Installation manual turbo kit

SkiDoo/Lynx ACE 900

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Supreme of the extreme !

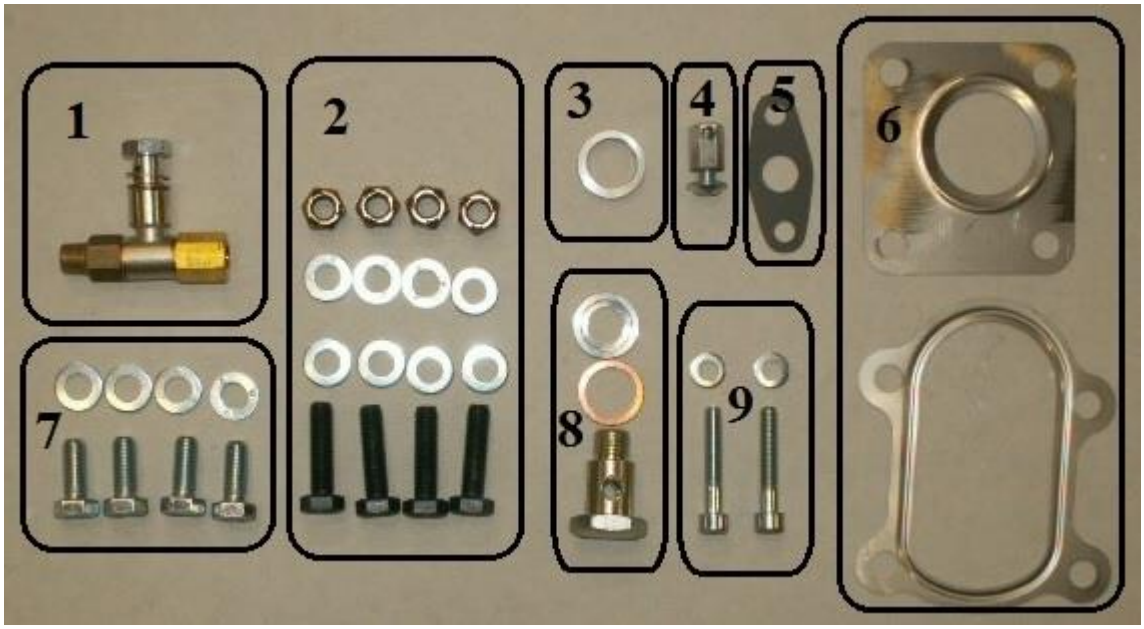
Thank you for choosing the MC Xpress turbo kit to your ACE 900 snowmobile
The turbo kit is designed for racing use only.
The turbo kit is designed to give you the best performance possible together with reliability.
During the developement work we have tried to keep the snowmobile as stock as possible to make the installation easy and to keep the sled as untouched as possible.

Read this manual carefully before you start with the installation.
We hope you will get much joy with your new investment.
The turbo snowmobile is only recommended to be used by experienced riders and for racing use only.

- This turbo kit greatly enhances the performance of the vehicle it is installed upon!
- Professional training should be received by anyone that operates this modified vehicle.
- Installation of this turbo kit may void any warranty that is provided by the vehicle manufacturer.
- A one (1) year warranty is provided on the kit parts only. This warranty does not cover any other parts even if the damage is caused by the installation of the turbo kit.
- MCXpress AB, its distributors, dealers, nor installers will not be held liable for any personal or physical damaged obtained in association with the installation or use of this product.

By installation or purchase of this product, the end user and or installer agree that the end user has been informed of this information.

Bolt kit ACE 900 turbo



1. Turbo oil outlet on engine
2. Bolts, nuts and washers exhaust pipe in to turbo
3. Spacer to cam chain tensioner. (170 hp kit only)
4. M6 special bolt and spring support nipple to fasten spring to turbo stay.
5. Oil outlet gasket on turbo
6. Gaskets exhaust in and out from turbo
7. Bots and washers for exhaust outlet on turbo
8. Oil return bolt and washers (replaces the stock oil plug)
9. M6 x 35 bolts and washers to fasten turbo to the turbo stay support frame.
   4 M6 x 10 bolts to fan brackets

Before the installation

Important to know:

turbo kit is designed for 170 hp / 80 kPa (11 psi) turbo pressure at sea level

Premium fuel or higher octane shall be used (98 octane pump gas for Europe)
If higher pressure is used, the risk of engine damages will rise rapidly.

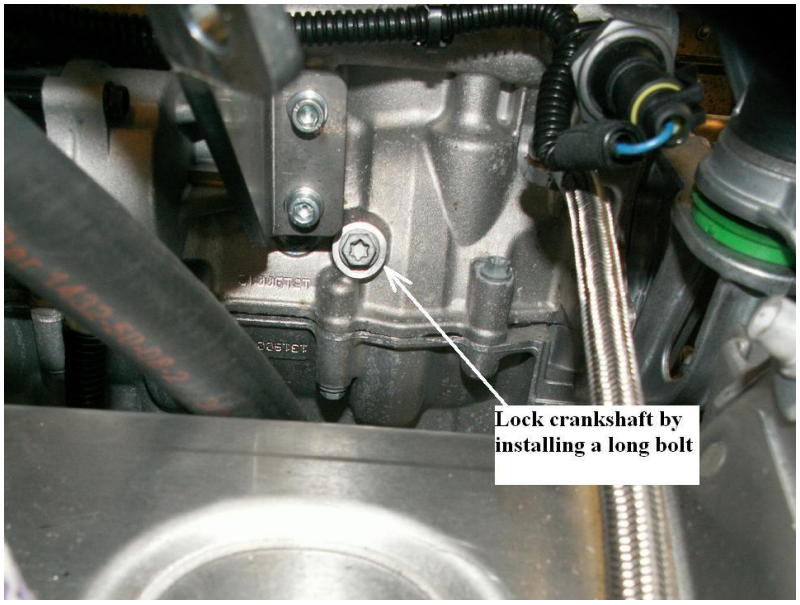
To make the installation as efficient as possible, we recommend you to follow these instructions.

To begin with, we recommend to:
Remove the plastic side fairings and the hood including the air box under the hood.
Remove the muffler and the exhaust pipe. The headers coming out of the cylinder head can be left in place.
Remove the fuel tank.
Remove the primary and secondary clutch.

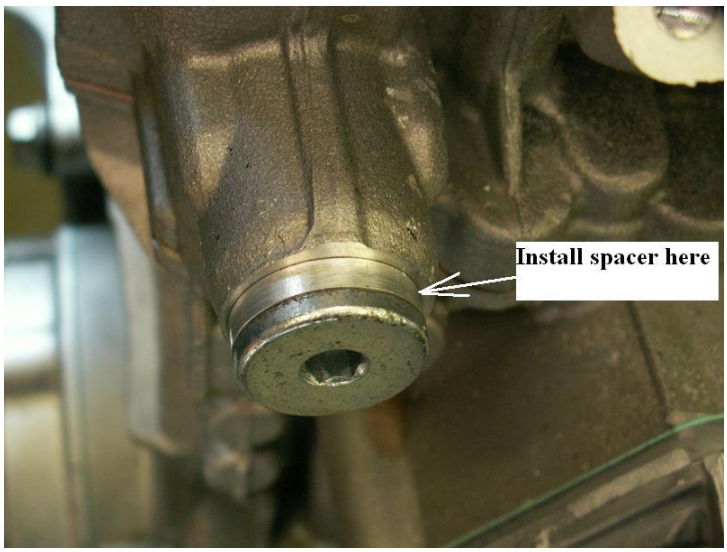
Lowering the compression ratio.

To avoid detonation, the compression ratio must be lowered by installing a thicker head gasket.
First of all, drain the anti freeze water from the engine.

