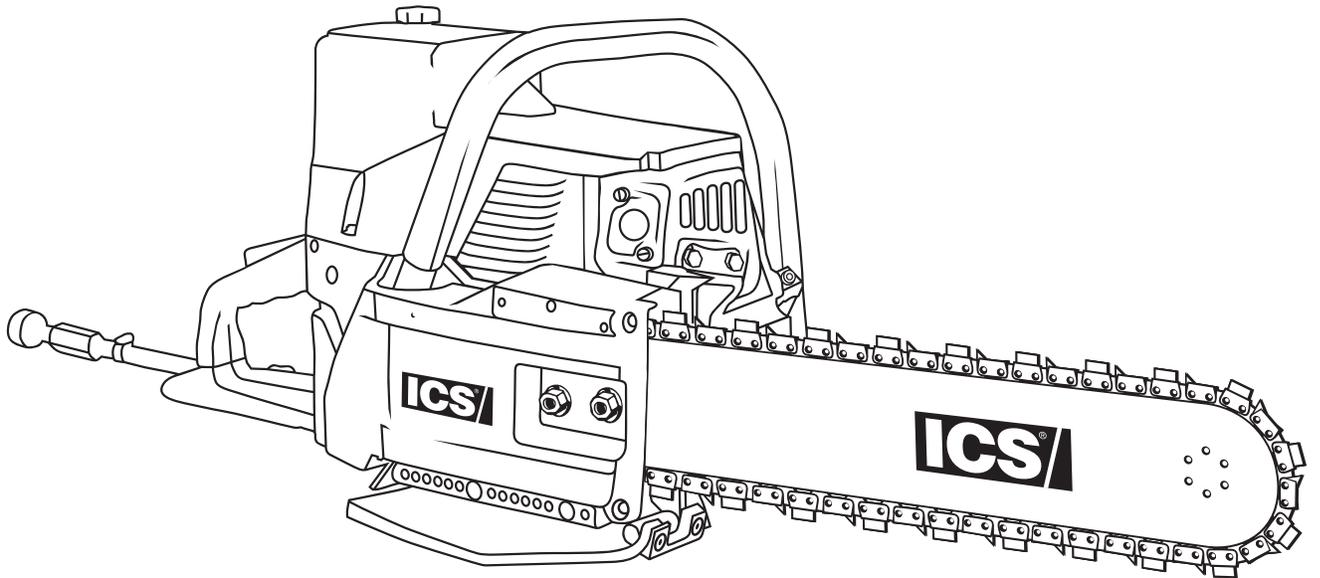




Diamond Tools and Equipment

633GC



SERVICE MANUAL

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Shop Manual Use

This manual contains all the technical information necessary for carrying out repairs on the 633GC cut-off saw. For safe, efficient work, it is of prime importance that the values indicated be adhered to. Routine periodic maintenance is covered in the operator's manual included with each cut-off saw.

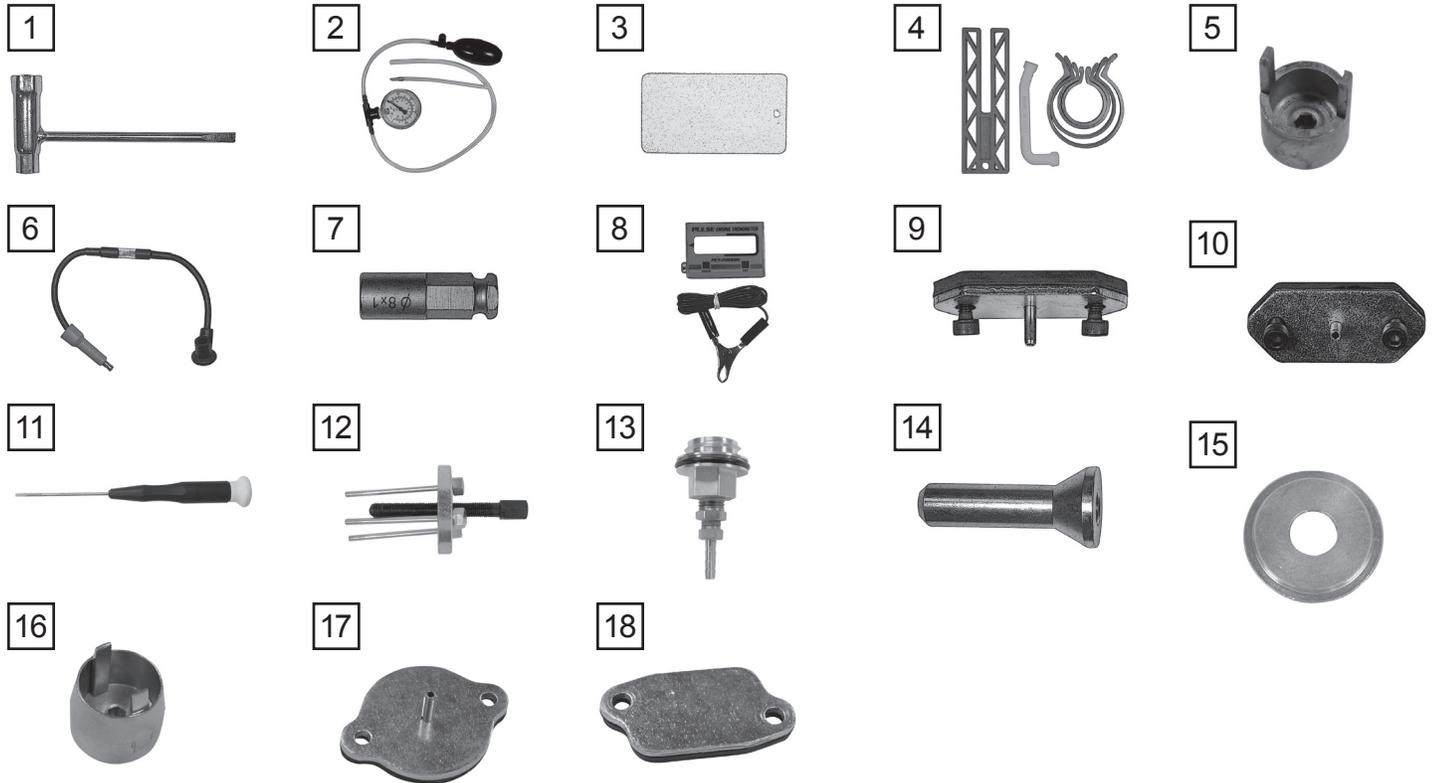
General Shop Rules

- Always use the right tools for the job, otherwise components may be damaged.
- Use a plastic dead blow mallet to separate parts attached solidly to each other.
- Mark mating parts as a reassembly reference.
- Keep component parts together as a group. Assemble screws and nuts into appropriate subgroups.
- When reassembling, clean all parts carefully, lubricate moving parts and replace all oil seals, o-rings, gaskets, washers and self-locking nuts.
- **For best results, use only original ICS® replacement parts.**

General Recommendations

- Some procedures in this manual require the use of special tools. A complete tool kit for the 633GC is available from ICS®.
- Detailed carburetor maintenance and overhaul information is available in Walbro's Diaphragm Carburetor Service Manual. Walbro can be contacted at <http://www.walbro.com> or by calling 1.989.872.2131.

633GC Service Tool Kit - P/N 71700

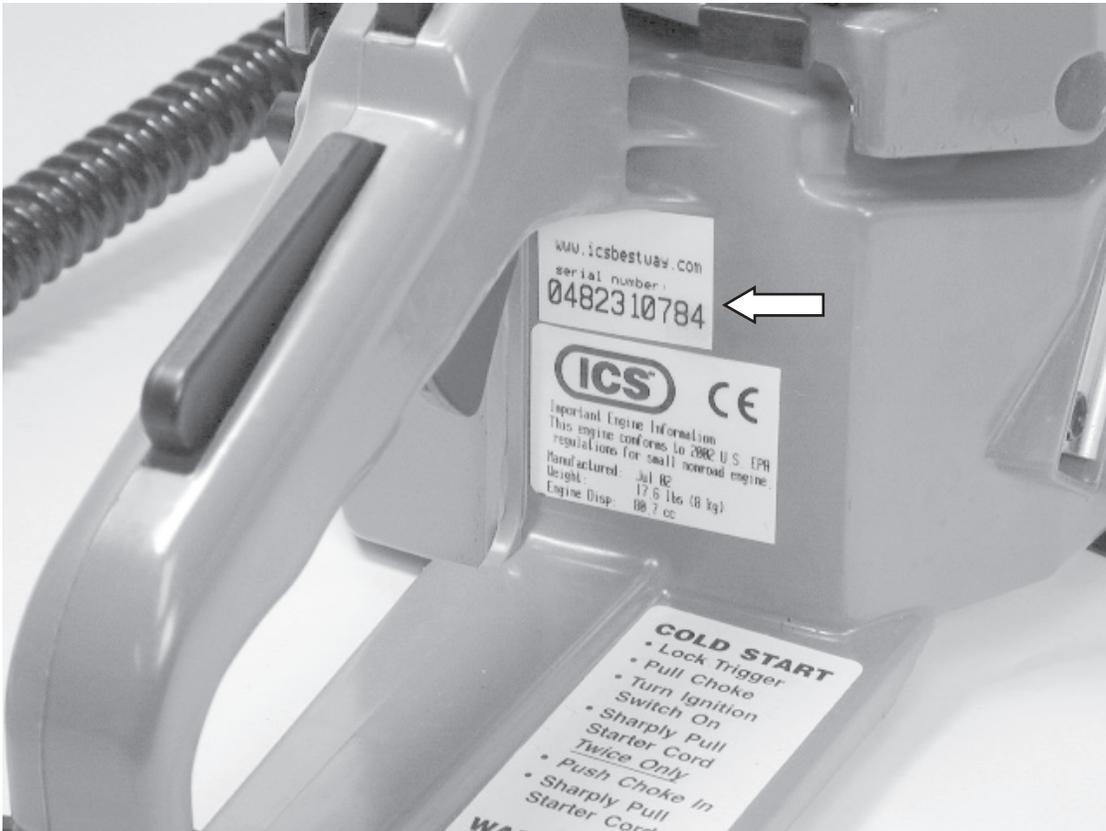


P/N		DESCRIPTION
1	71521	SCRENCH
2	71541	PRESSURE GAUGE BULB
3	71542	COIL/FLYWHEEL TIMING SHIM
4	71543	CYLINDER ASSEMBLY CLAMPS & PISTON STOP
5	71546	613 SHOCK ABSORBER TOOL
6	71547	SPARK TESTER
7	71548	613 FLYWHEEL DISASSEMBLY TOOL
8	71565	ELECTRONIC TACHOMETER
9	71569	613GC INDUCTION SEAL FLANGE W/ SCREWS
10	71570	613GC EXHAUST SEAL FLANGE W/SCREWS
11	71573	TUNING SCREWDRIVER
12	73410	633GC FLYWHEEL PULLER
13	73425	633GC FUEL PRESSURE CAP
14	73428	613GC & 633GC MAIN BEARING DRIVER TOOL
15	73429	633 MAIN BEARING SPACING TOOL
16	73430	633GC SHOCK ABSORBER TOOL
17	73431	633GC INTAKE PORT COVER TOOL
18	73432	633GC EXHAUST PORT COVER TOOL

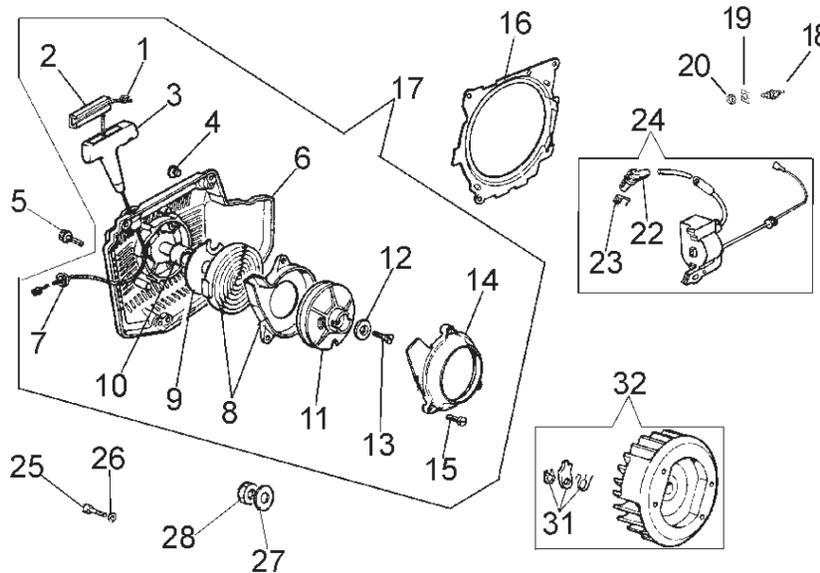
Specifications

Engine Type	2-Stroke Single Cylinder Air Cooled
Displacement	6.2 cu.inch (101 cc)
Horsepower	6.1 hp (4.6 kw) @ 8700 rpm
Engine Speed	11,500 ± 500 rpm, mechanically governed 2500-2800 rpm @ idle
Piston ring gap (Maximum)	.040 in. (1 mm)
Chain Speed	4950 fpm (25 m/s), free running 4000 fps (20 m/s), in the cut
Weight	27.5 lbs. (12.5 kg)
Cutting Depth	Up to 16 inches (40.6 cm)
Dimensions	23 inches (58 cm) length 14 inches (35 cm) height 12 inches (30 cm) width
Carburetor	Walbro diaphragm WGAK3 w/ throttle shaft seals
Air Filtration	Washable cotton (K&N) or washable dry nylon
Starter	Dust and water shielded
Ignition	Electronic, water sealed
Spark plug type	Champion RCJ-7Y (for conversion chart see appendix)
Clutch	Three-weight, single spring, centrifugal
Fuel Mix Ratio	25:1 gasoline to oil with oil brand name gasoline and ICS® 2-stroke engine oil, or other high quality 2-stroke engine oil for air cooled engines.
Fuel Capacity	.26 gal (1 liter) 15-18 minute run time
Water Supply	Minimum 20 psi (1.5 bar)
Noise Level	102 dB @ 1 meter
Vibration Level	8 m/s @ front handle
Cutting Rate	Hard aggregates w/ steel: 15-25 sq-in/min (90-160 sq-cm/min) Medium aggregates: 20-30 sq-in/min (160-190 sq-cm/min) Masonry, soft aggregates: 30-50 sq-in/min (190-320 sq-cm/min)

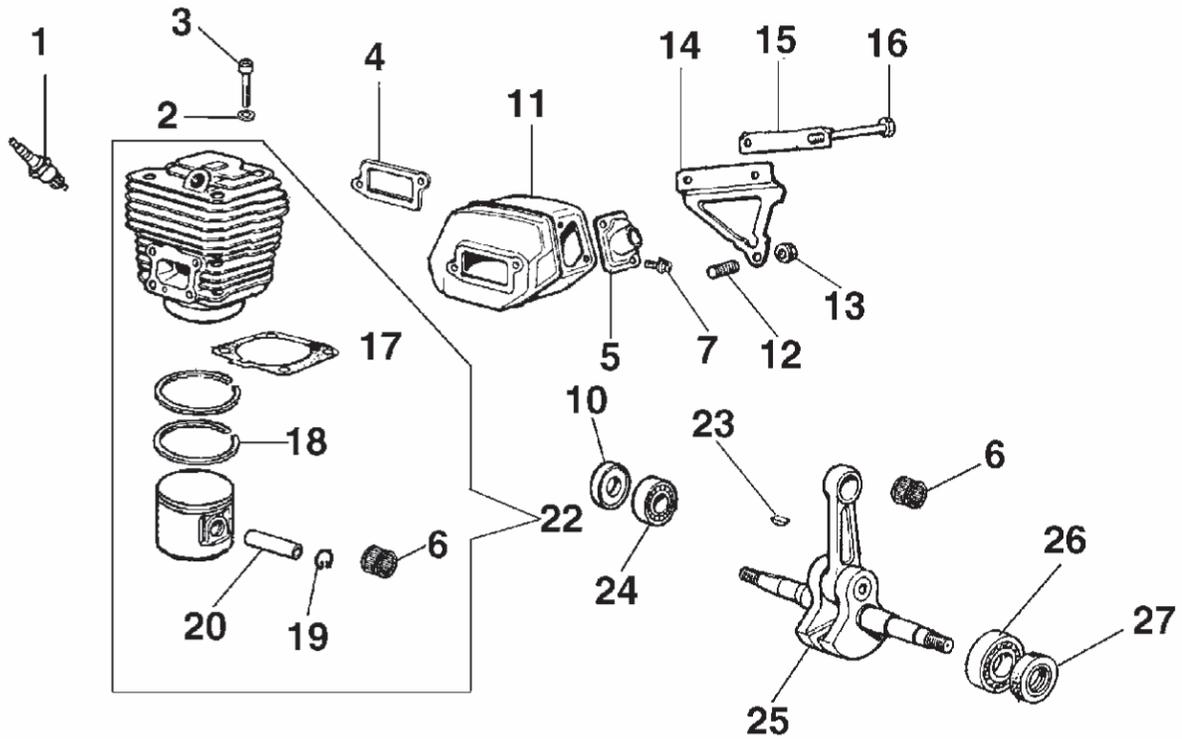
3 This section shows the two locations of the serial number.



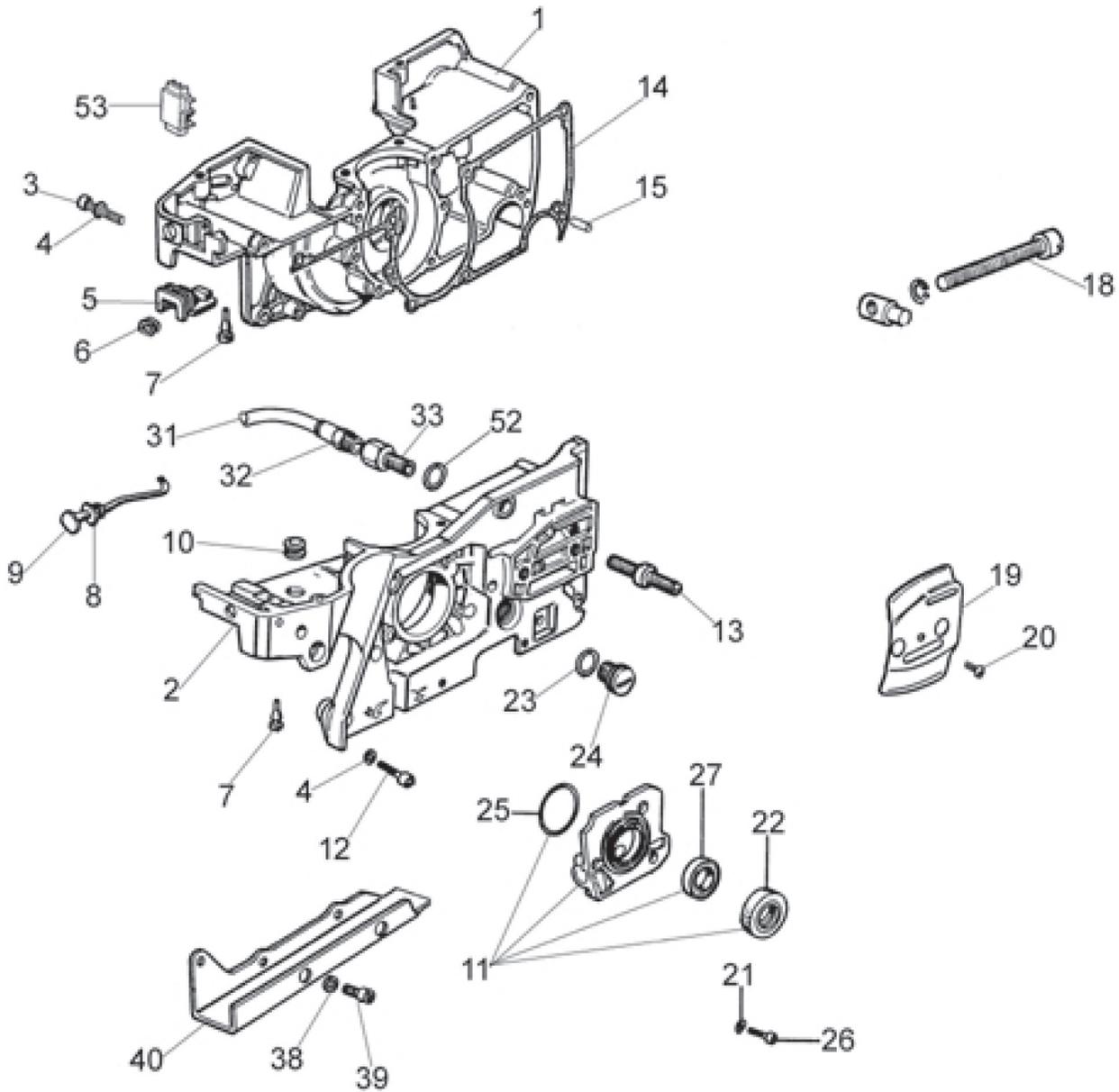
4 This section covers torque, Loctite®, and lubrication requirements of the individual components. The key numbers used are not related to the key numbers in the 633GC Replacement Parts Price List.



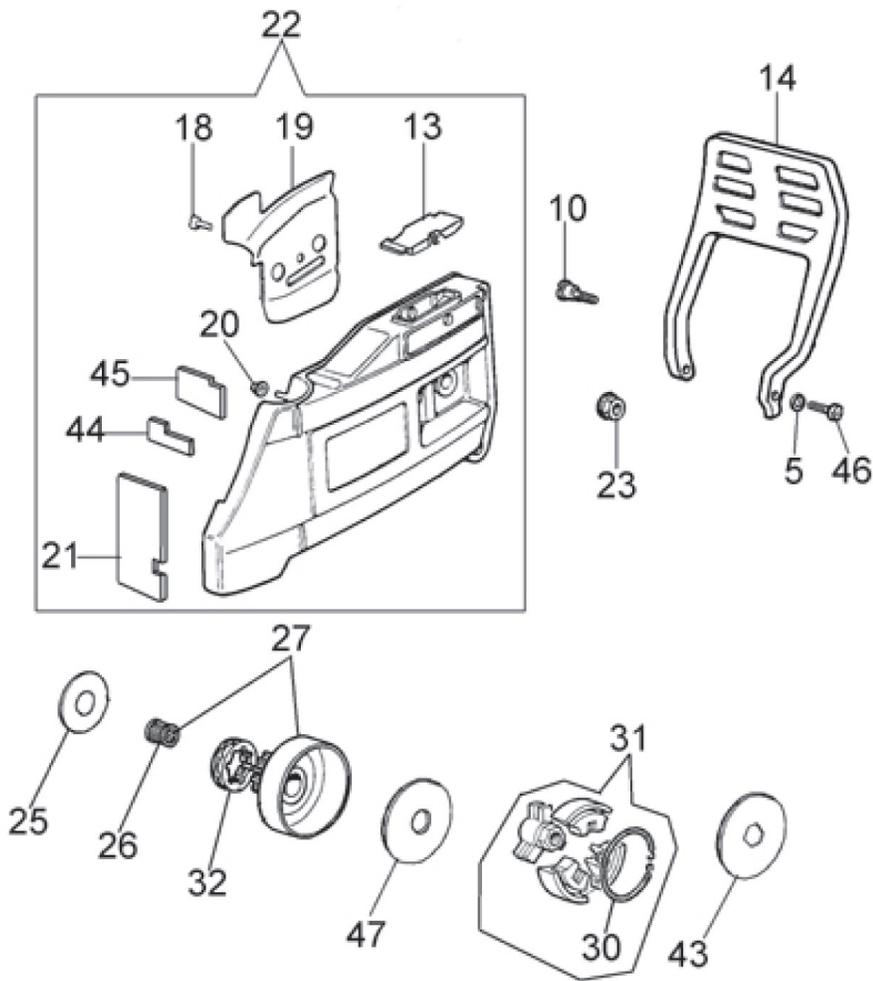
KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
1	STARTER ROPE				73188
2	STARTER ROPE RETAINER				73228
3	STARTER ROPE HANDLE				73189
4	STARTER HOUSING OIL CAP				73229
5	SCREW	4.85	43	X	73230
6	STARTER COVER				73190
7	STARTER ROPE WASHER				73231
8	STARTER COIL SPRING & HOUSING				73191
9	STARTER SPRING COVER				73232
10	STARTER BUSHING				73192
11	STARTER ROPE PULLEY				73193
12	STARTER PULLEY WASHER				73233
13	STARTER PULLEY SCREW	2.93	26	X	73234
14	STARTER PULLEY COVER				73235
15	STARTER PULLEY COVER SCREW	1.92	17	X	73236
16	STARTER COVER DUST SHIELD				73194
17	STARTER COVER ASSEMBLY (COMPLETE)				73195
18	IGNITION TOGGLE SWITCH				73237
19	IGNITION TOGGLE PLATE ON/OFF	3.95	35		73238
20	IGNITION TOGGLE SWITCH NUT				73239
22	SPARK PLUG CAP				73241
23	SPARK PLUG CAP SPRING				73242
24	IGNITION COIL WITH SPARK PLUG LEAD & PRIMARY	5.87	52	X	73196
25	IGNITION COIL MOUNTING SCREW				73243
26	WASHER				73897
27	FLYWHEEL MOUNTING WASHER				73245
28	FLYWHEEL MOUNTING NUT				73246
31	STARTER PAWL KIT				504386
32	FLYWHEEL ASSEMBLY REPLACEMENT KIT				73433



