



EB EFI management to run an EFI xflow thread.

Started by noobus m@x1mus, Mar 17 2009 10:22 PM

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noobus m@x1mus

Posted 17 March 2009 - 10:22 PM

Ok, many know I have been up to this for a while but I finally pulled my finger out and got around to finishing it off. So I wanted to opt for a better fuel/spark management system to run my EFI xflow in the LTD but didn't want to lay out the cash for an aftermarket system like Microtec, Motec or Haltech. So I thought if I could get a more recent EFI setup to control the xflow I could see more gains in power and fuel economy with the least amount of outlay from my back pocket.

The same runthru applies to any one wanting to install an OHC 6 into an X series falcon.

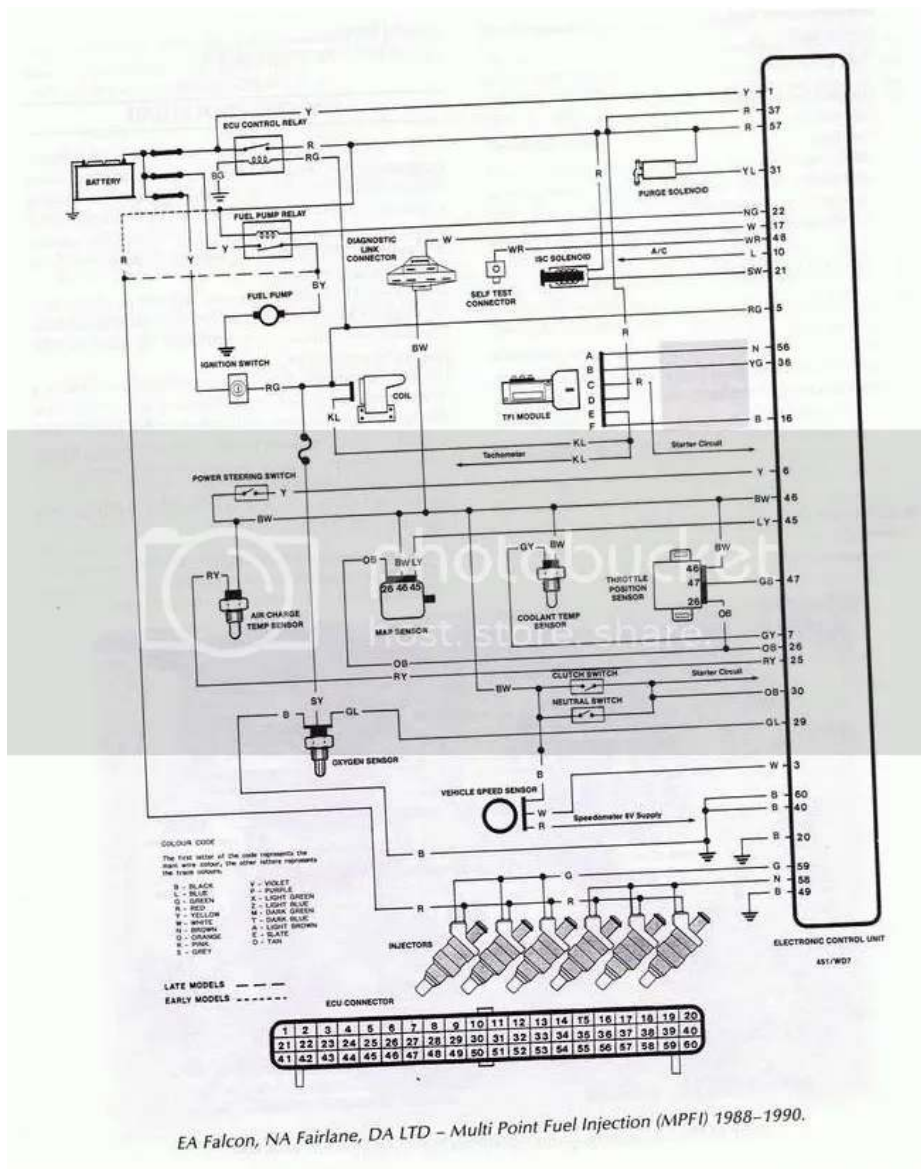
So I found an EB MPFI auto pre smartlock and worked it out from there.