Turn the crankshaft of the engine until the piston in the middle reach TDC (top dead centre)
Lock the crankshaft by installing a long bolt in the crank case (see picture)

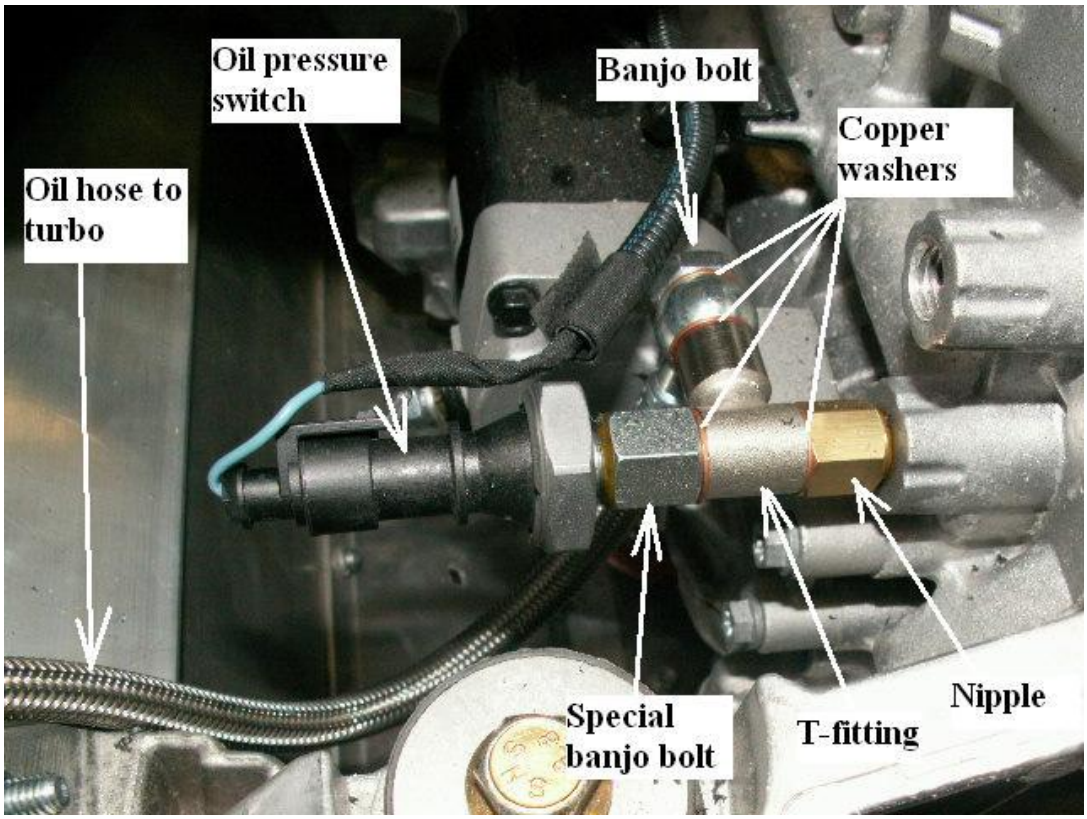


Remove the cam chain tensioner.
Before removing the camshafts, note how the marks are positioned.
Remove the camshafts and the cylinder head.
Clean the surface of the cylinder head and the engine.
Install the new thicker turbo head gasket.
Install the cylinder head. Re-use the stock head bolts.
Tighten the head bolts 20 Nm. Start from the centre and out.
Final tighten the head bolts in a 120 degree angle.
Install the camshafts in the same position as before.
Install the cam chain tensioner again.
But to make space for the cam chain when the thicker gasket is installed a spacer must be installed (see picture)



Oil hose to turbo

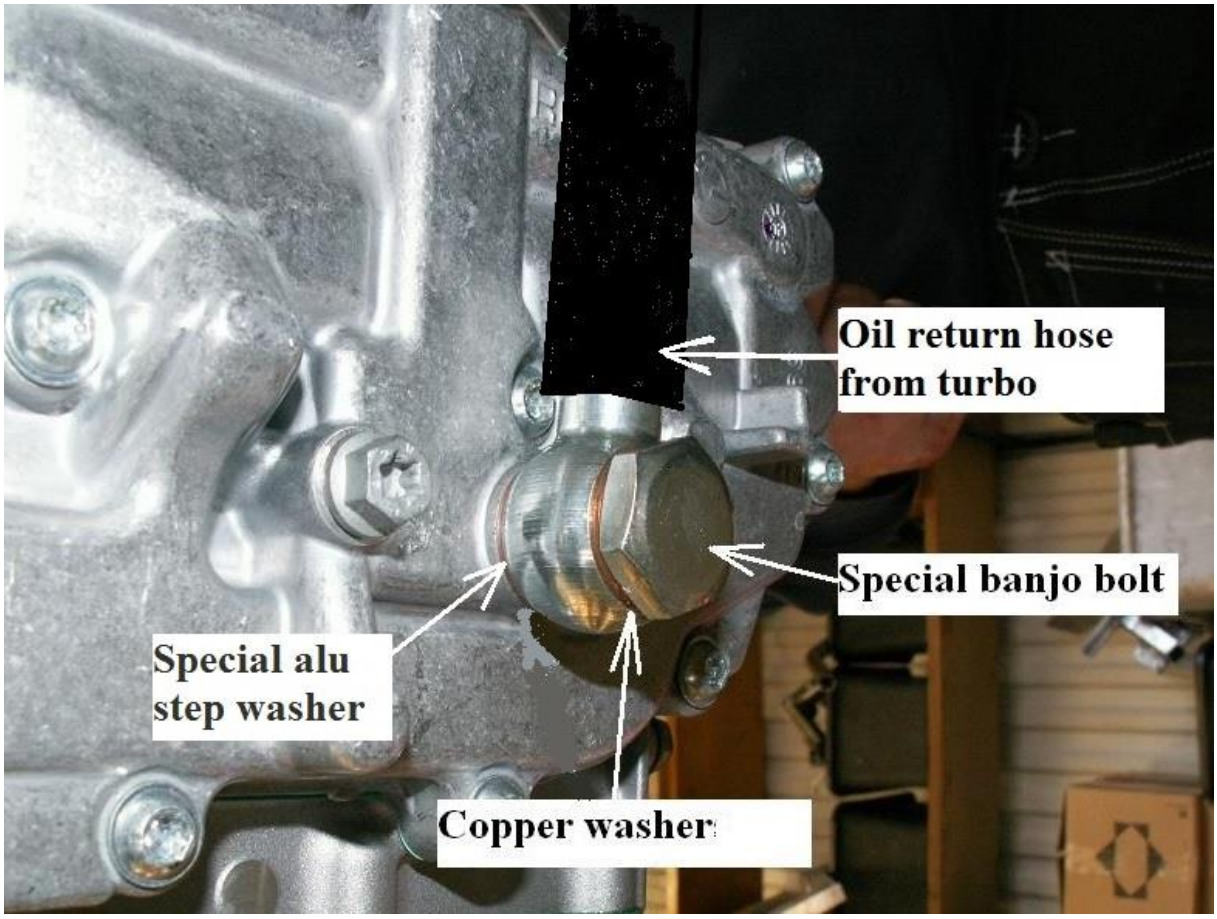
Install the nipple supplied with the kit where the oil pressure sensor was located.
Use Loc-tite thread sealant (or similar) on the threads of the gold coloured nipple.
Install the sensor to the special banjo bolt.
Use thread sealant on the sensor threads. (But not to much)
Install the oil hose to the turbo (=the hose with 10 mm banjo on one side and 12 mm banjo on the other) the T-fitting like the picture.
Use cupper washers between each item.



Oil return hose

Remove the oil plug under the engine. You first have to take away a small cover under the chassis to find the oil plug.
When you remove this plug, the oil inside the dry-sump tank behind the engine will be drained, so be prepared with a clean pan to catch the oil that is coming.

