Harley Davidson V-rod

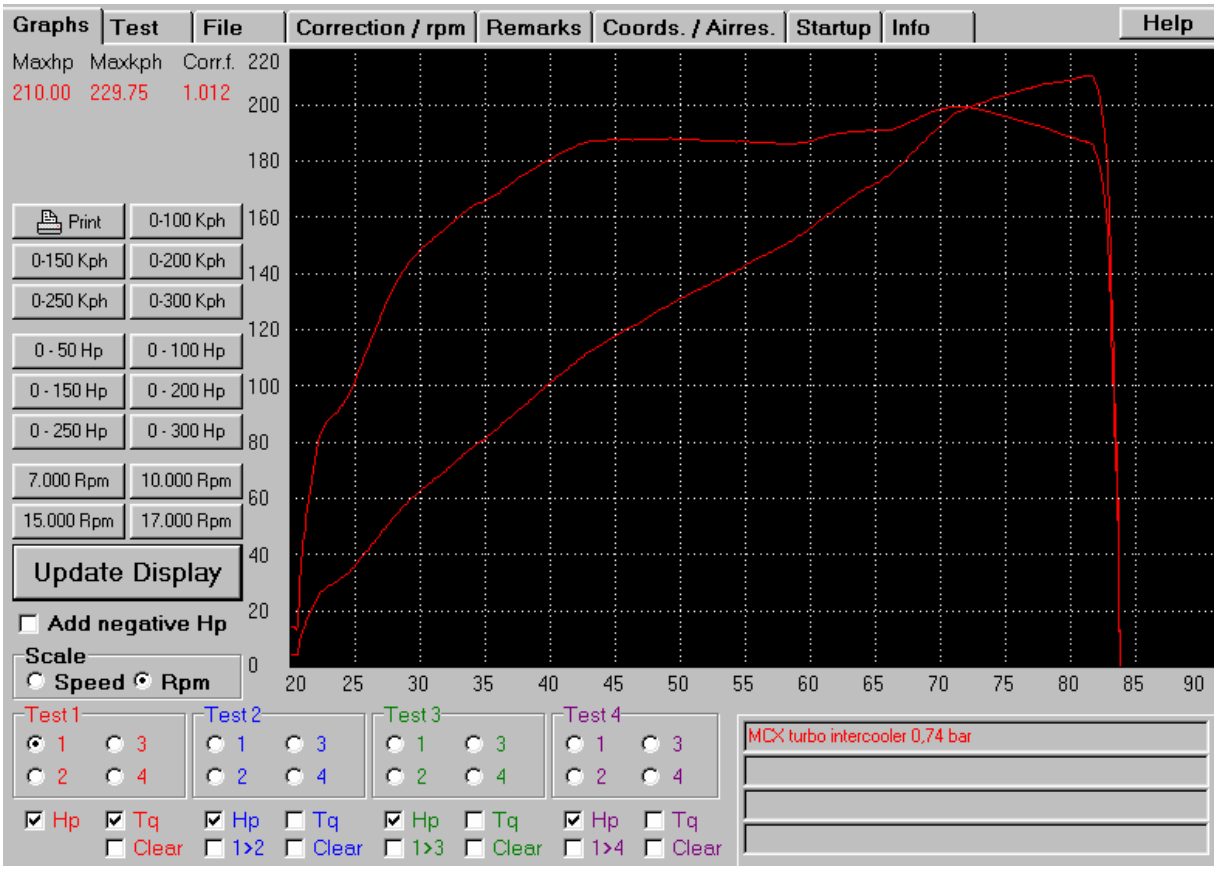
Installation manual MCX turbo kit

-supreme of the extreme!

Introduction

Thank you for choosing the MC Xpress turbo kit to your Harley Davidson V-rod.
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 development work we have tried to keep the vehicle as stock as possible and the installation work as easy as possible.
Read this manual carefully before you start with the installation.
We hope you will get much joy with your new investment.
Take it easy especially in the beginning.
The turbo side by side machine is only recommended to be used by experienced riders.
MC Xpress does not leave any warranty except 1 year on the parts included with the kit.
The warranty does not cover damage on other parts even if itôs caused by the turbo parts or installation.

- 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.



Typical V-rod power and torque curves after turbo installation. (rear wheel)

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

Preparation

First of all the engine has to be taken out from the chassis.
Remove the stock exhaust system, seat, tank cover, disconnect the battery, remove the front section of the frame, throttle body etc. The front main bolt to the swing arm has to be removed before the engine can be taken out of the frame.

Put the engine in a stand or similar so it is easy to work with.

Lower the compression ratio

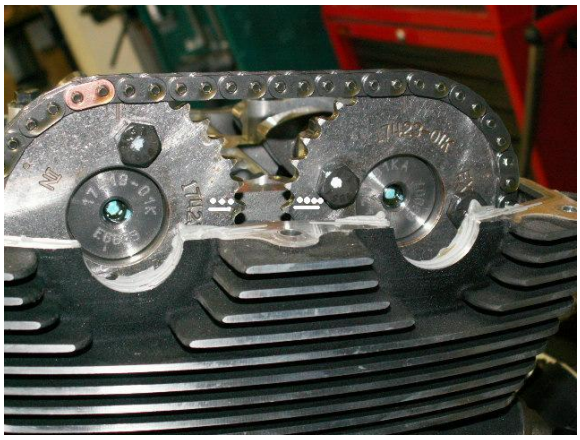
The compression ratio has to be lowered for two reasons.

1. When the turbo is producing pressure, the compression pressure in the cylinder and combustion chamber will be much higher than on a natural 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.

The compression ratio is lowered to make the engine both reliable and more powerful.

