MCX Turbo Kit Installation Manual For the Polaris RZR XP900





When unpacking the parts, please check inside the tubes, plenum and intercooler for dirt or packing material. Blow with high pressure air, or clean the object if necessary.

Introduction

Please Read Before Beginning Installation!

Thank you for choosing the MC Xpress turbo kit for your Polaris RZR XP 900. The turbo kit is designed for racing use only and to give you the best performance and reliability money can buy. Due to the increase in power, these kits are designed for experienced drivers only. During the development of these kits, we try to keep the vehicle as stock as possible with very little modifications needed to install it. Please read this manual carefully before you start with the installation, because if not followed in order, you might miss an important step crucial to a properly running kit. MC Xpress warranties all parts included with this kit for a period of 1 year. The warranty does not cover damage of other parts even if the turbo parts or installation causes it.

- Installation of this turbo kit may void any warranty that is provided by the vehicle manufacturer.
- Neither MCXpress AB, its distributors, dealers, nor installers will 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.

Preparation

In preparation for the installation of the turbo kit, begin by removing the following stock items:

- Seats
- Clutch Cover & Belt
- Rear Cargo Bed and fenders
- Heat Shield over the exhaust system
- Stock air box
- Remove all remaining brackets that held the air intake system
- Exhaust system
- Header
- Muffler

Lowering the Compression Ratio

The compression ratio has to be lowered for several reasons:

- 1. When the turbo is producing pressure, the compression pressure in the cylinder and combustion chamber will be much higher than on a naturally aspirated engine. This can cause detonation and serious engine damage.
- 2. It is possible to let the turbo produce more turbo pressure when the compression ratio of the engine is lower, which results in more HP/TQ gains.
- 3. The compression ratio is lowered to make the engine both reliable and more powerful.

You can follow the service manual for the removal and re-installation of the head. These are brief instructions on the process. These are abbreviated and are not complete. Please call us if you have questions during this process. After the valve cover is removed, rotate the primary clutch to the point that the I and E hash marks are lined up with the top of the head. This will put the motor at TDC. You may also want to mark the chain and gears so that the position is easy to find during re-installation. This will also help in case the crank is moved at anytime during the process.

Remove the valve cover.

Remove the timing chain tensioner. There is a small washer on this.

Remove the cam caps.

Remove the cams. They are different so be sure to know which one is exhaust and which one is intake.

You may now remove the head bolts and head.

Try to not tilt the head too far from the position it is mounted in the RZR. The shims under the buckets can slide out of place and will cause severe engine damage. You will need to clean the surfaces of the cylinder and head before re-assembly. If you intend to turn the head over, it is best to remove the shims and buckets and reinstall them after the job is complete. They MUST be re-installed in the same location they came from for proper adjustment.***

You can now install the new head gasket/shim and re-install the head.

The head should be torque in sequence at 21 ft/lbs then 26 ft/lbs and finally 165 degrees. This is slightly less than factory specs, but is sufficient.

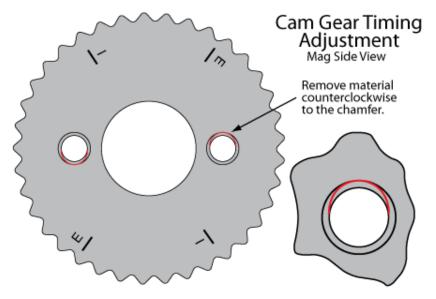
It is a good idea to verify valve clearance at this point. This will also be a test to insure that the adjustment shims have not gotten out of place.

As a note, if you intend to run higher than recommended boost pressures, we recommend installing new head bolts or studs. We have not seen an issue with using the same head bolts when running recommended boost pressures.

Because of the thicker head gasket, the cam timing will changed. For optimum performance, the timing should be set back to the stock position. To do this, note how the sprocket is installed on the cam. Make a scratch between the center of the cam and the sprocket.



Remove the sprocket from the cam and make the holes a little longer by grinding on one side to elongate the hole (counter-clockwise with the Intake and Exhaust marks facing you). If you grind to holes about 0,6 mm (0,025") wider, the cam settings will be right when turning the cam fully to this direction when installing the cam sprocket bolts.



