MANUAL FOR OPERATION OF THE 4JX1 – DIESEL UBS-73

UBS69 = 3.1 turbo diesel motor (4JG2) Trooper/Bighorn/Jackaroo

UBS73= 3 turbo diesel motor (4JX1) Trooper/Bighorn/Jackaroo [4JB1-T engine will replace 4JX1]

Manual (whole car) [for download]:  http://www.clubisuzy.com/

General: The 4JX1 is a CAT licenced engine to IZUSU

<table>
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<th>South Coast 4wd in Wollongong.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical World on Edward St, Wagga.</td>
<td></td>
</tr>
</tbody>
</table>

Disclaimer: - Any brand, posters or other names mentioned are purely for information and are not endorsed by the author.
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Overall operation of the 4JX1 Engine:

Suggested Actions for Owners [Injector Article written by Red-one]

- Ensure the correct type and grade of oil is being used in the engine. Correct operation of every part of the injector oil circuit is critical to the successful operation of this engine. The piston within the injector has to move exactly the correct distance to deliver the correct quantity of fuel, and operate at exactly the right moment in the engine cycle, for the engine to run correctly. Selection of a good quality oil, of suitable viscosity, clearly plays a vital part in this.

- Check sump oil level regularly (at least once per week), and be aware that a rising oil level could be the start of other problems.

- Keep a wary eye open for fluid loss or leaks such as oil leaks from engine seals, or the smell of diesel in the coolant.

- Holden Jackaroo owners - contact Holden and enquire whether the Campaign 03-H-03 has been done on your vehicle. Note this Campaign relates to the injector sleeve sealing O-rings, which according Holden: “can deteriorate and cause fuel to leak into the crankcase”. If not, book it in – Holden should do this free of charge.

- At each 80 k kms service interval, replace the O-rings between injectors and sleeves, and between sleeves and cylinder head, as a precaution. This will add little to the overall cost of the service, as the mechanic will already be working in this part of the engine, checking and adjusting the valve clearances.

- If the oil level in the sump rises to the point that it enters the crankcase breather pipe, the engine may start to run on its own oil. In this situation, in Holdens words: “this may result in an unintentional increase in engine speed, and possibly vehicle speed”.

If this happened, it would cause most people to get very alarmed, especially if it happened in heavy traffic, driving at high speed, etc.. The engine will no longer respond to normal throttle operation, and will continue to run even with the ignition switched off.

- In extreme cases, engines have been known to red-line and self destruct. In the UK, there have been cases of engines being replaced free of charge by Isuzu.

- If a motorist is unfortunate enough to experience a run away engine, the best advice is to immediately steer in a safe direction, engage the highest possible gear and jump on the footbrake and hand brake together to stall the engine. Only depress the clutch or engage neutral as a last resort as this will allow the engine to spin freely out of control.
This will be alien to most normal driving, and against normal instincts. Failure to stop the engine at this point may lead to a very expensive engine rebuild. Staying on a high traction surface eg bitumen would be better than driving onto loose sand – spinning wheels would have little braking effect on the engine. Do not turn off the ignition before the vehicle comes to rest, to avoid locking the steering wheel.

1. How the 4JX1 System Works:
**A close look at the HEUI System**

The HEUI fuel system consists of four basic components:

1. **HEUI Injector** Uses hydraulic energy (as opposed to mechanical energy from the engine camshaft) from pressurized engine lube oil for injection. The pressure of the incoming oil (800 to 3300 psi) controls the rate of injection, while the amount of fuel injected is determined by the ECM.

2. **Electronic Control Module (ECM)**
   This sophisticated on-board computer precisely manages fuel injection and other engine systems. The HEUI injector solenoid is energized by an electronic signal generated in the ECM. Using input from multiple sensors, the ECM’s dual microprocessors use proprietary software and customer-supplied performance parameters to produce maximum engine performance under any conditions.

3. **High Pressure Oil Pump** The variable displacement axial pump features a built-in reservoir to immediately supply oil at cold starts.

4. **Injector Actuation Pressure Control Valve** This electronically operated valve controls oil pump output and injection pressure.
Diagnostic gear - TECH – II
http://www.uobd2.net/wholesale/gm-tech2-gm-diagnostic-scanner.html

I believe it is this card. http://www.uobd2.net/wholesale/32mb-card-for-gm-tech2-1538.html

ISUZU ISUZU-English 107.021 2006-2010
ISUZU-CANBUS is for ISUZU after 2010
ISUZU-K-line is for ISUZU from 1996 to 2010
Request the K-Line software as this covers our Jackaroo’s.

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HEUI Fuel Systems

**Advanced technology yields higher performance**

The HEUI (Hydraulically Actuated Electronically Controlled Unit Injector) Fuel System represents one of the most significant innovations in diesel engine technology in decades. HEUI surpasses many of the limitations of mechanical and conventional electronic injectors and sets new standards for fuel efficiency, reliability and emission control.

Available as standard equipment on an ever-widening range of Cat® Engines and machines, the highly sophisticated HEUI system uses hydraulic energy instead of mechanical energy to operate fuel injectors. Working in tandem with the engine’s ECM (Electronic Control Module), the HEUI system provides extremely precise control of fuel metering and timing, resulting in unmatched engine performance and economy.
1. Diesel - Initial analysis

### Diesel Troubleshooting

<table>
<thead>
<tr>
<th>Probable Cause</th>
<th>Engine not starting</th>
<th>Hard to start engine</th>
<th>Runs rough at lower RPM</th>
<th>Lack of power</th>
<th>Diesel knock / pinking</th>
<th>Black smoke</th>
<th>White smoke</th>
<th>Blue smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low compression</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low fuel pressure</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low cranking speed - flat battery</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glow plugs or relay faulty</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient fuel supply</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fuel quality &amp; contamination</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air – vacuum in fuel supply</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Blocked fuel supply – filters</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty diesel injector(s)</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty high pressure pump</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty pressure regulator – sensor</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faulty low pressure supply pump</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air intake restriction</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbo problems – waste gate</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>EGR problems</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injector blow-by seat leaking</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cam – crank sensor</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injector wiring harness</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Internal engine problems</td>
<td>▾</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### The Answer is in the Smoke

We can generally understand what is wrong with a diesel engine by the colour of smoke emitted from the exhaust. There are three basic colours - black, white and blue.

#### Black Smoke

This is due to a air to fuel ratio imbalance, either the fuel system is delivering too much fuel into the engine or there is not enough clean air (oxygen) a few things to look for:

- Faulty injectors (injectors need attention at about 100,000 to 120,000 miles)
- Faulty injector pump
- EGR air cleaner
- Turbocharger or intercooler faulty
- Problems within cylinder head, valves clogged up due to faulty EGR (exhaust gas recycling unit)

#### White Smoke

Normally means the fuel injected into the cylinder is not burning correctly. The smoke will burn your eyes.

- Engine/pump timing out
- Fuel starvation to the pump causing the pumps timing not to operate correctly
- Low engine compression
- Water/petrol in the fuel

#### Blue Smoke

The engine is burning engine oil

- Wear cylinders or piston rings
- Valve seals or valve stem seals
- Engine over full with engine oil
- Faulty injector pump lift pump allowing engine oil to be mixed with the diesel
2. Diagnostics – Non Starting Engine:

2.1 Circuits Description
In this type of injector system, the Engine Control Module (ECM) triggers the correct driver inside the injector, which then triggers the correct injector based on the 57X signal received from the crankshaft position sensor (CKP). During cranking, the ECM monitors the CKP 57X signal. The CKP signal is used to determine which cylinder will fire first. After the CKP 57X signal has been processed by the ECM, it will command all four injectors to allow a priming shot of fuel for all the cylinders. After the priming, the injectors are left “OFF” during the next four 57X reference pulses from the CKP. This allows each cylinder a chance to use the fuel from the priming shot. During this waiting period, a camshaft position (CMP) signal pulse will have been received by the ECM. The CMP signal allows the ECM to operate the injectors sequentially based on camshaft position. If the camshaft position signal is not present at start-up, the ECM will begin sequential fuel delivery with a 1-in-4 chance that fuel delivery is correct. The engine will run without a CMP signal, but will set a DTC code.

2.2 Diagnostic Aids
An intermittent problem may be caused by a poor connection, rubbed-through wire insulation or a wire broken inside the insulation. Check for the following items:
- Poor connection or damaged harness – Inspect the ECM harness and connectors for improper mating, broken locks, improperly formed or damaged terminals, poor terminal-to-wire connection, and damaged harness.
- Faulty engine coolant temperature sensor – Using a Tech 2, compare engine coolant temperature with manifold air temperature on a completely cool engine.

2.3 Test Description
Number(s) below refer to the step number(s) on the Diagnostic Chart.

4. An obvious cause of low fuel pressure would be an empty fuel tank.
5. The engine will easily start and run if a few injectors are disabled. It is not necessary to test all injectors at this time since this step is only a test to verify that all of the injectors have not been disabled by fuel contamination.
8. If there is an open or shorted driver circuit, DTCs 0201-0204 should be set.

2.4 Engine Cranks But Will Not Run

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Value(s)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Was the “On-Board Diagnostic (OBD) System Check” performed?</td>
<td>—</td>
<td>Go to Step 2</td>
<td>Go to OBD System Check</td>
</tr>
<tr>
<td>2</td>
<td>Check the 15 A injector fuse, the 15 A engine device fuse, and the 15A ECM fuse.</td>
<td>—</td>
<td>Go to Step 3</td>
<td>Go to Step 4</td>
</tr>
<tr>
<td>3</td>
<td>Check for a short to ground and replace the fuse. Is the action complete?</td>
<td>—</td>
<td>Verify repair</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>Is fuel tank empty?</td>
<td>—</td>
<td>Fill the fuel tank</td>
<td>Go to Step 5</td>
</tr>
<tr>
<td>5</td>
<td>Is the right fuel using?</td>
<td>—</td>
<td>Go to Step 6</td>
<td>Replace the fuel</td>
</tr>
<tr>
<td>6</td>
<td>Is the right engine oil using?</td>
<td>—</td>
<td>Go to Step 7</td>
<td>Replace the engine oil</td>
</tr>
<tr>
<td>7</td>
<td>Using the Tech 2. Is DTC P0192 or P0193 set? (Check rail pressure system)</td>
<td>—</td>
<td>Go to DTC P0192 or DTC P0193</td>
<td>Go to Step 8</td>
</tr>
<tr>
<td>8</td>
<td>Using the Tech 2. Is DTC P0201 – P0204 set? (Check inject circuit fault)</td>
<td>—</td>
<td>Go to DTC P0201 – P0204</td>
<td>Go to Step 9</td>
</tr>
<tr>
<td>9</td>
<td>Using the Tech 2. Is DTC P1657 set? (Check ECM Main relay)</td>
<td>—</td>
<td>Go to DTC P1657</td>
<td>Go to Step 10</td>
</tr>
</tbody>
</table>
## 6E-80 4JX1–TC ENGINE DRIVEABILITY AND EMISSIONS

### Engine Cranks But Will Not Run (Cont’d)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Value(s)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| 10   | Refer to *Engine Mechanical Diagnosis* to diagnose the following conditions:  
+ Faulty camshaft drive belts  
+ Leaking or sticky valves or rings  
+ Excessive valve deposits  
+ Weak valve springs  
+ Incorrect valve timing  
+ Leaking head gasket  
Is the action complete? | —         | Verify repair | Go to Step 11 |
| 11   | Observe the "Engine Speed" data display on the Tech 2 while cranking the engine.  
Is the engine RPM indicated? (If the Tech 2 is normally powered from the cigarette lighter socket, and if the Tech 2 display goes blank while cranking the engine, it will be necessary to power the Tech 2 directly from the vehicle battery) | —         | Go to Step 12 | Go to Step 17 |
| 12   | 1. At the ECM (female) side of the connector mentioned in step, connect a test light between the ignition + terminal and one of the injector driver circuits at the same connector.  
2. Ignition "ON."  
3. Observe the test light, and repeat the test for each injector driver circuit by oscilloscope.  
Did the test light stay on when checking any of the 4 injector driver circuits? | —         | Go to Step 13 | Go to Step 15 |
| 13   | 1. Ignition "OFF," disconnect the ECM.  
2. Ignition "ON," observe the test light.  
Is the test light "ON?" | —         | Go to Step 14 | Go to Step 16 |
| 14   | Locate and repair the short to ground in the injector driver circuit.  
Is the action complete? | —         | Verify repair | —                |
| 15   | Check for an open injector driver circuit.  
Was a problem found? | —         | Verify repair | Go to Step 16 |
| 16   | Replace the ECM (Refer to the Data Programming in Case of ECM change).  
Is the action complete? | —         | Verify repair | —                |
| 17   | 1. Raise the vehicle and disconnect the CKP sensor harness.  
2. Ignition "ON."  
3. With a test light to ground, probe the harness ignition feed terminal.  
Did the light illuminate? | —         | Go to Step 19 | Go to Step 18 |
| 18   | Check the ignition feed wire between the sensor and the ECM for a short to ground or open circuit.  
Is the action complete? | —         | Verify repair | —                |
## Engine Cranks But Will Not Run (Cont’d)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Values(s)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| 19   | 1. Ignition “ON.”  
2. At the CKP harness connector, connect a test light between the ignition and ground terminals. Did the light illuminate? | —          | Go to Step 21 | Go to Step 20 |
| 20   | Check the sensor ground circuit for an open or short to voltage.  
Is the action complete? | —          | Verify repair | —           |
| 21   | Check the signal circuit between the sensor and the ECM for a short to ground, short to voltage, or an open.  
Was a problem found? | —          | Verify repair | Go to Step 22 |
| 22   | Replace the CKP sensor.  
Is the action complete? | —          | Verify repair | Go to Step 16 |
3. Service Intervals [found by 4JX1 users]

