COMPLEAT IDIOT'S GUIDE TO

IVECO

2020 REVISION

DON INCOLL

COMPLEAT IDIOT'S GUIDE TO IVECO DAILY 4X4 55S17W
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Don Incoll, www.goingbush.com
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compleat idiots guide

to

IVECO

55S17W

2020 REVISED EDITION

About this Book

Having worked as a Communications Technician for 30 something years Don Incoll is without automotive or engineering qualification, but an inherent desire to know how things work had him stripping down and rebuilding everything from radios to lawnmowers, from the time he could hold a screwdriver. Once old enough to get behind a wheel this interest soon graduated to Four Wheel Drives. 'Off The Wall' R/C Aeromodeling design and construction also assisted in his understanding of mechanical engineering.

This book was born from a frustration of owning his first ever brand new vehicle, the 2013 Iveco Daily 4x4 55S17W and finding it was almost everything he wished it would be ..... but "not quite", he realised that other owners or potential owners may need to be more more informed. How much easier it would have been if there had been a useful field guide available containing information on the vehicles unfortunate shortcomings, what might go wrong and how to deal with it, information on servicing and repairs, spare parts you should carry, with emphasis on the quite unique features of this vehicle and how to go about overcoming the problems.

This book contains such information, which unfortunately is often difficult to find, unable to be found or is simply incorrect in the Iveco Daily 4x4 Owners Handbook, even the official workshop manual falls short. From a simple seat adjustment to major rectification of issues with the braking system.

The book includes information from online sources (listed in the appendix) including Don & Val Incoll's website goingbush.com and from the Daily 4x4 Facebook group with permission of the respective copyright owners.

Owners or potential owners of new or used Iveco Daily 4x4's, may be intimidated by the amount of 'quirks' that are highlighted in this guide but the issues are not insurmountable. The Good, by far, outweigh the Bad and the Ugly.

The "Compleat Idiot's Guide to the IVECO 55S17W" does not imply that you are a Complete Idiot for owning an Iveco. This is hyperbole for an approach that relies on explaining a topic via basic terminology.

Occasionally Iveco Part Numbers are referenced, with a "Vexi" price quoted www.vexi.co.uk , a UK based Genuine Iveco parts vendor. (prices occasionally converted from GBP £ to $AU via XE.com) The prices unless otherwise stated, do not include shipping to Australia but are comparable to Iveco Australia parts prices. To be used as a guide only and in a few instances compared to OEM or alternative prices current at time of writing.

Unless otherwise stated none of the information in this book is endorsed or approved by Iveco or Iveco Australia. If your vehicle is under warranty it should be used in consultation with Iveco or at your own discretion. Furthermore any modification from original specification may require Engineering approval or certification per relevant government bodies.

Note: Product placements or endorsements in this book are not paid advertising, if stuff is mentioned its just because it works!

 https://www.facebook.com/groups/1944264565832765/

INTRODUCTION

The Iveco Daily 4x4 is essentially a re-bodied SCAM SMT55. 2WD Daily body shells are delivered to the SCAM facility in Olona, Italy where the vehicle is mostly hand assembled. The Iveco 4x4 Daily was released to a New Zealand All Blacks marketing campaign in early 2007. It was available in 3500kg and 5500kg GVM versions, model designation 35S18W and 55S18W, (18=180HP Euro 4) and plated MY2006. The 3500kg version is to satisfy the European car driver license weight limit requirement. The difference between the two vehicles is the 3500Kg model had one less leaf in each rear spring pack. In Australia the car license threshold is 4500kg so no need for the 3500kg model.

With the Introduction in Europe of Euro5 emission standards in 2009 the truck received changes to the pollution controls including the fitment of new electronic EGR and the inclusion of a Diesel Particulate Filter DPF in the exhaust system, with a resulting loss in power, somewhat compensated for by the addition of Compound Turbos, re designated 35S17W / 55S17W (170HP) (Euro 3 models are also sold in some markets, no EGR or DPF)

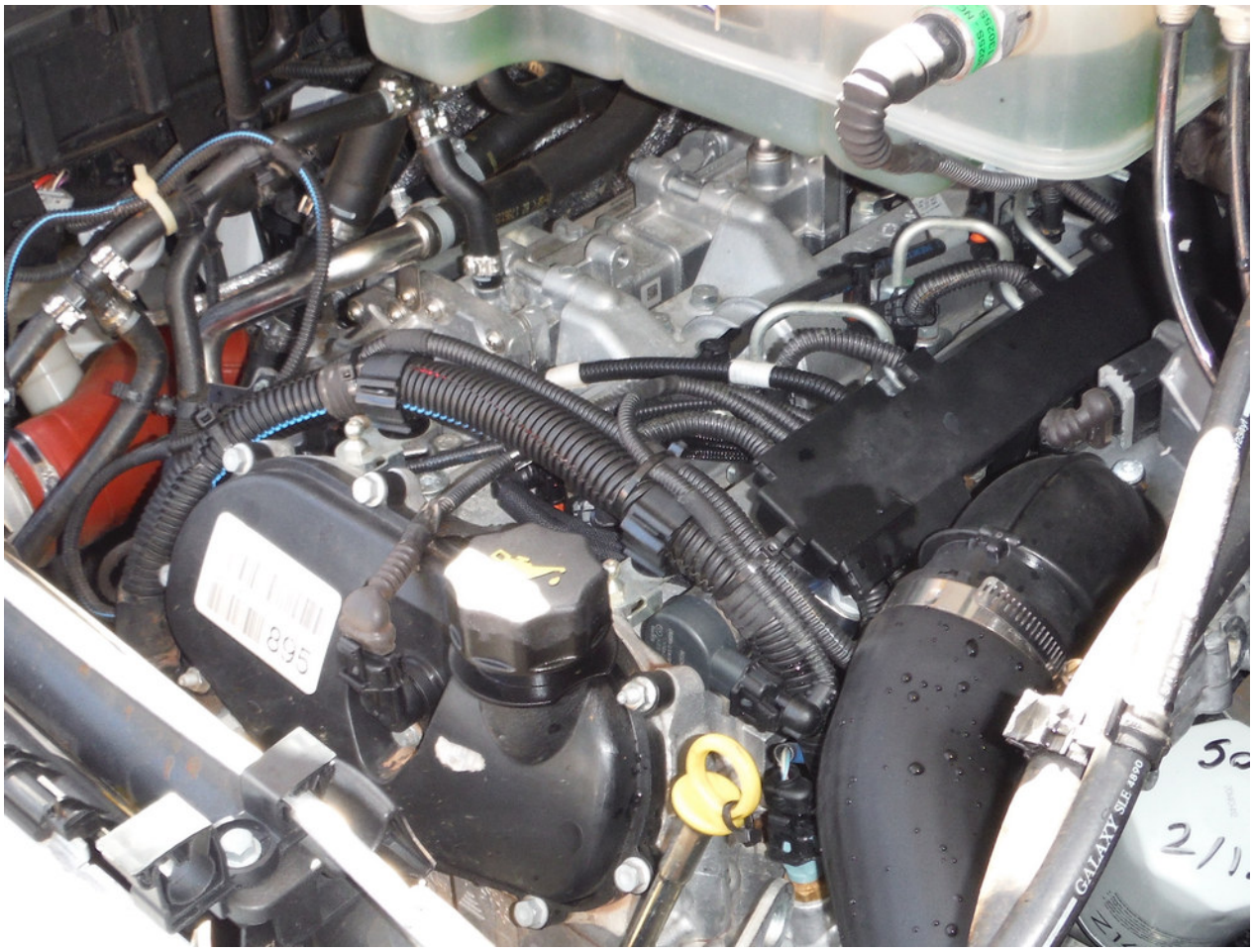
The Euro5 MY2009 Iveco Daily 4x4 55S17W was announced to the Australian market early 2013 in both Single Cab Chassis and Dual Cab versions. They are certified in Australia with RVCS as Euro 4 standard but the vehicle is still fitted with Euro 5 pollution controls.

Due to an Australian certification anomaly the 5500kg GVM version was rated at 5200kg. The 55S17W can be registered locally in either a car or truck license category. The braked towing capacity is 3500Kg. It is also possible to have the truck re-certified to 5500kg GVM without modification. From early 2015 the 5200kg specification has been amended to 5500kgs.

The Australian introduction was not preceded by any local testing to determine the suitability of the vehicle for long distance or outback conditions.

Could it be that Iveco Australia deemed local trials unnecessary because, by all reports, the truck had performed faultlessly since its introduction in Europe, serving in commercial, construction, paramilitary, and fire fighting duties, as well as private overland expedition vehicles including service in deserts and mountains in many countries?

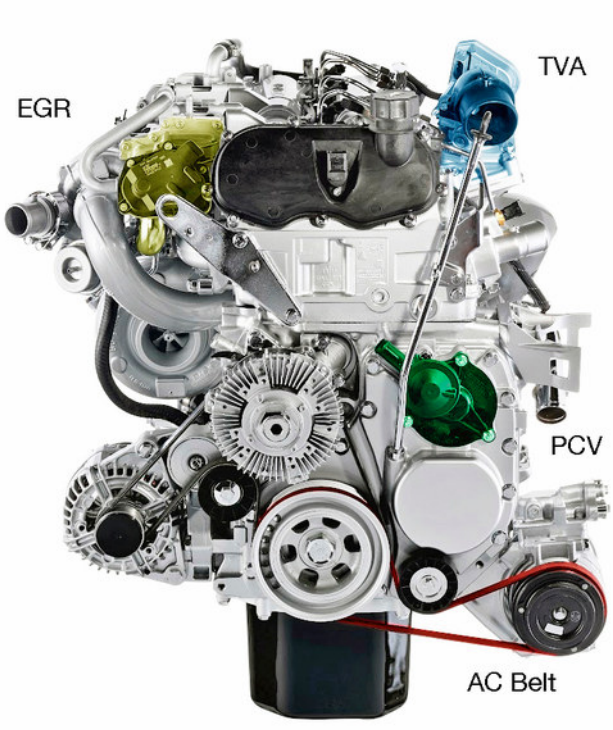
ENGINE



The engine used in the Daily 4x4 is the outstanding 3.0 liter F1C made by FPT (Fiat Powertrain Technologies) which was introduced in 2006. This engine is a Common Rail Diesel, DOHC 4 valves per cylinder. The twin camshafts are driven by double and single row chains.

The Euro 5 version is fitted with Borg-Warner compound (twin) turbocharger. The small turbine is Waste-gate controlled and the large is a fixed compressor. A very reliable turbo setup. Earlier Euro 4 & Later E6 versions have a single VGT.

Torque Output is 400Nm across the useable rev range from 1200 to 3500RPM and 170 HP (125Kw). Engine is ECU governed at 5500RPM.



The 2012 and on, Fuso Canter also uses the same engine core built by FPT, re-designated as the Mitsubishi 4P10. It speaks volumes about the engines reliability for the Japanese to specify a European engine for their commercial range. Fuso have retained the Bosch electronics, but have trumped Iveco with the fitment of an exhaust brake as standard equipment.

At this time Iveco will not specify an exhaust brake, will not option an exhaust brake and will threaten to void the warranty if you fit an exhaust brake, despite the fact the the Fuso fitment to the same engine is fully warranted by Mitsubishi.

The PCV Oil Recovery System incorporates a centrifugal 'filter' which is meant to condense out crankcase fumes to return as oil into the sump, venting clean vapour into the intake duct aft of the MAF sensor. The device (shown in green) is supposed to avoid the problem of turbo, intercooler and inlet manifold becoming gummed with oil fumes as is a problem with every other modern diesel engine, but does need regular servicing.

Self Servicing & Engine Oil

The plastic engine cover is neither a fire suppressant, nor sound insulator. Repeated removal can interfere with the rear injector return line. Regular visual inspection for oil, coolant, fuel leaks or nesting wasps, mice etc is impossible with a cosmetic cover in place. To remove, lift front then carefully pull the back forward.

Because the engine is fitted with a Diesel Particulate Filter, a Full Synthetic Low Saps Oil must be used, both for oil changes and for top ups (Low Sulphated Ash, Phosphorus-Sulphur). Iveco specify Urania Daily LS, ACEA C2 5W30. In Australia you can only buy this oil from Iveco Dealers, using any oil other than an ACEA2 Low SAPS oil can damage the DPF and may also void the engine warranty

(noting that, according to service invoicing, some service centres have used non LS oil on these trucks - check your service invoices carefully - apparently some mechanics still think "oils is oils", a failed DPF due to incorrect oil is your responsibility - even if it was done at an authorised Iveco Service Centre)

When performing scheduled DIY Oil and filter changes on this Engine the ECU must be notified when the oil has been replaced, at least on each multiple of 40,000km or 12 monthly service, this function resets the DPF regeneration counter. The Oil change reset is done using an Iveco EASY OBD-II interface device,

The computer will give a "Check service 350" message on the display console at 39650km, as a warning that service is due in 350km, if the service is not performed, including computer reset, the vehicle will give another warning some time after 40,000km and then may go into limp mode.

Bremach T-Rex Oil Change Protocol

If it is not possible to visit an Iveco service centre due to distances or time involved and need to change the oil yourself because of an ECU / OiL warning light, or have had a service done at an "Authorised Iveco Agent" that does not have an Iveco EASY device, (there are some) it is possible to use the Bremach T-Rex protocol. Iveco will not tell you about this.

The T-Rex uses the same engine and has exactly the same engine electronics. Following is the Procedure as translated from the T-Rex owners handbook.

F1C engines are equipped with self-cleaning DPF. Even though this kind of DPF is maintenance free, after every oil change the electronic counter of the filter must be reset to zero.
Proceed as follows if there is no possibility of using Iveco EASY computerised equipment:

1. – *Turn the engine off and position the ignition key on*
2. – *Depress the accelerator pedal completely for at least 15 seconds. Simultaneously depress and release the brake pedal 10 times and then release the brake pedal.*
3. – *Turn Off the ignition key*
4. – *Once the maximum allowed running time of the engine is reached, if the electronic DPF counter is not reset to zero, the control unit will reduce the engine output power.*

Oil Filter

The oil filter is torqued down, removal of the filter will require a cam action or webbing wrench with a top mounted ratchet drive handle. Fit new filter till it is in contact with the housing then tighten 3/4 of a turn. Oil filter tightening torque is 25Nm

The use of aftermarket filters may result with a refusal by Iveco to honor a warranty claim but the ACCC clearly states that with respect to vehicle warranty, parts of "appropriate quality may be used". (refer Appendix 1)

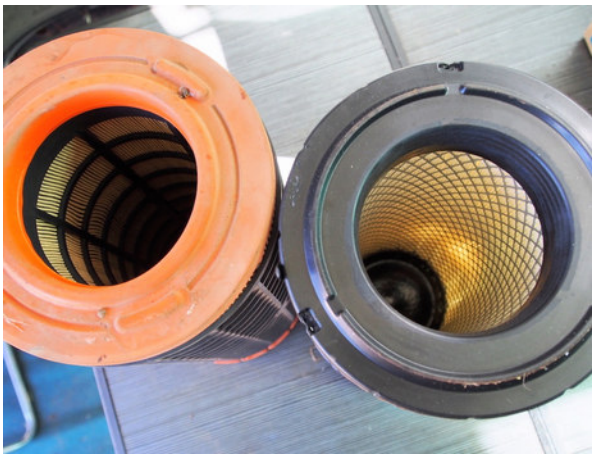
In the case of Ryco, for example, they have a voluntary warranty that covers engine damage arising from the use of their product. Either the Z141 or shorter Z516 are appropriate for this engine.

The Z516 is also the recommended filter for the Ford Modular 6.8 Liter V10 engine, if it fine for a 6.8 engine then it will have no problem at all with the demands of a 3.0 Liter engine.

It has been found that the use of a smaller capacity filter results in faster oil pressure build up on a cold engine start, faster pressurisation of the hydraulic cam chain tensioner and hydraulic lifters minimises the cold start rattle, and associated engine wear. Use of the smaller filter will necessitate more frequent oil changes @ 10.000 - 15,000 km, and that can only be a good thing.

Genuine Filter Iveco Part no. 2995655
Ryco Z141 / Ryco 516

Air Filter



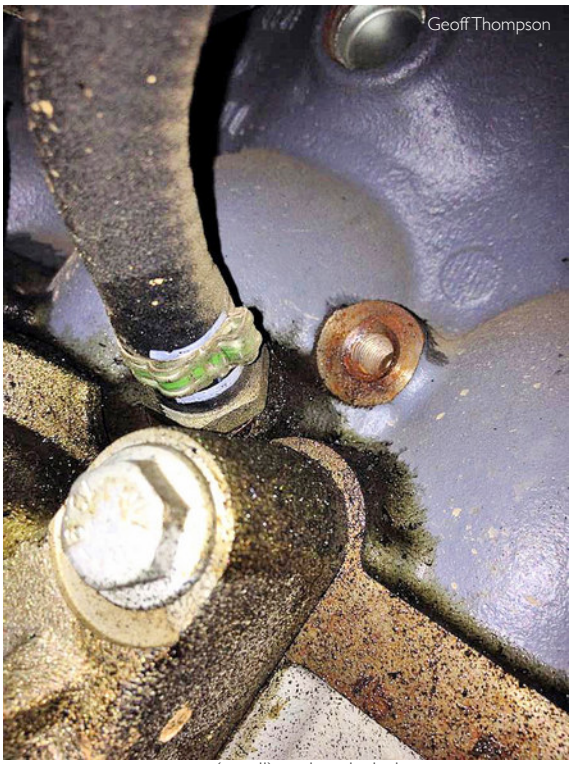
Genuine element is Iveco 1903669 , about $85.00 locally (made in Italy)
Donaldson P828889 , $45 (made in Australia or China)
Wesfil WA5019

Comparing the filters side by side the Donaldson looks and feels much better quality. The Iveco has a plastic cage to contain a paper filter media, Donaldson has expanded steel mesh enclosing a water resistant cellulose media. The Donaldson has approximately 20% more media surface area, with 12 pleats for every 10 on the genuine filter. Also the orange "silicone" that the Iveco filter is encased in easily breaks apart, its more like a dense sponge than a silicone rubber. A comparison of the two clearly shows the Donaldson filter to be more than acceptable for use in the 55S17W. If Iveco frown on you using this cartridge they are being Obtuse.

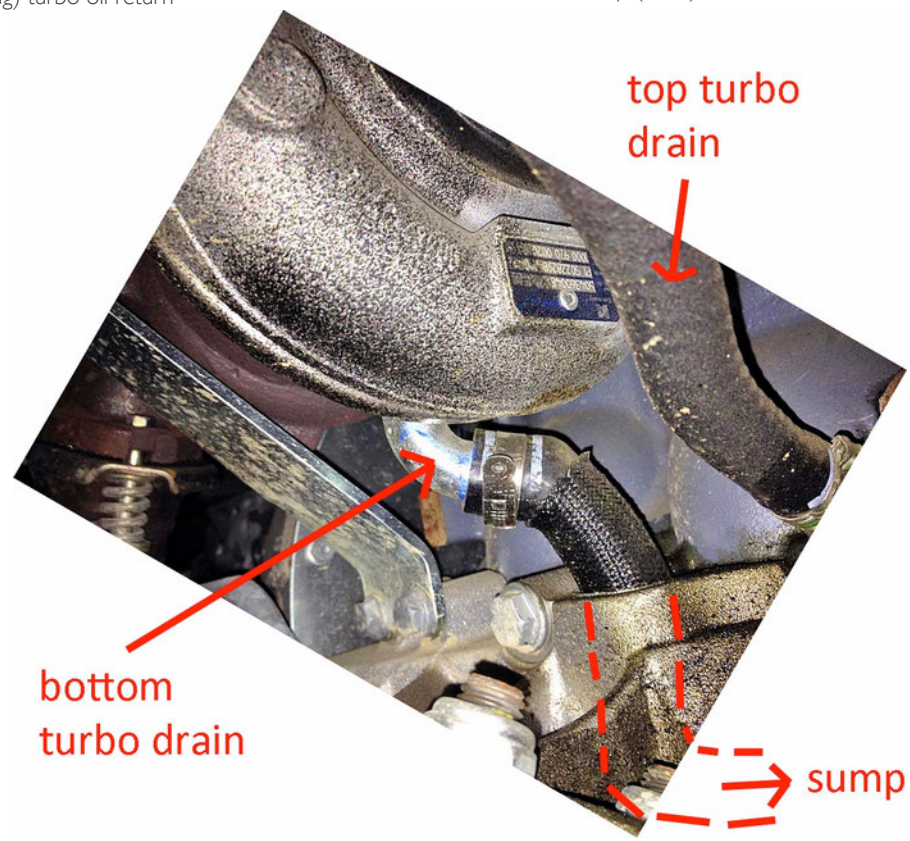
Turbo Oil Drain

Something to keep an eye on, the oil return line from the top turbo has required attention on some vehicles. The bottom turbo oil return hose drains directly into the sump, the Top return hose drains into the block as shown in the image to the right.

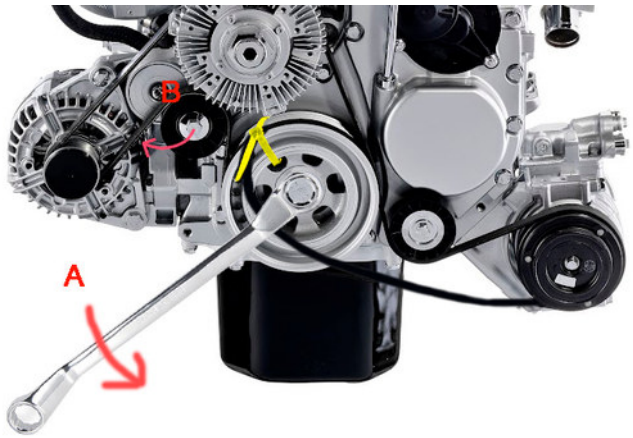
bottom (big) turbo oil return



top (small) turbo drain hose



Engine Belt Servicing



The Steering protection guard / grate needs to be removed for access from underneath,to replace the engine belts. The main belt is straightforward using the typical serpentine belt, left hand thread tensioner wheel, grab the spring loaded tensioner nut with a spanner and turn through a clockwise arc (B) to release tension on the belt.

Note, the Main belt can not be replaced without removing the A/C belt, the A/C belt is not re-useable.

The AC Belt is stretch fit, there is no tensioner or belt tightening facility. Old belt needs to be cut off. There is a special Iveco tool Part number 99360186 install A/C stretch fit belt, but a Heavy Duty cable tie or two may suffice in the absence of the correct tool. Handbrake on, Gearbox in Neutral and Key OFF, rotate engine anti clockwise to install A/C Belt

Do not be tempted to buy any equivalent sized A/C belt as a spare, If its not a stretch fit it wont shrink back to size after fitting.

