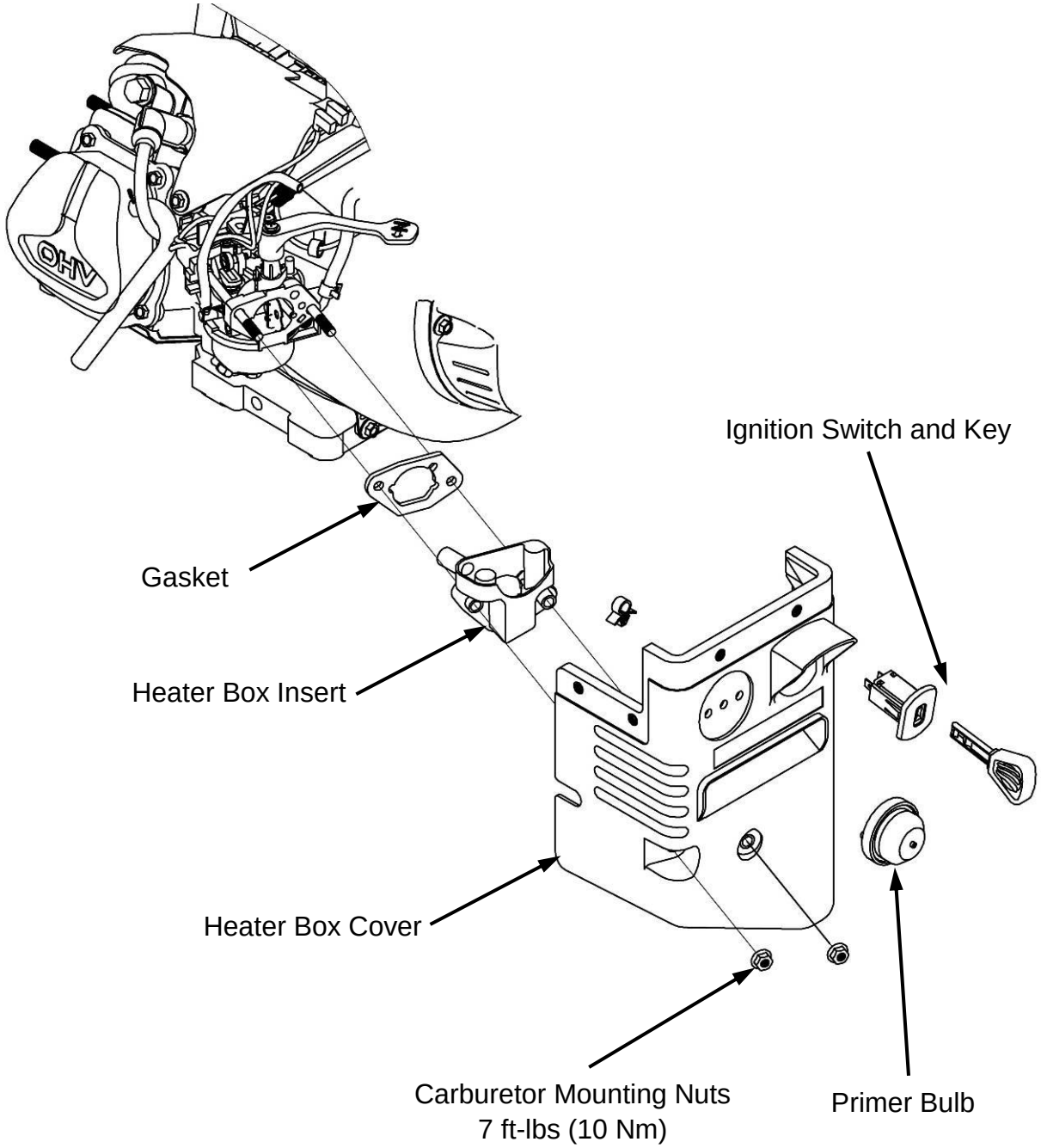
Chapter 3 - Engine Disassembly and Service 3

Engine Service – Upper End 18-31

Engine Service – Lower End 32-40

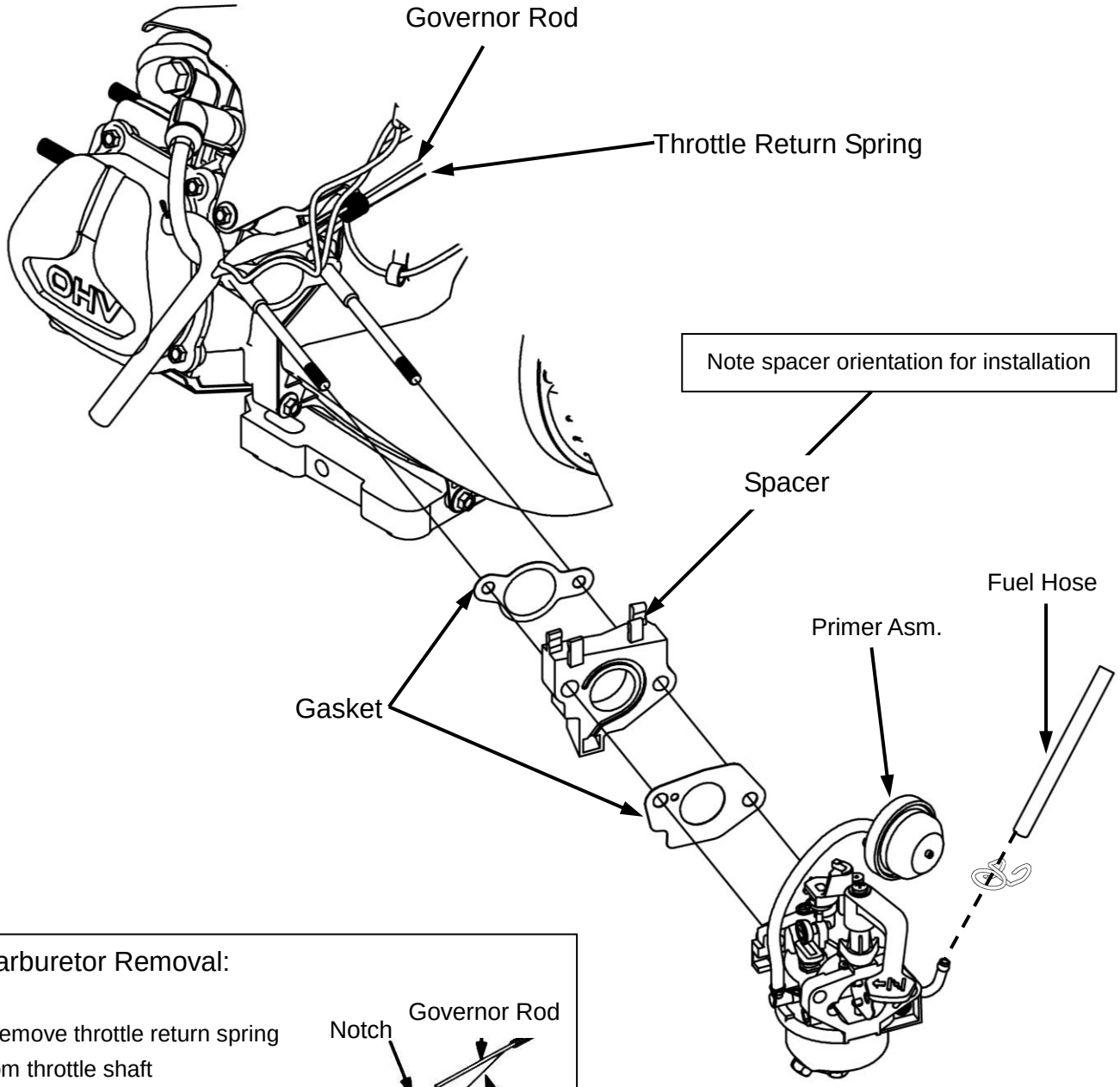
Engine Service – Upper End

Heater Box Exploded View



Carburetor Mounting

3



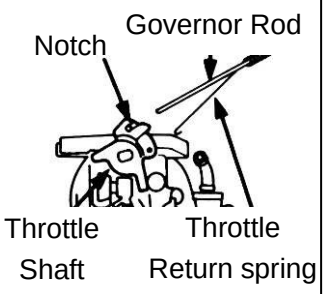
Carburetor Removal:

