

Pair Valve Modification

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The Pair Valve System on the Ninja 650R (ER-6F), ER-6N and Versys engine actually comprises two valves, an electrically operated Air Switching Valve located on the airbox which is controlled by the ECU and a reed valve assembly on the engine valve cover which Kawasaki terms the Air Suction Valve. The two valves are connected by a length of black plastic hose.

Basically the simplest method to “plug the pair valve” is to remove this black plastic hose and fit secure plugs (correctly sized plastic caps or an alternative blockage) to the outlet of air switching valve and the inlet of the air suction valve.

The purpose of the pair valve system is to allow fresh air from the airbox into the exhaust system at the exhaust port, this aids ignition of unburned fuel vapour before it leaves the exhaust pipes and assist operation of the catalytic converter in the OEM muffler.

Clean air is drawn out of the airbox via a cover plate and hose assembly and passes through the air switching valve which is regulated by the ECU, from the air switching valve the air passes to the air suction valve via a second hose. The air suction valve is bolted to the valve cover with passages to the exhaust port in the cylinder head. Reed valves in the air suction valve prevent exhaust gases back feeding into the airbox.

Most owners are going to want to carry out this modification after fitting a high flow aftermarket exhaust (slip-on) due to the popping (backfire) during deceleration and acceleration. This is particularly noticeable when you change down or back off the throttle and then accelerate.

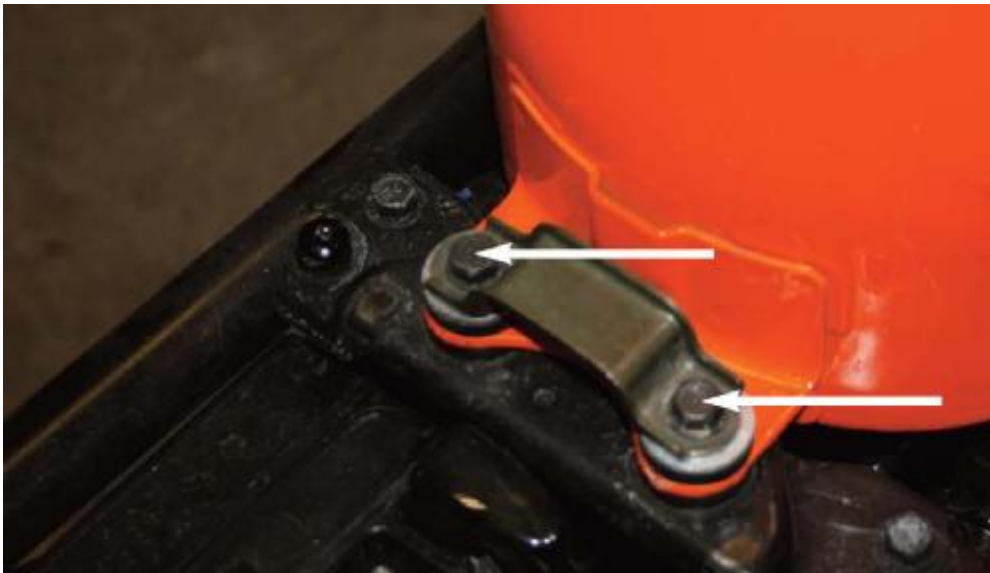
Procedure:



Remove the seat and side cover.



The side cover is secured using a single screw and tabs which push into rubber stoppers on the tank and frame.



Removal of the fuel tank. First open (then close) the fuel cap to relieve any pressure then remove the two rear bolts and seat mounting bracket. A tank full of fuel is quite heavy and difficult to handle. Consider draining the tank by hose through the tank cap (using suction or a hand pump) or riding until the tank is low enough if you feel this weight will be a problem.