Mine cost me \$50 and I got an OHC engine and 93LE 4spd auto to fit in the LTD later 🙌

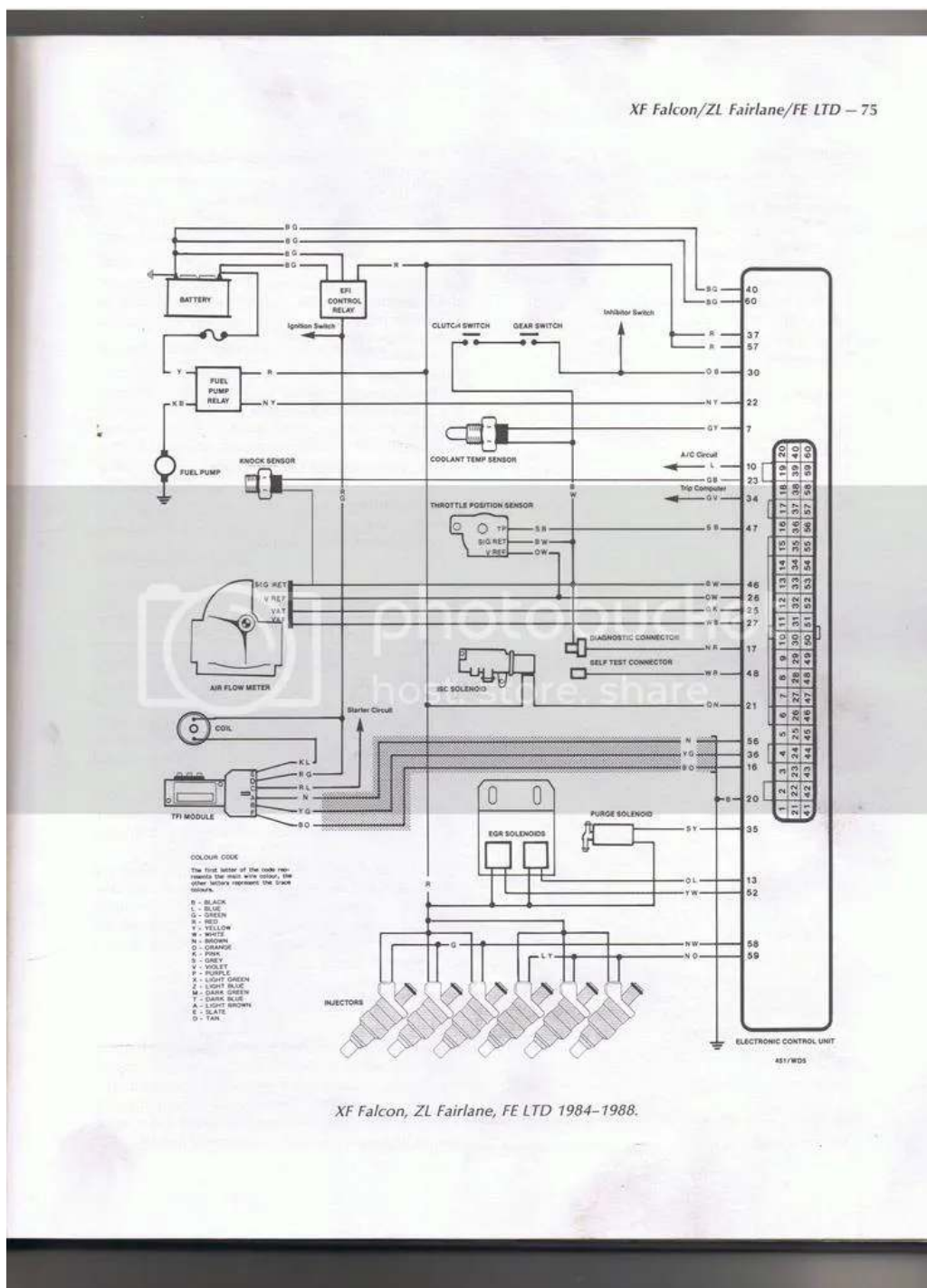
So here goes:

I started out by removing the entire loom from the EB engine bay and dash. I later found out that I should have chosen an EA MPFI as the EFI loom is separate and not integrated into the main loom like the EB is, but also the EA never has a controller for the 4 speed auto but ran the BW51, so I'm glad I have the option to run an auto with an overdrive later on without any extra fiddling about to control it.