-Remove throttle return spring from throttle shaft

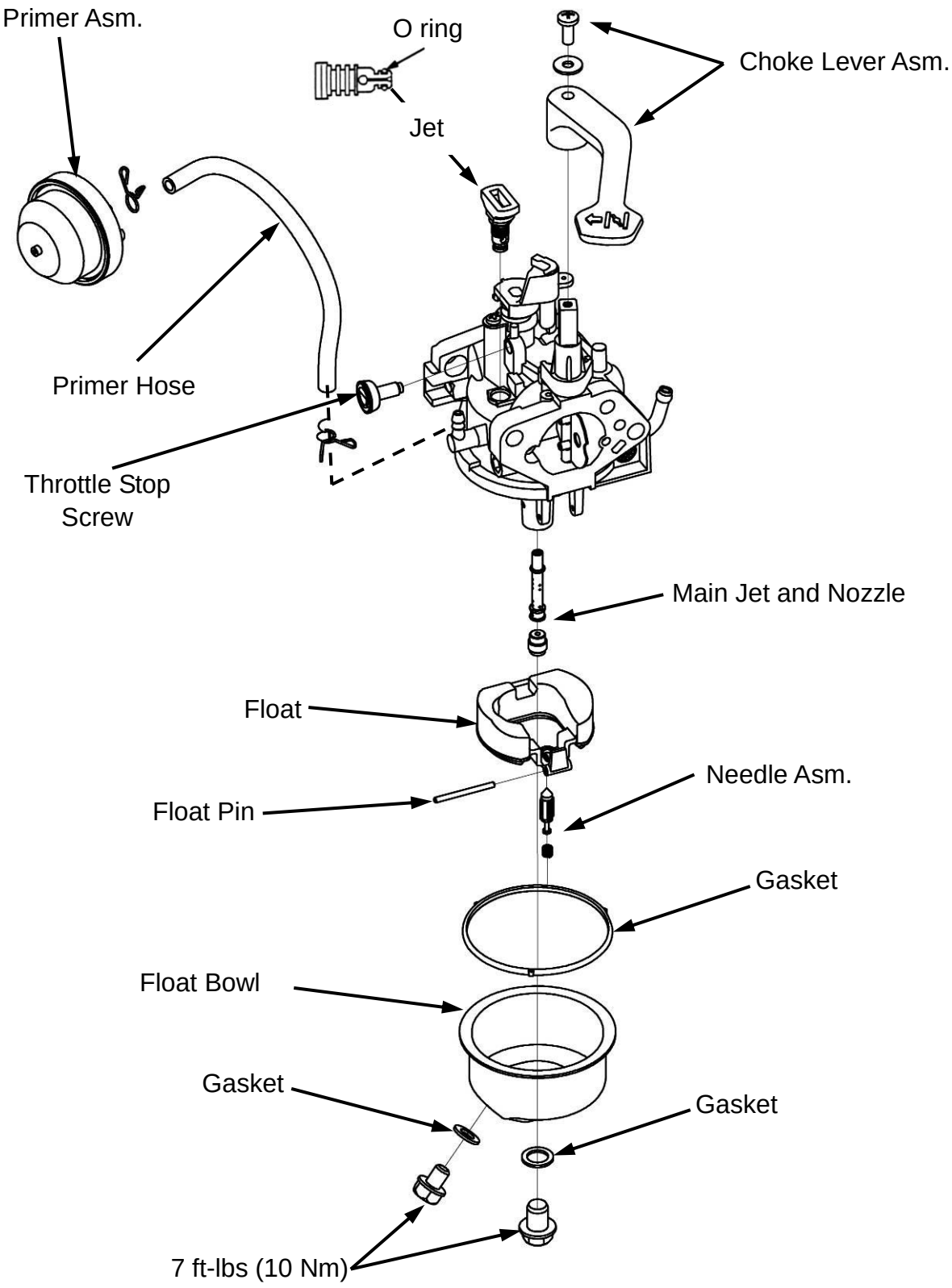
-Pull Carburetor outward

-Align governor rod with notch in throttle shaft

-Remove governor rod and remove carburetor

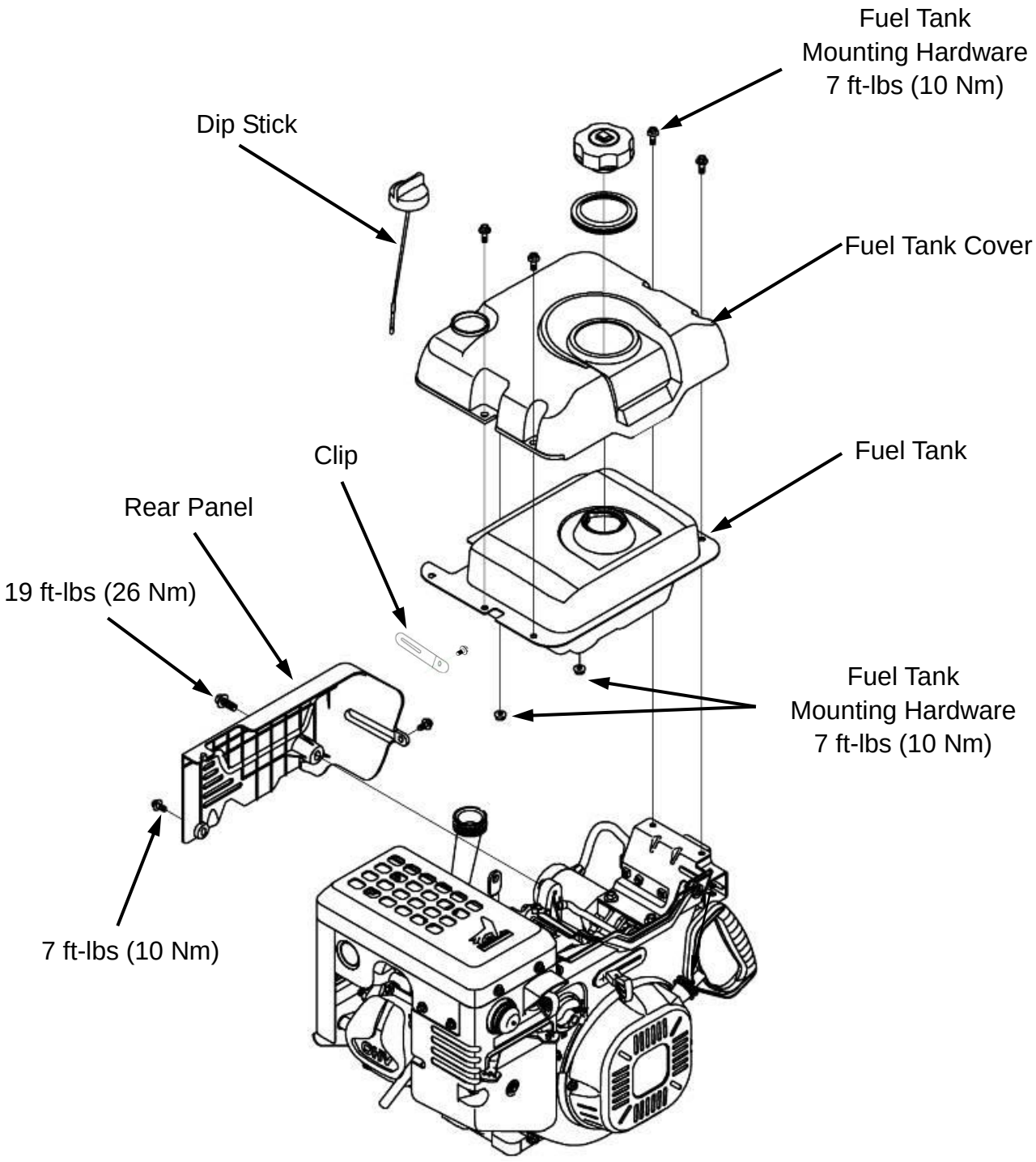


Carburetor Exploded View

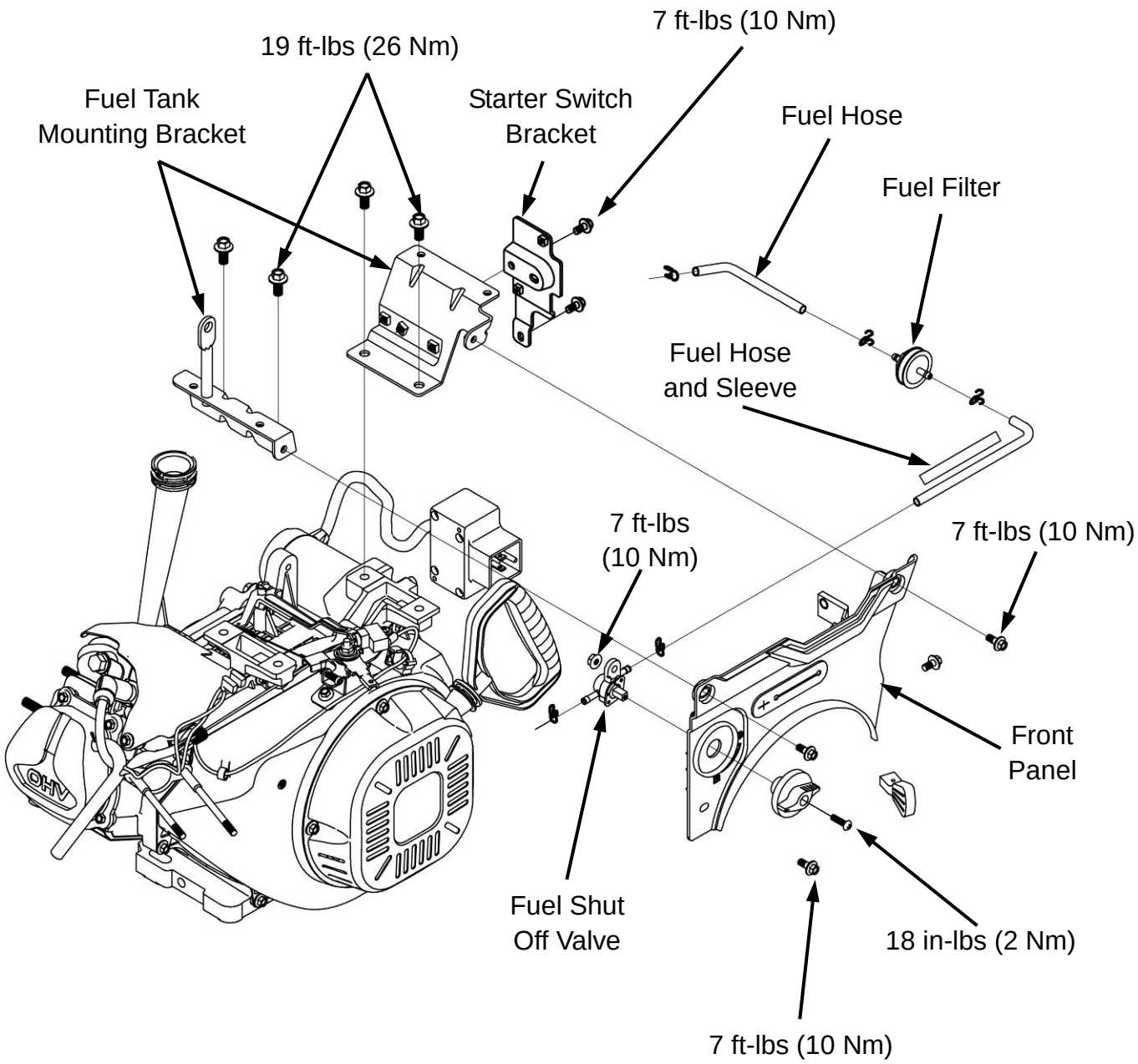


Fuel Tank / Engine Cover / Rear Panel Exploded View