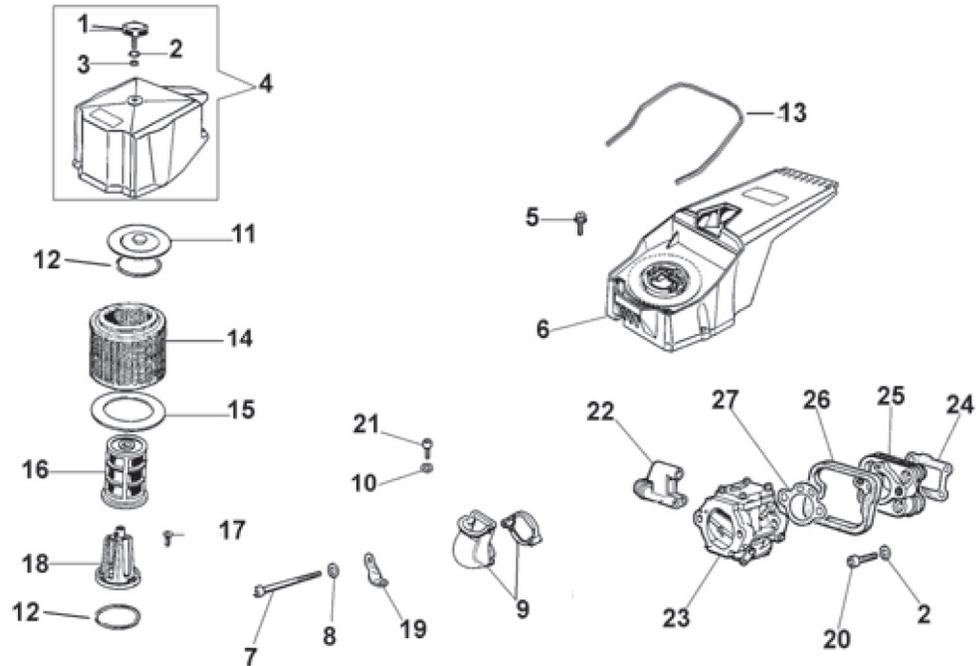
KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
1	SPARK PLUG	27.45	243		73199
2	WASHER				73250
3	CYLINDER BLOCK BOLT	11.75	104	X	73251
4	CYLINDER TO MUFFLER GASKET				73434
5	EXHAUST PIPE				73253
6	WRIST PIN NEEDLE BEARING				73211
7	EXHAUST PIPE MOUNTING SCREW	3.95	35		73254
10	CRANKSHAFT SEAL FLYWHEEL SIDE				73201
11	MUFFLER BODY				73203
12	MUFFLER SUPPORT BRACKET SCREW	4.85	43	X	73255
13	MUFFLER SUPPORT BRACKET NUT	2.95	26	X	73256
14	MUFFLER SUPPORT BRACKET				73204
15	MUFFLER SCREW LOCKING PLATE				73257
16	MUFFLER MOUNTING SCREW				73258
17	CYLINDER BASE GASKET				73436
18	PISTON RING PAIR				73437
19	WRIST PIN SNAP RING				73259
20	PISTON WRIST PIN				73208
22	COMPLETE CYLINDER/PISTON ASSEMBLY				73442
23	CRANKSHAFT FLYWHEEL WOODRUFF KEY				73264
24	CRANKSHAFT BEARING (FLYWHEEL END)				73209
25	CRANKSHAFT ASSEMBLY				73443
26	CRANKSHAFT BEARING (CLUTCH SIDE)				73200
27	CRANKCASE OUTSIDE SEAL-CLUTCH SIDE				73202



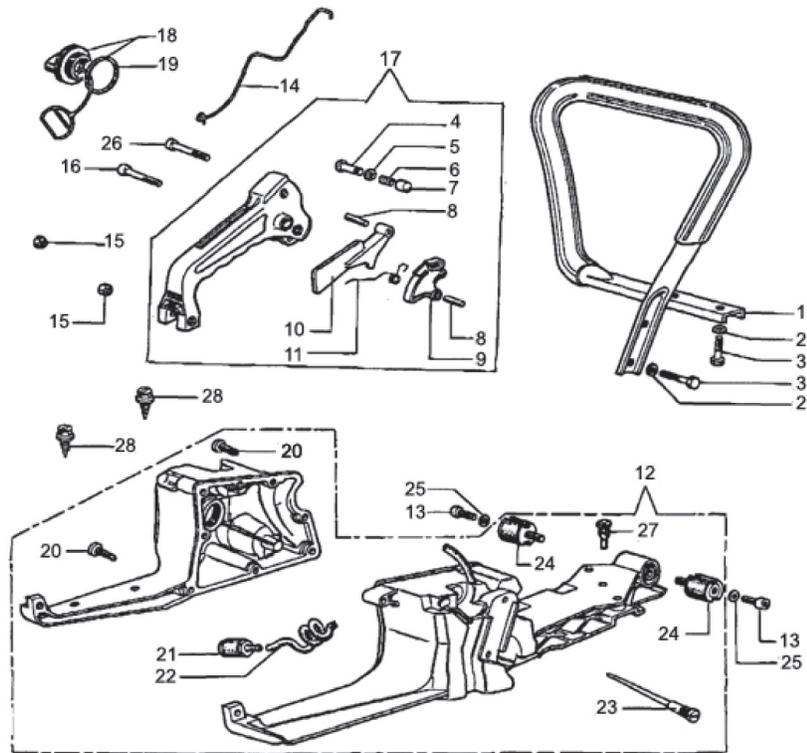
KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
1	CRANKCASE LEFT HALF				73444
2	CRANKCASE RIGHT HALF				73445
3	BOLT				73278
4	WASHER				73897
5	TRIGGER ROD GROMMET				73268
6	TRIGGER ROD BUSHING				73269
7	BUMPER, SHOCK ABSORBER, FUEL TANK TOP				73270
8	CHOKE LEVER GROMMET				73389
9	CHOKE LEVER				73213
10	FUEL LINE GROMMET (CRANKCASE)				73390
11	MAIN BEARING SEAL HOUSING ASSMBLY-CLUTCH SIDE				73446
12	SCREW	7.80	69	X	73275
13	BAR MOUNTING STUD	19.54	173	X	73280
14	CRANKCASE GASKET				73447
15	CRANKCASE DOWEL PIN				73281
18	PREMIUM TENSIONER KIT (REPLACES 73283), ASSEMBLY				73935
19	BAR MOUNT PAD COVER PLATE				73225
20	SCREW			X	73284
21	WASHER				73285
22	CRANKCASE OUTSIDE SEAL-CLUTCH SIDE				73202
23	CRANKCASE PLUG O-RING				73391
24	CRANKCASE PLUG				73286
25	SEAL HOUSING O-RING				73287
26	SEAL HOUSING MOUNTING SCREW (3)	2.93	26	X	73288
27	CLUTCH SIDE MAIN BEARING SEAL-INSIDE				73289
31	WATER TUBE (IN TANK)				73384
32	WATER TUBE FITTING				73385
33	TUBE FITTING-BACKSIDE BAR MOUNT				73386
38	COVER GUARD MOUNTING WASHER				73396
39	COVER GUARD MOUNTING BOLT	2.93	26	X	73397
40	COVER GUARD				70967
52	WATER TUBE O-RING				71468
53	633GC PLASTIC CAP				504389
Not Shown. Gasket Set, includes parts 73434, 73436, 73456					73435



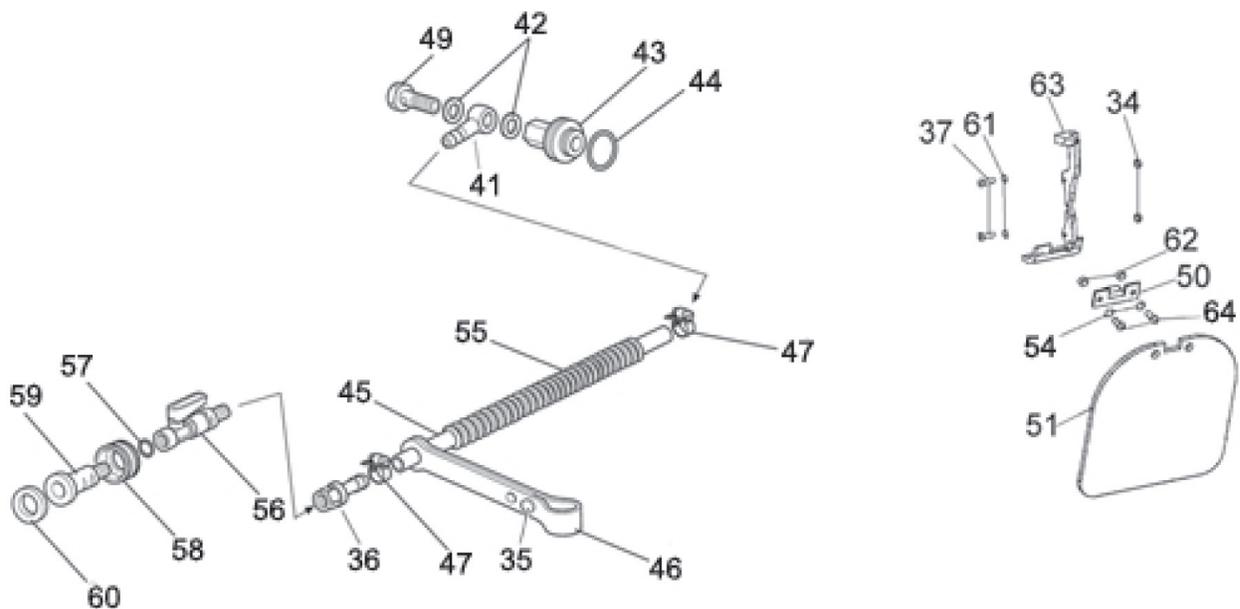
KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
5	WASHER				73897
10	SHOULDER SCREW, HAND GUARD			X	71436
13	633GC SIDE COVER PLUG KIT				71441
14	633GC HAND GUARD				71435
18	SCREW				73284
19	COVER SIDE BAR PLATE				73309
20	RUBBER BUMPER, COVER				73310
21	COVER RUBBER FLAP				73311
22	SIDE COVER W/O BRAKE COMPONENTS				73449
23	COVER CLAMPING NUT				73313
25	CLUTCH SPACER WASHER				73314
26	CLUTCH NEEDLE BEARING				73423
27	CLUTCH CUP WITH SPLINED ADAPTER				70948
30	CLUTCH SPRING				73317
31	CLUTCH ASSEMBLY	4.97	44		73451
32	8T RIM SPROCKET KIT				70949
43	CLUTCH SHIELD				73452
44	CHAIN COVER RUBBER INSERT-MIDDLE				73315
45	CHAIN COVER RUBBER INSERT-TOP				73316
46	633GC HAND GUARD SCREW				71437
47	633GC CLUTCH SPACER				504568



KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
1	FILTER COVER KNOB	2.93	26		73320
2	WASHER				73897
3	FILTER KNOB O-RING				73322
4	AIR FILTER COVER ASSEMBLY				71721
5	SCREW	4.85	43	X	73230
6	CYLINDER COVER				71722
7	CARBURETOR ATTACHMENT SCREW	4.85	43	X	73326
8	CARBURETOR ATTACHMENT SCREW WASHER				73327
9	INTAKE MANIFOLD RUBBER				73328
10	INTAKE MANIFOLD BRACKET				73329
11	FILTER CANNISTER COVER				73330
12	O-RING, AIR FILTER				73331
13	AIR FILTER GASKET				71719
14	AIR FILTER CANNISTER, POLY				71752
15	FILTER CANNISTER GASKET				73335
16	PREFILTER PLASTIC, SECONDARY FILTER				73336
17	FILTER SUPPORT SCREW	4.85	43	X	73337
18	FILTER SUPPORT				73338
19	CARBURETOR STANDOFF SUPPORT				73387
20	BOLT	5.87	52	X	73278
21	CARBURETOR SUPPORT SCREW	2.93	26	X	73340
22	CARBURETOR MIXTURE SCREW GROMMET				73341
23	CARBURETOR				73454
24	INSULATOR TO CYLINDER GASKET				73455
25	CARBURETOR INSULATOR				73344
26	INSULATOR FOAM GASKET				73345
27	CARBURETOR TO INSULATOR GASKET				73456



KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
1	FRONT HANDLE ASSEMBLY				73457
2	WASHER				73897
3	FRONT HANDLE BOLT	4.85	43	X	73349
4	TRIGGER LOCK PIN				73353
5	TRIGGER LOCK PIN WASHER				73354
6	TRIGGER LOCK SPRING				73355
7	TRIGGER LOCK BUTTON				73356
8	TRIGGER PIVOT PIN				73357
9	THROTTLE LEVER				73358
10	TRIGGER LOCKOUT LEVER				73359
11	TRIGGER LOCKOUT LEVER SPRING				73360
12	FUEL TANK ASSEMBLY				73458
13	SCREW	6.89	61	X	73275
14	THROTTLE OPERATING WIRE				73366
15	MOUNTING NUT				73367
16	REAR HANDLE REAR BOLT	2.93	26	X	73368
17	REAR HANDLE ASSEMBLY				73369
18	FUEL CAP ASSEMBLY				73370
19	FUEL CAP O-RING				73448
20	FUEL TANK SCREW				73372
21	FUEL FILTER				73459
22	FUEL LINE				73375
23	FUEL BREATHER PIPE				73376
24	SHOCK ABSORBER	4.85	43	X	73377
25	WASHER				73250
26	SCREW (REAR HANDLE, UPPER)	2.93	26	X	73379
27	BUMPER, SHOCK ABSORBER, FUEL TANK TOP				73270



KEY	DESCRIPTION	TORQUE		LOCTITE® 272	PART NUMBER
		Nm	in-lbs.		
34	COVER GUARD FRONT MOUNT NUT				73392
35	HOSE HANGER BUTTON				71744
36	FITTING				71454
37	WALLWALKER SIDE ARM SCREW	4.85	43	X	71478
41	FITTING				71453
42	COPPER WASHER				71456
43	633GC WATER CAP				504388
44	FUEL CAP O-RING				73448
45	WATER HOSE				71455
46	HOSE HANGER				71461
47	HOSE CLAMP				71465
49	WATER HOSE SCREW				71463
50	GUARD FLAP CLAMP				71531
51	GUARD FLAP				71534
54	GUARD FLAP WASHER				71483
55	WATER HOSE COVER				71464
56	WATER SHUT-OFF VALVE				71458
57	WATER HOSE O-RING				71468
58	RING NUT				71457
59	FITTING				71467
60	WATER HOSE GASKET				71469
61	WASHER				73951
62	GUARD FLAP SPACER				71480
63	633GC WALLWALKER LEVER ARM				504387
64	GUARD FLAP SCREW	4.85	43		71479

5 This section covers the disassembly, inspection, and assembly of the air intake.

5.1 Loosen the air filter cover screw and remove air filter cover.



5.2 Remove filter canister cover and air filter.

A Inspect air filter.

B Replace filter if necessary (P/N 71752)



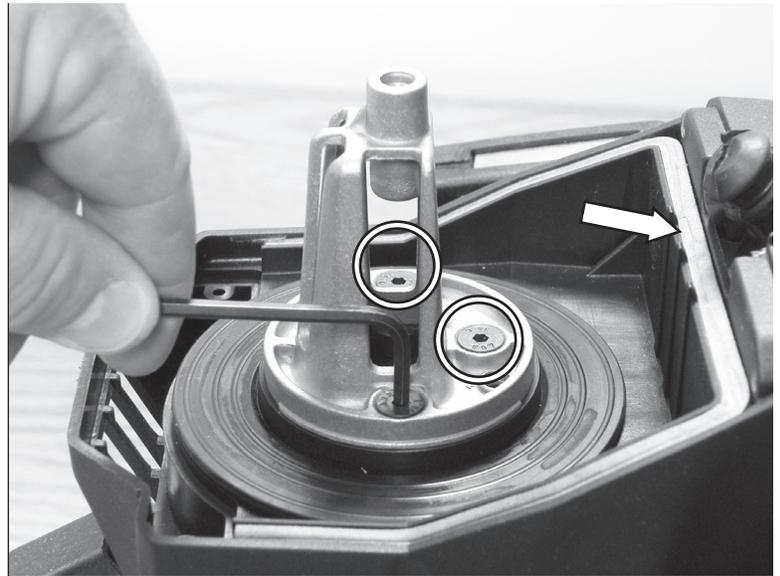
5.3 Remove pre filter from air filter mount.

A Clean filter with cleaning solution and water.

B Let dry and reinstall.



- 5.4 Secure air filter mount screws (3).
- A Make sure filter canister gasket and air filter water seal are secure.
 - B Replace air filter water seal if it is damaged, permanently depressed, hard due to slurry, or missing (P/N 71719).
- 5.5 Assemble filter system in the reverse order.



6 This section covers the removal, inspection, and installation of the spark plug.

6.1 Remove the spark plug lead.

6.2 Clean area around the spark plug to prevent debris from entering the cylinder.

6.3 Remove the spark plug.

6.4 Inspect the spark plug.

A If dirty clean with a wire brush as shown.



B Gap if necessary to 0.20" (0.5 mm).

NOTE: If the sparkplug must be replaced refer to the Spark Plug Reference Guide on page 70.

6.5 Assemble in the reverse order.

A Make sure the plug boot is seated completely.



7 This section covers clutch removal, rim sprocket removal, inspection, and assembly. Refer to sections 5 and 6 if necessary.

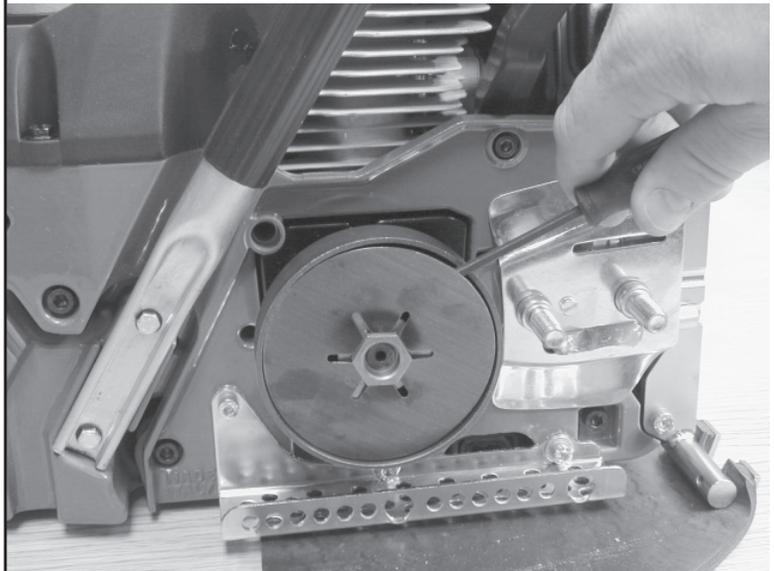
7.1 Insert piston stop tool into spark plug hole.



7.2 Pull starter handle until piston stops against tool.



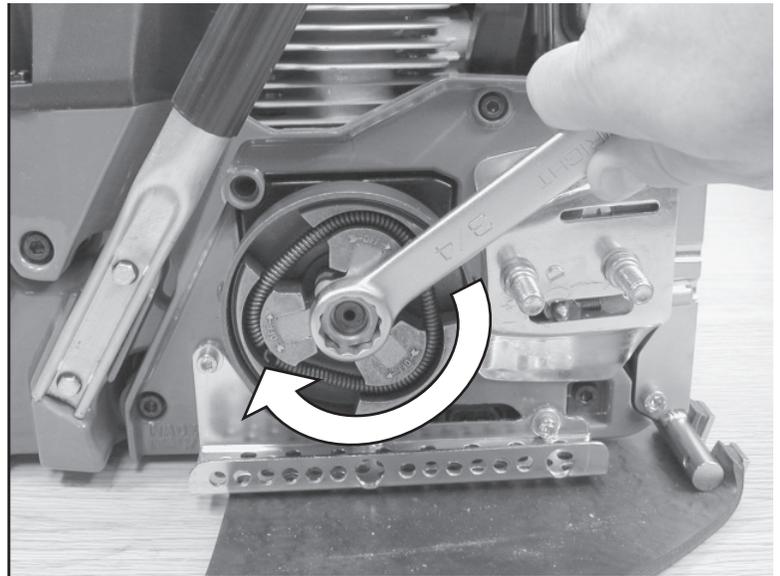
7.3 Remove clutch shield with small screwdriver.



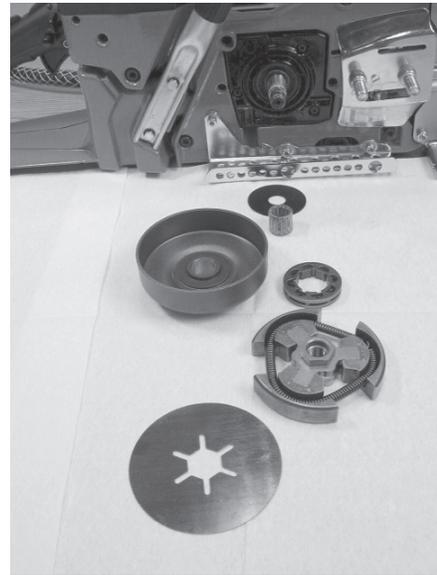
7.4 Remove clutch.

- ⚠ Left hand threads - rotate clockwise to loosen.

NOTE: If an impact wrench is available steps 7.1 and 7.2 do not have to be performed.



7.5 Remove all drive components.

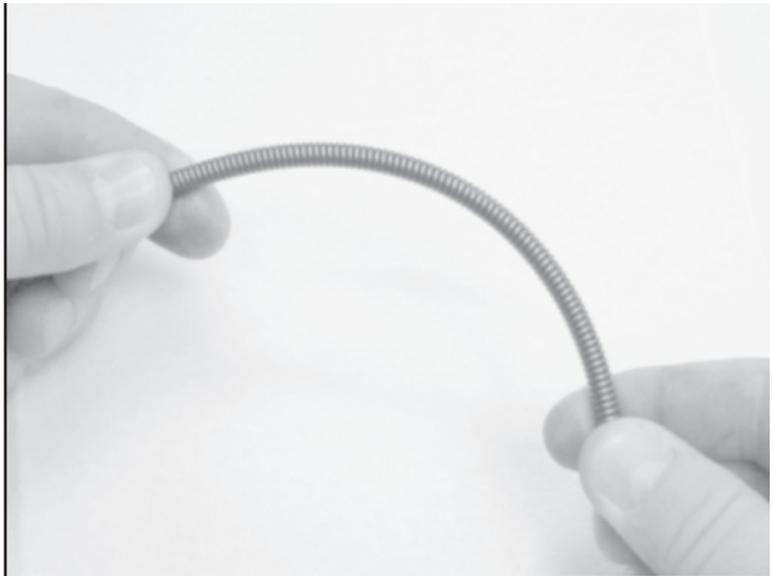


7.6 Inspect the clutch shoes for wear.

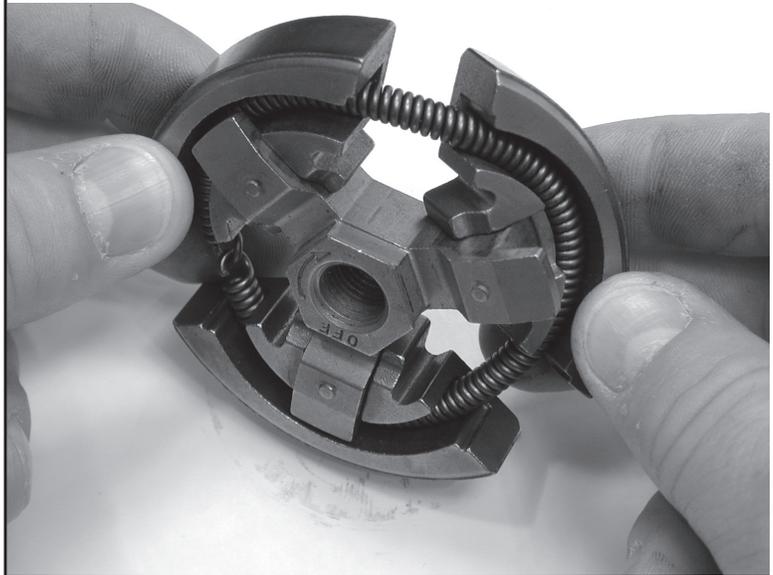
- A Replace if the shoe has less than 0.04" (1 mm) of material, as shown.



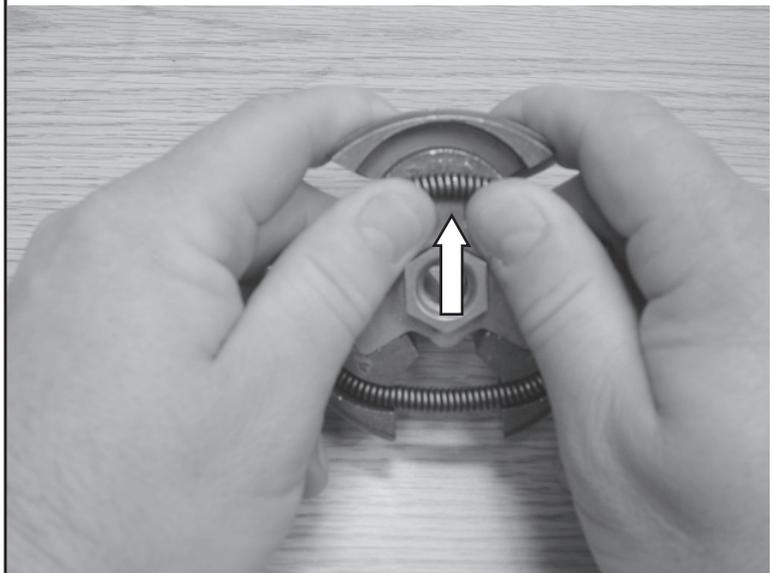
7.7 Inspect spring for cracks.



