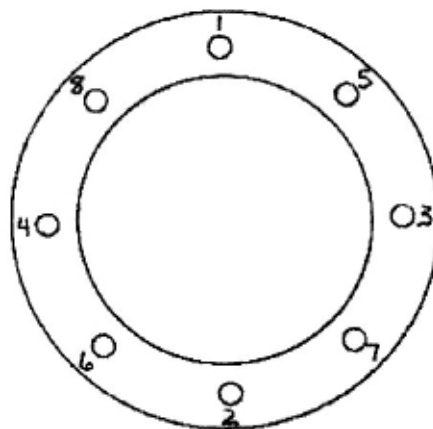
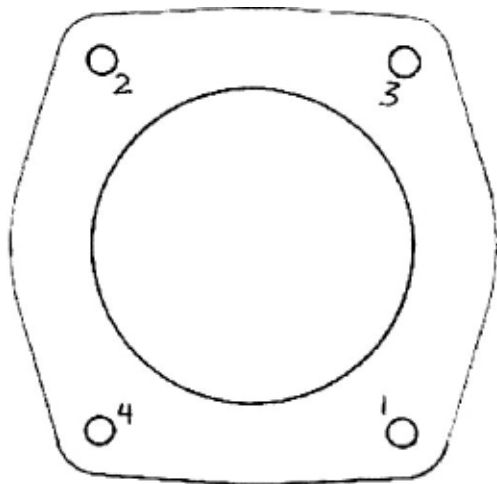


TABLE OF TORQUE VALUES

TORQUE

Fastener Description	Size	Ft. lb	inch/lb
AIR GUIDE ATTACHMENT SCREWS AND BOLTS	6mm	6 Ft.Lbs.	72 inch Lbs.
CYLINDER HEAD SCREWS	6mm	8 Ft.Lbs.	96 inch Lbs.
ELECTRONIC IGNITION BOX & IGN. COILS NUTS	6mm	7 Ft.Lbs.	84 inch Lbs.
FAN HOUSING MOUNTING SCREWS	6mm	8 Ft.Lbs.	96 inch Lbs.
FLYWHEEL DUST COVER (265C1)	6mm	6 Ft.Lbs.	72 inch Lbs.
INTAKE MANIFOLD MOUNTING SCREWS	6mm	7 Ft.Lbs.	84 inch Lbs.
RECOIL STARTER MOUNTING SCREWS	6mm	8 Ft.Lbs.	96 inch Lbs.
CRANKCASE ASSEMBLY SCREWS 2703	8mm	19 ft.Lbs.	228 inch Lbs.
CRANKCASE ASSEMBLY SCREWS 3203 4-6mm bolts	6mm	8 Ft.Lbs.	96 inch Lbs.
FAN PULLEY MOUNTING SCREWS	8mm	19 ft.Lbs.	228 inch Lbs.
ELECTRIC STARTER MOUNTING SCREWS	8mm	19 Ft.Lbs.	228 inch Lbs.
CYLINDER BASE NUTS	8mm	19 Ft.Lbs.	228 inch Lbs.
EXHAUST MANIFOLD MOUNTING SCREWS	8mm	19 ft.Lbs.	228 inch Lbs.
RUBBER INTAKE FLANGE SCREWS (2702/03)	8mm	12 Ft.Lbs.	144 inch Lbs.
RUBBER INTAKE FLANGE SCREWS (3202/3203)	6mm	8 Ft.Lbs.	96 inch Lbs.
COOLING FAN MOUNTING NUT	10mm	37 Ft.Lbs.	444 inch Lbs.
REDUCTION DRIVE MOUNTING SCREWS	10mm	37 Ft.Lbs.	444 inch Lbs.
SPARK PLUGS (cold engine) (2703/3203 single ignition)	14mm	14 Ft.Lbs.	168 inch Lbs.
CRANKSHAFT BOLT (PTO-end) (½ inch NF)	½" NF	55 Ft.Lbs.	660 inch Lbs.
CRANKSHAFT NUT (Magneto end)	16mm	107 Ft.Lbs	
ENGINE MOUNTING BOLTS	½" NC	44 Ft.Lbs.	528 inch Lbs.

For items not listed, contact Neoteric



Criss cross torque patterns for cylinder base nuts and cylinder heads. Repeat torque pattern in 1 /3 increments until final torque spec is reached.