3

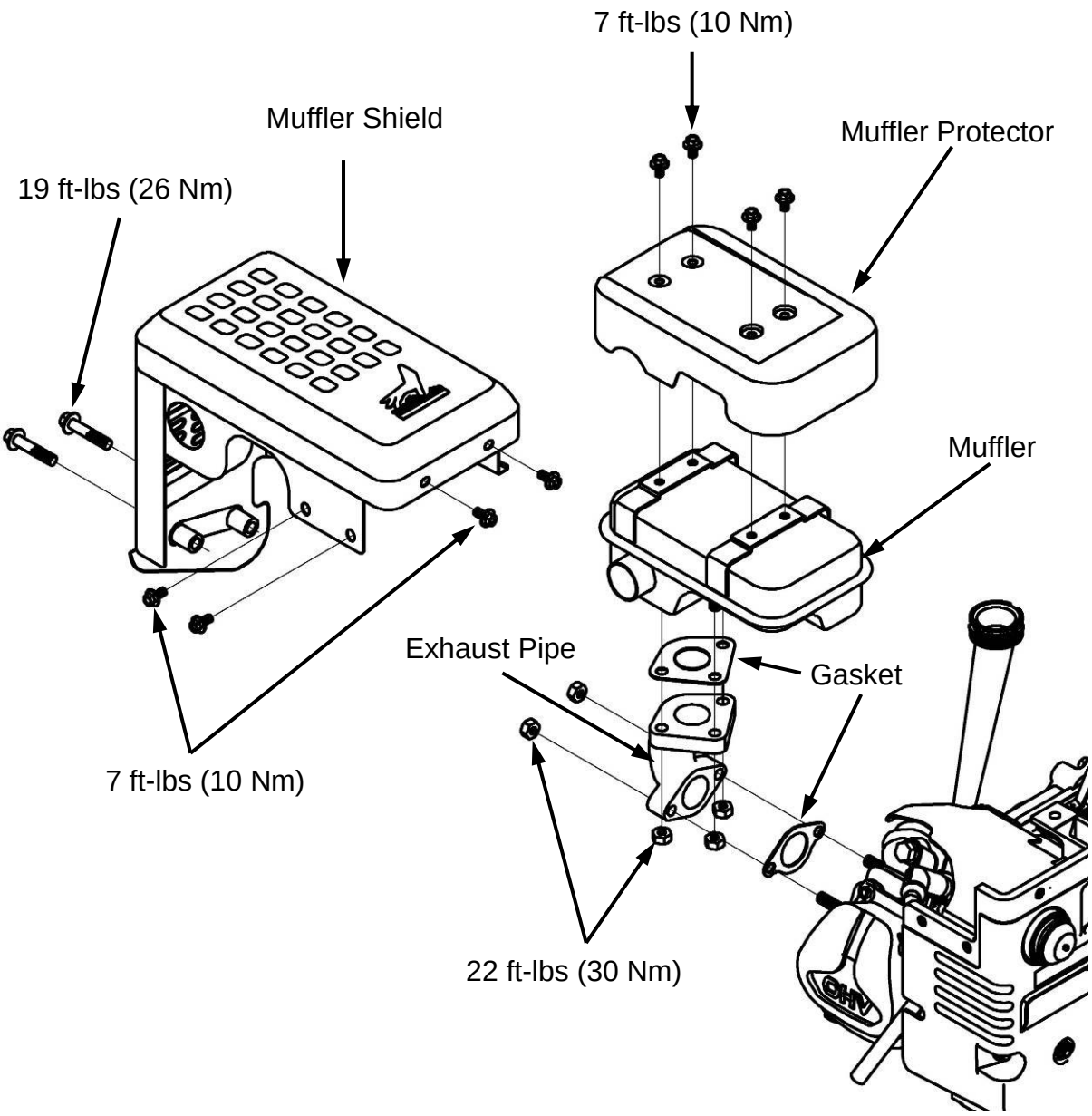


Engine Cover / Front Panel / Fuel Tank / Fuel Hose Exploded View

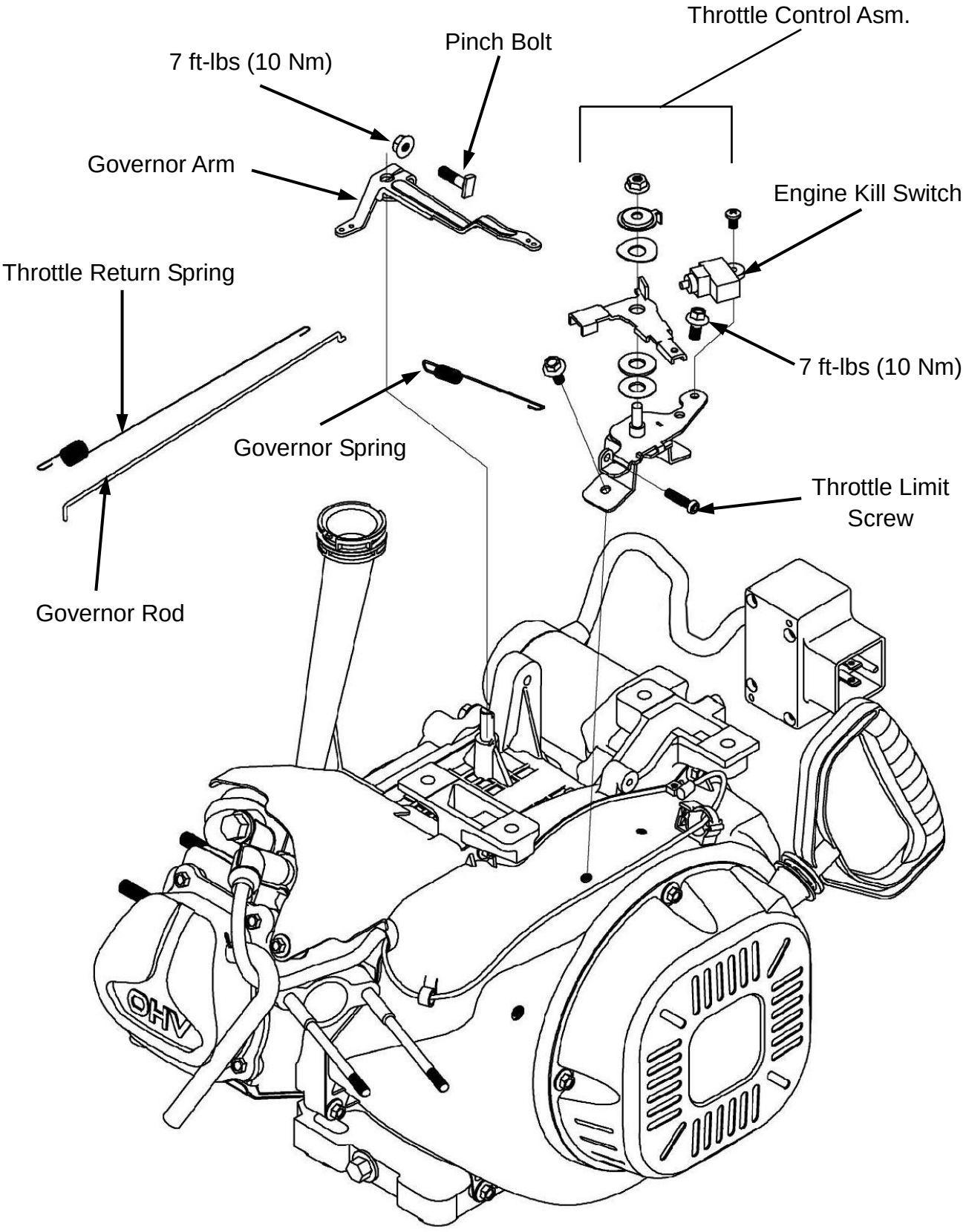


Muffler / Heat Shield Exploded View

3

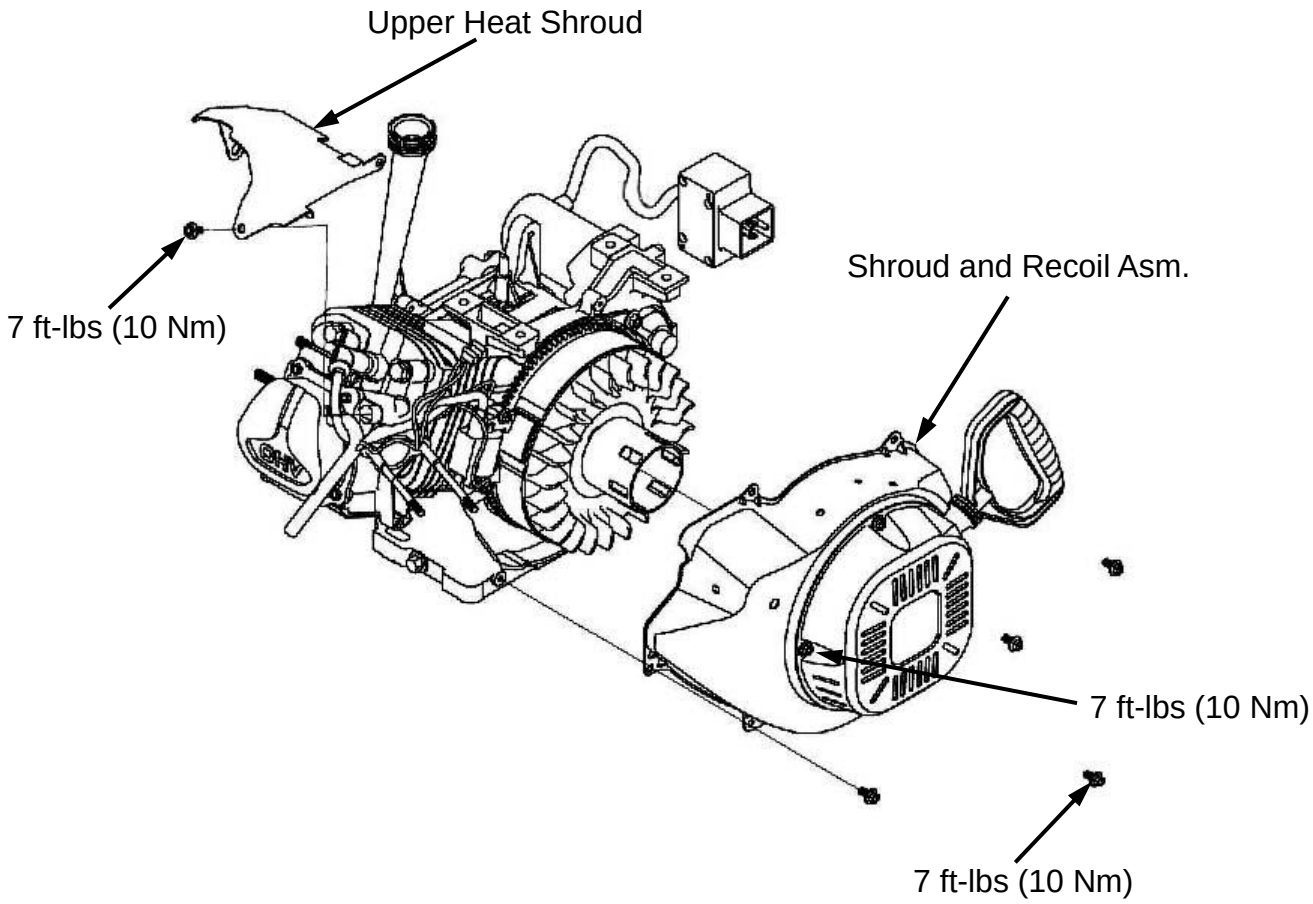


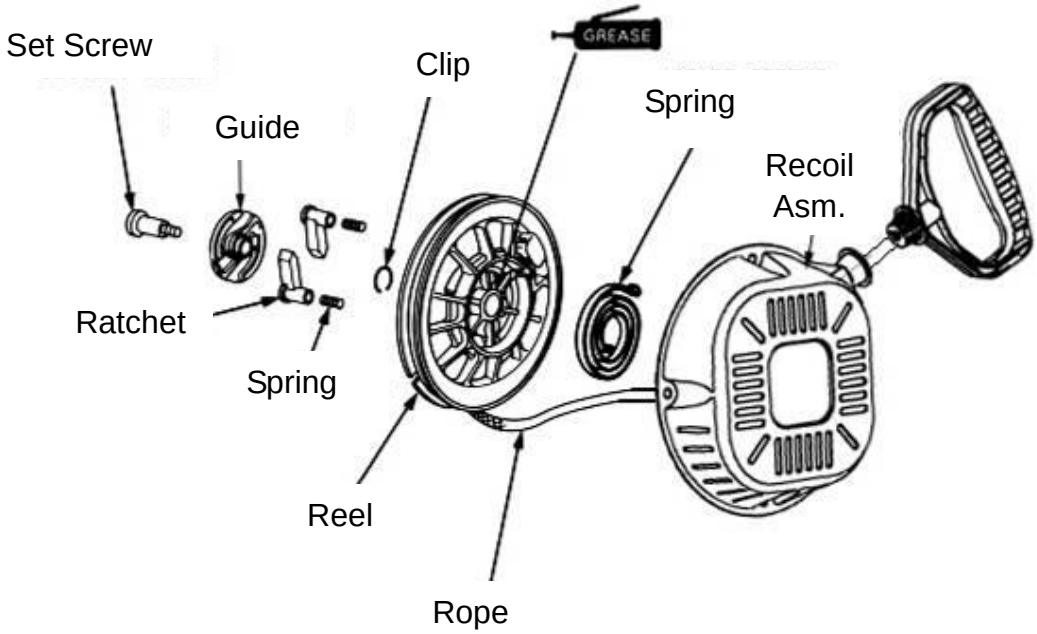
Governor and Throttle Control Asm. Exploded View



