SkiDoo 1203 Turbokit Install Instructions

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DISCLAIMER

The installation of a turbo kit on your snowmobile is recommended for experienced riders and/or racing use only. Installation of this turbo kit may void any warranty that is provided by the vehicle manufacturer, Check with your dealer before installing.

Powder Lites Inc. and dealers, or installers will not be held liable for any Personal injury or physical damaged obtained in association with the installation or use of this product.

POWDER LITES would like to thank you for purchasing our 1203 turbo kit. There have been many hours of R&D into this turbo kit so you can have many hours of great riding, with little wrenching. This motor has new designs that are not common to other snowmobile engines and with its large bore and short stroke it makes for great torque at low RPM. This engine responds very well to boost and will enhance the torque on this engine by more than double with only 13 PSI boost at sea level.

As with all performance modifications though you must realize that a little extra maintenance will be required. Be sure to check for tightness of all bolts and nuts after the first ride and throughout the year as well, especially the bolts associated with the turbo and header as heat cycling may loosen these. Your engine and turbocharger should also be allowed to warm up properly before any sustained full throttle runs are undertaken, and after you have run the sled hard you should allow adequate cool down before shutting down the engine, the turbocharger spins in excess of 120,000 rpm be sure to let it slow down a bit before you turn off the engine!

Please read the install instructions completely and make sure you understand them before starting this project. This turbo kit comes complete with specialty tools for doing camshaft timing, but you will need the following to complete this project:

- Complete set of hand tools including some TORX bits and a GOOD Torque wrench
- Torque angle gauge
- Factory service manual
- Digital camera (take pictures for reassembly!)
- Engine oil
- Oil filter
- Notepad (take notes for reassembly!)

The 1203 is has a very tight cam chain, we recommend engine have at least 10hours of service on it or it will be impossible to reinstall the cam chain after the installation of head spacer.

You will need a new primary clutch as stock one will fail catastrophically! We recommend a Polar billet clutch and can be purchased from us at a discounted price as an addition to your turbokit.

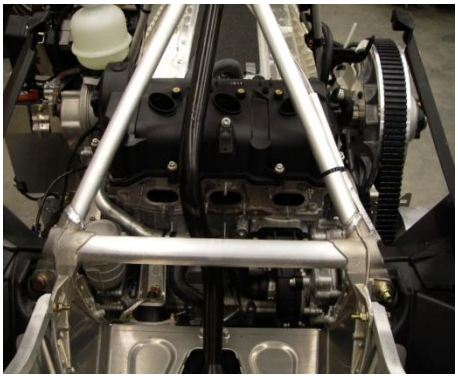
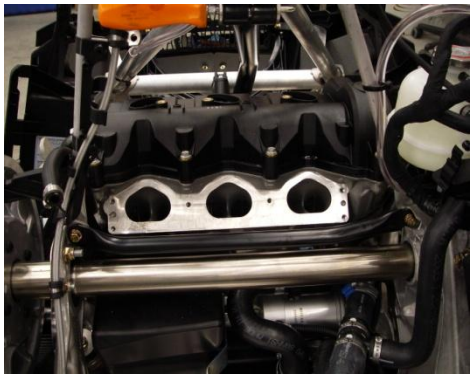
Each kit is shipped with a check sheet, it is your responsibility to go through your sheet and packaged kit and account for everything on the list. You must contact us immediately if there is any missing or damaged pieces.

New injectors are supplied with the kit, Please send back your stock injectors in the mail to receive your CORE CREDIT back. Mark a LOW value dollar amount (for Post/Mail insurance), as we get charged duty.