Use thread lock, for instance Locktite 272 on the sprocket bolts and tighten them to 20 Nm (14 ft/lbs.)

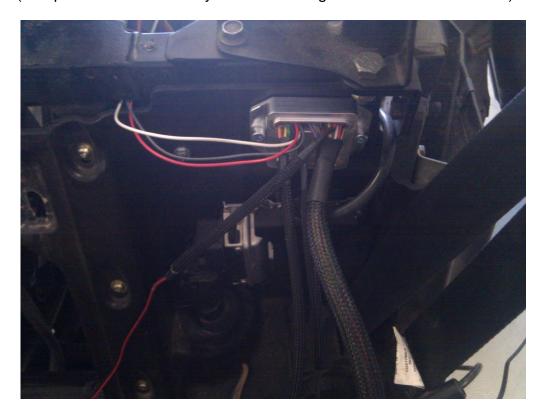
Note the direction you shall turn the sprocket compared to the camshaft (See photo above)

Apply engine oil on the bearing surfaces. Make sure the cams are installed with the markings in the correct position.

The torque shall be 10 Nm on the M6 bolts.

MCX EFI Box Installation

Install the EFI-box behind the drivers seat as shown below (The picture shows an early version of the generation 5 MCX-EFI-box)



Connect the three wires from the MCX EFI-box (red, grey and white) into the stock wire harness on the left side of the oil tank.

The red wire (+12Volt) shall be connected to the red wire with white tracer.

The grey wire **(can be yellow in some cases)** (TPS Throttle Position Sensor) to the stock dark green signal wire from the TPS,.

The white wire (can be orange in some cases) (Rpm signal wire) to the black signal wire from one of the stock injectors.

Use solder to get perfect connection.

Insulate properly to avoid short cuts in the future.



A small MAP (Manifold Air Pressure) signal voltage converter box will need to be installed inline with three of the wires from the stock MAP sensor. This can be done near the MAP sensor or at the bundle where the EFI box wires are connected. The box is labelled with the end that is connected with the ECU end of the wires that are cut as well as the MAP (sensor) end.

To connect the wires, you will simply cut the wires and strip about 12 mm ($\frac{1}{2}$ ") of insulation off and push these in the box as the picture below.





There are multiple yellow and orange wires in the bundle, so it needs to be verified that the correct ones are used.

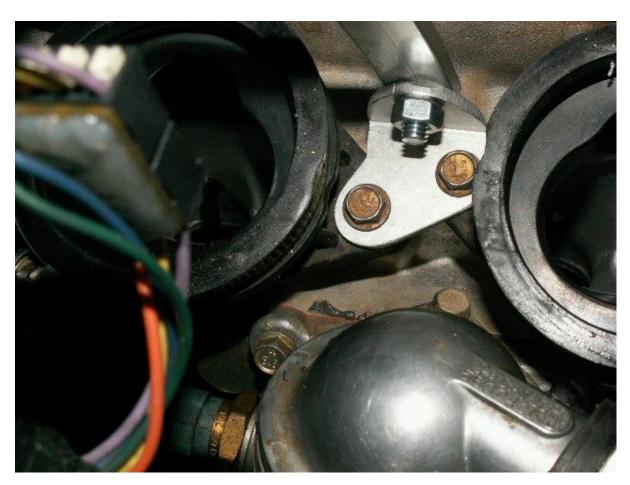
Intake system

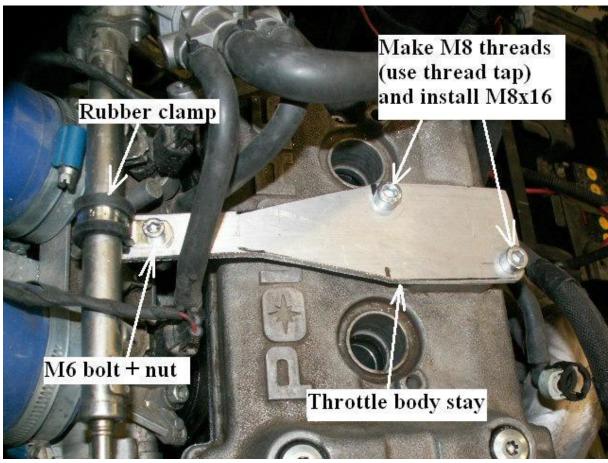
The existing air box bracket will need to be removed from the crossmember to allow the tubing to run properly.