Assy 17322
Form 16934

General Tools

Tools:

1. Inch pound torque wrench 0 to 250 in/lbs
2. Allen wrench set including 2.5, 4, 5, 6, and 8mm
3. Ball wrench set including 5 and 6mm at least
4. Open end wrenches 7, 8, 10, 13, 17, and 19mm
5. Regular and Phillips screwdrivers
6. 3/8" drive hex bit set including 2.5, 4, 5, 6, and 8mm
7. 5/8" or 13/16" spark plug sockets depending on spark plug size
8. Wrist pin puller (optional, only needed if removing pistons)
9. Ring Compressor for 72mm or 76mm diameter pistons
10. 3/8" drive ratchet
11. Piston Ring Remover (optional)
12. 3/4" socket
13. 24mm socket
14. T25 and T20 torx bits (FI engines only)
15. Spark plug gap setter/checker
16. Soft faced hammer and ball peen hammer
17. Timing light (optional)
18. Exhaust spring remover and installer
19. 0-250 ft/lbs torque wrench (optional used only flywheel nut and G-50)

Materials

1. Loctite 242 or 243 blue
2. High temp anti-seize
3. Acetone
4. Hylomar gasket dressing (Permatex 25249)
5. Assembly lube (straight 2 cycle oil)
6. Aviation form-a-gasket (Permatex 3D)
7. Loctite 271 red
8. Loctite 518, 574 or equivalent (block sealant)
9. Mild acid (used to remove

Specialty Tools

Specialty tools (available at RPE):

1. Flywheel puller
2. Base nut torque wrench (preset to 19 ft/lbs)
3. Seal setters W137
4. Crankshaft PTO bearing spacer
5. 17mm Allen wrench G-50 gearbox
6. Snap ring pliers
7. Dial indicator and holder for timing
8. 40mm socket for prop shaft nut

Assembling Hirth Top End

Some tips on re-assembly that may be helpful

VERY IMPORTANT: When installing the piston on to the connecting rod, note the small arrow imbedded in the top. **THIS ARROW MUST POINT TO THE EXHAUST PORT!** If you put the piston on backwards, the piston and the cylinder will be ruined in about 10 hours of run time. Piston rings must have small gap at the ends pointing up. A size cylinder must be used with A size piston, B cylinder with B piston and C cylinder with C size piston. Make sure all mating surfaces are clean. Con Rods are marked with a paint dot or etched with a letter (W, R, B) this indicates which needle bearing to use.

Use Omni Visc Silicone to seal block halves and all joints. Use Permatex Gasket Dressing on Gaskets.

IF IT IS A 2-CARB INLINE ENGINE: (Or F30 4 carb/Injected). After you have the cylinders on, only snug the nuts tight enough that you can still move the cylinder a little. Now put the exhaust manifold on without gaskets and snug the bolts. This will insure your cylinders are parallel with each other and prevent exhaust leaks. Now, you can torque the cylinder base nuts to 1/3 of full torque. Use a crisscross torque pattern. After 1st 1/3 torque pass remove exhaust manifold. Now repeat the same criss-cross pattern to 2/3's torque, then a third pass at full torque (19 ft. lbs.) Once the cylinder is fully torqued, you can install and torque the exhaust manifold with the exhaust gaskets.

Use a criss-cross torque pattern on head bolts also in 1/3 increments. (96 inch pounds) It is very important to use an accurate inch pound torque wrench on heads and spark plugs.

IF IT IS A SINGLE CARB ENGINE: (Or F30 2 carb) Procedure is the same as 2 carb except you must use the intake manifold to align cylinders instead of the exhaust manifold. This is important to prevent intake gasket leaks.

Use blue loctite 242 on both the 8mm base nuts and the 6mm intake manifold bolts. **DO NOT** use loctite on the exhaust or head bolts. (It will boil inside the holes)

You may want to consider using Permatex - Hylomar HPF gasket dressing (Part#25249) on all the brown paper type intake gaskets to be sure of your seal. Do not use gasket dressing on used gaskets. (This is optional-gaskets can be installed dry as well) Never use a sealer designed for metal surface sealing on paper gaskets as it cannot cure and will leak. Torque 8mm rubber carb flange bolts to 120 inch pounds.

If piston and rings are new, engine will have to go through break-in again. Cylinder head bolts should be re-torqued within 10 hours. It is important to check the torque of the cylinder base nuts within 10 hours of putting engine back in service. (19 Ft. Lbs.)

Use torque specs in the manual for all fasteners involved.