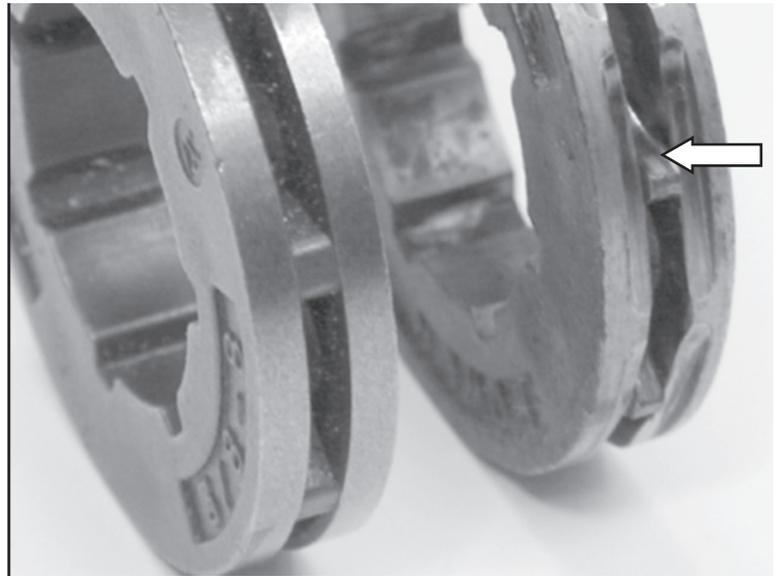
7.8 Assemble clutch shoes as shown.



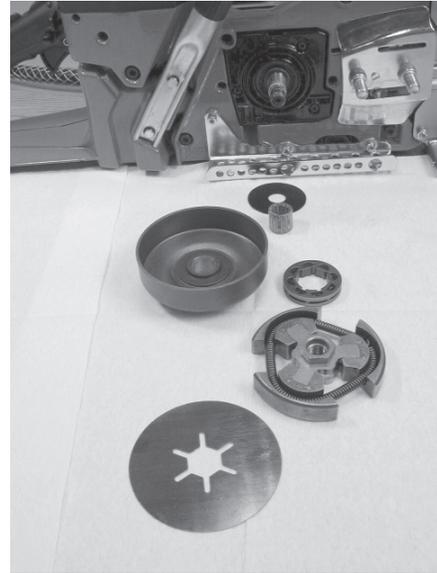
7.9 Finish installation of clutch shoe as shown.



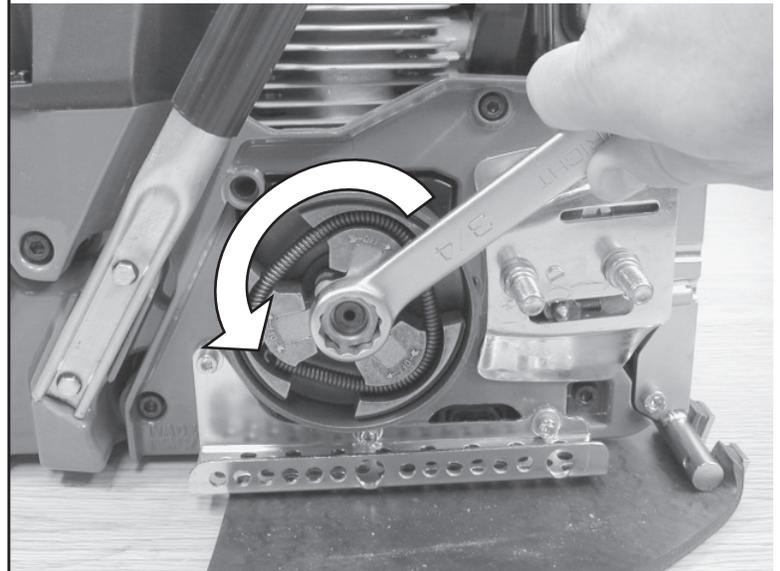
- 7.10 Inspect the rim sprocket for wear.
- A Replace if the rim sprocket teeth are worn to points, as shown on right.



- 7.11 Clean and assemble.
- A Clean all parts in solvent.
- B Grease clutch cup bearing with a waterproof grease (ICS® P/N 70885).
- C Assemble clutch: use spacer washer, bearing, clutch cup with rim sprocket, inside clutch spacer washer, and clutch assembly.



- 7.12 Install clutch.
- A Tighten firmly.
- ⚠ Left hand threads.



8 This section covers the removal of the starter cover, replacement of the starter rope, and replacement of the recoil spring.

8.1 Remove starter cover screws.

8.2 Remove starter cover assembly from saw.

8.3 Remove starter cord shield screws.

8.4 Relieve spring tension.

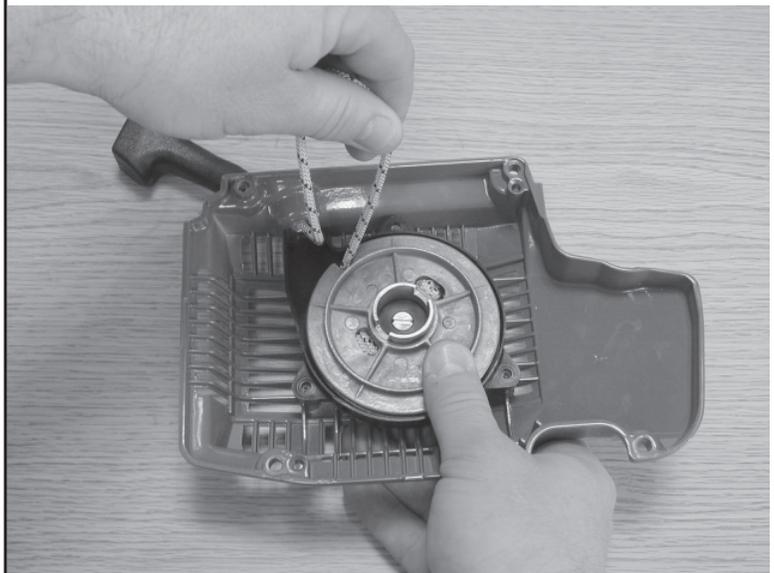
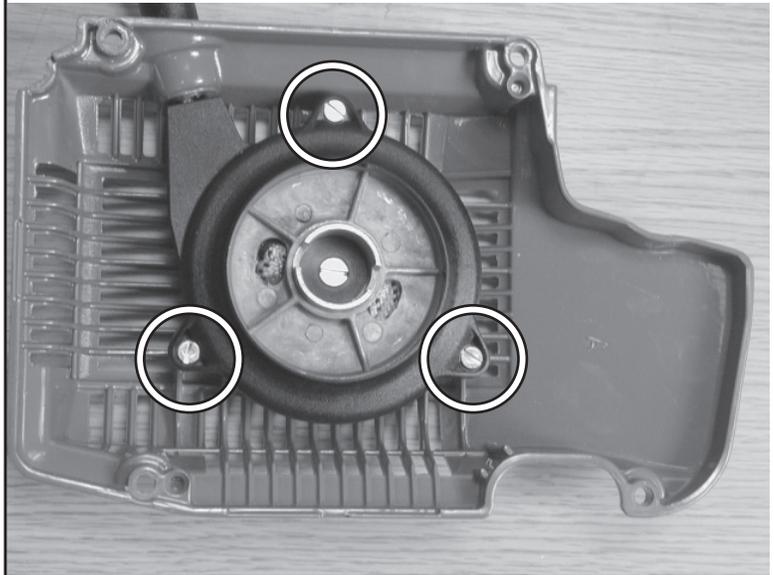
A Pull 4-6" (10-15 cm) of rope out.

B Line rope up with notch on pulley.

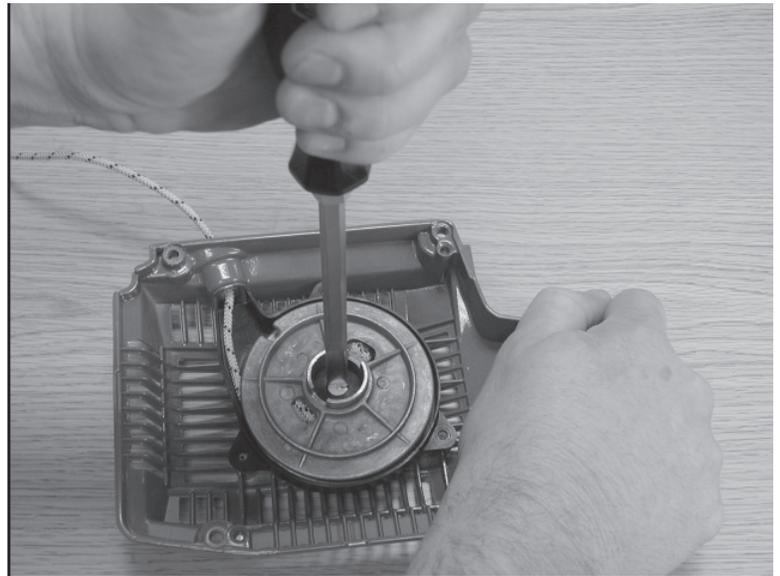
C Slowly rotate pulley counterclockwise until spring pressure is released. Use thumb as a brake.

8.5 Remove starter pulley screw and washer.

NOTE: Hold starter cover firmly.

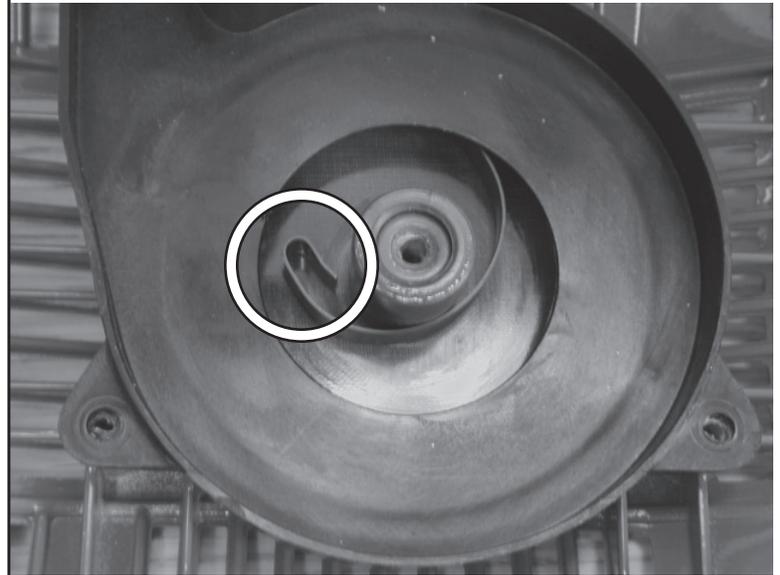


8.6 Remove starter pulley.



8.7 Inspect coil spring.

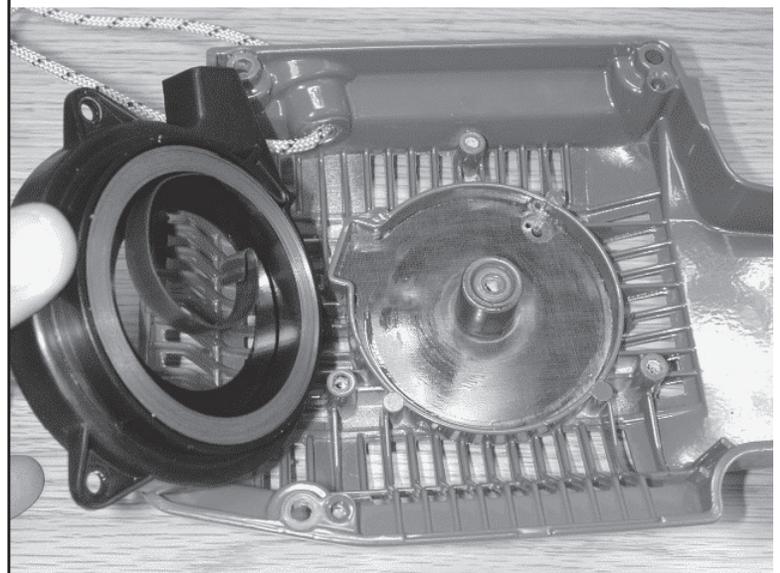
- A Replace if spring hook is damaged. Attempting to re-bend the spring hook may cause the hook to break off.



- B Carefully remove coil spring and housing to prevent spring from unwinding.

8.8 Apply light weight oil.

8.9 Replace parts carefully.



- 8.10 Inspect pulley spring catch.
- A Clean with cleaning solution.
 - B Replace if worn or broken.

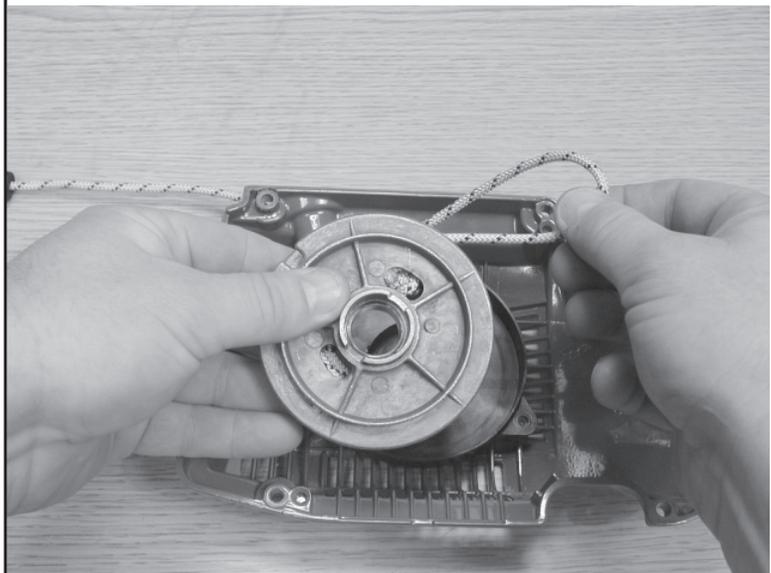


- 8.11 Install starter rope and tie knot.

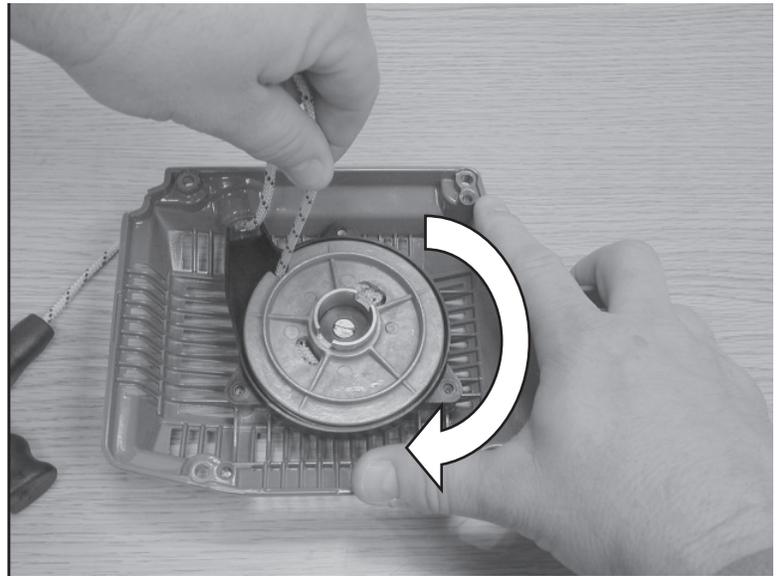


- 8.12 Install pulley
- A Wind rope onto pulley clockwise leaving 4-6" (10-15 cm) out.
 - B Make sure that the pulley spring catch is in the spring hook.

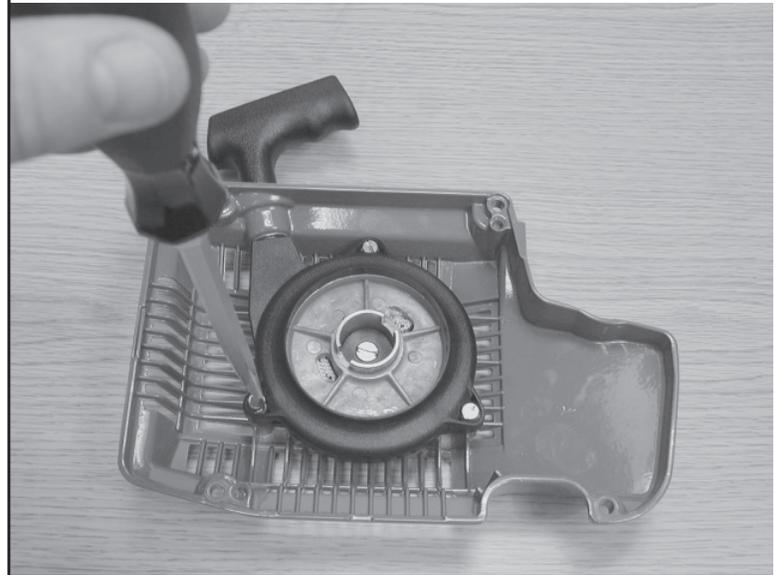
- 8.13 Install center screw.
- A Use blue Loctite®.
 - B Torque to 26 in-lbs. (2.9 Nm).



- 8.14 Wind the recoil spring.
- A Line rope up with notch on pulley.
 - B Rotate the pulley with the rope clockwise 5 times.
 - C Untangle rope and release.



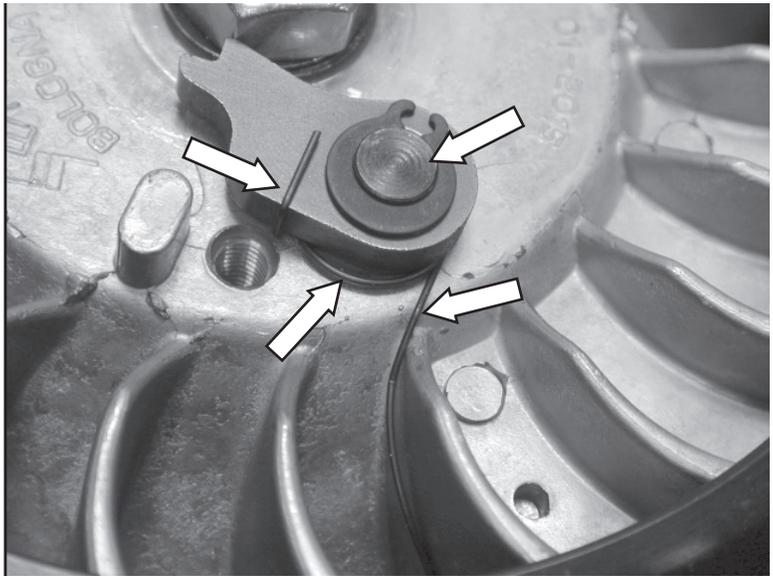
- 8.15 Assemble starter cord shield.



- 8.16 Remove starter pawl snap rings, pawls, spring, and plain washer.
- 8.17 Inspect and clean pawl components.
- A Inspect the components. Replace if necessary.
 - B Clean the components with a brush and solvent.

8.18 Assemble components

- A Make sure the snap ring spring is in the correct position.
- B Make sure the spring is in the correct position.



8.19 Install starter cover.

- A Pull out cord 4-6" (10-15 cm). Slowly release while placing cover to allow pawls to engage.



8.20 Install starter cover screws.

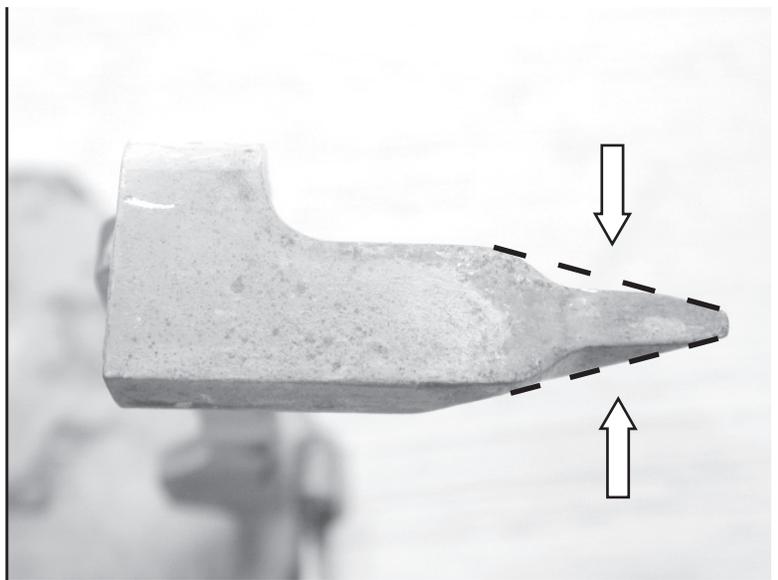
- A Use blue Loctite™.
- B Torque to 60 in-lbs. (6.77 Nm).



9 This section covers the removal, inspection, and assembly of the WallWalker® and guard flap.

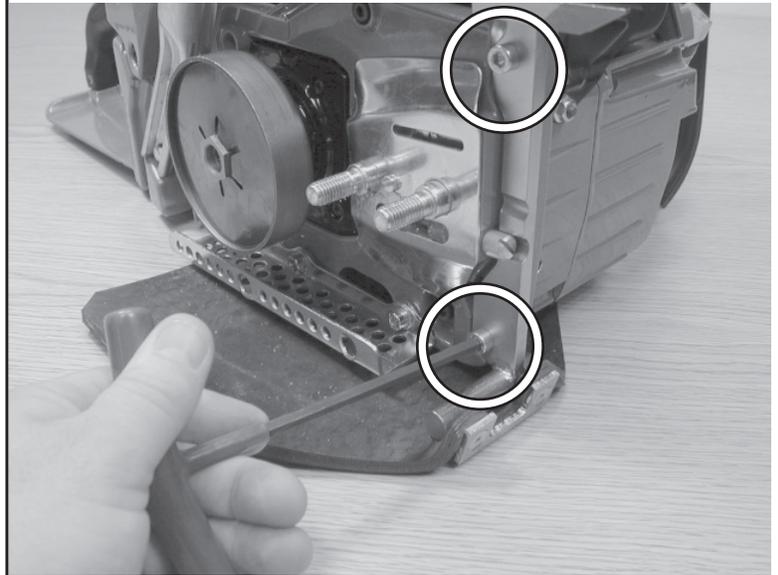
9.1 Inspect WallWalker® tip.

A If the tip is worn as shown, replace.



9.2 Remove crankcase screws and wave washers.

9.3 Remove WallWalker® from saw.



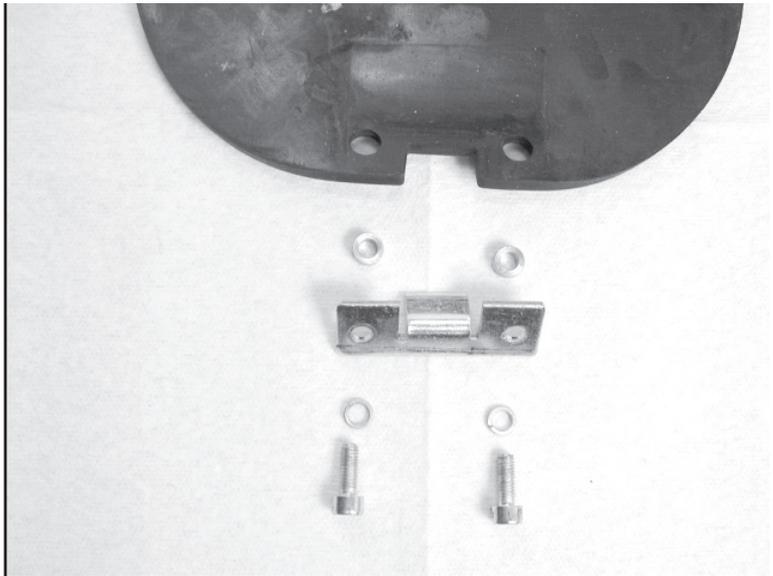
9.4 Remove guard flap screws and washer.

9.5 Remove and inspect guard flap.

A Replace the flap if it is torn or damaged in any way.



- 9.6 Assemble in the reverse order.
- A Install crankcase screws and wave washers.
 - B Use blue Loctite®.
 - C Torque to 70 in-lbs. (7.9 Nm).



10 This section covers the disassembly and assembly of the cylinder cover. Removal of the air intake components and front handle is required. Refer to sections 5 and 18 if necessary.