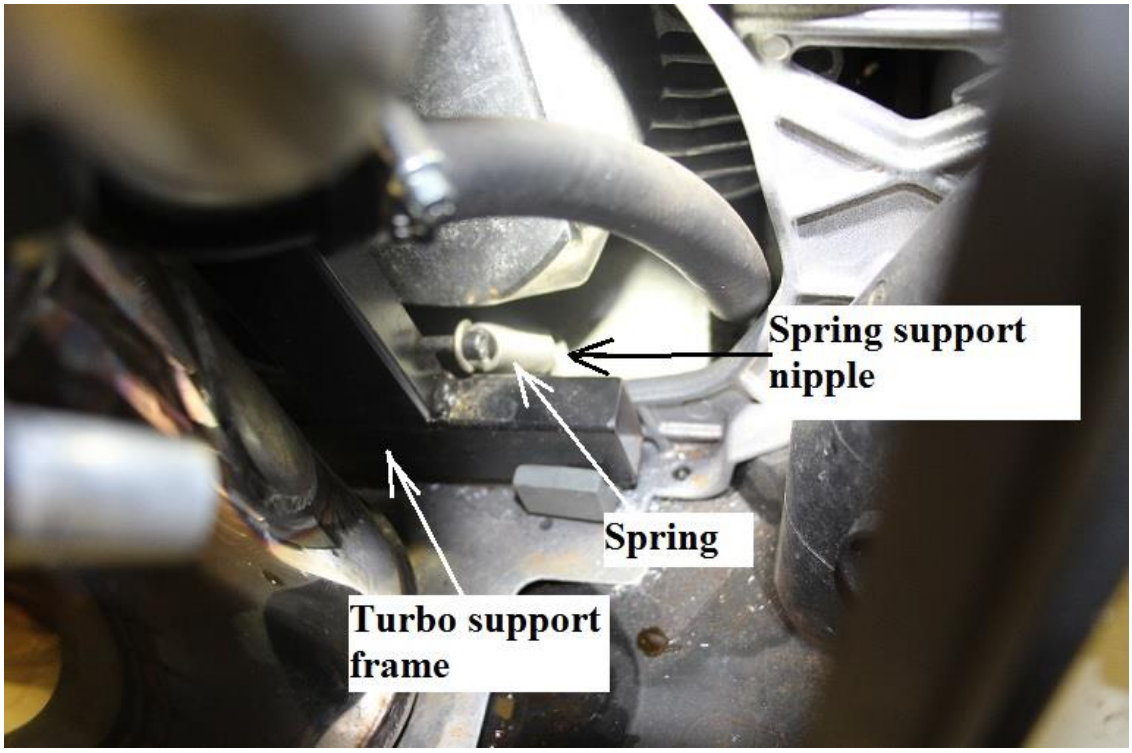
Install the oil return hose + banjo fitting to the oil pan.
Use the special banjo bolt + the step washer in aluminium and a copper washer to where the oil plug has been located.
This special banjo bolt is rather fragile, so tighten just 15 Nm.

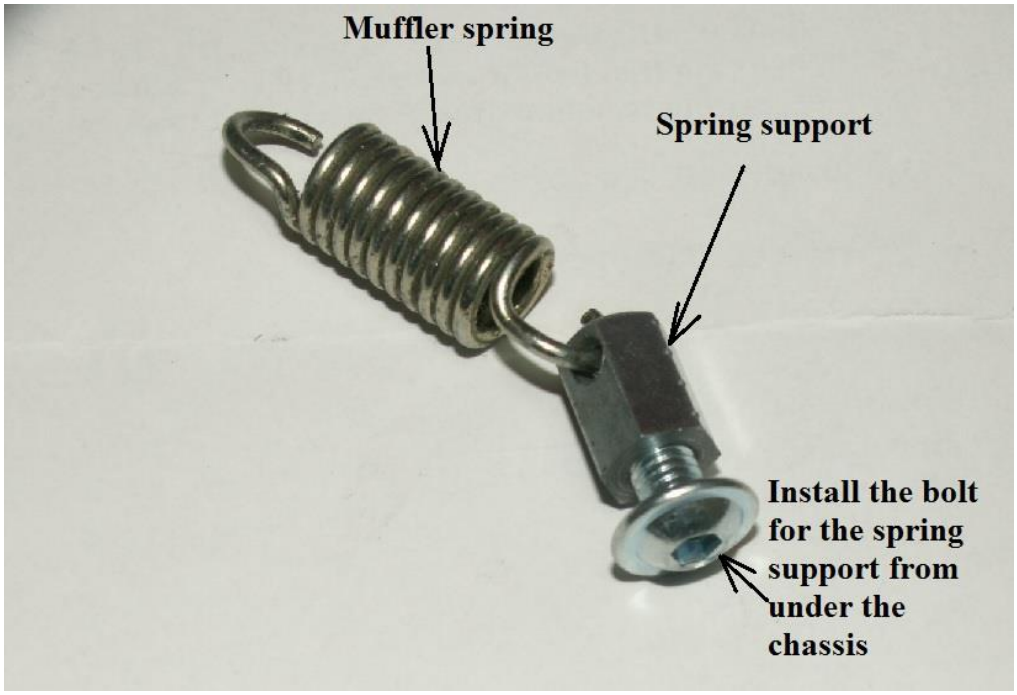


Install the turbo

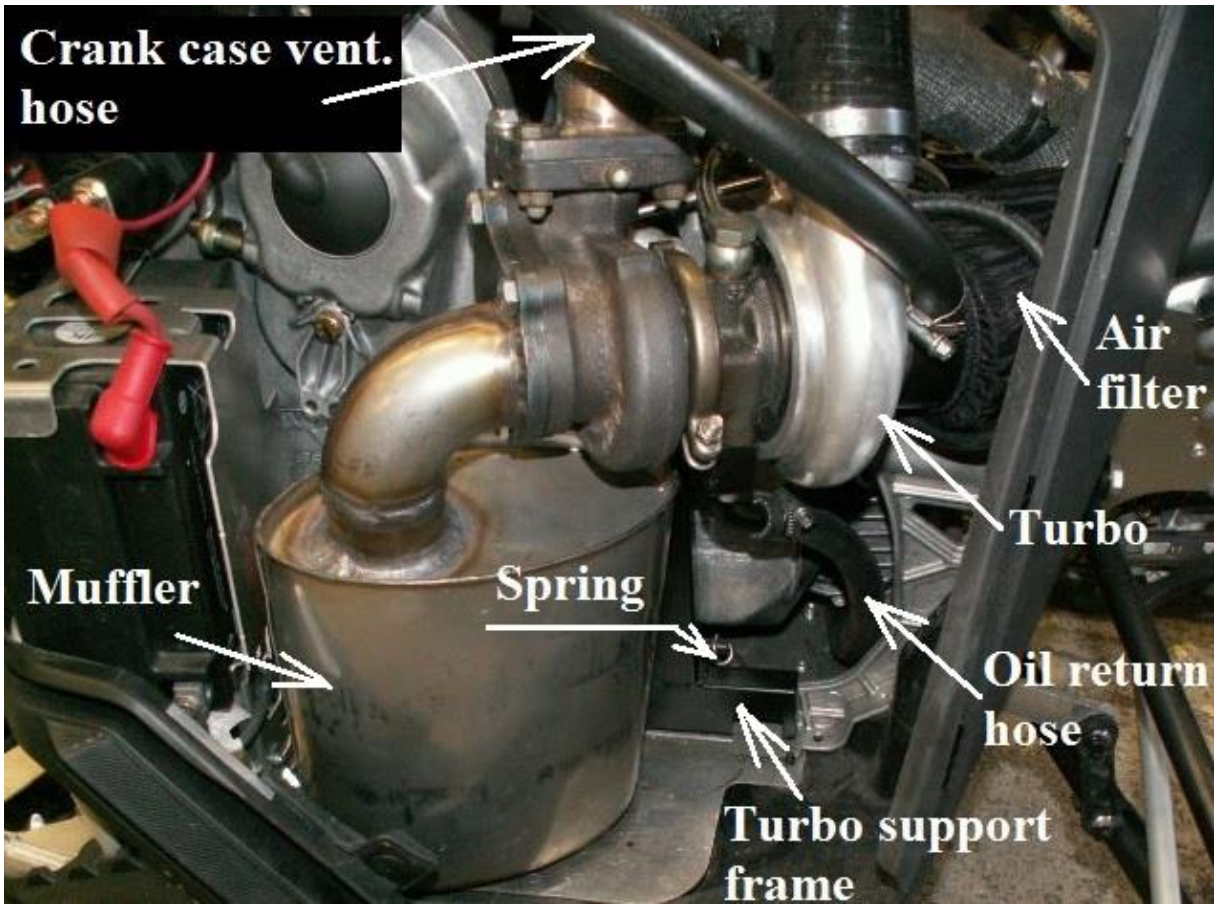
The turbo is supposed to be installed where the stock muffler was located.
First, install the turbo to the turbo support frame.
Install the muffler to the turbo. Don’t forget to install the gasket between the turbo and the muffler.