Top End Disassembly

Tools needed:

- 5mm Allen wrench
- 3/8" drive 5mm Allen wrench
- 10mm socket (fan cooled engines only)
- 3/8" drive ratchet
- 13mm open end wrench
- 6mm Allen wrench
- 5mm Allen ball wrench
- Circlip remover
- Wrist pin puller
- Spark plug socket 5/8" or 13/16"
- Marker or something to keep parts together
- Plastic or rubber faced hammer

Procedure:

1. Make sure ignition is turned off and battery is disconnected to reduce risk of injury.
2. Remove exhaust system including EGT probes.
3. Remove spark plugs.
4. Remove air guide from fan cooled engine or free air scoop from free air engine.
5. Remove carbs or fuel injection (you can simply let the carbs or FI hang on the cables and hoses).
6. Remove intake manifold.
7. Remove all head bolts (you may want to mark your heads for reassembly later, example pto, mag).
8. You may want to remove the fan tower or flywheel cover for easier access to the base nuts on the cylinders.
9. With a 13mm open end wrench, remove all 4 base nuts from each cylinder needed to work on (mark the cylinder for reinstallation later as mag or pto).
10. To remove the pistons, you will need to first remove at least one circlip from each piston (I usually remove the pto end circlip from each piston), (throw the circlips away, they are not to be used over) with either a wrist pin puller or a soft round piece of material, push or pull the wrist pin out. BE CAREFUL TO SUPPORT THE PISTON WITH YOUR HAND IF PUSHING THE PIN OUT SO YOU DO NOT BEND THE CONNECTING ROD. (You will also need to mark the pistons for later reassembly). The needle bearing on the wrist pin is caged so there is not need for concern about needle bearings falling out, keep the needle bearing in the rod eye for safe keeping by using a tie wrap or piece of wire.

Top End Reassembly

Tools needed:

- - 13mm open end wrench
- - 13mm base nut torque wrench (available at RPE)
- - 3/8" drive 5mm Allen wrench (to fit your torque wrench)
- - torque wrench 0 - 250 in/lbs.
- - 6mm Allen wrench cut short for exhaust manifold
- - 5mm Allen wrench cut short for intake manifold
- - sparkplug socket 5/8" or 13/16"
- - ring compressor

Materials needed:

- - blue loctite 242 or 243
- - acetone or paint thinner (cleaning mating surfaces)
- - top end gasket set ALWAYS USE NEW GASKETS
- - new circlips NEVER USE CIRCLIPS OVER (if pistons removed)
- - high temp antiseize (optional for head, exhaust bolts, and sparkplugs)
- - straight 2 cycle oil for assembly lube
- - hylomar gasket dressing PN #25249 (optional to be used on paper gaskets only)
- Omni Visc Silicon (used to seal block halves on the gaskets)
- Permatex Gasket Dressing #85420 (use to dress all gaskets)

Procedure:

1. Make sure all parts are clean.
2. Clean mating base gasket surfaces with acetone or thinner and install base gaskets.
3. If run, put the same cylinder with same piston.
4. Lube all connecting rod bearings with straight 2 cycle oil. Con Rod has either paint dot or letter etched to dictate what color bearing to use.
5. Put on piston with new circlips if removed THE ARROW ON TOP OF THE PISTON MUST POINT TOWARD EXHAUST PORT (the electric starter side of the engine is the exhaust side or exhaust port side, when putting in circlips ALWAYS support the back side of piston to reduce the risk of bending the connecting rod when pushing.
6. Lube piston and cylinder with straight 2 cycle oil.
7. Turn piston rings to line up opening with the pin in the piston.
8. Compress rings with ring compressor with one hand and with other hand put the cylinder over the piston. DO NOT FORCE IT, it should slide on freely.
9. Remove ring compressor.
10. Place cylinders down against base gaskets, and put on all four washers and cylinder base nuts using blue loctite, DO NOT tighten completely, tighten the nuts enough that the cylinder can only shift slightly when grabbed a hold of. MAKE SURE THE ARROW ON THE TOP OF THE PISTON STILL POINTS TOWARD THE EXHAUST PORT.
11. Put on exhaust manifold WITHOUT gaskets and tighten down, this insures that the cylinders are mating the rigid exhaust Y manifold perfectly so there are no leaks. NOTE: if you have a single carb engine use the intake manifold to do this process.
12. Now you are ready to tighten down the base nuts using a criss cross torque pattern in 1/3 increments with the final torque being 19 ft/lbs. (Proper base nut criss cross torque pattern depicted on page 11).
13. Once you have completely torqued down the cylinders, remove the exhaust manifold and put back on with gaskets, and torque down.
14. You are now ready to put on your intake manifold system using blue loctite on all the intake mounting bolts
15. Put on the cylinder heads, make sure both mating surfaces are completely clean, start all the head bolts and tighten until you can still move the head slightly from side to side, center the head in the movement and begin torque down in 1/3 increments in a criss cross torque pattern with the final torque being 96 in/lbs., then do one final pass at 96 in/lbs, in a circle around the head to insure complete torque down.
16. Finish up by putting any accessories back on such as air guide, exhaust, carbs or fuel injection, sparkplugs, etc.