Engine belt	Iveco Part No.	504092335	generic 6PK1215
A/C belt	Iveco Part No.	5801419157 / 504087247	generic 4PK1102 (stretchy belt)

Throttle Valve Assembly

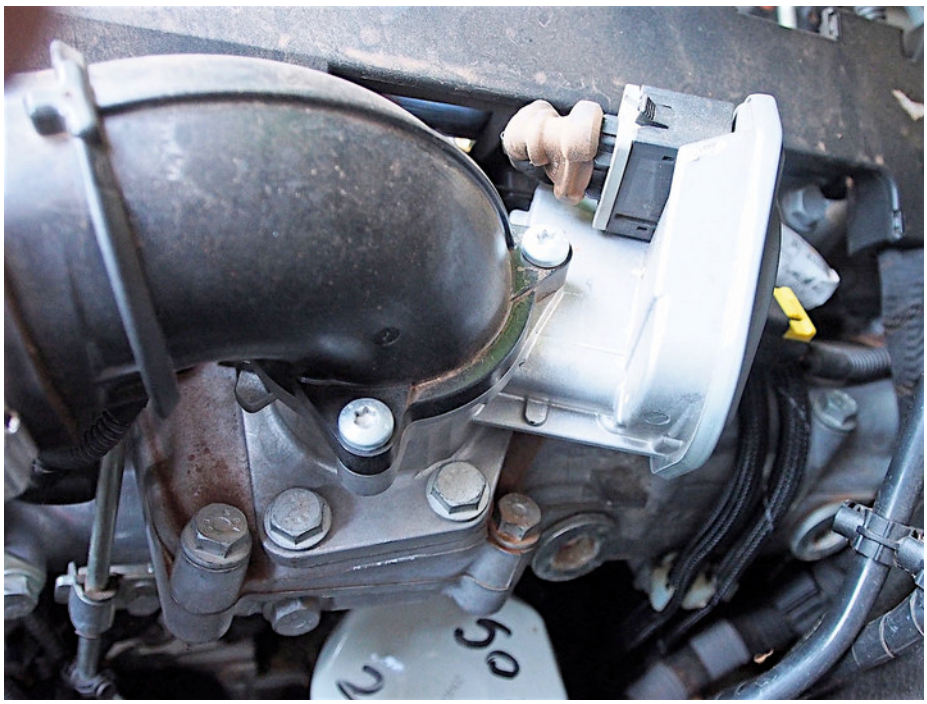
There is a software programming error in the 55S17W Bosch EDC 17 causing the TVA, (Throttle Valve Assembly), to display a "short circuit to ground" fault. When doing a parameter check in EASY the computer diagnosis shows the TVA as always stuck on 5%, no matter the pedal position.

Comparison of ECU data downloaded from a number of 55S17W shows they all have this same software error.

As from August 2015 Iveco has a software revision for the TVA issue, which involves rewriting ECU, be aware that the update may or may not overwrite an aftermarket performance tune.
The motor-driven throttle body officially performs two functions:

(1) Engine shut-off management
(2) it controls exhaust gas temperature by restricting the cross-section area of the intake duct.

Unlike a petrol engine, Diesel engines do not have any natural over-run engine braking, a closed intake throttle can normally provide a deceleration function, but the open EGR Loop on the Euro 5 F1C does not allow this. (see EGR section)

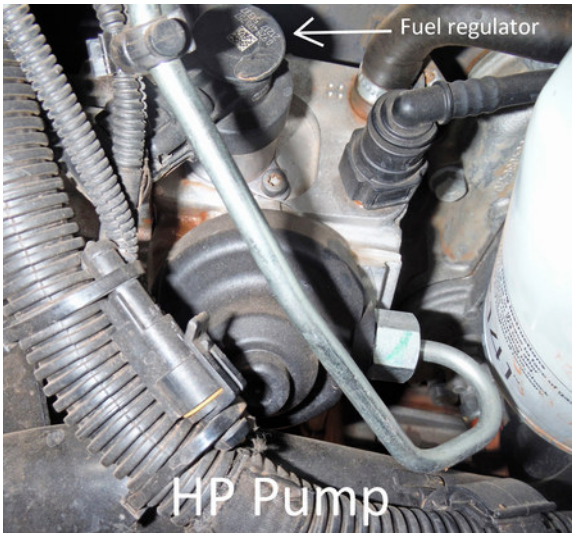


ENGINE ELECTRONICS & SENSORS

The FPT F1C Common Rail Engine uses Bosch electronics and sensors. The system is extremely reliable, in conjunction with the use of Iveco EASY diagnostics fault finding is simple. The following summary of the various electronic input devices, sensors, actuators and engine controls will help de-mystify the engine control system.

High Pressure Pump

The E5 F1C is equipped with Bosch CP4 pump, located in front of the oil filter. The HP pump then feeds the Common Rail as appropriate. Only the necessary amount of fuel is pressurised in an attempt to minimise overheating fuel in the system.



The CP4 pump maintains fuel at high pressure in the "Common Rail" for all Fuel Injectors regardless of which cylinder is expecting the fuel. When the ECU energises the solenoid valve of an injector, fuel is drawn from the rail and injected into the corresponding cylinder.

Iveco Part no. 504342423 Bosch 0 445 010 545

Surprisingly neither these Bosch pumps nor the injectors are not that expensive, the horror stories one might expect after hearing about mortgaging ones home to pay a Prado repair bill after catastrophic fuel system failure, from ingesting bad fuel, do not apply to these vehicles.

Low Pressure Pump

This pump has a brush motor energised by permanent magnets, it is mounted on the suction pipe, on the left-hand side of the chassis frame. It has a check valve to prevent the fuel circuit from emptying (with the pump stationary) and an overpressure valve that recirculates the delivery with the inlet when pressures over 5 bar are produced. Delivery pressure: 2.5 bar > 155 litres/h Coil resistance at 20°C: = 28.5 Ohms

Iveco Part no. 69503673 Bosch 0 580 464 127

Low Pressure Fuel regulator

The fuel pressure regulator is situated on the CP4 HP Pump body (seen at top in the photo above) in the low-pressure circuit. The pressure regulator meters the amount of fuel delivered to the high-pressure circuit according to the commands it receives directly from the ECU. The pressure regulator is normally open unless it is receiving any input signals, in this condition, the pump will be delivering its maximum flow rate. The engine control unit varies fuel delivery in the high-pressure circuit by partially closing or opening the fuel pipe sections in the low pressure circuit via a PWM signal

Iveco Part No. 42567116 Bosch 0 928 400 757 Ford 8C3Z9J307A

Fuel Temperature Control

The UFI Filter housing on the 55S17W incorporates a fuel temperature sensor. When fuel reaches 80°C, the ECU begins to gradually decrease maximum power and keeps cutting power up to 90°C, until achieving a minimum value of 60% of rated power. This scenario can be minimised by fitting an aftermarket Fuel Cooler

Fuel Injector

The fuel injectors have up to 1600 bar (23,000psi) supply-pressure and recirculation at atmospheric pressure. The temperature of the return diesel can reach approximately 120°C. The head of the electro-injector has a fitting for the electrical connector.

These Bosch injectors are about $750 each and specific to Iveco Daily and Fiat Ducato, Fuso 4P10 part reference not found. If an injector is replaced its specific code must be entered into ECU by Iveco EASY

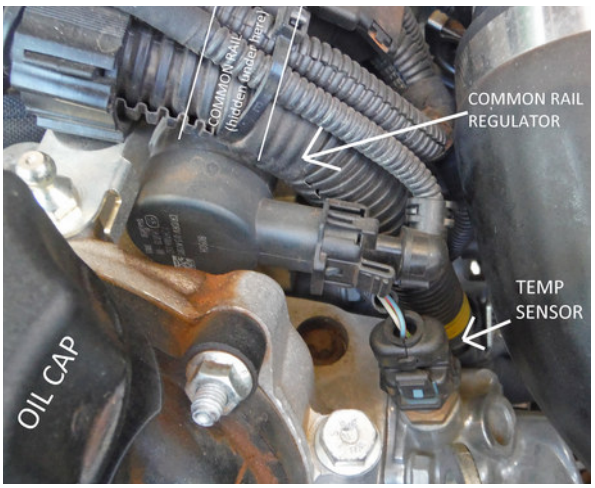
Iveco Part No. 504385557 Bosch 04451160059

Common Rail Pressure Regulator

The common rail pressure regulator or DRV is situated on the very front of the Common Fuel Rail, it controls the pressure in the rail by regulating the amount of fuel.

Fault codes often seen with Common Rail Pressure Regulator failure are, Difficult staring, Non Start, Engine cuts out, Excessive exhaust emissions, Misfire.

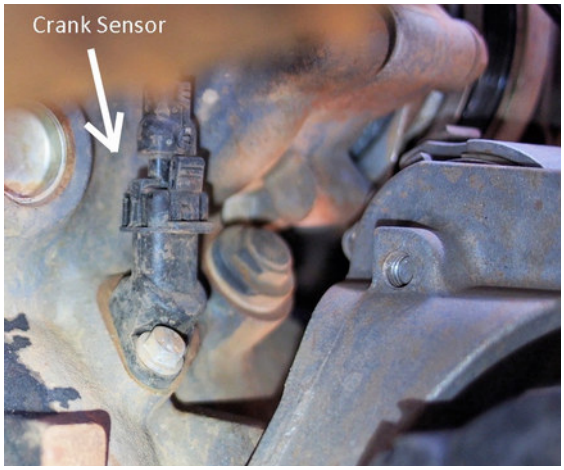
Iveco Part No. 504384251 Bosch 0 281 006 032



Fuel rail pressure sensor

Situated on the very rear of the Fuel Rail, the ECU samples measurements from this sensor and regulates the fuel at the Low Pressure regulator and DRV accordingly. Iveco Part No. 504382373, Bosch 0 281 006 158

Crank Sensor



The CKP is on the block beside the Alternator. It inductively senses the changes in the magnetic field caused by a phonic wheel on the crankshaft. The ECU uses the CKP sensor signal to determine the RPM and determine the angular position of the crank.

An irregular / faulty Tachometer is a symptom of a faulty CKP, engine may run with a faulty CKP but will be hard to start.

Iveco Part No. 504129943 Bosch 0 281 002 778

Cam Position Sensor

The CMP is a Hall affect sensor fitted on engine oil filler cover It determines engine timing by sensing the position of intake camshaft drive gear. The ECU uses the signal of the CMP to determine T.D.C. at the end of the compression stroke.

Common faults found with CMP: Engine light warning, Stalling, Poor idling and Poor or non-starting

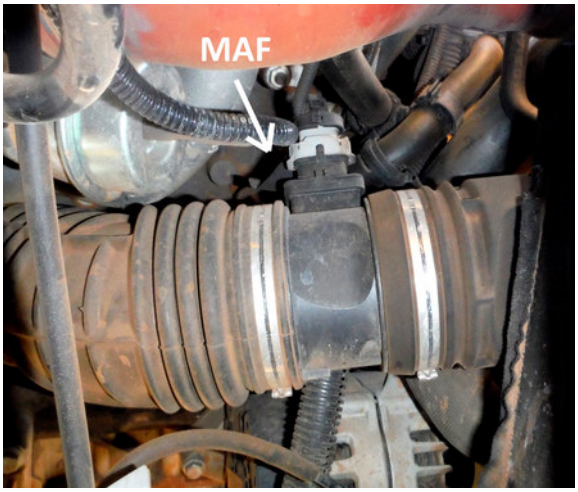
Iveco part number 504048261
Bosch 0 281 002 667

Inlet Manifold Sensor

The MAP Manifold Absolute Pressure sensor, located on the Inlet Manifold functions as Turbo Boost pressure sensor and temperature sensor. Its output is used by the ECU to adjust turbo boost pressure, to protect the engine from overheating and to diagnose MAF sensor operation

Iveco part number 504307953
Bosch 0 281 006 049

Mass Air Flow Sensor

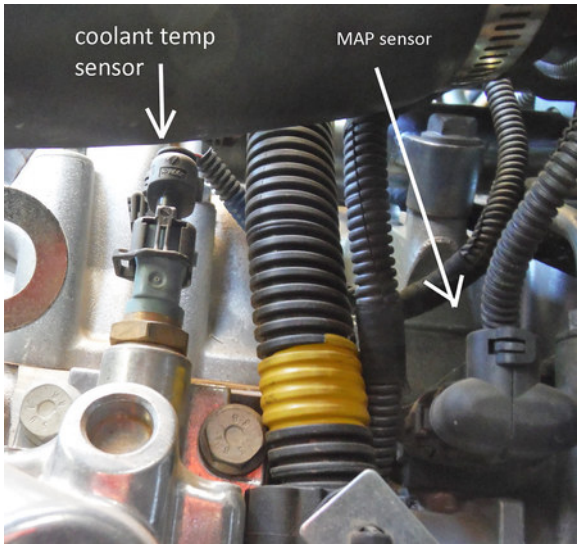


The Mass Air Flow (MAF) sensor measures the amount of air flow entering the intake manifold using a hot film. The ECU uses this signal for fuel control. The MAF also incorporates the intake air temperature sensor. The Mass Air Flow sensor is located in the intake ducting after the air filter. A MAF will typically last about 150,000km, poor fuel economy is a result of faulty MAF

Do not use oiled foam air filter elements, the oil vapor will damage the MAF sensor

Iveco part no. 5043011164 Bosch 0 281 066 056

Coolant Temperature Sensor



The coolant temperature sensor is mounted on the Thermostat housing, and detects coolant temperature by means of a double NTC (negative temperature coefficient) thermistor.

One NTC thermistor sends a signal to the ECU, while the other sends a signal to temperature indicator gauge on the instrument panel. The sensor uses semiconductor technology; as sensor temperature increases with coolant temperature, sensor resistance drops.

Iveco Part no. 500382599 Bosch 0 281 002 209

Coolant pressure Sensor

The pressure sensor located on the coolant reservoir is not sampled by ECU for engine management, but does report an alarm condition for lost pressure, EDC 035. Invoke Engine Limp mode. Sensors on early E4 models were faulty allowing coolant to damage wiring by capillary action. If servicing required due to faulty sensor replace O-Ring (There is no Coolant Level sensor)

Iveco Part 69502214

Oil Pressure Sensor

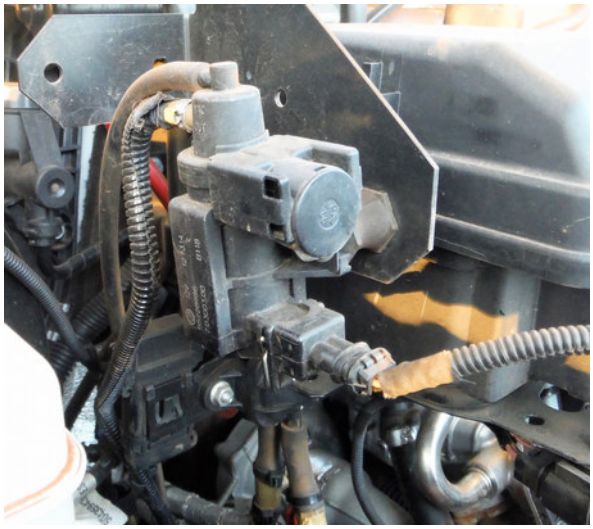
The engine oil pressure sensor conveniently located beneath the oil filter on the oil cooler housing body is a simple on - off switch. There is no Oil Level sensor on the 55S17W as the hot wire type level sensor is not compatible with various oil levels expected in the sump during driving on steep or difficult ground.

Iveco Part no. 504310254

Boost Modulator Valve

The ECU processes the MAP & MAF sensor inputs at varying engine rpm and determines the amount and duration of fuel to be injected, it adjusts the Intake turbo boost by varying the amount of exhaust gas flowing through the turbocharger via the Wastegate modulator valve. It is located adjacent to the Master Cylinder

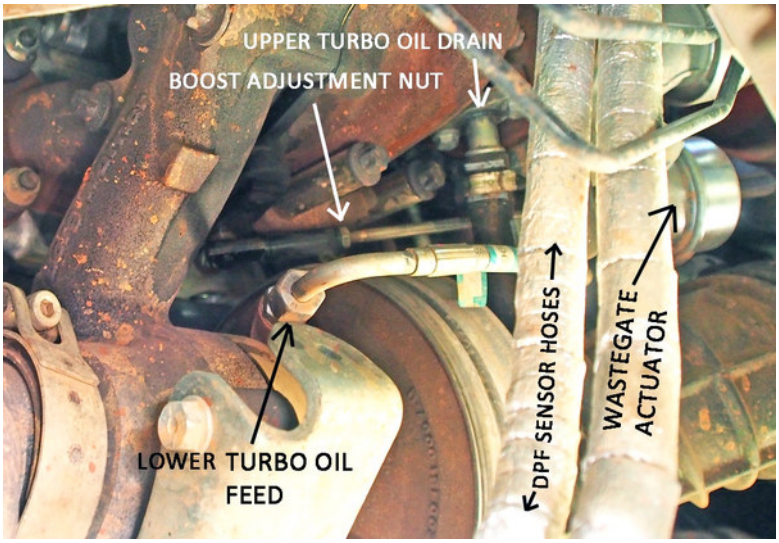
Iveco part 5801259656 OEM 55228986

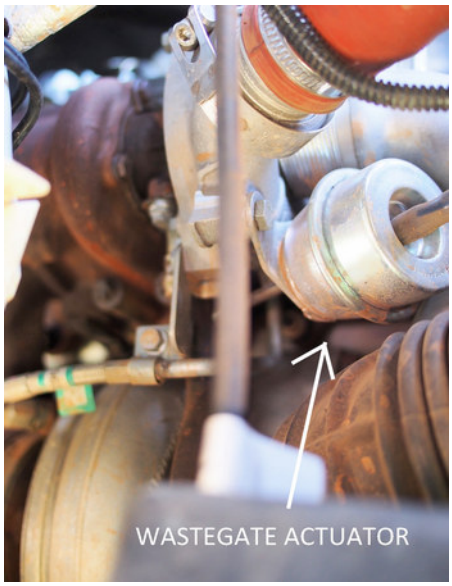


Wastegate Actuator

Following the Vacuum hose from the Turbo Boost valve will lead to the Wastegate Actuator. The rod from the actuator directly controls the amount of of Turbo Boost.

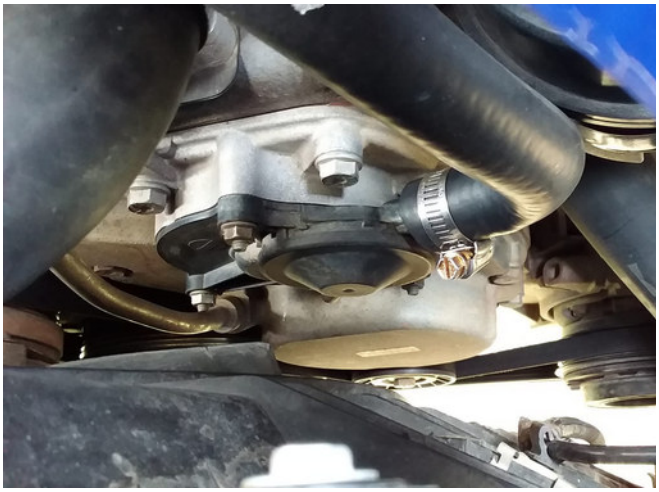
Iveco part 5801376224 (Vexi £239.73)





PCV Filter

Iveco recommend the PCV filter is changed at 200,000 km. intervals. In service these tend to fail at about 100,000 km. with no apparent symptoms, but should be serviced every 50,000 km. When the filter blocks oil fumes are sucked through the intake duct and can pollute the turbocharger, tboost hoses and intercooler. If the oil fumes migrate into the intake manifold & mix with carbon particles from the EGR which can reduce the performance, efficiency and longevity of your engine.



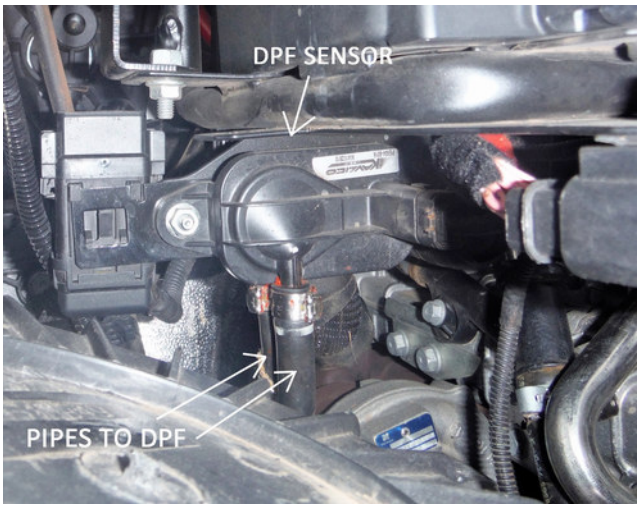
Tight access between front of engine and radiator makes PCV servicing difficult.

One preventative strategy is to remove the filter and PCV valve from the PCV housing and retrofit an aftermarket PCV Filter such as Mann&Hummel Provent 200. Ironically Mann & Hummel make the PCV filter in the rocker cover of the smaller Iveco F1A engine .

Provent 200 PCV unit installed on firewall

PCV filter cartridge, part 5040751145

DPF Differential Pressure Sensor



The differential pressure sensor uses oil-filled ceramic capacitive sensing technology to measure the difference in pressure across the front and rear of the Diesel Particulate Filter, it senses the soot mass load. The ECU uses the data to initiate DPF regeneration burn, when the DPF is becoming blocked.

Iveco Part no 504102810 Kavlico 604 102810
(Ford 1415606)

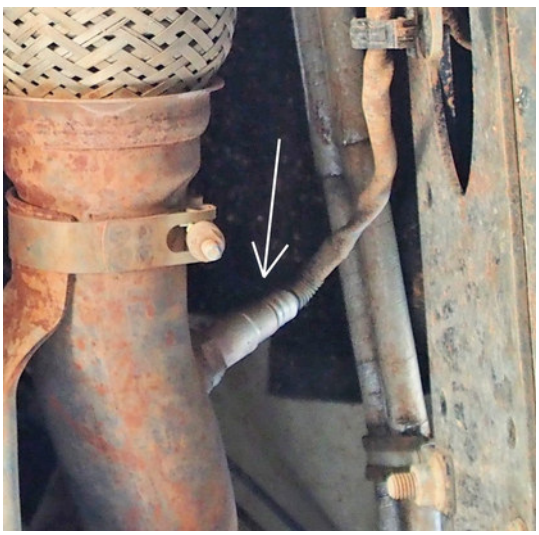
This is a robust DPF sensor, many DPF sensor faults are more likely to be the rubber hoses connecting the sensor to the DPF. The hoses go brittle and crack, even inside the foil backed glass fiber heat insulation. The DPF sensor hoses typically fail from around 50,000km Idea: replace with stainless lines !

CAT Pyro sensors

There is a pair of EGT probes front and center of the Catalytic converter, The CAT shares the DPF housing.

EGT Mid CAT Iveco Part No 69502946
EGT Front CAT Iveco Part No. 69502363

Lambda sensor



The Lambda sensor or oxygen sensor is located in the engine pipe. It detects the amount of oxygen in the exhaust gas and helps to regulate the emission of harmful gases into the atmosphere. This sensor sends signals back to the ECU to calculate the engines fuelling requirements.

Iveco Part No. 504135503 BOSCH 0 281 004 026

Clutch Pedal Switch

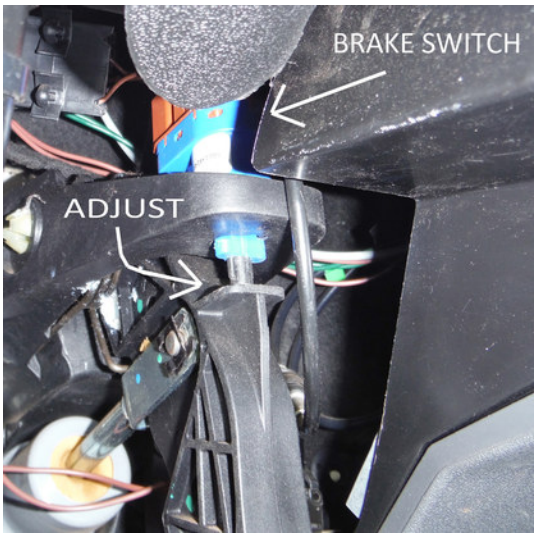
Whenever the clutch is disengaged to shift gears, (pedal pressed) the ECU senses that the switch signal is missing and disables the Cruise Control. The clutch switch generates a positive signal for the ECU when the clutch is engaged (pedal released).