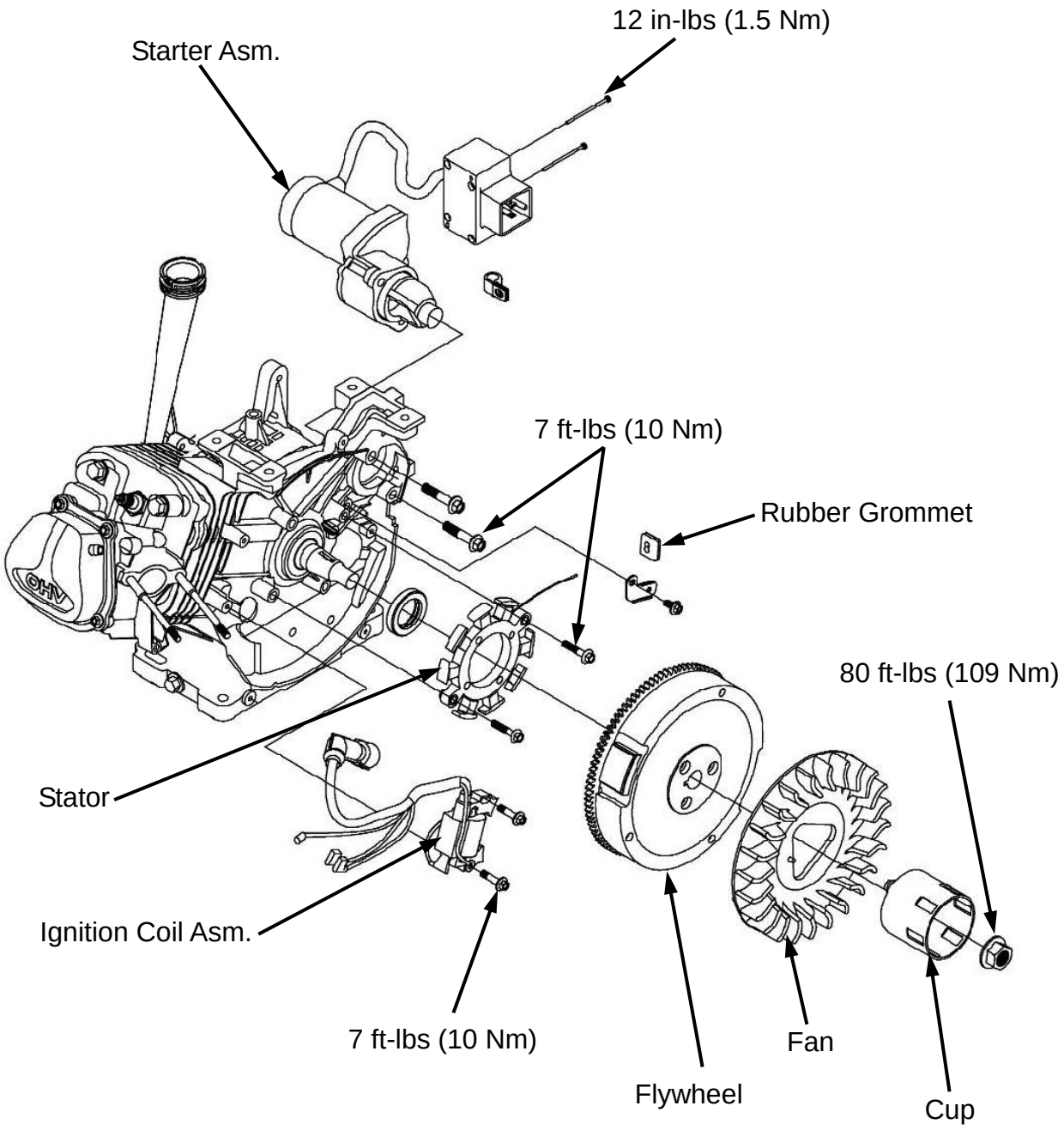
Recoil Asm. Exploded View

3



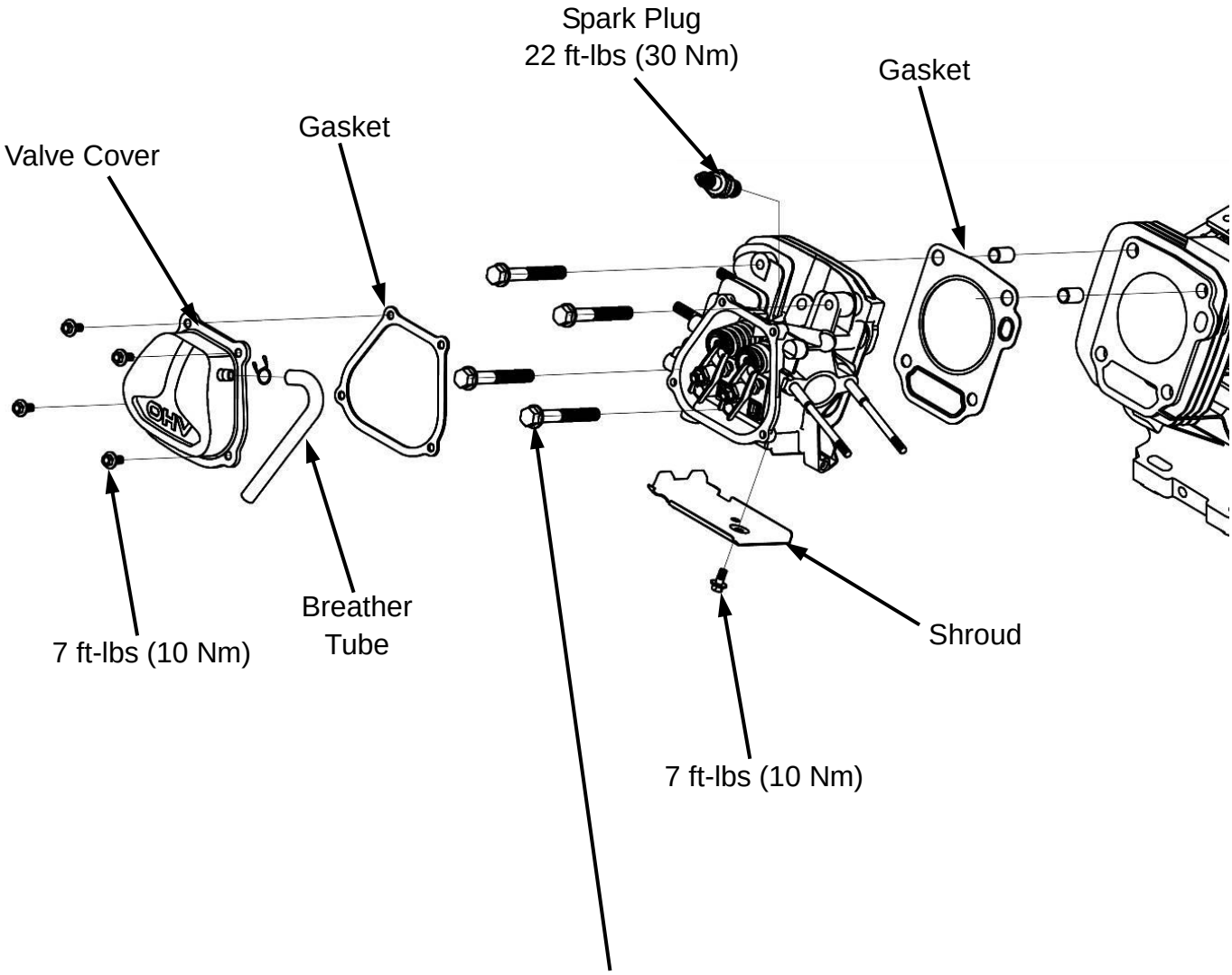


Starter / Flywheel / Coil Exploded View



Cylinder Head Exploded View and Service Information

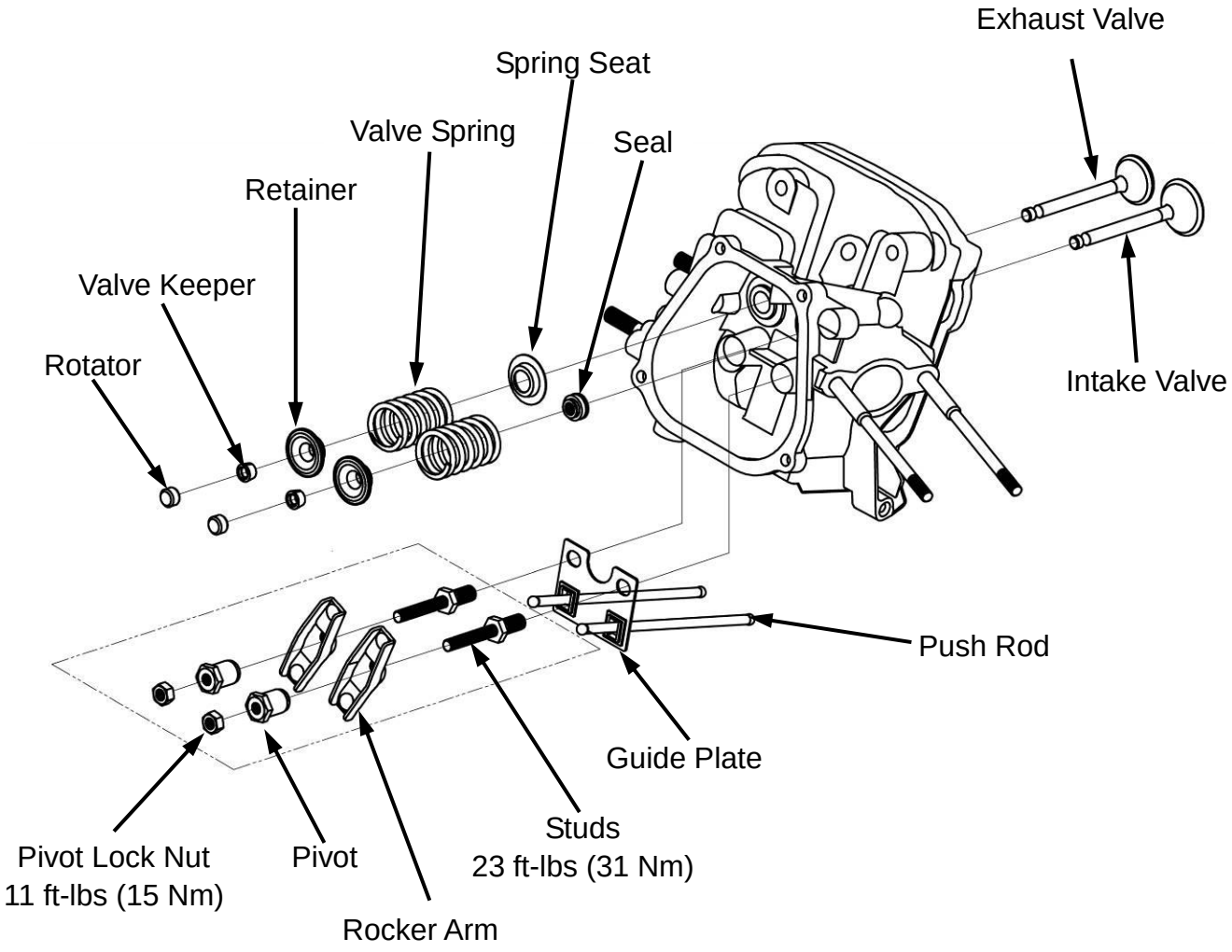
3



Cylinder Head Bolt Torque Sequence:

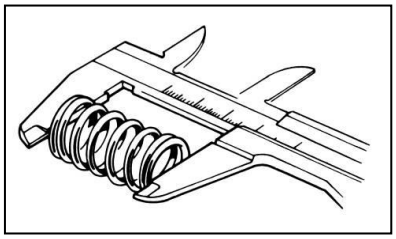
1. Initially Torque the (4) Cylinder Head Bolts in a Crisscross Pattern to **10 ft-lbs (14 Nm).**
2. Evenly Torque the (4) Cylinder Head Bolts in a Crisscross Pattern to **35 ft-lbs (48 Nm).**

Cylinder Head / Valves Exploded View and Service Information



Valve Spring Free Length Specification

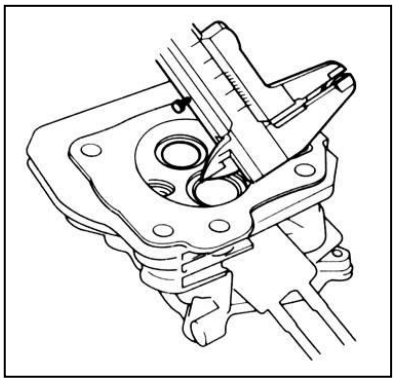
Standard	Service Limit
1.535” (39 mm)	1.476” (37.5 mm)



Valve Seat Width Inspection

Remove carbon deposits from the combustion chamber. Inspect the valve seats for pitting or other damage.

Standard	Service Limit
0.03149 - 0.0393” (0.8-1.0 mm)	0.0591” (1.5 mm)



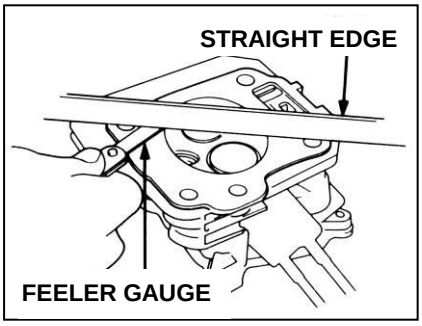
Cylinder Head Warp Inspection

- Remove carbon deposits from the combustion chamber.

- Clean off any gasket material from the cylinder head surface.

- Check the spark plug hole and valve areas for cracks.

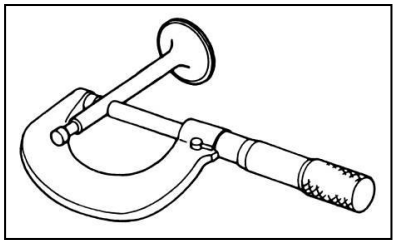
- Check the cylinder head for warpage with a straight edge and a feeler gauge as shown.



Service Limit	0.00393” (0.10 mm)

Valve Stem Inspection

Inspect each valve for face irregularities, bending or abnormal wear.



Valve Stem Diameter Specification

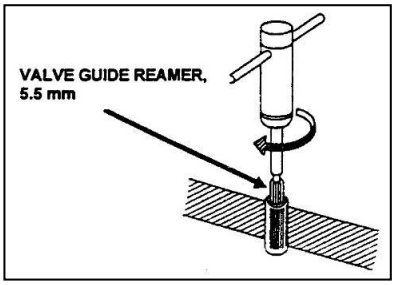
	Standard	Service Limit
Intake	0.2584 - 0.2590” (6.565-6.58 mm)	0.2535” (6.44 mm)