<table>
<thead>
<tr>
<th>Item</th>
<th>Distance</th>
<th>Change</th>
<th>Best Use/ Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>INJECTOR SEALS</td>
<td>100,000-140000 km</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>CAT HEUI injectors for internal seal replacement</td>
<td>100,000 - 150,000</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Oil Changes</td>
<td>5000 to 10000 km</td>
<td>Yes</td>
<td>Penrite HPR Diesel 5 or Mobil Delvac1, Castrol R-synth 5W-30, Mobil 1 5w50</td>
</tr>
<tr>
<td>ORPS</td>
<td>50000-70000 km</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Throttle body position sensor</td>
<td>50000-70000 km</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ORPCV</td>
<td>50000 km</td>
<td>Clean</td>
<td>Replace when necessary.</td>
</tr>
<tr>
<td>Injector [CAT HUEI overhaul set]</td>
<td>100,000km</td>
<td>Overhaul</td>
<td>CAT - Kit sells for about A$65-85 per injector [must change Cu washer]</td>
</tr>
<tr>
<td>Wiring harness</td>
<td>At 240,000 km intervals</td>
<td>clean</td>
<td></td>
</tr>
<tr>
<td>Coolant</td>
<td>50,000km</td>
<td>Replace</td>
<td>orange dexcool type coolant for Al heads/ radiators</td>
</tr>
<tr>
<td>Glow Plugs</td>
<td>100,000km</td>
<td>Check/replace</td>
<td></td>
</tr>
<tr>
<td>Cam/ Timing Belt</td>
<td>100,000km</td>
<td>Replace</td>
<td>Type:</td>
</tr>
</tbody>
</table>

Battery:

Alternate: Delkor M27 marine battery, Century N70ZZ 4WD battery has 700CCA and 145RC, Supercharge Calcium-calcium 720cca & 160 Min reserve, I run a 650CCA RHS and a 550CCA LHS from Marshals, Century N70ZZ4WD 700CCA battery
Battery Isolators/ Charge Protectors:


This is the STANDARD SC80. The SC80 has been in production for more than 20 years since it is was first introduced and it still has features that make it far more versatile than any other other isolators.

The Standard SC80 is available in 12 volt ( and 24 volt on request ) The SC80's first and most important objective is to protect the vehicle's main battery against being discharged bellow a point at which the battery would not be able to start the vehicle.

The Standard SC80 has a PRIMARY and a SECONDARY circuit. These circuits can be joined together and operated as a single 90 amp auxiliary battery charger, connecting the main battery to 1 auxiliary battery.

The Standard SC80 can be used to charge 2 auxiliary batteries via separate 45 amp circuits, so if there is one auxiliary battery under the bonnet of a vehicle and another in a caravan being towed by the vehicle, the SC80 will charge both batteries while the voltage at the main battery is at a high enough level. After the vehicles motor is stopped, the power can be shared by all the batteries to extend the operating time of the auxiliary batteries. But once the voltage at the main battery drops to the cut out level, all the batteries will be isolated from each other.

Dual Battery:

This is how I have done mine along with a bezel light from dick smiths and a momentary pushbutton from same shop.

To start I completely removed cabling from the positive side of the passenger side battery and also removed the other end from the connector on the solenoid of the starter motor. (Leave the negative where it is or if non existent, ie don't have battery there yet. then attach to engine block on passenger side with a sturdy bolt and steel crimp soldered if you don’t posses an industrial crimper. then wire the rest in as per the drawing attached.

I also put in an Anderson plug into the rear of the jack as well as to the tail gate for the trailer off the auxiliary stud of the smart solenoid with a 80 amp automatic circuit breaker fuse.

Hope this helps. Jas
4. Parts List:

<table>
<thead>
<tr>
<th>OIL FILTERS</th>
<th>Isuzu</th>
<th>Ryco</th>
<th>Cooper Wesfil/Nippon Max</th>
<th>Change at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Oil Filter</td>
<td>Part 8-97167-972-0</td>
<td>Z600</td>
<td>WZ554/ MO-024</td>
<td>5000 to 10000 km</td>
</tr>
<tr>
<td>Secondary Filter</td>
<td>Z79A</td>
<td></td>
<td>WZ79 *</td>
<td></td>
</tr>
<tr>
<td>Air Filter</td>
<td>A1081</td>
<td></td>
<td>WA1081</td>
<td></td>
</tr>
<tr>
<td>Fuel Filter</td>
<td></td>
<td></td>
<td>Donaldson P550225 FF</td>
<td></td>
</tr>
</tbody>
</table>

Out of all the above, the Wesfil products are not only the cheapest, but also seem best quality suited to the Jackaroo. The main filter from them, appears to be almost identical in marking to the OEM, minus the Isuzu branding...

Contact Neil @ http://www.sydneyfilters.com.au/jackaroo/. He has all the Nippon Max and Wesfil Filters and is cheaper including the freight than what I can buy the lot locally. Just tell him you have the 4JX1 Jackaroo Diesel and he will do the rest.

5. Air Filters

**Oiled air filters**

There is a history of filter oil residue causing problems with the td sensors, but if you are getting oil residue downstream of the filter then it is being over-oiled, which is common and easy to do.

I think Unifilter do a foam element for the td. I prefer the castrol filter oil or silkolene.

**Green Cotton filters:**

They do make one for the 3.0TD, and are available from http://www.greencottonfilters.com.au/.

The part number for the 3.0TD Jackaroo filter is R252209 and costs $88 plus $7 shipping in Australia.
Belts and replacement:

<table>
<thead>
<tr>
<th>Belt</th>
<th>Gates</th>
<th>Bosch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternator belt</td>
<td>7385</td>
<td>11A0980</td>
</tr>
<tr>
<td>AirConditioner belt</td>
<td>9490</td>
<td>13A1245</td>
</tr>
<tr>
<td>Adjuster pulley - Fan - Harmonic Balancer/ bearings</td>
<td>BSC bearings Davco or Top Cog</td>
<td></td>
</tr>
</tbody>
</table>

OK here is a quick how to:

- Remove the battery, battery holder and tray.
- Undo the hose that connects the turbo and intercooler, you can take it off or just spin it out of the way.
- Undo the Air inlet, solid black tube on turbo. Also undo the clips on the air filter housing, lift the air inlet out of the way.
- Loosen the pulley on the adjuster for the AC compressor belt, release the tension and remove the belt.
- Loosen the adjuster bolt for the alternator, you will also need to loose the retaining bolt at the bottom of the alternator. Now you can let the tension off the belts and remove them.
- Replacing is the reverse of the above, except do up the alternator adjustor bolt (top one) first.
- To tension the alternator, the good old broom stick was a bit too bendy, I used a long socket handle I have, I didn’t get them super tight, 10mm give between the fan pulley and drive pulley (Harmonic Bal.)

6. Fuel Supply:

Fuel Filter

I also fitted a non-return valve in the fuel line just upstream from the filter, as I had been advised an air leak could sometimes develop around the filter, leading to air ingress when stood overnight. A bloke in the UK told me this was yet another known (irritating) problem with this engine - the valve was only about $20 so I thought nothing to lose.

Fuel Pump:
7. OIL CHANGES:

Most likely the wrong grade of oil was used.

The oil must be 5W 30/40 (0W if in cold climates) else it wont start.

Interestingly the 2 oils that is known to work well with this engine (Penrite HPR Diesel/5 and Mobil Delvac1). Both have the lowest pour points available from oils (around -48 degrees C)

Notes on Oil related matters:
The injectors are hydraulic? (Correct me if I am wrong) and use the oil to operate.

If there is not enough oil pressure, they don’t fire.

Pretty simple really.

Many 4JX1 owners and myself use Penrite HPR 5 5W40 oil with Nippon Max filters which can be bought from Sydney Filters.

Ryco filters have caused oil pressure issues for some people.

Small oil filter meant to be changed every second service so 20,000km

Oil Pickup:

There have been instances of the “oil pickup” in the engine sump breaking off. These are found by topping up oil levels when suspected and then engine starting.

Pickup pipe on the oil pump been fixed under a recall As I recall they were prone to falling off. Had mine a 2000 se fixed under warranty whilst I had a fault on a pressure relief valve rectified.

Slow rise of Oil pressure on start-up:

** I also had this problem of oil pressure taking 5 seconds to come up on cold start. I discovered that the problem was the oil cooler (which sits on top of the oil filter housing) draining slowly into the sump when the engine was shut down. The oil filter housing bolts to the engine block and has an o-ring surrounding it, which prevents oil leaking externally. There is no gasket to prevent oil moving between the two ports to the engine block so if the oil filter housing is not tight against the block a slow leak can
exist which allows the oil cooler to drain. I cured the problem by tightening the 4 nuts holding on the oil filter housing.

I would think that the only way this problem could damage the turbo is if the engine is revved up straight away on start up before the oil pressure comes up. The owner’s manual warns against this.

If the oil pressure is taking longer than 5 seconds to come up then suspect the oil filter non-return valve. I had a problem with a non-Isuzu oil filter, which had a faulty non-return valve. Oil slowly drained from the filter and if the engine wasn’t started for a couple of days it took about 15 seconds for the pressure to come up.

*** We had a problem with our Oil pickup in April that lead to the turbo destroying itself. Turns out that the O-ring on the oil pickup failed/or was failing and the lubrication oil circuit received no oil. This was indicated by the low oil pressure coming on when starting.

*******I had an indicated Lubrication-oil pressure failure. The easiest place to start was the lub-oil suction seals. I did the work myself, as I was not game to move the vehicle. It is not a difficult job.

Before you proceed though, you can try over-filling your sump with about 2 litres of oil. This will raise the oil level to a point above that of the suspect seal, thereby excluding air from the suction. Fire the engine up and see if there is any improvement. Obviously if the problem is rectified then the seals are gone and will need to be replaced. Do not run your engine for longer than is absolutely necessary while the sump is overfilled.

To change the seals (they are not expensive - about $7-00 for both), and you might as well do both, you will need to put the car onto axle stands until the front wheels are at least clear of the floor. Remove the cross-member immediately behind the oil pan. Drain and remove the oil pan - you will need a 12mm thin-walled socket spanner (a 3/8 drive will do it) as there is not much room around the bolt heads.

The jointing compound they used on the pan is extremely strong, so be careful not to deform the pan as you remove it - try running a knife around the joint as you go.

Try to resist any lateral movement as you remove the pan, as the suctions are very close to it and are bent easily. When it is removed, the suction lines will become immediately obvious, and if the seals are worn, will practically fall out when the retaining bolts are undone. Be careful with them, they look very robust, but are not. The engine lub oil suction is on the driver’s side of the engine, you will see that its seal is above the normal oil level, whereas the other one is fully immersed. Clean the jointing compound from both faces of the oil pan joint - I found kero and a "scotch mitt" to be best, otherwise persevere, both surfaces must be spotless. For reassemble you will need to rejoint the oil pan with a suitable compound - I found Permatex Blue to be very good.

After all that, (I did not do the overfilling thing) the problem was not rectified and I eventually traced the fault to the pressure sender mounted on the oil filter block. That part cost me $237, and I had to
remove the top control arm of the suspension to get at it. Although this is not a job for the faint hearted, it can be done.

8. Engine head

Injectors

The vehicles were sold in Australia by Holden (GM) as the Jackaroo. In Australia, these problems appear to be little understood by the general Holden dealer network. There has been a single campaign to replace injector sleeve sealing O-rings, but no indication of replacing the injectors themselves. The relevant Campaign Notice is available at the Product Recalls Australia website: http://www.recalls.gov.au/view_recall_detail.php?Recall_ID_Auto=13023

Early injectors (up to Serial No. 519266) used a rubber O-ring material (green colour probably Viton) but later ones were fitted with ceramic seals instead. Whenever owners are having injectors replaced, they should ensure only later model injectors (ie after 519266) are fitted, as these will have the most recent ceramic seals.

Based on extensive experience in the UK, my overseas contact advised that all injectors fitted to early vehicles up to about 2001 (ie those fitted with rubber O-rings prior to later ceramic seals) are likely to have a problem at some point, and would need to be replaced. From 2001 onwards, it seems if they are going to go, they fail early (say approx 30 k kms). Failure of the later model injectors (ceramic seals) appear to be very rare.

Gaskets and seals needed to change the injectors

<table>
<thead>
<tr>
<th>Item</th>
<th>Holden part numbers</th>
<th>Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>gasket nozzle</td>
<td>GM-8972407980</td>
<td>4</td>
<td>washers, 'o' rings, and seals</td>
</tr>
<tr>
<td>gasket injector nozzle</td>
<td>GM-8971757830 4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>gasket injector nozzle</td>
<td>GM-8971611092 4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>gasket HP oil pipe</td>
<td>GM-8971842160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gasket Throttle Body</td>
<td>GM-8971378200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘Rocker cover gasket’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGR Port gasket</td>
<td>GM# 97137811 or 8-97137811-1</td>
<td></td>
<td>between exhaust manifold and head</td>
</tr>
</tbody>
</table>
**Manifold gaskets**
Yes you can change the manifold gaskets without removing the turbo or dump pipe (and gaskets) from the manifold, if you want to be tight. Just need to undo a $5 exhaust flange gasket under the car and then put a slit in your new gasket for #3 cylinder only.