I got a set of diagrams and compared the 2, seems they are pretty much the same on paper with some small adjustments.



EA Falcon, NA Fairlane, DA LTD - Multi Point Fuel Injection (MPFI) 1988-1990.



I had to trace back a lot of wires that were running thru the main loom and sort it all out into something that resembled the XF loom that I later removed from the vehicle.



When you remove the XF EFI loom you can see that there are only 4 points where it connects to the rest of the car or main loom.

- 1 ECU socket, behind passenger kick panel.
- 2 8 pin plug at brake booster
- 3 large yellow wire running to brass circuit breaker at battery
- 4 Earth, large black wire to battery post.

I broke down the EB loom to resemble as above and to get it to talk to the rest of the car without chopping into anything and leaving all the standard wiring intact to reverse the procedure if need be.

The first 1 is simple, as is the last 2 but the 8 pin plug breaks down as follows:





Once the old is out you can install the new. It's worth mentioning that I actually trial fitted mine and just ran wires everywhere and sat the ECU in the corner of the bay near the loom socket for the ECU and did some trial runs to make sure all was ok before I removed the old loom for security. Once satisfied I swapped the 2 over.

Now for the senders:

The MAP I sat at the firewall in the same place as the EB had it just for convenience, but you could mount it anywhere you please but with a few rules to follow.

It must be above the plenum and the hose coming out of it must fall downwards away from it so any oil vapors in the plenum will not pool up and drain into the unit and destroy it.



The IAT (Intake Air Temp) probe was the same thread and size as the vacuum tree in the rear of the plenum so I used this hole instead of tapping in a new hole into it elsewhere but it would make the whole process a little easier.



Because I did this I need to source vacuum for the rest of the gear including the brake booster from elsewhere, So I used the pipe coming from the centre of the plenum to the ISC and cut it short near the back of the head and used a coolant temp probe adapter that you would normally use in a heater hose to adapt it all up.

Now I had to modify the ISC (I did say it would be easier to tap it into the front 🤔) so I used some hoses to stick it back into the EGR diaphragm hole that is no longer needed when using the EB fuel management.



I will actually be redesigning all this when I fit up some oil catch cans, I will make up a vacuum reservoir tank and plumb it all into this so it neatens it all up and becomes more functional but what I have done above works fine.

HEGO (Heated Exhaust Gas/Oxygen) sensor, it reads the afr mix out the exhaust and deciphers whether or not the mixtures are too lean or too rich.



It must be placed after the last collector of a set of extractors or after an exhaust manifold but before a catalyst convertor. The nut to fit the sender is a Metric 18mm with a thread pitch of 1.5. I cut the nut in half so the probe sits deep into the pipe and also gives me a second nut I will weld in for a second probe to use with a gauge on the dash so I can see what's going on.

Mine isn't installed as yet because I want to do a bit of adjusting to the exhaust before I weld them in. It does run a little rich at present but I would expect it is because the ECU can't tell how hot the exhaust and how rich it is so it is receiving a false signal.

This should fix itself up when I fit them in.

I wired in the Spout wire connector so I can break the signal to the ECU and send it into Limp Home Mode to set the base timing on the dizzy. This is standard with any EFI XF but not with the EB loom. The EB uses a test socket that needs to bridge pins to send the ECU into Limp Home Mode and thus revert to base timing.



Lastly a pic of the engine bay with the VAF removed. It is a little bit dodged up here but I will be running some polished aluminum 3" pipe around the back of the head and down the passenger side to a pod behind the headlight,

the same as an AU runs but in polished pipe.



Ok so now it's all in its time for a test run.