Brake Pedal Switch

When the brake pedal is pressed, the switch generates a positive signal. The control unit uses this signal to determine when the brake is operated so as to disable the Cruise Control, cut off fuel and operates the brake lights.

NOTE : Cruise Control Fault
There is no Inertia switch on 55S17W, Brake pedal switch needs resetting if Cruise Control cuts out over bumps.

If the problem persists EDC FAULT 049 is an "incoherent brake switch"



The switch pushrod height is self adjusting and takes place when the switch is installed on the brake pedal assembly, Disconnect, Fully press the push rod , and twist clockwise to remove. To reset switch reinstall, do not press brake pedal during installation.

Throttle Position Potentiometer

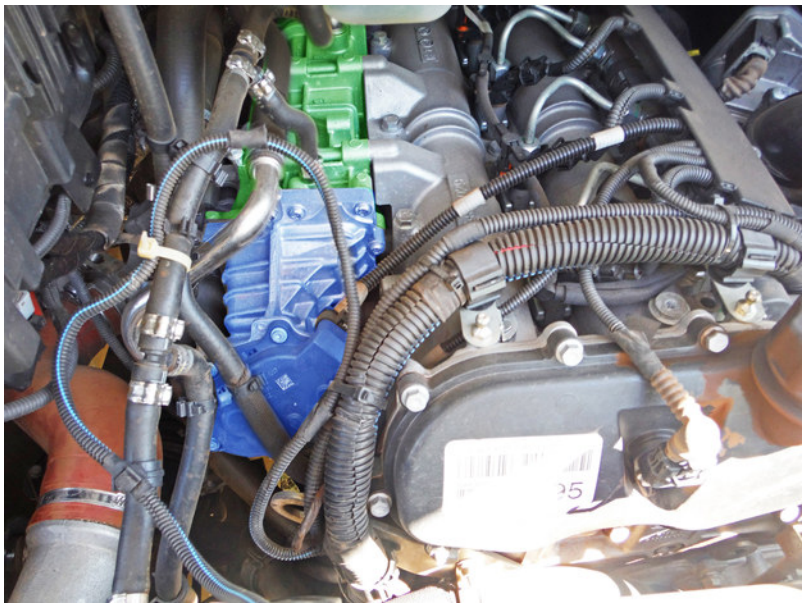
The sensor casing is secured to the accelerator pedal and accommodates two hall sensors (primary and redundancy) by an axial shaft. The shaft is fitted with two springs: a coil spring provides the correct resistance when pressure is applied to the pedal, the second is the return spring for when the pedal is released.

Sensor output voltage 0-5v changes with accelerator pedal position and is sent to the ECU. The accelerator pedal position signal is processed together with the rpm input to calculate injection times and pressure.

EGR EXHAUST GAS RECIRCULATION

The EGR system that is typically fitted to small CRD engines, and to the FPT F1C engine, in E4, E5, and E6 versions seems to be counterproductive to the Environmentalist agenda. (The Euro3 version sold in Africa does not have EGR)

There is a cumulative decrease in engine efficiency and reliability with EGR, additional fuel is used to generate the same power, more pollutants are being generated. Think of it as like whatever smoking does to a human lung, EGR does the similar damage to your engine. Diesel exhaust gas contains soot. By re-directing exhaust back into the combustion process, soot collects in and clogs up the EGR system, the inlet manifold, inlet valves and over time the soot (abrasive carbon granules) will damage every internal engine part. The cleaner the air going into an engine, the better it will run and the longer it will last. Think about the reasons that cars have air cleaners to begin with. The EGR does not pass the exhaust back through the air cleaner because the soot would clog the filter. Yet the EGR pumps that soot directly into your clean air charge.



EGR (blue) with EGR Cooler behind (green) Exhaust is fed to back of inlet manifold through a 35mm dia pipe at rear of engine

Under side EGR showing Exhaust entry pipe and Blanking plate location

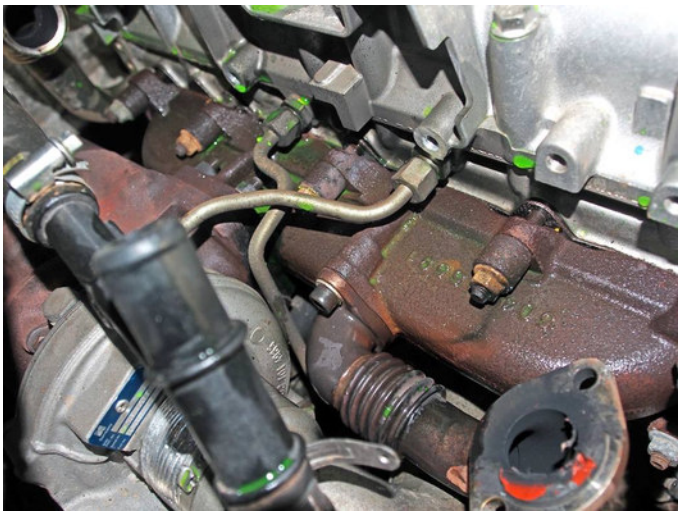
One of the biggest efficiency gains to Diesel Engines in the last few decades has been the addition of the intercooler. The Intercooler cools down the intake air charge after it has been heated by the Turbo charger. As far as power engine efficiency is concerned the colder the intake air the better. Power can be calculated as a factor of the difference in temperature from intake to exhaust. Along comes Euro4 and an EGR gets bolted to the side of our efficient engine, and we have again hot exhaust pumped into the nicely cooled intake charge. !!!

Granted our engine does have an EGR cooler, but still it is only a heat exchanger effectively trying to cool the 650°c exhaust with ~95°c coolant, giving a cooled EGR flow of approx. 450°c, during a wasteful DPF regeneration cycle the EGR will be even hotter with EGT's approaching 800°c

The Other issue with the EGR Valve on the Iveco Daily 4x4, is safety related, and is why the modern Iveco Daily has zero engine braking, When the driver backs off the accelerator pedal there is no deceleration.

The TVA does close but never fully, some vacuum will develop in the inlet manifold but because the EGR remains open there is next to no engine braking.

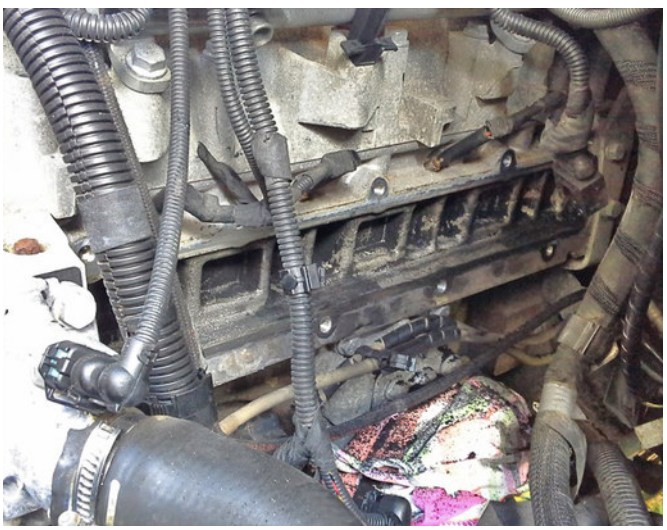
There is the argument that Automotive engineers "know what they are doing", and "if it was designed like that by the manufacturer then its for a good reason". The reason is to satisfy the stringent European Vehicle Emission regulations.



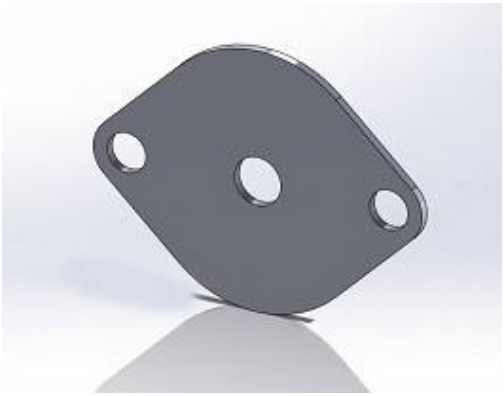
The Designers do know that EGR is harmful to the engine , but so long as the engine lasts the warranty period then it is really a moot point as far as they seem to be concerned.

Soot build up inside Iveco F1C Plenum - inlet manifold , EGR error 148.

Almost one Kg of soot removed from inlet tract of this Iveco F1C, ...images courtesy Pavel Shcherbakov ...drive2.ru



EGR Blanking/Removal



EGR Blanking Plate with 10mm hole

EGR gasket and "full" blanking plate

Why not just blank off the EGR and solve all those problems, ... because it is illegal, and the law is an ass.

In Australia it is completely Legal to manufacture and sell EGR blanking kits, but it is illegal to install them in vehicles newer than 2011 models, except for "off-road" use only.

There are some loopholes in the law that might allow you to fit a blanking plate to your 55S17W at your own discretion, and at the risk of voiding your engine warranty! Yes doing something good for your engine that will eliminate excessive carbon build up and accelerated wear will double, perhaps triple your engine life may void your warranty.

Loophole 1 all Euro5 55S17W models are designated 2009 Model year, (MY2009)

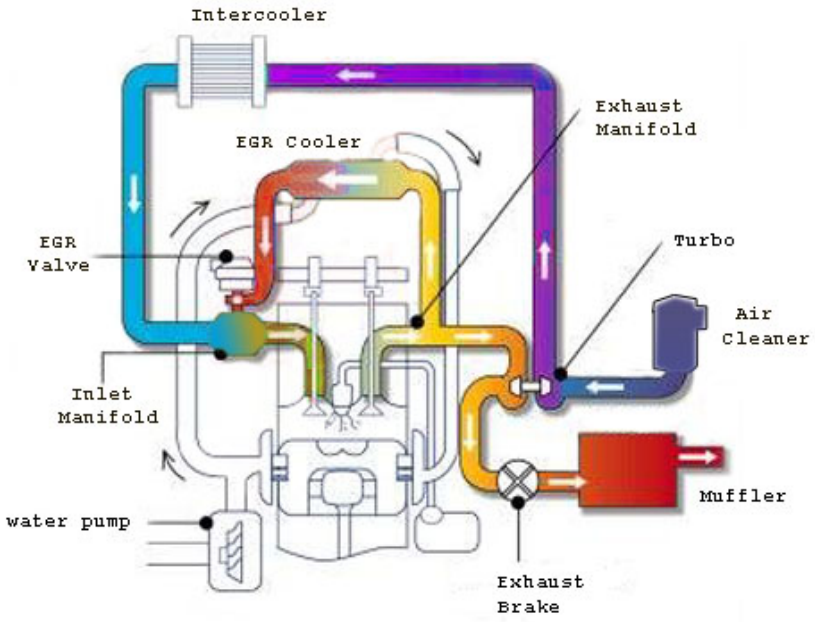
Loophole 2 EPA Regulations…. "A person must not, **without just cause**, alter, replace or modify the engine or the exhaust system or fuel system of any motor vehicle in a way that – (a) departs from the manufacturer's design: or (b) increases the rate of discharge of any of the constituent parts of emissions or defeats the intended upward discharge or dispersion of the emissions."

note the emphasis on Without Just Cause -

Benefits of EGR blanking on the 55S17W are noticed both Long Term and instantaneous. First drive you notice, faster turbo spool up more power, and significantly now that the free flow loop from exhaust to inlet is closed the vehicle has..... engine braking!!! A major safety coupe and significantly safer to descend mountain highways without overheating your brakes, there is your "Just Cause" in Loophole 2

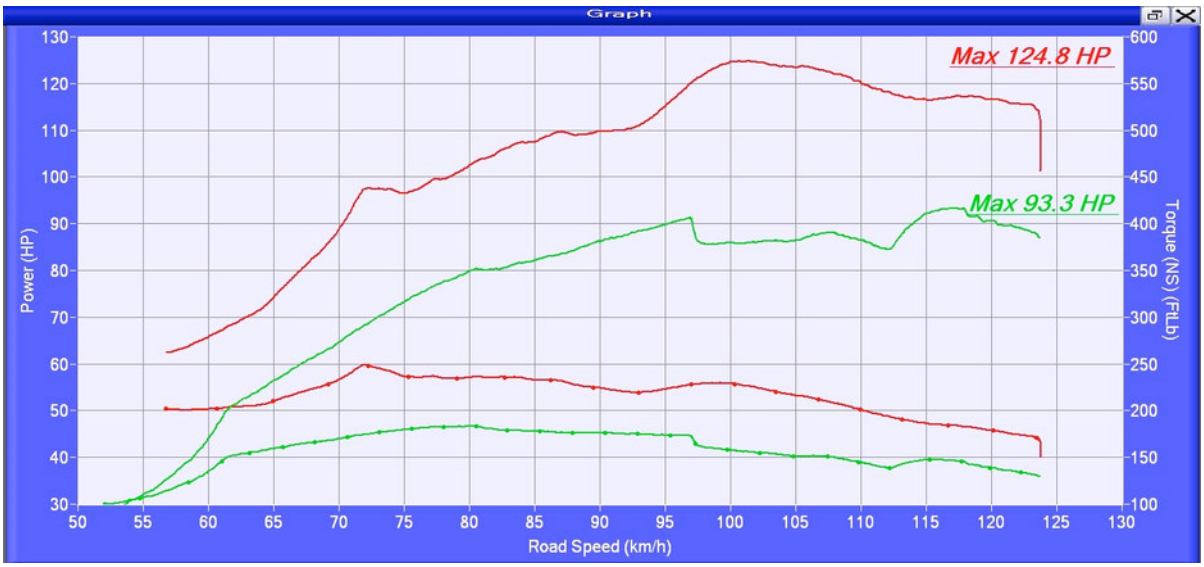
You will notice better fuel economy and your engine oil will stay clean for many thousands of km instead of going black in the first few hundred km

Downside of full EGR blank is the ECU will report a EGR fault and put the vehicle into "limp-mode", This can be overcome with either of 2 strategies - ECU remap or fitting a Blanking plate with 10mm hole, enough exhaust will pass through to keep the ECU happy, and significantly you will have achieved most of the benefits of a full EGR blank.



ECU Remapping

ECU remapping results in better fuel economy and more useful power and drivability. It is a proven and reliable method of getting the most from your engine. Most aftermarket tunes are derived from a higher horsepower factory version of the same engine and are completely safe to use. Remapping is a better and safer option to an add-on chip tuning module.

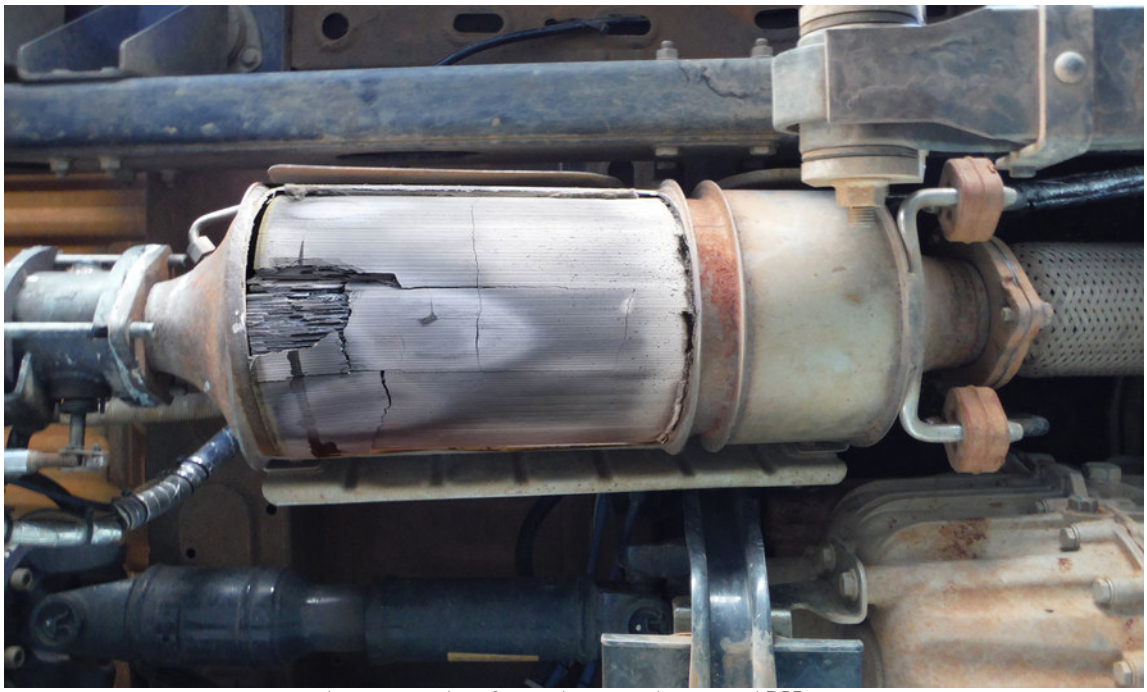


Dyno graph of Travel Trucks ECM Tune courtesy www.traveltrucks.com.au

DIESEL PARTICULATE FILTER DPF

The Euro5 55S17W is unfortunately fitted with a DPF. The best way to describe a DPF would be to use the analogy of a large cigarette filter in the exhaust, its purpose it to trap the remaining soot that has not been redirected into the engine through the EGR. When the filter becomes partially blocked the DPF Pressure sensor detects the condition and ECU implements a regeneration burn, where raw fuel is injected into the exhaust stroke and the DPF becomes a furnace to burn off the carbon particles. DPF regen temperatures are in the area of 750-800°c

The DPF (part number 504131264) have a limited lifespan, typically in the area of 200,000km, very expensive, and is not a warranty replacement item, genuine part is in the area of $7000, best OEM price at time of writing ex Europe is €2624 = AU $3879 + shipping & import duty



artist representation of opened can exposing an actual DPF core

DPF Issues

1 You must use a specific Low SAPS oil, for both oil changes and top ups, If you use a high SAPS oil (most oils) the sulphur / Phosphor content can destroy the DPF and as a result engine damage may occur.

2 DPF Regen cycles are wasteful and damaging to the engine, fuel is injected into the cylinders on the exhaust stroke to burn up inside the DFP, some of that fuel makes its way past the piston rings to dilute the engine oil, on some engines a rise in oil level on the dipstick has been observed.

3 DPF Regeneration burns by design produce Exhaust Gas Temperatures in the 750-850°c range, normal post turbo EGT's are in the range of 350-450°c. The flash point of dry grass leaves etc is around 250c

DPF Removal Strategy

As with the EGR, DPF removal is illegal, except for "off-road" vehicles.
Loopholes apply to DPF, use at your own discretion.

Loophole 1 Euro 5 55S17W vehicles sold in Australia up to the time of writing are in fact registered as Euro 4, and the Iveco Compliance number 37140 categorises them as Euro 4
(RVCS Database http://rvcs-prodweb.dot.gov.au). --Euro4 F1C engines do not have DPF.

Loophole 2 EPA Regulations…. "A person must not, **'without just cause'**, alter, replace or modify the engine or the exhaust system or fuel system of any motor vehicle in a way that – (a) departs from the manufacturer's design: or (b) increases the rate of discharge of any of the constituent parts of emissions or defeats the intended upward discharge or dispersion of the emissions."

"Just Cause".... Appearing in statutes, contracts, and court decisions, the term "just cause" refers to a standard of reasonableness used to evaluate a person's actions in a given set of circumstances. If a person acts with just cause, her or his actions are based on reasonable grounds and committed in good faith. Whether just cause exists must be determined by the courts through an evaluation of the facts in each case.

The Owners Handbook states on page 149
"Never park the vehicle over flammable material such as paper, grass or dry leaves: risk of fire!"
The fire warning is reiterated on page 191 of the handbook, and in the side bar on page 229.
Dry grass flashpoint is about 250°c, The DPF operates at 750°c+

You have bought a Four Wheel Drive vehicle in "Good Faith" with every expectation that you will be able to use it in "Off Road" conditions, including driving through, stopping on and even setting up camp on grass, leaves, pine needles etc. Driving through Spinifex grass is almost unavoidable if touring Outback Australia

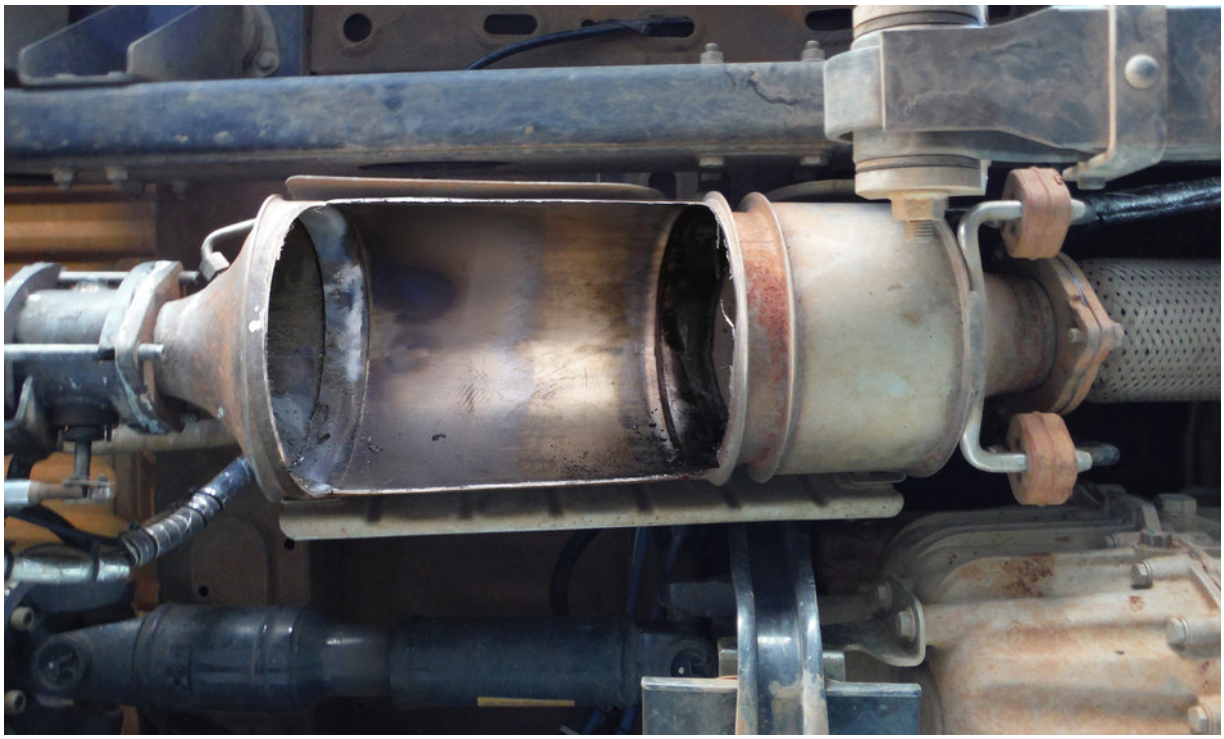
Country Fire Authority Victoria have a directive that each morning of High Fire danger period their DPF equipped Scania Fire Appliances must perform a forced regen at the Fire station to prevent auto regeneration occurring during a call out. Forced regen requires running up the truck for about 20 minutes.

Iveco Daily operators do not have any in-vehicle facility to perform a pre-emptive forced regeneration. Service centers can perform this function using EASY OBD2 diagnostic equipment.