To prevent the plenum air box and throttle body from blowing off the cylinder head, a bracket shall be installed between the the engine and the plenum. Install the L-shaped bracket between the intake channels like the picture. Install the short alu-bracket to the L-shaped piece you just installed.





Install a throttle body stay to the cylinder head cover. This stay will prevent the bending force on the rubber air intake hoses.

But first, you have to make new threads into the holes in the valve cover by using an M8 thread tap. Secure the throttle body by installing a rubber clamp around the stock fuel rail. Use M6 bolt and nut to the clamp.

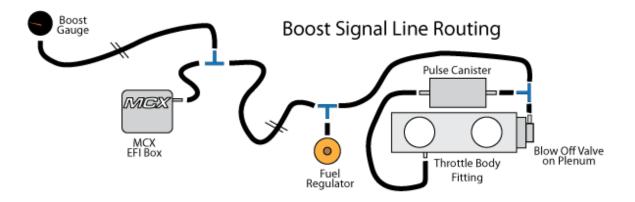
Update info:

Changes on the valve cover on the later models of RZR 900 might make this aluminium stay not to be able to install.

You will need to install a boost signal nipple in the throttle body. This will give the boost signal to the EFI controller, Blow off valve, fuel regulator, and boot gauge. The pulse absorber canister will be installed in this line before the EFI box and boost gauge.

The boost signal nipple will be installed on the bottom side of the throttle body like in this picture.





A pulse absorbing canister is provided to be installed between then engine side of this hose and the EFI/Boost gauge connections.

The fuel adapter can be installed now while it is easily accessable. Remove the fuel regulator from the end of the fuel rail. Install the adapter (oil the oring first) and then the regulator in the adaptor. Secure these with the supplied M5 bolts.

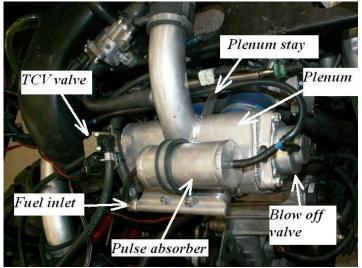


You can now install the hoses to hold the throttle body in place.



The plenum will be installed on the front of the throttle bodies with the supplied hoses and clamps.

The plenum can now be installed and will look like this:



Turbo Installation

1. The new exhaust pipe will install to the stock header. Install 2 bolts on the upper and lower tabs. Use the stock exhaust gasket



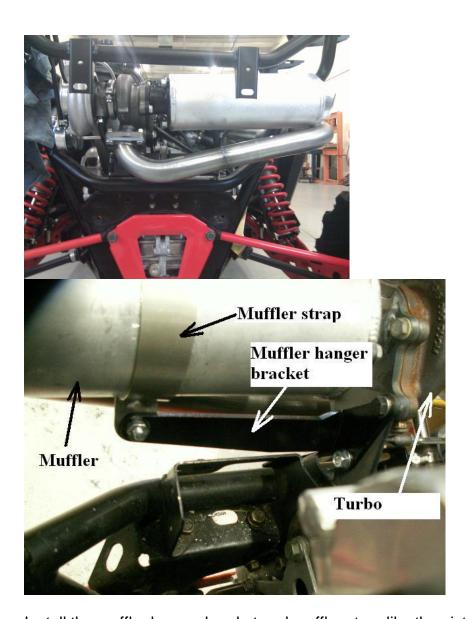
- 2. The turbo will mount to this with the supplied nuts and bolts.
- 3. The turbo mount will attach to the rear end as pictured here. The nuts tack welded to the mounting plate will need to be removed. This can be done by simply twisting them off with the proper sized wrench or socket/ratchet combination after the bolt is removed.



- 4. The muffler and muffler adapter can be installed.
- 5. Using the supplied bolts and locking washers, attach the muffler to the exhaust flange loosely. These lock washers are installed in pairs with the larger grooves together and the smaller groves on the mating surfaces.



6. A small amount of the passenger side existing muffler bracket will need to be cut off. The supplied muffler mounting hardware will be used to support the muffler as pictured here.



Install the muffler hanger bracket and muffler strap like the picture.

