



2-Stroke Top End Assembly

**Note the following information is recommended to be used in conjunction with your OEM (original engine manufacture) service manual.*

- Before beginning reassembly be sure to have all the necessary new parts needed to do the complete job. Including; New piston, rings, pin, clips, gaskets, top end bearing, cylinder dowels etc.
- Clean all gasket surfaces thoroughly. **They cannot be too clean!** Make sure all gasket surfaces on cylinder (head, base, reed, exhaust) are clean. Clean all surfaces on cylinder head, intake manifold, reed cage, etc. All parts should be cleaned using a small pocketknife, wire brush, small file etc. Great care should be taken to clean each surface **without causing any damage** to the surface. The final surface to clean should be the base gasket surface on the center case. Special care must be taken to prevent any foreign material from falling into your 2-stroke lower end cavity. When you feel all gasket surfaces are clean, run your finger over all the surfaces. You should feel absolutely no obstructions on the surfaces. If it feels smooth it is.
- Before assembly it is recommended to wash cylinder, cylinder head, piston etc, thoroughly. It is recommended to wash these parts with **HOT** soapy water. After washing is complete the parts should be immediately blown dry with compressed air.
- **Warning!** When washing and drying is completed it is necessary to spray WD-40 (or similar chemical) onto any parts that have steel in them. This will help prevent them from rusting prematurely, For example, many 2 stroke cylinders have steel sleeves, after washing with water they will rust if not protected.
- After all your parts are cleaned and prepped you are now ready to reassemble your engine. To start it is recommended that you lay out all of your parts on a clean towel or rag in a neat and orderly fashion. Make sure all pieces are accounted for and easily accessible.
- Check cylinder head and base studs to ensure they are all tight.
- Check piston ring end gap. As a general rule an end gap between .015 and .025 is acceptable. Consult your OEM service manual for the specific specification regarding your model machine.
- Install rings on piston. As a general rule for all 2 stroke ATV engines the rings are marked with a trademark I.D. (usually the ring size .25, .50 etc.). This trademark always goes up. Always note if your piston uses any keystone style (tapered) rings and their location.
- Install piston on connecting rod, Lubricate piston pin and top end bearing with premix oil. Make sure both piston circlips (retainers) are in securely. **NOTE:** It is advisable to place a rag under piston and over crankshaft when installing circlip(s). So that nothing falls into the crankshaft cavity.



- Coat all paper OEM gaskets (except exhaust) with a thin coat of grease. Grease on the gaskets will help them become more pliable. Generally no sealer is required on gaskets. But if there is good cause to require (Scarred gasket surface, etc) a sealer on the gaskets. It is recommended to use a thin coat of Hi-Temp silicon on the gaskets instead of grease. DR recommends using OEM gaskets in almost all instances. Using quality OEM gaskets in your engine will help keep gasket failures to a minimum.
- Install base gasket(s) onto cases. Then install cylinder(s) onto cases. Install base nuts finger tight, Work kick-starter 4 or 5 times to make sure engine turns over freely.
- Install head gasket. Make sure head gasket is the correct gasket for your application. Measure I.D. of head gasket. It should be at least .010 bigger than the cylinder bore. After confirming gasket diameter is correct make sure gasket is installed on cylinder deck correctly. Most head gaskets have a front and back. They are usually marked by an arrow or a mark designating Exhaust. It is critical that gasket is installed correctly because many gaskets serve as the engine thermostat. An improper install can result in severe engine damage.
- If your head uses O-Rings instead of a head gasket grease o-rings and install them in o-ring grooves in head. Install head on cylinder. Install head nuts and washers (when applicable) and finger tighten.
- Install reed cage and intake manifold. Install bolts finger tight.
- Torque Values: (the following specs are a guideline only. Refer to OEM manual for specifics)

BASE STUDS:	8mm	18 ft. lbs.	(Banshee, Blaster, Suz LT 250)
	10mm	33-35 ft. lbs.	(Hon TRX 250R, Suz 500)
HEAD STUDS	8mm	18-21 ft. lbs.	(most models)
REED BOLTS	6mm	7-10 ft. lbs.	(most models)

Torque values are for stud/bolt diameter. **Not the size of the nut!** All torque should be done with a high quality, name brand torque wrench that is correctly calibrated. Incorrect torque readings can cause severe damage to your cylinder, studs etc.

All torquing should be done in 5 ft lbs graduations, Always tighten/torque multiple bolts/nuts in a criss cross manner.

- After all items are torqued to the proper specification. The engine is then ready to be **Pressure Tested**. (See separate DR Tech sheet for specific instructions regarding pressure testing) Engine must hold 6 lbs of pressure for 6 minutes.
NOTE: Failure to pressure test your engine can result in not diagnosing an air leak. Air leaks in 2 Stroke engines can cause unexplained piston seizures, jetting problems, poor



performance etc.