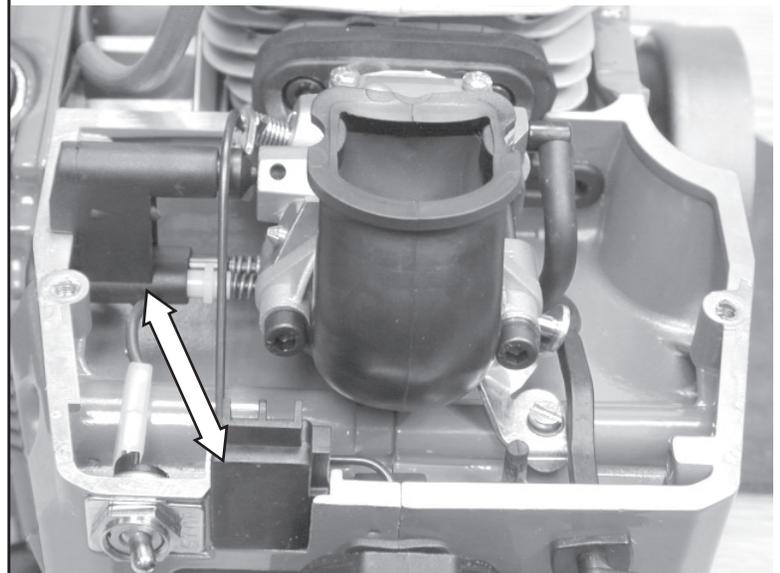
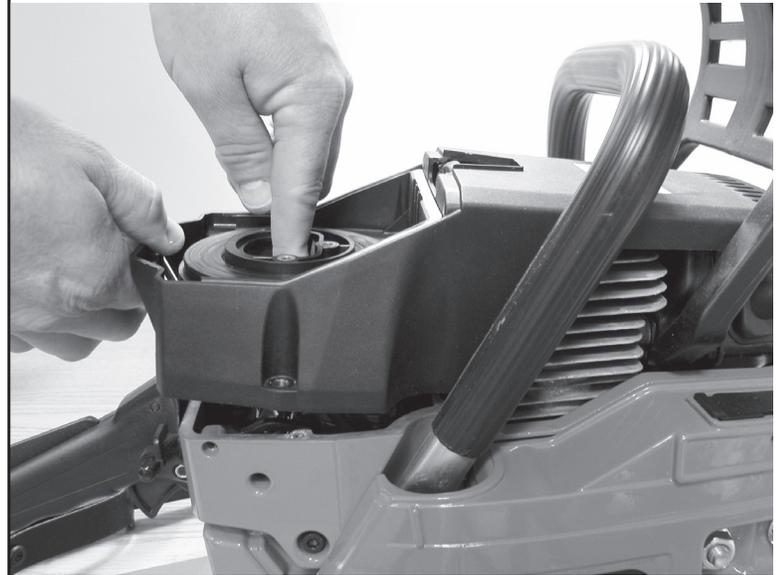
10.1 Remove the cylinder cover screws.

10.2 Remove spark plug lead from cylinder cover.

10.3 Partially remove intake manifold from cylinder cover while lifting cylinder cover away from saw.

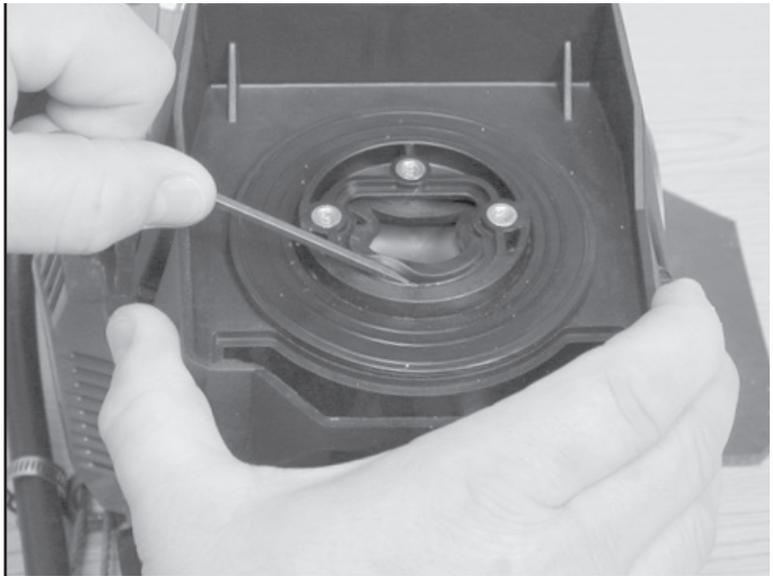
10.4 Inspect cylinder cover for damage.
A Replace if necessary.

10.5 Make sure carburetor screw boot and cylinder cover plug are in place.



10.6 Install cylinder cover.

- A Pull spark plug lead into slot in cylinder cover.
- B Push the cylinder cover down on the crankcase, guide intake manifold into cylinder cover.

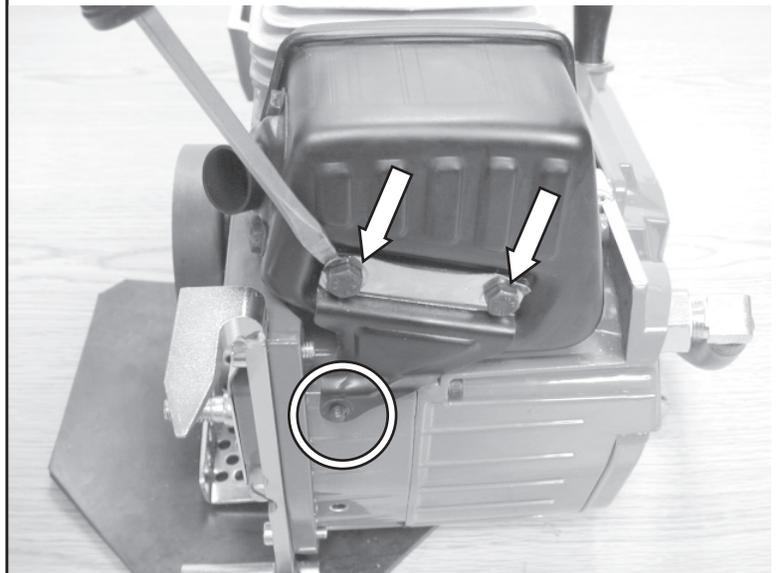
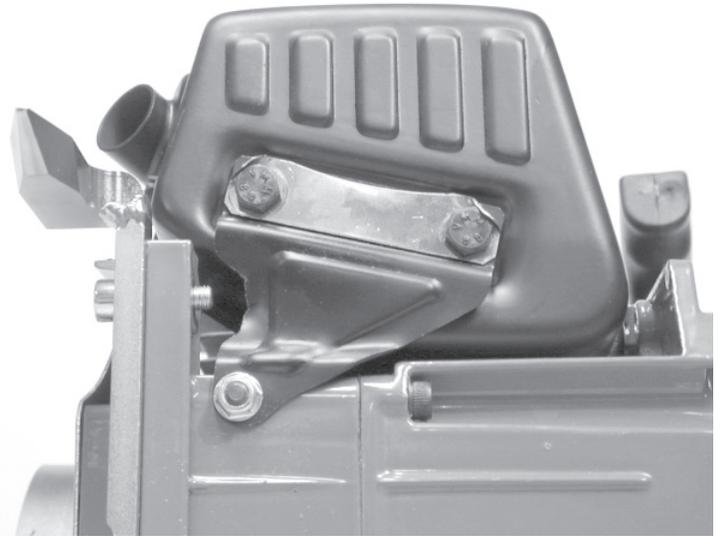


10.7 Push down cylinder cover until it sits flat on crankcase.

- A Install the cylinder cover screws using blue Loctite®.
- B Torque to 35 in-lbs. (3.95 Nm).



- 11** This section covers the disassembly, inspection, and assembly of the muffler. Removal of the WallWalker® and cylinder cover is required. Refer to sections 9 and 10 if necessary.
- 11.1 Bend the corner of the muffler screw locking plate away from the muffler screw.
- 11.2 Remove muffler screws, muffler support bracket nut, and muffler assembly.
- 11.3 Clean and inspect parts of muffler assembly.
- A Replace any damaged components.
- 11.4 Install muffler.
- A Assemble muffler screws, muffler support bracket, muffler screw locking plate.
- B Thread muffler screws into cylinder; torque to 104 in-lbs. (11.75 Nm).
- C Bend muffler screw locking plate over flat edge of muffler screw.
- D Install muffler support bracket nut (use blue Loctite®); torque to 26 in-lbs. (2.93 Nm).

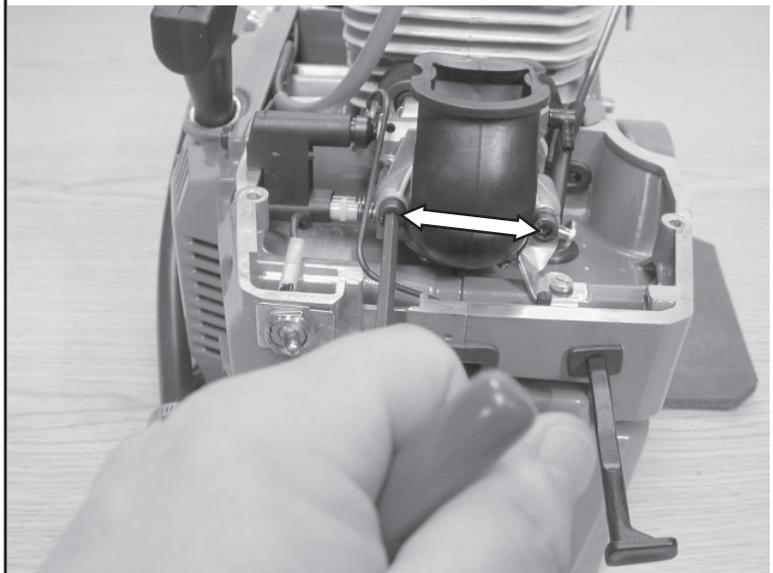
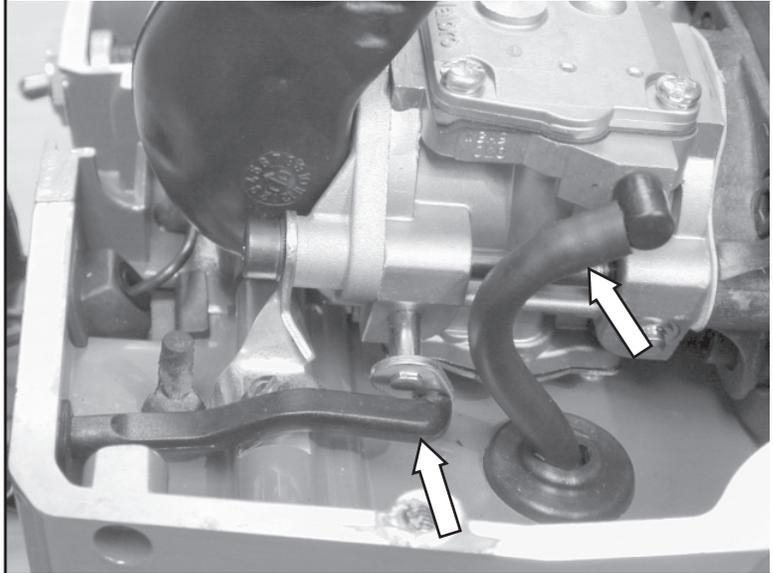


- 12** This section covers the removal, and installation of the carburetor. Removal of several groups of components is needed. Refer to sections 5 and 10. If necessary, carburetor tuning is covered in section 23.

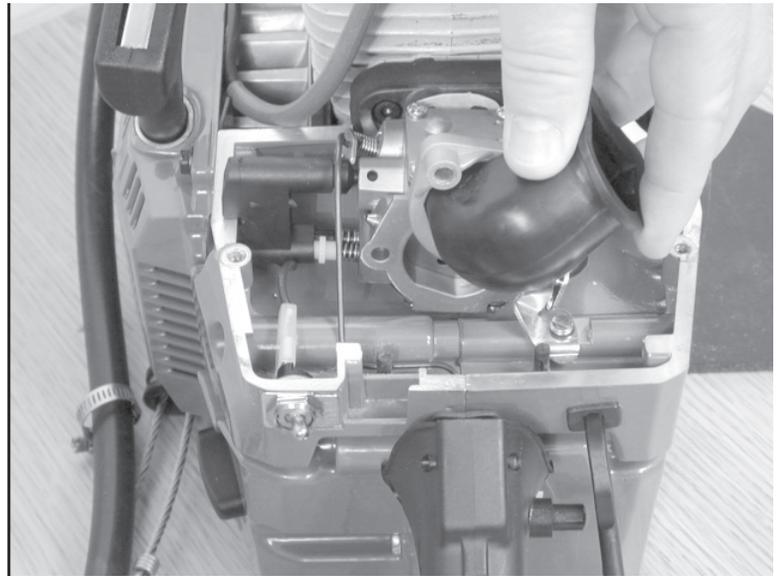
12.1 Remove fuel line from carburetor and plug.

12.2 Remove choke lever from carburetor.

12.3 Remove carburetor attachment screws.

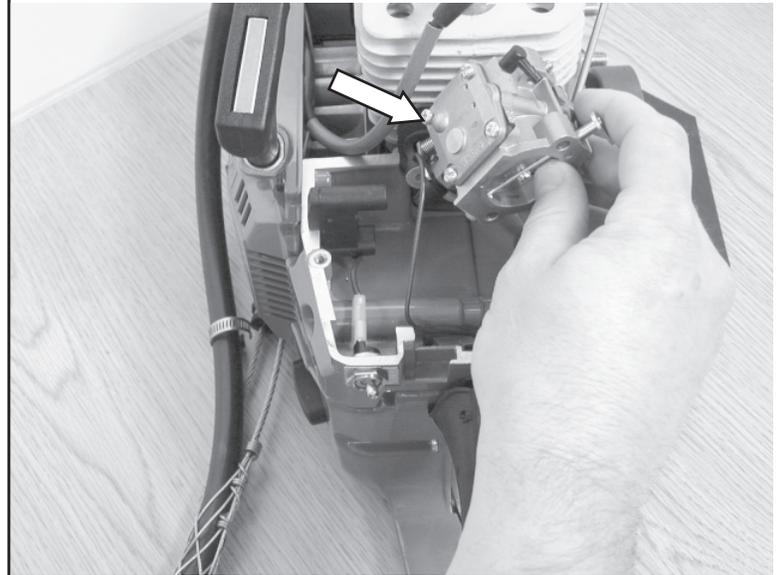


12.4 Remove intake manifold.



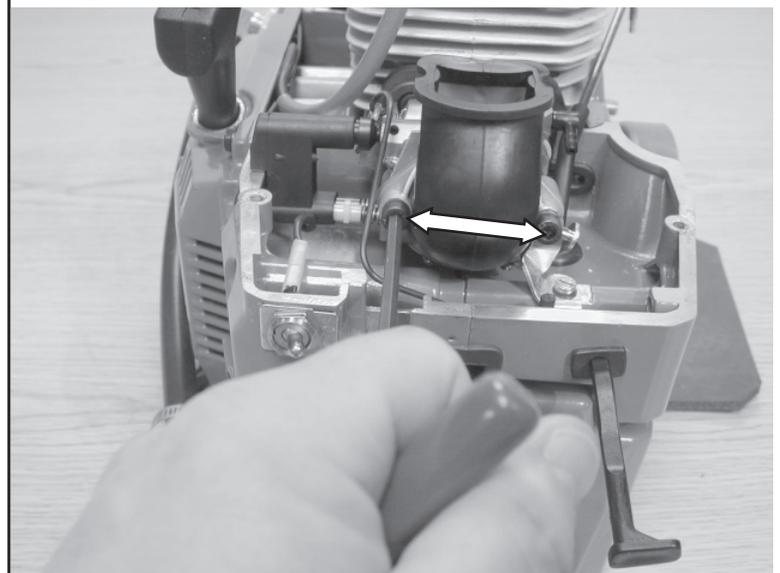
12.5 Remove carburetor.

- A Lift and twist carburetor away from throttle linkage to remove.



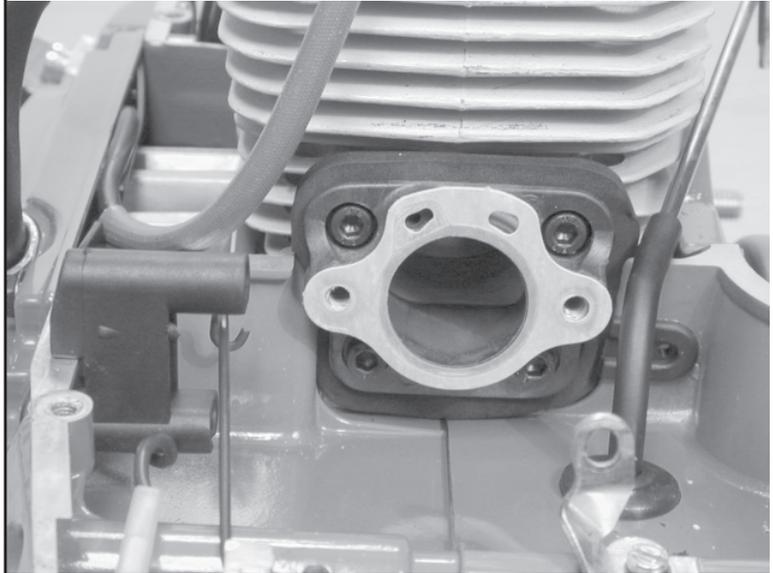
12.6 Assemble in the reverse order.

- A Torque carburetor body screws to 43 in-lbs. (4.85 Nm).

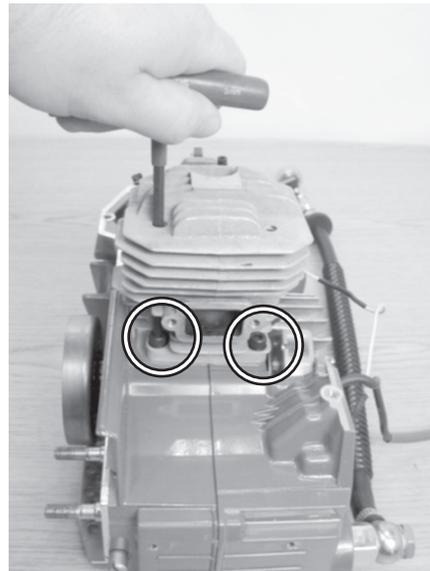


- 13** This section covers the disassembly, inspection and assembly of the cylinder, piston and related components. Removal of several component groups is required. Refer to sections 5, 6, 10, and 12 if necessary.

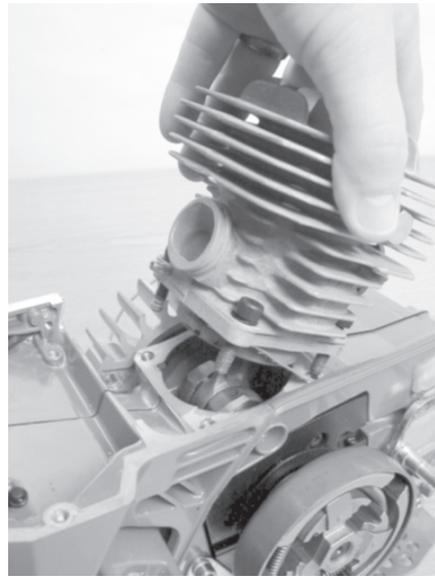
- 13.1** Remove insulator base screws.
A Remove carburetor insulator from cylinder.



- 13.2** Remove cylinder screws (4) and wave washers.



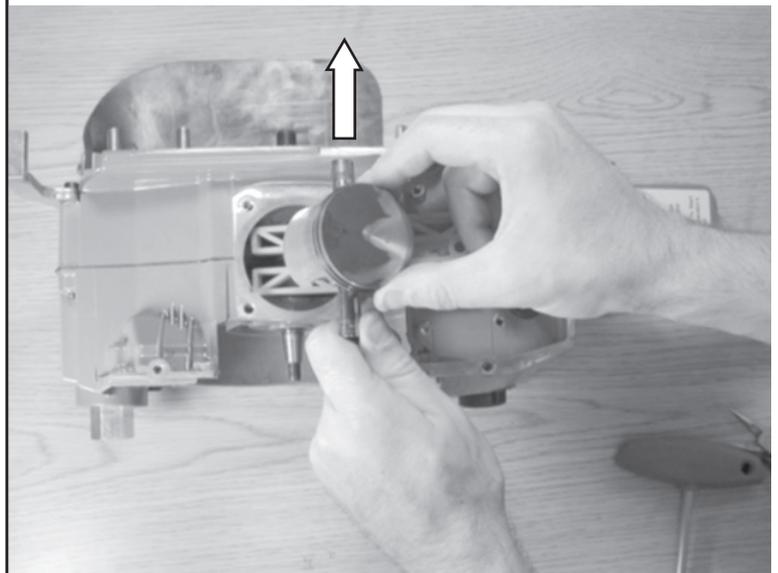
- 13.3 Remove cylinder.
- A Remove cylinder gasket and clean case.



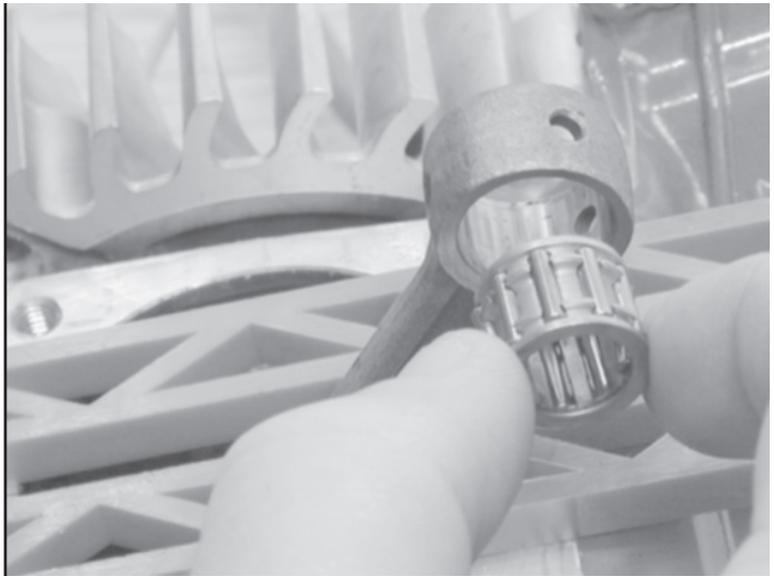
- 13.4 Remove wrist pin retaining clips



- 13.5 Press wrist pin out with an 8 mm deep socket.
- 13.6 Remove piston and inspect. Replace if damaged.

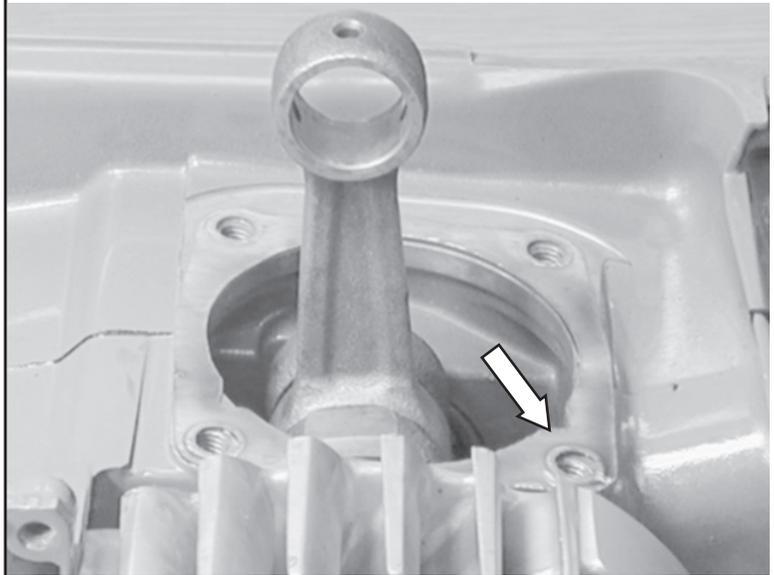


13.7 Remove wrist pin bearing.



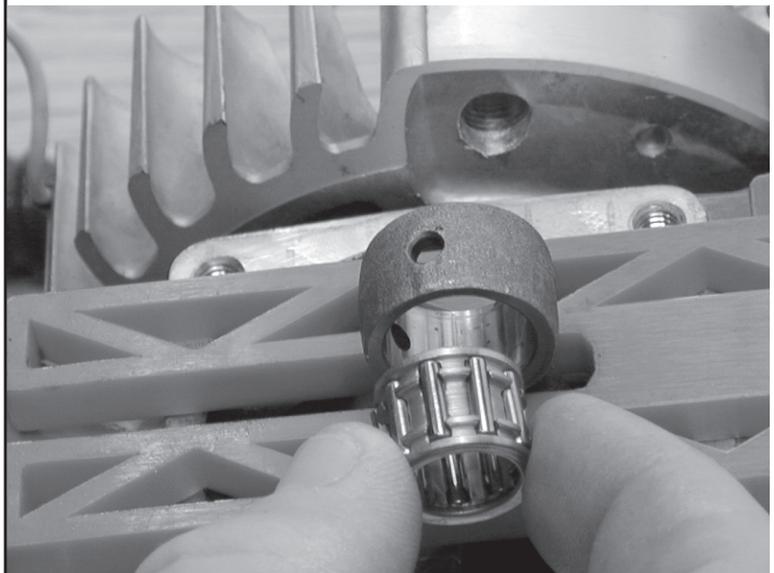
13.8 Cylinder gasket

- A Oil gasket with ICS® 2-stroke engine oil.
- B Install gasket and align holes and notch.