Exhaust	0.2577 - 0.2583” (6.545-6.56 mm)	0.252” (6.40 mm)

Valve Guide Inspection

Ream the exhaust valve guide to remove any carbon deposits before measuring.

Valve Guide ID Specification:

Standard	Service Limit
0.2598 - 0.2604” (6.60-6.615 mm)	0.2624” (6.66 mm)



Valve Stem to Guide Clearance

Subtract each valve stem OD from the corresponding guide ID to obtain the guide-to-stem clearance.

	Standard	Service Limit
Intake	0.00039 - 0.00145” (0.01-0.037 mm)	0.000393” (0.10 mm)
Exhaust	0.00197 - 0.00303” (0.05-0.077 mm)	0.0047” (0.12 mm)

Valve Seat Reconditioning

3

1. Thoroughly clean the combustion chamber and valve seats to remove carbon deposits.

2. Apply a light coat of Prussian Blue or erasable felt-tipped marker ink to the valve faces.

3. Properly install valves, springs and keepers. Manually open the valves, then and snap them closed against their seats several times. Be sure the valves do not rotate on the seat. Remove the valve assemblies. The transferred marking compound will show any area of the seat that is not concentric.

4. Use a 45°cutter to remove enough material to produce a smooth and concentric seat. Follow the valve seat cutter manufacture's instructions. Turn the cutter clockwise, never counterclockwise. Continue to turn the cutter as you lift it from the valve seat.

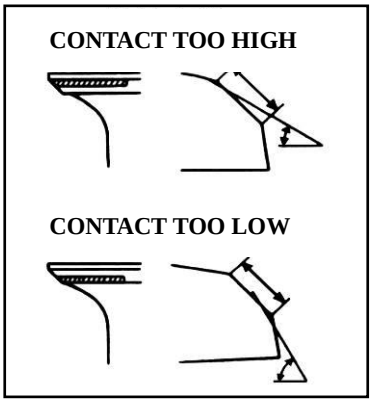
5. Use a 30°~32° and 60° cutter to narrow and adjust the valve seat so that it contacts the middle of the valve face. The 30°~32° cutter removes material from the top edge. The 60° cutter removes material from the bottom edge. Be sure that the width of the finished valve seat is within specification.