NOTES:

1. Since you have had the engine apart, you should consider going through a short break in to ensure everything is put back together correctly.
2. If you have installed new the rings and / or pistons, it is recommended that you go through a complete break in to break in the rings.
3. Also since you have had the engine disassembled you should go through a regular re-torque schedule as if the engine were new. Pay special attention to the head bolts and base nuts.

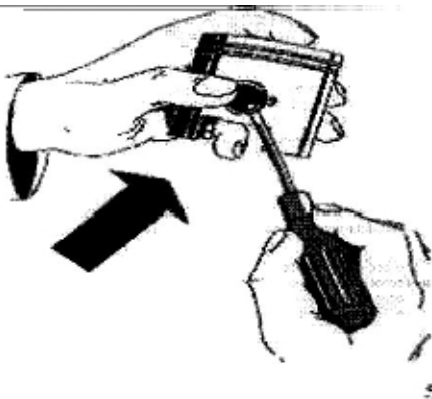
BOTTOM END DISASSEMBLY

Tools needed:

- 5mm Allen wrench (intake and fan tower)
- 6mm Allen wrench (fan pulley, gearbox, exhaust and crankcase bolts)
- 13mm open end wrench (cylinder base nuts)
- 24mm socket (crankshaft nut)
- 8mm Allen wrench cut short (gearbox)
- 10mm wrench (air guide)
- flywheel puller
- 4mm Allen wrench (stator plate)
- star puller
- soft faced hammer
- 1/4" socket
- wrist pin puller
- circlip remover

Procedure:

1. Remove engine from machine (remove all attached parts that can be left on machine; exhaust, carbs, FI system, etc.
2. Remove gearbox completely (refer to page 12).
3. Remove fan tower or flywheel cover.
4. Remove flywheel and stator plate (refer to page 6).
5. Remove air guide.
6. Remove intake system (5mm Allen wrench).
7. Remove exhaust manifold (6mm Allen wrench cut short)
8. Remove cylinder heads.
9. Remove cylinders (keep piston and cylinders matched together, and also make note of which cylinder went where, pto/mag) (13mm open end wrench).
10. Remove pistons (wrist pin puller very helpful in doing so) (leave wrist pin bearing in rod eye and secure with tie wrap), (remove circlip to do so).
11. Remove 7 - 8mm Allen head bolts that hold crankcase together (the crankcase is not free to be split apart).
12. Split crankcase: holding up on the top of the crankcase, tap down on both the mag end and the pto end of the crank, the crankcase will begin to split (DO NOT PRY CRANKCASE APART).
13. Thread 2 of the 7 Allen head bolts back into case 3 or 4 threads and tap on the Allen head, while holding up on top half of crankcase.
14. Once the crankcase is split you can now remove the crank (put crank in a safe place free of dust and debris).
15. Remove small "alignment pins" from block.



How to remove piston from connecting rod;

1. Remove circlip or retaining ring from pto end side (as shown in picture)
2. Withdraw wrist pin from piston using a wrist pin puller or pushing out with a soft material. **MAKE SURE TO SUPPORT THE BACK SIDE OF THE PISTON WHEN PUSHING OUT PIN, TO REDUCE THE RISK OF BENDING CONNECTING ROD.**
3. Secure needle bearing on rod with tie rap until reassembly. This is to insure needle bearing goes back in same direction and on the same con rod. Pistons should also be returned to same con rod and cylinders.

HOW TO REMOVE FLYWHEEL/STATOR PLATE

Tools needed to remove flywheel:

- 5mm Allen wrench (fan housing bolts)
- 6mm Allen wrench (fan pulley)
- flywheel puller or harmonic balance puller
- 24mm socket (flywheel nut)
- impact wrench if available (makes job much easier)
- 4mm Allen wrench (stator plate bolts)

Procedure:

1. Remove cover plate or recoil starter.
2. Remove fan pulley.
3. Remove flywheel nut and washer.
4. Remove fan tower or flywheel cover, the fan tower will have five 6mm bolts to remove, the flywheel cover on a free air engine will have only four 6mm bolts to remove.
5. Carefully remove the fan tower or flywheel cover to the left, keeping in mind that the stator late wires are still attached to the ignition on the piece set aside to the left.
6. Attach flywheel puller to the flywheel carefully screwing in the bolts. Be careful not to turn the bolts in too far, there is a plastic plate beyond the threads of the hole, and can be damaged if the bolts are turned too far. Also make sure that the bolts are all placed in evenly so that you will pull evenly on the flywheel.
7. Using either your impact wrench or ratchet tighten the puller bolt to press against the end of the crank (flat). Continue to tighten until the flywheel pops off (it will take a large amount of pressure to remove the flywheel).
8. To remove stator, disconnect all ignition wire leads, (there will be 2 or 4 shrink wrapped connections to disconnect), (these connections will be behind your coil assembly on a fan cooled engine). Also disconnect the 2 yellow wires connected to your regulator rectifier and or tach, remove two 5mm bolts and the stator plate will be free to remove, (you may need to carefully pry the stator plate out).