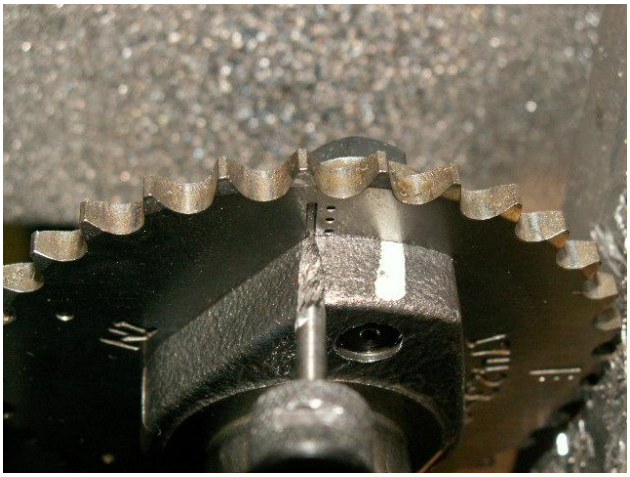
Remove the valve covers.
Rotate the crankshaft until the marks on the cam sprockets are pointing like the pictures. Remove the plug on the right side of the engine. Make sure the mark on the crankshaft is align with the hole when the camshafts are located in this positions. It is available a special HD tool for this. You can also use a M8x80 mm or longer bolt.

Rear cylinder head



Front cylinder head

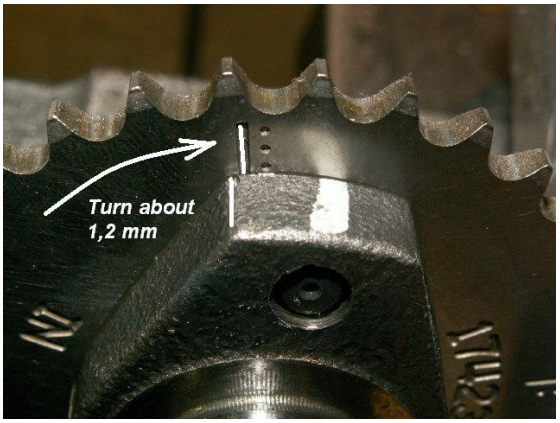
Remove the camshafts and the cylinder heads.
Install the new thicker head gaskets supplied with the kit.
Torque cylinder head bolts: 35 Nm (26 ft-lbs)
loosen each bolt 1 turn,
tighten 20 Nm (15 ft-lbs)
Tighten each bolt 90 degrees.



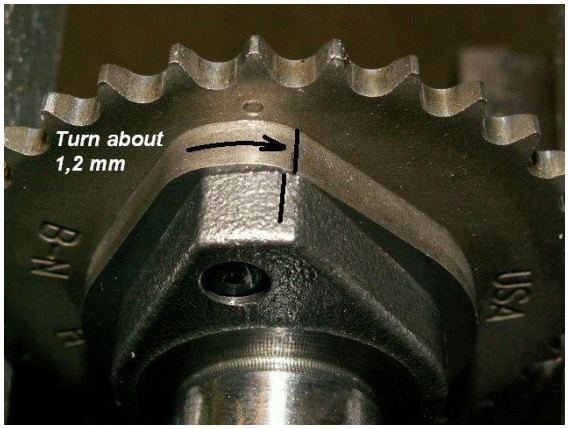
Front cylinder sprockets

Due to the thicker head gasket, the cam timing will be slightly changed.
To avoid this, the cam sprockets shall be modified.
Make a mark with a grinder or similar on the camshaft/cam sprocket so you know its original position.

Grind the holes oval with a grinder. Make sure you grind on the right side of the hole.



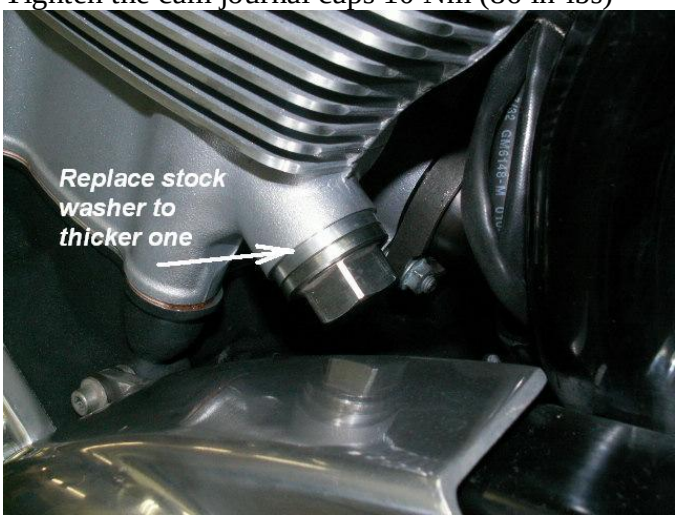
(Front cylinder)



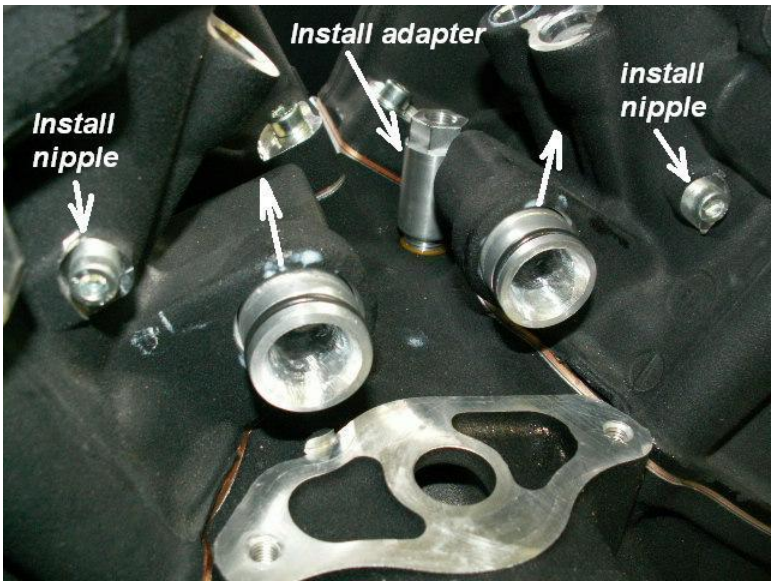
(Rear cylinder)