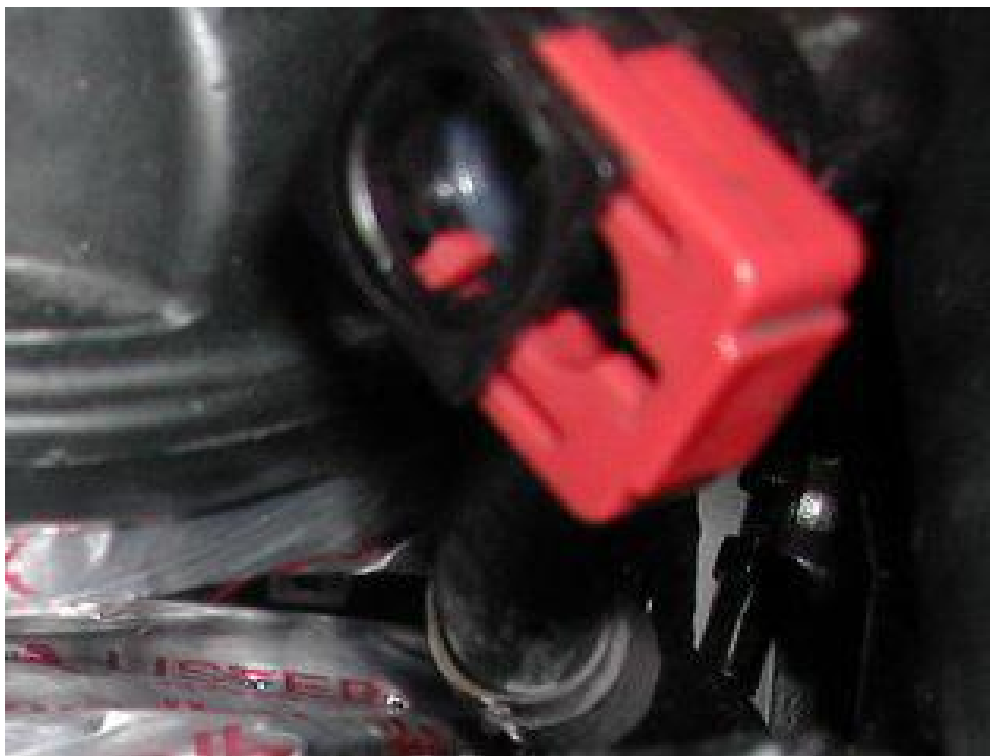
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The fuel tank is secured at the front with C brackets on the tank locating into two rubber dampers on the frame.



Before removing the tank, the fuel line, fuel pump electrical connector and fuel cap drain hose need to be disconnected.



To disconnect the quick disconnect fuel line, use a flat blade screwdriver to pop out the red securing clip. Pull the female fitting (on the hose) away from the male fitting (on the fuel pump).