Initially it started with a bit of a cough but I assume it needed to find its legs, after a few seconds of holding it at 1500rpm it idle smoothly and revved really crisp (this procedure is meant to be carried out on an EB when the battery has been disconnected for a period of time)

When accelerating from a standing start it launches as normal but from around 2000rpm upwards has a lot more torque and keeps on making power up past 4000 rpm. Which is something mine always lacked in because of the restriction of the VAF. It is like it has freed up the intake a lot with the last bottle neck removed and breathing freely. Interesting the sound of the exhaust is a lot crisper, at 3000rpm and higher it has lost its drone of blended noise and has now got a crisp pop of every exhaust valve opening with a nice burble out the back when decelerating, the note is higher and louder too, I might quieten this down when I fit my new exhaust on later.

I can't comment on fuel economy yet until I fit the HEGO sensor and see what L/100kms I get then.

Overall a big success, it's not quite finished yet but as it sits I am quite impressed with the outcome. I have gained a lot more torque above 3000rpm and will be able to play with XR6 tunes and the like with a plug and play flash tuner later on for cam and maybe turbo upgrades.

Edited by noobus m@x1mus, 17 March 2009 - 10:58 PM.

KLR250

Posted 17 March 2009 - 10:27 PM

The ISC will have to be swapped for the E series one as the XF one works in the opposite direction

Good Work

KLR250

Posted 17 March 2009 - 10:29 PM

Oh, just read your other thread, you already worked that out lol

noobus m@x1mus

Posted 17 March 2009 - 10:32 PM

KLR250 said

The ISC will have to be swapped for the E series one as the XF one works in the opposite direction

Good Work

Good pick up 🙌

It seems to work fine but is a bit bulky.

I want to make a block up to mount the EB ISC onto in the same place with 2 fitting coming out the side to tap in the

2 pipes.

I originally want to use a TB and ISC off of an EL/AU as they sit atop of the TB but unfortunately the overall height was around 10mm too high to close the bonnet onto, i could either chop a hole in the bonnet or drop the engine by 10mm.

I chose to run the stock units 😊

KLR250

Posted 17 March 2009 - 10:33 PM

and hurry up and put an O2 sensor in so it can start trimming its own mixtures and run in closed loop, will be very interesting after a week or so of driving

KLR250

Posted 17 March 2009 - 10:34 PM

if you can change the idle valve it will be much nicer, XF valves suck, are slow to respond and like to stick

noobus m@x1mus

Posted 17 March 2009 - 10:48 PM

I don't know if you have seen any threads about pipes lately but i been in nearly all of them and want to cut up my extractors and lengthen the secondaries and fit a 2.5" 150mm collector at the rear, then run a 2.5" system from there. I will weld in the bungs in the collector but it will be up under the car abit. I have about 3 feet of wiring so it will reach fine but i don't want to have to waste the nuts i have now. I took nearly 2 weeks to order them in and the wrong set came up twice before i got the ones i needed. Damn small hicksville i live in 😊

KLR250

Posted 17 March 2009 - 10:50 PM

Pays to keep the O2 sensor close to the engine (within reason) sampling of 3 cylinders will be better than sampling of 6 cylinders a long way back.

The sensors are heated, but in my experience they don't heat very well

Cruze

Posted 17 March 2009 - 11:00 PM

Would a sensor a long way back tend to say the mixture is rich or lean?

KLR250

Posted 17 March 2009 - 11:03 PM

generally the ecu will see it as being out of range for a lot longer and disregard it

Cruze

Posted 17 March 2009 - 11:03 PM

thanks

noobus m@x1mus

Posted 17 March 2009 - 11:06 PM

KLR250 said

Pays to keep the O2 sensor close to the engine (within reason) sampling of 3 cylinders will be better than sampling of 6 cylinders a long way back.

The sensors are heated, but in my experience they don't heat very well

So here's my pipes now, would you recommend welding it the rear primary into 1 collector instead of at the end after i extend the secondaries by about 18"?

What if the rears run a bit leaner or richer than the fronts?