CLEANING PARTS FOR REASSEMBLY

With engine tore down completely this is also a good time for a decarbon.

You must clean all parts thoroughly before re-assembly, this is also a good time to inspect parts for any damage. The process of cleaning can be done a few different ways including: ultrasonic, chemically, and physically scraping. Make sure when using chemicals that they are safe to use on the material being cleaned (aluminum). Once your parts are completely cleaned and dried you will be ready for reassembly.

SEIZURE ALUMINUM DEPOSITS

Slight aluminum deposits on the cylinder walls can be burned off with acid if needed. If there is scoring of the nikasil after aluminum is burnt off the cylinder will have to be replaced. DO NOT HONE OR DEGLAZE A NIKASIL CYLINDER EVER.

BOTTOM END REASSEMBLY

Materials needed:

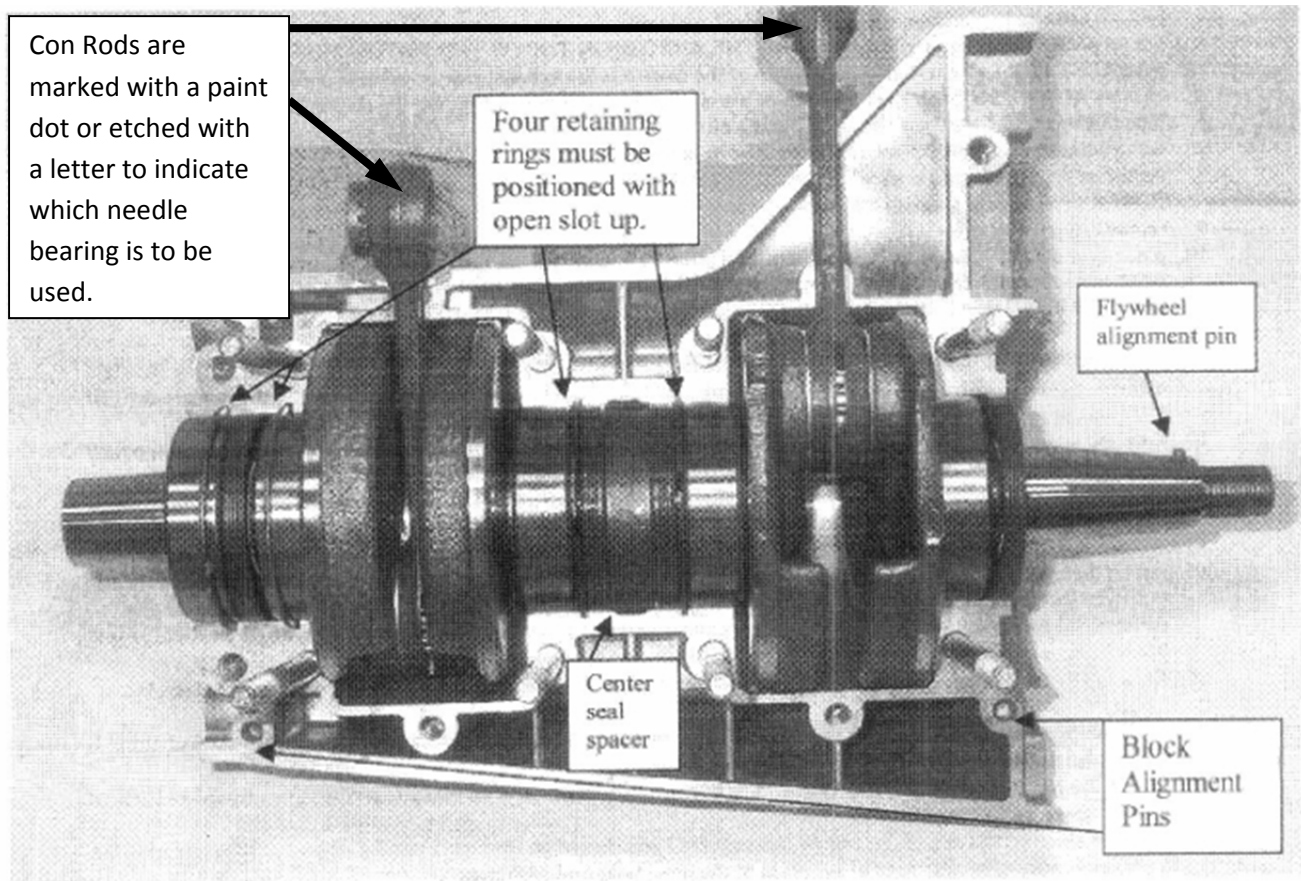
- - assembly lube (use straight 2 cycle oil)
- - Loctite 518, 574 or equivalent
- - Acetone for cleaning mating surfaces
- - Loctite 242 or 243 blue for fasteners

Tools needed:

- - 3/8" drive 6mm Allen wrench (must fit your torque wrench)
- - W137 seal setter to set mag end seal properly
- - Plastic or rubber faced hammer
- - Torque wrench 0 - 250 in/lbs.