Rotate the sprockets about 1, 2 mm in the direction above and install it to the camshaft.
Torque the cam sprocket screws to22 Nm (16 ft-lbs)

Install the cams in the engine. Make sure the cam setting will be right.
Tighten the cam journal caps 10 Nm (86 in-lbs)

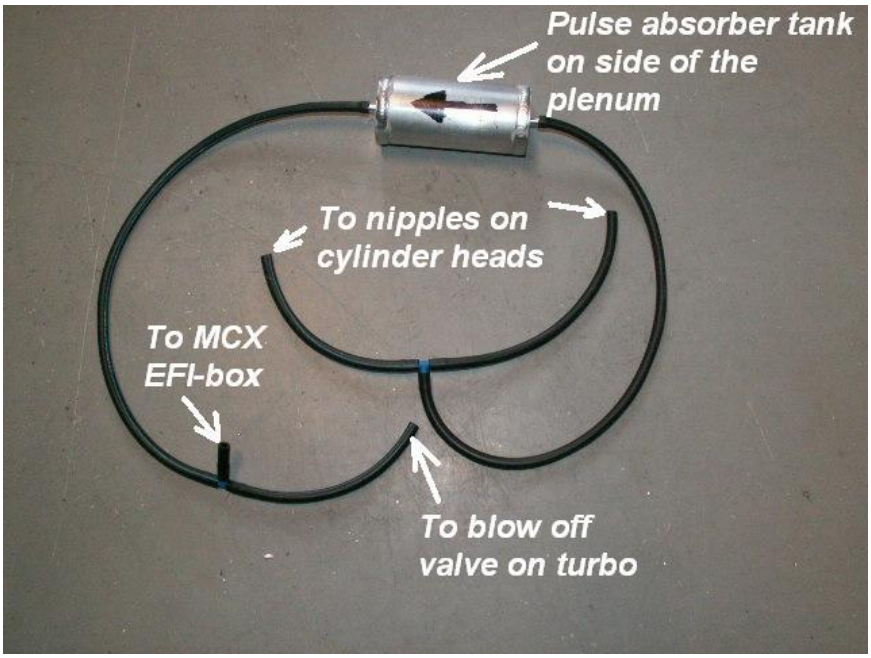


When installing the cam chain tensioners, replace the stock alu washer to thicker ones.
Tighten 100 Nm (73 ft-lbs)
Rotate the engine and check cam timing once again.
Check valve lash. Intake 0,19 to 0,25 mm, exhaust 0,29 to 0,35 mm
Install the cam cover, tighten 10 Nm (86 in-lbs)



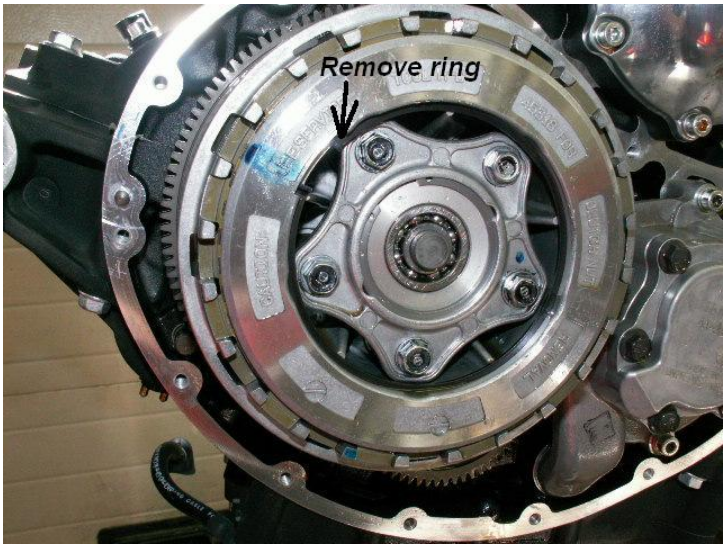
The tubes between the cylinder head and the thermostat housing shall be replaced due to the thicker head gaskets. Install new offset tubes. Use the stock O-rings.
The offset of the tubes shall be pointing upwards.
Replace the stock oil pressure sensor with the adapter tube. Use loc-tite or similar thread lock.
Replace the M5 plug-screws on each intake channel with nipples. (See the right picture)

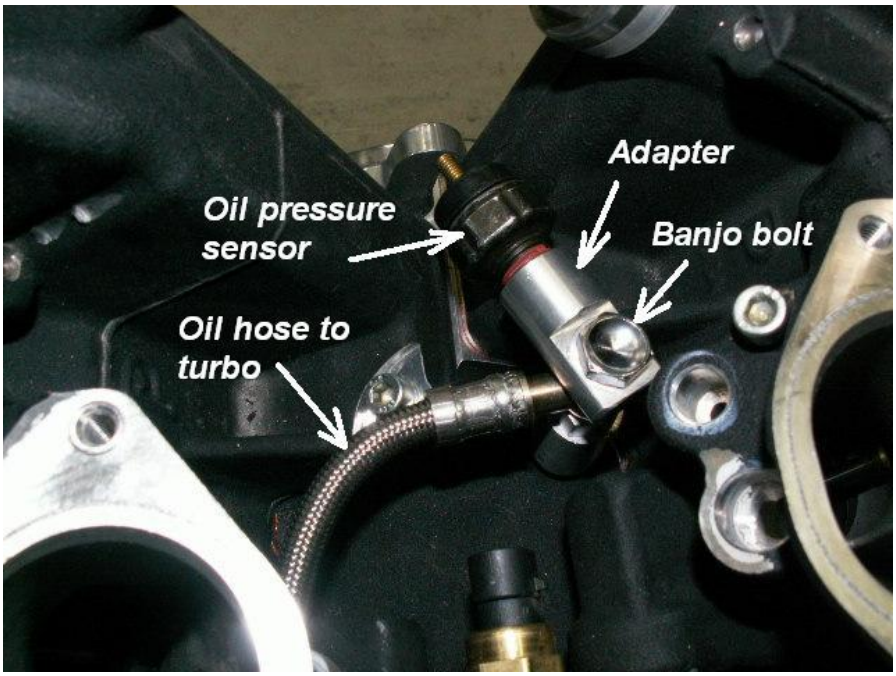
Install the vacuum hose to the small nipples you just installed.