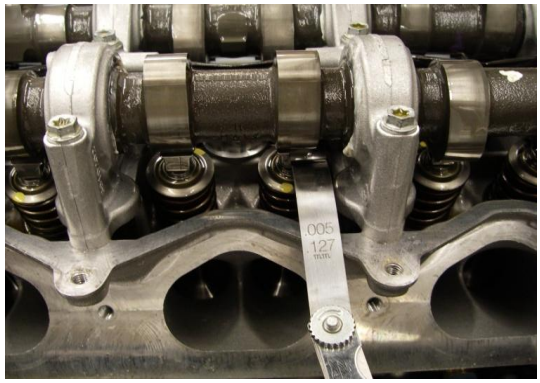
NOTE-2010 models have a cooler thermostat part # 420822541 that should be installed in your 2009.

This is your turbo kit as shipped.

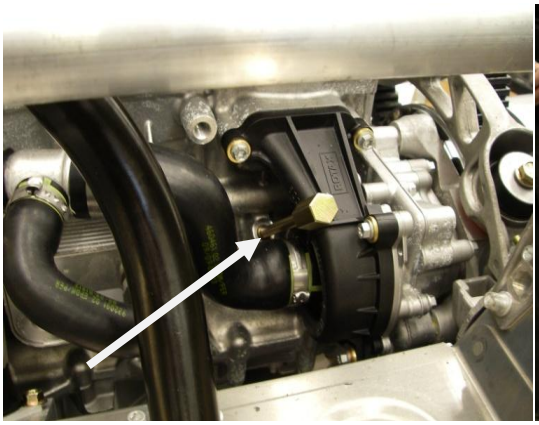
STEP 1- Remove all the plastic panels, fuel tank, and drain the coolant. Next remove the entire exhaust system, followed by the air box, fuel rail, wiring, coilpacks, sparkplugs, and valve cover.

STEP 2-With the valve cover off check the valve clearance and write it down so you can readjust the valve shim clearance later when the head is on the bench.



STEP 3-Once you have checked all the valves you can install the cam alignment tool and the crank TDC tool.



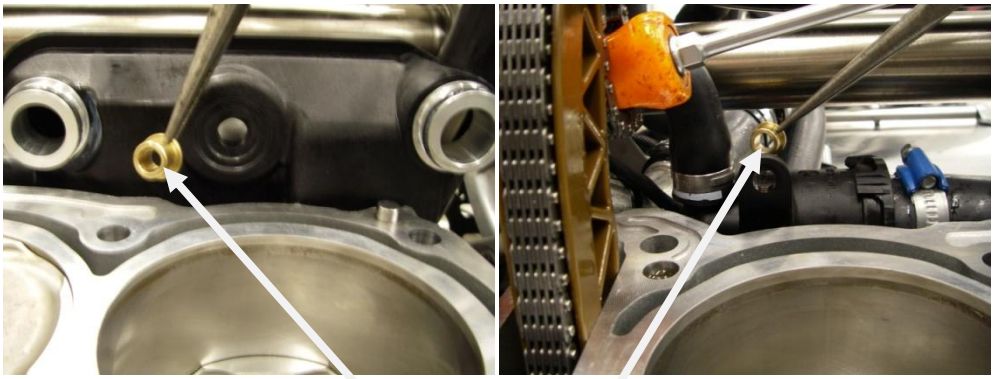

STEP 4- Remove the chain tensioner from the back of the motor, an allen key will slip in under the driveshaft, this will be tight. Remove the three bolts holding the timing chain sprocket on and remove this sprocket, support the chain with some wire.

STEP 5- Remove the 12 bolts securing the cam caps and carefully remove the cams. Make sure the valve shims are still in place, they sometimes get stuck to the cams as you lift them.

STEP 6- Remove the head bolt as instructed in the shop manual, new bolts are not supplied with your kit. If reinstalling head bolts make sure they tighten properly. Remove the head from the engine (a helper makes this job easier as to not damage the head surface on removal). Clean both the head and the block for reassembly, Be careful not to tip the head over as the valve shims will fall out!