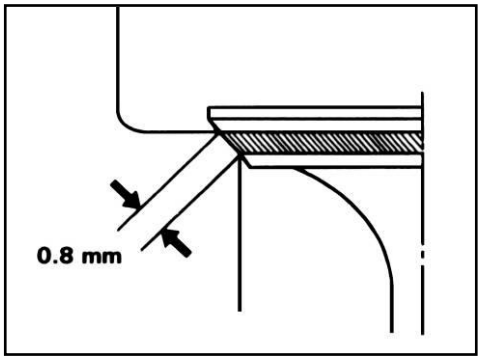
6. Lap valves in accordance with valve lapping kit instructions.

7. Clean valve and seat of all lapping compound.

Valve Seat Width

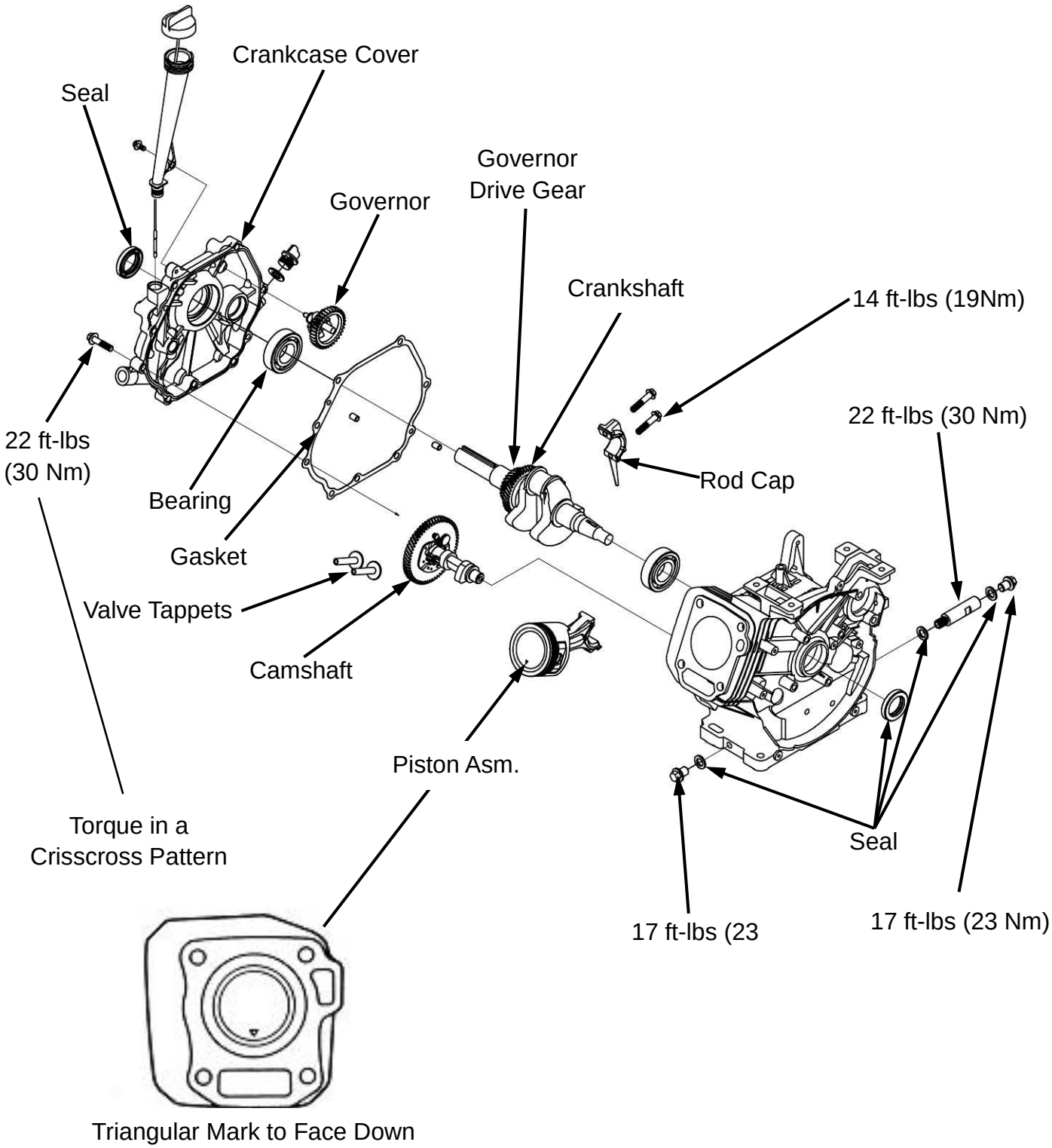
Standard	Service Limit
0.0315 - 0.0394" (0.8-1.0 mm)	0.0787" (2.0 mm)