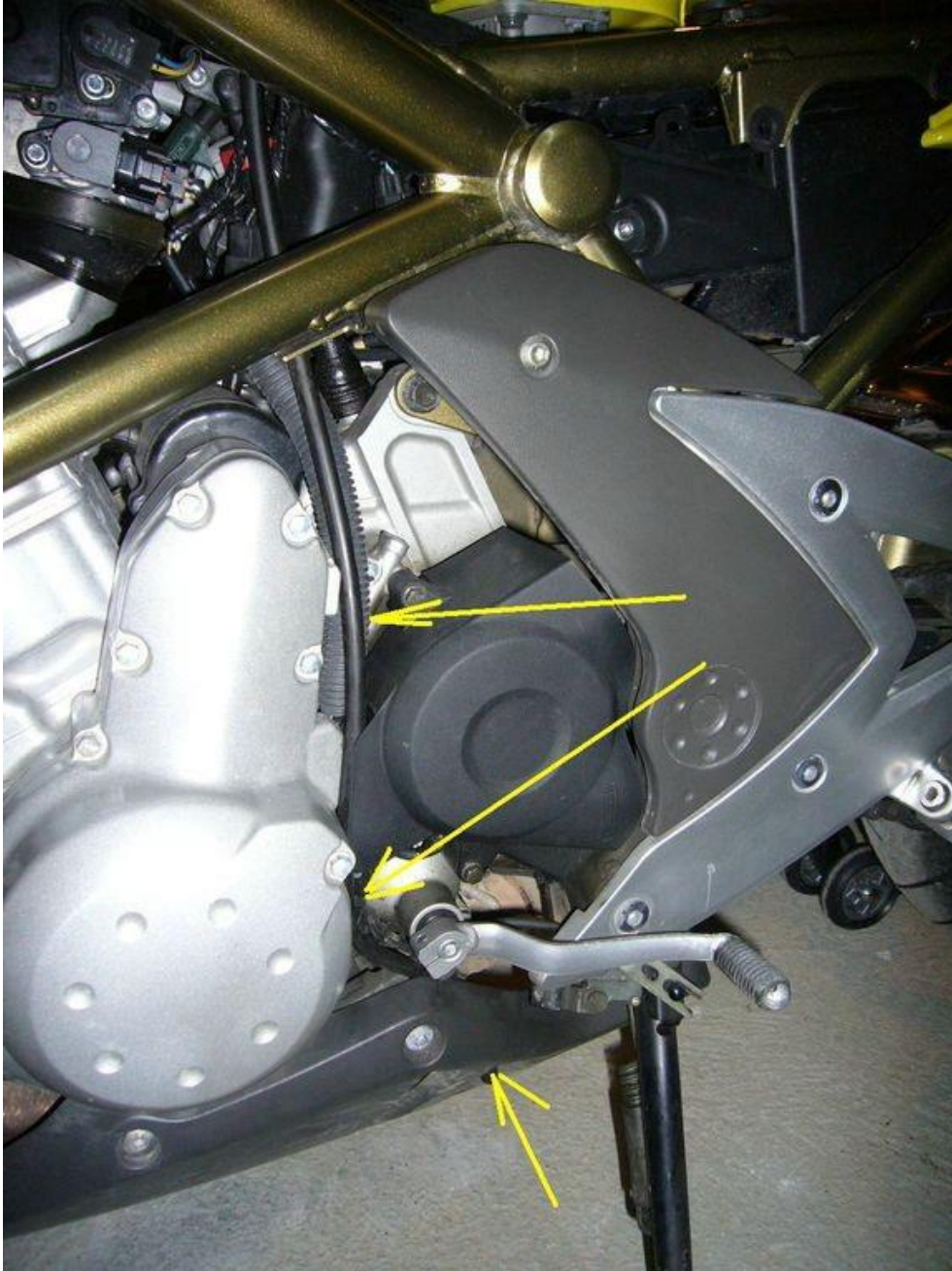
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The fitting is self-sealing so no fuel should run out. However there will be a small amount of fuel drip from the fitting as you disconnect so have a rag underneath.



The fuel pump electrical connector simply unclips (small screwdriver) and pulls apart.



The fuel cap drain cavity hose disconnects from the underside of the tank and runs down the LHS of the engine.

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It is held in place with a small squeeze clip and when it is disconnected the hose can be left in place as there is no requirement to remove it. Move it out of the way so that the airbox can be removed next.

On California models there will be other hoses which are part of the ecology system and these will also need to be disconnected.

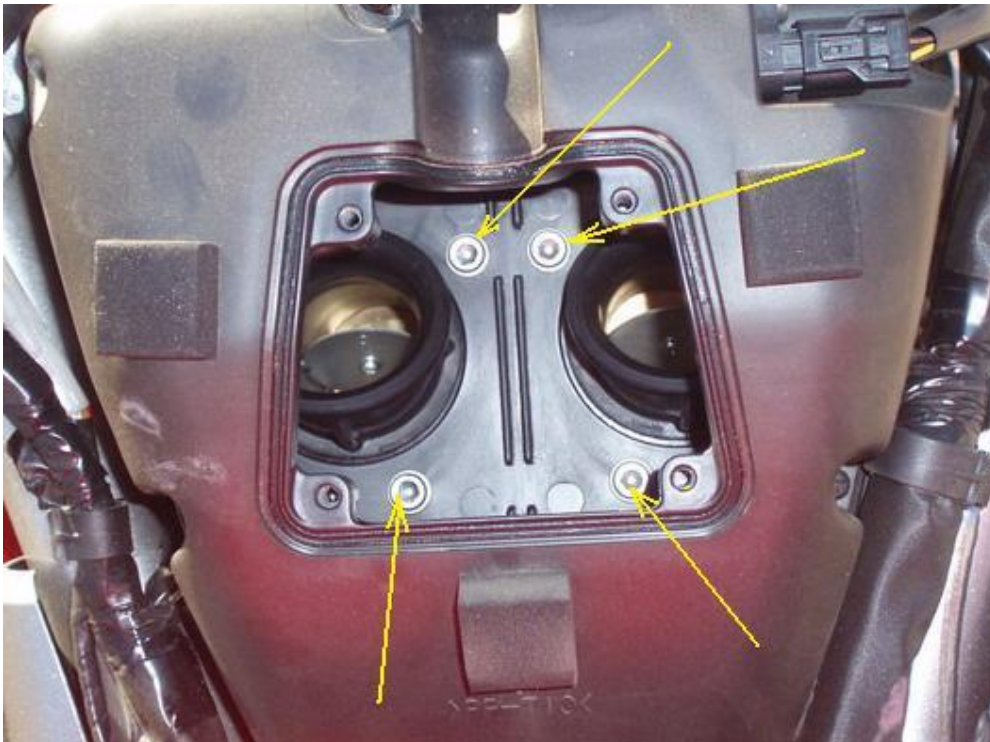
The tank can now be lifted from the bike.