Before you put the turbo into the sled, install a spring support nipple to the chassis.



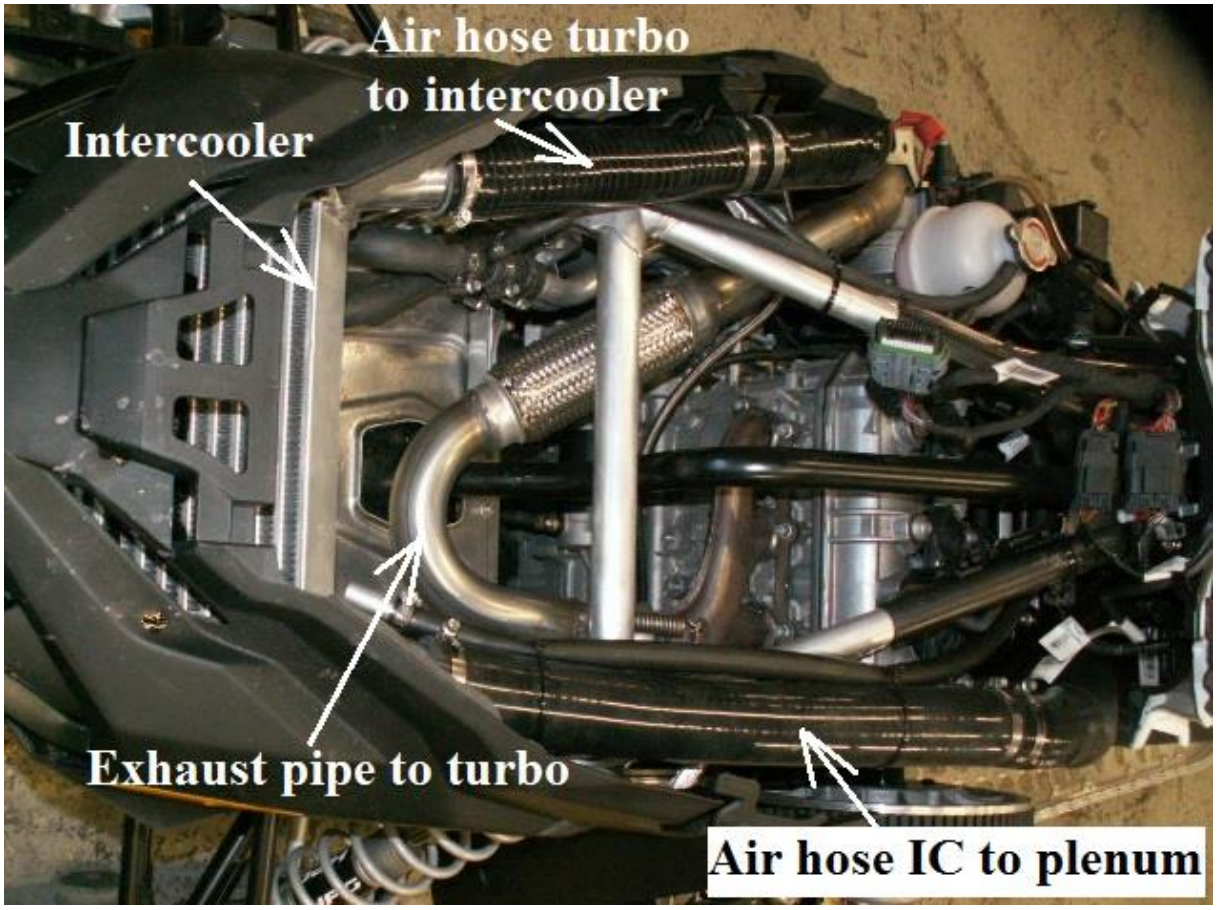


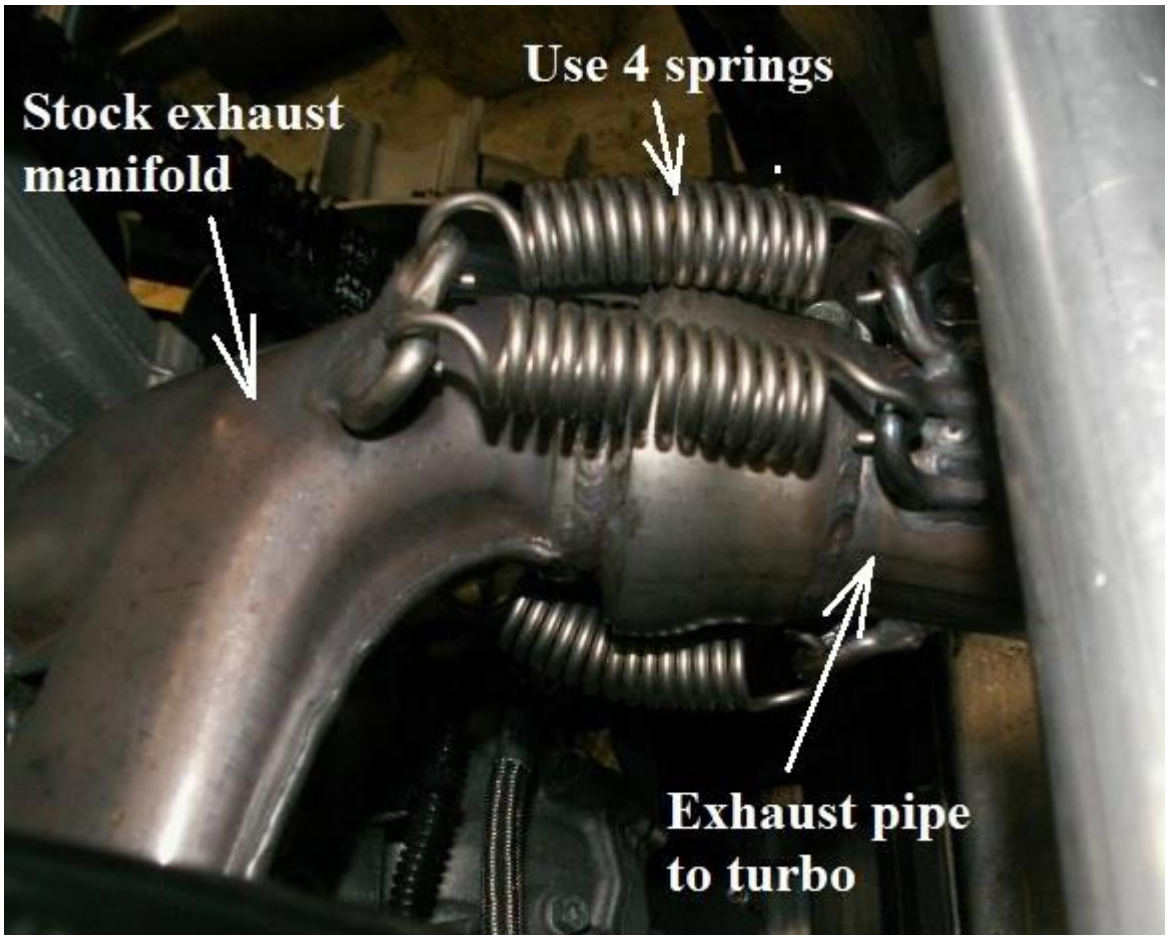
After that, install the turbo into the snowmobile.
Connect the spring between the turbo support frame and the spring support nipple.