<u>Benefits of DPF Removal</u>

1 reduced maintenance costs
2 no need to use Low SAPS oil
3 can use high Sulphur Diesel if touring undeveloped countries
4 free flowing exhaust = better fuel economy
5 no wasted fuel during regeneration burns= better fuel economy
6 no dilution of engine oil by diesel
7 reduced danger of setting fire to surrounding bushland
8 reduced danger of vehicle itself being destroyed by fire

DFP delete' involves more than just gutting the DPF canister or replacing it with a straight pipe, The ECU is expecting a variable pressure difference across the front and back of the DPF. With out that a fault condition will be triggered and Vehicle will go into Limp Mode.



artist representation of removed DPF core - front section houses CAT

The DPF needs to be amended in software programming, involving the removal of EDC17 ECU from vehicle and bench mounted reprogramming, this can be done by a Diesel Tuning Specialist under the owners assurance that the vehicle is for "off road" use only. Most Specialist will offer a Mail order option for ECU modification.

A discreet DPF delete involves gutting the canister, and inserting a straight pipe through the center. The DPF delete, if done correctly is undetectable, either by visual inspection or by dealer interrogation with EASY diagnostics. The DPF sensors still send signals to ECU and DPF but the values are no longer sampled. The sensors will still need to be plugged in and working.

IMPORTANT ... Prior to DPF Delete the Oil Ash counter and DPF Regeneration counter need to be reset. Oil and DPF counter reset is done via EASY, parts replacement , "replace engine oil "

Without access to EASY use the Bremach T-Rex oil change protocol. (as described on page4 of this book)

if this is not done the possibility of an engine error light exists with DPF related fault codes.

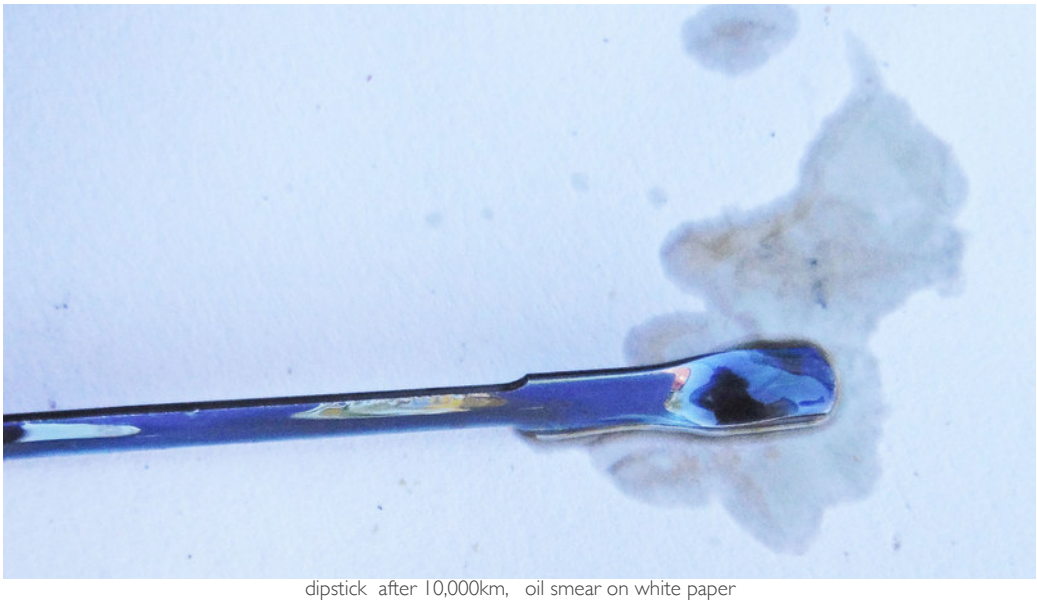
Post EGR / DPF Delete

ECU Remap
ECU EGR Delete & Physical Blanking
ECU DPF Delete and DPF Gutting

Results in a vehicle with better drivability, better fuel economy, at least one gear better up hills, Vastly improved engine braking. .....also results in a sometimes audible and distinctive Turbo whistle.

Without DPF a better class oil can now be used, as opposed to ACEA C2 Low SAPS,
Penrite HPR5 full synthetic as specified for the Euro4 F1C has a better suite of additives including zinc, sulphur and phosphorous.

Implementing any of the above changes will be completely at the vehicle owners own risk and may result in refusal of warranty claims by Iveco.



dipstick after 10,000km, oil smear on white paper

Oil on above dipstick still clean at 10,000km after running Penrite HP5 Synthetic in Euro5 F1C with Ryco Z516 filter, this oil is the second oil change after blanking of EGR and DPF removal.

Typically a new modern CRD diesel engine oil will go black after a only few hundred km, thanks to the EGR.

Older diesel engines, and Old technology diesel engine oils go black quickly because the tolerances inside the engine are larger and some combustion gasses make their way past the piston rings and into the oil.

The first oil change after EGR/DPF delete you will still see black oil, as not all the oil drains from an engine when you change the oil, but after the second oil change you will notice clean oil for much longer.

Just because something is 'normal' does not mean it is right !!

FUEL SYSTEM

The fuel system of the Australian delivered 55S17W is typical of most Common Rail Diesels except that it has a remote Lift pump rather than an in-tank pump and it lacks a fuel cooler in the return line. It also lacks the fuel heater / pre filter / sedimenter /water trap of European delivered models.

The fuel system is comprised of a low pressure and high pressure circuit.

The high pressure circuit consists of the following pipes:

- pipe connecting high pressure pump outlet to Rail;
- Common Rail;
- feed pipes from Rail to injectors.

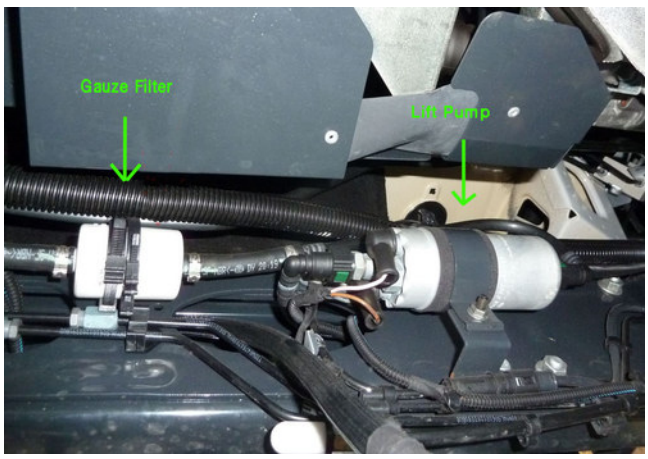
The low pressure circuit consists of the following pipes:

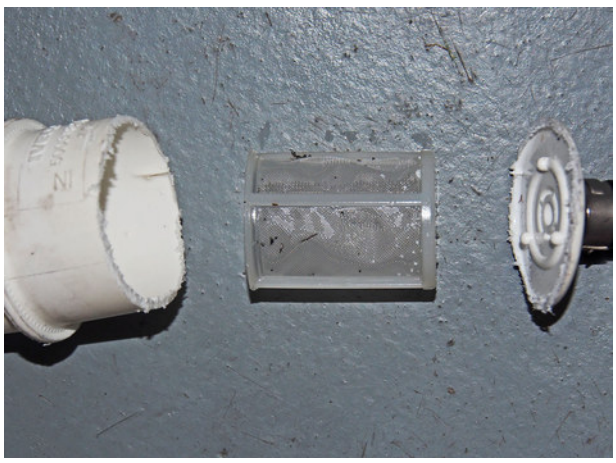
- suction pipe from tank to pre-filter
- pipes from pre-filter to electronic supply pump (aka lift pump)
- pipes feeding the high pressure pump through the fuel filter;
- return pipe from high pressure pump;
- return pipe from common rail;
- return pipe to tank.

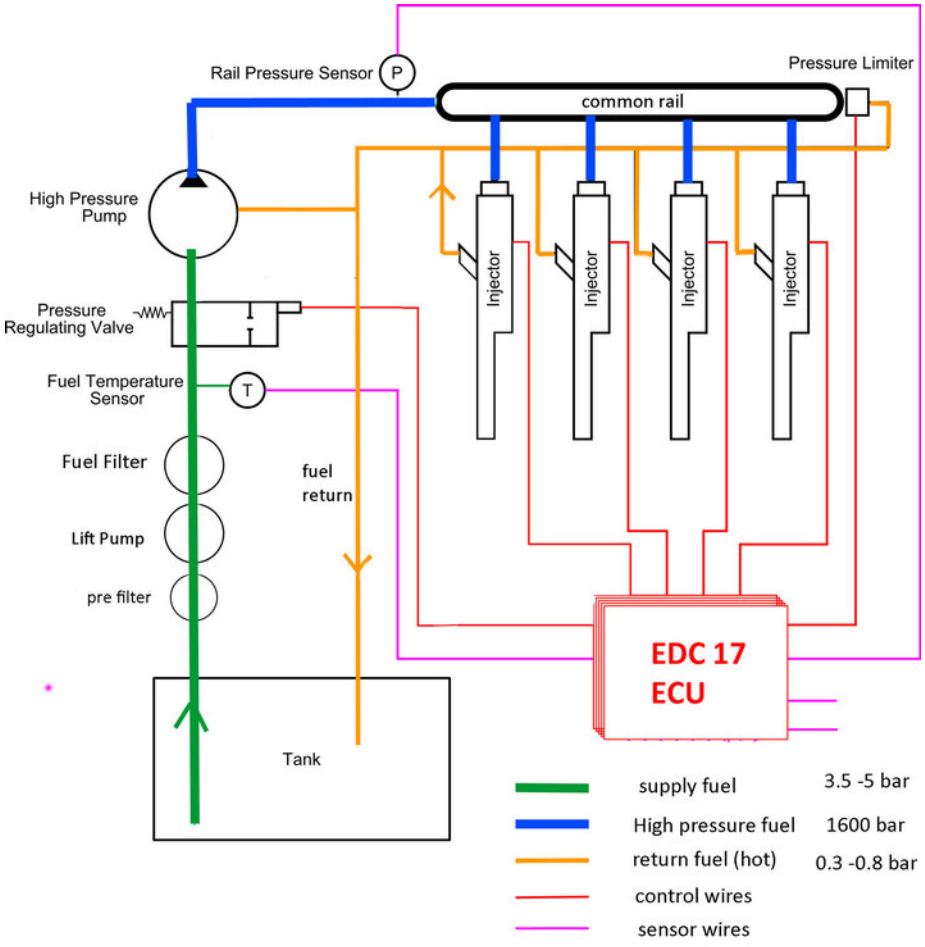
NEVER disconnect high pressure pipes while the engine is running, there is more than enough pressure to sever human flesh & bone, DO NOT attempt to bleed the circuit, this would be dangerous and futile (Common rails are self bleeding through the return line)

A low pressure circuit in good running order is critical to proper fuel system operation.

The 55S17W has a small gauze pre-filter between the main tank and the lift pump, about the size of a lawnmower fuel filter, part no 500318246 . This filter may be to stop small rocks from getting into the lift pump, not a bad idea, but it will easily pass moisture or water.







In the Australian Outback the fuel supplies may contain moisture as a consequence of the high variation in ambient temperature. Condensation, especially in above ground storage tanks, will occur in areas of hot daylight temperatures followed by cold to freezing night temperatures.

It is a good strategy to replace the small gauze 'pre-filter' with an aftermarket sedimenter-water trap. Any Diesel water trap filter such as Racor, Donaldson, Fuel Manager that allows flow rates of 150L/hr or 2.5L/pm will be adequate. The filter / sedimenter is to be installed in the low pressure suction line, a so called "CRD high pressure filter" is un-necessary.

Typically the aftermarket Filter should be located where it is convenient for easy regular inspection but is not likely to be damaged by stones or rocks. Checking the sediment bowl is an easy weekly check, Water or contaminates can be drained off here. Sediments collect in the bowl before the fuel is passed through the filter media.

Note: A professionally fitted aftermarket fuel pre-filter will prolong the life of the fuel system and should not endanger a warranty claim

Aftermarket Racor style pre-filter - sedimenter

Slow Fuel Tank Filling

Main tank breather pipe (in image above) should be cable tied high up under the floor. This prevents overflow fuel pooling in it which can cause an air lock resulting in very slow filling at the fuel bowser!

UFI FUEL FILTER

The main fuel filter is located beneath the battery and is accessed from underneath by removing the inner mudguard. The UFI Filter housing 'electronic unit' incorporates the fuel temperature sensor, a clogging sensor and drain cock. A dashboard error light will illuminate if moisture is detected. Routinely drain the sediment bowl. The fitment of a pre-filter will prolong the life of the UFI filter.

40,000km main filter intervals are reasonable, with 20,000 for your aftermarket pre filter

Iveco Part no.	500054702
Mitsubishi	MK667920
Ryco	2705P

The element is the synthetic media cartridge type and being difficult to access, it makes sense to install a good pre-filter if for no other reason than to extend the life of the main filter. The Main filter is in very inconvenient location to perform your weekly fuel filter check as prescribed on page 220 of the users manual.

Before servicing fuel filters, or presenting the vehicle at a service center it is advise to thoroughly wash the vehicle and pay particular attention to clean the filter housing and area around fuel filter. Surgical cleanliness helps as the ingress of dirt into a filter housing on reassembly could be problematic.

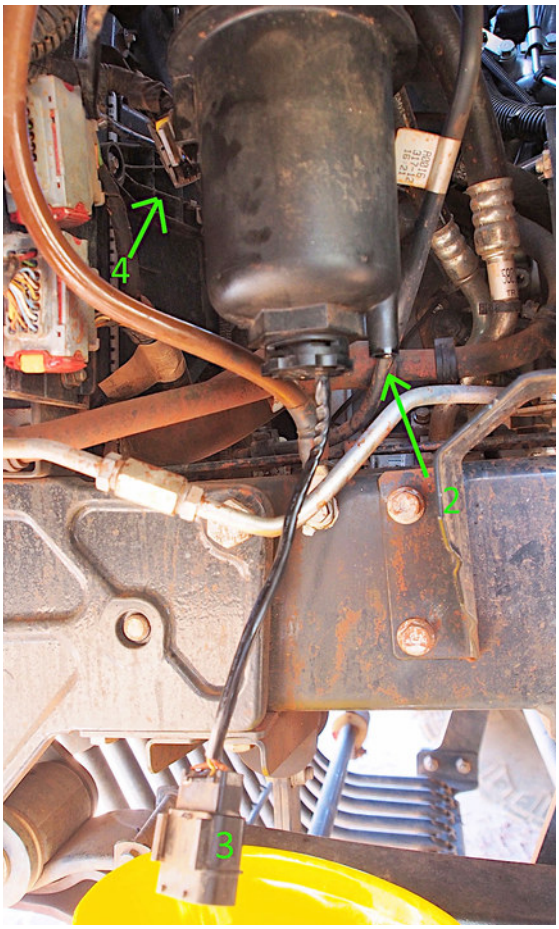
Fuel Filter Servicing

The Instructions in the official Iveco 4x4 Workshop manual for servicing the UFI filter describe a previous model "Lifetime" disposable UFI filter housing and is incorrect for the Euro5 55S17W,

To eliminate the messy issue of siphoning, and to reduce fuel wastage it is a good idea to perform fuel filter maintenance when the fuel tank is no more than half full. Drain any sediment bowl and replace aftermarket filters first.

Meticulous cleanliness is required, use new lint free rags. There is no need to remove the 'Electronic unit' from filter housing, nor is there any need to remove housing from vehicle. Disconnecting the fuel lines from the filter will allow the possibility of introducing dust or dirt particle into the HP Pump and injectors.

1. Remove front inner guard on Left side.
2. Release fuel drain plug
3. Release electrical unit plug
4. Unclip electrical loom socket from UFI filter housing
5. Disconnect fuel lines
6. Unbolt and remove filter housing from truck
7. Mount filter bracket in suitable vice
8. Press in release tab (top of canister flange)
9. Unscrew filter canister using the big nut on the bottom, NEVER use belt type filter wrench, this may stress fracture casing.
10. Leave new filter in wrapper until it is fitted
11. Twist old filter 1/2 rotation and pull from housing
12. Exchange o-ring seal on top of filter canister,
13. Clean hands and outside of canister before unwrapping new filter,
14. Inspect but resist the temptation to clean inside of canister. In the case of the need for cleaning (e.g. algae) the 'electronic unit' will need to be removed Release stainless clip then remove 'electronic unit'
15. Install new filter cartridge and reverse procedure described above.
16. To bleed air from system turn ignition on for one minute, and off for 10 seconds, (do not crank engine) repeat 3 times. ...Job Done



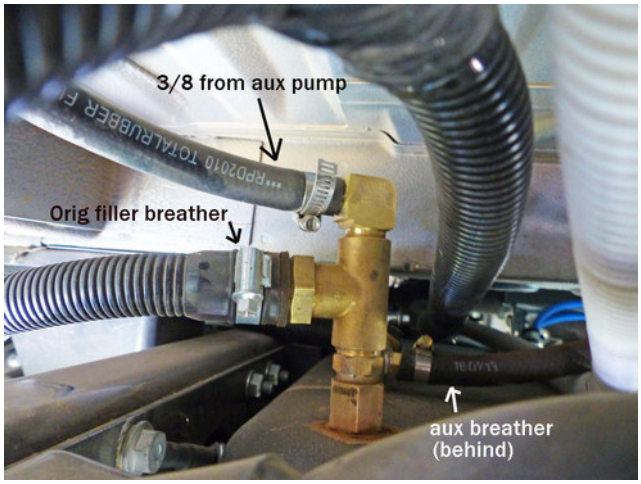
Filter lock tab (circled), photo Craig Medhurst.

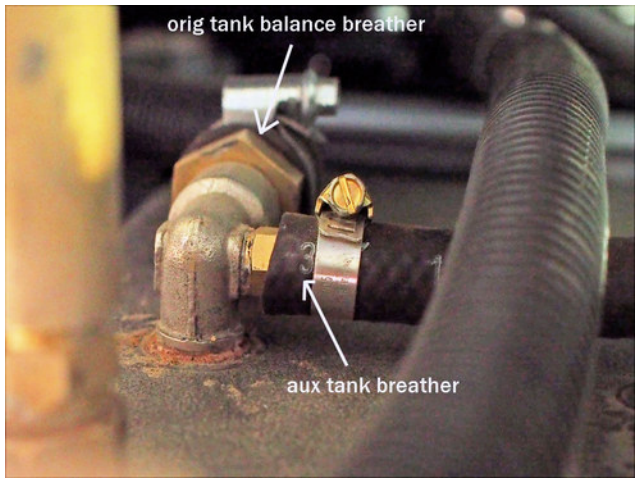
New filter vs Dirty, (allegedly changed by dealer 20k ago)

When servicing fuel system meticulous cleanliness is required, like you have OCD! The electronic unit sits in the 'clean' side of the filter, introducing the smallest particle of dust can destroy the HP Pump or Injector, so place the Electronic Unit inside a ziplock bag - not resting on a dirty rag (*per photo above*) as is often the case at an Authorised service centre.

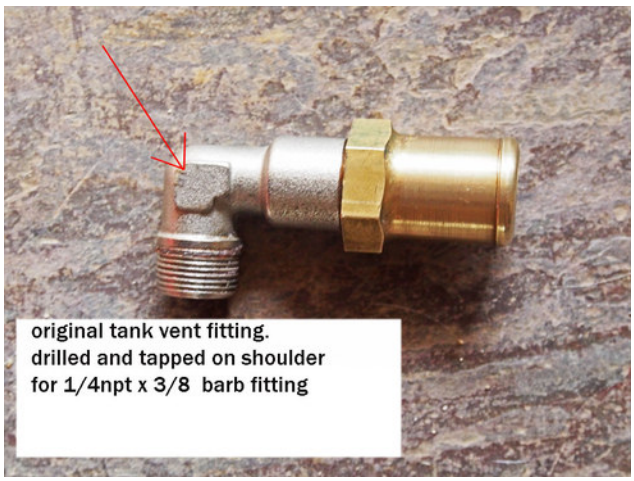
LandCruiser CRD Z699 spin on filter with Iveco sensor adapted.

Auxiliary Tank Plumbing





examples of hose adaptors used to plumb aux tank into original tank fittings



The standard 90 liter tank with a range between 500-600km will almost certainly be too small for most operators, luckily there is a vast amount of room under the truck for auxiliary tank options.

The typical method of plumbing in an auxiliary tank is to use a 12 volt fuel pump to transfer fuel from the Aux tank into the main tank.

Care is needed not to over tighten metal fittings into plastic tank threads, use a diesel compatible thread sealant such as Stag jointing paste, or Aviation gasket cement, the fittings should be firm but not excessively so. Do not use a silicone sealant on fuel fittings.

Fuel Gauge Quirk

The BCU (Body Computer) makes calculations from fuel used and outputs the result to the trip computer, the fuel gauge does not read from the fuel level indicator in the tank. This is problematic because if you pump fuel into the main tank from the auxiliary tank whilst you are traveling the fuel gauge will not rise as the level in the main tank rises, but it will continue to lower as fuel is consumed. The Body computer seems to have no idea that fuel is being added to the tank.

The solution is to only transfer fuel into the main tank while you are stopped. When you start the engine the new fuel level will register. If you transfer fuel 'on the move' then stop and restart the new level usually does not get recognised until the next day

Understanding the Temperature Gauge

It has been observed that the dashboard Temperature gauge on the 55S17W reflects not only engine coolant temperature but a combination of coolant and Fuel Temperature. Whether by design or software error, this alarming phenomenon has been deduced by interrogation of ECU data after "overheating events".

The operation of any CRD engine involves the pressurisation of fuel to extreme values in the order of 1600bar (23,200psi.), a byproduct of of this pressurisation is heat, after leaving the fuel rail, the hot unused fuel is returned to the tank, the fuel being constantly cycled by the electric low pressure pump to keep the High pressure fuel pump on the engine lubricated. Under a certain combination of conditions, on warm day, climbing a steep hill in low range, towing, or in heavy traffic, when the fuel tank level around 1/4, there is insufficient fuel tank volume to cool the hot return fuel, heating up the entire volume in the tank instead.

As the fuel temperature rises and the gauge climbs above 1/2 the radiator fan clutch cuts in, in an effort to resolve the problem fan level increases to second stage. No amount of fan blowing can cool the fuel down, as there is no fuel cooler, let alone a fuel cooler in the radiator stack. The gauge keeps climbing until above 3/4 the truck will enter 'limp mode', with no associated overheat warnings.

This phenomenon is not mentioned in any of the manufacturers literature, or in the fault menus in EASY diagnostics. The symptoms indicate to the unsuspecting operator or service technician that there is a overheating problem with the engine. Observation of ECU download data does indeed show the vehicles tested have not had coolant above 105°c which is in the normal range. but have had fuel temperatures in the danger zone of 80°c - 90°c. Normal fuel temperature is in the 50°c - 60°c range.