Note: If you opted for a Wide Band O2 sensor or the MCX Display for tuning purposes, the sensor can be installed in the bung on the short exhaust pipe between the turbo and the muffler at this time. If you purchase the stock system, this port will be plugged.

The oil supply and return can now be installed to the turbo. On the left side of the motor, in front of the clutch, you will find a steel plug. Replace the plug by the oil return fitting. (see picture below)



Install the oil return hose between the oil outlet of the turbo and this new oil return fitting on the engine block. Use hose clamps.

The oil supply will be obtained from the port on the passenger and forward side of the engine. An adapter and clearance spacer will be installed this:



The other end of this supply line will bolt to the turbo:

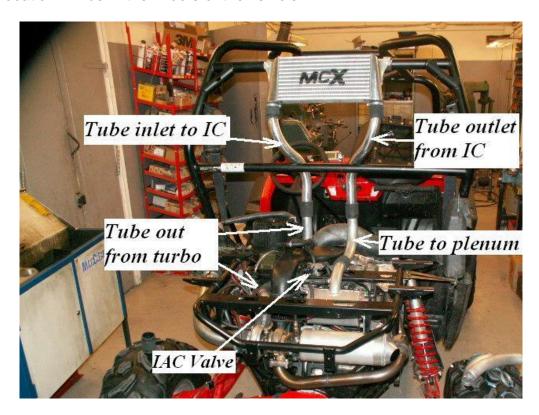


Please be sure that your RZR has the heat shield installed from the factory that goes in front of the header. This is installed on all the newer RZR XPs, but was a retrofit part for the original units. This piece can be purchased from Polaris for a nominal fee if needed.

Intercooler installation:



The intercooler will hang from the roll cage with the supplied straps and blocks. The location will be in the middle of the vehicle..



Place the tube out from the turbo and the tube to the plenum in its position, but do not final tighten these tubes yet until the bed is in its place.

Install the tube in and out from the intercooler later after the bed is in place. The stock IAC valve will need to be slightly repositioned for the tubing to be routed properly.

Check so the small hoses to and from the IAC valve will be routed nicely. Connect the hose from the IAC valve to the nipple on the intake tube going into the plenum.

Intake Tubing

The Intake tubing connects to the turbo as shown in the following picture.



The vent from the oil tank will connect to the intake tube.

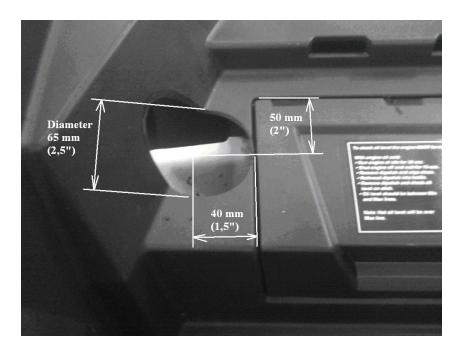
An air filter will be attached to the intake tube after the bed is installed.

If driving in dirty conditions, the filter must be oiled per its instructions prior to use.

Three holes will need to be drilled in the bed. The two holes for the charge tubes to and from the intercooler will be positioned like this.



The intercooler will connect with the S shaped tubes with the supplied hose and hose clamps to the aluminium tubes that will come up thru these holes.



The air tube from the air filter to the turbo will run through the bed. Drill a hole like the picture.

Stickers







Place the stickers like the pictures. Put a "98 octane" (for Europe) or a "premium only" sticker for USA/Canada as a reminder near the fuel tank cap.

Almost Done...the end is in sight!

1. Refill engine coolant. Be sure all air is purged from the system. It is a bleed screw located near the header in the block.

Refill your oil to the proper levels plus 5-8 mm (1/8)" on the dipstick. If you didn't change the oil, just add enough oil to be about 6 mm (1/8") more

- 2. than the top level. This helps to ensure a proper amount of oil is able to circulate through the turbo
- 3. Turn on the ignition and make sure to listen for the fuel pump to start before turning the key
- 4. Let it idle till normal operating temperature as you go around checking for leaks:

Header-Turbo Junction Turbo-Exhaust Flange Junction Exhaust Flange-Muffler Junction

Cylinder Shim

Once you confirmed there are no leaks and all coolant air has escaped, go around and snug up all accessible bolts and clamps one more time to make sure

It's especially important to tighten the muffler bolts from the flange to the muffler, but don't overtighten.