13.9 Install wrist pin bearing in rod.

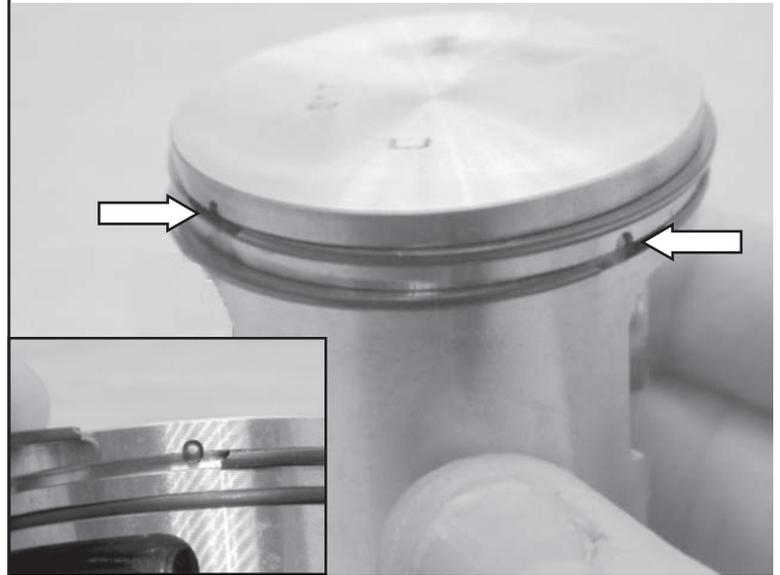
- A Oil bearing with ICS® 2-stroke engine oil.



13.10 Install rings.



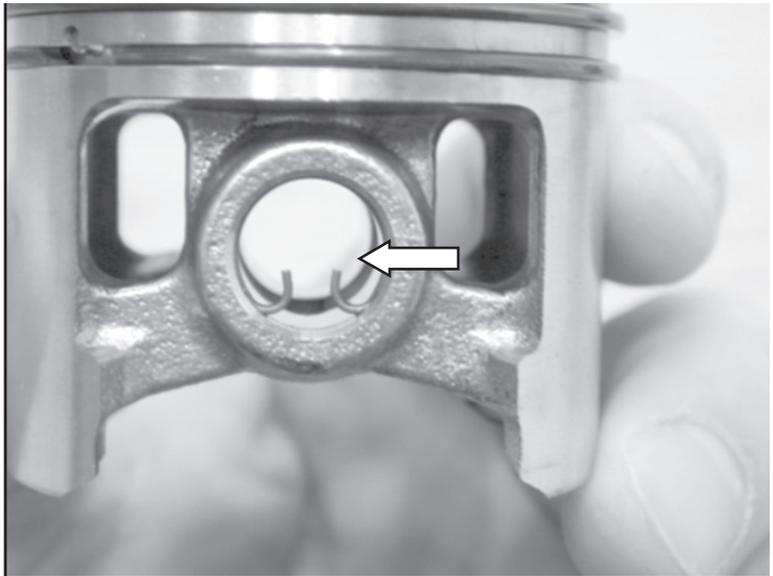
13.11 Ring orientation.



13.12 Install one wrist pin retaining clip.



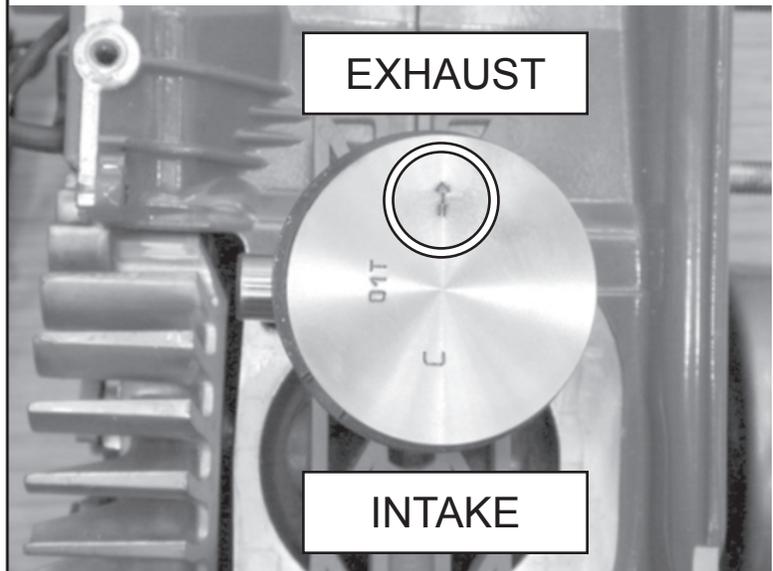
13.13 Make sure wrist pin retaining clip is in the proper orientation.



13.14 Lubricate wrist pin and partially install in piston.

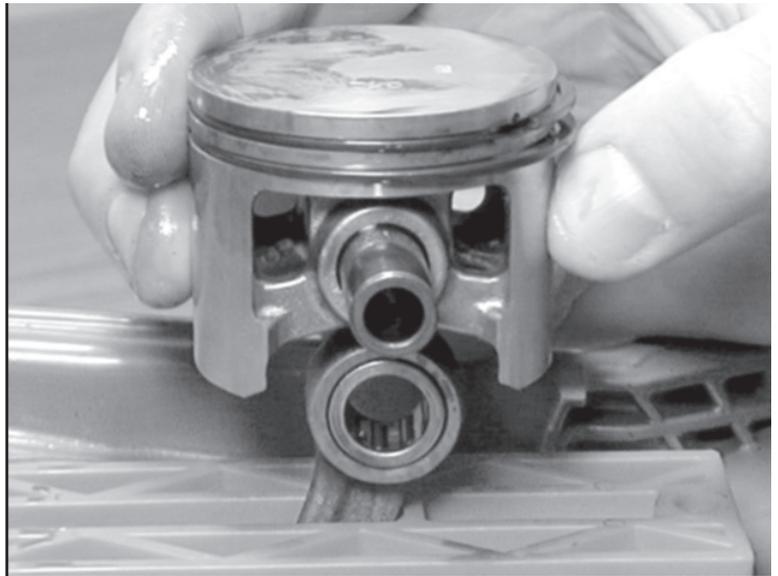


13.15 Align piston in correct orientation.



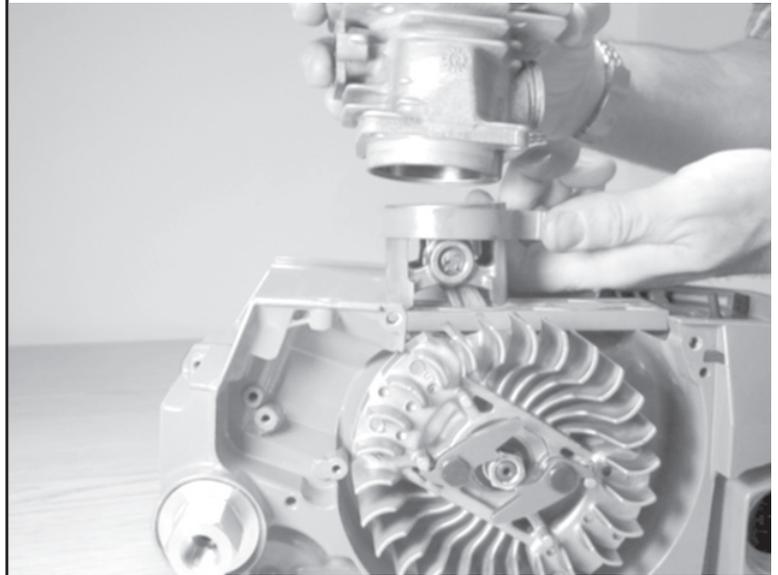
13.16 Install piston.

- A Oil piston with ICS® 2-stroke oil.
- B Align wrist pin with wrist pin bearing.
- C Complete wrist pin installation.
- D Install second wrist pin retaining clip.



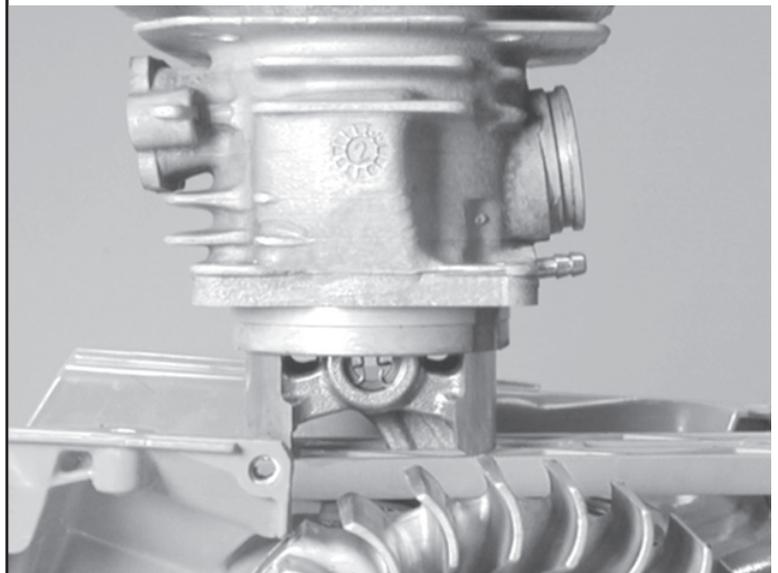
13.17 Install cylinder

- A Lubricate cylinder bore with ICS® 2-stroke oil.
- B Compress rings with ring compression tool.
- C Slide cylinder onto piston, pushing ring compression tool down.



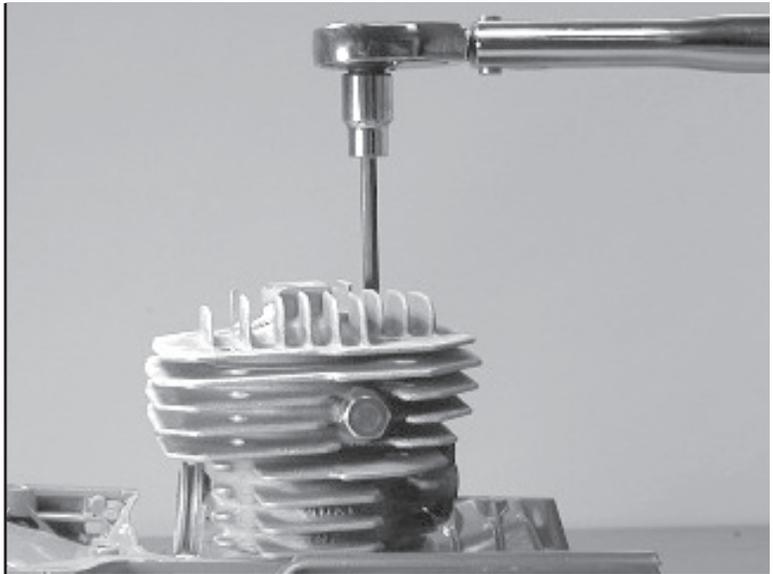
13.18 Install cylinder.

- A Remove ring compressor.
- B Slide cylinder onto piston and into crankcase.
- C Align cylinder bolt holes with crankcase.



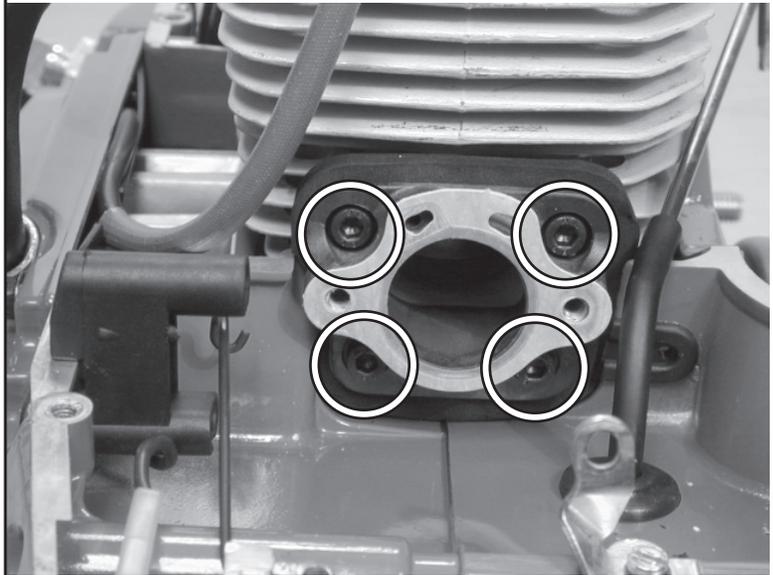
13.19 Install 4 cylinder screws and washers.

- A Use blue Loctite®.
- B Torque bolts to 104 in-lbs. (11.75 Nm).



13.20 Install insulator base.

- A Install insulator base screws, use blue Loctite® and torque to 52 in-lbs. (5.87 Nm).



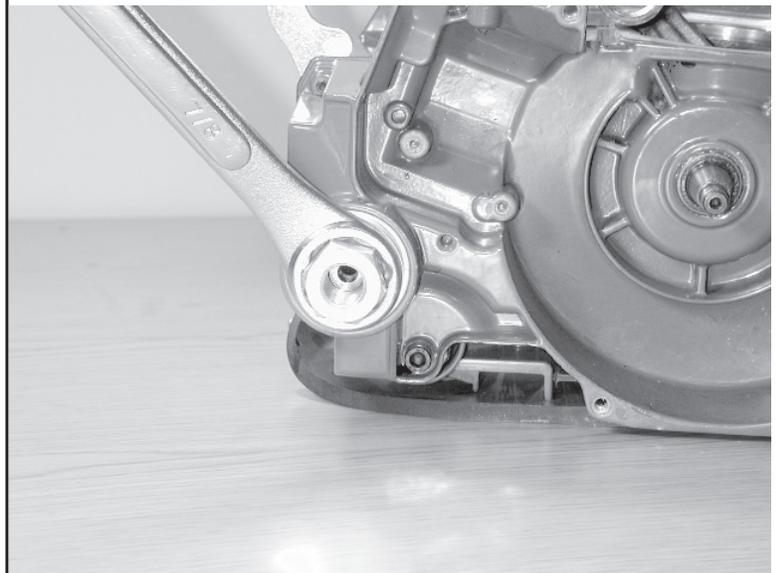
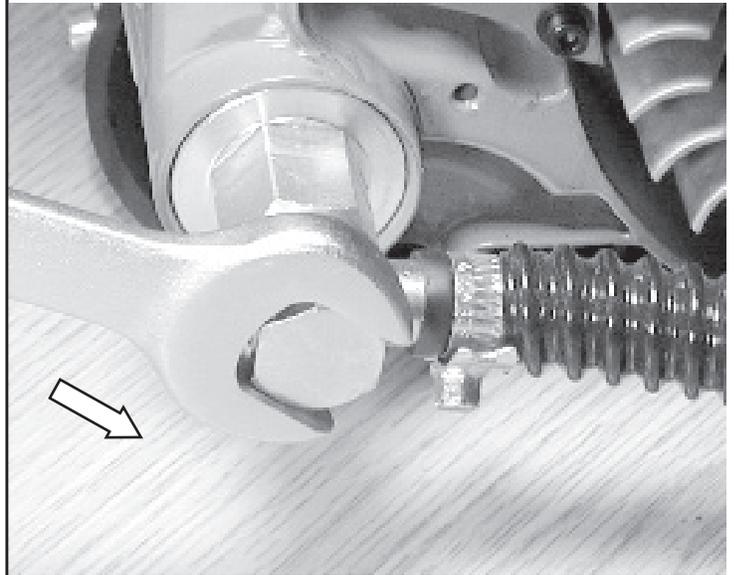
14 This section covers water hose and water tank cap.

14.1 Remove water connection from hose end.

14.2 Remove starter cover screw with hose hanger from saw.

14.3 Remove water hose connector.

14.4 Unscrew water tank cap from saw.



14.5 Release water tank cap from water tank tube.

A Depress orange fitting as shown.

14.6 Assemble in the reverse order.



15 This section covers the removal, inspection, and installation of the ignition coil. Removal of the starter is required. Refer to section 8 if necessary.

15.1 Remove starter.

15.2 Remove starter flywheel shroud by unhooking wires.

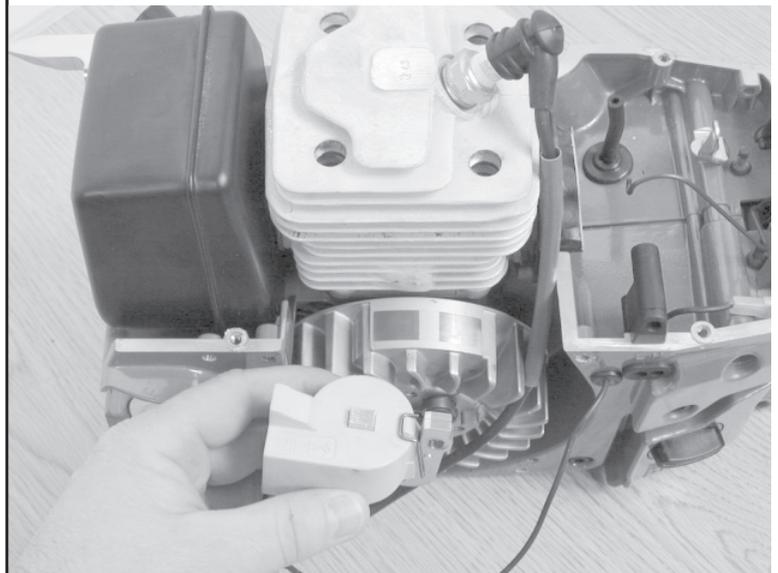
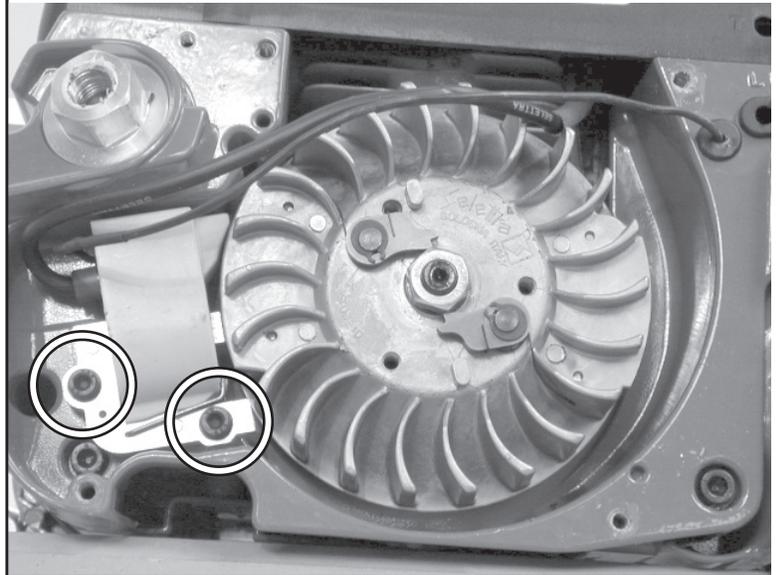
15.3 Remove ignition coil screws, wave washers and plain washers.

15.4 Remove ignition coil.

15.5 Inspect.

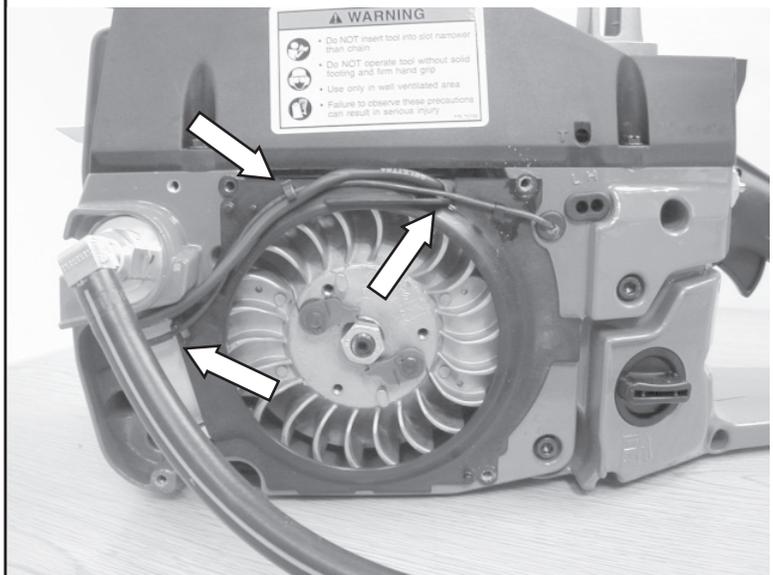
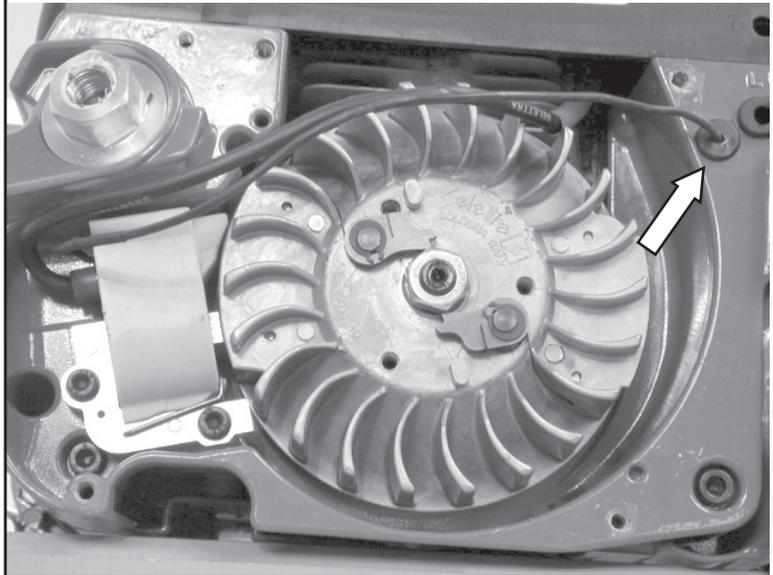
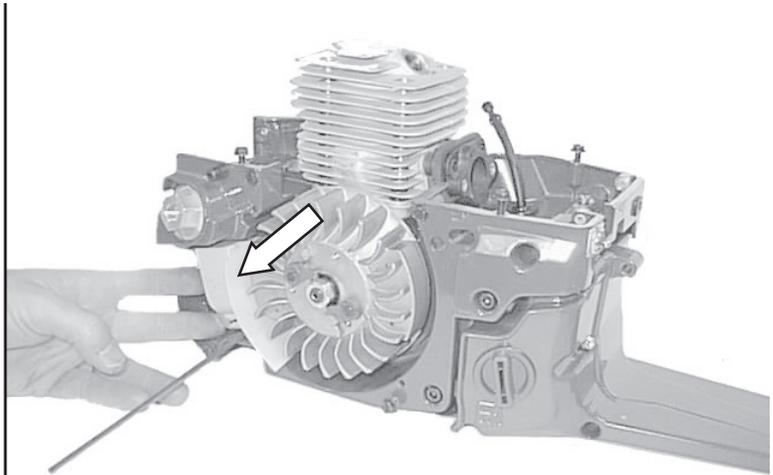
A Look for cracked/missing insulation.

B Clean flywheel magnets and coil if rusty.



15.6 Install Ignition coil.

- A Place ignition coil shim (0.012") on magnet counterweight side of flywheel.
- B Set ignition coil in place.
- C Install ignition coil screws, wave washers, and plain washers with blue Loctite®.
- D Holding shim, rotate flywheel magnet around to coil.
- E Torque ignition coil screws to 52 in-lbs. (5.87 Nm).
- F Remove shim, rotate flywheel to check clearance.
- G Route ignition stop switch wire through crankcase into carburetor chamber. Install wire grommet in crankcase.