The cut needs to go on the LOWER stud hole (from lower stud hole in gasket down-ways to the OUTSIDE of the gasket). This is because it was the only stud that the manifold did not come clear of. The cut will allow you to wrap the gasket around the stud. Mines not leaking!

**Exhaust:**

I decided on 2.5in tube from the turbo back. Originally went with no muffler or cat and fuel economy was improved as was the power. Noise wasn’t a real issue as the turbos keep the noise down to almost legal limits (just don’t flog it around town). The problem that developed was there was not enough back pressure on the engine so no engine braking (or very little) and the turbo didn’t enjoy the experience either.

Installed a 2.5in straight through muffler and no more turbo problems but a little more fuel usage and less power (but more than factory). The whole system in mild steel including muffler was $250 installed at Dandy Exhausts in Melb.

I had a new mandrel bent 2.5in system installed from the turbo back with new flexible joint and flow through muffler for under $400 if that helps you in your decision. Give the genuine one a miss. Cheers My Roo.

**MAP Sensor/ EGV valve:**
Doing some checking in the manual: Quote: ‘that round object with the triangle on the outside also fixed to the manifold. That’s the EGR valve.

Quote: ‘underneath the little black box that sits at the front of the inlet manifold behind the radiator hose. The black plastic box is the MAP sensor. The black box (20cm x 7cm ata guess) is a resonator in the air induction

"A resonator is used also in the air duct between the air cleaner and turbocharger to reduce air intake noise."

The MAP sensor is mounted on a bracket near the EGR valve, it is about 10x3cm at a guess, I can’t see from the manual where there is an air hose connected to it, this is mounted with the EGR VSV. This sits just near the EGR. It is just in the top left corner of AlexV’s picture.
If you look at the photo I took today of where I believe is the sensor port, after talking to the mechanic who did the job, and he walked me through where on the engine this is.

In the middle of the picture is a black rubber hose that goes into the aluminium inlet manifold horizontally held in place by a spring hose clamp. You cannot miss it as its underneath that round object with the triangle on the outside also fixed to the manifold.

That hose runs off to the left to underneath the little black box that sits at the front of the inlet manifold behind the radiator hose. The black plastic box is the MAP sensor. 
http://en.wikipedia....wiki/MAP_sensor offers an explanation how these work.

To take this photo I had to take off the cover that surrounds the fuel filter and this is needed to get better access to this port anyway.

Apparently you undo the clip with a pair of plyers and poke an object in there like a phillips head screwdriver to break the carbon and sludge that has accumulated there.

When the mechanic first put the engine onto the electronic management system, he found no vacuum whatsoever so he went straight to that and found it blocked which is a common problem on most engines (diesel and petrol) with EGR and the like. He said the Holden Vectra and Astra's are notorious for this.

In the 4JX1 engine the manifold gets quite filled or coated (sometimes excessively) with this sludge/oil deposit from the combustion process over time. Taking off the manifold is necessary and mechanically cleaning it is the only way but would be expensive and difficult. I suggest that from experience working with diesel engine operators in trucks, ships and mining equipment over half my life that taking the vehicle for a drive under high load conditions of towing a heavy load uphill under extended periods in low gears and RPM's around 3,500 up to 4,000 may remove some of these deposits. High RPM's is not enough, the engine must be loaded. Under these conditions it is normal for the engine to smoke excessively. It does them a great deal of good and people are surprised what comes out of the exhaust.

The problem that causes these deposits in the first place is a combination of the EGR system that blows combustion by-products back into the inlet manifold from the exhaust combined with also low RPM or low load use around town. This causes a small part of the spent combustion charge to retreat back through the inlet valve into the inlet port and manifold and then stopping when the valve closes and settling onto the surfaces. Inlet gas speed is slower and cooler than exhaust gas flow hence these deposits forming. I have seen the backs of inlet valve completely caked in deposits almost blocking off the inlet port, thus affecting performance.

Sustained high load/high RPM operation cures a lot of this if the deposits are soft and oily but I have seen them hard carbon and can only be removed through immersion in carbon removing chemicals etc....

Yes mine is the same, I misunderstood what was being discussed. There is another small pipe behind the TPS which is connected to a PCV valve, this is on the pressure side of the turbo, Holden left this off when they did my injector recall!!!!!!
Checked my MAP sensor port on Friday and it was pretty gunky, gave it a clean, truck seemed to run better but I always think that as I only drive it on weekends.

AlexV's description is pretty accurate, my apologies for correcting you.

The MAP sensor is the little black box in the top right corner of Alex's pics, there is a pipe that runs from underneath it to just below and right of the EGR Valve.

As for the pipes on the air intake, I have the large (1” OD) that goes to the rocker cover, and a smaller (1/4” OD) that goes to the EGR Valve

IGINCTOR SEALS: Good article at:


Please be in injector seals and not the head! And 9 times out of ten it will be the injector seal.

As I have said previously on this forum, this procedure should be in the maintenance manual for every 100 000km’s for the 4JX1.

Basically, get the M16 Dynabolt as long as you can. About 150mm from memory. I welded on about 200mm M16 threaded rod to the threaded end. Then tightened up the dynabolt in the sleeve and used a 50x50 box section supported by some 4x2. Then used a nut & washer to screw it all up. Have a look through the forums and you will see some that others have done.

Some say it may score the inner sleeve. I did not notice any marks inside, although am sure it is not the best method. (Cylinder 4 took a lot of attempts and it pulled out of the sleeve a few time)

The removal tool would be the easiest & safest but there you go......

Remember to try to fill the oil rail up with oil before installing it back otherwise it takes a while to start.

I did the oil rail pressure sensor and wiring loom while I was at it just for piece of mind and you are taking it all apart at the same time. (Not sure if you know about the dramas with these parts. If not, search the forum) The cost of all the items is not much and as it all came from Dubai, the transport costs made it all worthwhile.

Holden do a service kit think sleeves are $80 each plus o-rings
Injectors:

Clicking indicates the solenoids are working. How well they’re working is normally decided on a test rig. Alternatively, it’s trial and error. The injector internal O-rings and springs also need to be sound. These 3 types of parts are replaced in a kit for the CAT HEUI injectors for 100,000 - 150,000km services. Isuzu don’t do a kit.

When you removed the original injector, was there any discolouration between the bottom O-ring and the copper “gasket”? Update for anyone interested....I replaced seals on the 2nd hand injector and reinstalled it this evening...did all the usual things, double checked everything, soon as I got oil pressure up she fired up and sat there idling like it was brand new...no smoke. Took it for a run...beautiful. Starts easily. I now have 3 spare injectors with new seals. Total fix cost $100 for injector, $45 for seals. Thanks for advice and help.

In measuring the HEUI internals, they seemed to have little wear in the metal parts. I would guess this is because they have light diesel fuel as well as heavier engine oil surging through their guts all the time. Also they’re water cooled so remain at a constant temperature, rather than simply relying on the fuel temperature like in a standard common rail. This would indicate that the “reconditioned” injectors for sale have simply had new O-rings and springs fitted. The solenoid would have been checked if not rewound.

The CAT HUEI overhaul set is: solenoid + o-rings + spring. Their kit sells for about A$65-85 per injector. Recommended interval between overhaul is 100,000km.

This is why I am fiddling with it. The Isuzu injector is a direct scaled down copy of a CAT injector.
Hi Glenos, After seeing it done first hand I would attempt it myself from now on. If you have ever taken off the intercooler and cylinder head cover insulator to get to the rocker cover your basically there. This involves a couple of steps including the removal of the throttle body flange, plus the air intake duct from the air cleaner box through to the turbo and the removal of a hose at the rear of the engine. You can then remove the engine insulation cover and foam from the cylinder head cover and inlet manifold. This will then allow you access to the glow plugs. A narrow metal runner is bolted to the top of each glow plug, which needs to be removed first. Then you can remove each glow plug. Mine came out quite easily, but the mechanic was very surprised and was expecting it to be a little harder. It is important the right tools are used here as the glow plugs are at an angle. A cheap socket set will not suffice, you need a higher quality socket set which allows you to remove the plug at an angle. They also took the time to inspect the wiring loom near the throttle body and give it a good clean out. They re-attached it with a cable tie at an angle so the oil would no longer run down the wiring loom into the connector. I was shocked at the amount of oil in the connector itself.

**Glow plugs / Cleaning intake manifold:**

I have not been happy with the performance since. Anyhow, I had the check engine light appear last night and was blowing some white smoke in the mornings until it reached operating temperature. ish.

[1] **White smoke** implies you have not yet got 4 working Glow-Plugs. Did you check the resistance was within spec [0.8 - 1.2Ω] AFTER installing the new Plugs? They’re all supposed to be attached to a strong little bus-bar. Is THAT broken in some place - or is there a good electrical-connection at the bulkhead-end?

[2] **DTC #16** does, indeed, indicate a faulty **Oil-Temp-Sensor** - but it MIGHT just be that you’ve damaged the connector. The sensor itself is pretty robust! It’s the sensor beside the ORPS, on the HP-Oil-Rail. All of those connectors are subject to heat and vibration and sometimes the locking-clips break-off.....! Some folk have re-attached the connectors with Cable-Ties!

[3] **DTC #74** is our old pal, the TPS - which, again, might NOT be faulty. Whether with a new TPS or an old one, the output-voltage seen by the ECM [measured at J1-18] varies with the MOUNTING-ANGLE of the TPS on the side of the Throttle-Body.

So, loosen the 2 mounting-bolts, set up the Voltmeter [between the ECM-connector-J1, pin J1-18 and Battery(-)] and turn the TPS until the voltage is about 0.85V - that’s with the Ignition ON and the Engine OFF.

It does NOT require a Tech2, as the voltage can be read directly from the ECM connectors.

Jack, My **glowplugs** were u/s at 100 k kms., but probably failed some time before that.
I suffered a gradual deterioration of starting, and had gone through the ritual of making sure the correct oil was being used, etc. ..... I also fitted a non-return valve in the fuel line just upstream from the filter, as I had been advised an air leak could sometimes develop around the filter, leading to air ingress when stood overnight. A bloke in the UK told me this was yet another known (irritating) problem with this engine - the valve was only about $20 so I thought nothing to lose. I also changed air and fuel filters. But poor starting continued and winter came.

The Jackaroo was in for the injector seal recall, so I got them the check the glowplugs - result all u/s. The front three were removed and replaced successfully, but the rear one was snapped off (Craig's current problem). I left the damaged one in situ and get by on three, as I reasoned much more serious damage could be done trying the get the broken plug out. I find it starts ok on three plugs and will remove the broken one when I am convinced a reliable method exists.

A warning to those who like to do things by the book. The Isuzu book that is. Three new glowplugs were totalled when they were tightened to the spec set out in the genuine Isuzu manual. 23NM (17 ft/lb).

This spec is still in the current Isuzu update used by Holden.

23Nm isn't a lot of torque. As a comparison, spark plugs on the V6 are 18Nm and wheel nuts are 118Nm. At 23Nm, the tightness of the glow plug shouldn't be more than about 1/8th of a turn after it seated. CraigS The supplier of the glowplugs said the maximum should be around 12 to 14NM. Said I should discuss with Isuzu.

I have been informed that the UK spec for the same motor is 15NM.

**SMS Diesel Spares**: [http://www.smsdiesel.com.au/main_pages/product-brands.html](http://www.smsdiesel.com.au/main_pages/product-brands.html) they have competitive pricing on many of the parts that I would have needed and were very considerate with returned unused parts.

9. Cooling/ Water System/Heater/Coolant:

**Radiator:**
Natrad have both radiator cores available in aluminium or brass, the aluminium core was very efficient. Use thicker than 25mm if replacing

The workshop manual doesn't specify an interval for replacement. It does specify that coolant concentration should be checked every 10000kms.

It depends on the coolant being used. My V6 is now using the orange dexcool type coolant for aluminium radiators and alloy engines. It is supposed to have a 5yr / 100000km life, but I'll replace it every 50000km or 2.5yrs regardless.

More often is better, so 40000km would be a good move.

---

**Coolant:**

Sorry Jack, can't answer that question...

The owner’s handbook states that the coolant conforms to specification number HN2217 and should be 50% coolant, 50% water. I found some Nulon long life coolant at Supercheap Autos that conforms to that specification and also specifically says that it is suitable for diesels so I reckon it is the sort of coolant AlexV is referring to.

ack, Ensure you replace the coolant with a Diesel specific coolant, preferably based on OAT (Organic Acid Technology) like most diesel trucks now use like CAT, Cummins, Mack and other Jap engines use etc............

You can buy an Anti-Freeze type or basic type but go hunt around for a proper Diesel engine coolant and dilute with water at least 50%. The larger truck parts places or the more reputable car parts joints may have this product. Or the truck stops where they sell diesel fuel.