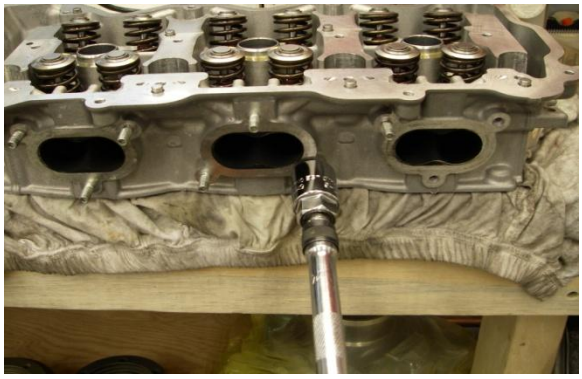
STEP 7- Remove the two brass inserts from the oil tank and the thermostat

STEP 8-Remove the oil tank collars and replace with the new supplied offset ones.



Brass inserts

STEP 8-Remove the exhaust studs as the kit comes with stainless steel bolts & Nordlock washers to hold the header on. These studs can be quite stubborn, USE HEAT! Do not break them off in the head, as they are quite difficult to remove then!



STEP 9- Split the head gasket and spray the surfaces with copper coat spray gasket also coat the head shim. Permatex part# 101MA

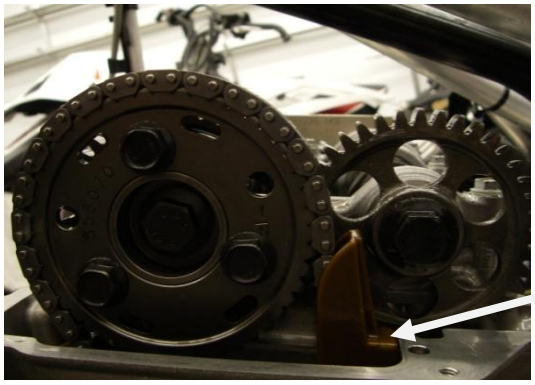
STEP 10- Reinstall the head as the shop manual directs, be sure to coat the new bolts with moly lube for proper torque.

STEP 11- Adjust the valve shims clearance, we recommend the following specs for the turbo.

- Intake 0.008”
- Exhaust 0.015”

STEP 12- Reinstall the cams and sprocket and timing chain.

STEP 13-* GRIND ONLY IF NEEDED*, remove material off the back of the timing chain guild right from the block all the way down to the tip. This will only apply to sleds with zero hours!



Start grinding here and go all the way down.

STEP 14- Reinstall the timing chain tensioner with the supplied spacer.

STEP 15- update thermostat on 2009 model if applicable

STEP 16- Transfer the IAC motor, map sensor, throttle body, fuel rail from your old air box to the new air box along with the new supplied injectors.

STEP 17- Install new intake plenum, make sure o-rings are installed on sealing surface. Don't forget the bolt in the bottom bracket! Install clip from old air box on tab on new airbox.

STEP 18- Install ECU to plenum with new longer bolts and spacers supplied.

STEP 19- Removed TDC tool and install new fitting for oil return for turbo.

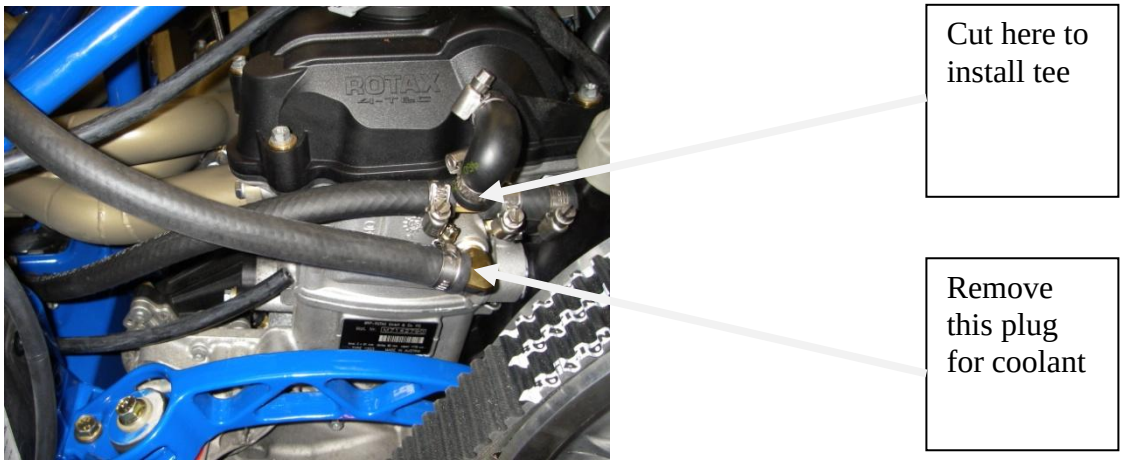
STEP 20- Remove mag side motor mount to gain access to remove oil pressure sender. Install Tee fitting and reinstall oil sender and adapter fitting as well as turbo feed hose. Reinstall motor mount with blue loctite and torque to spec.