15.7 Complete ignition wire routing and assemble saw in reverse order.

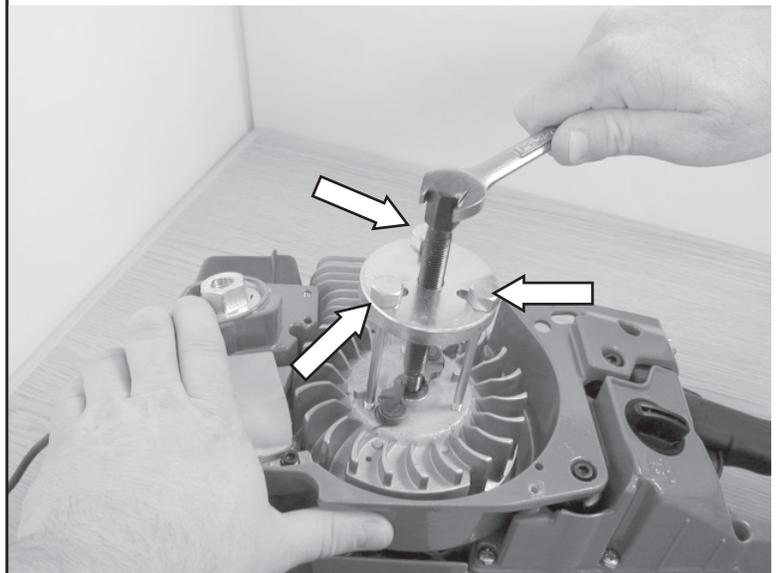
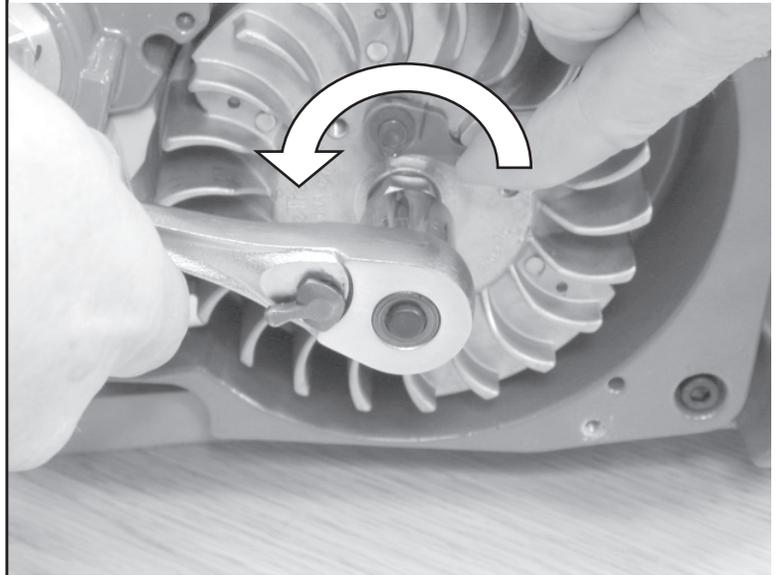
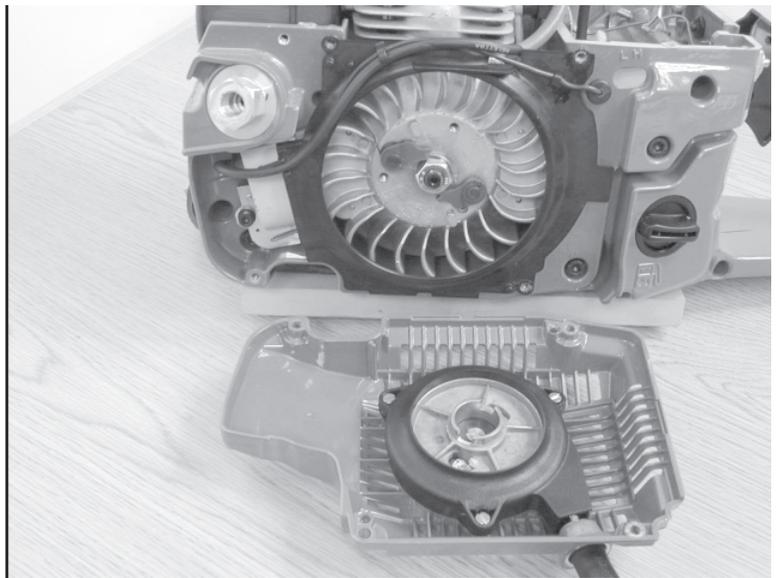
16 This section covers the removal, inspection, and installation of the flywheel. Removal of the starter and spark plugs is required. Refer to sections 6 and 8 if necessary.

16.1 Remove sparkplug and insert piston stop.

16.2 Remove flywheel nut (counter clockwise), wave washer, and plain washer.

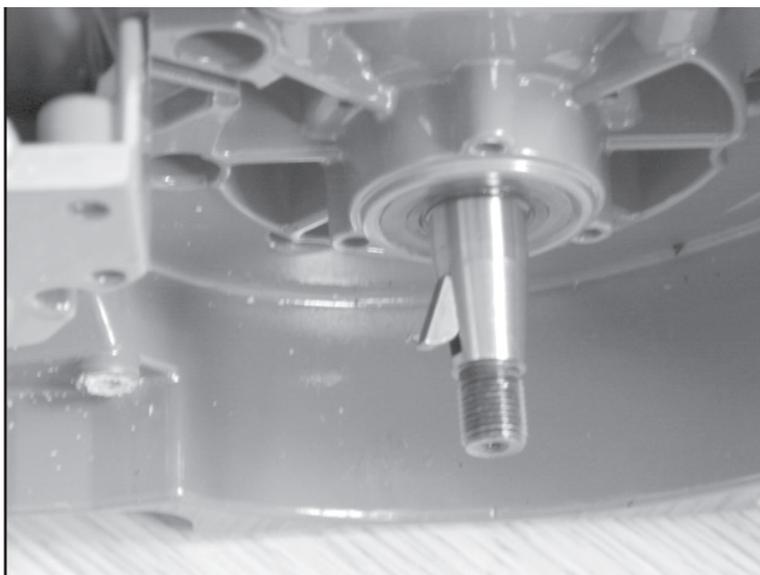
16.3 Install flywheel puller bolts (3) finger tight. Turn main puller bolt clockwise with wrench until flywheel releases from the crankshaft.

16.4 Inspect & clean flywheel. Replace if any of the fins are broken.



16.5 Inspect woodruff key.

- A Replace if broken or damaged.



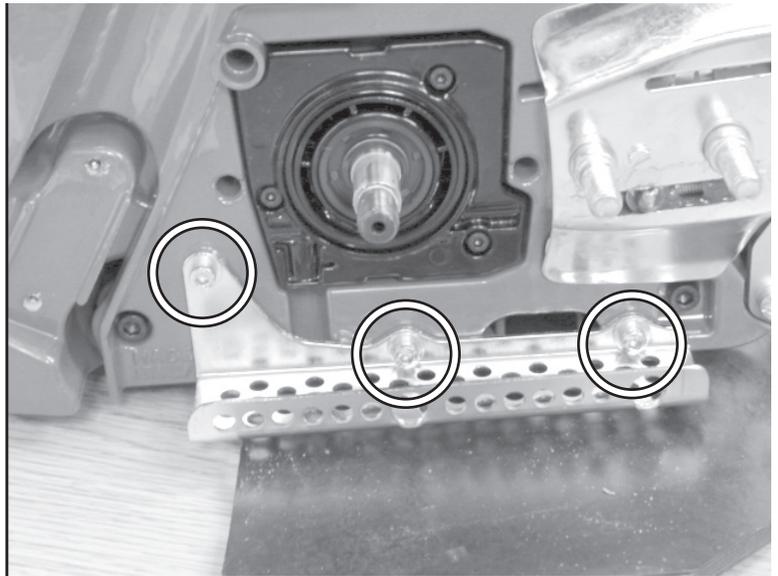
16.6 Install flywheel, plain washer, wave washer, and flywheel nut.

- A Torque nut to 390 in-lbs. (44 Nm).



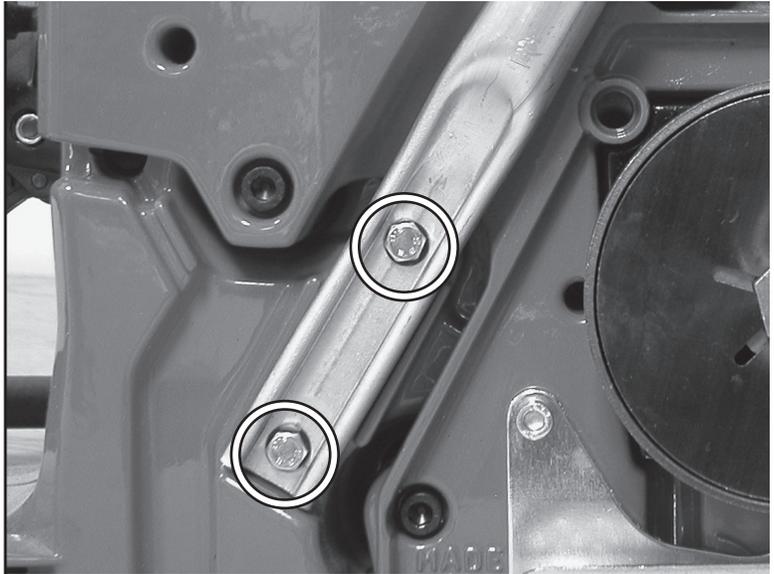
17 This section covers the removal, inspection, and installation of the bottom guard.

- A Remove bottom guard screws and split washers.
- B Inspect bottom guard.
- C Replace if damaged.
- D Assemble in reverse order

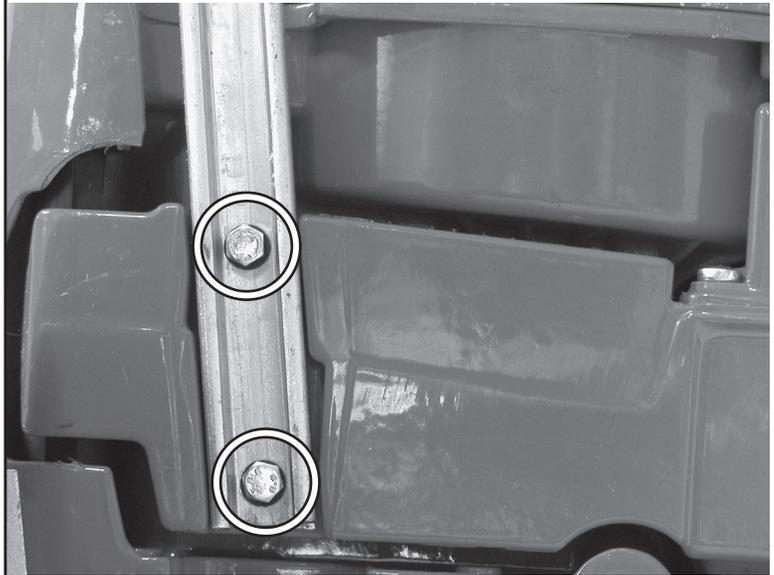


18 This section covers the removal, inspection, and installation of the front handle.

18.1 Remove front handle screws on right side.



18.2 Remove front handle screws on bottom.



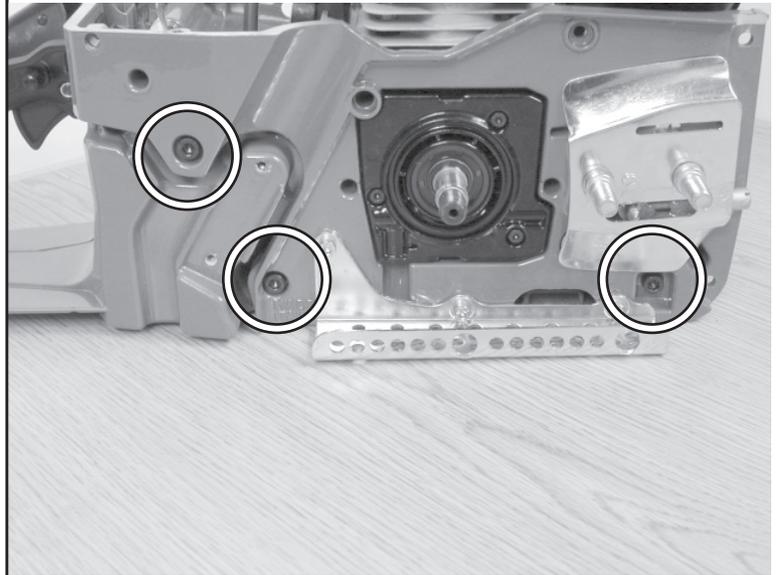
18.3 Install front handle.

- A Roll front handle into place.
- B Install front handle screws (4).
- C Use blue Loctite®.
- D Torque to 43 in-lbs. (4.9 Nm).



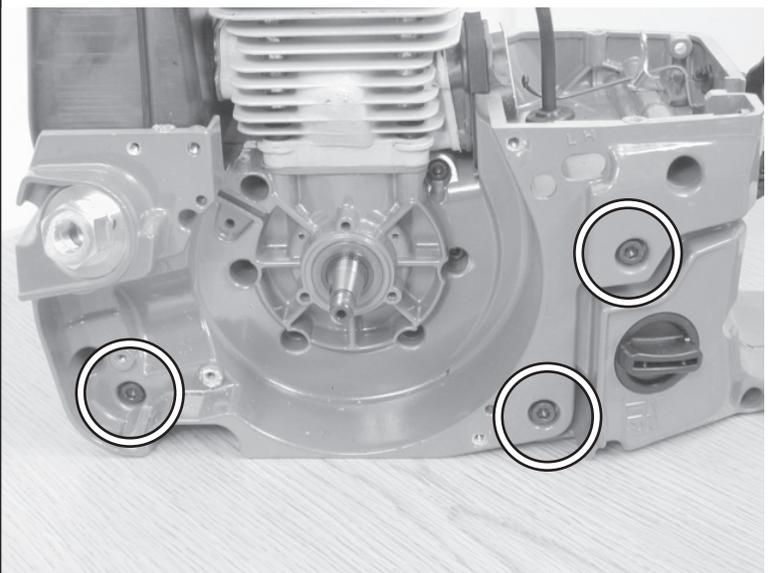
- 19** This section covers the disassembly, inspection, and assembly of the vibration isolaters, fuel tank, and rear handle.

- 19.1** Remove vibration isolator screws and wave washers on clutch side of saw.



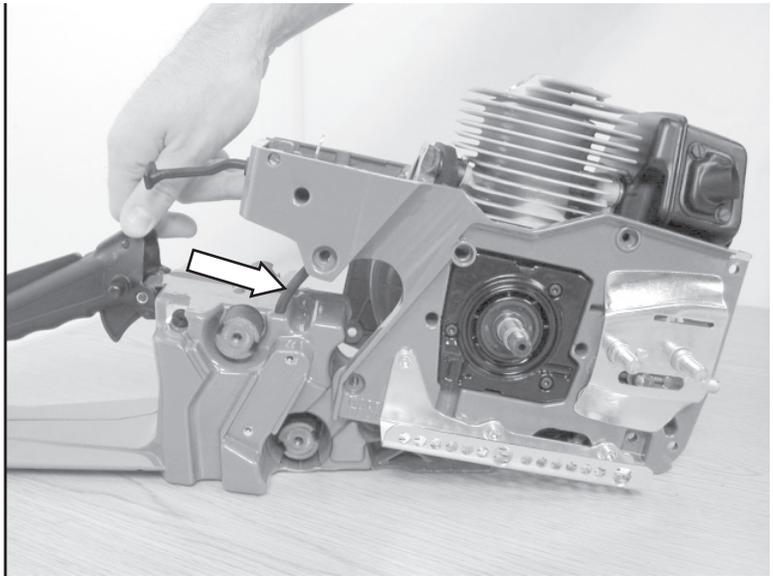
- 19.2** Remove vibration isolator screws and wave washers on flywheel side of saw.

NOTE: Flywheel and cylinder cover do not need to be removed to perform fuel tank maintenance.

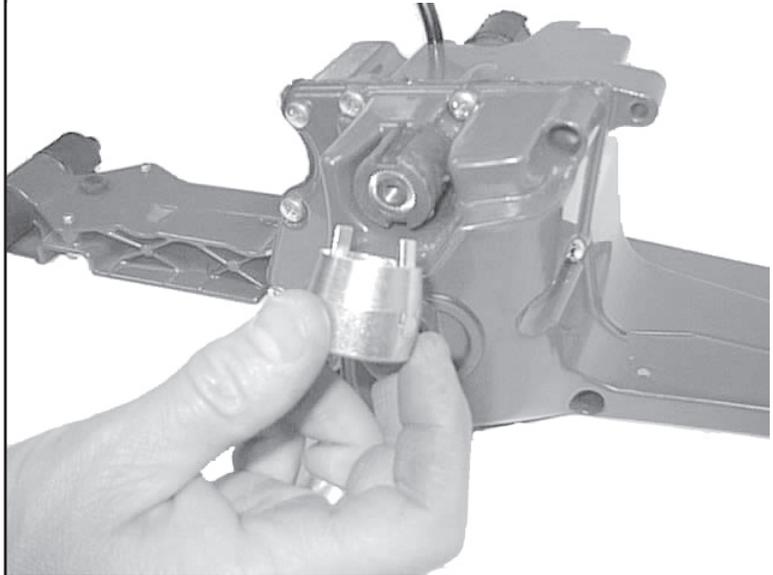


19.3 Separate crankcase and fuel tank.

NOTE: During assembly be careful not to kink the fuel line between the crankcase and fuel tank

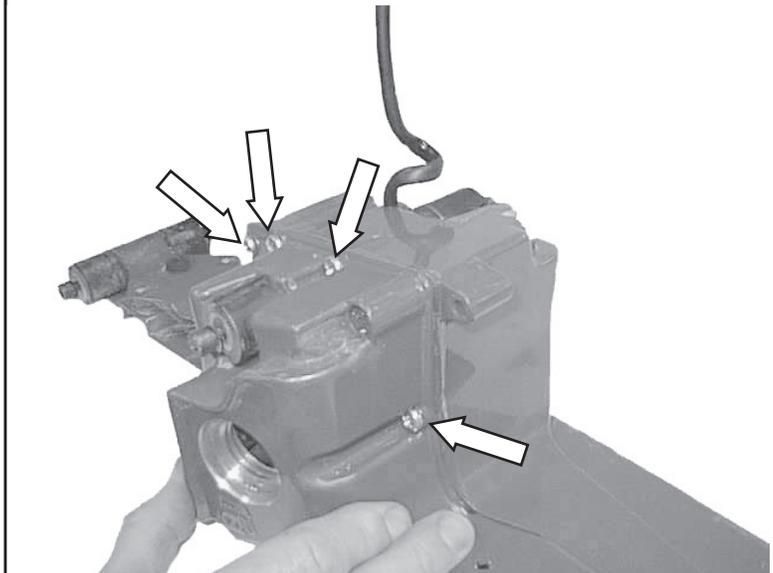


19.4 Remove vibration isolators from fuel tank (6) if necessary.



19.5 Separate the fuel tank halves.

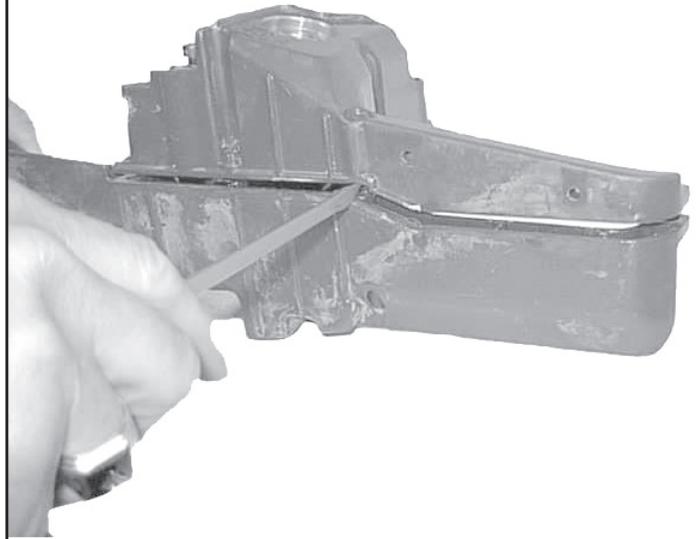
- A Remove the rear handle.
- B Remove the screws (9) around the tank.



19.6 Separate the fuel tank halves using a large screwdriver.

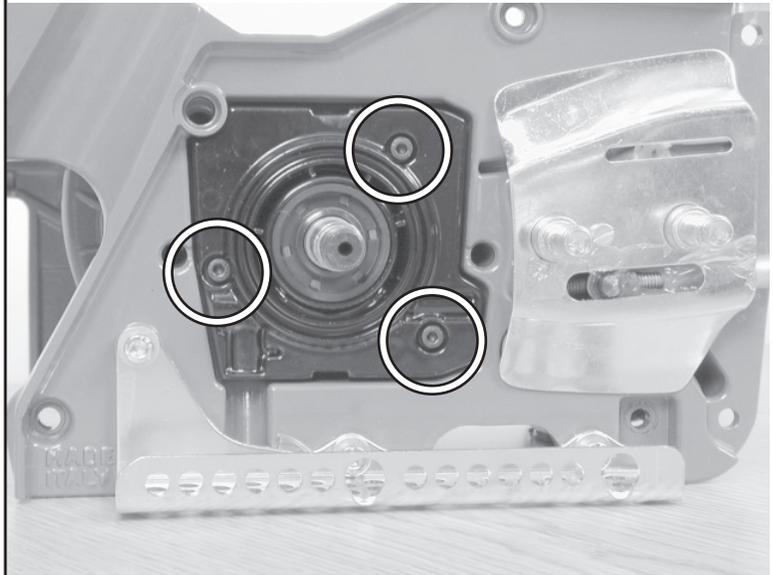
- A Clean the joining surface of the tank halves.
- B Assemble in the reverse order.

NOTE: Use a fuel proof liquid gasket material to reseal the tank (Scotch Grip® #847) when assembling fuel tank.

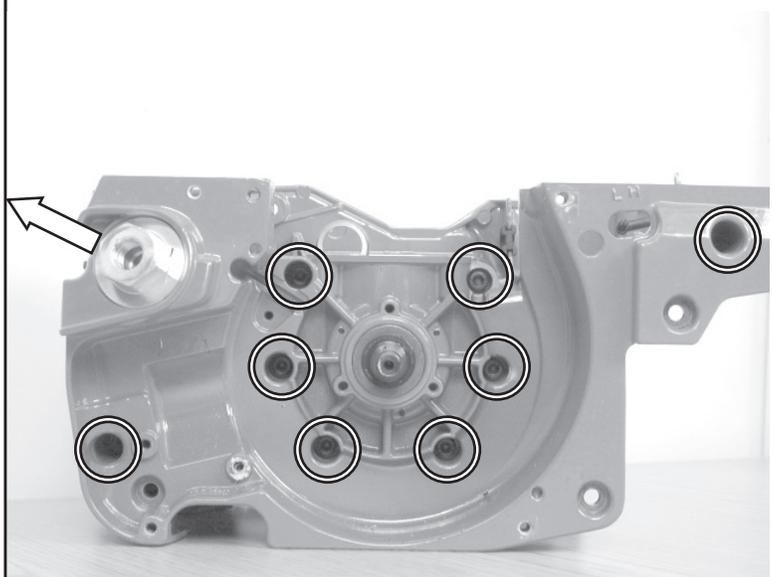


20 This section covers the disassembly, inspection, and assembly of the crankcase seals and crankshaft bearings.

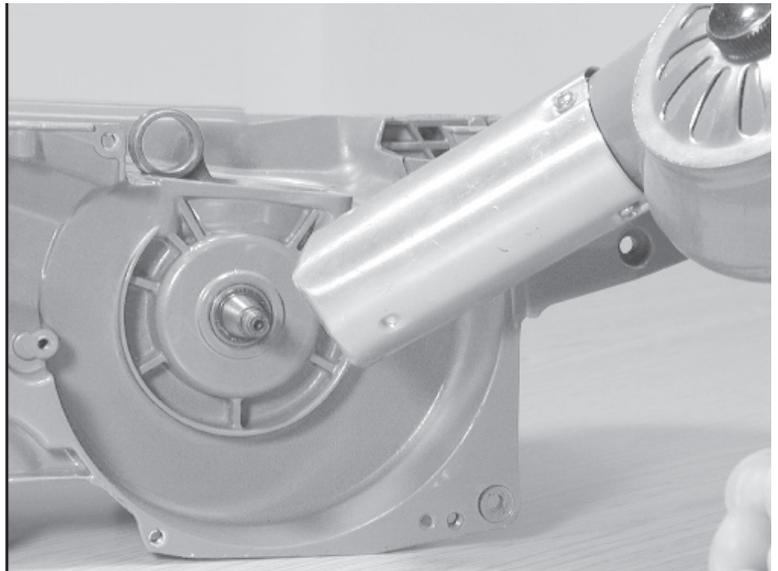
20.1 Remove outer crankshaft seal housing screws and wave washers.



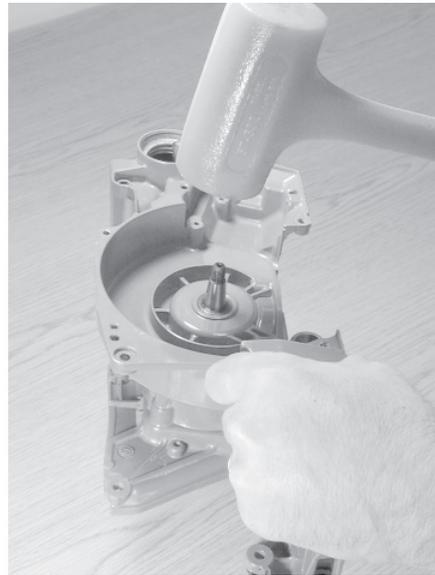
20.2 Remove crankcase bolts.



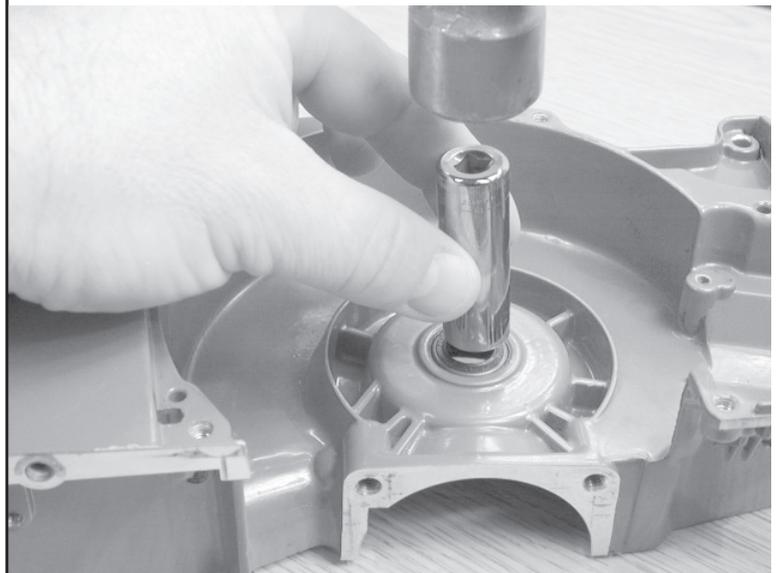
- 20.3 Heat the flywheel side of crankcase with heat gun to 150° F (65.5° C).