Castrol, BP and other oil companies market it so you can check with their agents. It is even sold pre-diluted to 50%. I bought a 20 litre of **SUPER ROO SR400 EXTRA LONG LIFE COOLANT** concentrate that is mixed at 50% with water.

**Product Name - SR400 Extra Long Life Coolant Concentrate**

Description - Is a universal ethylene glycol based anti-freeze coolant concentrate (contains 1060g/liter ethylene glycol) incorporating an advanced formula technology with virtually non-depleting organic acid corrosion inhibitors. SR400 is silicate free for improved pump life and contains no harmful nitrates,
borates, phosphates, amines or nitrites. SR400 satisfies or exceeds all major standards and is recommended for major European, Japanese and USA gasoline, diesel and heavy duty wet sleeve diesel engines.

**Supplier:** Quinlan’s Auto Spares PTY LTD, 325 Townsend St, Albury S NSW 2640, Australia 02 6021 5311

SR400 can be added to the cooling system as top-up adjustment of freeze point of the cooling water.

Product Benefits - SR400 can be used in most OEM diesel, petrol and natural gas engines allowing one coolant to be inventoried. The product lasts up to 3 times as long as conventional coolants. Reduces engine coolant cost up to 60% over conventional coolants. The recommended maximum service interval without pre-charging or recharging is 500,000 kms, (or 5 years) at a 50/50% mix, for on-highway diesel truck engines and 5,000 hrs for off-road equipment and commercial engine applications.


Don’t put normal off the shelf petrol engine stuff, it wont protect the unique operating conditions of a diesel. This is necessary to ensure that electrolysis does not eat the cylinder sleeves on the water side. Electrolysis (Cavitation Corossion) for those who havent heard of it, occurs due to the high compression in a diesel causing the bores to "pant" in and out momentarily during the point of combustion, or expand causing air bubbles to form on the sleeve eating off a bit of metal at a time, until you get compression and/or water leakage into the cylinder or exhaust into the cooling system. Either way your engine needs a rebuild.

---

**HEATER leaks [under Dash]:**

Both pipes where the go into the heater matrix are plastic, see photo attached. Did this job several months ago myself, yep time consuming s#*t of a job. I had to let the gas out of the air con to get the a/c box out to get to the heater element.

Had to pull most of the dash apart to get at it because of where the heater sits and the way to get it out. All I can say further is have fun. I did find a radiator place in Canberra I think was the cheapest place to source a new core.

I wasn’t going to put a 2nd hand 1 in that could break as well soon down the track.

---

After checking try Autoheat in Canberra. Ken

**Faulty “O” Ring rear head:**

*Correction Page 23 contains a mistake: there is no fuel pressure switch at the back of the head. Just orifice. Small rectangular unit is a housing for fuel temp sensor, orifice and a metal pipe to connect a fuel return line.*
Of one more explanation about o-rings at the sleeves and possible reason of their damage.

It could be overheating. Not a big overheating, that comes before cracks in the head, but small regular overheating every time your start the cold engine.

**Place:**

The reason for this could be a faulty (or just old) O-ring at the L-shape metal coolant pipe, going from the block of the engine to the head. At the block side its flange is bolted by 2 bolts m10 size, and at the other side its just pressed in the head. This L-shape pipe is located under the air conditioner pump holder, about 100 mm long, about 15-18 mm in dia.

**Reason:**

Due to temperature changes head and metal pipe are expanding and compressing the o-ring. After cooling down the rubber o-ring returns to initial shape. By the time rubber becomes like a plastic and water starts leaking out(sometimes invisible from outside) and the air starts coming in, creating an air bubble in the gallery of the head, around injectors and sleeves. When the engine is started it takes some time to fill up the gallery with coolant and all this time injectors are working heated from combustion chamber.

**Diagnostics:**

**At the beginning stage**

Place the inner car heater temperature handle to max hot. Switch off the fan and radio. Start the engine and listen to the sounds near glovebox area. If you hear sounds like water murmuring that means the air bubble was there. Repeat the test next morning.

**At the escalated stage:**

Park a car with a warmed-up engine at an angle to the front. Front side should be lower than a back, in my case 150mm of difference was enough.

Stop the motor and wait for 2-10 min, you will see coolant drops under the car coming out pretty fast.

*(--Or just do a pressure test ---)*

**How-to-fix:**

Take out aircon pump, aircon pump holder, belt tensioner. Unbolt L-shape pipe and pull it out. Replace the O-ring.

App time about 3h cleaning everything under aircon pump included.

That’s what I did yesterday after I got a spot of coolant under the car.
A bit of measurements:

Old o-ring dimensions. Inner D =20mm, Outer D~25, H=3.5mm

I’ve tried to fit a replacement o-ring (from Bunnings) with Inner D=19 and Outer D=26 it was very hard and i decided not to force it in.

A little bit smaller from the same plumbing o-ring kit ($2.50 for a lot of them :-) ) fits well. But few weeks later it will be replaced with a genuine one, of course. Or a vitton one, if I’ll find an equal replacement and it will pass my tests.

Water pump:
The water pump went a couple of years later at around 215,000km.

That cost me $246.50 from SMS Diesel Spares here in Sydney.

Sensors and Returns:
Ok, after cutting THE [white] wire codes are:

<table>
<thead>
<tr>
<th>Fault Type</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inj #1 fault</td>
<td>51</td>
</tr>
<tr>
<td>Inj #2 fault</td>
<td>52</td>
</tr>
<tr>
<td>inj # 3 fault</td>
<td>53</td>
</tr>
<tr>
<td>Inj # 4 fault</td>
<td>54</td>
</tr>
<tr>
<td>Multi plug connector:</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>When the loom is unplugged, oil in the plug, means the harness is wicking, and the oil creates cross talk too and from the ECM, and its only going to get worse</td>
<td></td>
</tr>
<tr>
<td>I would recommend changing the harness as well as the ORP’s</td>
<td></td>
</tr>
</tbody>
</table>
10. **ORPS [Oil Rail Pressure Sensor]**
Since the engine will run when the ORPS wire to the ECU is cut and you have replaced the ORPS it would appear that the ORPS is either not getting the correct 5V voltage or GND voltage to it. Can you do a flash code test to see if there are any of the following DTCs set?

- DTC P0192 (Flash 63) Rail Pressure Sensor Low Voltage
- DTC P0193 (Flash 63) Rail Pressure Sensor High Voltage
- DTC P1194 (Flash 61) Rail Pressure System Low Voltage
- DTC P1195 (Flash 61) Rail Pressure System High Voltage

Flash code diagnostics can be used to read active codes and to determine if history codes are present but cannot be used to clear codes or read history codes. Flash code diagnostics is enabled by grounding by terminal 4 shorting to terminal 13 of the DLC connector with the ignition switch “ON”. Grounding terminal 4 of the DLC connector. (see documents below).

**Attached File**  Reading Flash Diagnostic Trouble Codes.pdf  70.49KB  2 downloads

**Attached File**  Rail pressure system low or high voltage.pdf  89.06KB  1 downloads

**Attached File**  Engine cranks but won’t run.pdf  69.67KB  3 downloads

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**The White Wire [ORPS wire to the ECU]:**

The wire channel is on about is the white wire in the big multi plug next to the dipstick this will bypass the pressure sensor if it starts then the sensor is at fault if not then chances are the control valve is stuck open.

******** The oil pressure sender under the tappet cover has a loom attached to it. It seems that the oil seeps out of the sender and down in the loom and affects the plug by upsetting the readings to the computer. Ours started out by running rough for a few seconds the first time and then clearing itself..just like a small trace of rubbish in the fuel.

Second time..would start but only run at about 700rpm at full throttle..turned off ...would'nt restart..rang mechanic and talked for few minutes...tried again..started perfect. No problem for a few weeks then would stop on way to town..wait a minute ...starts...no problem. Pull off fuel filter...water in fuel...drain tank...should be good...week later same thing..dealer decided to look further...check fuel wiring harness...oil in loom ...replace sender and loom...around $600..thanks.

******** You can easily check the harness - it comes out on the left hand side of the rocker cover, and joins a connector block at that level (it's easy to find). If it is playing up you will see oil coming out of the connector block, or you can open the connector and have a look inside there will be oil there if this is your problem. From memory the cables were red in colour.
When they replace the harness, the cables will be pink - they told me this component has been redesigned to prevent this happening again. It cost me $500 to replace as (again from memory) it controls a fuel pressure valve, which will need to be replaced. If this is this case, do not muck about trying to do temporary repairs, as it may affect your spray patterns and cause flame impingement on your pistons - not good with alloy gear!

Anyway, pulling out of the drive last week, as soon as the car went over the hill and was pointing downhill, the engine speed suddenly dropped back to idle, regardless of throttle pressure. The engine did not stall, but would not rev up beyond idle, so I came to a gradual stop, engaged reverse and slowly crawled back to the shed front for a think.

******* After a cuppa, I remembered a wiring connector that I've long thought, 'didn't look right'. With the engine again idling, I found I could make the engine speed up (slightly, but noticeable) by moving the connector block which is located next to the oil filler cap! Very strange, so I stopped the engine, pulled it apart and found it coated with oil, so I cleaned it with electrical contact cleaner and no problem since. There is some oil around the intercooler outlet pipe which I think had got into the connector and perhaps caused a stray electrical path which I think effected the wire throttle response. As added insurance against the risk of a short circuit, I also used cable ties to support the connector away from direct contact with metalwork.

I've also been concerned about a tight bend in this wiring loom upstream a few inches towards the engine, and meant to check it for a while. Today I pulled the connector apart again, lifted the wiring and found the insulation had worn away badly (not quite through) through contact with a corner of the engine. Fortunately, there was no exposed copper, but there certainly would have been in time. I carefully cleaned the wiring, wrapped with insulation tape and the then spiral wrap. I also rerouted the wiring slightly to avoid the tight bend.

Engines now runs as smoothly as ever, no hesitation and correct throttle response.

Thanks Red-one, I checked my plug as soon as i read your post and sure enough full of oil. Cleaned it out and she runs better than ever ( only had her two weeks). As for the wiring already done all good.

******* Once the wiring insulation is worn through, giving a possible earth path, any change of direction such as going up or down a hill, starting or pulling up (eg at traffic lights ???) could cause the wiring to move slightly and in some cases cause intermittent symptoms. My theory anyway !

When I had the problem, I found I could make the revs change just by moving the wiring around with my fingers.

******* My connector sometimes still gets a little oil in it - I just clean with electrical contact cleaner, but so far I haven't needed to replace the loom ............... nor have the funny throttle response symptoms returned.

My problem is fixed!!! Well after the check engine light was coming on and all, and experiencing the same problems as husky, the car finally refused to start. Luckily I had already ordered a RPS, so it was waiting at Holden for me ($223). Oh yeah, no matter how much contact cleaner I used, it made no
difference for me :-( Anyway, a few hours of pulling apart, reinstalling etc later, and at least 1 min of engine cranking to build up pressure in the oil rail (it all drained out changing the RPS), she fired back into life. You could probably do it a bit faster then a few hours, but I took my time to make sure every little thing was clean and 100% correct.

******* Replaced oil pressure sensor, injector solenoid wiring harness, and sealed the head back.

First click and it went. Its been a week now and is still going strong. Hope you get you truck back on the road soon. Cheers, MMR

Has anyone had their motors nearly run but just wont fire up ? When I cut the white wire (orps) it runs fine but as soon as I replace it she wont run just nearly gets there but wont go . I have replaces the orps , injector seals , tps . I tried to compression test it and broke 3 glow plugs so I took the head off removed the broken ones and fitted it back up . It has very small crack in the glow plug hole of 3 cylinders but i dont know if that would be causing my problem , as the compression is fine.

When It runs I get 2.7 volts at the white wire (orps) - It doesn’t blow any smoke .

Hi Nathjack,

Since the engine wil run when the ORPS wire to the ECU is cut and you have replaced the ORPS it would appear that the ORPS is eiher not getting the correct 5V voltage or GND voltage to it. Can you do a flash code test to see if there are any of the following DTCs set?

DTC P0192 (Flash 63) Rail Pressure Sensor Low Voltage
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Flash code diagnostics can be used to read active codes and to determine if history codes are present but cannot be used to clear codes or read history codes. Flash code diagnostics is enabled by grounding by terminal 4 shorting to terminal 13 of the DLC connector with the ignition switch “ON”. Grounding terminal 4 of the DLC connector. (see douments below).

Cheers, JackDriver

Attached File  Reading Flash Diagnostic Trouble Codes.pdf  70.49KB  3 downloads
Attached File  Rail pressure system low or high voltage.pdf  89.06KB  2 downloads
Attached File  Engine cranks but won’t run.pdf  69.67KB  4 downloads
Hi Edco - You really have to examine CAREFULLY what Nathjack is saying! As you quoted “When I cut the white wire (orps) it runs fine but as soon as I replace it she wont run just nearly gets there but wont go!” The phrase “nearly gets there but wont go” actually points out that it’s TRYING TO START - and NOT trying to CONTINUE to run!! In a later comment, he wrote “It continues to run after I plug it [the ORPS] back in” - which means the ORPS is OK and ALL would then be well if the ECM could successfully control the pressure in the Oil-Rail in proportion to the Pedal-position. It can’t ‘cos the ORPCV is NOT responding.