Clutch modification

New clutch springs have to be installed.
Take of the clutch cover.
Remove the ring (see lover picture) and the five M6 screws.
Replace the stock clutch springs with the stronger ones supplied with the kit.
Install the clutch cover again.



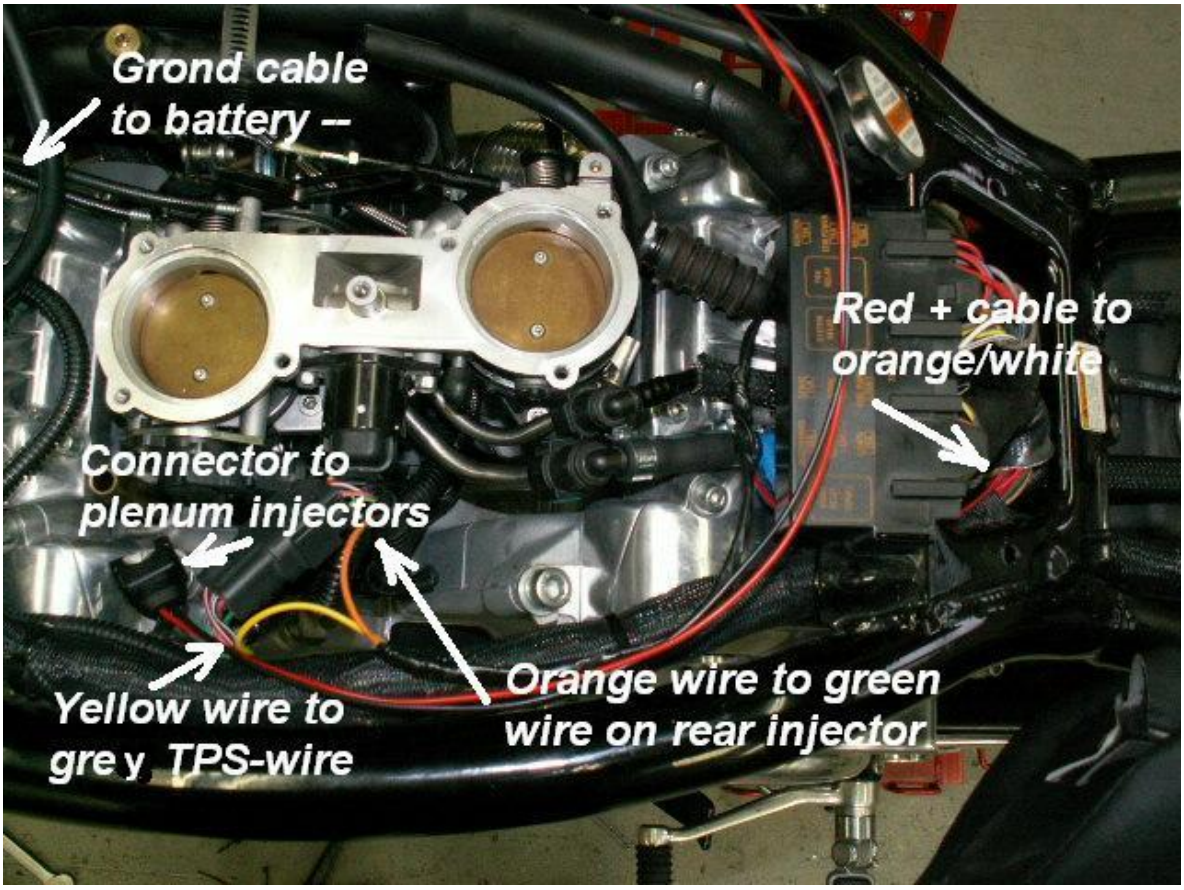


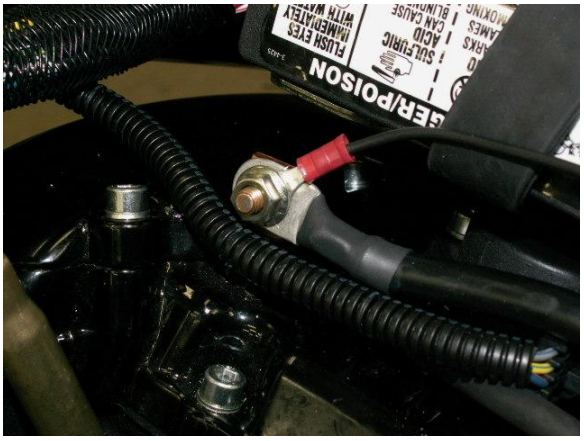
Install the oil pressure sensor to the alu-adapter.
Install the oil hose to the turbo and the alu-adapter on the engine like the upper picture.

Install the engine in the frame again.
Install the water radiator.