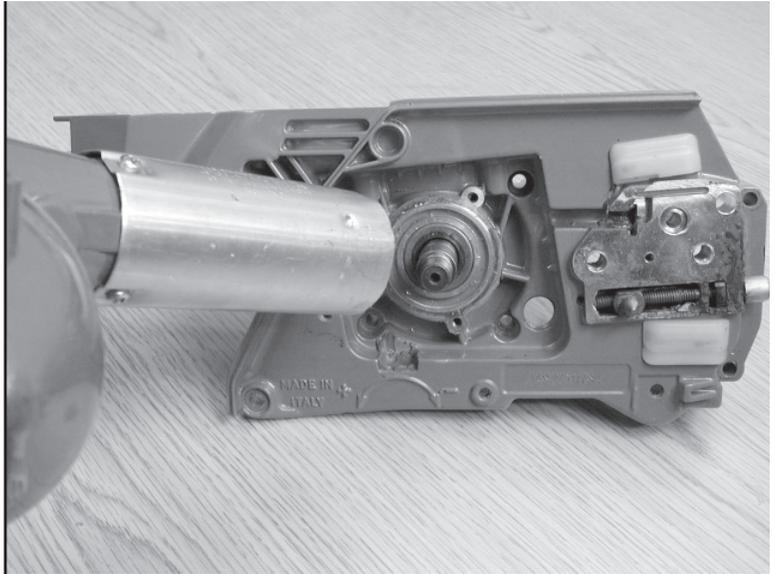
- 20.4 To remove the flywheel side of crankcase; tap crankshaft with plastic mallet.
- A Suspend above work surface.
 - B Tap with mallet.



- 20.5 Remove the flywheel side of crankcase seal.

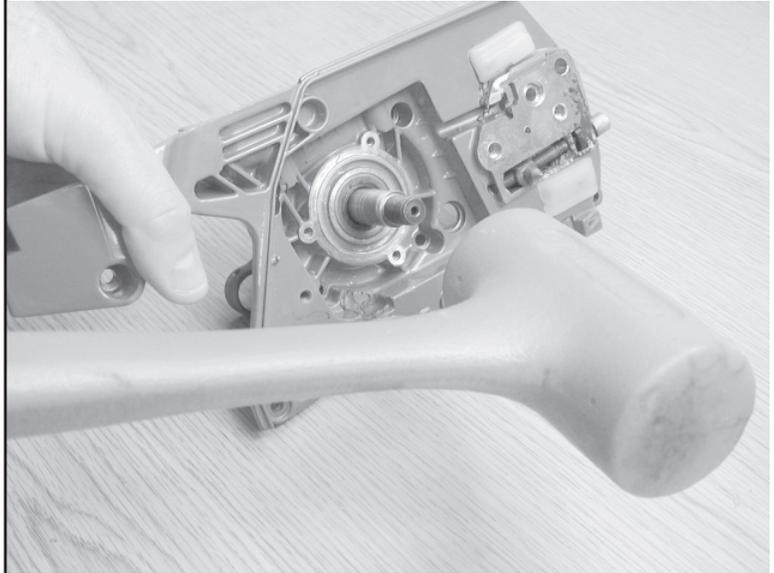


- 20.6 Heat the clutch side of crankcase with heat gun to 150° F (65.5° C).

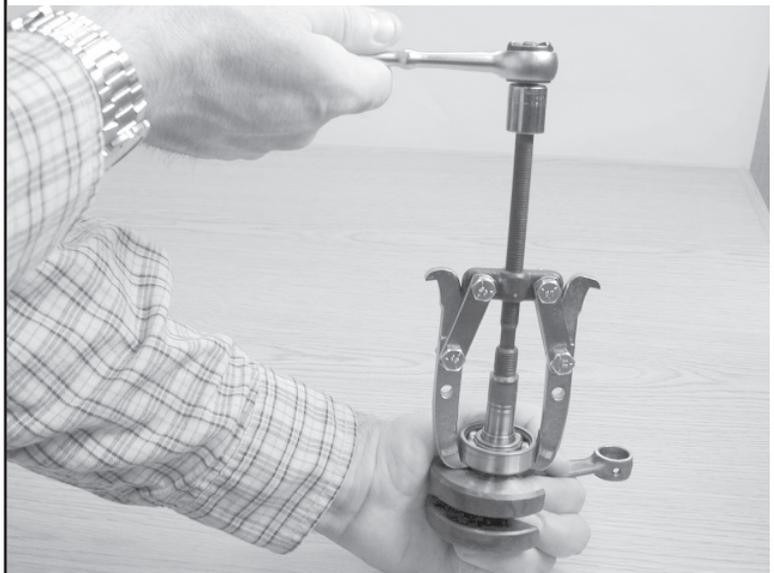


- 20.7 To remove crankshaft from the clutch side of crankcase. Tap crankshaft with a plastic mallet.

- A Suspend above work surface.
- B Tap with plastic mallet.



- 20.8 Remove the bearing from the flywheel side of crank shaft.

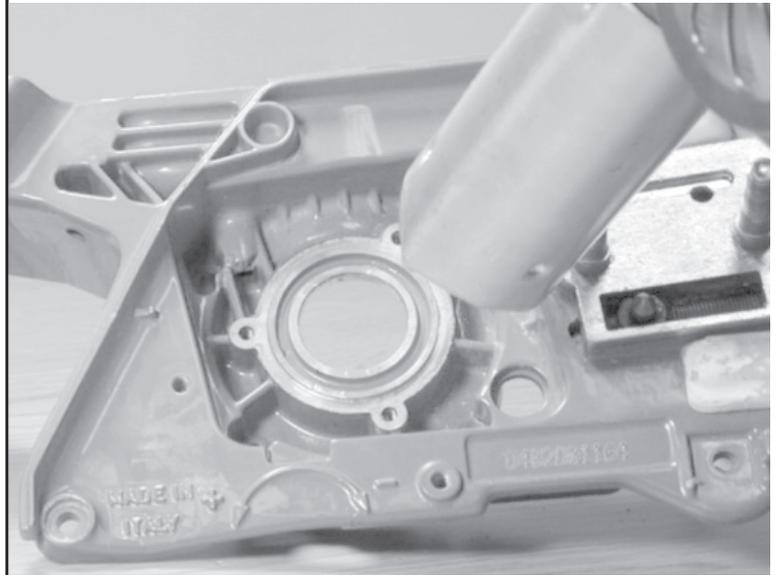


20.9 Remove the bearing, seal, and bushing from the clutch side of crankshaft.



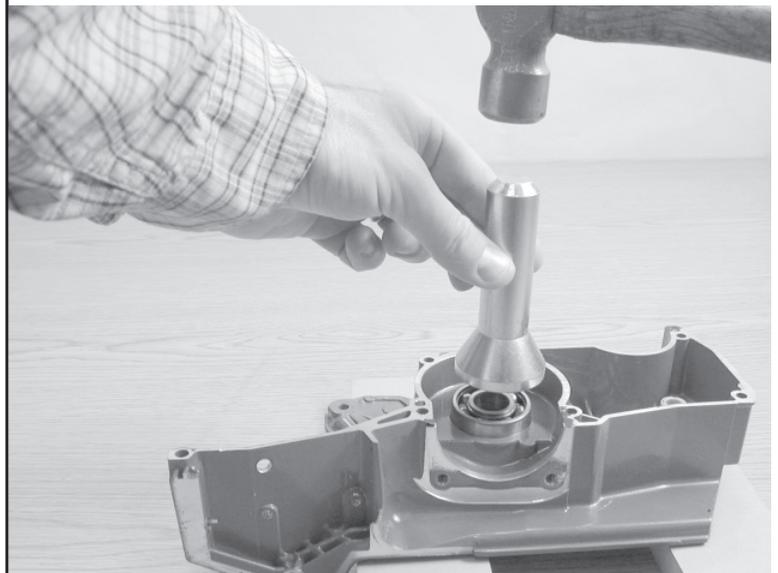
20.10 Clean mating crankcase faces.

20.11 Heat crankcase halves to 150° F.

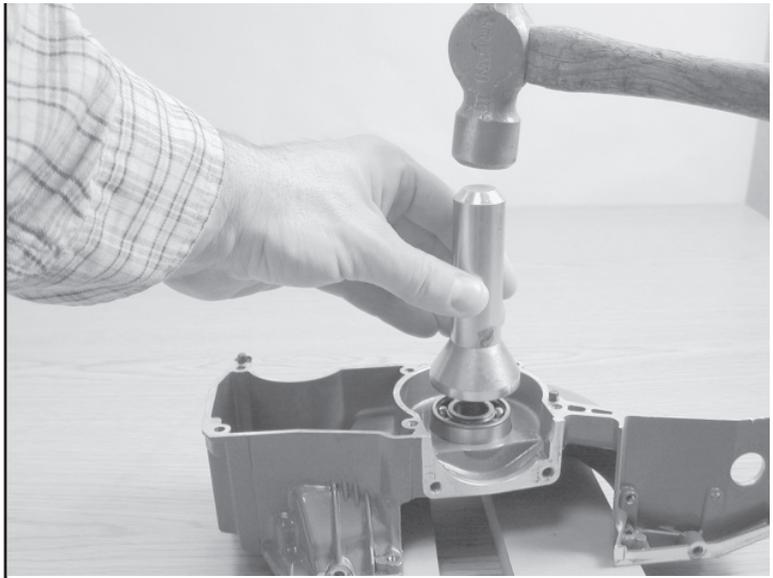


20.12 Install bearing into crankcase halves.

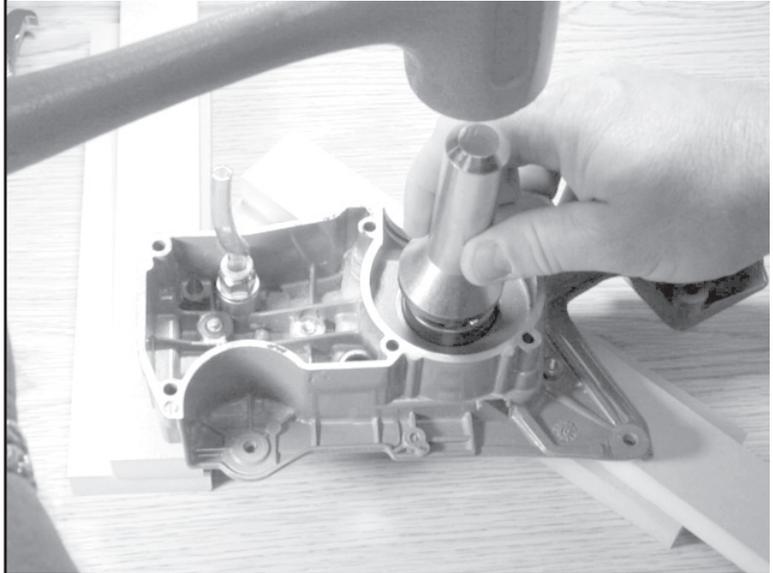
20.13 Tap with bearing driver and mallet.



20.14 Repeat with other half.



20.15 Install crankshaft into clutch side of case.

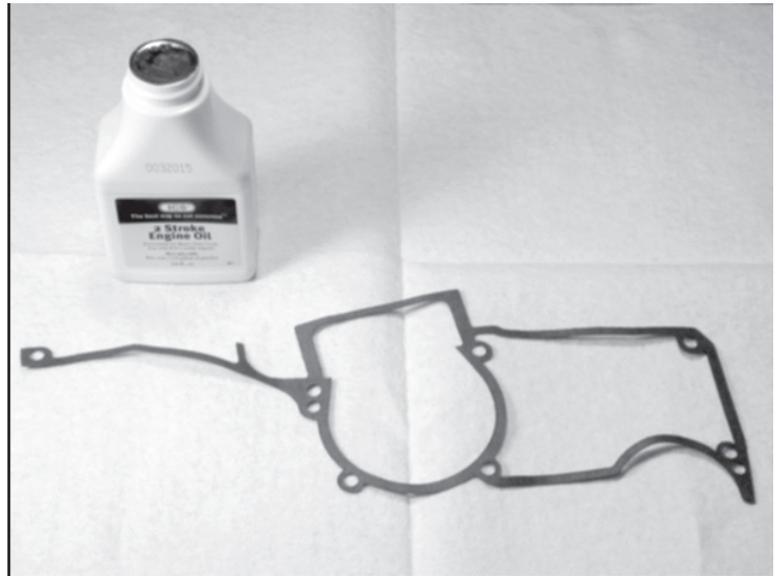


20.16 Place clutch side of crank case seal on crankshaft.

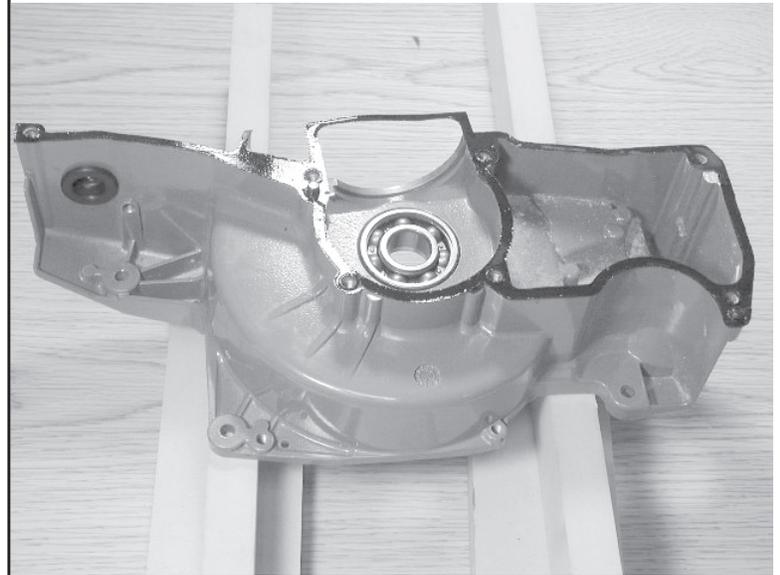
- A Tap lightly with bearing driver and mallet.



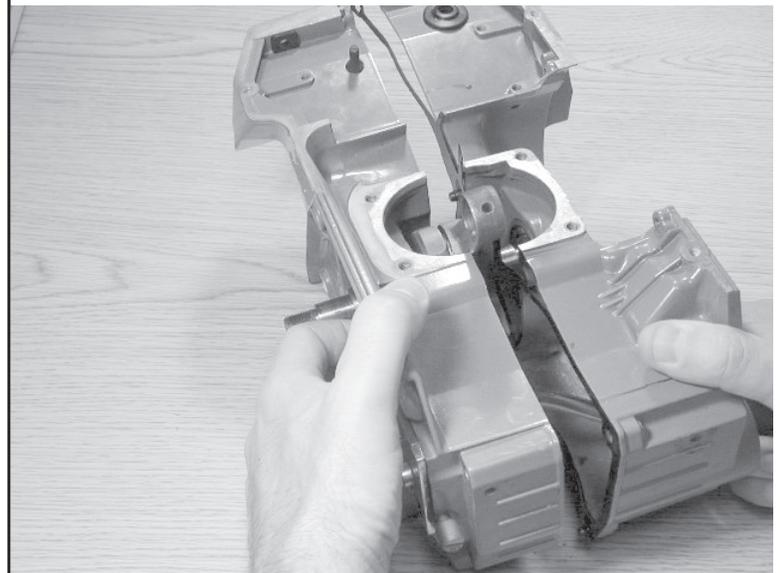
20.17 Coat crankcase gasket with ICS® 2-stroke engine oil.



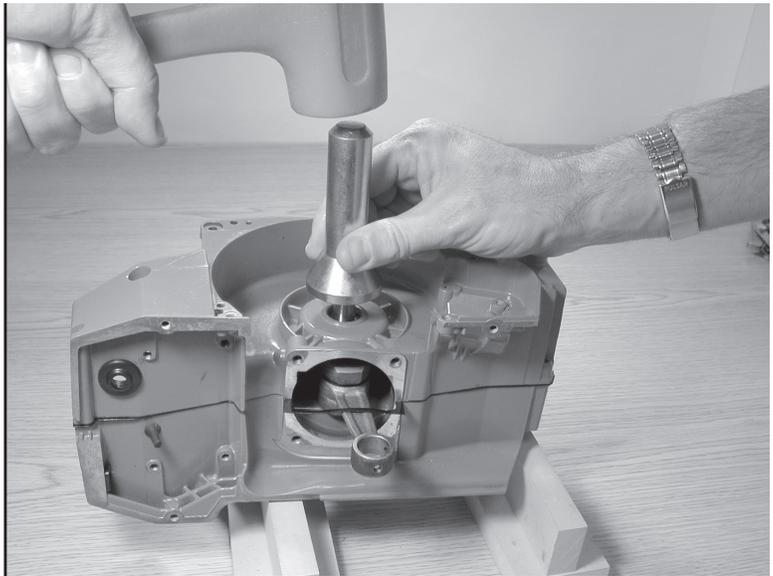
20.18 Align crankcase gasket on flywheel side crankcase pins.



20.19 Place crankcase halves together and align crankcase pins.



20.20 Assemble crankcase halves; tap with bearing driver and mallet.

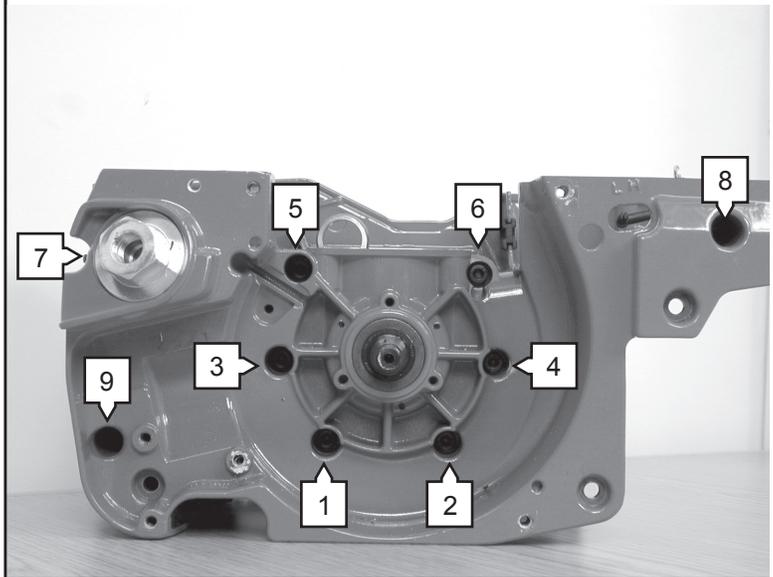


20.21 Install main crankcase bolts.

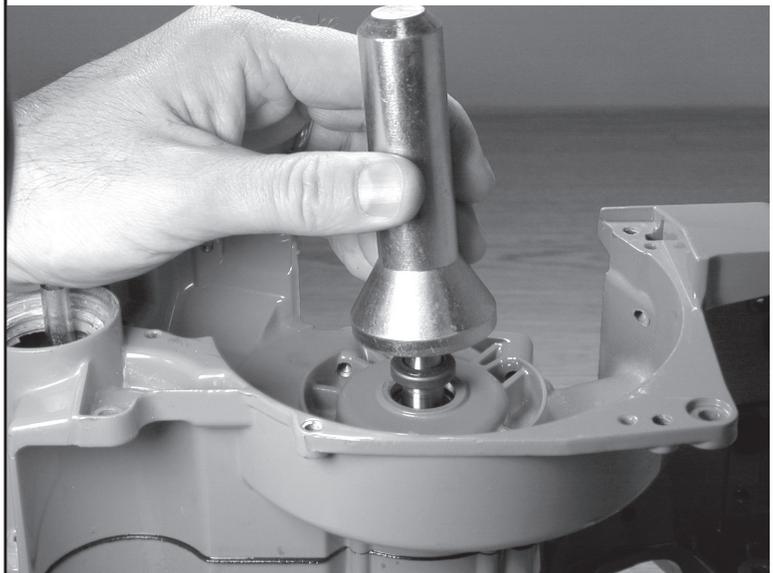
A Use blue Loctite®.

B Torque to 70 in-lbs. (7.9 Nm).

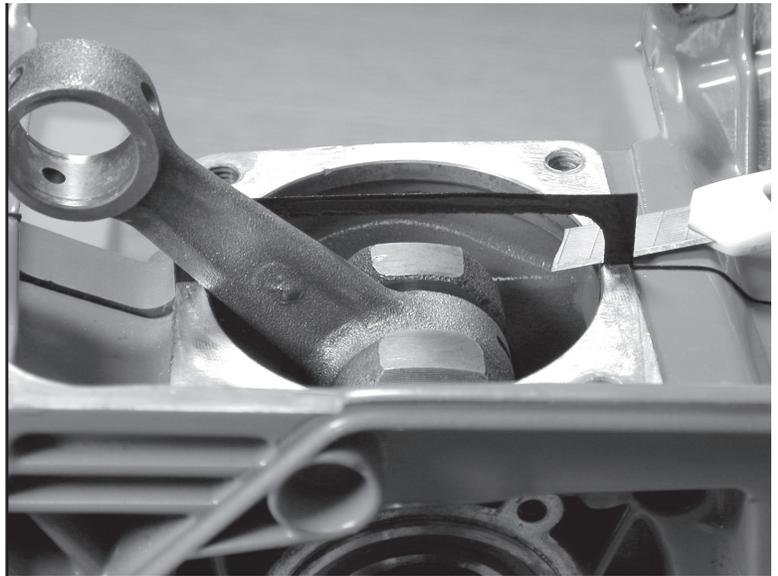
NOTE: Tighten bolts hand tight, then torque bolts in sequence listed at right.



20.22 Install flywheel side crankcase seal – tap with bearing driver and mallet.



20.23 Trim crankcase gasket flush.

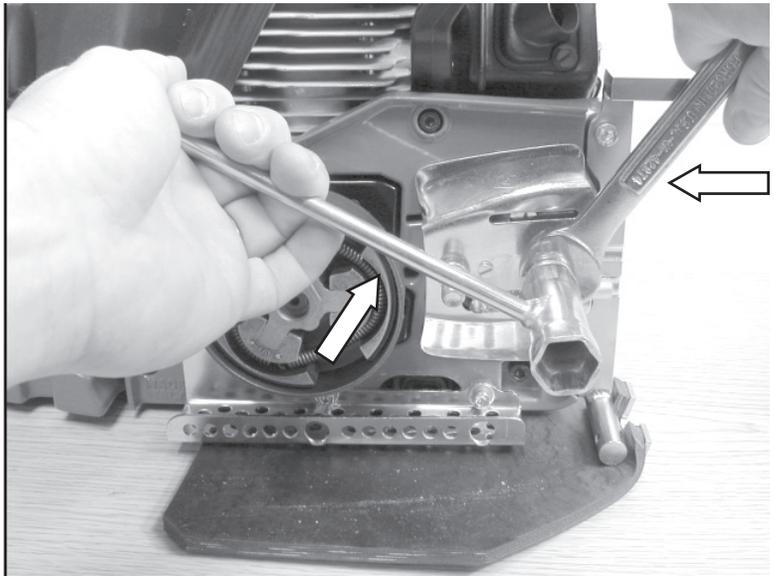


21 This section covers the removal and installation of the bar studs and bar pad.

21.1 Remove bar studs.

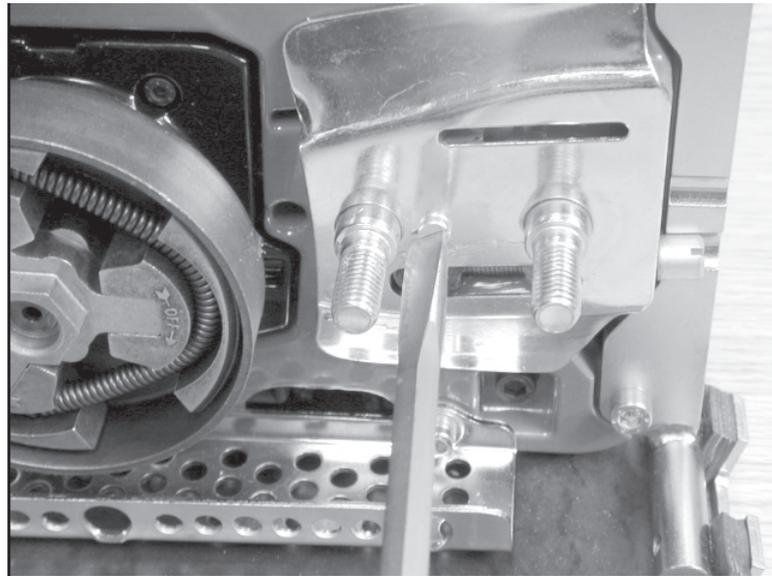
- A Install side cover nuts, flange to flange.
- B Tighten side cover nuts against each other.
- C Attempt to remove the inside nut which should pull out the bar stud.
- D Repeat on second bar stud.