Therein lies the BIG DIFFERENCE - When actually running, it’ll plod along with barely enough pressure to fire the injectors - but at STARTUP - the ECM will ‘forbid’ the injectors to fire if the signal from the ORPS shows too low Oil-Pressure. Cut the magic white wire and it’ll go - but very badly - ‘cos the REAL pressure is still too low!

I pulled apart the orpcv it all appears ok gave it a good clean, put it back together and still no luck it still runs fine with the orps wire cut . When I stop the motor and plug the orps wire together it will try to start and just idle along very slowly with no throttle response. When its running I get between 2.7 volts at idle and 2.9 volts at 2000rpm from the white wire so to me it seems like the oil is being controlled fine and I am getting a signal back to the ecm . I have 5 volt supply to the orps , I will put a test light from the battery and check the earth circuit tomorrow .

It is a cheap ebay orps as well!! Would be great if someone could check their voltage at the white orps wire. Nathjack

ECM - Engine Control Module

The ECM is the Engine Control Module - which is a fairly robust computer dedicated to managing the timing and length of the injection-stroke [fuel input] and the oil-pressure in the Rail [hydraulic power to the injectors] etc. You shouldn’t mess with the ECM beyond making sure that all its connectors are clean [they can get oil seeping-into them!] and dry and making good solid electrical-connections.
<table>
<thead>
<tr>
<th>DTC using a Tech 2</th>
<th>Flash DTC</th>
<th>Description</th>
<th>MIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0107</td>
<td>34</td>
<td>MAP Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0108</td>
<td>34</td>
<td>MAP Sensor High Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0112</td>
<td>23</td>
<td>Intake Air temp Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0113</td>
<td>23</td>
<td>Intake Air temp Sensor High Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0117</td>
<td>14</td>
<td>Engine Coolant Temp Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0116</td>
<td>14</td>
<td>Engine Coolant Temp Sensor High Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0121</td>
<td>33</td>
<td>Accel Position Sensor Rationality</td>
<td>ON</td>
</tr>
<tr>
<td>P0122</td>
<td>21</td>
<td>Accel Position Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0123</td>
<td>21</td>
<td>Accel Position Sensor High Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0182</td>
<td>15</td>
<td>Fuel Temp Sensor Low Voltage</td>
<td>ON</td>
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<tr>
<td>P0183</td>
<td>15</td>
<td>Fuel Temp Sensor High Voltage</td>
<td>ON</td>
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<tr>
<td>P0192</td>
<td>63</td>
<td>Rail Pressure Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P0193</td>
<td>63</td>
<td>Rail Pressure Sensor High Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P1193</td>
<td>64</td>
<td>RPCV Circuit Open/Short</td>
<td></td>
</tr>
<tr>
<td>P1194</td>
<td>61</td>
<td>Rail Pressure System Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P1195</td>
<td>61</td>
<td>Rail Pressure System High Voltage</td>
<td>ON</td>
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<tr>
<td>P1196</td>
<td>62</td>
<td>Rail Pressure System High Warning</td>
<td>ON</td>
</tr>
<tr>
<td>P0197</td>
<td>16</td>
<td>Oil Temp sensor Low Voltage</td>
<td>ON</td>
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<tr>
<td>P0198</td>
<td>16</td>
<td>Oil Temp sensor High Voltage</td>
<td>ON</td>
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<tr>
<td>P0201</td>
<td>51</td>
<td>Injector #1 Circuit Fault</td>
<td>ON</td>
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<td>P0202</td>
<td>52</td>
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<td>ON</td>
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<tr>
<td>P0203</td>
<td>53</td>
<td>Injector #3 Circuit Fault</td>
<td>ON</td>
</tr>
<tr>
<td>P0204</td>
<td>54</td>
<td>Injector #4 Circuit Fault</td>
<td>ON</td>
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<td>P0217</td>
<td>22</td>
<td>High Coolant Temp Warning</td>
<td>ON</td>
</tr>
<tr>
<td>P1217</td>
<td>36</td>
<td>High Oil Temp Warning</td>
<td>ON</td>
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<tr>
<td>P0219</td>
<td>11</td>
<td>Engine Over Speed Warning</td>
<td>ON</td>
</tr>
<tr>
<td>P0336</td>
<td>43</td>
<td>Crank Position Sensor Out of Syncro</td>
<td>ON</td>
</tr>
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<td>P0337</td>
<td>43</td>
<td>Crank Position Sensor No Signal</td>
<td>ON</td>
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<tr>
<td>P0341</td>
<td>41</td>
<td>Cam Position Sensor Out of Syncro</td>
<td>ON</td>
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<tr>
<td>P0342</td>
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<td>Cam Position Sensor No Signal</td>
<td>ON</td>
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<td>P0380</td>
<td>66</td>
<td>Glow Relay Circuit Open/Short</td>
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<td>67</td>
<td>Glow Lamp Circuit Open/Short</td>
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<tr>
<td>P1403</td>
<td>32</td>
<td>EGR EVRV Fault</td>
<td></td>
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<td>P1404</td>
<td>31</td>
<td>EGR VSV Circuit</td>
<td></td>
</tr>
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<td>P0405</td>
<td>26</td>
<td>EGR Pressure Sensor Low Voltage</td>
<td>ON</td>
</tr>
<tr>
<td>P1405</td>
<td>37</td>
<td>EGR EVRV Circuit Open/Short</td>
<td></td>
</tr>
<tr>
<td>P0406</td>
<td>26</td>
<td>EGR Pressure Sensor High Voltage</td>
<td>ON</td>
</tr>
</tbody>
</table>
ECU – Electronic Control Unit
At idle the ECU adjusts the Oil rail pressure control valve until it sees a voltage of approx. 1-volt from the ORPS.

As you crack the throttle open the ECU gives a very short burst of full pressure injection where the ECU wants a voltage of around 4.6 volts until the boost starts to rise and the ECU cuts back the injection pressure to what is needed under its mapping program.

At a constant 80 km/h on flat ground my car shows a voltage of approx. 2.4 volts.

At a constant 100 km/h on flat ground it shows approx 3.0 volts.

Under full throttle the ECU varies the pressure up to approx 4.6 volts depending on current boost etc---

High pressure Pump:
Hi Mattsjack,

Diesels like the 4JX1 do not generate vacuum from the inlet manifold, as this is mostly under positive pressure, not negative as in a petrol motor. Instead a diesel have a dedicated vacuum pump which, in the case of the 4JX1, lives under the high pressure oil pump and is driven directly from the timing gears.

timing gear.jpg

ISSUES:

• Leaking injector tube seals
• Faulty ORPS
• Wrong engine oil type
• Dodgy oil filter for the high-pressure supply side.

TIMING/ High pressure Pump + Replacement Timing Belt:
The timing of the fuel pump is actually irrelevant since the 4JX1 produces the high fuel pressure in the injector itself by means of a hydraulic piston driven by high pressure oil under the control of the ECU.

Now it happens that the fuel pump is driven directly from the High Pressure Oil Pump (HPOP) which is turn is driven directly by timing gears from the crankshaft. A pulley on the HPOP then drives the camshafts via the timing belt. If the timing gears have never been interfered with then the timing of the HPOP must be correct.

Unfortunately the timing marks on the HPOP do not align with every rev of the crankshaft and therefore the engine may need to be turned a number of revs before the timing marks on the HPOP are aligned. I found this out when I first replaced the timing belt on my Jack.
However, it is true that when the timing marks on the HPOP are aligned the timing marks on the camshaft must also be aligned, PROVIDING that #1 cylinder is at TDC.

To check that #1 cylinder is at TDC you also need to look at the timing marks on the crankshaft pulley. Unfortunately this is very difficult to see. In fact to see it you must first remove the sound cover that surrounds the crankshaft pulley. The mark can then be seen as a small cut across the rear most edge of the pulley.

For piece of mind I would follow the advice in the manual which states to rotate the crank at least two turns after fitting the new timing belt to ensure that the camshaft is correctly timed. After rotating the crank twice, loosen off the tensioner bolt to allow the tensioner to find the correct tension, then retighten.

Having another look at the photo you posted it looks like you probably didn’t have the crank exactly at #1 TDC, unless of course the timing gears have been interfered with. To determine if the timing gears are out, rotate the crank at least six times, stopping at #1 TDC each time. On at least one of these rotations, the timing marks on the HPOP, crankshaft and camshaft should all be aligned.

__PCV Valves:__

__Injectors:__

It is also suggested you replace the copper washer every 100-150k it as in CAT HEUI diesels and 4JX1’s in Russia as maintenance item. Saves time later down the track.

__Oil Rail Pressure Meter__

CTIs Oil Rail Pressure Meter is a diagnostic tool designed to verify the oil pressure in the injection system of Isuzu 4JX1 3.0 Litre Turbo Diesel engines. The Oil Rail Pressure Meter can be retro-fit to any existing vehicle using the 4JX1 motor in approximately 1 hour by someone with handyman skills.

Rough idling, long starting crank cycles or your engine not starting are all tell tale signs that your Isuzu 4JX1 engine has compromised components in the hydraulic system. Our Oil Rail Pressure
Meter can help in identifying which components are faulty or failing based on the oil pressure readings at different engine states.

Under normal driving conditions the Oil Rail Pressure Meter readings should read between 1.00 and 3.50. Should the meter readings fall outside of these parameters (for normal driving and no noticeable change in performance) it is possible that the oil rail sensor is faulty.

With a cold engine and the cam angle sensor disconnected, cranking the engine should give a reading above 1.20 (depending on oil temperature, battery condition, type and grade of oil used). Note that the engine will not start with the cam angle sensor disconnected.

Under normal operation, if the Oil Rail Pressure Meter reading does not reach 1.00 the engine will not start.

Likely causes are:

- HEUI pump control voltage missing (reading should be approximately 10.00 or more)
- Loose connection (oil leak) on an injector or associated hydraulics
- Low oil in sump, and/or
- Air leak in the pickup for the hydraulic priming pump

If the Oil Rail Pressure Meter reading is above 1.00 the engine will not start. The problem is most likely associated with other ECU inputs:

- Cam angle sensor
- Crank angle sensor
- Fuel pressure switch, and/or
- Other electronics

CTIs Oil Rail Pressure Meter can also be used as an economy fuel gauge for Isuzu 4JX1 engines by driving with oil pressure readings below 2.5.

I think buying a Tech2 and reading the Isuzu manual is the correct translation. There are so many hoping to cash in on the fear of the 4JX1.

It’s a simple system. The oil that drives the injectors is held at the right pressure by the ORPS and the RPCV. The Oil Temp sensor is a bit of a fine tune for oil viscosity.

The wiring harness needs a clean at 240,00km intervals. After that the ECM does all the work. Period.
Change the sleeve seals and copper washers at the same intervals as a CAT diesel - 100,000km. Buy a Tech2 for $400 lousy bucks and learn to read it. Then be assured you have the same super reliable, super economical, super long lived Isuzu diesel as in all the trucks I’ve owned.

**Starting after replacing injector O-rings:**
You need a fully charged battery to get oil up into the common rail and at 400psi, + all the air out of the fuel lines. The Isuzu manual tells you straight that it will take a lot to start it if the oil rail isn’t primed with 300cc of oil. When the diesel tries to start there’s about 20A going to the glow plugs, about 15A going to the power transistors in the ECM, and about 25A going to the starter motor.

I hope you bled the fuel lines properly.. after draining the tank to check for coolant in there. If the seals were leaking it could be full of water. :-)

Did you pre-fill oil gallery before connecting injectors to it?

Did you pre-fill oil filters before installation?

What filters did you use? Genuine?

Wiring loom is connected properly?

Oil pressure gauge showing no oil pressure -which one? at the dash? or extra?

Oil level is ok?

Any MIL codes?

Check that the o-rings have not caught when you put the sleeves in and don’t have fuel in the coolant etc.

Otherwise, as SergAnt says above, it takes a lot of oil to fill up again if you emptied all the system.

I was cranking my engine for quite a while. (Two battery charges from memory)

The Jack LIVES. After reading through your questions sergey, i took everything apart, gave the wiring loom another thorough clean, reinstalled everything again and hey presto oil pressure on the dash and no cel =)

**Red-one:** Have just completed the sleeve O ring replacement job, have run engine all seems fine.

A few hints and observations:

There is a plug under the front end of the oil rail to empty it of oil before lifting it out. This makes it lighter as well as avoiding oil running into the chambers.

It is possible to remove the oil rail and injectors as a single unit without disconnecting the electrical leads. This removes the risk of snapping connectors, as they remain connected throughout.
Before attempting to lift the oil rail/injectors out, slacken relevant bolts and work each injector in turn until all are freed. In use, some carbon deposits around each tip, making it difficult to pull em all out together without doing this. A toothbrush is nice and soft for gentle cleaning of the tips.

I made a dynabolt puller to get the sleeves out, but instead of using a slide hammer on the end, I used a separate nut on the thread to jack the sleeves out. Used some hardwood packers to push down against the camshafts.

The lower O rings were in a worse condition than the upper ones. The lower o rings seal between the diesel and coolant. I had just started to get early symptoms of diesel in the radiator, in fact my radiator cap was difficult to remove due to swelling of the rubber seal and was replaced a couple of weeks ago.

The hesitation I was starting to get when engine running in the 2000.s ‘revs. Under low load conditions now appears to have gone.