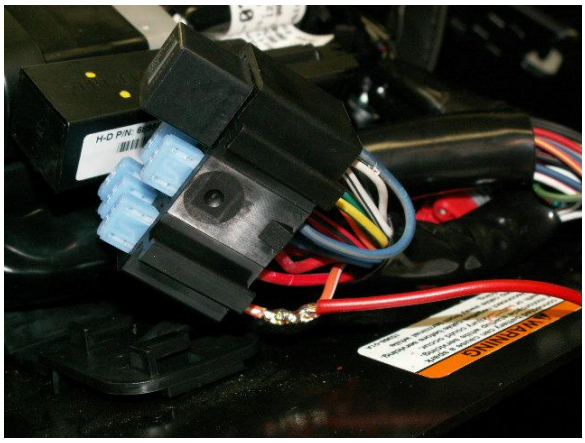
Extra fuel injection

The stock fuel injection shall be left untouched.
An external fuel injection system shall add more fuel when the turbo pressure builds up.
The MCX-EFI control unit shall later be installed on the right side of the plenum.
The EFI-wire harness shall be installed now.

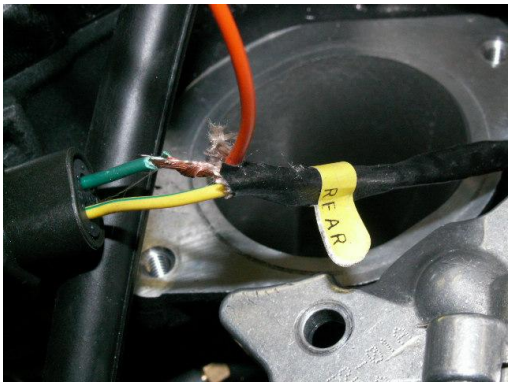




Black ground cable to battery negative
or ground connection on engine.



Red + cable to orange wire with white tracer.



Orange rpm signal to green wire on rear stock injector.

Throttle position cable to grey cable to stock TPS- sensor.

Use solder and insulate carefully.

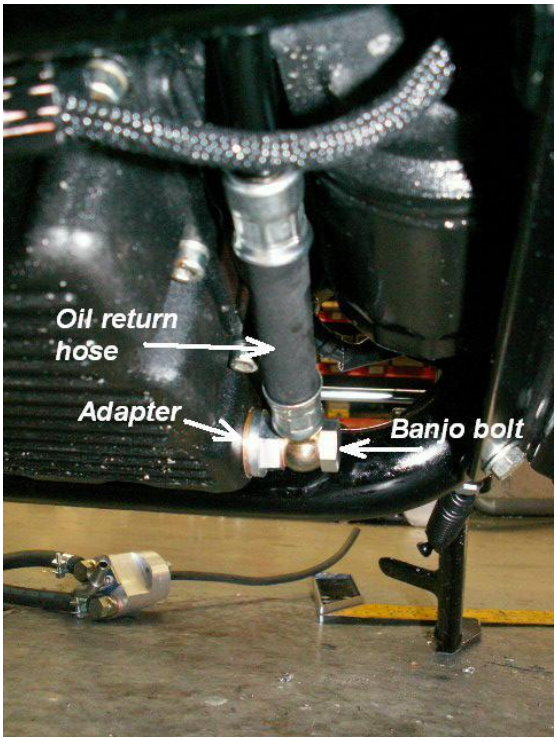
The connector with red/black wires shall later be connected to the external injectors in the plenum
The connector with brown and blue wires shall later be connected to the TCV-valve on the turbo.

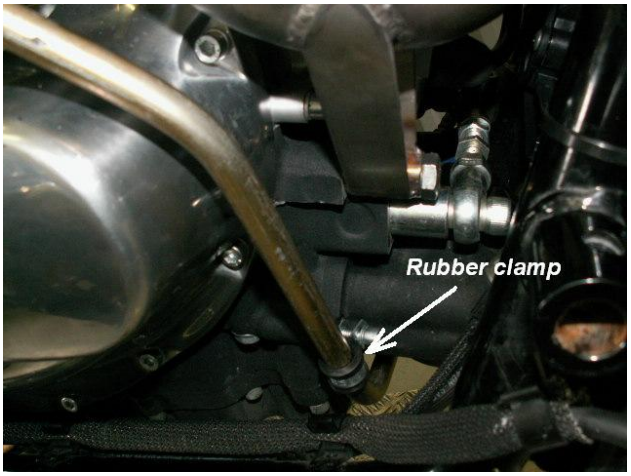
Turbo installation

Install the turbo to the exhaust manifold.
No gasket shall be used between the exhaust manifold and the turbo or between the turbo and the exhaust system. A thin layer of exhaust gasket cement can be used.
Install the exhaust manifold to the cylinder heads.

Install the oil inlet banjo to the top of the bearing housing of the turbo.
The two other holes pointing sideways shall be left open.

A support stay shall be connected to the starter motor on the engine.
The oil return hose shall be installed between the oil outlet of the turbo and where the oil drain plug has been located in front of the oil pan.



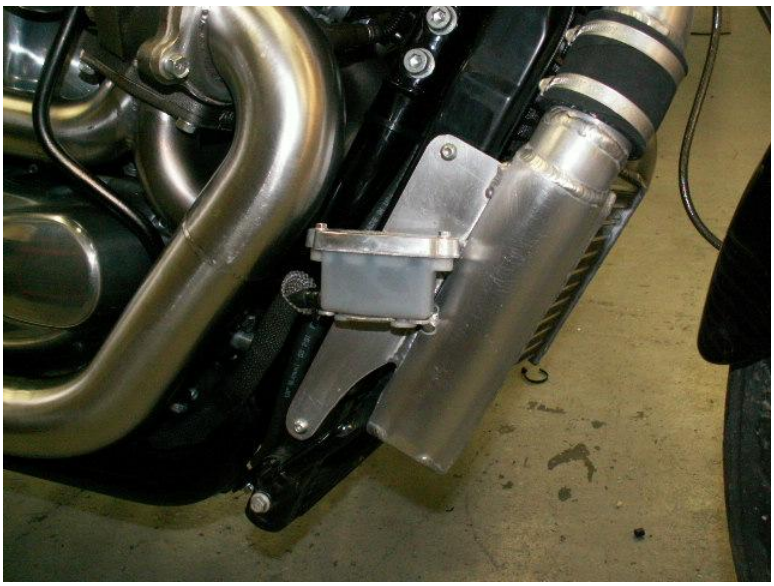


Install a rubber clamp like the picture above.