21.2 Assemble in reverse order using blue Loctite®.



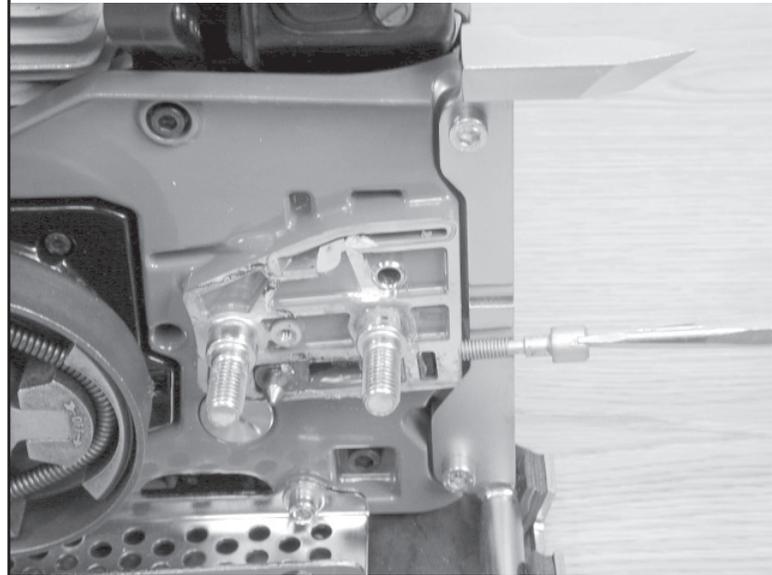
22 This section covers the removal and installation of the chain tensioner.

22.1 Remove bar plate to expose the chain tensioner.



22.2 Unscrew tensioner to remove.

- A Remove tensioner pin.
- B Remove tensioner screw keeper.



22.3 Assemble in reverse order.



- 23** This section covers carburetor tuning. Included in this section are basic settings, idle speed adjustment, and complete adjustment.

The carburetor has been set at the factory for optimal performance and compliance to EPA Phase I emissions standards. However, minor adjustments may be required in certain conditions, such as when operating at high elevation or after the saw has been rebuilt.

NOTES:

- This cut-off saws speed is mechanically governed by the carburetor. This will prevent the saw from going above 11,500 rpm. Attempting to set the carburetor mixture to increase the speed or power beyond this limit may seriously damage the engine.
- Always check the air filter, fuel filter, and spark plug before making carburetor adjustments and clean or replace if necessary.
- When adjusting the carburetor, turn the screws very little – no more than 1/4 of turn at a time. Minor adjustments will have large effects on the engine.
- If the carburetor has to be readjusted completely, the limiter caps must be released before the basic setting can be made.

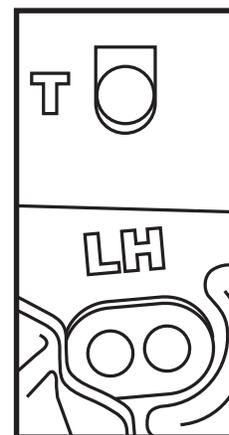
Basic Setting – if the carburetor needs to be completely readjusted, see following procedure:

- A Pull limiter caps using ICS® P/N 71625.
- B Gently turn both adjusting screws (H and L) clockwise as far as possible.
- C Turn screws counter-clockwise:
 - H = 1 turn from closed
 - L = 1 1/2 turns from closed

Verification of rpm, with bar and no chain

Idle = 3,000 ± 200 rpm

Full throttle = 11,000 ± 500 rpm



- 23.1 Complete carburetor readjustment.
- 23.2 Look into adjustment screw hole.
- A Observe orientation of the release slots on the adjustment screw limiter cap.



- 23.3 Insert the limiter cap puller blades into the release slots.
- A Firmly hold the tool shaft while screwing in the puller screw until the screw head is against the puller shaft.
- B Unscrew the puller screw.



- 23.4 Using a 5/64" straight blade screwdriver, gently turn the adjustment screws clockwise until completely closed.
- 23.5 Set the adjustment screws at the Basic Setting:
- H = 1 turn counterclockwise from closed
- L = 1 1/2 turns counterclockwise from closed



23.6 Start the saw and warm up the engine.

NOTE: The side cover must be held tightly in place with the side cover nuts, using a bar and no chain. Failure to do so may result in personal injury.

23.7 With a tachometer check the saw rpm, with no bar and chain:

A Idle = $3,000 \pm 300$ rpm

If the idle rpm does not fall into this range, adjust the T screw slowly.

23.8 With a tachometer check the saw full throttle rpm, with no bar and chain:

A Target = $11,500 \pm 300$ rpm

23.9 If the full throttle rpm falls below this range, turn the H screw in (clockwise) $1/16^{\text{th}}$ of a turn at a time.

A Pulse the throttle to help stabilize the system.

⚠ Do not hold the saw at maximum rpm for more than 5 seconds.

23.10 If the full throttle rpm falls above this range, turn the H screw out (counterclockwise) $1/16^{\text{th}}$ of a turn at a time.

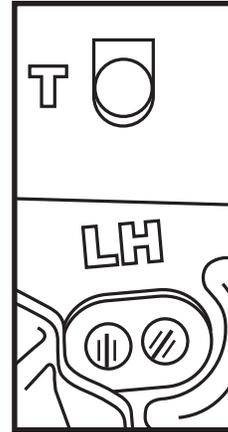
A Pulse the throttle to help stabilize the system.

⚠ Do not hold the saw at maximum rpm for more than 5 seconds.



23.11 When the carburetor is adjusted correctly set the limiter caps with a $\frac{1}{4}$ " straight blade screwdriver.

- A H = horizontal
- B L = vertical



24 This section covers idle speed adjustment.

24.1 If engine stops while idling:

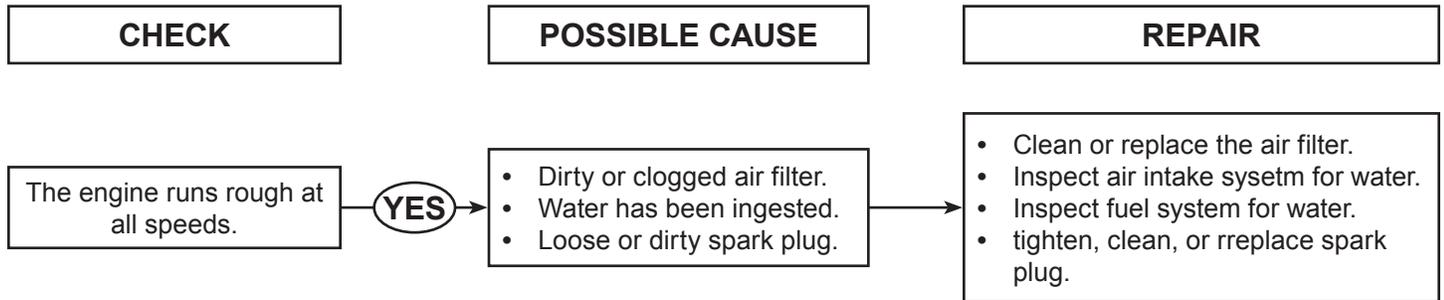
- A Make sure the chain is properly tensioned.
- B Turn T screw clockwise until chain begins to move.
- C Back T screw out $\frac{1}{2}$ turn.

24.2 If chain turns at idle:

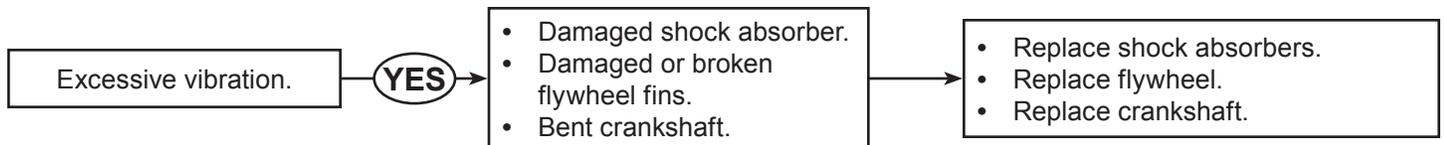
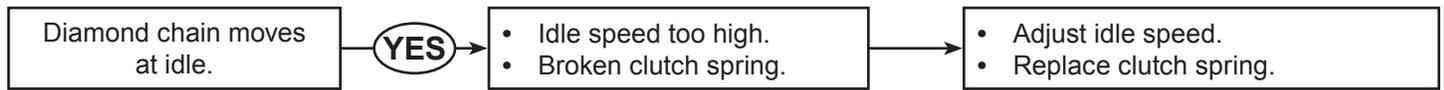
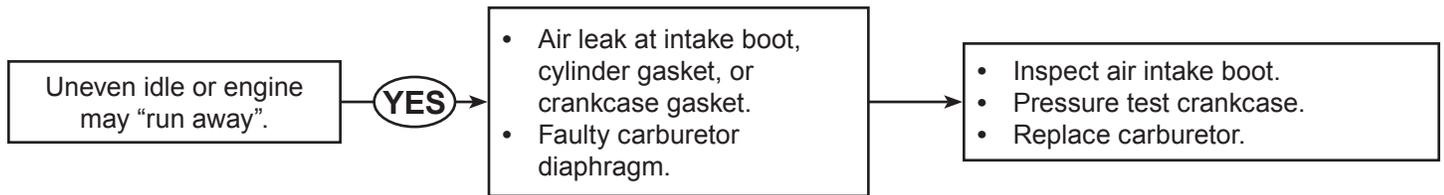
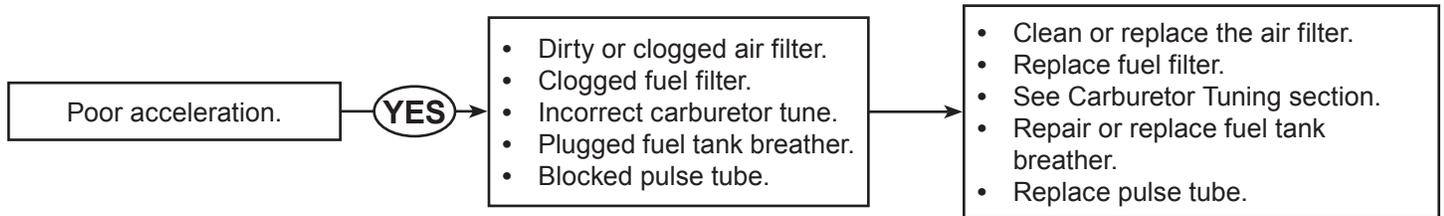
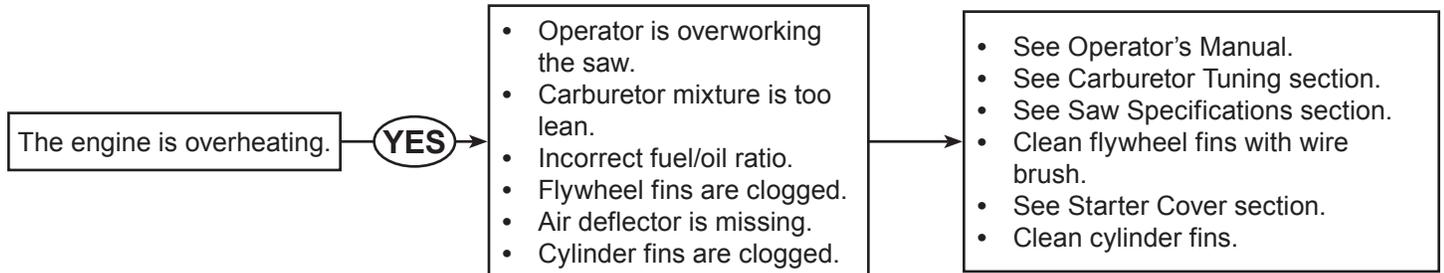
- A Back T screw out until chain stops moving.



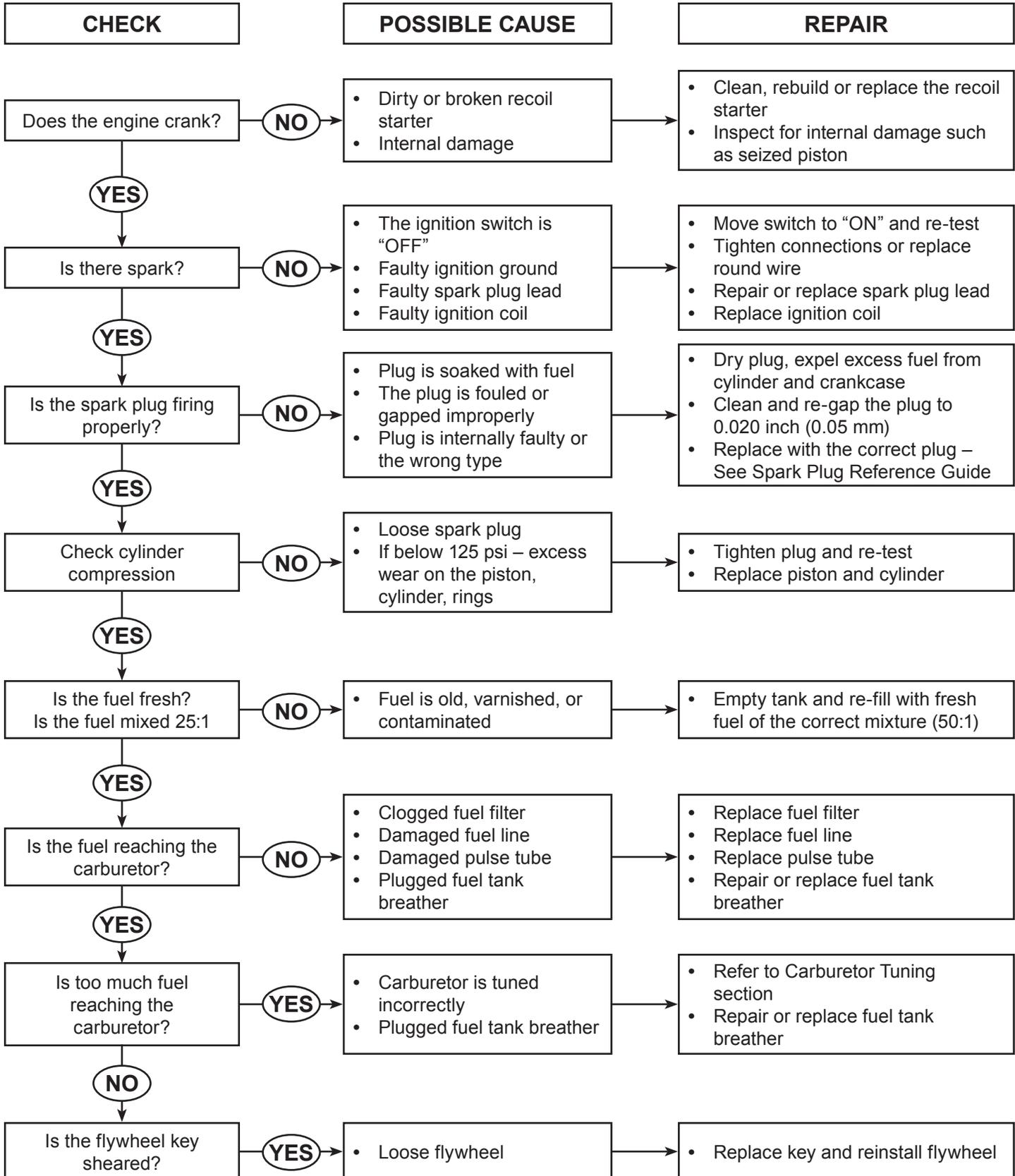
25 This section provides several flowcharts to aid diagnosing common problems.



 A dirty air filter is the #1 reason for engine problems.



Saw Will Not Start



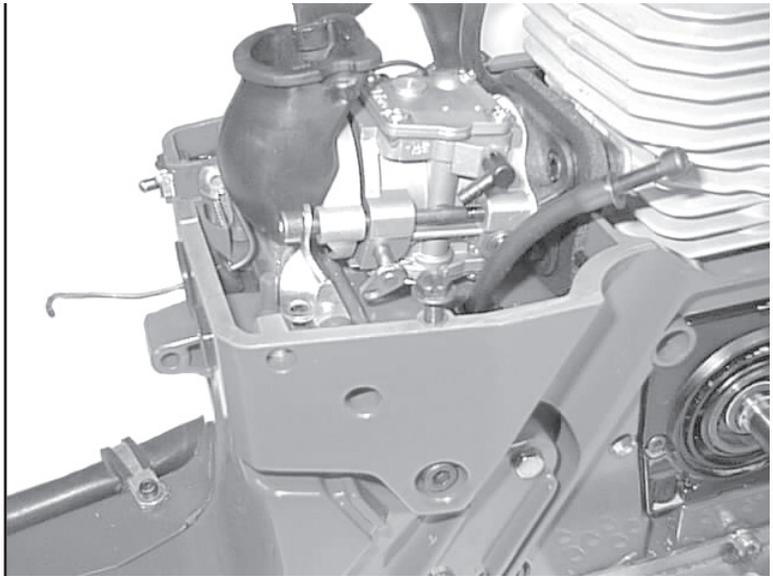
26 This section covers testing the fuel system for leaks. Engine starvation can result from a leak or malfunction of any of the main components of the fuel system. The five main components are the fuel tank, fuel tank breather, fuel filter, delivery tubes, and carburetor.

- 26.1 Remove and inspect the fuel filter.
- A Replace the fuel filter if there is any foreign material in the felt or the internal screen.

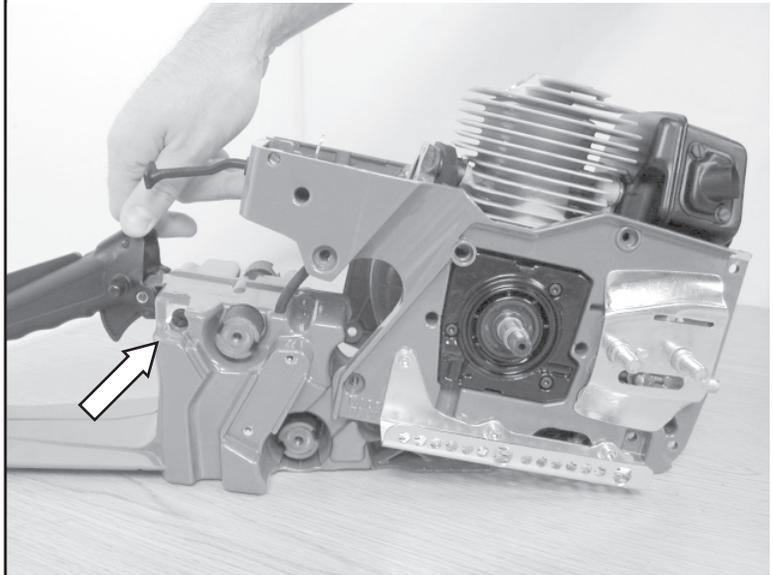
- 26.2 Test the main fuel pick-up tube for leaks.
- A Install the pressure gauge and bulb to filter end of fuel line.
 - B Pressurize the tube to 7 psi (0.5 bar).
 - C If the pressure does not maintain, separate the fuel line from the carburetor.



- D Plug one end of the main fuel pick-up tube.
- E Re-pressurize the tube to 7 psi (0.5 bar).
- F Replace the tube if pressure is not maintained.
- G If the main fuel pick-up tube does maintain pressure, than the leak has been isolated to the carburetor. Refer to the Walbro Diaphragm Carburetor Service Manual.

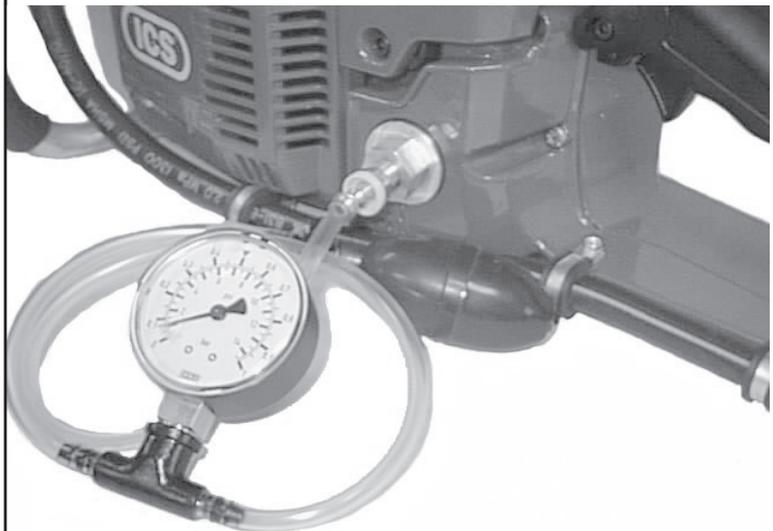


- 26.3 The fuel tank breather stabilizes the pressure in the fuel tank preventing both excessive pressure, which could flood the engine, and negative pressure, which could starve the engine of fuel.

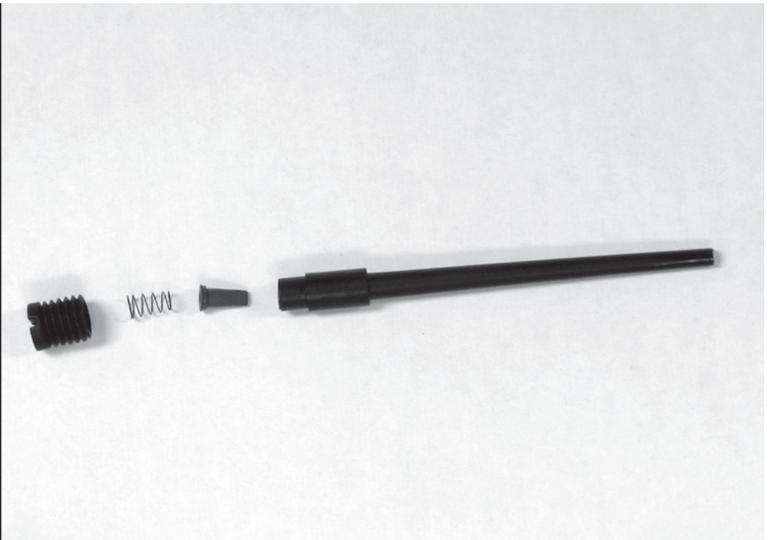


- 26.4 Testing the fuel tank breather.

- A Attach the pressure gauge and bulb to the fuel tank plug. Plug the fuel line at the carburetor end. Pressurize the tube to 4.5 psi (0.3 bar).
- B The pressure should reduce to nearly 0 psi (0 bar) over about 3 seconds.



- 26.5 If the pressure does not reduce to 0 psi, disassemble or replace the breather.
- A Clean the parts with fuel for the cut-off saw.
 - B Assemble in reverse order.
 - C Make sure that the spring taper is oriented in the correct direction.



27 This section covers testing the crankcase for leaks. A leak in the crankcase can cause the engine not to run or to run too lean.

27.1 Install the exhaust seal flange.

- A Be sure the spark plug is installed and tightened firmly.

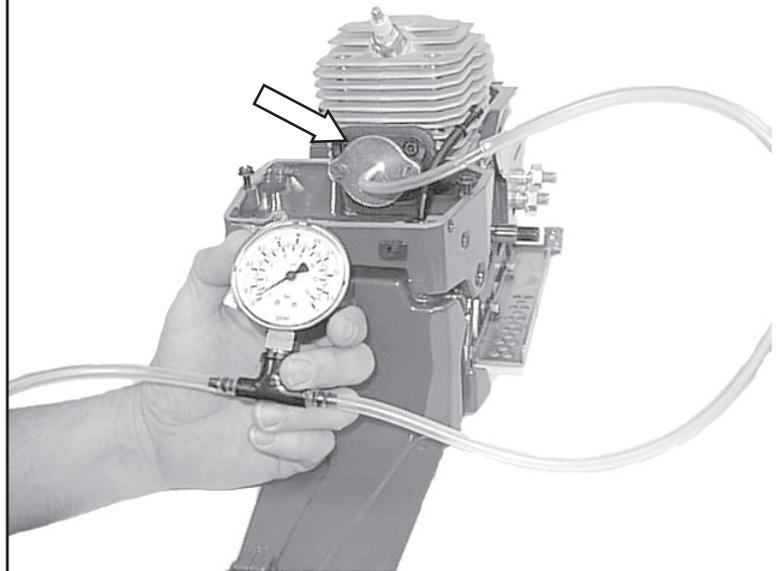
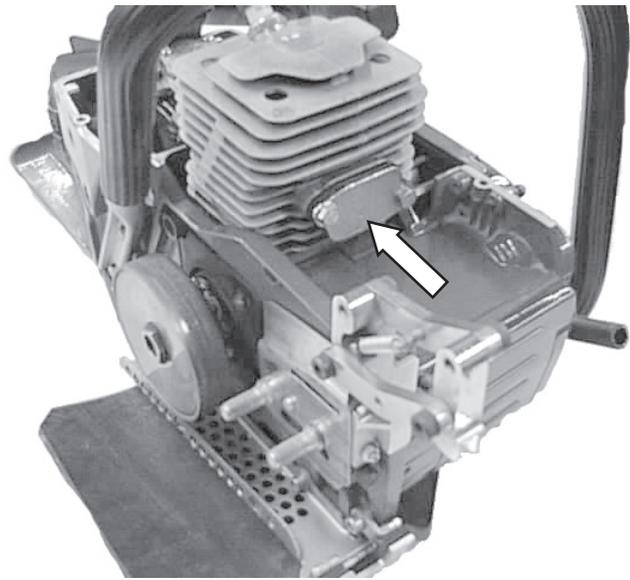
27.2 Install the intake seal flange.

27.3 Install the pressure gauge and bulb.

27.4 Pressurize the crankcase to 7 psi (0.5 bar).

27.5 If the pressure does not remain the same, use soapy water to find the leak.

NOTE: It is recommended that this test be performed after an engine rebuild.



- 1 The Spark Plug Reference Guide is to be used as a guide only. When trying a plug from a different manufacturer, perform a plug check to be sure that the plug will work.

SPARK PLUG REFERENCE GUIDE			
ICS RESISTOR	CHAMPION RESISTOR	NGK RESISTOR	BOSCH RESISTOR
73199	RCJ7Y	BPMR7A	WSR7F

633GC SERVICE MANUAL

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