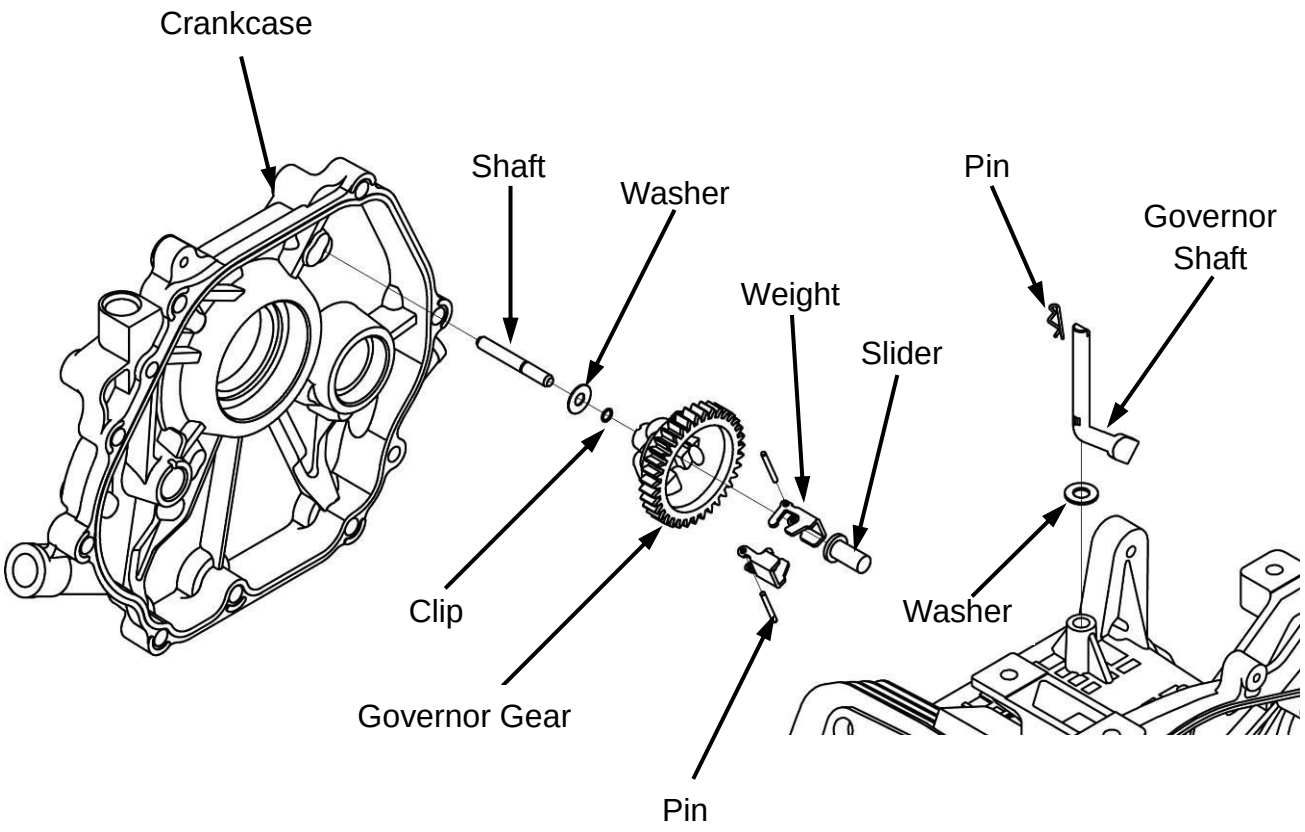
Engine Service – Lower End

Crankcase Exploded View and Service Information

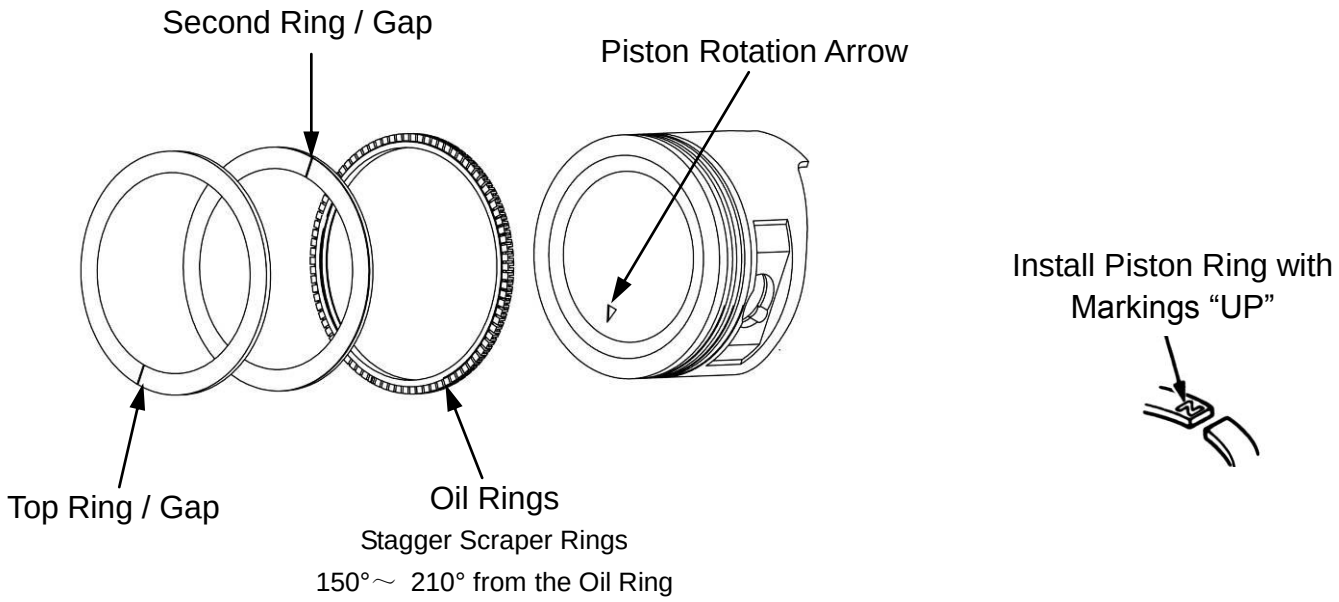


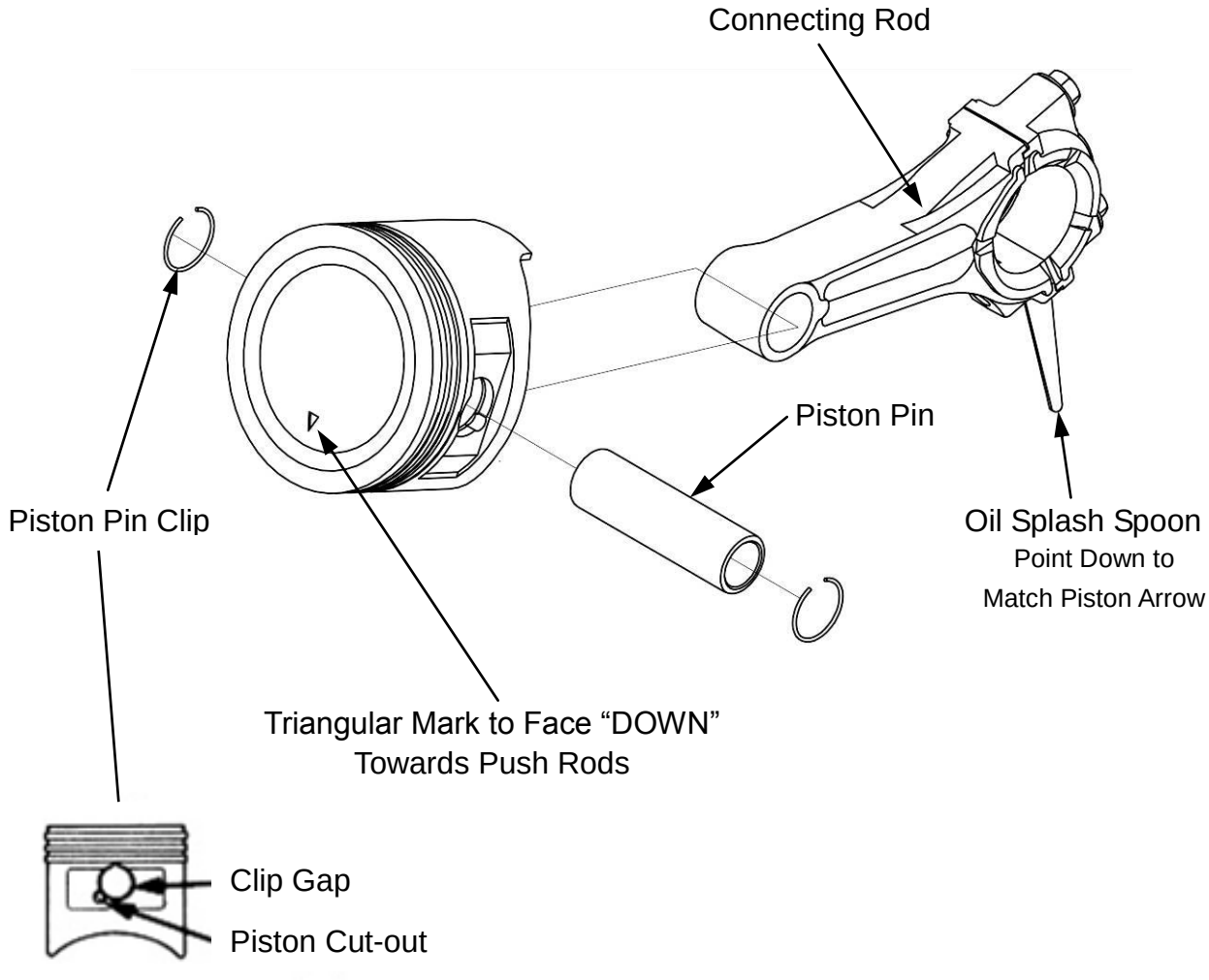
Governor Exploded View

3

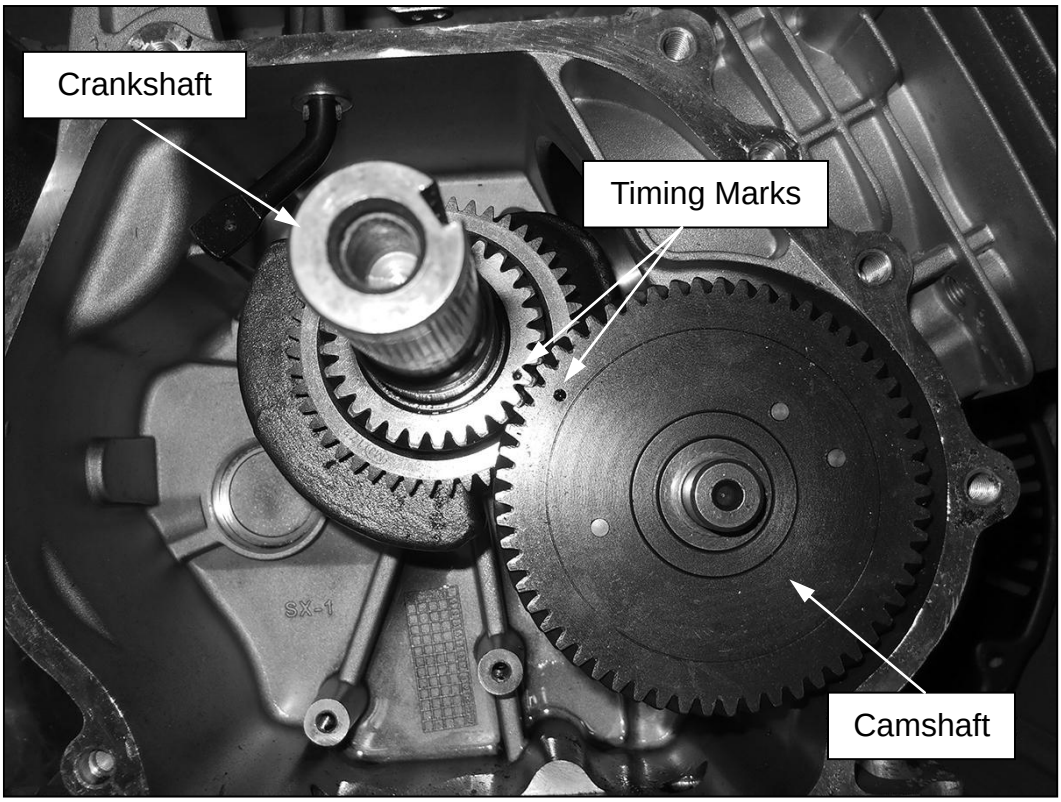


Piston / Connecting Rod Exploded View and Service Information

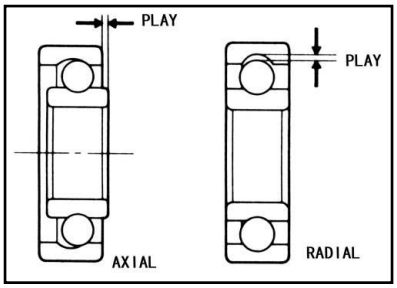




Crankshaft / Camshaft Timing



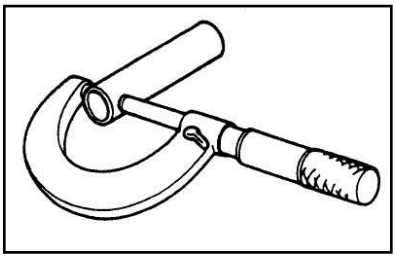
Crankshaft Bearing Free Play



1. Clean the bearing in solvent and dry it.
2. Spin the bearing by hand and check for play.

Replace the bearing if it is noisy or has excessive free play.

Piston Pin OD

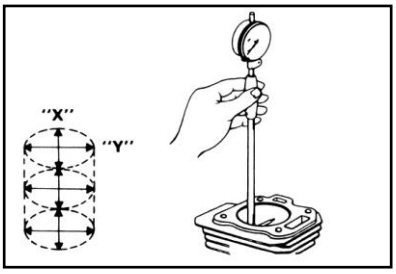


Standard	Service Limit
0.7083 - 0.7085” (17.992-17.998 mm)	0.7067” (17.95 mm)

Cylinder Inside Diameter

Inspect cylinder inside diameter for taper and out of round with a bore gauge.

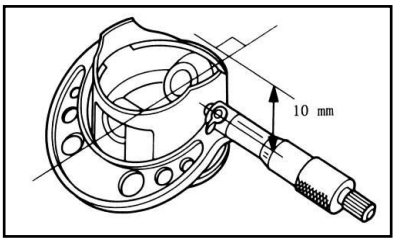
Measure in two different directions, front to back and side to side, on three different levels (½”down from the top, middle and ½” up from the bottom).



Engine	Standard	Service Limit
175FDS-1	2.953 - 2.954” (75.015-75.025 mm)	2.959” (75.17 mm)
180FDS-1	3.4651 - 3.4655” (80.015-80.025 mm)	3.4712” (80.17 mm)

Piston Skirt Outside Diameter

Measure and the piston skirt outside diameter
10mm from the skirt base and 90°to piston pin hole.