Clutching

Clutching is extremely important to achieve the optimum performance out of your Polaris RZR. We've included what we believe will be the optimum clutch setup for your machine. But, it's possible it's still going to be off slightly. If this is the case, you need to let us know what's happening when you drive it in the following circumstance on terrain you normally ride on:

- Wide open throttle run from a dead stop
- Wide open throttle run up a steep long hill-if applicable
- Gradual pressing of the throttle to WOT from a stop

Note: We need to know if it's bouncing off the rev limiter off idle, up top, at what speeds and conditions it's doing it, so we can easily correct the problem for you. Also, there's a chance that it never hits the rev limiter, and if that's the case, let us know what RPM it's running under the above situations, as well.

The stock RPM limiter is set to about 8500 rpm.

Clutch Removal & Installation

- 1. Remove the 6 10mm or 3/8 bolts on the outer part of the primary clutch Note: Using a sharpie, mark the clutch plate edge and main spider of the clutch so you know which way the plate should be reassembled
 - 2. Next, remove each weights and replace with the new weights we provide with the kit.
 - 3. Re-assemble in reverse order making sure not to overtighten the 10mm (3/8) bolts (The center bolt needs to be very tight) .
 - 4. Re-install the clutch cover.

Boost gauge (option)

You can install the boost gauge pretty much anywhere on the dash you'd like. All you have to do is "T" into the tube coming off the MCX EFI Box in between the pulse absorber and the EFI box. The critical thing is to make sure that when securing the tube under the floorboard, make sure it's clear of obstructions and potential pinching. Troubleshooting Note: In the event the readings ever get sporadic or weird after running it a while, check he full length of the hose for cracks and pinching.

MCX Display (option)



The MCX display can be bought as an option. A wide range oxygen sensor is included. You can watch many different things on the display for instance air/fuel ratio, turbo pressure, rpm, throttle position etc.

It is also possible to do data logging and down log into your PC and study all values. Contact us for more info.

Test-driving

CAUTION: Always use high-octane pump gas, 98 octane Ron (Europe) or 91-93 octane Pon (USA/Canada) . Low octane fuel can no longer be run in your machine with the turbo.

If only lower octane is available, please add some octane booster with the fuel. You can also drive more gently if you have to low octane.

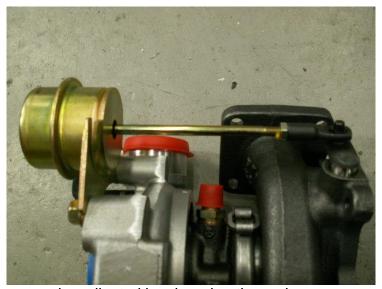
CAUTION: Be very careful when you drive in the beginning.

Check water level and oil level several times. Check for leaks and control so everything seems normal. It is very important there is no air left in the coolant lines, so double check this after your initial few runs.

The recommended turbo pressure is 80 kPa (11 PSI). The horsepower will be about twice as much as the stock power, and using higher turbo pressure may cause engine damage.

At this point, it's important to test the boost pressure. To do so, begin by easing into the throttle from a stop till full throttle while watching your boost gauge for at least 2 seconds at WOT. If the boost pressure is higher than 11psi, you'll need to manually adjust the boost pressure on the turbo. Don't do this test repeatedly if it's overboosting, because you don't want to run it long at higher than 11psi on pump gas.

Note: When doing this test, the clutch setup must be preventing you from hitting the rev limiter to achieve a proper reading from the boost gauge. If it's hitting the rev limiter, try to load the engine some more by going up a hill or doing it off-pavement or a clutch adjustment may be needed.



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 the turbo. Shorter rod = higher turbo pressure & longer rod = less pressure. Essentially, one full turn is roughly a 5-10 kPa (1 psi) change.

Please call us for the adjustment procedure if you live at high elevation.

Belt Break-in

Break in your clutch by running 5-10 minutes between 2-3K RPM, then let it completely cool, and repeat 2-3 times to properly break it in

 Please don't hesitate to call us if you have any problems or questions. It's better to ask us before messing something up that could cost us both a lot more money.

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