Install the air filter to the inlet tube of the turbo

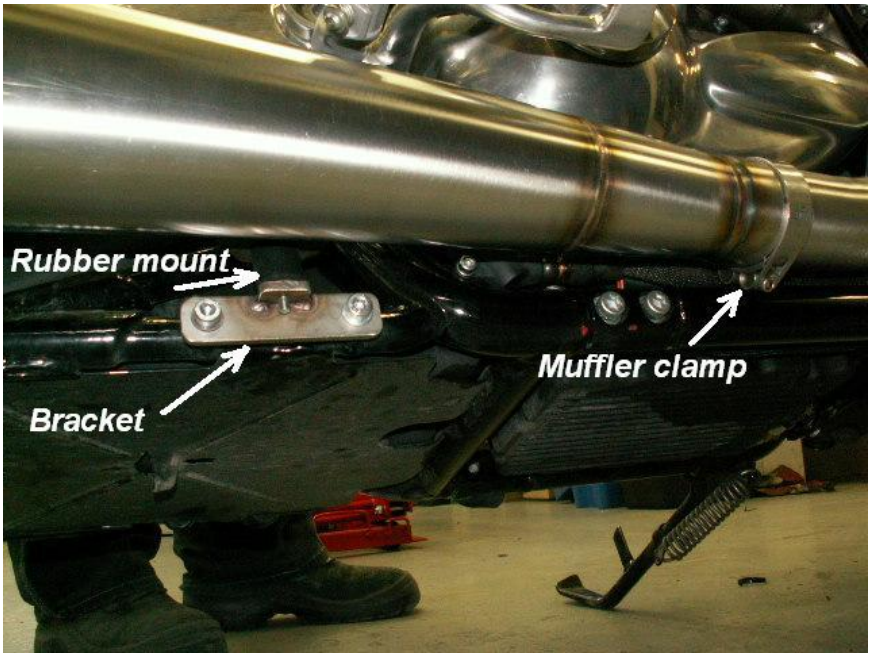
Intercooler installation

Install the intercooler in front of the water radiator. Use the stock screws.



Install the oil reservoir on the intercooler like the photo.

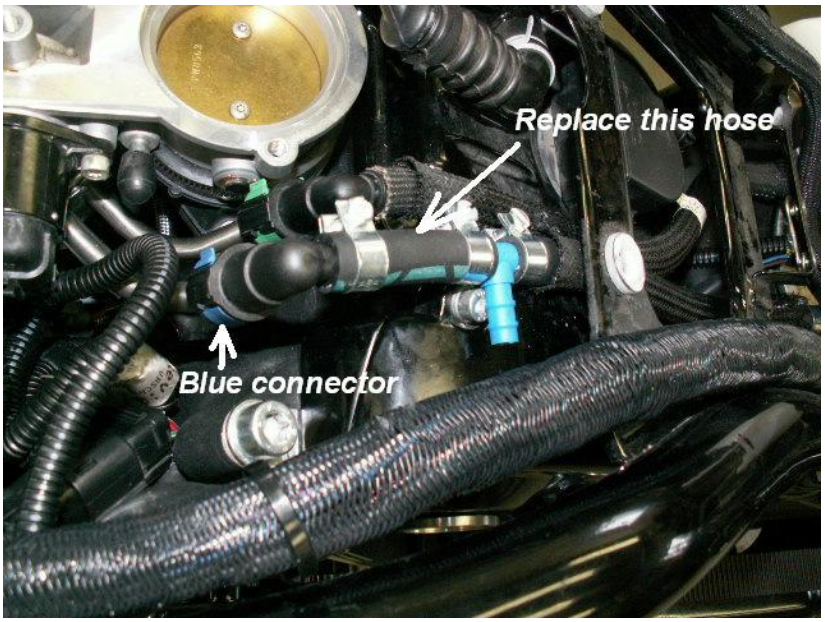
Exhaust pipe installation



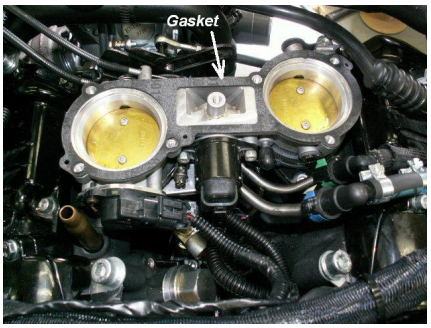
Install the exhaust pipe to the turbo. No gasket shall be used.
Install the bracket to the frame like the picture.
Use a muffler clamp between the exhaust pipe and the muffler.

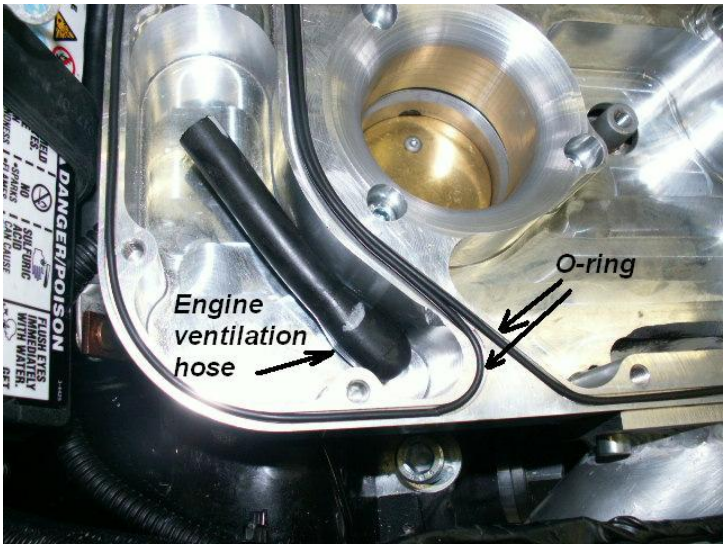
Fuel hose installation.