Apart from using the correct grade of oil, etc etc.. That most are now aware of - it seems to me that there are 3 key components that require regular replacement to keeping this engine running well: oil rail pressure sensor, injector wiring harness and injector sleeve O ring seals. Ignore these at your peril. If these were done together at say, 100 000 km intervals, I am sure many people would be saved from much grief.
11. Sump and Engine Front -end

High pressure Pump / Harmonic Balancer and O-rings

It turned out to be a good call. The small o-ring was totally shagged. The cost for parts was only $40 but labour was $840 which I thought was pretty good considering they had 2 guys on it all day to get access and compared to Holden that was going to charge approx. $1300 labour to do the job. harmonic balancer = crankshaft pulley.

If you’re having problems with the HPOP or as diagnosed on Tech II lack of pressure (min 2.8 Mpa) to enable injectors, have a search on ITOCUK, for Oil Rail Control valve, known as ORPCV or ROPCV search posts by “Gribble” for a piccy step by step. ;)

Obviously check ORPS first.

Harmonic Balancer is main pulley on crankshaft it is balanced to reduce any vibration in crankshaft. As well as drive fan etc that’s my understanding anyway.

Sump Removal:

Scrooge - Posted 20 April 2006 - 01:13 PM

On a camping trip recently to a fairly remote National Park, on starting up one morning to drive home there was no oil pressure on the guage and the oil warning light did not go out. Thankfully on the third attempt (after running about 30 seconds each time) oil pressure came up so we were able to drive home! A similar thing happened a few days later.

I figured the most likely problem was the oil pick-up seals so I changed them. I have put some pictures in my gallery showing the parts etc. A couple of points to note:

- The cross brace behind the sump needs to be removed to enable the sump to be removed (well I'm pretty sure it needs to be, much easier anyway)
- After draining the oil the sump is still not empty, there is about .5 litre in there, so handle with care.
- You will need a 3/8” drive 12mm socket (for sump and pick-up bolts) and long extension bar. 1/2” drive ones are too bulky.
- After removing all the sump bolts and the two nuts the sump is stuck to the block by the sealant and has to be prised off with a screwdriver.
• The pick-up seals are quite a loose fit on the pick-ups and also in the holes in the engine block so it is best to put some engine silicon sealant (I used the gasket stuff, see below) under the seals so they attach to the pick-ups and round the outside before fitting to the engine. Why they are loose escapes me.

• The sump is sealed to the engine with a silicon rubber sealant. I used Silastic Black Formed in Place Gasket from Repco but anything like that will do the job.

Having done all that there was no oil pressure on start-up.

I removed the oil pressure sender to check it out (with an ohmmeter and a tyre pump) and it seemed to be working properly. On replacing it and having one last go the oil pressure gauge came up and the light went out.

I think there is a reasonable chance that there is an intermittent fault with the oil pressure sender however Holden wanted $274 for a new one. I decided therefore to modify the sender. I got an adapter which is designed to allow fitting of an after market gauge (Speco part number 547-62) and a suitable oil pressure switch (VDO part number 231.084). I cut the black wire between the sender and the plug and soldered a wire to this and the switch terminal. There is a picture in my gallery of the assembly.

The sender now operates the oil pressure gauge and the new switch operates the oil warning light. If the light stays on and the gauge stays at nil I know I have a problem with oil pressure. If the light goes out and the gauge stays at nil I know there is a fault with the sender. Better still nothing odd happens again!

The parts cost $27 but it was a bit fiddly as the thread on the switch and the adapter both had to be shortened so that they sealed properly. Just for the record, the thread on the sender is 1/8” BSPT.

Thanks to Husky and Suzu for help along the way.

Cam sensor  My "Gates" alternator belt broke today and ripped out my cam sensor. Car won’t start now but kept running when it happened.

Not available at SMS diesel spares, Repco don't have a supplier, Bursons do but the price comes in around $150 - Genuine from Holden $128.

No warning lights came up when sensor was destroyed but vehicle continued to run.

Only one of the alternator belts broke so no alternator light came on as it continued to run on one belt. It was only when stopped that it wouldn't restart.
I am unsure when the belt broke on my journey but I do recall thinking to myself that the Jack seemed to be performing noticeably better toward the end of my trip. It was pulling much harder with the caravan on than it normally did.

Oil Blow-by:
Turbo motors (both petrol and diesel) often suffer with blow-by, causing oil mist to be blown out the crankcase breather. Most performance shops sell oil/air separators/catch cans to strip the oil out of the air before it hits the air-filter and the rest of the intake. I made one for a previous turbo car and haven't yet fitted it to my jack. From dead cold start I am getting 20-30 seconds of thick blue smoke as the oil in the 'cooler and manifold feeds through the engine.

Something like this is what you want.... Maybe this weekend

Oil Pickup Pipes:
I checked my oil pickup pipes on the W/E due to fluctuating pressure. The injector pickup is quite short and should not be prone to problems but the main pressure pickup is quite long (about 10 or 11 inches) and enters the oil galleries to the pump well above the oil level.

The O ring was looseish but what I believe the problem to be is the lack of support allowing the pipe to move about and then suck air through the O ring area. After fitting new O rings I fashioned a small bracket to fix both pipes together and (hopefully) making them more secure. Oil pressure is now back to normal so it looks like that was the cause of the problem.
CPS - Crank Position Sensor:
Jack would just die, no running rough / coughing / farting, nothing. Just cut out, intermittently.

I’d had a check engine light for some time with no associated code on the scan gauge, didn’t seem to affect the running so ignored it....

The lack of motive power forced me to look into things a little more and after shorting the ODBC pins, I got the code for the throttle position sensor. No probs, quick call to Kumbak and the new (to me) sensor is fitted, code gone, and a quick spin down the back paddock proves it’s all fixed. Not!

Thinking all was good; I headed into town to pick the kids up from school. I made it half way before she stopped again. Towed home behind the wife’s Dunny door, not real embarrassing!

About another week of diagnosing the problem, ruling out all the usual suspects and I finally happened on a tip on the UK Isuzu website, which mentioned the crank position sensor. I pulled the sensor and what do you know, it was covered in mud and crap! Surely it can’t be this simple....

Cleaned the sensor and reinstalled it. The workshop manual mentions an oring, which there was no sign of when I removed the sensor....I found one roughly the right size in the shed and fitted that.

Good find, not sure if your scan gauge will tell you, but if the CPS is dead the RPM as shown on the scanner while cranking will be half of actual.

That is it seems to be cranking at normal speed (220~240) but shows around 120RPM.
12. TURBO:

Cold Start Butterfly:


Doesn't really matter if its at the front or on top, the 4x4 has to be moving to get airflow, so the fan would only be any good at speeds below approx. 20k's... is it worth doing ???

Yes, but there is a lot more heatsoak for top mounted intercooler’s on idle.

The turbo system can be modified and the following gives some advice:

http://www.autospeed.com/cms/article.html?&A=2478

and for some construction of a fan system:

http://www.autospeed.com/cms/article.html?&A=110214

and:

http://www.autospeed.com/cms/article.html?&A=110215

Airbox to turbo pipe

Was adjusting my steering box preload today to eliminate some free-play and in the process removed the airbox to turbo pipe to allow better access, when I discovered that it had not been installed correctly by the last person to have it off. The underside of the flexible end that attaches to the turbo was folded under the clamp, which not only allowed intake oil contamination to leak out but also most disturbingly allows air/dirt etc to be drawn straight into the compressor.

If you haven't had yours off it would be worth checking, as replacing a turbo is something all of us want to avoid.

I don't know whether it is directly related, but I also checked the turbo-bearing free play and it is well beyond the allowable max of 0.14mm. Looks like I have another warranty claim to make.

Cheers Andy
13. **TPS [Throttle Position Sensor]**

DTC #74 is our old pal, the TPS - which, again, might NOT be faulty. Whether with a new TPS or an old one, the output-voltage seen by the ECM [measured at J1-18] varies with the MOUNTING-ANGLE of the TPS on the side of the Throttle-Body. So, loosen the 2 mounting-bolts, set up the Voltmeter [between the ECM-connector-J1, pin J1-18 and Battery(-)] and turn the TPS until the voltage is about 0.85V - that’s with the Ignition ON and the Engine OFF. It does NOT require a Tech2, as the voltage can be read directly from the ECM connectors.
I think what Browndoff means to say is use a Tech 2!

Then using the Throttle Position Motor program, check the TPS voltages at each step against the chart below.

The TPS might be OK, but just way out of alignment or in need of a clean with some contact cleaner.

I removed the TPS and cleaned it with contact cleaner. This made no difference whatsoever. I purchased a new TPS (Holden part number 8973728510) which cost $108. Fitting this seems to have cured the problem (I haven't driven far yet but the check engine light has not come on).

I disassembled the old TPS which is basically a carbon film potentiometer (variable resistor). The carbon film was badly worn (see picture) by the sweeper and presumably the film was completely worn through in places giving the occasional open circuit which would cause the check engine light to come on. There was no oil inside the TPS.

Two points which may be helpful to others:

1/ There is no need to take off the throttle assembly to replace the TPS if you have the right tools. The top bolt can be removed and replaced easily with a 5/16 AF ring or open-ended spanner. The bottom bolt can be removed and replaced reasonably easily with a 1/4" drive 5/16 AF socket with ratchet driver. I did need to remove the air pipe between the intercooler and throttle to allow access.

2/ There seems to be no need for adjustment using the Tech 2, no mention of the need for adjustment is made in the workshop manual. It would be great if this could be confirmed by someone who knows!!

**Throttle Body and EGR:**

How can the throttle get dirty from oil AND EGR if the EGR is AFTER the throttle plate??

We have had the discussion about disabling the EGR before and the conclusion is the ECM in the 4JX1 uses the throttle and EGR to increase efficiency not the other way round like most people wrongly believe!

The EGR also is used to reduce the combustion temp by about 500 degrees by reducing the amount of oxygen in the air as you said which is a good reason not to disable it. This extra 500°
could also cause the injector sleeve seals and injector gaskets (copper washer under the injector) to fail prematurely thus causing more trouble than good.

Also, if you disable the EGR we won’t ALL live happily ever after. You won’t be happy after receiving a fine or yellow sticker for disabling the emissions reduction system and the tree huggers won’t be happy either!

**Easy solution** to keeping the intake throttle clean is to use a *catch can* on the breather hose.

No more oil into the intake = clean throttle plate and cleaner intake manifold.

If you use a EGR filter|soot catch can thingo (they do actually exist!) you will then reduce the soot in the intake and the intake manifold will be nice and clean. No oil or soot. Problem solved!

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Calibrating the TPS [Throttle Position Sensor]

I’ve had the throttle body off a few times for various reasons and I thought I’d share with you my procedure for calibrating the TPS. As SergAnt and other gurus will tell you it’s important that the TPS is calibrated correctly otherwise engine power and fuel consumption can be adversely affected.

Use of Tech2. With this baby you can run a throttle position sensor test where you can step through all the throttle positions from 0 through to 10 and display the TPS voltage.

**TPS:**
*The adjustment procedure that I recommend is as follows:*

1. Remove intercooler cover.
2. Loosen the clamps on the pressure hose between the intercooler and the throttle body.

3. Remove the intercooler mounting bolts. No need to remove all four, just the two on the throttle body side will suffice.

4. Remove the pressure hose between the intercooler and the throttle body.

5. Remove the intercooler bracket that is attached to the throttle body.

6. Remove throttle body assembly, take off stepper motor and TPS. Make sure that you don’t lose the small section O-ring that seals the TPS to the throttle body.

7. Clean the throttle body with good quality carby cleaner. It’s important that you take the stepper motor and TPS off before you use the carby cleaner as it’s an aggressive cleaning agent and could easily damage them.

8. After cleaning, and before reinstalling the stepper motor and TPS, ensure that the throttle blade moves freely throughout its entire travel without binding and that the return spring moves the blade back to wide open without hesitation.

9. Clean the O-rings that seal the stepper motor and TPS with a clean lint free rag then mount the stepper motor and TPS back on the throttle body. Nip the mounting screws up just a bit but leave them loose enough so that you can rotate the stepper motor and TPS against the throttle body.

10. Loosen the jam nut on the small allen head screw which determines the maximum blade angle and loosen the screw. This needs to be loosen to ensure that the stepper can move the throttle blade to its maximum extent.

11. While I’ve found that you can adjust the TPS with the throttle body installed on the manifold, it’s much easier to adjust everything with the throttle body connected but just sitting on the manifold as shown in this image.

12. Disconnect the glow plug wiring harness as shown. This will reduce battery drain while you adjust the stepper motor and TPS positions.

13. Turn on the ignition without engaging the starter, power up the Tech2, go to the Miscellaneous Test menu and select Throttle Position Motor.

14. Scroll down the data display until you see TPS voltage above the Throttle Position at the bottom of the display.
15. Use the ‘Decrease’ soft key to get the stepper motor to zero steps if it isn’t already there then rotate the TPS until the TPS voltage is as close to 0.50V as you can get. The allowable voltage range is 0.44V to 0.56V.

Attached File Tech2 showing motor steps & TPS voltage.jpg 78.24KB 2 downloads

16. Tighten the TPS mounting screws and ensure that the TPS voltage has not changed.

17. Use the ‘Increase’ soft key to advance the stepper motor to 1 step, then rotate the stepper motor until the TPS voltage is as close to 0.84V as you can get. The allowable voltage range is 0.75V to 0.95V.