Remove the airbox cover plate by removing the four screws and black plastic hose that runs from the cover plate to the air switching valve. Also disconnect the electrical connector to inlet air temperature sensor.



At this time also disconnect the air switching valve electrical connector.



Removal of the airbox. The airbox is secured to the engine with four allen headed bolts, take care when removing these as it is easy to drop them down the throttle body intakes. It is worth stuffing rag in the intakes to avoid this problem.

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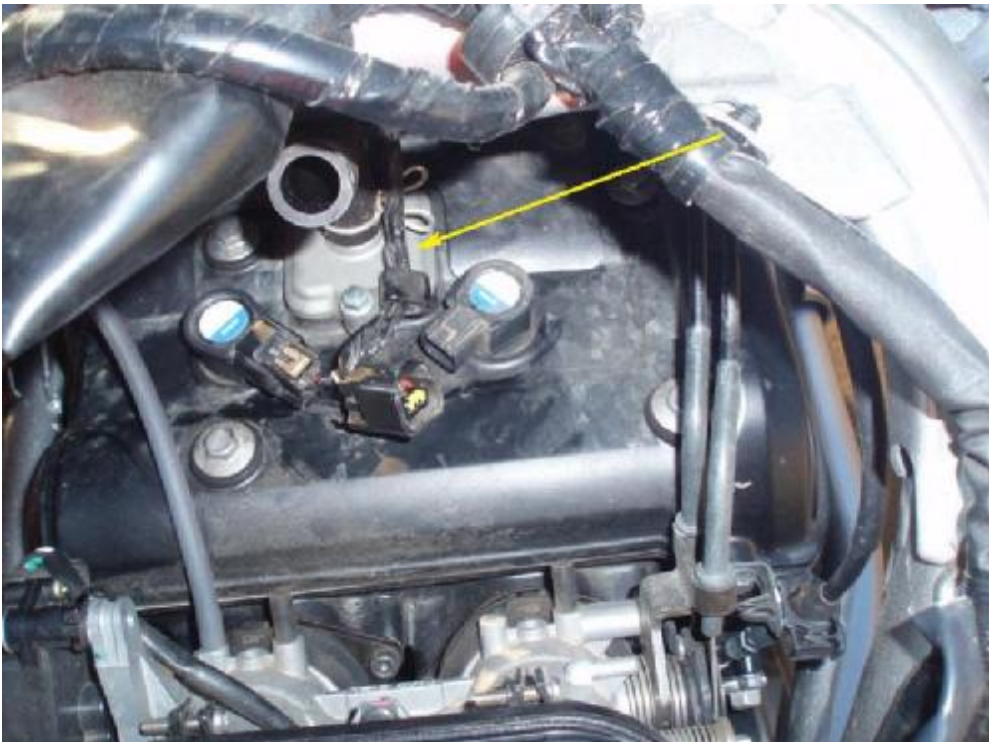
Before removing the airbox disconnect the airbox drain hose from the bottom, this is held in place with a small squeeze clip.

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Also requiring disconnection is the engine breather hose which is held on with a large squeeze clip.

The airbox can now be wrestled from the frame. As the air switch valve can get in the way this can also be removed at this time. The airbox is a tight fit so use care.



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The air suction valve is now accessible, the above picture shows it with the hose from the air switching valve still connected.