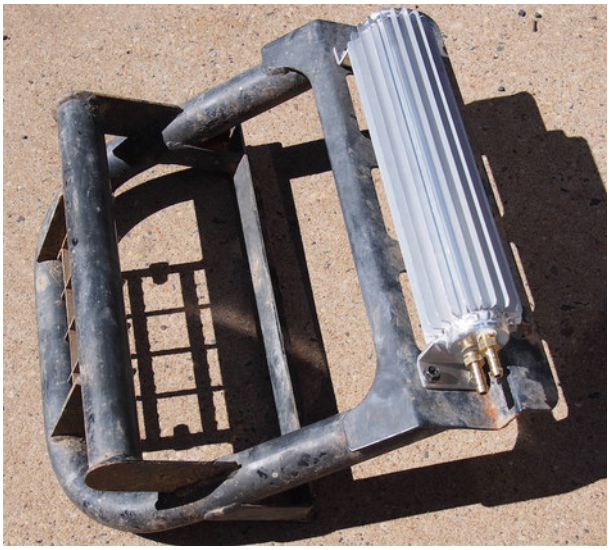
Fuel temperature	50-60ªc	60-70ªc	70-80ªc	80-90ªc
Truck1 3/1/15 44,623km	139h 33m 31s	16h 12m 33s	29m 2s	0
Truck1 24/3/15 50,254km	144h 13m 34s	16h 12m 33s	29m 2s	0
Truck1 20/4/15 53,529km	151h 4m 16s	18h 33m 34s	29m 2s	0
Truck1 07/08/15 60,003km	167h 18m 18s	18h 41m 38s	29m 2s	0
Truck2 4/3/15 22,589km	89h 27m 30s	8h 24m 10s	0	0
Truck3 5/2/15 7292km	20h 24m 19s	1h 43m 13s	0	0
Truck4 17/03/15 49837km	104h 57m 36s	10h 0m 31s	0	0
Truck5 27/12/14 39210km	133h 53m 24s 0ms	13h 57m	0	0
Truck5 10/02/15 43782km	163h 36m 46s	19h 51m 27s	1h 3m 47s	27m 21s
Truck5 30/03/15 49024km	189h 13m 55s	21h 54m 40s	1h 3m 47s	27m 21s

Hot fuel no longer has the ability to effectively lubricate the High Pressure fuel pump, which is why the Limp Mode is engaged. This phenomenon is unlikely to happen with a full fuel tank, and can be minimised by transferring cooler fuel from an Auxiliary tank into the main tank whilst driving, but that will invoke that fuel gauge quirk.

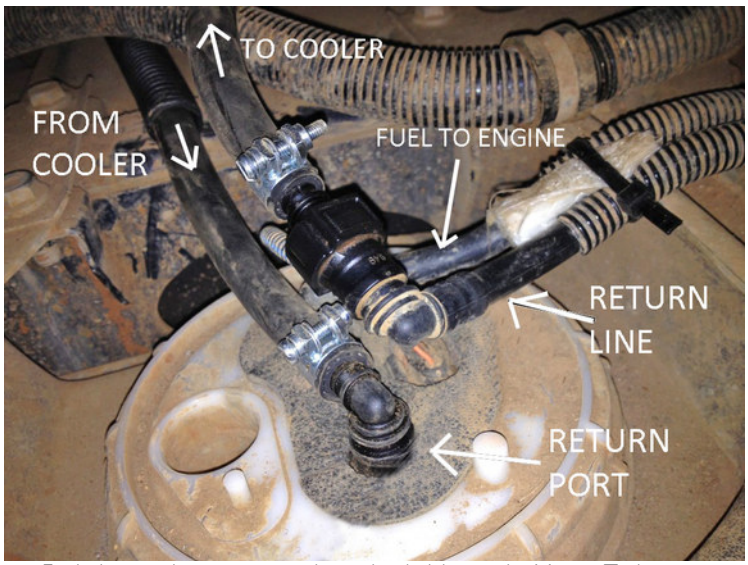
FUEL COOLER

Most CRD vehicles have a factory fitted fuel cooler in the return line as standard equipment, even the Fiat Ducato with the same FPT F1C engine has a fuel cooler. An aftermarket fuel cooler fixes the problem.

A fuel cooler should only be installed in the return fuel line, definitely not the pick up line, a cooler has much better thermal efficiency at higher temperatures. The return line exits the Fuel Pressure Regulator at the back of the Fuel rail (rear of engine) and runs along the left chassis rail entering the top of tank in the sender / pickup assembly.



Dual Pass 12" finned alloy transmission cooler makes a great fuel cooler, fits under dual cab rear step



Fuel pipe arraignment on tank sender / pickup unit, Marcus Tuck

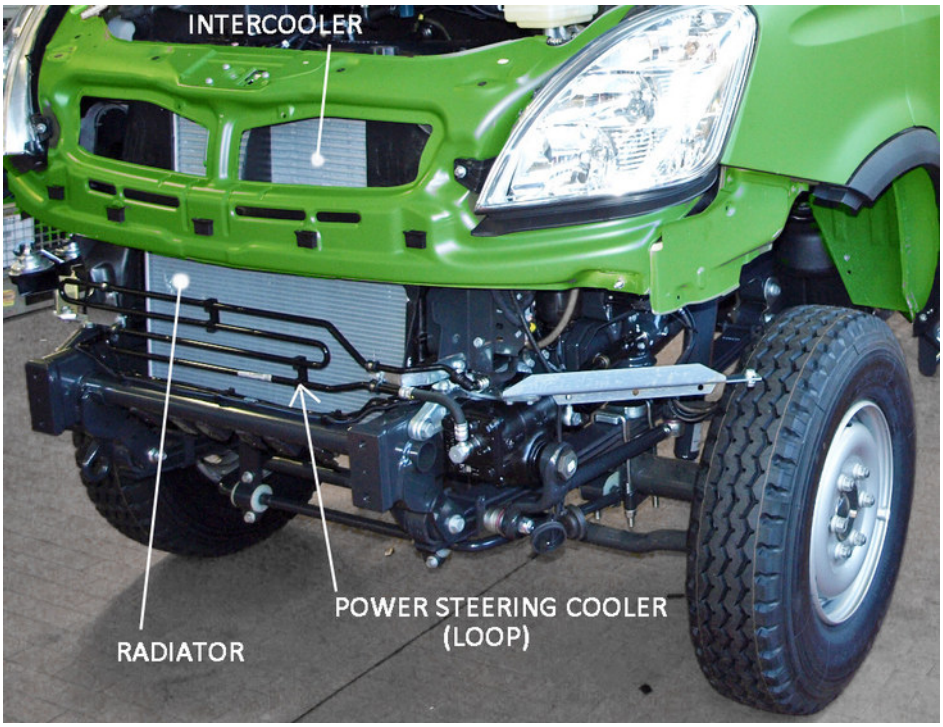
The Chart on the opposite page contains ECU Data from sample vehicles., The hours are cumulative, Fuel Cooler fitted to Truck 1 at 45,000km, has no new time added to 70ªc & above counters.

Most Iveco 4x4 aftermarket vendors or diesel tuning centers should be able to install a suitable fuel cooler.

COOLING SYSTEM

The cooling system on the 55S17W is relatively trouble free, as with any 4x4 vehicle close inspection of all hoses to ensure no rub points, e.g. contact with cable tie tangs, is warranted.

The radiator sits in the lower half of the stack, directly behind the bumper bar.
The intercooler sits on top behind the grille.



Interestingly the vehicle is equipped with a Power steering cooler !! That loop would have made a nice fuel cooler! Normal engine running temperature is between 91°c- 99°c and is indicated on the temperature gauge as between 1/2 & 3/4. No vehicles in the ECU study group have had coolant temperatures above 106°c.

Be Aware: Unique issue with this vehicle is that "Hot Fuel" will register as 'overheating' on the 'coolant' temperature gauge and is often misdiagnosed at the service level as a cooling system fault.

Two conditions will cause the temperature gauge to rise:

1. Hot engine coolant
2. Hot return fuel

Three conditions will start the cooling fan:

1. Hot engine coolant
2. Hot return fuel
3. Air conditioning

The ECU continually monitors engine coolant temperature via the Temperature Sensor on the thermostat housing. If coolant temperature exceeds predetermined values, the ECU will signal the fuel pressure regulator and the injectors to reduce the amount of fuel injected (Power Reduction starting from 106°C).

The cooling fan switches on at 95c, off when it cools to 91°C for first stage, 99 / 95°C for second stage

There is a plastic blanking cover, at the rear of and under the right side of the bonnet, it is where the cabin filter on Left hand drive models feed from, this can be pressed out without tools, and can aid hot air to escape the engine bay during low speed and Four Wheel Driving.

Coolant Inspection

The cooling liquid level should be between the "MIN" and "MAX" on the coolant tank when the engine is cold.

WARNING: The cooling system will be pressurised if the engine is still hot. To avoid possible injuries undo the coolant cap only with a cold engine!
– Top up with a mix composed of 50% radiator antifreeze (as per Spec. SAE J1034) and water.

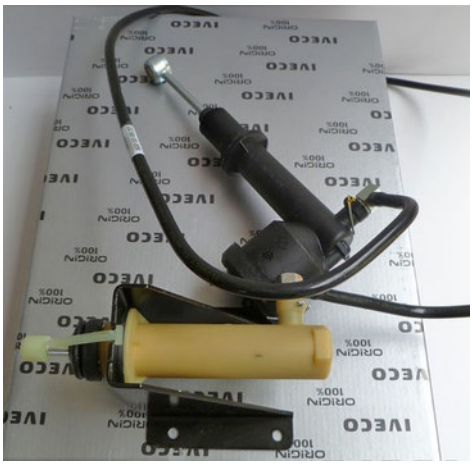
Year round use to avoid corrosion to the system. The coolant should be changed every 3 years.
– Quantity: approx. 11 liters

CLUTCH

The clutch hydraulics on the 55S17W is a fully sealed unit, with no serviceable parts, as per the side note on page 229 of the Owners Handbook, the master cylinder cap must not be removed. The master cylinder, slave cylinder, and hose is all one part, and comes sealed with synthetic fluid, pre bled, and ready to use upon installation. Part number 5801386404

The Clutch is a light duty unit from the 2WD model range. Pressure plate has a pull-type release mechanism. The engine is fitted with a dual mass flywheel which typically last about 150 - 200,000km upon which time it may be feasible to replace with a solid flywheel.

Dual Mass Flywheels are standard fitment on modern vehicles, their purpose is to enable quiet, vibration free idling. A Diesel engine with a solid flywheel will rattle and sound more tractor like at idle, but unlike a DMF a solid flywheel will usually outlast the the vehicle.



Clutch hydraulic system - all one part

A protective stone guard bracket under the slave cylinder is prone to fatigue cracking and is responsible for an annoying buzzing rattle under the vehicle.

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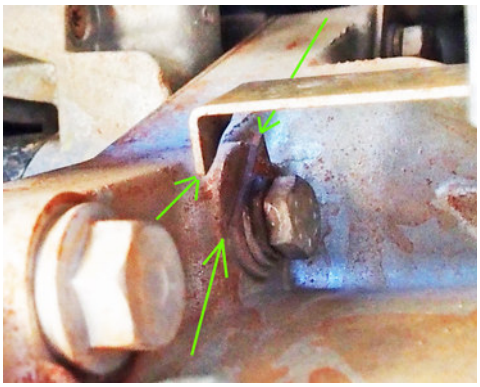
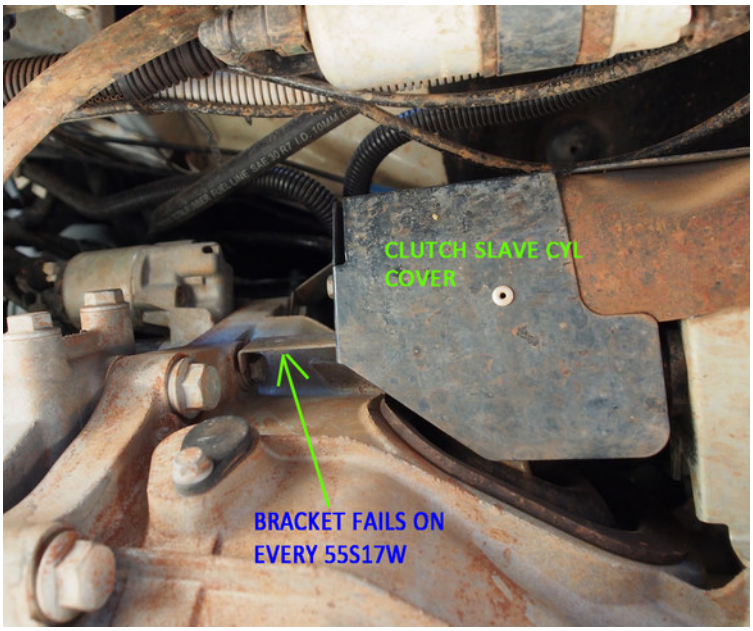




The flimsy bracket is south of the starter motor, image showing point of fatigue

Gearbox

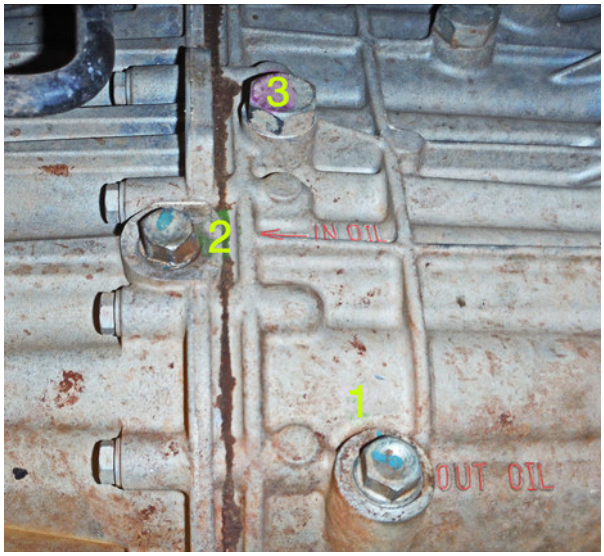
The main gearbox is the tried and tested ZF 6S 400 OD, designated as such for 6 speed, 400Nm (torque input) and OD for Overdrive / cable operated gear shift. It has facility for one PTO drive connection. A proven gearbox, with regular oil changes should not give any trouble for the life of your truck, no reported problems towing in 6th gear.

A word of caution about changing gearbox oil, "OUT OIL" is marked on the casting, pretty obvious that you unscrew Plug-1 to drain oil.

"IN OIL" is labeled in the casting about 100mm above, it is indicating Plug-2 which is on the rear housing.
DO NOT unscrew Plug-3.

Oil Capacity = 2.2L

Iveco specify, Tutela Truck Gearlite SAE 75W80 GL4 , only available from some Iveco Dealers, locally available Castrol Syntrans-Z and Penrite Progear 75W-85 are both Full Synthetic GL4 oils meeting ZF specifications.



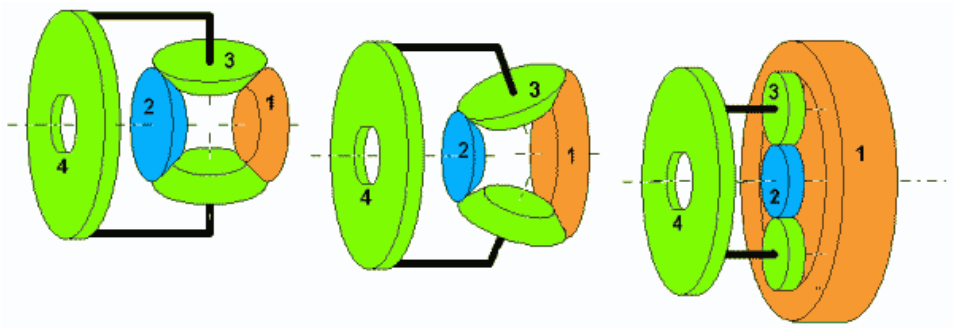
ZF 6S 400 OD as removed from 55S17W

TRANSFER CASE

The Transfer case is designed and built by SCAM Technologies. It is a remote 4 Speed Transfer case, constant 4x4, torque split 32% front, 68% rear, with Hydraulic Diff Lock. It has two independent gear change mechanisms. The 1:1 High range and 1:1.2.44 (aka Half Gears) has synchro mesh and can be changed on the move, using the Green gear knob. The Low (red knob) range of 1:3.115 when used in conjunction with the half gears gives a ratio of 1:3.866. With an overall ratio of 1:101, it has the lowest crawler gear of any 4x4 made.

The 32/68 torque split is performed by a planetary diff on the TC lower shaft.

Visual explanation; morphing a diff into a theoretical asymmetrical torque diff then into a planetary diff.



Another planetary gear cluster on the upper shaft provides the low range ratios, Half gear ratios are by a synchro dog gear set on lower shaft in constant mesh with the intermediate cluster.

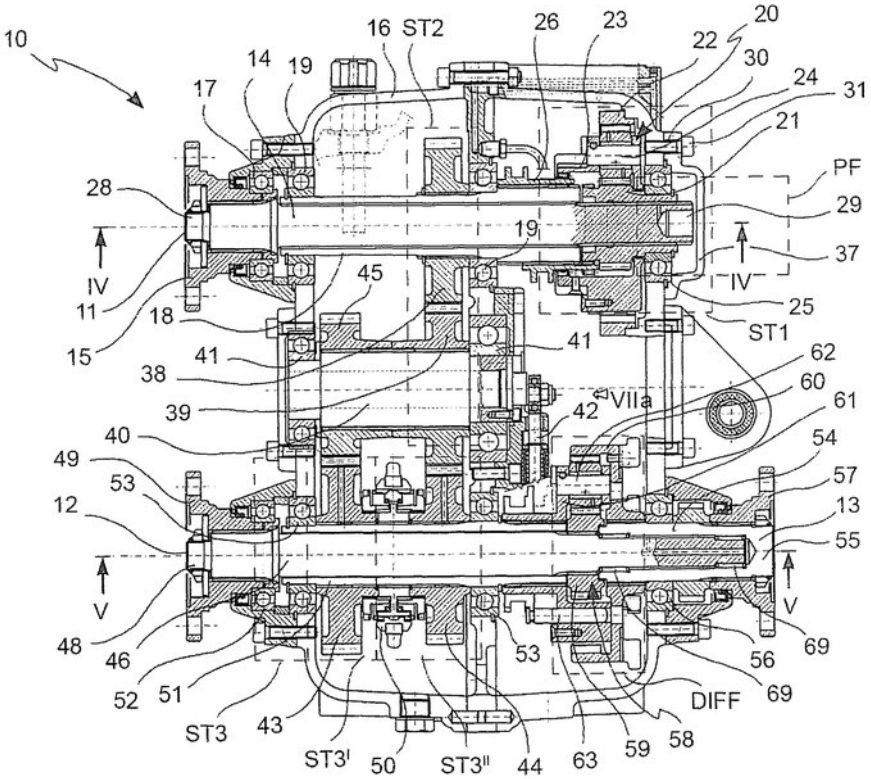
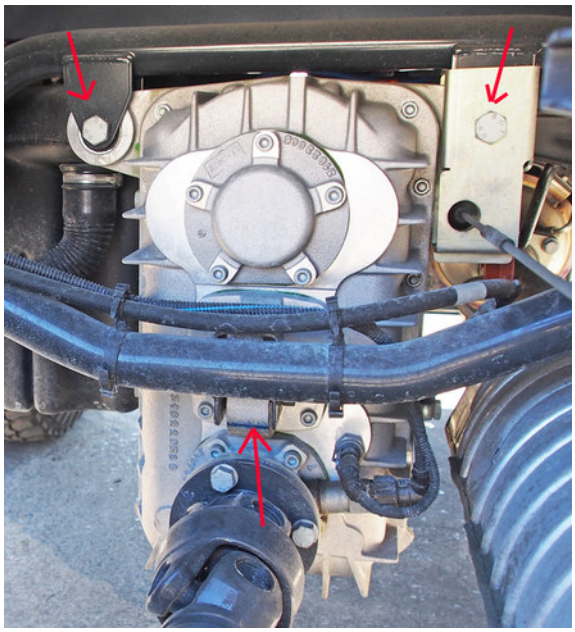


diagram courtesy: SCAM Transfer Case patent application (public domain)

Transfer Case Issues

One of the major issues that have come to light with this vehicle in Australia is the suitability of the Transfer Case. It Fails in 3 key areas. First, the integrity of the mounting is inadequate. Second, after any highway distance the Lubricating Oil overheats to the point of failure resulting in damage to or failure of internal oil seals and internal components. Third, the Low Range planetary grip suffers catastrophic failure due to lack of quality control of the Low Range circlip groove.

Transfer Case Mounting



The transfer case is mounted with 3 "Silentblock" bushes, part number 42559937

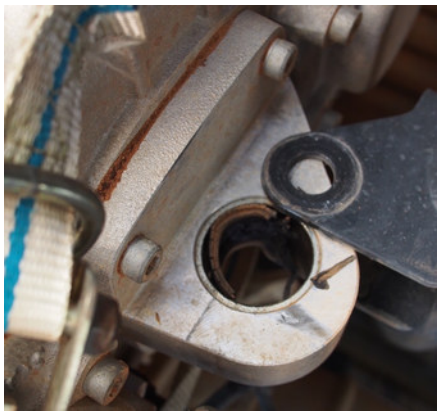
Failed transfer case silentblock bushes are the cause of a rumbling vibration when pulling away from a start on an incline or under load. In some cases the vibration has been misdiagnosed as clutch shudder.

The Bremach T-Rex uses a transfer case with the same chassis mount design and the same silentblock bushes. In regard to the mounting flanges The T-Rex owners handbook states;

"*Every 15.000 km:*
verify there is no longitudinal/vertical movement of the flanges"

There is no such warning in the 55S17W handbook, and no mention of the bushes in the official workshop manual, or scheduled maintenance guide. The mounting bushes are not fit for purpose, and are overlooked during vehicle service or maintenance inspection.

Typical early symptoms are low frequency rumble on take off, a violent shudder will became quite evident at 15,000km.



Above rear mounting bush was in a vehicle presented for service at 20,000km, problem not resolved. At 40,000km the Iveco Service centre was asked to check and replace Transfer Case bushes if necessary. Service centre "checked" and reported 'no problem'.

At 45,000km the vibration and clunking was excessive and a decision was made by the owner to fit a polyurethane bush rather than a genuine bush, knowing a genuine bush is 'not fit for purpose'

for examining TC bushes only, position jack in this location

It will be obvious when the TC bushes are shot from the transmission shudder when taking off from a stop, but to be 100% certain best method to confirm is to take the weight off the TC bushes with one pump of a jack positioned underneath, If you are able to move the TC sideways, or back & forth the bushes are unserviceable.

NOTE: only place the jack on the thick center part, otherwise the casing will be damaged, lift no more than 10mm after contact is made Never jack the truck from the Transfer Case.

SuperPro SPF0108, or SPF0109 Jeep rear spring eye polyurethane bushing is the correct diameter to fit inside the external steel sleeve of the existing silentblock, either use another flange cut off one end of a second bush, or two short bushes to complete the job.

one full poly-bush with cut off flange

cut in half for insertion from each side

The image at right shows the poly bush installed in the transfer case rear mount, this is done in situ. The easiest method is to remove all but the top front transfer case crossmember bolts on each side of the chassis and then rotate the crossmember away from the transfer case.

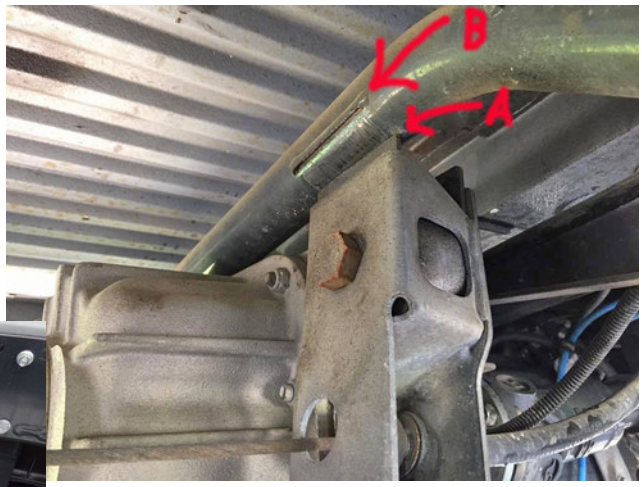
Using a "Universal Pull Press Sleeve Kit Bearings Seal Removal Bushing Driver Set" to remove the remains of the old silentblock rubber, and also to 'press' the replacement bushing into position using supplied lubrication grease. The flanges locate the bush as it's not bonded to the crush tube and eliminates the possibility of metal to metal contact between the transfer case flange with the chassis mounting brackets.