Install the oil inlet hose on top of the turbo.
But before you do that, lubricate the oil inlet to the turbo with motor oil.
Install the oil return hose.
Install the air filter and the crankcase ventilation hose to the filter.

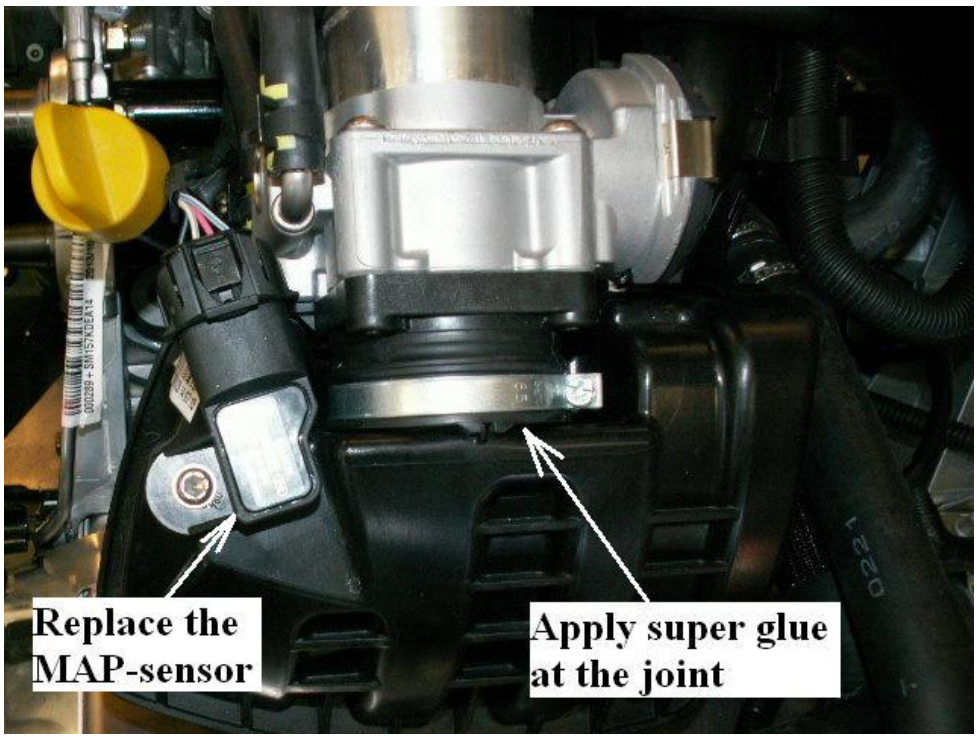
Install the exhaust pipe between the stock exhaust manifold and the turbo.





Replace the ECU, MAP-sensor and fuel injectors

The ECU must be re-programmed by MC Xpress.
This can be done by sending in advance the ECU to MC Xpress, or that a new ECU is included with the kit, and the stock ECU will be returned after the installation.
(In these cases a core charge will be held until the ECU is returned)
The ECU is located between the fuel tank and the engine.
The DESS-key is related to the ECU. If the ECU is replaced, the new ECU must be updated to accept the existing DESS key. This must be done by the BRP-program BUDS by an authorized BRP dealer.



The stock MAP (=Manifold Air Pressure) sensor located on top of the air plenum behind the engine must be replaced by a new sensor that is made to read turbo pressure.
The fuel injectors on the intake manifold shall be replaced with injectors with higher flow capacity.
To prevent the throttle body from blowing off because of the turbo pressure, we recommend to use super flue on the joint between the plastic air box and the throttle body rubber mount.

Intercooler installation

Before installing the intercooler, install the air filter to the inlet of the turbo.

Some models of ACE 900 have a water cooler placed in the front of the chassis.
Remove the water cooler from the aluminium frame.
Place the water cooler behind the intercooler.
Use the stock rubber mounts and bolts.

To get some space between the chassis and the electric fan, the fan itself can be moved forward about 10 mm by installing it like the pictures below.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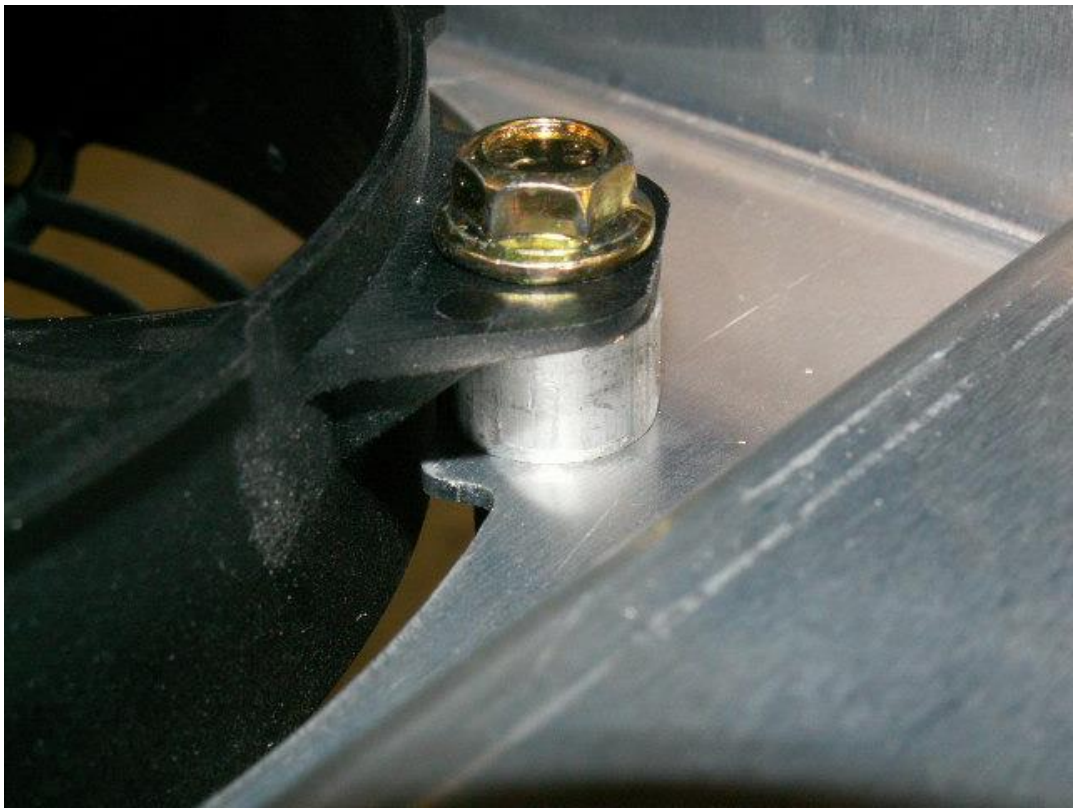
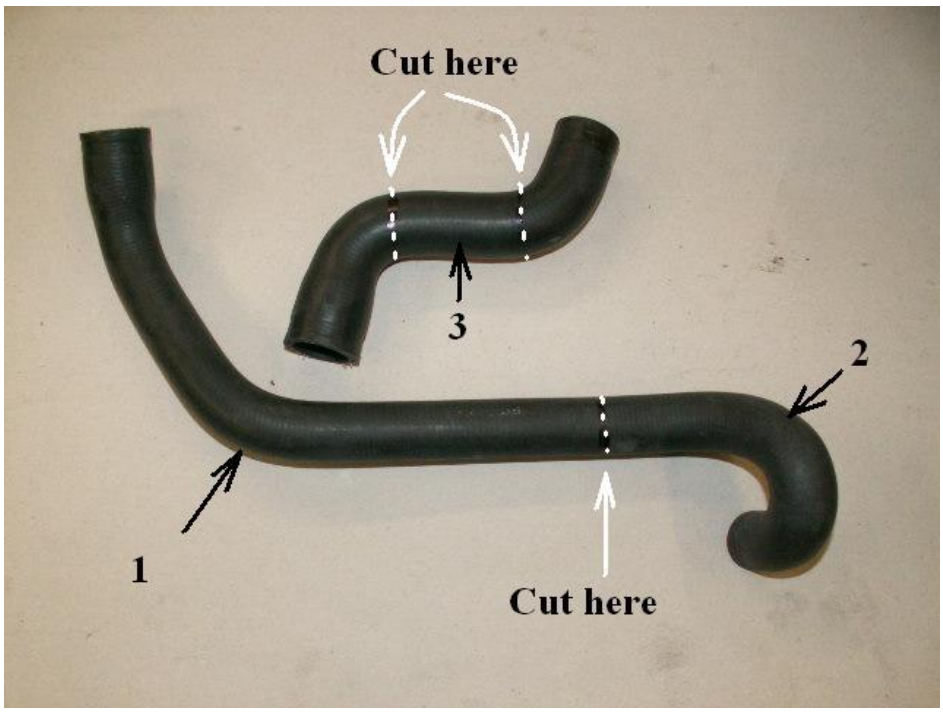
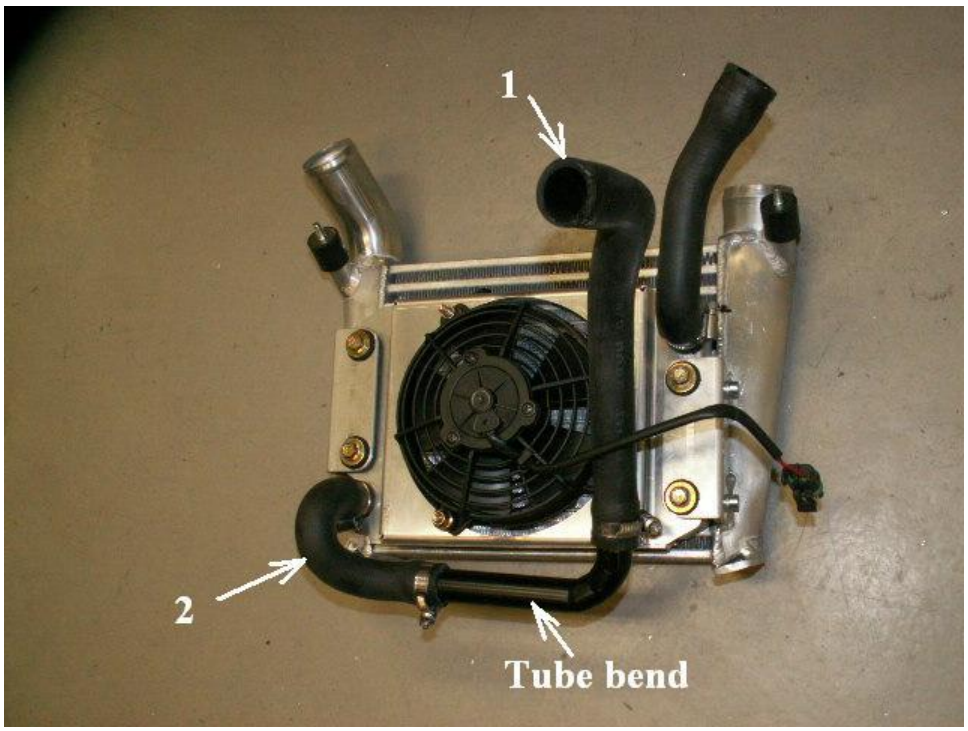