Fit a secure cap to the inlet, preferably with some high temp sealant.



Some owners have removed the air suction valve completely and fitted a blanking plate.



Other owners have blocked off the air suction valve inlet using sealant but this method is not recommended.

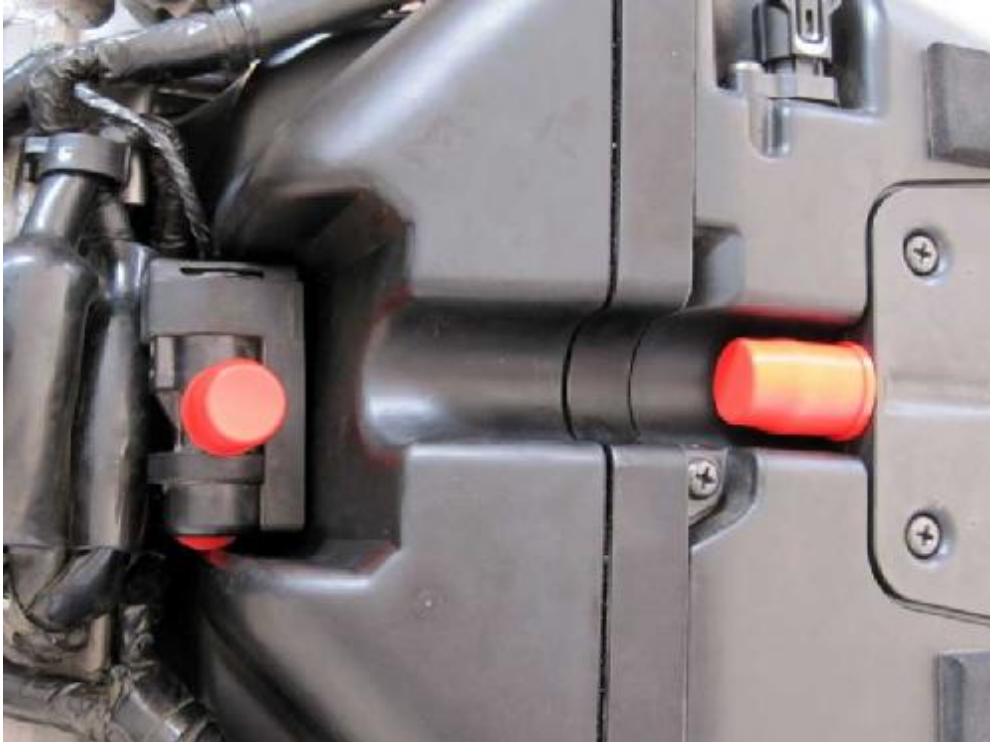


Plug the outlet of the air switching valve using a plastic cap.



In this picture (and the next) the owner has plugged both the inlet (electrical connector side) and the outlet of the air switching valve.

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In this picture the owner has plugged both the inlet (electrical connector side) and the outlet of the air switching valve, the air switching valve has also been fitted upside down as the electrical connector side is facing downwards (not good practice).



The hose between the airbox cover plate and the air switching valve can remain fitted. As long as the outlet of the air switching valve and the inlet of the air suction valve are blocked off then the modification will work.



Purists may wish to leave the electrical connector to the air switching valve disconnected, this will cause a fault to be logged by the ECU and illuminate the FI on the instrument cluster. Owners who have carried out this mod recommend "shorting out" the connector if it is left off. The Service Manual (page 16-61) advises a resistance value of 18-22 ohms for the air switching valve so a resistor of this value could be fitted across the connector terminals.

The simplest solution is to reconnect the electrical connector and let the air switching valve operate normally but perform no function.

Reassembly is the reverse of the above procedure.

Worth considering whilst carrying out this mod is:

- Clean the air filter.
- Replace the spark plugs.
- Seal the engine breather hose to the bottom of the airbox (a common cause of oil leaks in this area).
- Sub-throttle plate removal and snorkel modification.

Remember to check the fuel hose quick disconnect point after reconnection, some owners have reported leaks after failing to reconnect it properly. Any leak will be apparent fairly quickly after the high pressure fuel pump pressurises the line. Also easily forgotten is the electrical connector to the inlet air temperature sensor.

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