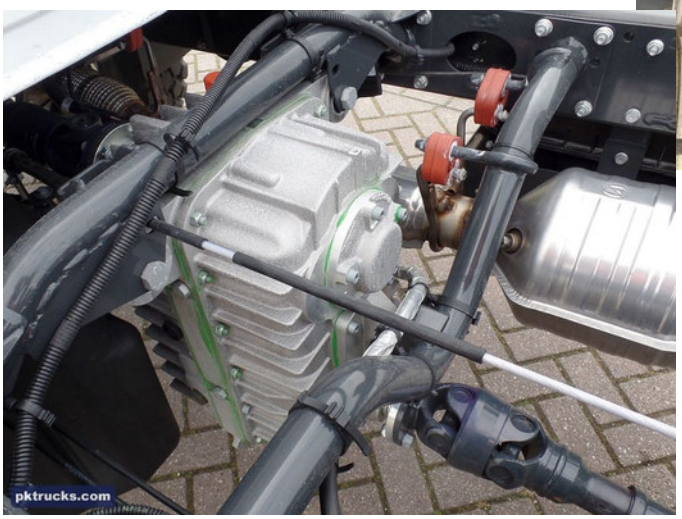
Repair eliminates vibration and drive line shudder, also noticed a significant reduction in transmission slop and clunking. Inspection15.000km later shows the poly bush repair to be in perfect, as-fitted, condition.
LandCruiser, spring eye rubber bushing can also be made to fit, Toyota Part 90385180 21.

Aftermarket poly-bush system has been trialled by Iveco but found to transmit road noise into the cabin.

Transfer case brackets have also failed on a some of these vehicle fitted with poly-bush replacements. Regular inspection and thorough pre-trip inspection & maintenance is essential .

If left unattended worn bushes can result in upper brackets cracking and breaking free from the mounting cross bar along the welds. (right)





The upper mount has been redesigned on Euro-6 (left) & is unlikely to break away from cross bar).

Ultimately the Iveco transfer case mounting system is flawed. Whatever bush system is in use on these trucks will need regular inspection.

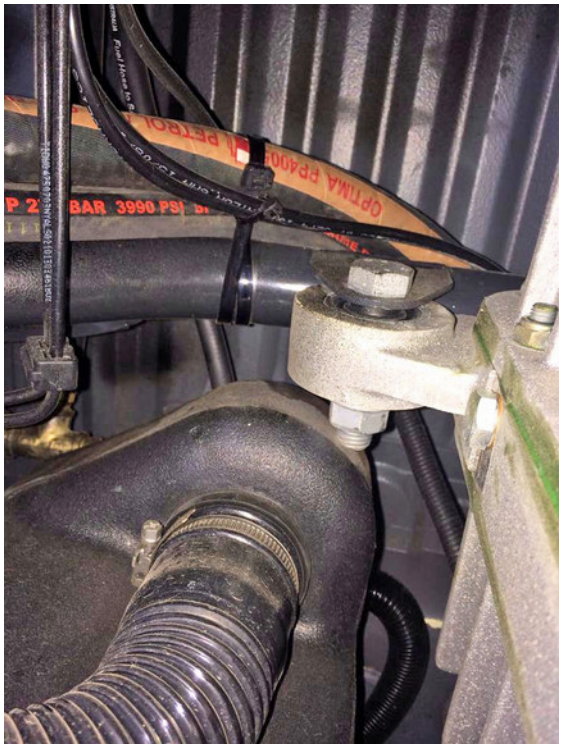
Modified Commodore strut rod bushes (Kelpro 28006) are the most successful retrofit bush in use to this date, and seem to be a 'fit & forget' solution. Modified on a Lathe the crush tube needs to be shortened and rubber profile adjusted. They are pressed into the bare alloy of the Iveco mount without the steel 'outer' ring of there Iveco bush. These are fitted into all three positions on the Iveco transfer case with no issues to date.

Images show unmodified Commodore bushing alongside modified bushing installed into factory rear mounting bracket . (makes no difference which way around it is inserted.) Generous use of rubber grease helps with the installation.

Its only taken 7 years since the vehicle was introduced into Australia, Iveco have finally produced a redesigned transfer case mounting bush, shown below . Easy to install, hopefully it proves reliable in service .

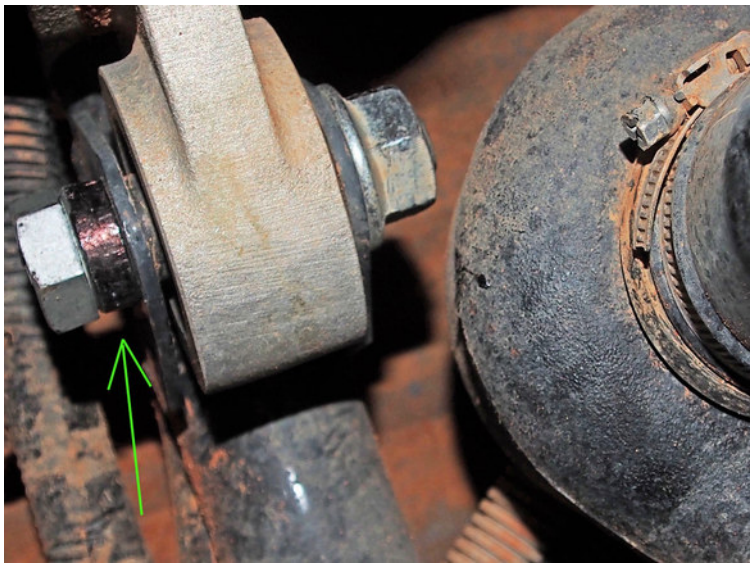
Transfer Case bolt - Fuel Tank interference

Whilst under your truck looking at the transfer case be sure to check out the top left transfer case mounting bolt. Something else that got past Quality Control in Italy, and Pre Delivery Inspection at your dealer is the bolt protrusion rubbing into the fuel tank.



Jason Robinson

photos: Dave McNee



If left unchecked is likely to wear a hole right into the tank. This will be a warranty repair but you need to point it out to the service centre, it is not something they will notice, and is not on the service schedule.

One DIY fix is to add a 7-8 mm spacer behind the bolt head, shown in the image at left, thus pulling the exposed bolt end back away from the tank.

Transfer Case Oil Levels

Confusing information about oil levels in the TC has caused a number of failures.

The black plastic plug (1) is the filler hole, not the level hole. The clear plastic sight glass (2) shows the apparent oil level? Do not touch detent bolt (3)

One version of the SCAM Transfer Case manual specifies 4.5L

Iveco Specify 3.0L in the owners handbook and workshop manual.

An Iveco service center bulletin specifies the correct level is in the center of the sight glass.

Adding exactly 3.0 L of oil brings the level to the top of the sight glass !!

Some transfer cases have been damaged by over filling prior to delivery to the customer and were replaced under warranty. The plastic plug and sight glass are prone to loosening, over tightening results in breakage. It is prudent to replace each with metal M20x1.5 bungs or easily obtainable sump plugs.

No other 4x4 uses a sight glass, it is totally anachronistic fitting with no place on a modern vehicle, if the transfer case is low on oil you will not be needing a sight glass to tell you, the outside of the transfer case will be dripping, and your going to be able to smell burning oil is it flings onto the exhaust pipe. If the manufacturer had confidence that the Transfer Case would hold oil, why even fit a sight glass? It makes no sense.

Transfer Case Filler plug and sight glass be should be retrofitted with metal M20x1.5mm sump plugs.

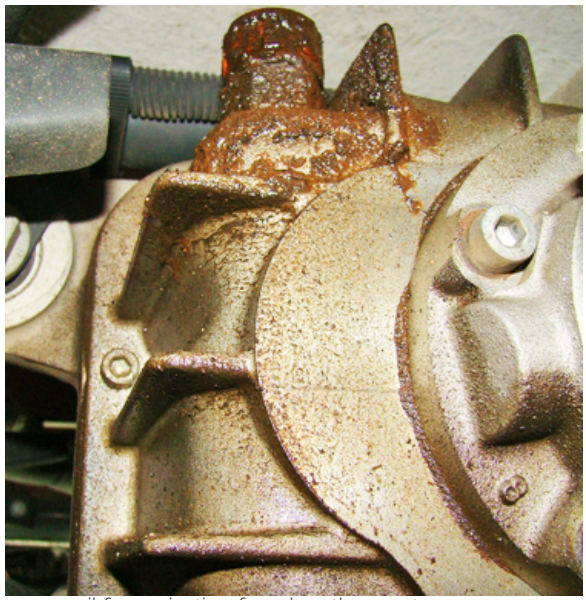
Clearly Label oil level so that there is no doubt in the minds of Service Personnel.

Transfer Case Oil Foaming and Overheating

It has been noticed in almost all cases that upon draining the Transfer Case oil, that it has been discolored from a golden honey to a dark treacle, a sign of being overheated and burned.
Perhaps, because of its mixmaster design, but for whatever reason the Transfer Case oil suffers from foaming, Foaming leads to overheating. Overheating leads to mechanical failure.

Alex Clayton

oil foaming in sight glass



oil foam ejection from breather port.

The manufacturer specifies the use of API GL5 mineral base SAE 80W90, Tutela W90/M, This oil's maximum service limit is 120°c, and that would be for stable oil - not oil foam.

The transfer case operating temperature should not exceed the limits of its design parameters, nor the oil specification limits. The Transfer Case manufacturer documentation states a maximum operating temperature of 105°c. Actual running temperatures of the Transfer case are reported to be well in excess of 125°c

Clearly an oil with a higher performance rating and decent anti foaming agent is needed.

The use of a superior Fully Synthetic GL5 75W90 Transmission oil would merit some consideration. Castrol Syntrax GL5 or Penrite ProGear GL5 are fine choices. Note Castrol Syntrax GL5 is for transfer case, Syntrans is GL4 for Gearbox, the bottle looks the same so select oils carefully.

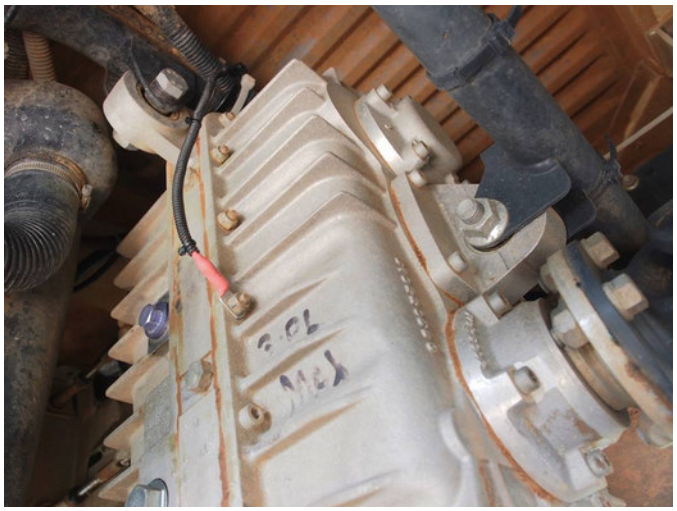
Adding 10% Morey's Heavy Duty Oil Stabiliser is worth considering. This excellent additive will help preserve the seals, reduces foaming and helps cooling. (10% in Diffs and Transfer case)

Transfer Case Temperature Monitor

Awareness of Transfer Case overheating concerns has resulted in proactive fitment of Transmission temperature monitors by a number of owners.

Overwhelming results show that the TC temperature slowly climbs to about 90°c during the first hour of towing at speeds above 90kmh, then after reaching 90°c the TC temp rapidly rises to above 125°c.

It has only taken 2 Years but finally Iveco Service Centres in Australia now acknowledge the Transfer case has "issues" and Iveco is "working on a solution". Iveco are at least fitting Temperature sensitive Labels on Transfer Cases, possibly as a study to determine the cause of the TC failures in Australia



Red sensors on TC bolts are TM4 probes

Why so many TC Problems in Australia?

In Europe there is no DIY Automotive culture, the industry is highly regulated and private owners do not have easy access to the dealer parts infrastructure, nor is there any aftermarket parts suppliers. Places like Repco, SuperCheapAuto etc. simply do not exist. DIY Oil change is out of the question, let alone vehicle modification. The speculation as to why there have been no reports of issues, prior to the Australian Introduction is simply because the problems have been kept In-House

Transfer Case Oil Cooler

If you intend to travel remote or plan to keep your 55S17W beyond the warranty period you will need to be proactive in regard to Transfer Case issues. For the life of the warranty period, of-course, the Manufacturer will keep throwing transfer Cases at your truck but Replacing a Transfer Case out of warranty is not something you would want to be paying for.

As well as switching to Synthetic GL5 oil it is highly advisable to fit an aftermarket Transmission cooler. This strategy will allow the lubricant to perform its intended function and extend the life of the SCAM Transfer Case considerably. To date none of the Transfer cases retrofitted with Coolers by concerned owners have failed in service. Installing an external oil cooler will also increase the Transfer Case total oil volume, without affecting the aforementioned TC oil level. Depending on your cooler choice and location there will be up to 50% more total oil volume. More volume = better cooling = less problems.

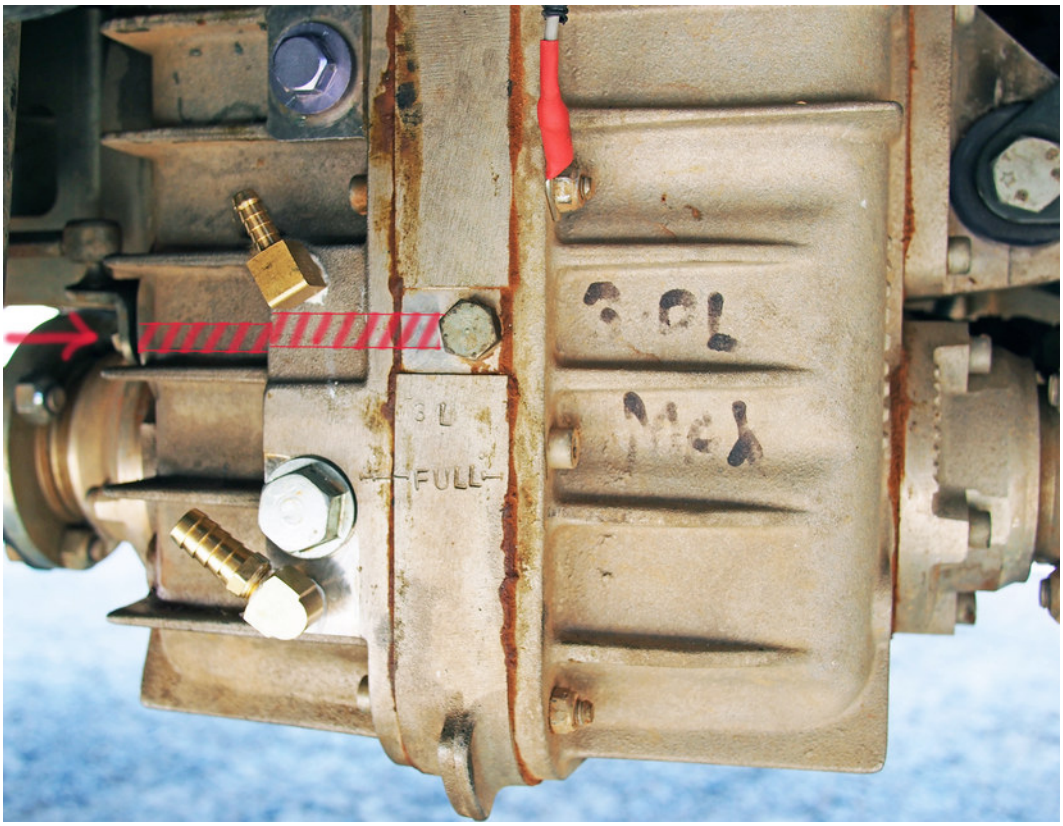
The 55S17W Transfer case does contain an internal oil pump to supply lubricant to the upper shaft and low range planet gears, but unfortunately there is no external oil pump port, so an external 12v oil pump is needed. Aftermarket turbo scavenge gear pumps are ideal for our application.

Gear type oil pumps are self priming and will only flow oil when the pump is running, there is no convection flow nor any oil drain-back issue. To install the pump, suitable oil pick up and return lines must be plumbed in to the transfer case. This can be done using M20x1.5 banjo connectors in the TC drain and Filler holes, or by drilling and tapping the Transfer Case in suitable locations .

The Advantage of the Banjo hose connectors are obvious but there is the danger of having an exposed oil line on the bottom of the transfer case.

For the 1/2" pick up line the safest place to drill and tap the transfer case is at the bottom of the thick alloy casting below the sight glass hole (sight glass replaced by M20x1.5 Sump Plug in above image).

For the 5/16 oil return line either use a M20x1.5 adaptor or Banjo fitting in the Fill hole, or drill and tap the thick part of the casting as high as practicable, use caution to avoid the 1/2 gears selector shaft. The casting wall is approx. 25mm thick in the suggested locations.



The shaft is not actually in the alloy section you will be drilling, but there is a danger of contact from the drill bit after breaking through the inner casting wall.

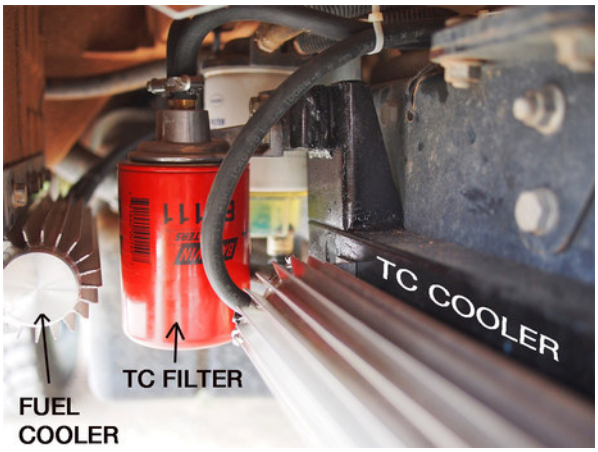
Use an 11mm drill and 1/4-NPT - taper tap, dip drills and taps in grease to catch swarf. Pressurise T/C with air blower through filler hole to prevent swarf entry, (do not use air compressor - use an air bed type blower only) flush out T/C with diesel to remove any remaining swarf.

Consider installing a remote filter in the cooler line, this not only adds more oil volume, which aids cooling but will also increase the life of your Transfer Case. The Z9 / PH8A type remote filter mount part BM80277 will accept the Baldwin BT111 Hydraulic filter. The BT111 is an ideal filter as it does not incorporate a flow restricting Anti Drain Back Valve.

The cooler is a 18" Finned Alloy Dual Pass transmission cooler, but many types of automotive oil cooler can be adapted to this task.

Use rated auto transmission hoses or oil transfer hoses only. Don't be tempted to remove the gauze filter from the VDO pump inlet, it will void the Pump warranty. The 1/2" hose from pickup on TC to Pump inlet may need reaming out, as its a very tight fit on the pump.

Any convenient mount location away from the exhaust will work, along side chassis, under tray, etc. if space is limited use two smaller coolers, try to mount bracketry using existing bolt holes, do not drill the chassis.

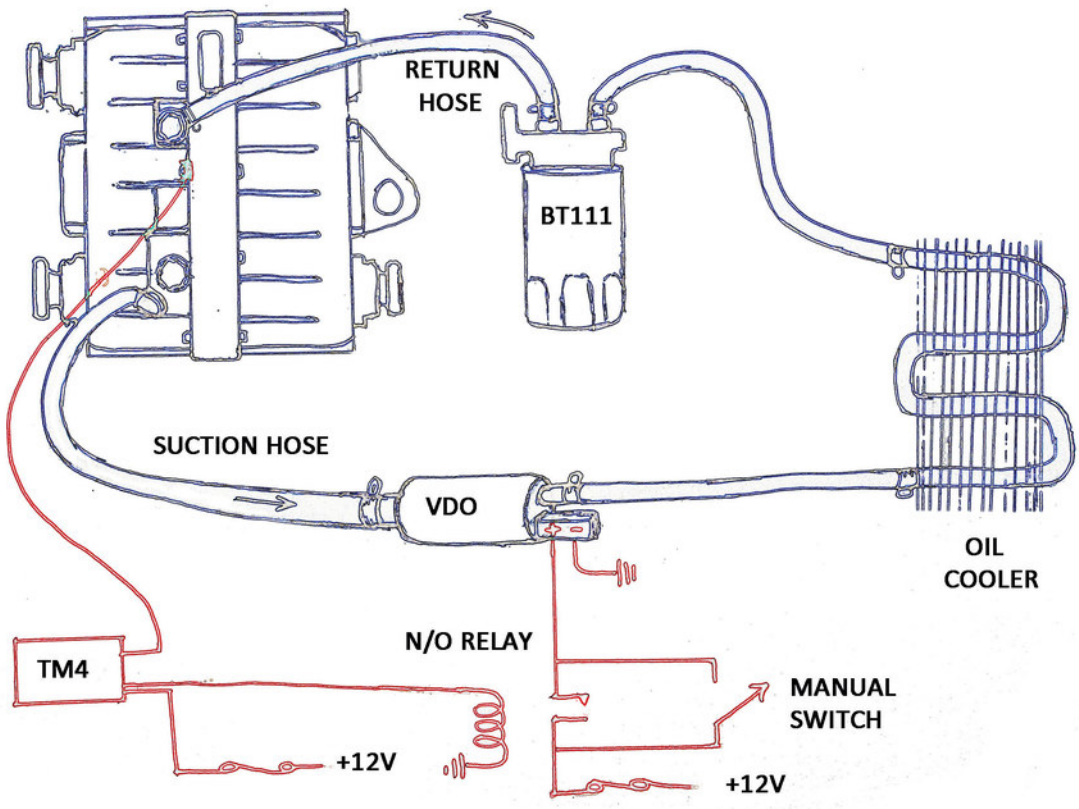


Configure The TM4 Watchdog to automatically start pump when oil reaches 80°c, Maximum Oil temperature now observed after several hours non stop driving, using oil cooler and Synthetic GL5 oil when towing long highway distances at 110Kmh should be below 110°c.

When you install your Oil Cooler system it is advisable to have an idea of the volume of hoses, filter and cooler used, Easiest way is to fill them up with diesel (using an oil syringe) & pour into a measuring container to determine volume, add that amount to 3.0L to determine total capacity.

NOTE: the VDO Oil pumps have been failing in service, Cheaper "Geared Turbo Scavenge pump" from eBay are more bulky and noisy but have been much more reliable.

Once installed fill transfer case with total oil volume, run pump using manual over-ride switch to fill hoses, cooler and filter, otherwise you will be driving with ~4.5L in Transfer Case, which in itself can cause problems. Either use previously described method to determine system volume for correct oil level, or else park truck with two left wheels 250mm higher than right wheels and use bottom of sight glass hole as a level.



Iveco are not the only vehicles to have overheating Transfer Cases, Hummer and Mercedes also suffer from this issue, but the difference is they have implemented solutions. At this stage Iveco still are in denial.