Procedure:

1. ALL PARTS MUST BE COMPLETELY CLEAN.
2. Lube all bearings on crankshaft with straight 2 cycle oil.
3. Place crank in bottom half crankcase, making sure the mag end of the crank is at the correct end of the crankcase. Tap down slightly to ensure proper seating of bearings, also make sure that all of the retaining rings are in their correct location and that the split in the retaining ring is up (refer to picture on this page) and NOT in line with crankcase split. Place center seal spacer in center of crankshaft, bend separator slightly to ensure a snug fit. Place 2 alignment pins in bottom half of crankcase (they will fit loose, they are only to fill the void).
4. You are now ready to place sealant on the top half of the crankcase (only needed on mating surface) a LIGHT coat of sealant is all that is needed. Use Omni Visc Silicon to seal block halves together.
5. Now you are ready to assemble the complete bottom end of the engine. Carefully hold the connecting rods up with one hand and guide them thru the top half of the crankcase as you bring the halves together. Tap down slightly to ensure proper mating.
6. Using blue Loctite 242 or 243 on the 7 - 8mm. crankcase bolts, (4 - 6mm and 3 - 8mm bolts on 3202/3203) start all bolts before tightening. Hand tighten using a criss cross torque pattern. With W137 seal setting tool set the mag end seal. Spin crank in crankcase by hand to make sure it is smooth and free of drag. You are now ready to torque the crankcase bolts to their proper torque setting (228 in/lbs. on 8mm - 96 in/lbs. on 6mm) using once again the criss cross torque, pattern. Spin the crank once again to ensure smooth operation, and no large increase in drag from the first time spun. If drag increases, disassemble case and determine cause.
7. You are now ready to assemble the top end.



HOW TO CHANGE FAN OR TIGHTEN FAN BELT

Tools Needed:

- 5mm Allen wrench
- regular screwdriver
- 7mm wrench (for 2704/06 only)
- 19mm wrench
- 6mm Allen wrench (fan pulley)

Changing Belt Procedure:

1. Remove cover plate or recoil starter (5mm Allen wrench).
2. Remove fan pulley from flywheel (6mm Allen wrench).
3. Loosen lock nut on fan eccentric cam shaft (19mm wrench and regular screwdriver).
4. Remove fan tower (you will need to remove five 6mm bolts to do so using a 5mm Allen wrench) be careful when doing so because your ign. Wires will still be attached (you do not have to remove these wires).
5. Remove fan air deflection plate (2704/06 only) (regular screwdriver and 7mm wrench).
6. Remove fan's eccentric cam shaft (be careful there may be a spacer washer between fan case and fan depending on year of engine).
7. The fan is now free to be removed, replace belt, follow the procedure in reverse.

Notes:

- Do not tighten lock nut until end of procedure.
- Once the fan and belt are in place, turn eccentric cam to the closest position toward the fan pulley on flywheel. This will make it easier to install the pulley on flywheel later and also keep you from over tensioning the belt or stretching the belt.
- Use blue loctite 242 on fasteners.
- There is no reason to ever remove the plastic fan grill. Removing it will damage the mounting clips.

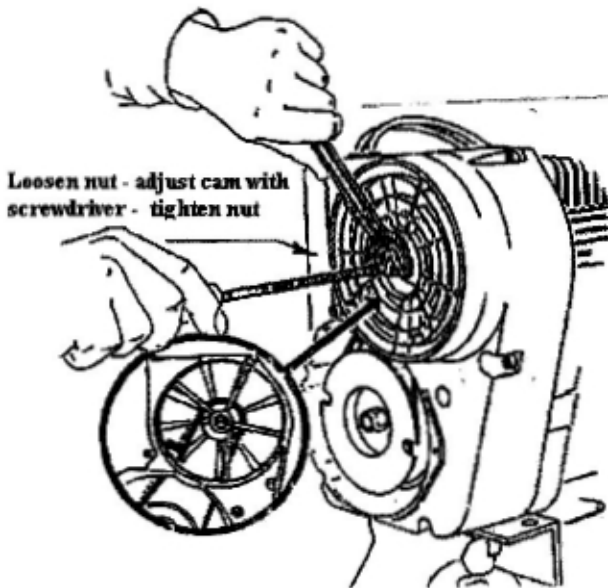
Tightening fan belt:

Tools Needed:

- 19mm wrench
- regular screwdriver
- 5mm Allen wrench

Procedure:

1. Remove cover plate or recoil starter
2. With regular screwdriver in one hand and the 19mm wrench in the other hand, break the nut loose (hold the center shaft from turning with the screwdriver and break nut free with wrench) (see illustration).
3. Turn the Screwdriver 10 or 15 degrees to tighten fan belt, check tension (if the belt does not tension it may be time to replace it).
4. Hold shaft from turning with screwdriver, tighten nut so that you cannot turn the shaft when tightened.
5. Reassemble any removed parts.