The fuel hose from the tank to the engine shall be replaced. (the one with blue connectors)
Take off the stock fuel quick connectors and install it on the new fuel hose. Use hose clamps.



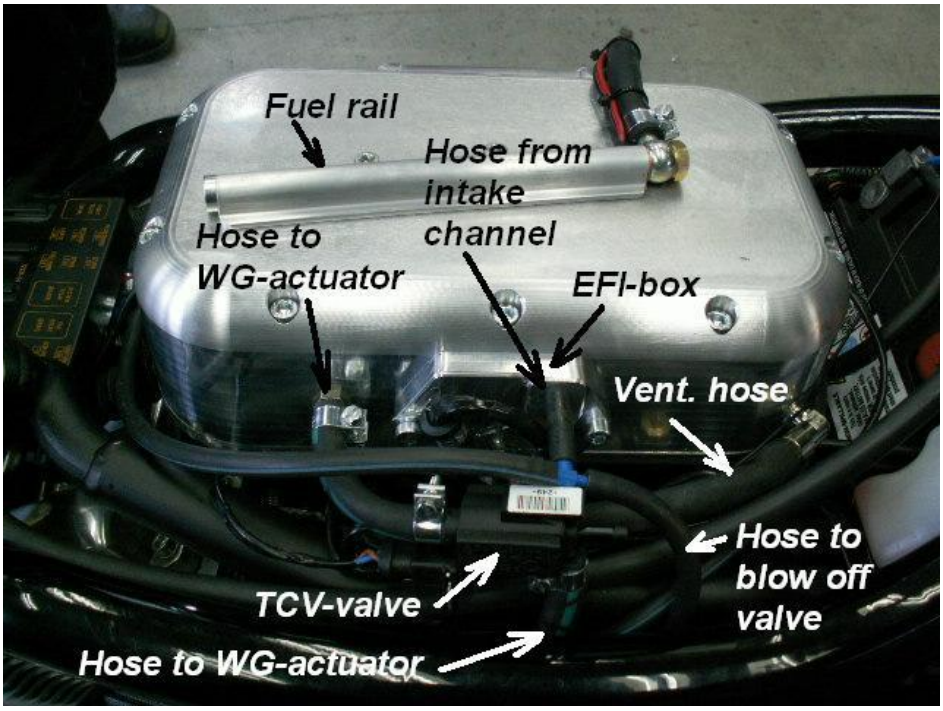
Plenum installation



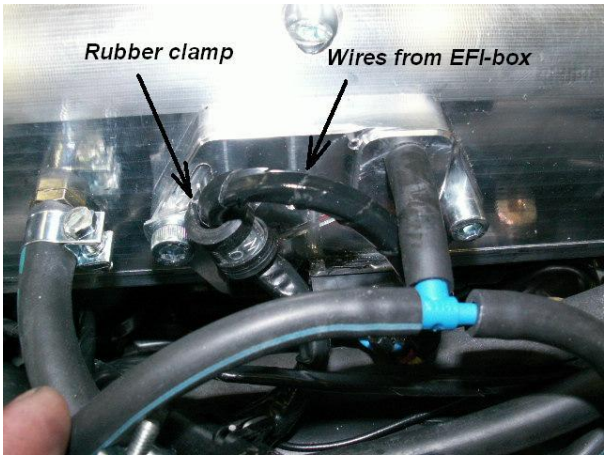


Install a gasket on top of the throttle body.

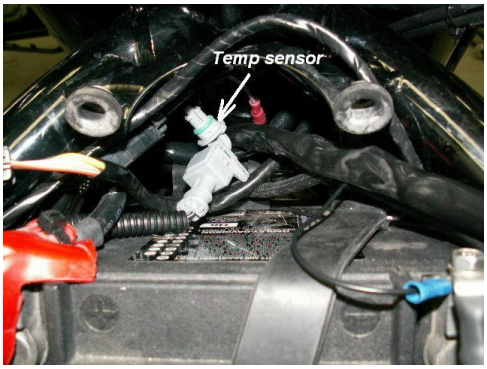
Take out the engine ventilation hose from the stock air filter housing and install it in the new plenum
Install the lower section of the plenum.
Install O-rings like the upper picture.