Image at left shows TravelTrucks professional transfer case cooler installation

Muffler removal,

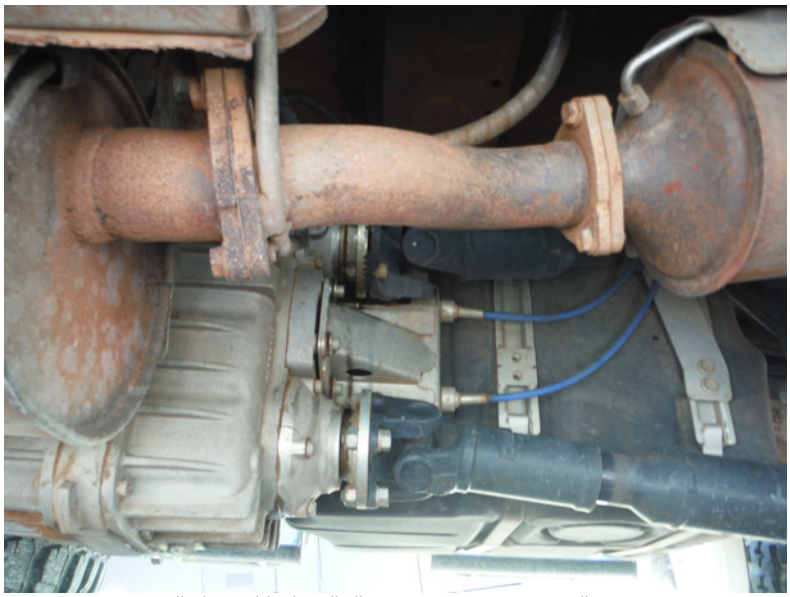
Its not what your thinking, The muffler has been found to block the flow of air needed to cool the transfer case during highway operation at speeds above 80kmh. Especially on Dual Cab versions. Removal of the muffler on a Euro 4 - 5 makes no noticeable difference to the exhaust noise, the turbo whistle becomes slightly evident, is not illegal and is not part of the emissions equipment. Another piece of expensive and heavy equipment, not needed at all and actually contributes to the overheating and early failure of the transfer case.

The transfer case runs fast least 20c cooler when the muffler is replaced with a length of straight pipe (or a hot dog) . One of the best improvements you can make to the truck and costs next to nothing. This modification really makes fitment of the aforementioned oil cooler almost pointless.

This mod can not be done on Euro6 models as there is no muffler , The Exhaust components consist of DPF (Diesel Particulate Filter) and SCR (Secondary Catalytic Reactor) both of which are part of the emissions equipment.

Transfer Case Leaky Seals

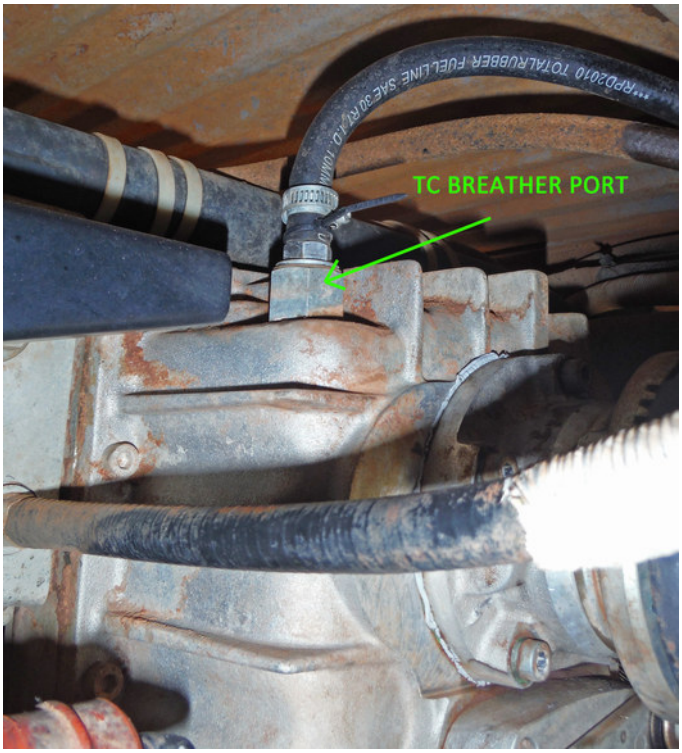
Unfortunately the SCAM Transfer case in the 55S17W has issues with leaking seals.



telltale seal leak- oil sling pattern on surrounding parts

no comment needed !!

Apart from a visual inspection a burning oil smell is a foreboding sign, the oil slings in a circular pattern around the seal, some settling on the exhaust pipe to produce the oil burning smell. Always determine the source of oil smells.



remote breather hose in-place of standard orange cap

It is a matter of contention as to weather the Factory breather contributes to the leaky seals, in effect that breather is a one way valve, it lets pressure out as the transfer case heats up, but as the TC cools down a vacuum forms inside, the TC reaches a state of equilibrium and in effect the breather does nothing at all. This puts undue pressure on the seals.

Consider using an aftermarket breather extension kit and breather filter. The breather is the 'orange cap' located on top of the transfer case. If you plan on keeping the original breather, check it often as they do come loose and fall off, and being plastic, will break if overtightened.

The Diffs and Transfer case both have a one way valve "breather" design and both suffer seal issues. The main ZF Gearbox has an 'open' breather and does not suffer seal issues.

Prior to presenting a Vehicle for TC seal repair it is advisable to first enquire as to weather the workshop has the necessary tools and parts needed, specifically the flange nut socket. (while your at it get them to check & replace the silentblock bushes if required).

The Transfer case input / output seals can not be serviced without the special keyway socket needed to undo the flange 'ring nuts', tool part no. 99355047. Most service centers have never seen one of these vehicles let alone have the tools required. It is prudent to buy your own socket, and even carry spare seals. In the event you do require seal replacement is a remote location at least you will not be stranded waiting for tools and parts.

TC nut tool Iveco part no 99355047

Genuine TC output seal 42559750 is $67 from Iveco.

Equivalent 68 x 50 x 8mm Viton seal part no 103143V from bearing supply $27.00 handy to keep as a spare .

Transfer case fastening ring 42559758 $45.00

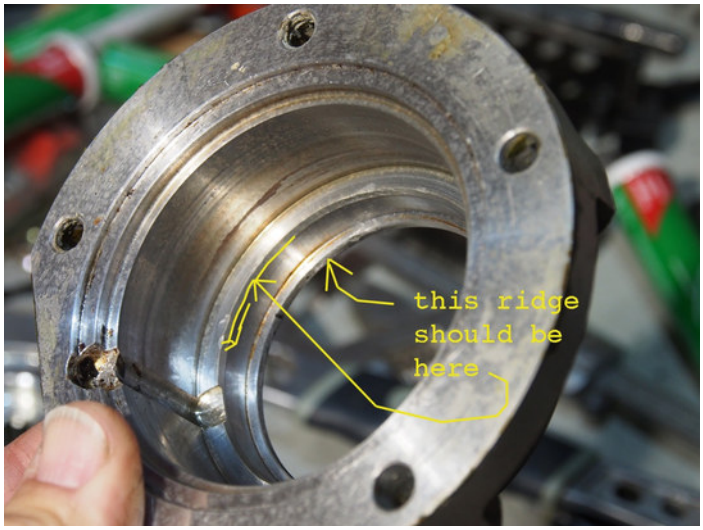
This is the glorified nut which, which is why you need the special Transfer case tool.

Note: Iveco Parts call the genuine seal a 'Gasket', its the lighter brown seal in the photo.

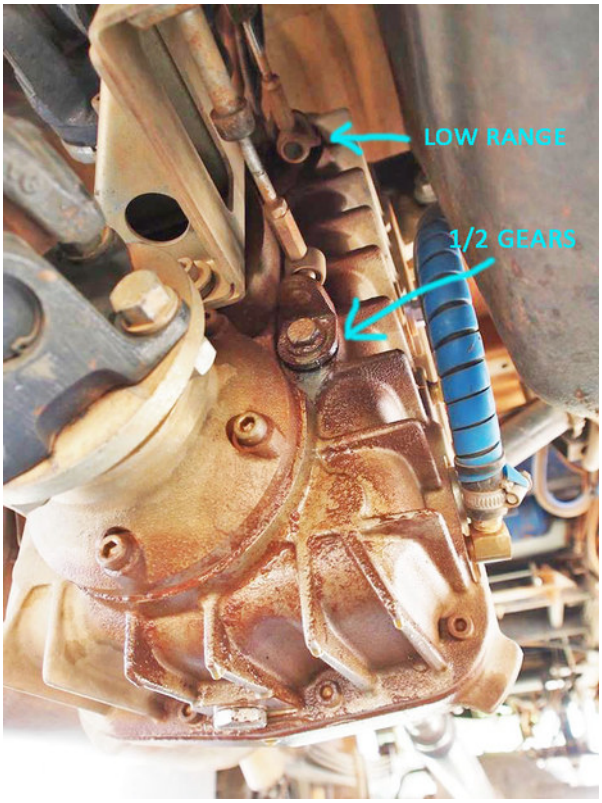
A popular modification is to ‘externalise’ the oil seals. For some unknown reason the Input (and output) housing seals are on the inside of the housings, instead of the outside. Mind boggling engineering requires removal of housing to replace a simple seal.

As can be seen in the image at right the oil seal needs to be pressed into the internal surface of the input shaft bearing housing, This means removal of the housing and disturbing the bearing. It makes no engineering sense.

The housing can easily be modified on a lathe to accept an oil seal with the same internal diameter but a larger external diameter (72x52x8mm instead of the original 68x52x8). Future seal changes only need the drive flange removed to replace the seal.

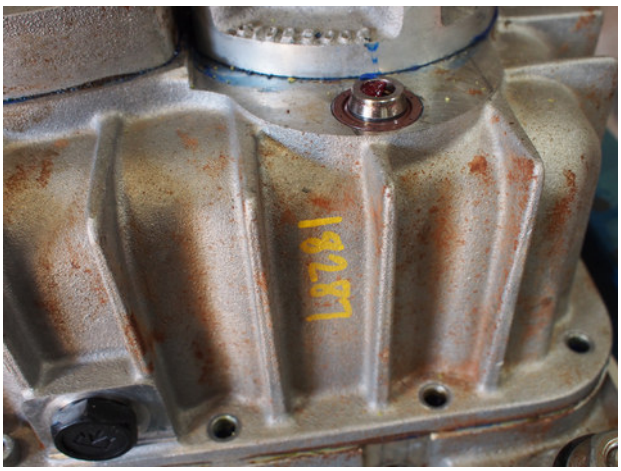


The o-ring seals on the half gear and low range gear selector shafts are also prone to leaking, unfortunately in this case replacing a simple o-ring is not a DIY job, nor even an Iveco Service Centre job, The transfer case needs to be dismantled by a specialist to replace a $1.00 seal, no mention is given to these o-ring seals in the official workshop manual. The o-ring, part number 42559818, is listed with Iveco parts as a "washer" and is 0.48p from Vexi.



It is a waste of time and effort to re-install the o-rings, have your Transfer Case front cover milled out to accept a pair of rotary seals, which last infinitely longer and can subsequently be replaced from outside without disassembly.

Boring out case to accept external seal



External oil seal inplace of 'selector shaft o-ring

Transfer Case Circlip Failure

There have been many Transfer Cases fail in service, The failures result in a lack of drive and inability to engage high or low range, leaving the vehicle stranded. On All Australian delivered models the High / Low Range planetary gear mechanism in the upper half of the rear housing is held in place with a 180mm diameter circlip. Failure of the circlip results in total low range reduction gear failure and the inability to proceed even in high range.

According to the parts catalogue there are 6 Transfer Case revisions. They are listed as 1, 5, 6, 7, 8 & 9. the circlip low range is only on version 9. and apparently all 55S17W models subsequent of chassis number 5895544 are fitted with version 9, (Australian delivered vehicles.) The point of failure is the circlip Iveco Part Number 42567335, listed as "Spring Lockwasher" Vexi £17.89

We are told that Iveco were "working on the problem" but never came up with a solution

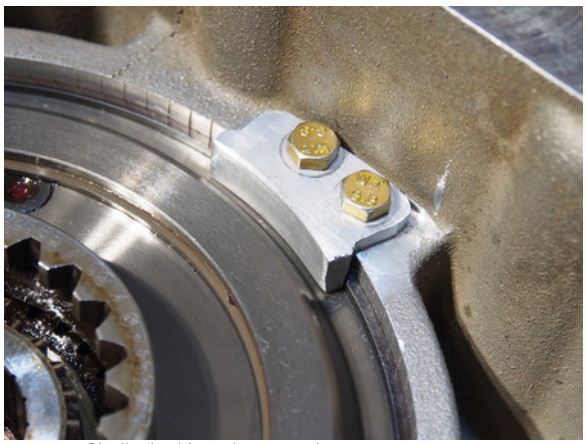
The problem is with quality control (or lack of) during the Transfer Case manufacture, the circlip groove machining is inconsistent, some circlips have been found to be loose, others are tight in the groove, regardless of age or distance travelled. A simple remedy is to install a clamp device retrofitted into the Transfer Case rear cover to keep the circlip expanded into the groove so that it is impossible to fail.

The "problem" is certainly costing Iveco a lot of money as transfer cases do not come cheap. at a Vexi price of £11,733.78 = $25,157 AU

Once the circlip fails the damage is catastrophic, other than replacing the entire Transfer Case remote or field repair is impossible.

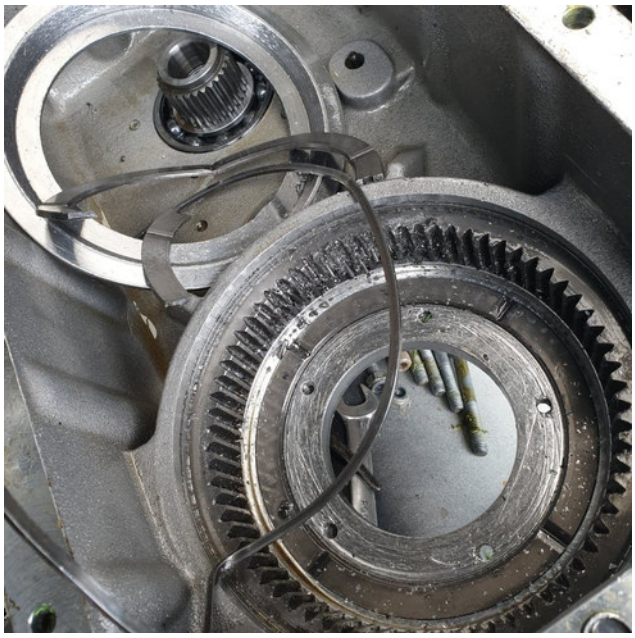
In that case you need a Satellite Phone and Ivecocare phone number

less than 0.9mm of circlip sits in the groove



Circlip 'lock' makes sure it can never pop out

Classic Low Range circlip failure . The stuff nightmares are made of.
20,000km , never been off-road, only once been in LowRange ,



Bowden Cable Clips

There have been a few cases the Transfer Case gear change Bowden Cable clips falling off , this results in a pucker moment with the inability to select or change a transfer ratio.

It is an inconvenience rather than a disaster, and noted by the respective transfer case gear moving freely without the ability to change back into high gear.. The Bowden Cable Clip is a U shaped clip engaged into a recess in the end of the Bowden Cable.

It would have been sensible to rotate the clips at manufacture so that they are not gravity assisted when they come loose. Brake Hose clips of appropriate size may be substituted as a field repair.

Transfer Case Lever Boot

So It seems the SCAM transfer case was only half done, they could have made it so much better with little extra effort, so why should inside the cabin be any different? With a little extra effort the utilitarian Transfer Case binnacle is transformed to suit the rest of the nicely appointed interior.

A LandRover Defender gear lever boot fits on perfectly Remove knobs by twisting and pulling upwards, they are not threaded but a taper fit. The dual lever boot is LandRover part number DA5498.

Differentials

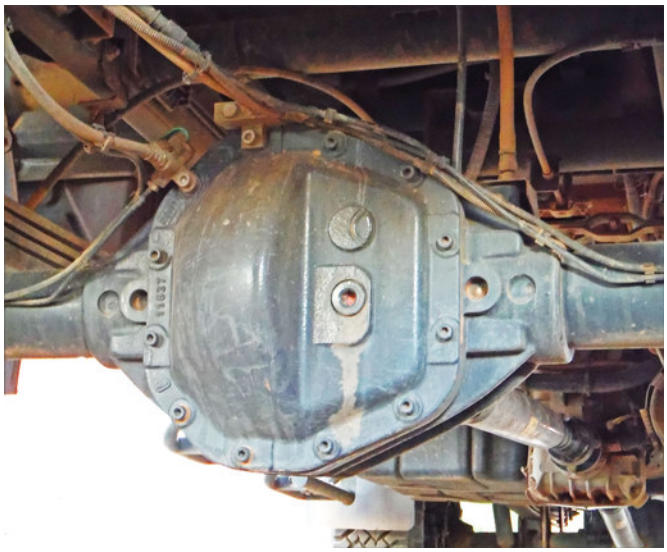
The Diffs and Axle assemblies are built by Carraro, not a common name in automotive parts, but well known Industrial machinery and Tractor transmission and diff manufacturers, and suppliers to John Deere / Case etc.

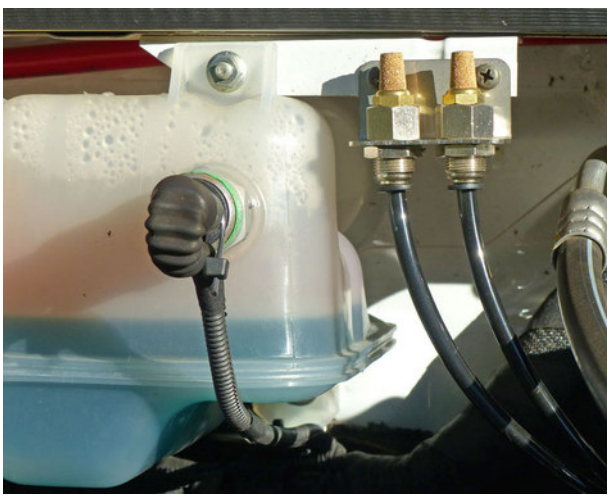
Front Axle; Carraro HS 6.07 4.875:1
Rear Axle; Carraro HS 8.09 4.875:1

These Final Drive units sit between a Dana 70 & 80 in construction and specification, with 4 pinion carriers and Fully Floating Axles with Hydraulic diff locks standard on the 55S17W

Bullet proof Axles and gears, with 88.9mm Axle Tubes and Nodular Iron covers. Diff Locks and unbreakable covers already done, you don't need to spend any aftermarket dollars here. These pumpkins are so strong out of the box they wont need pegging. Only the passage of time and serious overloading will tell if they ever need trussing.

Front axle CV joints are open knuckle 'maintenance free' Double Cardan U/J's. There have been reports of a 55S17W in a serious heavy duty pump application on a Mine site suffering multiple CV failure.





ARB diff breather extension kit

Diff breathers, like the Transfer Case breather, use one way valves, letting built up pressure out - not back in, creating a vacuum when cold and pressure equilibrium when hot -it's just wrong.... why have a breather at all ??

You should consider using an aftermarket breather extension kit and breather filters. The factory breather sits on the end of a short extension hose and is a total waste of time, by design it can not suck water in -so why even have it on a hose ???

The Breather problem may be partly to blame for a more serious issue, Leaking Pinion Seals. (as can be seen in photo of front diff above)

In some cases the Diff pinion seal starts leaking after only a few thousand km, it is a warranty repair. Oil leaks are a roadworthiness issue. It also has been noted that some seals replaced under warranty have started leaking almost immediately. A special tool, Iveco Part no. 99374459 is needed to set the seal position in the diff housing 5.4mm below the diff nose.

One might surmise that either the genuine replacement seals are either faulty or that some service centers do not have, or refuse to use the required seal insert tool.

Iveco Diff Pinion Seal Insert tool,
part no. 99374459

Diff Pinon Seal,		
Genuine	Iveco 42558469,	$175.00
cross reference	CORTECO 12017026B	$30.00
Genuine	JOHN DEERE AL159591	$20.25
GENERIC	viton seal 60.0x90.0x10.0mm	$30.00

The seal shown on the tool in the photo at left, in position ready to insert into a diff nose, is a generic $30.00 Viton seal 10x60x90 from an industrial bearing supply, and from all accounts, most likely will have a longer service life than the Genuine $170.00 seal.

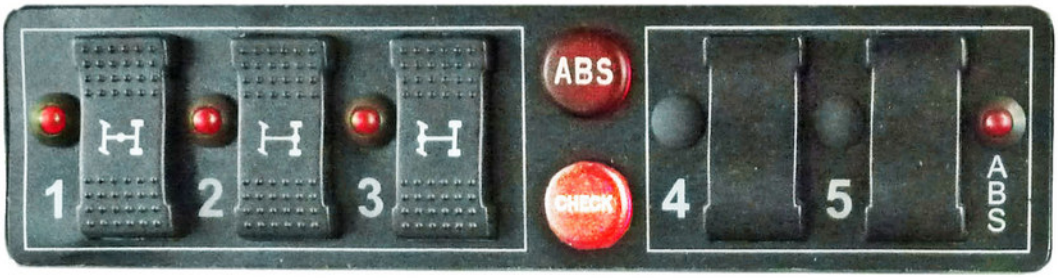
Consider carrying the seal insert tool and spare diff seals, many service centres do not have this tool in the workshop, or the seal in stock. If you are traveling remote there is a chance that you are going to have a scheduled service done at a dealer that is unfamiliar with this vehicle, let alone the seal insert tool. Replacing a Diff pinion seal is a straightforward job, most mechanics could do asleep, and most would not know a insert tool is needed let alone know that one existed.

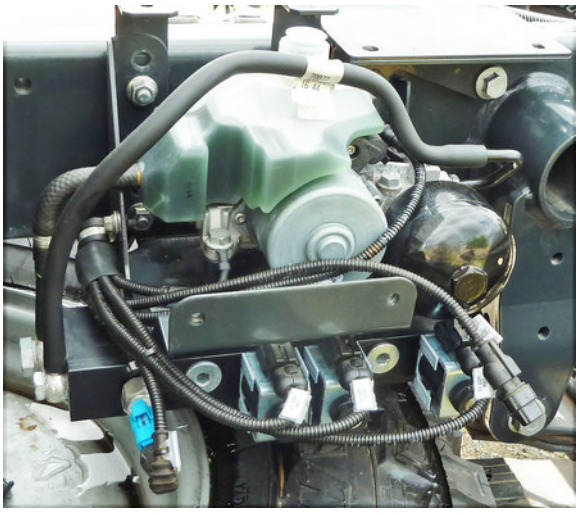
The manufacturer recommends 3.2 Litres, GL5 Mineral based Gear / Diff oil Tutela 80W90 or 85W140. Tutela oil being difficult to obtain in Australia, any GL5 Mineral EP diff oil (not LS) will be fine, 80w90 for colder climates, 85W140 for tropical or Towing applications. Synthetic is fine to use but a waste of money, the Diffs do not suffer overheating issues.

Note: rear axle is mounted on wedge spacers, resulting in diff nose pointing upwards, you may need to point vehicle downhill to fill rear diff with 3.2 Litres of oil.

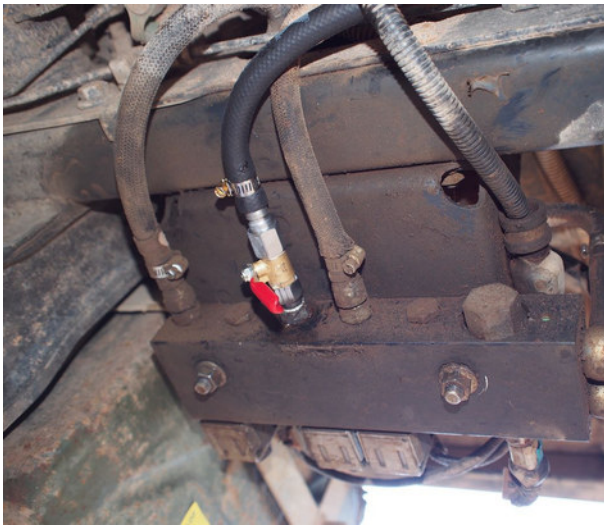
APU - Diff Lock Fluid

The check light on the Diff Lock control panel is not mentioned in the owners handbook, Iveco service centres often misdiagnose a check light error. The check light relates to the Fluid reservoir in the Auxiliary Power Unit, aka. Hydraulic diff lock pump, under the metal cover above the spare wheel. If you have low or leaking hydraulic fluid the light will flash or remain on.