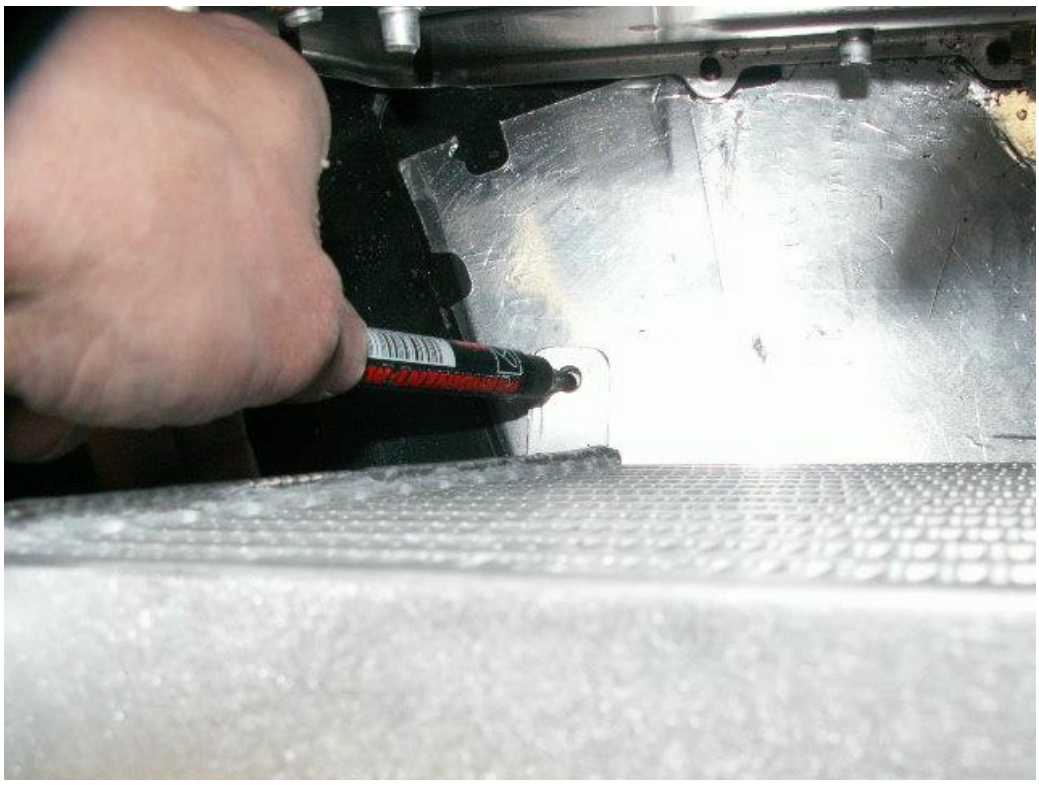


Use the existing water hoses. Cut them like the picture.
Se page 10 and 11 where to install the hoses.

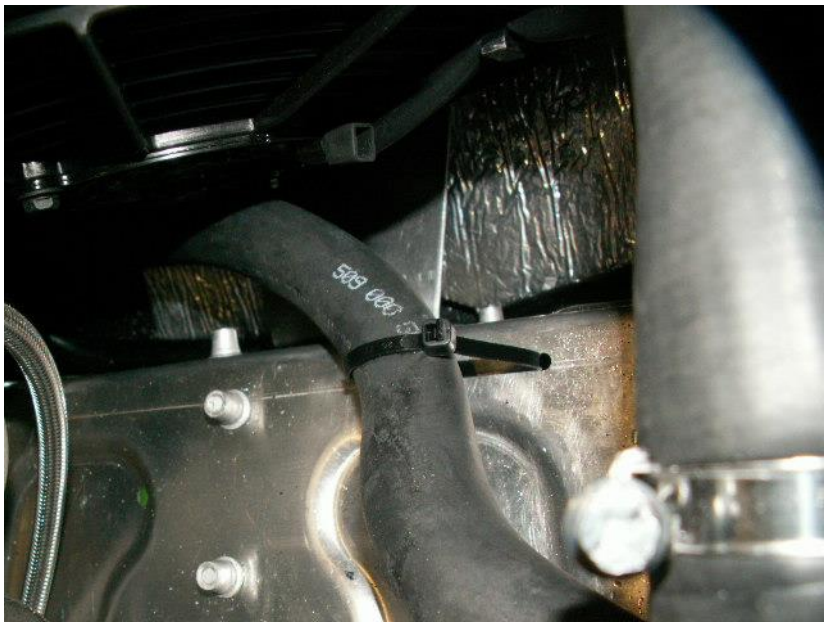


Install the water cooler / fan to the intercooler like the picture.