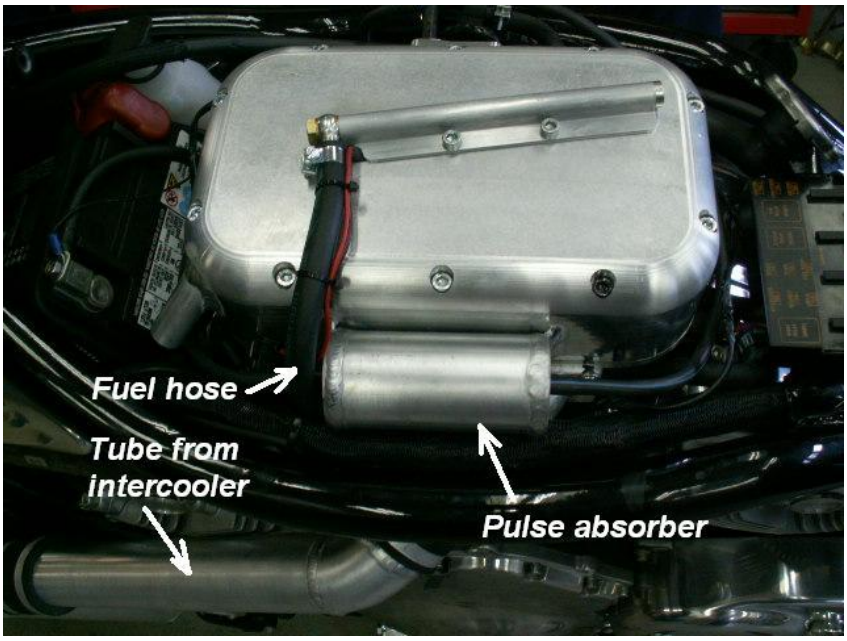
Install the upper section of the plenum.
The engine ventilation hose from the rear cylinder head shall be extended and connected to the nipple in the front of the plenum. The hose to the TCV-valve/wastegate actuator shall be connected to the plenum.
Connect the wire to the TCV-valve.



The EFI-box wire harness shall be secured with a rubber hose clamp.



Remove the temp sensor from the stock air box and connect it to the wire harness of the bike. Place it on top/in front of the battery. Strap it to the wire harness with a cable tie.



Connect the fuel hose from the plenum to the T-connector on the fuel hose from the tank.
Connect the injector cable to the EFI-wire harness.
Install the air pressure tubes between the turbo and the intercooler, and between the intercooler and the plenum.

Install the Dynojet power commander according to the Dynojet instructions.

Start the engine

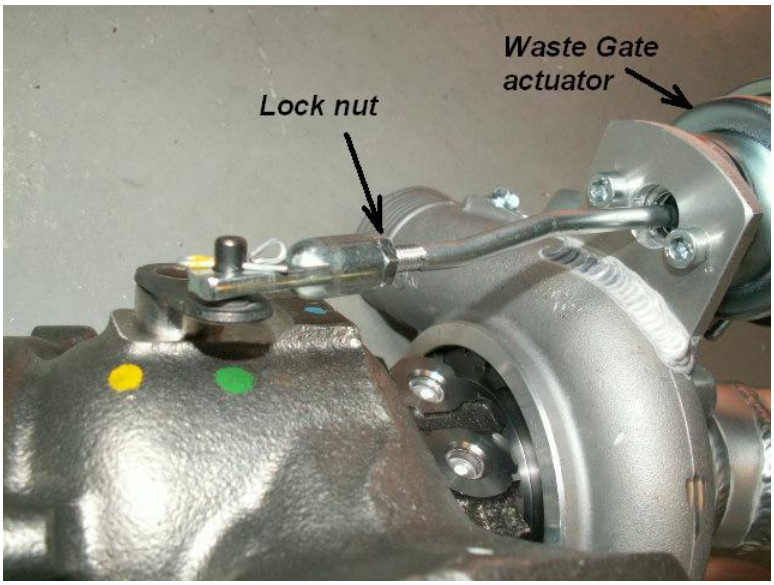
Caution: Fill engine water and oil.
Make sure everything is installed and tightened.
Turn on the ignition key. Make sure the fuel pump start.
Start the engine.
Search for leaks.
Be sure the engine got oil pressure.

Test-driving

CAUTION: Always use high octane pump gas. Low octane may cause engine damages.
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 cooling water system.

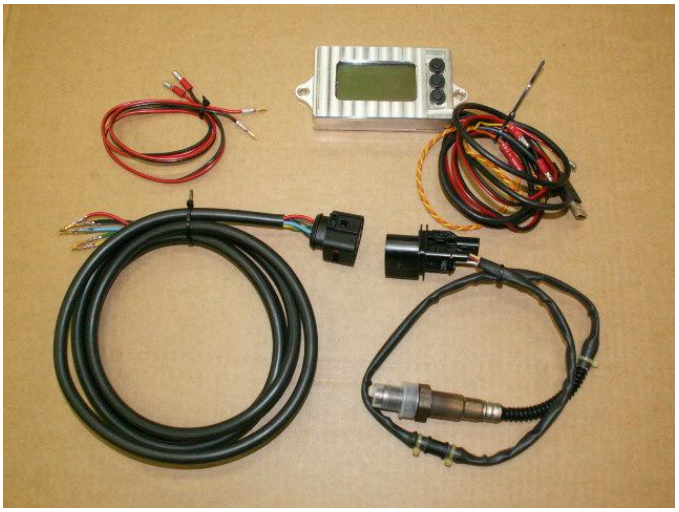
The recommended turbo pressure is 0,7 to 0,8 bar(11 PSI). The maximum power will then be 200-210 hp at the rear wheel. Stock power is about 105 hp at the rear wheel.

After installation, the turbo pressure shall be tested.
When testing turbo pressure, we recommend connecting a gauge via a T-connector on the hose just before the MCX EFI-box.
The test shall be made at full throttle for at least 4 seconds.
Best way to do thi is in a dyno.
We recommend being careful when doing this, both for your own and for the motors safety.



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.
The turbo pressure can also be adjusted by a PC computer if you use the display unit that can be bought as an option.

Options:



Display and log unit with wide range oxygen sensor and software can be offered as an option.

The clutch is the weakest spot of the engine. We can offer a stronger Vance&Hines clutch basket, a stronger back plate and rivets.

For racing use above 250 hp, a lock up clutch is recommended.
Carillo rods are available for higher power outputs
The stock pistons seem to be able to handle the extra power without problem.

Good to know: Drive gently before the engine has reached proper temperature.
We donôt recommend letting the engine idle very long time after start. Itôs better to drive slowly instead.
Before turning off the engine, just let it idle for about 10 seconds.
But drive very gently the last minute before you stop.

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