TIMING

Timing is a term referring to the ignition firing or sparking at a specific time in the crankshaft's cycle of one revolution. Timing is very important to the proper running of the engine: The engine comes factory timed and should never need retimed, unless you have changed a flywheel or stator plate or if engine symptoms suggest timing problems.

Tools needed: (to check timing)

- timing light (without advance preferably)
- 1" indicator and correct sparkplug hole insert to hold indicator
- pointer (to point at flywheel) (should be stiff enough not to move)
- 5mm Allen wrench to remove cover plate or recoil starter
- felt marker or paint marker to draw line on flywheel

Procedure:

1. Remove cover plate or recoil starter with 5mm Allen wrench, and also remove fan pulley with a 6mm Allen wrench.
2. Remove one sparkplug from the pto cylinder and remove both sparkplugs from the mag end cylinder (this will make it much easier to turn the engine over by hand to set up your timing mark)
3. Place pointer on engine using a bolt you removed to remove the cover plate or recoil starter, put it in a position that you can easily see the pointer, point it toward the flywheel.
4. Next, place your dial indicator holder in the mag end sparkplug hole, and then place your 1" dial indicator in the holder.
5. Make sure your ignition is turned off.
6. By hand, turn the flywheel clockwise. You will notice that your dial indicator needle will begin to move when the piston makes contact. When the needle stops, this is what is known as top dead center, (you must be on the compression stroke or up stroke of the engine). Hold the flywheel at this point, not allowing it to move either way and very carefully place a dot on the flywheel at your pointers end. This dot is not your timing mark, it is just for reference later in the procedure. Also at this time you will want to make note of where your dial indicator needle stopped and set it for zero by turning the dial face. Go through the steps once again to make sure you have marked and set your dial indicator correctly. Now it is time to put your timing mark on the flywheel using the same procedure, your timing mark will come before your TDC mark on the flywheel, how much before depends on the number of degrees your ignition timing is set for. You should always be on a compression stroke or up stroke on the crankshaft when setting these marks due to bearing slap.
7. Now that you have your timing mark on the flywheel properly, you are ready to begin checking the timing. First, remove your dial indicator from engine and the indicator holder. Second, put all your sparkplugs back in the holes and torque to spec (engine must be cold to torque sparkplugs or you will risk damaging your heads). Third, hook up your timing light to the mag end sparkplug wire correctly and whatever power source is necessary to run your timing light (refer to your timing light owners manual). Next, make sure all your tools, parts and people are clear of engine, you may want to remove your prop for this procedure for safety reasons, (if you remove prop, make sure to set your idle setting down or the engine will rev to high), make sure aircraft is secure so that it will not move if you do leave your prop on, Now you are ready to start the engine and hold at 1700 to 2000 rpm for proper timing, point your timing light toward your pointer and your pointer and timing mark should line up. If they do not, line up adjustment will be necessary.