18. Go through all the stepper motor positions and record the TPS voltage for each step. The allowable voltage values are in the table below.

Attached File TPS values.png 26.03KB 1 downloads

19. Repeat step 18 a number of times to see if the TPS voltage remains the same each time. Note that the allowable voltage variation is by +/- 0.02V between runs.

20. With the stepper motor at step 1, tighten the stepper motor mounting screws and ensure that the TPS voltage doesn’t change.

21. Select zero steps, unscrew the allen head screw then push the throttle blade until it contacts the throttle body. Next, screw in the allen head screw until the throttle blade starts to move away from the throttle body. Note the voltage on the Tech2 - it should be higher than was achieved at step 10. When shutting down the engine, the ECU commands to stepper motor to step 11, which I presume is to fully close the air intake to gently stop the engine.

22. Retighten the jam nut and recheck that the TPS voltage at 10 steps has not changed.

23. Power off the Tech2 and turn off the ignition.

24. Disconnect the stepper motor and TPS wiring and reinstall the throttle body using new gaskets.

25. Reconnect the stepper motor and TPS wiring. Retighten the stepper motor and TPS mounting screws.

26. Reinstall the intercooler bracket that bolts to the throttle body.

27. Reinstall the pressure hose between the intercooler and the throttle body.

28. Tighten the intercooler mounting bolts.

29. Tighten the clamps on the pressure hose between the intercooler and the throttle body.

30. Replace intercooler cover.

31. Reconnect the glow plug wiring.

32. Start the engine and re-run the Throttle Position Motor test on the Tech2 as a final confirmation.
**ECU and calibration of TPS:**

When I replaced my first TPS I checked it out with a multimeter and found that it gave correct values at either end of its travel but gave inconsistent readings in the middle of its travel. From what I have observed while freeway driving around with Tech2 attached is that the stepper motor spends a lot of its time in the middle sectors, around 4~7 steps which is exactly where it was giving inconsistent readings. So to recap,

1. It may be possible to use a multimeter to diagnose a faulty TPS

2. It is possible for a known good TPS to be calibrated to produce the correct voltage at zero steps by using a simple multimeter.

3. It is not possible to calibrate the stepper motor without being able to get it to move from zero steps to a known step, whether that step be 1, 2, or any number up to 10.

4. If the stepper motor is not calibrated then the ECU will not be able to position the throttle blade accurately even though the TPS is correctly calibrated.
INTAKE THROTTLE VALVE

REMOVAL
1. Remove intercooler assembly.
2. Remove harness connector from motor and ITP sensor.
3. Loosen the two fixing nuts and remove the throttle valve assembly.

Legend
(1) Motor
(2) Intake Throttle Valve
(3) ITP sensor

INSTALLATION
1. Put gasket on the intake manifold and install throttle valve.
2. Tighten nuts to the specified torque.
**Torque:** 20 N·m (2.0 kg·m / 14.5 lb ft)
3. Reconnect harness connector to motor and ITP sensor.
4. Install intercooler assembly.

Rail Pressure Control Valve [RPCV] or Pressure control valve by DieMonty
Recommend retail price $680. (Obviously dealer dependant) Part # G*8971748720

The rail pressure control valve is in the high-pressure oil circuit. It is an important device, which is used to control oil pressure in the HEUI system. High oil pressure = high voltage and Low oil pressure = low voltage

The reason the engine won’t start is because the ECU sets the ORPCV at a position that returns the wanted 1 volt but because the ORPS is giving a “false high” the pressure is actually too low for the injectors to work correctly.

The workshop manual also establishes this information. i.e. the relation ship between pressure / volts
Symptoms: If faulty (these occurred to me and replacing the valve fixed all of them MAY 2009)

1. Shuddering or missing like petrol engine;
2. Below average horse power and performance and a slight rise in fuel consumption
3. Delayed auto change down and laboring in all gears

Generally a good strip and clean of the mechanical parts would suffice, but my valve had substantial corrosion, which prevented smooth operation. Speaking to the mechanic who found and cleaned mine said a lot of the problems associated from dirty oil.

Being either from **not changing the small oil filter regularly enough this will cause a blocked filter and the bypass valve will open** allowing unfiltered oil into the fuel pump side circuit or letting the oil degrade leaving residual deposits of crud.

In my case the previous owner doing too many short trips to get the paper and not getting engine oil to operating temperature to evaporate condensation.

Preventative maintenance would suggest frequent oil and filter changes (including small one), a few extra dollars every 5000klms will save break downs due to bad oil condition.

**To replace or disassemble the control valve DIY.**

1/ Check if you have a selection of 1 1/8 open spanners or tube socket.(a normal socket won’t fit around the flange)
2/ good idea to check if dirt or sand is in the area because you are going to expose the high-pressure oil pump to contaminates and get a good light [this fella is in a bad spot];
4/ remove passenger front wheel or jack up so it drops away. (RH drive vehicle) and remove small rubber skirt to gain access to engine bay from wheel arch
6/ identify valve and disconnect electrical connection it has small clip just for added fun
7/ remove pressed metal nut, sleeve and coil using 1 1/8 spanner or tube socket unscrew valve from pump
9/ the valve does come apart by unscrewing the front part where the oil holes are (mine had vice grip marks on it).

10/ inspect condition and clean then carefully reassemble and do not to over tighten pressed metal nut

The ROPCV can be changed without going through the wheel arch. Disconnect the batteries. Remove the fuel filter mount, and put this aside, with fuel lines still intact. Unplug and remove the ECU, putting it somewhere safe.

**TOOL:** A Stanley 1 1/8 th inch ring spanner from Supercheap costs $26, and if you cut the one third end off near the open ender, with a metal drop saw, you can easily access the ROPCV.

There is even no need to disconnect the fuel line in front of the ROPCV. I did mine without the ECM being removed, twice now. From the top, and even left the fuel line to the cyl head sitting on the lower banjo bolt still, although it was lose and removed from the top.
Fuel supply – Tank and initial Fuel Filter:
This problem started [Woodsy] when I did the 120000km service and one of the jobs was to replace the fuel filter.

I noticed a little later (a couple of 100 ks) that the motor would start OK and a couple of seconds later run rough and then stall. To restart I would have to crank it over for about 20 seconds and it would splutter into life. After this happened again I checked around under the bonnet and found I could pump the primer on top of the fuel filter several times. I opened the bled vent and pumped the air out thinking that would be the end of the problem - NO WAY.

It has continued to happen after about 100/200 kms.

I replaced the full filter housing containing the priming pump and no more problems!!!
Obviously the diaphragm in the pump had a small hole or tear allowing air to be drawn in.
I had pressure tested the housing before and found no leaks but the pressure must have closed the hole/tear.
HIGH PRESSURE OIL PUMP, OIL FLOW

This is the pressed metal nut. Note this is designed so you can't crush the solenoid coil and damage the inner plunger clearance.

Looking from the dipstick past Egr vacuum (ohh there is a bulge in that hose!!) toward front of engine.

Here is the 1 1/8" or 28mm hex flange

(17) Oil Pan
(18) To Oil Pan
(19) Balance Shaft
(20) Cooling Jet Relief Valve 245 Kpa (2.5 kg/cm²/36 Psi)
(21) Cooling Jet
(22) To Oil Pan
(23) Two Way Check Valve
(24) Nipple Filter
(25) Edge Filter
(26) Edge Filter
(27) High Pressure Oil Pump Assembly
(28) To Oil Pan
(29) Pressure Control Valve
(30) To Oil Pan
(31) Turbocharger
(32) Oil Gallery
(33) Timing Gear Train
Replace Fuel Filter - Posted 05 May 2005 - 10:13 PM

I did mine last week after Sal had a starting problem one night, just to be safe. To get going she hit the priming pump a couple of times and the Jack started?? Dunno what was wrong.

Ok assuming you have removed and replaced the filter, this can be a challenge.

Get a 10mm spanner and loosen (about a turn) the bolt on the pump body, at about 9 O'clock standing at front of vehicle. Press the pump down lots of times until smooth flow of fuel, no bubbles. Tighten bolt.

Done.

If you are having trouble removing the filter, I did. I resorted to removeing the pump body, only 2 bolts and 2 hose clamps and attacking the filter with a screw driver. What eventually got it free was using a screw driver to break the seal of the O-ring on the filter.

Basic steps start to finish:

1. Remove shield bracket thing, 2 bolts
2. Remove fuel hoses (hose clamps)
3. Remove pump assembly (2 bolts) may not be necessary if you can get the old filter off.
4. Attack old filter to get it off
5. Install new filter and reassemble

To bleed fuel system:

Loosen bleed screw on filter housing

Pump until fuel comes out continue pumping until no air bubbles.

After bleeding, secure bleed screw.

Operate primer several more times and your done

PCV:

Since it fires with the white-wire cut - but runs at only 300RPM with no throttle-response - then it’s clear that the cut wire is fooling the ECM into thinking that there’s enough Pressure -so it fires - but very weakly! THAT means the pressure is REALLY too low for normal running - so the problem lies with the Rail-Oil-Pressure-Control-Valve. They’re awkward to reach - but it DOES NOT require you to access it via the wheel-arch - just move the Fuel-Filter and the ECM temporarily.

In cleaning the ROPCV, be careful to ensure that the 4 tiny holes in the little cylindrical needle-valve are clear ROPCV Stripped -1.png and that you re-assemble with the needle’s sharp end pointing INTO the cylinder.
When clean, it SHOULD allow the HP oil into the Rail and it should start properly. If you DO have to replace the ROPCV - then try [http://www.isuzuauto...m/Pages/gp.html](http://www.isuzuauto...m/Pages/gp.html)

The Large-Dampening-Hole faces the ‘blind’ end of the Valve-Body [where the sheet-metal Nut attaches], then the Long-Pin sits on the other end of the Solenoid-Moved Piston - with the Long-Pin inside the Pin-Housing, itself screwed into the Valve-Body until just ‘tight’ - don’t get too ‘enthusiastic’!

Slip the Needle into the Needle-Valve [blunt-end facing the Long-Pin] and screw the Main-valve into the Valve-Body [try NOT to scratch the outside!]. After you’ve screwed the whole thing into the HP-Oil-Pump, oil the inside of the Solenoid casing and slip it over the end, then the Top-Hat and the Nut - be SURE to tighten the Nut as much as you think it will take - if it gets loose it can fall OFF and the ROPCV will stop working properly ['cos the Solenoid has no ‘leverage’].

The reason the small hole must face out, is that the piston must PUSH on the end of the Long-Pin - if it were the other way around, the Pin might fall inside the Piston.
Other Solutions – Other sources:

Shop there had replaced second hand H.P. pump, New injectors and new glow plugs. Still failed to get it to run. My guys got it running. It was driven to us and I rode it around for about seven days to make sure everything was ok. Parked it on a slope one day and it began to misfire on start up. Idled but would not pick up RPM. Bled the system, and it started up behaved as it should. The next few days it became progressively worse....Went to start it two days later....Zero....just cranks....We've tried to clean the ORPS with WD-40 still nothing...

Try fitting a separate transfer pump between the tank and HP pump (quick/cheap fix only) and see if this resolves the problem. If yes check filler cap (no air lock), air leaks in supply hoses or transfer pump (and

![Diagram]

J-1-15(not indicated) : Earths glow plug relay to enable glow plug circuit.
ECM : Electronic control module
IS : Idle switch
ECT : Engine coolant temp
OTS : Oil temp sensor
IAT : Intake air temp
FTS : Fuel temp sensor
INJ : Injectors 1 through 4
RPS : Rail pressure sensor
EGR : EGR vacuum pressure
MAP : Inlet manifold pressure
APS : Accellerator position sensor

of course the usual "check the fuel filter").

If not, dig deeper.
Isuzu Trooper 3.0D DOHC 4JX1 WON’T START AFTER REPLACING FLYWHEEL

Three weeks ago I replaced the faulty dual mass flywheel with a second hand but working one + Diesel and oil filters for engine and Turbo. From then on the 4JX1 engine refused to start. An expert mech. checked the flywheel sensor and declared it fit, still he could not start it. It cranks and produces all the signs of attempting to start but fail to. Did I overlook something? Can you please help out?

Open one of the injector lines till fuel pumps out

My Isuzu Trooper 2004 4JX1 turbo just underwent a general engine overhaul.

It's cranking but will not start. All electrical’s are ok. Does the PCM needed to be reset for it to start?

Check the alignment of the camshafts. Make sure the marks were aligned correctly.

isuzu tropper 4jx1 my isuzu 4jx1 don’t start.

Is it an electric problem, looks like no current on injection pump. Where to check? Where is the connection or valve are located?

You have no injection pump, each injector does that job. You have a faulty rail oil pressure sensor [ORPS] I think, read my tips to test this sensor.

Isuzu 4JX1 Engine Won’t Start after replacing new injector

Can anyone can suggest, assist, help me with these? My newly replaced injector did not received any fuel as I start (crank the engine)

You probably need to enter the new injector numbers into the ECU using a Tech2 Tester by your nearest dealer.