- After engine is fully assembled and all tests have been run. Install exhaust pipe and silencer.
- Make sure exhaust pipe doesn't have any unnecessary build up of carbon inside it. Silencer should be freshly repacked.
- Before installing carburetor it should be cleaned and jetting should be checked and recorded. It is advisable in most cases to richen jetting before running a fresh engine. Consult your engine tuner or a professional for more information.
- Clean air box and install a freshly cleaned air filter. New fuel and premix should be used.
- Fill engine with fresh coolant/ distilled water mixture. For winter mix 50-50. For summer mix 60% water and 40% coolant. Make sure to recheck coolant level after running machine. Machine must be cool before removing cap to check fluid level.
- After machine is completely reassembled and all fluids are filled. You are ready to start machine and begin the break in procedure. **Duncan Racing has a very specific Break-In procedure that is recommended to follow. This process is detailed thoroughly on a separate DR Tech Sheet.**
- **Spark Plug Recommendations:** For optimum performance use a **NGK BR9EVX** gapped at .028 in most 2-Stroke ATV's. When using plug in stock OEM cylinders, you may also use a Champion N6YC gapped at .028. If unsure of the specific plug contact DR or consult Manual.
- **WORDS of CAUTION:** Plug gap should be checked on **ALL** spark plugs. Use feeler gauge type gaper. Do not use wire gaper. Check manual for gap specifications.
- **Fuel Recommendations:** Use a high quality race gas with octane between 105 and 112. We recommend using **VP C-12** (www.vpracingfuels.com) or **SONOCO Std** (www.racegas.com). The use of a high quality fuel such as VP C-12 will enhance the reliability of your machine; lower operating temperatures and increase jetting consistency. Be careful not to use fuel with an octane rating higher than 112 in your 2 stroke ATV, engine damage may result.
- It is **NOT** recommended to use aviation fuels and or octane boosters in your engine.

Premix Oil Recommendations:

ABOVE 40°F (6°C) Use MAXIMA Castor 927 at a 32-1 ratio

BELOW 40°F (6°C) Use MAXIMA K2 at a 32-1 ratio



- Note for a 32-1 ratio use 4 oz of oil per each gallon of gas

- **SPECIAL NOTES**

- When Servicing your top end it is advisable to closely inspect your crankshaft and main bearings when cylinder is removed. Care should be taken to ensure crankshaft and main bearings turn over freely and without abnormal noise. Verify lower rod bearing cage and thrust washers are intact. Make sure rod has no up and down play. There should be reasonable side play. But if the rod has any upward movement it must be repaired/replaced. If there are any doubts to the condition of these items, consult a professional.
- **CYLINDER REBORING:** Cylinder reboring is often one of the most overlooked maintenance issues concerning your machine. Proper boring of the cylinder when it is required is **CRITICAL** to both your engines performance and reliability. When this service is necessary a professional that specializes in 2 stroke cylinder boring should perform it. Do not use just any machine shop. Though they may be great machinists, if they are not experienced in this process problems may arise.
- **PORT CHAMFURING:** All 2-stroke cylinders must have the ports chamfered after the cylinder is bored. Many may also require that the exhaust bridge be relieved. **FAILURE TO DO THIS PROPERLY WILL CAUSE ENGINE DAMAGE.** A trained professional should only perform this cylinder modification. Generally the technician that performed the reboring process performs this job.
- **NIKASIL COATED CYLINDERS:** If your cylinder has Nikasil or other chrome type plating on the bore surface it **cannot be bored.** A Nikasil coatings is a form of plating adhered to the inside of your aluminum cylinder to do away with the old style conventional steel sleeve designed cylinders. Many OEM MX bikes have these types of cylinders. As does many of **Duncan Racings PC 2000 and Hyperdyne** ATV cylinders.
When replacing piston and or rings in a cylinder of this type, it is advisable to deglaze bore with a **Ball Hone.** Use some form of lubricant when honing. **DO NOT USE ANY OTHER TYPE OF HONE OR CYLINDER DAMAGE COULD RESULT.**
Consult a professional if you have any reservations regarding the above information.
- When should you rebuild your top end? That question has many variables. Following is a rough guideline. For preferred reliability and performance. The average recreational user should be servicing the 2 stroke top end every 30-50 hours. Serious racers should service their top ends every 5-10 hours. **Please be aware that any foreign abrasives (dirt, sand etc.) that get into**



your engine can greatly accelerate the above timetable.

- Servicing your 2 stroke top end should entail the removal of the cylinder so that the piston to cylinder wall clearance can be checked among other things (reed pedals, top end bearing etc.) After cylinder/piston clearance is measured professionally the proper course of service should be performed; boring, honing, ring replacement etc. A certified professional should guide you through the proper course of action.