KLR250

Posted 17 March 2009 - 11:09 PM

I would put it in the main collector, that distance wont be to bad as for running lean on a few cylinders, the O2 sensor is only used for light load/cruise conditions, so it wont matter at all, the O2 sensor is disregarded under loads generally exceeding 65kpa manifold pressure admittedly im running the O2 sensor on my range to far back, and it takes a long time to warm up, even though it is a heated sensor. I discovered this through datalogging (Megasquirt fitted) but yours should be fine

noobus m@x1mus

Posted 17 March 2009 - 11:19 PM

If i do that i wont be able to increase the length of the secondaries, i am trying to duplicate a lot better designed set of pipes hopefully in the running for more HP but i guess it would be a lot easier to just buy them ready made and HPC coated too.
I will probably just weld it in the bottom and just modify the end flange to run straight thru at 2.5" instead of stepping back down to 2.25"
Thanks man, looks like i should find myself a welder 🙄

crazy2287

Posted 17 March 2009 - 11:19 PM

My sensor is plumbed in just after the final 2-to-1 and it works fine. It's a narrowband 4 wire heated sensor from a suburu. I had an ebay 4 wire sensor but it failed at life.
Current one works fine.

that said, Awesome mod!!! I didn't think it would work but I've been shown wrong. Top stuff!!!

Be interesting to have a before and after dyno run! Is the engine standard other then exhaust and ECU?

Also, i thought IAT were interfearence type threat, also, wont you get some heat soak there?

Edited by crazy2287, 17 March 2009 - 11:25 PM.

earlybirds

Posted 18 March 2009 - 12:18 AM

FARKNHELL !!! ibetter read this a few 1000 times 🤪 and 🤪

noobus m@x1mus

Posted 18 March 2009 - 08:32 AM

crazy2287 said

Be interesting to have a before and after dyno run! Is the engine standard other then exhaust and ECU?

I would have loved that too but unfortunately there isnt 1 dyno available in my town, i could take the loom and sensors with me and dummy them up to run the old gear again if it wanted to though.

Mods over a stock engine thus far include:

Balanced crank and rods

30" over alloy pistons

intake has been matched ported from the throttle body to the intake valve and the exhaust has been match ported aswell.

Injector tubes have been ported out to allow a better smoother flow thru and around the injector caps.

Intake runners and plenum and exhaust have all been polished also

Pics of these are in my build thread.

Clutch fan removed for twin thermos

Other than that its completely stock rebuilt

10,000kms on the head up and the block was done by the previous owner and i picked it up cheap with about 40,000 on the clock

Quote

Also, i thought IAT were interference type threat, also, wont you get some heat soak there?

Dont know what you mean, interference type threat, but as for heat soak, maybe, the EB system was plumbed in the same place but most of the damaging heat soak will be coming from the heat straight out of the thermos fan across the extractors and into the pod filter. Thats why i said its dodged up a bit, i will be running a similar setup to the AU 6 and getting some polished 3" pipe same as i had before to turn at a 90 and go backwards around the plenum across the back and follow the intake runners down to the front and mount the pod in behind the headlight. I will use a rubber 90 bend at the throttle body to prevent heatsoak from the above best i can but hopefully the rest of the piping should act as a heatsink and cool down the last bit that will be exposed to the last 2 extractor tubes and the rear of the head.

I may even tig in a nut to take the IAT probe in the same place but into the intake tube and replace most of the vacuum lines into the factory spots aswell.

djriseo

Posted 24 March 2009 - 11:31 PM

So this is what was more important than hearing me whinge about how much my Fairlane hates me. LOL.

Half of what I read just made my head sore. But it sounds like a good mod...For those in the know.

noobus m@x1mus

Posted 24 March 2009 - 11:37 PM

djriseo said

So this is what was more important than hearing me whinge about how much my Fairlane hates me. LOL.

Half of what I read just made my head sore. But it sounds like a good mod...For those in the know.

😂 LOL hows that going anyway, did you sus it out, I wonder if the tines are so worn out that that just bend rather than pivot and lever the pressure off the clutch. But you said you are getting a new clutch kit didnt you?

djriseo

Posted 24 March 2009 - 11:46 PM

LOL. Yeah. When the government gives me my hard earned 900. I'll get a new clutch and pressure plate (no idea how much this will cost) with it and if paying a mechanic turns out to be too expensive, looks like I'll be doing it myself again.

I figured the problem was the clutch not leaving the flywheel. Because now I can drive around in first all day. Just if I move out of fist I can't select any gears at all. Including first.