STEP 21- Install supplied heat shielding on the main water hose that feeds water pump, VERY IMPORTANT OR YOU WILL BE REPLACING THIS HOSE LATER!

STEP 22- Install the tee in the oil return line. Cut at about 4 inches of hose from engine and then leave 6 inches of hose to reach the turbo. Apply heat shielding to helps to protect this hose. **Change the oil filter now as well while you are right beside it!**

STEP 23- Install the 13 inch piece of hose from your kit from the lower tee to another tee installed at the valve cover breather hose.

STEP 24- Remove plug from head to install brass fitting from kit to supply coolant to the turbo.



STEP 25- Install the header using supplied stainless bolts and Nord-lock washers and the original gasket.

STEP 26- Remove the compressor housing from the turbo by removing the large snap ring from the back of the compressor cover and the e-clip from the wastegate rod

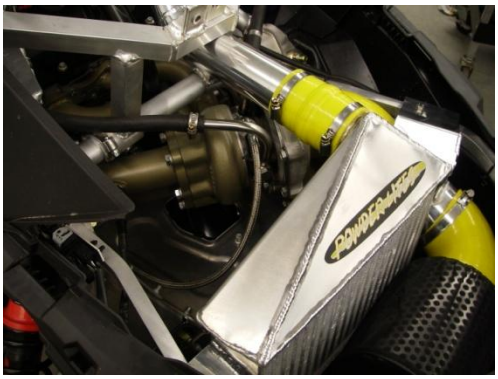
STEP 27- Install the turbo on to the header using supplied bolts, nuts and Nord-lock washers, don't forget the stainless gasket!

STEP 28- Reinstall the compressor cover being extremly careful not to damage the compressor fins, they are easily damaged! Don't worry about alignment, you will come back and align it later.

STEP 29- Hook up the oil feed line and the oil return line.

STEP 30- Hook up the coolant line from the cylinder head to the turbo and then the coolant line from the turbo to coolant hose going from engine to tunnel cooler. See photo.

STEP 31- Install the intercooler, aligning the turbo to intercooler and install the hose. Due to machine tolerances all sleds are a bit different and you will have to take your time and fit the intercooler to the bumper supports. When you are happy drill the holes and bolt it up.



STEP 32- Install e-clip on wastegate rod making sure you have about half of the hole covered when you stretch the rod over the flapper lever

STEP 33- Install clamps on turbo to intercooler hose.

STEP 34- Install air intake tube and filter to turbo, align bracket on tube and drill holes in tab on intercooler mounting bracket tab.

STEP 35- Install upper intercooler to airbox tube, align and tighten clamps

STEP 36- Install headlight bracket to frame using supplied hose clamps

STEP 37- Install downpipe to turbo using supplied bolts and Nord lock washers.

STEP 38- Install muffler and connector pipe using springs and supplied brackets.

STEP 39- Drill hole in plastic and route valve cover breather to hole using plastic fitting from factory air intake hose to secure it. Push the fitting in from bottom and clamp to hose.