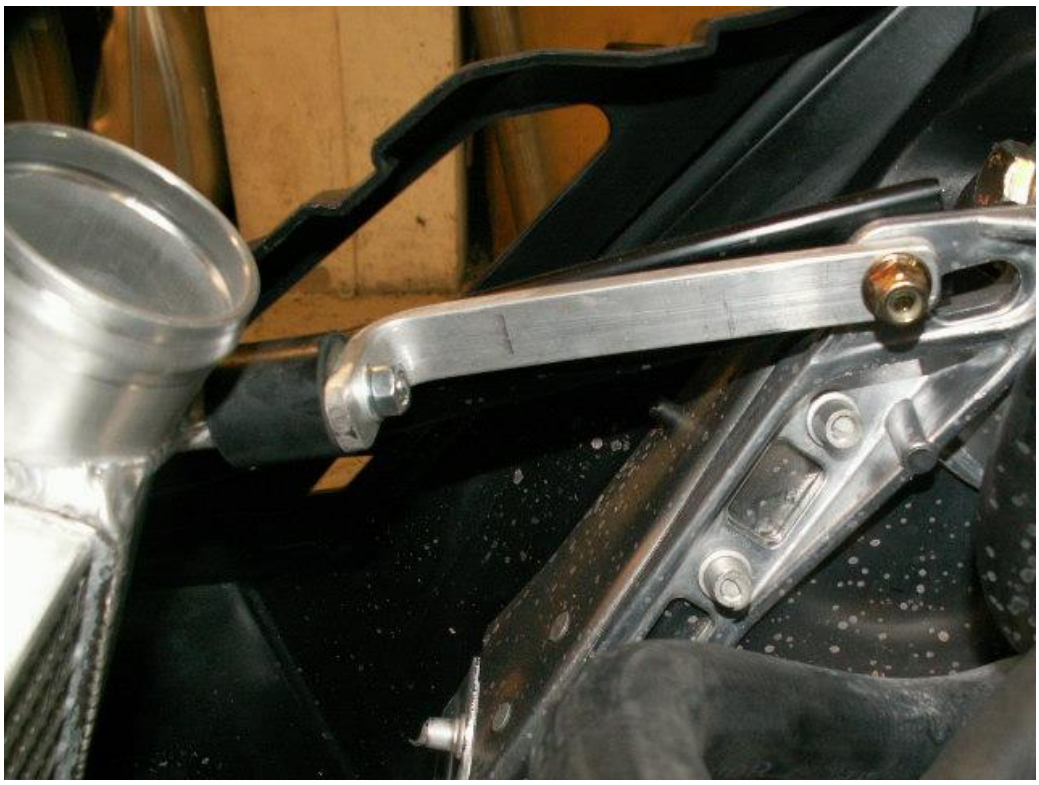
Place the intercooler in the front of the chassis.
Mark where to drill through the plastic chassis.
Make sure to get enough space so the fan does not hit the chassis.



Install two bolts + nuts in the lower intercooler mounts.
(Note the water radiator is not installed against the intercooler on the picture above)



The water hose can be strapped to the chassis to keep them not to move.



Install one stay on each side on the upper intercooler mount.

Then install the air hoses to and from the intercooler

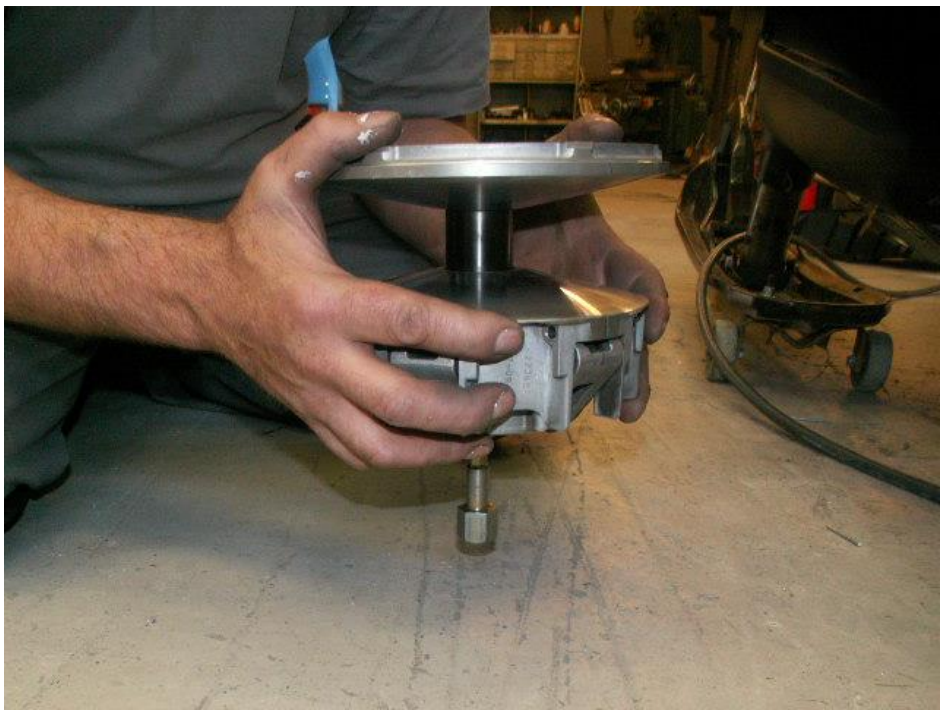
Air box modification:

The lower side of the stock air box must be cut and modified a little.
We have no picture of this modification in this manual, sorry.
But install the stock plastic air box on the sled when the intercooler and all the air hoses are in place, and see where you need to cut away some material to make it fit.

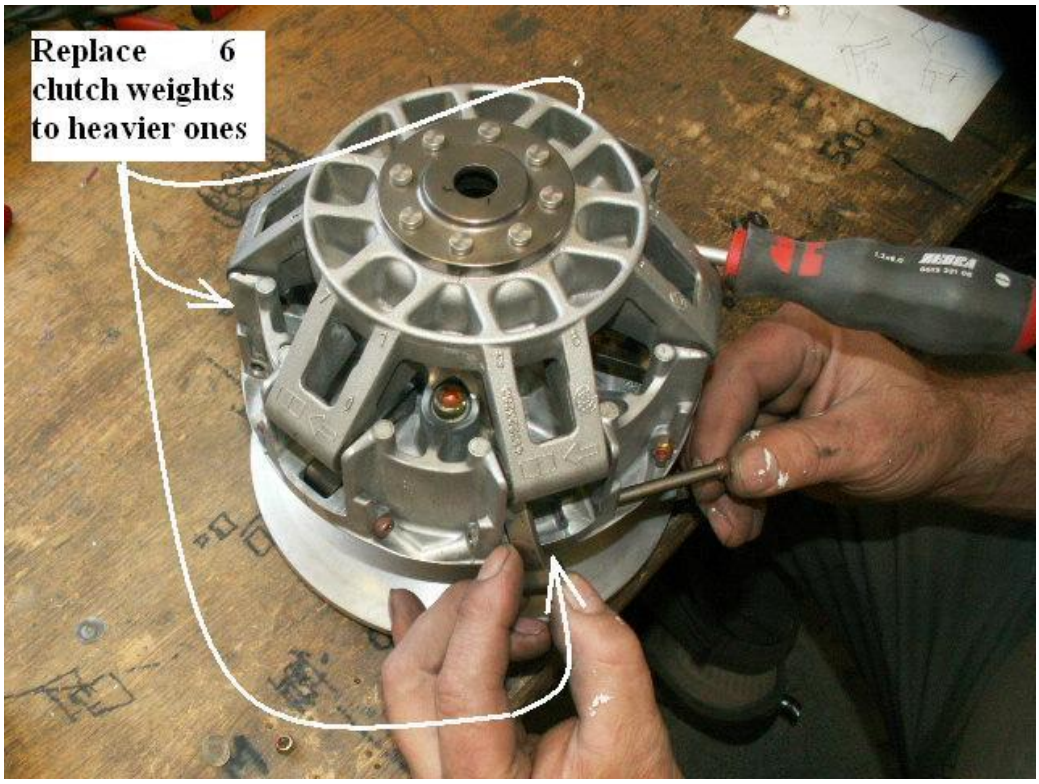
Clutch modification

The clutch must be re-calibrated to handle the extra power from the engine.