1999 trooper 4JX1 fuel black

My trooper would fire then die in mornings but would eventually start. Start ok when hot. Removed fuel filter and it was full of black fuel! New filter fitted and started fine but what can be causing this. The recall work on injectors has been done. Thanks

Engine oil leaking past injector O rings and going into fuel return hose back to tank contaminates tank. If recall done are O rings ok? Can put clear plastic tube on return fitting in rear of head to see if black (contaminated with oil) or air leaks, from cold start, it isn’t high pressure it could be from before or now?

My 1st experienced with my 4jx1 engine was, diesel fuel mixing with water inside my radiator so I replaced set of O ring at nozzle, 2nd is after a month I cant start my engine until I replace RPCV sensor and oil pressure sensor and it works and now I came to find out that my oil dip stick is getting high in normal level and smells in diesel,, how could you help me? Right now I’m still using my trooper. Is it safe to use?

You need to replacing Injector ‘O; rings properly.
My Isuzu Bighorn 4JX1 RJM Engine stalled after fitting it with new oil pump.

It can crank but is emits smoke but not run. What could be the problem? I have tried to check if the fuel pump is not working but the test showed that it is working well.

The engine oil pumps are in the rear of the engine (trans out) and behind flexplate/flywheel, were any of these 2 engine oil pumps touched if so the flywheel/flexplate has to be timed to crankshaft position. So you might have it in the wrong position, if your talking about the diesel lift pump (injector pump) that also supplies high pressure engine oil to injectors, after replacing this there is a learn procedure for the rail pressure control valve that is on pump. Dealer or some one with Tech2 scanner tool can only do this.

**Don't start after oil change** I have a 4jx1 trooper. It cut off after oil change.

I open the engine and change rings. Everything is new but the injectors. The mechanic put some 15-40 oil in it. It doesn't start. What else can I do if I can't get the Tech2?

I HAVE A TROOPER 3.0 L THE SAME AS YOU AND I KNOW THAT WHEN CHANGING OIL YOU MUST USE 5-30 OR 5-40 FOR THIS ENGINE REASON BEING IS THAT THE OTHER GRADE DOESNT CREATE THE SAME OIL PRESSURE AND IF THE OIL PRESSURE IS NOT CORRECT THESE ENGINES WILL NOT RUN BEEN THERE DONE THAT

I have a Isuzu Bighorn 4jx1 but is hard starting. When it cranks the engine on but but does not pick up speed or it starts like it was out of fuel. Can you advice on what to do?

Try slightly over filling oil level if engine starts and runs for a minute or two then dies the oil pick up in sump has fallen out (cracked mounting bracket) or sucking air instead of oil. you can remove small tin engine sump after draining to check oil pick ups, after confirming it runs ok for a little while once over filling oil level in engine.

Another thing that goes is the rail oil pressure sensor which reads incorrectly and a tell tale sign this is broken is the injector loom connector is full of engine oil when disconnected this is near engine oil level dip stick (wiring loom coming out of rocker cover).

The sensors reading can be checked with scan tool before starting with ignition on, (0-0.2MPA) it must read if its reading higher with ignition on only (motor not running) the sensor needs replacing.

The engine ECU needs to see approx. 200MPA when cranking to get injectors to start to work properly and higher when running at idle and beyond (up to about 5MPA at higher revs) if this is not getting to this or readings are fluctuating badly indicating air in oil the injectors wont supply the correct amount of diesel. In which the engine oil coming from low pressure (pickup pump) to then high pressure oil pump to rail and injectors.

**How to test the high pressure oil pump?**

Good day sirs, we are from the Philippines and we bought a 2nd hand Isuzu trooper with a 4jx1 engine, we had the trooper for almost 4 years now, the problem was the turbo, the impeller and its shaft was broken so we had it replaced, we drive tested it and after a few kilometers on the road (6 kms)
It emitted a white smoke, we towed the car and brought it home and contacted the supplier of the new turbo because it was again broken. So he came to see the car and tried starting it then he said that there was no oil coming to the turbo that’s why it broke. What seems to be the problem?

A mechanic told us that it could be the high pressure oil pump, but he is not sure. This pump is expensive and we don’t want to be gambling our money on this considering that we have spend so much money on this vehicle, rpcv, rps, turbo, injector you name it we have changed them all. Any help?

Thanks

YOU should have a oil pipe at the top and another one at the bottom of turbo, now these are the feed top and the return the bottom pipe. Take off top pipe turn engine over, oil should come out. Now take off the bottom pipe and blow down it and you should hear the sound of air in side of engine If you have oil going in top and clear bottom pipe then you haven’t any problems ..the turbo was no good. but change oil to 20w 50.IF YOU hadn’t any oil pressure then the engine would have blown up at about 1mile from the start Turbo was no good to start with...

White smoke and pressure in radiator.

My 1998 3.0 DOHC (4jx1 engine) started pumping out white smoke. Before this happened the "check engine" light was coming on intermittently. On further investigation I noticed that there was coolant blowing out of the breather tube on top of the radiator expansion tank.

When I took off the radiator cap there was coolant blowing out of the radiator with some force and I assume in time with the compression stroke of one of the pistons. A mechanic friend of mine says that the engine is not worth trying to repair and that these engines are notorious for this type of problem!

He said that it could be the cylinder head gasket or the head but he suspects that the engine block itself has fractured due to the force that the coolant is coming out of the radiator. Just before this all happened I noticed that the heater would go cold and the temperature gauge would go to the cold side of the scale then go back to normal but it never indicated any temperature higher than normal. Any thoughts????????

Any sign of diesel in the water? Sounds like head gasket to me, the engine will rebuild ok but have the dealer put in new injector tube sleeves and O seals.

No electricity from ECM to injector

Hi Markq, Seems you may have a similar problem on your machine to the one we've had....The 4JX1 has taught us a lot we didn't know before, but specifically for this particular engine.

First I'll advise you check the obvious things...Make sure that your battery is charged fully. I'll explain why later.

Next make sure that there's no air in the fuel system.

On the filter housing you'll see a ten-millimeter bolt, which should be loosened and once loose push the plunger atop the housing to remove any air.
If bubbles come out you'll know that that was the problem or part of it.

With this particular engine the ORPS (sensor) gives the type of problems you’re talking about. The sensor in question is fitted inside the tappet cover into the oil rail (which is the cylindrical pipe fitted over the valve assembly.

It has two sensors, one being the ORPS and the other being an oil temperature sensor. To get to these it'll mean removing the tappet cover which means first removing the inter cooler....then the oil feed pipe which fits into the side of the cover, Remove all the screws (five each side and three at each end)....The ORPS is the smaller of the sensors....It is a sensor which operates with a crystal.

The oil pressure pressing against it will cause a very small voltage, which is actually a pulsed signal.

That signal is sent to the management computer and controls the solid state switch, which allows the circuit for the injectors to become active.

**Remember the battery?**

If the battery is not able to turn the engine at what you'll hear as a normal speed the oil pressure will not be enough to send the signal which opens the injectors.

The ORPS (Oil Rail Pressure Sensor) cost's about two hundred and twenty US$ and if you do the job yourself your probably save a similar amount on labor charges....The engine oil is also critical....Only use the recommended oil....If that has not been used....

Buy double the amount of the correct oil and two of each filter....Drain what's there and then refill with the recommended oil (once vehicle is up and running) run the engine for thirty minutes or so (pref. on the road) and then re drain and again fit the other set of filters and refill.

We don’t like the chemical engine flush additives, too dangerous, especially in a diesel engine....
1. Clutch:

The clutch on my Jackaroo has stopped working. The pedal went down without disengaging the clutch and having pulled the pedal back up it will no longer go down.

Master cylinder has correct level of fluid, no detectable leaks.

I've removed the inspection cover where the slave cylinder goes into the bell housing. The fork (on the outside) is against the pressure plate. It clearly isn't pulling (?) against anything in the centre of the clutch. The fork is pivoting normally on its pivot pin.

Having looked at the workshop manual, it appears the clutch is disengaged by the release bearing pulling the cover plate diaphragm spring. It seems that there is a breakage in whatever connects the release bearing to the diaphragm spring.

Am I on the right track? If so, can this be fixed without taking the pressure plate off - I can't work out what connects the release bearing to the diaphragm spring?

The clutch pulls at the centre of the pressure plate instead of pushing. thrust bearing is held into centre by clip.

Is clutch engaged - do you have drive? Some things tom try are,

Open bleeder valve on slave and see if you can push pedal to floor and if this allows any movement at clutch fork. Also try-removing slave from gearbox and see what moves. You will not get much movement at fork by hand.

AJ

The hydraulics are all working fine. The problem is the fork is not connected to anything in the centre of the clutch. If I push back the slave cylinder rod after removing at the inspection cover, I can move the fork back and forth quite freely. The thrust bearing seems to have become disconnected from the pressure plate so it no longer pulls the springs and disengages the clutch.

How does the clip that holds the thrust bearing in the pressure plate springs work - is it possible this has broken and could be replaced?

I have found a video here of someone showing how the wedge collar, wire ring, pressure plate and release bearing work together in a pull type clutch. It looks from the workshop manual at 7C-14 that the Jackaroo clutch works the same way - is this right?

If so, it looks like I need to get a new wedge collar, wire ring and possibly release bearing. I will need to remove the pressure plate to install the wire ring on the wedge collar.

Hopefully I won't need to replace the pressure plate, which I am guessing would be horribly expensive.
Well I have finally removed the gearbox and disassembled the clutch. The problem is indeed the wedge collar. It has worn on the inside of the lugs where they contact the release bearing. Several lugs have broken along the wear line and the wire ring came off.

I finished the job today. In the end I replaced the wedge collar (Holden part number 8970650730 $20) clutch release bearing (Exedy part number BRG2247 $80 - this is the same as the original which must be made by Exedy) and pilot bearing (NSK 6203VVCM $5).

I replaced the release bearing mainly because the groove in which the wedge collar fits was badly worn which I believe would make the new wedge collar fail more quickly. Old is on left, new on right.

I used an ATV lift which cost $115 plus freight with a wooden platform for the gearbox. I put a strap around the gearbox and jack to make sure it was safe and it was all very stable.

**Some tips which aren’t in the manual in case anyone needs to work on a clutch:**

1/ I took the transfer case off to make the gearbox assembly lighter and less bulky. The connecting bolts are 14mm and you can’t get a socket onto them so I used a ring spanner with the 15mm end cut off and a long tube over it to get more leverage to loosen the bolts. Consider getting one of those ratchet spanners, the bolts are fiddly and it helps a lot.

2/ I couldn’t loosen the nuts on the front prop shaft so split it at the splines after marking both sides so it would be reassembled in the same alignment. This worked fine, the front half remained in place but didn’t get in the way.

3/ The top bolts holding the gearbox to the engine can be reached from inside the car through the hole the gear change levers go through. The gearbox needs to be lowered a little to enable these to be reached. Take care not to lower too far or the intercooler will swing back against some pipes running along the bulkhead.

4/ It took some force to pull the gearbox off the engine. I used rope and pulleys around the rear axle and gearbox to pull it off.

5/ The engine needs some support when the gearbox is removed. I started with a jack under the sump and then put a block of wood between the rear of the engine and the chassis cross beam running under it.

6/ The pilot bearing is easy to get out with a pull hammer with a hook that fits through the hole in the bearing. Definitely worth replacing this as it is so cheap - I got an NSK one as it is identical to the original but it is a standard bearing so other makes could be used.

Many thanks to everyone, particularly Red-One for your help
1 Body Issues:

Reduction of Drag  [https://www.buyairtab.com/](https://www.buyairtab.com/)

Airtabs™ are patented, unique wishbone shaped vortex generators designed to increase vehicle aerodynamic performance and fuel economy by reducing aerodynamic pressure drag at two key locations; the tractor-trailer gap and the rear facing surface (the base area) of any commercial or private square backed vehicle or trailer that routinely attains highway speeds. Drag reduction and fuel economy benefits from Airtab® application is not limited to commercial trucking operations. Airtabs™ enhance aerodynamic performance equally well on cube vans, straight trucks, expeditors, SUVs, RVs, buses, horse, toy and utility trailers, faired “bob tail” tractors, flat beds and tankers. The results may vary somewhat with vehicle type but the aerodynamic theory and principles are the same for all.

Each Airtab® creates two tight swirls of air or vortices that combine to reduce the suction and drag at the rear of vehicles traveling at speeds above approximately 35 mph or 55kmh. Airtabs™ are also effective at the rear roof lines of automobiles that have a rear window slope of greater than 30 degrees.

Airtabs™ offer several safety benefits as well. They improve vehicle stability by altering the airflow at the vehicle’s rear. The large random eddies at the rear surface are changed to an array of small vigorous “stream wise” vortices. The majority of users comment immediately on the improved vehicle handling performance, especially in gusty cross wind conditions or when passing (or being passed by) other vehicles. This increases driver safety margins by reducing wandering and sudden adjacent lane incursions. Mirror visibility in rain or snow is also improved as the Airtabs™ help suppress precipitation and spray patterns. Safety is improved through better mirror visibility yielding safer lane changes as well as improving the visibility conditions for other road users. By reducing the suction and aerodynamic drag at the rear of vehicles, the tendency to accumulate snow and road grime at this location is reduced. This helps to improve corporate image and reduce cleaning time and expense. It also enhances safety by keeping conspicuity tape, tail and brake lights cleaner and helps the bottom line by reducing snow and weight build up in winter.