STEP 40- Route Rapid Bike harness on top of engine harness, the Rapid Bike intercepts the injection and crank signals so:

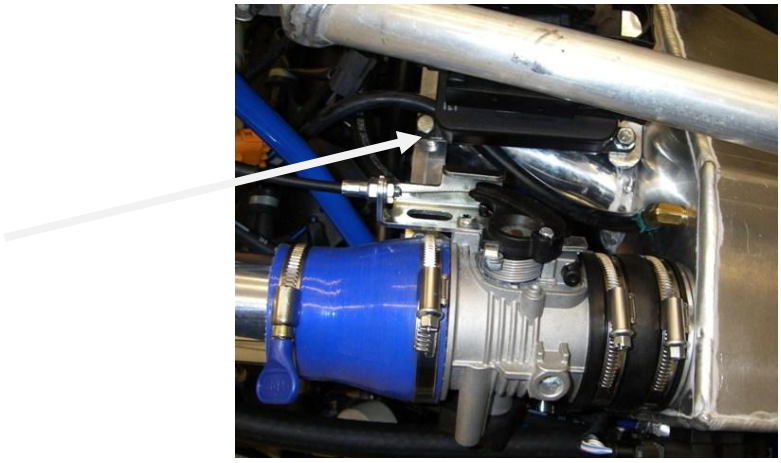
- Connect up injector plugs to harness and harness plugs to injectors.
- Do the same for the crank signal connection.

STEP 41- Splice the blue wire on the Rapid Bike harness to the purple/brown wire on the TPS sensor. Use solder! Green is unused, tape all connections well.

STEP 41- The harness should be preconfigured, but check to make sure green is to yellow at connections near Rapid Bike box end of harness.
Extra connectors with Gray wire for switching maps, Brown wire for RPM hold function.

STEP 42- Mount map sensor to frame behind headlight bracket using zip ties, plug connection from Rapid Bike harness to map sensor.

STEP 43- Route hose from nipple on airbox UNDER ECU bracket (so it doesn't get caught in throttle linkage!) to map sensor, Tee into this line and run to blow off valve intercooler as well. Tie up hose out of way from all moving parts and hot manifold!



STEP 44- Using zip ties, secure all wiring in Rapid Bike harness from moving and hot exhaust components!

STEP 45- Mount Rapid Bike box to bracket above battery, or wherever you feel is better, hook up ground wire of harness to battery or good chassis ground. POWDERCOAT WILL NOT CONDUCT ELECTRICITY! FIND A GOOD GROUND, OR GRIND OFF POWDERCOAT! Now is a good time to also mount your gauges and hook them up as well. Boost gauge gets tee'd into the hose after the map sensor. Wideband can get power from small plug by headlight harness that has a red/black, and black wire. Red/black is accessory power. Route wire out of way from exhaust components to sensor in exhaust, small bracket goes to bumper bolt to clip plug onto.

STEP 46- Reinstall gas tank.

STEP 47- Hook up fuel line making sure clip is securely fastened and locked into place, YOUR SLED COULD CATCH ON FIRE IF THIS CONNECTION COMES APART BECAUSE IT IS NOT LOCKED IN PROPERLY! TRIPLE CHECK THIS!

STEP48- Recheck everything and tie up all hoses and wires, make sure hoses are routed away from hot exhaust components, and anything that moves!

STEP 49- Check all hoses and clamps make sure they are all tight, especially the hard to get at coolant hoses on the back of the motor.

STEP 50- Fill with oil and coolant, and recheck everything again, when you are happy you have everything ready, push the button! The sled should start up without much fuss, do this outside or in a well ventilated area, as there will be some smoke as all the new parts burn off their coatings and any oil from handling them.

STEP 51- Recheck oil and coolant level after running for a few minutes, top up as needed. Coolant is hot and may expand out of the tank if there is any air in it be careful!

STEP 52- Boost should be set to 9psi at sea level, verify and adjust as needed. You may run 9psi on pump 91 at sea level, and up to 13psi at above 6500feet. With race gas or race/pump mix you may go higher, contact us for your options.

Thank you for purchasing a Powder Lites Turbo, we hope you enjoy our product!