Remove the primary clutch from the engine.
Use a puller made for the purpose. BRP Part number 529000064



Now the clutch must be taken apart. Turn in the puller about 20 mm into the clutch.
Turn it upside down, and knock it into a concrete floor or similar until it comes apart. (see picture)



Replace the clutch weights to the new heavier ones supplied with the kit.
We recommend the clutching rpm to be 7600 +/- 100 at full throttle.
We recommend not lifting up the upper lid completely when changing the clutch weights. Some buttons can come loose, and they are hard to install. Lift it up as much as possible and secure it with a screw driver or similar.

The outer part of the clutch shall be pressed together with the rest of the clutch.
Make sure you get a perfect seat under the steel part of the clutch before you start to press it together.

Press the clutch together with about 10 tons of pressure before you install the clutch on the engine.
Tighten the centre bolt of the clutch 115-125 Nm.

Start the engine

Check water level in the cooling system.
Fill oil into the oil tank behind the engine. Check oil level.

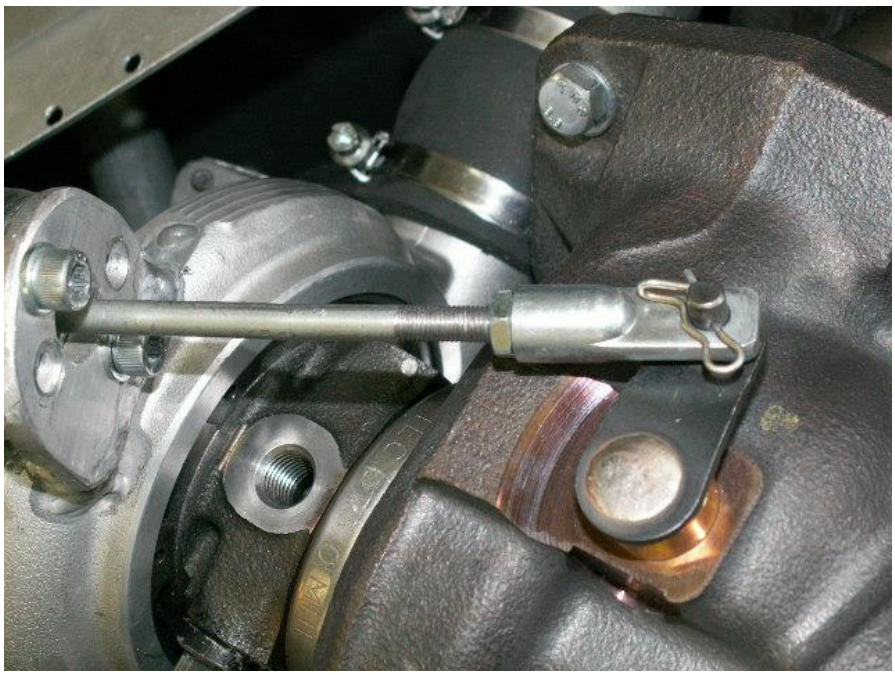
Start the engine before you put on the fairings.
Check for leaks.
Caution: We recommend loosening the oil inlet M12 banjo-screw on the turbo for a second just after you started the engine, just to make sure the engine and turbo get lubricated.
If everything seems to be working fine, install the heat shield. Let the engine be heated up and make sure the water is circulating through the radiator.
Install the remaining parts.

Test-driving

CAUTION: Always use high octane pump gas or race gas. Low octane may cause engine damages. Test-drive the snowmobile.
CAUTION: Be very careful when you drive in the beginning.
Check water level and oil level once again after the engine has been running
Check for leaks and control so everything seems normal. It is very important that it is no air left in the water cooling system.

The recommended turbo pressure is recommended to be max 70 kPa. (10 psi) at sea level
The maximum power will then be 170 hp. 98 octane pump fuel is recommended.
Using higher turbo pressure may cause engine damages.

IMPORTANT:
The maximum turbo pressure must be tested.
When testing turbo pressure, we recommend connecting a gauge via a T-connector on the same hose as to the waste gate actuator.
The test shall be made at full throttle for at least 2-3 seconds. And the clutching must be right when doing this.
We recommend being careful when doing this.



The turbo pressure can be adjusted by changing the spring pressure of the waste gate actuator. This is done by adjusting the length of the rod on top of the turbo. Shorter rod=higher turbo pressure.
When the turbo pressure is tested and everything seems to work fine, install the side cover and enjoy your turbo sled.

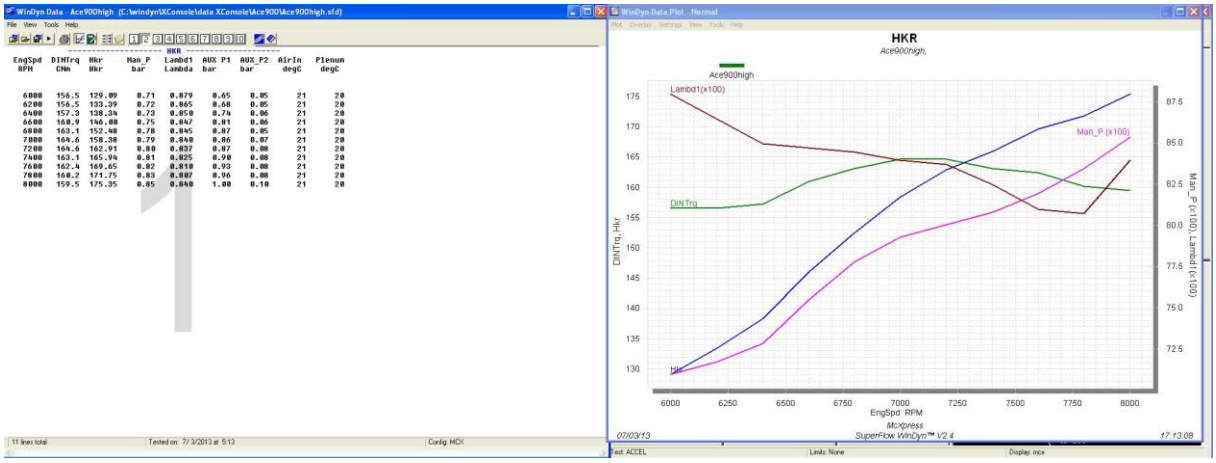
Good to know:

When you start: Turn the key and start it without touching the throttle.
Let the engine idle for a while.
Drive gently before the engine has reached proper temperature.
Before you intend to stop, drive slowly and gently the last minute.
Let the engine idle, but maybe just for about 10 seconds.

The ACE 900 engine is very reliable.
But at the same time, with turbo this is an extremely powerful vehicle and must be treated right and with care.
If something happens with the engine there is usually something else that has caused the problem. Here is some tip that is good to know:

Don’t use full power if the fuel level in the fuel tank is low, especially in steep hills.
This can cause fuel starvation and engine damages.
Always avoid the engine to hit the RPM-limiter. This can cause the valve adjusting shim to jump out of its position on the exhaust side.
(It can happen if the clutch drive belt suddenly breaks during a full throttle run or if the clutching rpm is set to high)
If one shim jumps out, the valve will not be able to close completely, and the engine will not run properly on this cylinder. Stop the engine at once if you suspect that this has happened.
If you continue to drive, the valve will drop down in the cylinder and this can cause major damage.

The shifting RPM is changing with the engine power. If the rpm suddenly rise, the power has for some reason been higher. Find the cause before you run into problems.
Maybe something has happened with the wastegate system?



Dyno graph ACE 900
Put the sticker ”98 octane” (Europe) or ”Premium only” (USA/Canada) close to the fuel cap as a reminder of the recommended fuel quality.