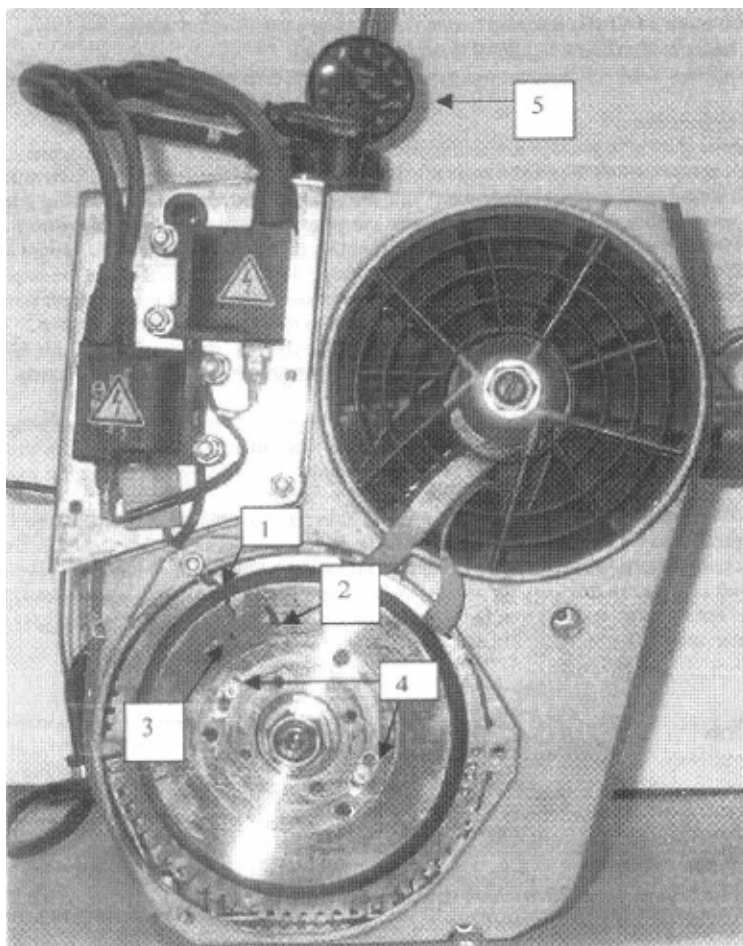
IGNITION TIMING SINGLE IGNITION

Degrees	521cc (64mm stroke)	625cc (69mm stroke)	55 and 65 HP are 69mm stroke
14.....	.047".....	.052"	All fuel injected timed -18°
16.....	.061".....	.068"	
			55 HP carbureted - 14°

The above dimensions in inches are the dimensions you use to set the timing mark before top dead center an dial indicator Form 17337

ADJUSTING TIMING PVL

1. Remove cover plate or recoil starter and also fan pulley.
2. To adjust timing you must first loosen 2 small Allen head screws (Item 4) (2.5mm Allen wrench) at either side of flywheel nut (loosen only slightly).
3. To advance the timing you must turn the screws clockwise, you may do this by slightly pushing or tapping on loosened screw heads (be careful)..
4. To retard the timing you must turn the screws counter clockwise, you may do this by slightly pushing, or tapping on the loosened screw heads (be careful).
5. Once the adjustment is made, tighten screws back down and check timing again (no need to reset mark or anything). Repeat until correct.
6. Once the timing is set correct check the screw tightness and reassemble any removed parts (fan pulley, recoil starter, or cover plate, etc.)



1. Temporary timing pointer installed.
2. Timing mark (for degrees before top dead center, this mark will line up with pointer, when shooting with timing light, when the timing is adjusted correctly).
3. Top dead center mark (for reference).
4. PVL timing adjustment screws (turned clockwise to advance timing, turned counter clockwise to retard timing).
5. Dial indicator installed in sparkplug hole for timing mark set up.

TABLE OF TORQUE VALUES 100 HP ENGINES**TORQUE**

Fastener Description	Size	Inch lb.
CYLINDER HEAD SCREWS	8mm	228 inch Lbs.
OUTER MAGNETO RING	6mm	72inch Lbs.
INTAKE MANIFOLD MOUNTING SCREWS	6mm	84inch Lbs.
CRANKCASE ASSEMBLY SCREWS	6mm	84inch Lbs.
V BELT PULLEY MOUNTING SCREWS	6mm	84 inch Lbs.
ELECTRIC STARTER MOUNTING SCREWS	8mm	228 inch Lbs.
CYLINDER BASE NUTS	8mm	228 inch Lbs.
EXHAUST MANIFOLD MOUNTING SCREWS	8mm	228 inch Lbs.
RUBBER INTAKE FLANGE SCREWS	6mm	84 inch Lbs.
SPARK PLUGS	14mm	192 inch Lbs.
CRANKSHAFT BOLT (PTO-end) (½ inch NF)	½" NF	552 inch Lbs.
CRANKSHAFT NUT(Magneto end)	16mm	107 FT Lbs.
ENGINE MOUNTING BOLTS	10 mm	444 inch Lbs.
COOLANT MANIFOLD BOLTS	6 mm	84 inch Lbs.

100 HP ENGINES TECHNICAL DATA

Engine	100Hp
Ign.Timing@2000 - carbureted	18 deg.
Ign.Timing@2000 - Fuel injected	18 deg.
Spark Plug Heat Vt.	280
Spark Plug Gap	.030
No. of Carburetors/Injectors	Three
Carburetor ID #	Dellorto - PHB34
Main Jet	165
Needle Jet	AB 265
Needle	K 43
Idle Jet	50
Do Not Exceed RPM	6300
Peak HP RPM	6000
HP @ Peak RPM	100
Peak Torque RPM	5500
Peak Torque Ft.Lb.	88
Maximum CHT	390
Maximum EGT @ full power	1256
Maximum EGT @ cruise power	1330
Maximum coolant temperature	240
Minimum coolant temperature	160