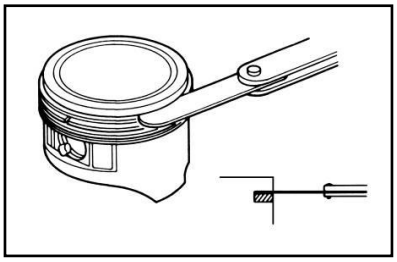
Engine	Standard	Service Limit
175FDS-1	2.951 - 2.952” (74.970-74.980 mm)	2.939” (74.65 mm)
180FDS-1	3.1484 - 3.1488” (79.97-79.98 mm)	3.1437” (79.85 mm)

Piston to Cylinder Clearance Specification

Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.00059 - 0.002” (0.015-0.052 mm)	0.0047” (0.12 mm)

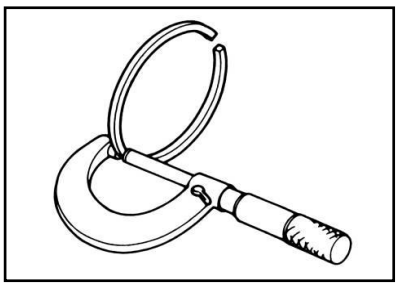
Piston Ring to Groove Clearance

Engine	Standard	Service Limit
175FDS-1 180FDS-1 Top / Middle Rings	0.00059 - 0.00177” (0.015-0.045 mm)	0.0059” (0.15 mm)

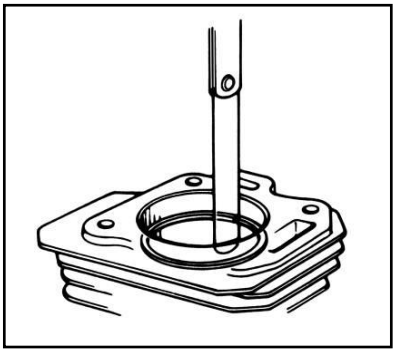


Piston Ring Width

Engine	Standard	Service Limit
175FDS-1 180FDS-1 Top / Middle Rings	0.077 - 0.078” (1.97-1.99 mm)	0.069” (1.75 mm)



Piston Ring End Gap



Top and Middle Rings

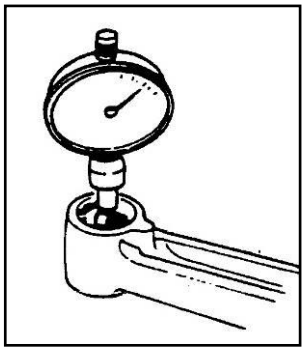
Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.0079 - 0.0157” (0.2-0.4 mm)	0.0394” (1.0 mm)

Oil Ring

Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.0079 - 0.0275” (0.2-0.7 mm)	0.0394” (1.0 mm)

Use the piston to position the rings squarely 1” down from the top of the cylinder.

Connecting Rod Small End ID



Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.7088 - 0.7093” (18.006-18.017 mm)	0.7114” (18.07 mm)

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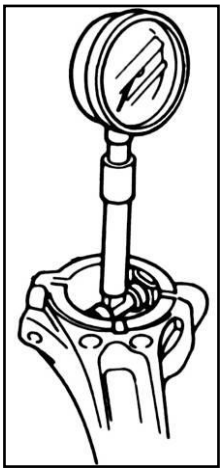
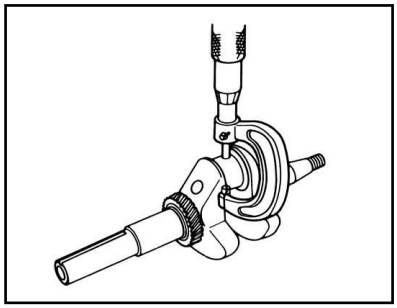
Connecting Rod Big End ID



Engine	Standard	Service Limit
175FDS-1 180FDS-1	1.3 - 1.3003” (33.02-33.03 mm)	1.3019” (33.07 mm)

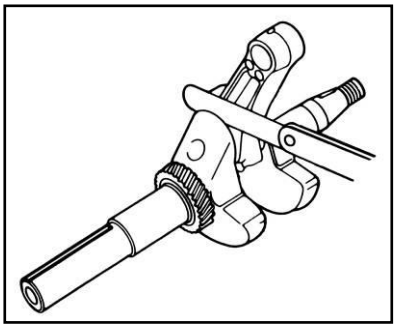
Crankshaft Pin Outside Diameter

Engine	Standard	Service Limit
175FDS-1 180FDS-1	1.2979” - 1.2984” (32.966-32.981 mm)	1.296” (32.92 mm)



Connecting Rod Big End Side Clearance

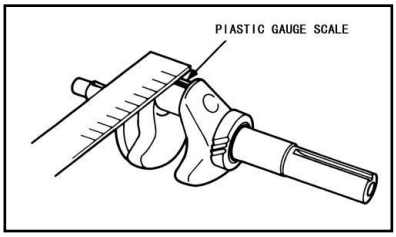
Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.0039 - 0.0275” (0.1-0.7 mm)	0.0394” (1.0 mm)



Connecting Rod Big End Oil Clearance

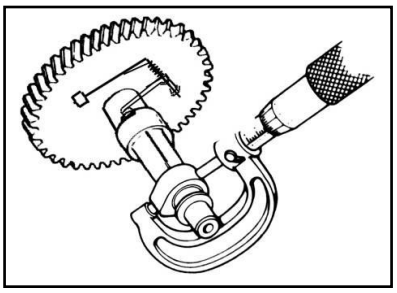
- Clean oil from the crankshaft and connecting rod.
- Use plastic gauge style measuring tool in accordance to the manufactures instructions to measure the oil clearance.

Connecting Rod Bolt Torque: **14 ft-lbs (19Nm)**



Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.00157 - 0.00259” (0.04-0.066 mm)	0.00472” (0.12 mm)

Camshaft Lobe Height Specifications



Intake

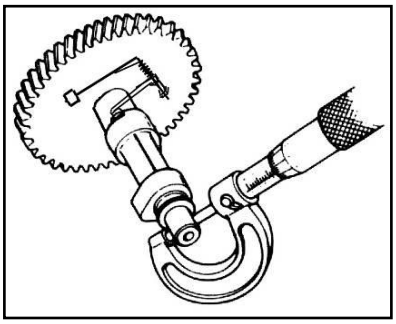
Engine	Standard	Service Limit
175FDS-1	1.2455 - 1.2501” (31.636-31.754 mm)	1.2342” (31.35 mm)
180FDS-1	1.257 - 1.264” (31.953-32.113 mm)	1.244” (31.60 mm)

Exhaust

Engine	Standard	Service Limit
175FDS-1	1.2470 - 1.2533” (31.674 -31.834 mm)	1.2342” (31.35 mm)
180FDS-1	1.246 - 1.253” (31.66 -31.82 mm)	1.232” (31.30 mm)

Camshaft Journal Outside Diameter

Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.6285 - 0.6292” (15.966-15.984 mm)	0.6267” (15.92 mm)



Check the camshaft bearing journal for scoring, wear or damage.

NOTE: Verify that the decompression mechanism moves freely.

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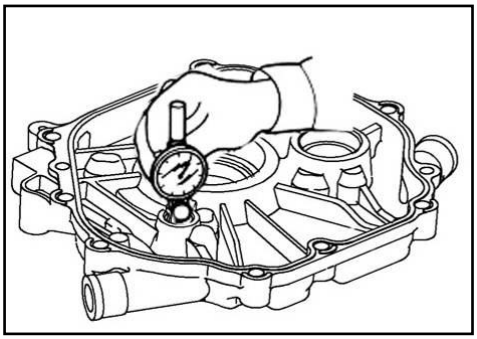
Crankcase Cover / Camshaft Hole Inside Diameter

Engine	Standard	Service Limit
175FDS-1 180FDS-1	0.6299 - 0.6306” (16.0-16.018 mm)	0.6318” (16.05 mm)



Chapter 4 – Electrical System Information

4

Ignition Coil Gap Adjustment

High Voltage Ignition Systems can be Dangerous - Use Caution when Servicing Ignition Systems

1. Install the ignition coil and lightly tighten the igniting coil mounting bolts.
2. Rotate engine so ignition coil is aligned with the magnet portion of the flywheel.
3. Insert the feeler gauge between the flywheel and coil.
4. Adjust the ignition coil gap at both side of the coil.
5. Sufficiently tighten the mounting bolts.

Ignition Coil Gap	0.011- 0.019” (.3-.5 mm)

Ignition Coil Resistance Inspection

Primary Coil

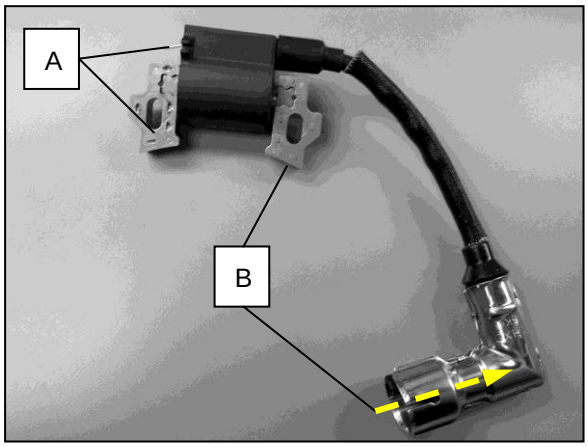
Place Ohm meter leads between the harness connection lead and the exposed metal coil leg.

A - Primary Coil Resistance	1.0-1.6 Ω

Secondary Coil

Place Ohm meter leads between exposed metal coil leg and the spark plug terminal connection.

B - Secondary Coil Resistance	10.5 KΩ +/- 15%



Spark Testing

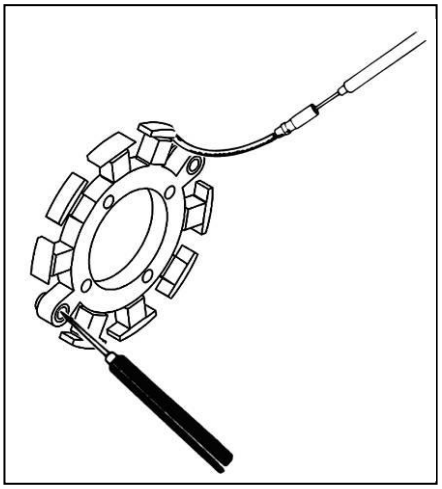
- **Fuel is Extremely Flammable** - Use Extreme Caution When Servicing the Fuel System
- **High Voltage Ignition Systems can be Dangerous** - Use Caution when Servicing Ignition Systems

1. Remove spark plug cap from the spark plug.
2. Remove the spark plug from the engine.
3. Connect the negative (-) electrode of the spark plug (threaded area) to ground (cylinder head cover).
4. Crank the engine and view the electrode gap. Spark should be present when engine is turning over.
5. Reinstall the spark plug and torque to specification - **22 ft-lbs (30 Nm)**.
6. Properly install the spark plug cap

Stator Resistance Test

Measure resistance between lead wire terminals as shown.

Resistance	0.21-0.31Ω



RESIDENTIAL PRODUCTS

Form Number: 492-9235