APU, Diff Lock Hydraulic Pump



Tap added to CDL line to "fix" leak into transfer case

The APU and fittings are not real Hydraulic components, it only operates at 70-120 psi.

If you need to add fluid and don't have an obvious leak then the fluid is leaking into one of the diffs or more likely into the transfer case via a worn centre diff actuator seal. To be sure check the diff and transfer case levels. The "Hydraulic oil" is a Synthetic fluid known as "Tutela G1/R" almost unobtainable in Australia, do not add regular power steering fluid or hydraulic fluid, Penrite "LDAS" is a locally obtainable equivalent.

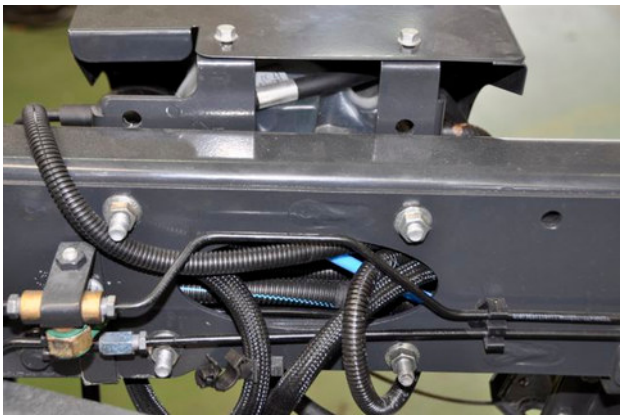
If the fluid leaks into the transfer case or diffs it pollutes the oil and damages the deals.
Running Synthetic GL5 75W-90 Gear oil in the APU is a good strategy. Does not harm the APU Pump or hydraulics and wont pollute the transfer case or harm the diffs.

The APU pressure sensor is a known fail point, (check light fault) $380 from Iveco.
It can be substituted with any of a number of suitable "on-off " air pressure sensors switches which are found between $10 and $50 . With a suitable metric to NPT adaptor an air compressor switch works just fine .

Reposition APU for Larger Tyres

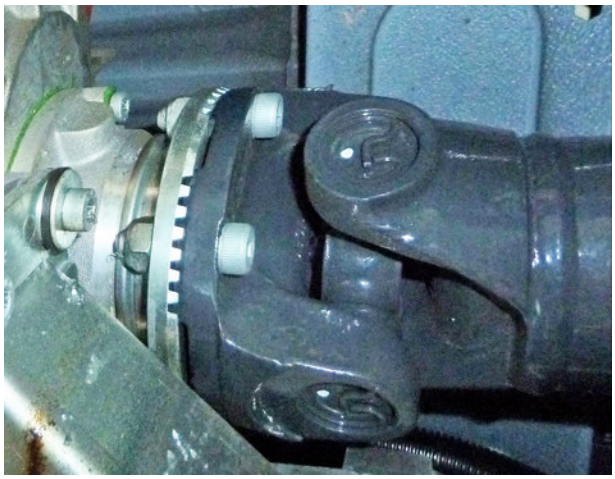
When larger tyres are used on the existing spare wheel carrier the tyre sidewall is forced up against the APU. Any pressure on the valve body will cause the Diff Locks to not operate correctly. The APU must be raised or relocated to give adequate clearance. Remounting the APU 20mm higher resolves any issues.

Remove the unit from the chassis and drill 4 new holes in the backing plate. Each new hole will be 20mm below the original hole. Re-bolt to the chassis rail using the original bolt



Drive Shafts

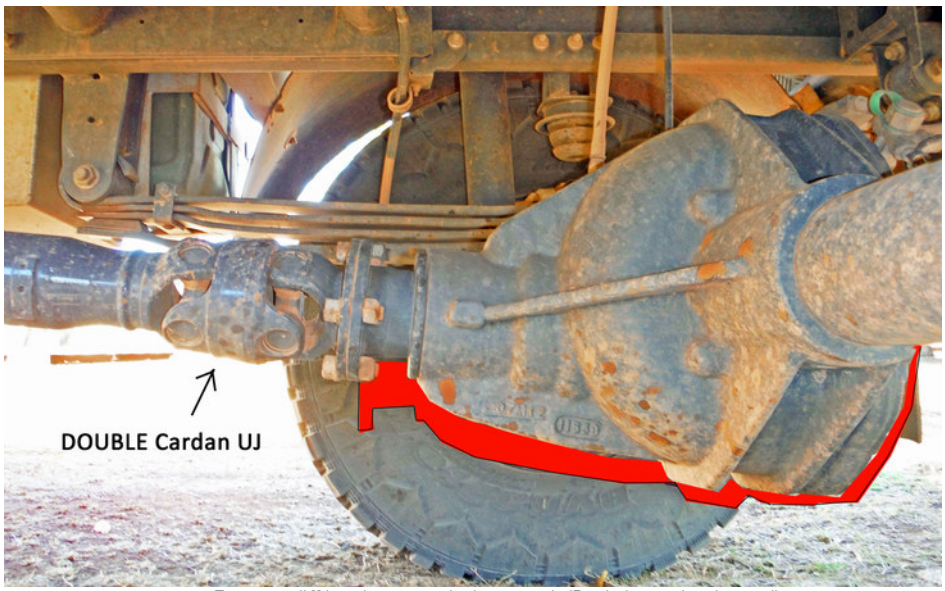
The drive shafts on the 55S17W are Carraro units with sealed for life slip-joints and universal joints. The Jackshaft flanges are keyed into the Gearbox output flange and Transfer Case input flange for zero backlash and maximum torque transfer. This is usually only seen on larger trucks.



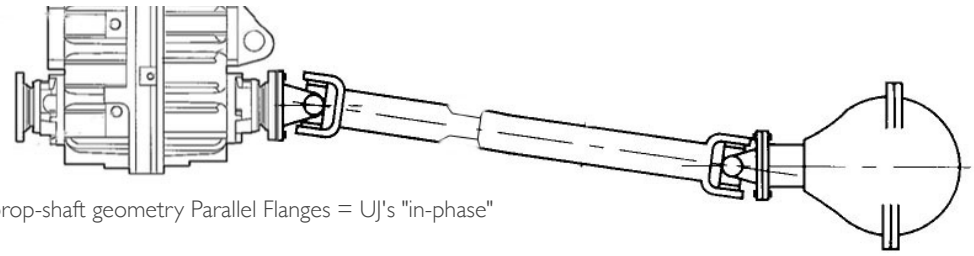
The Manufacturer has decided to point the rear diff pinion upward, apparently an afterthought, with the use of wedge shaped spacers under the spring perches.

Typically, conventional universal joint and propellor shaft geometry necessitates that the output shaft of a transmission and diff pinion shaft are parallel.

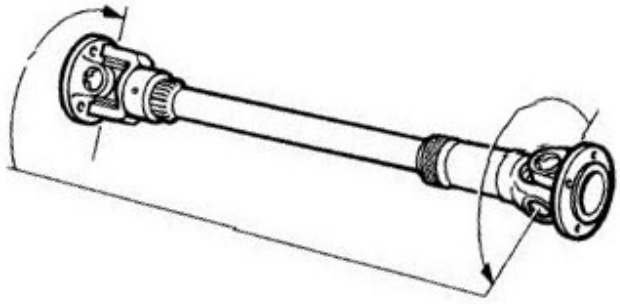
If the drive flanges are not parallel Prop shaft vibration and undue transmission wear results, hence the fitment of Double Cardan joints on the rear drive shaft. For some reason Iveco have fitted a DC joint to both ends of shaft, its only required on one end.



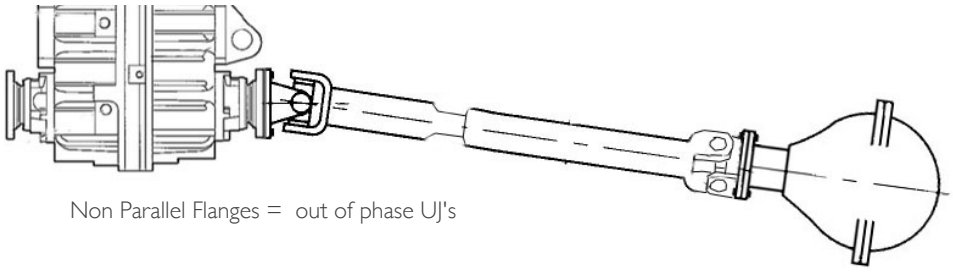
Factory diff has been angled upward, (Red shows horizontal)



Correct prop-shaft geometry Parallel Flanges = UJ's "in-phase"



When the drive flanges are not parallel, prop-shaft vibration can be over come by running the Universal joints "out-of phase", That is running the Universal joints at a calculated angle to each other, as is the case of LandRover Defender and Range Rover front prop shafts. Defender and RRC front diffs point up toward the transfer case.



Non Parallel Flanges = out of phase UJ's

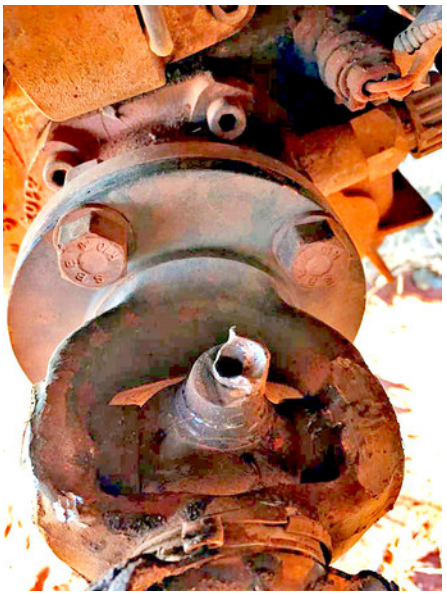
It seems incongruous that the Manufacturer has chosen to rectify the apparent afterthought of raising the nose of the rear diff by using very expensive to replace Double Cardan Universal joints, when first it was un-necessary to raise the diff to begin with, and second, the prop-shaft vibration issue can be overcome by simply running single UJ's "out of phase"

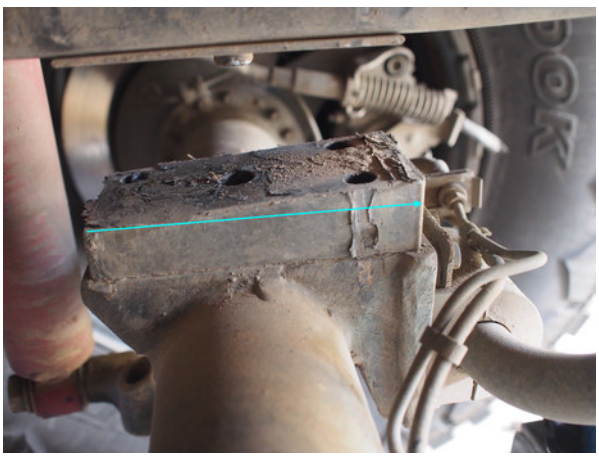
Down the track when its time for UJ renewal consider fitting a new rear prop-shaft with singe UJ on each end. Either 'out of phase' if retaining the spring perch wedges, or in phase if retrofitting with flat spacers. UJ's on the jack shaft are 42566476,

Front and rear prop shafts Dana-Spicer
Carraro UJ's are Iveco part number 42535251 30.17x82mm = 1.188" x 3.228",
Cross reference UJ part numbers 42530886, 42541373, 42546332,

Some Ford Transit models also use this size.

A number of these vehicles have suffered failure of the forward Double Cardan joint on the rear drive shaft . In the light of early failure without symptoms it would be prudent to fit a hoop around the shaft to prevent damage in the case of failure.





Retrofitting a standard tail shaft is one strategy to eliminate this weakness, requires modification of the wedges spacer block to allow diff pinion to sit horizontal.

If the front drive shaft does not have Double Cardan joints , there really is no valid reason that the rear should have them.

Whilst your at it a good time to fit centre locating dowels which Iveco neglected to fit during manufacture. These can be cut from the shank of a Hi Tensile 12mm bolt , these are vital to stop the axle 'walking' in the case of loose U-bolts .

A new Spicer shaft can be made locally for about 1/3 the price of a new Iveco shaft and for about half the price of having an Iveco shaft rebuilt. No more worries about Double Cardan joint failure .

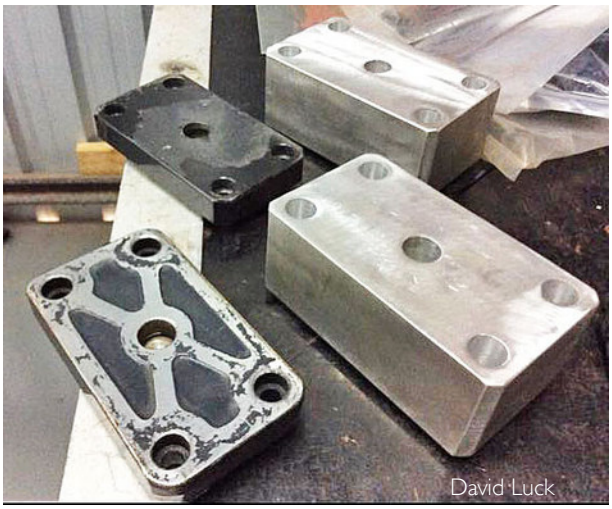
The first 4x4 Daily versions made in 2006 did not have DC joints in the rear tail shaft, Its reported the diff was pointed up toward the transfer case and DC joints added as a response to a fault caused by Axle Wind up a phenomenon where the axle rotates around the spring leaves under extreme braking (impossible in an Iveco) or extreme power (low range steep rock climbing). The DC shaft can not prevent axle wind up & the standard spicer Universal Joint can handle a 30° angle so very unlikely to be a problem

The Iveco Lean

Not only are there the wedged spacers on the rear spring perches, but there are also flat spacers under the front spring packs.

Both the left spacers are higher than the right. This is not to adjust for road camber as LHD models and RHD models use the same spacers and both lean to the right.

Apparently it is to compensate for the weight of the Fuel Tank, Spare Wheel and driver on the left side of LHD models. Too much trouble to change for RHD models ?? They are bolted to the axle housing with4 Allen head bolts . . You will also notice your "u" bolts are different lengths.


David Luck

A popular modification is to correct the lean by using equal height spacers (or even removing them), that will be a good time to add locating centre dwells between axle and spacer block, as mentioned at the bottom of page 66

The Iveco Lean is caused by uneven thickness spring spacers.

Brakes

If you have any brake problems, in the first instance present your vehicle to Iveco.

The main disappointment with the 55S17W is the very substandard service (wheel) brakes and absolute absence of any engine braking. As a result the brakes easily overheat, dangerously so, especially when towing on the long mountain descents of Great Dividing Range.

Yet the truck does pass ADR brake tests, that is more an indictment of the ADR testing regime than anything to do with "brake performance" of the vehicle..

With reference to NSW Department of Primary Industry, Safety Alert SA06-13 Braking Standards for Trucks, "Braking Standards may not be Fit for Purpose" The recognised standards appear to be fit for purpose on grades of up to 10% (1:10) only.

Despite what the advertising and specification literature will have you believe the front Rotors are SOLID - NON VENTILATED discs. 22mm thick x 297mm dia .

Up until Aug 2015 The Specification PDF sheet stated that they are Ventilated, The Workshop manual shows a picture of Ventilated rotors, and Iveco Power Parts show Ventilated, Even the SCAM.it website has literature to the effect that the front rotors are Ventilated. But the brakes on ALL and EVERY 55S17W ever made have NON-Ventilated front rotors.

Congratulations for your purchase, sorry about the brakes. Unless Iveco tell you either verbally or in print, and you clearly understand that the truck does NOT have ventilated front disc brakes then you are not getting what you pay for, according to ACCC misleading claims are illegal.

Also note for a routine brake rotor grind, or disc replacement the swivel housing needs to be dismantled, King pins removed and $440 unit bearings destructively pressed out. Not a DIY Job.

A pair of these original SOLID rotors is around $1500 . Similarly sized Ventilated LandRover or Toyota Rotors are about $120 a pair. 55S17W Rear brake shoes are $1500+ a set.

What might normally cost around $500 - $800 for a routine 4 wheel brake service on any other 4x4 or truck, involving rotor, pad and rear shoe replacement may well cost you in the area of $4000 for genuine parts alone at on a 55S17W. Due to unbelievably expensive consumable parts pricing and a ridiculously complicated rotor replacement procedure. You can look forward to that every 80-100,000km and that for woefully inadequate brakes.

There is absolutely no doubt that Iveco know the brakes are bad on this truck, because their 2WD Daily range has excellent brakes with ventilated front rotors and rear disc brakes, and they have class leading brakes. Im sure Iveco people have driven both, so they really must know.

Front Brake Pads

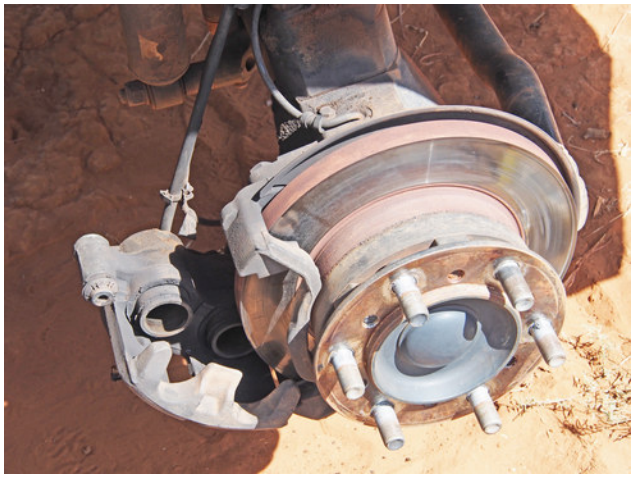
Soon after having had a 7km white knuckles 'adventure ride' towing a caravan (with working brakes) down a mountain highway pass, with fading, foot pumping, smoking brakes that resulted in the powder coating on the front rims melting, one owner presented their 55S17W for a 40,000km service and specifically asked for the brakes to be checked. They advised the service manager that the fluid had probably boiled and would need flushing. After picking the vehicle up there was no mention of any brake work on the invoice, the dealer was questioned and the was told that the brakes "checked out fine".

Assuming that the brakes were 'fine' the owner took a wheel off 900km later to change a tyre and noticed the pads were stuffed. That borders on negligence. There is no way the brakes would last till the next service so new pads and wear sensors were ordered from another dealer and replaced at home.

DIY pad change at 45,000km

new vs pad passed as serviceable by dealer

The Brembo Iveco calipers open up for east pad replacement, each side can be done in less than 15 minutes. However if the Rotor needs to be surfaced or replaced it is a major front end strip down job, To dismantle the front end, grind the rotors, reassemble the front end is about 8 hours labour and will cost an extra $440 for new wheel bearings.



same truck, 60,000km , clearly needs a rotor grind

new softer LPR pad vs 15,000km Iveco "metallic pad"

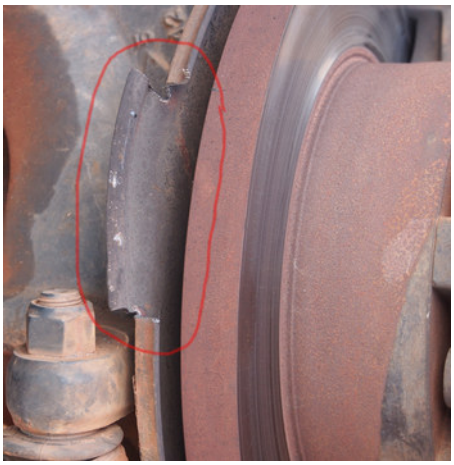
The genuine front pads appear to be too hard, and have sintered metal embedded in the compound, they eat away at the rotor which is not that good because the rotor is so bloody expensive to replace. Aftermarket pads appear to be softer and will wear out faster but give a better brake performance and less wear to the rotor but more likely to fade when overheated.

Front pads on the 55S17W, are the same fitment as front pads on 2002-2005 Daily (2WD) 35S13

Iveco	504329186	$220 -= bloody awful brakes on this truck.
EBC	DP12942	$175 - 10-15% better stopping power than Genuine
LPR	GDB1534	$40 - made in Italy, & 5-10% better stopping than Genuine-

Always fit new wear sensors with new pads, the correct orientation of wear sensor is shown above, with the "feet" of the sensor to the outside of the pad.

Wear Indicator Iveco part number 42548195 Bendix BWS1044



More in desperation than any real effort at reducing brake overheating one owner has butchered his backing plates in an attempt to direct some cooling air onto the inside of the rotors. In effect the backing plates serve no purpose on this vehicle and would be better off completely removed

Just to give a Comparison and to help explain why the brakes on the 55S17W are so bad.

BA Falcon Ute, tare 1700kg gvm 2700kg
297mm x 28mm Vented Rotors,
Iveco 55S17W tare 2800kg gvm 5500kg
297 mm x 22mm NON Vented rotors

Iveco Empty weighs more than the Falcon at GVM but has the same brake force to stop 2x the weight, and no cooling , and we are only talking front brakes, the Falcon has rear vented discs too, the Iveco has 11" drums.
Iveco rotors, $1500,
Brembo Falcon Rotors around $150

bread and butter BA Falcon Ute rotor

Phil Marsh photo

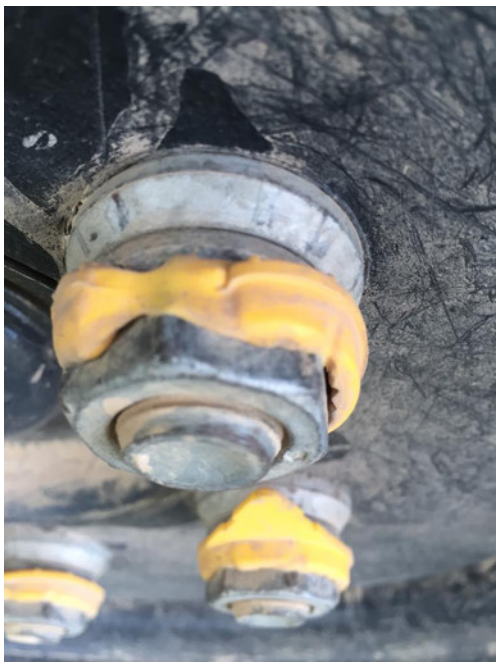
After a Brake Overheat Event - Loose Wheel Nuts

When your 55S17W front brakes overheat, and they WILL, not only because the front brake rotors are an inadequate size, and non-ventilated. but also because the rear brakes are inefficient, you will immediately need to retighten the front wheel nuts.

The powder coating or paint under the wheel nuts softens or melts, and the wheel nuts will lose their tension and most likely come loose.

The wheel nuts are not a Taper nut as found on typical 4x4 vehicles but employ a Truck Style flat nut Tightening torque is 375Nm

Also after a brake overheating event, especially where brake fade has been experienced, or multiple pumping of the pedal required it is advisable to flush the brake fluid at your next possible convenience.



On these vehicles the use of wheel nut indicators is highly recommended, Visual inspection will show immediately if a wheel nut or nuts are loosening. Available in common sizes from Safety suppliers or Truck equipment suppliers, but you guessed it, the Iveco 27mm nut size is not common. Obtainable from Iveco aftermarket specialists or look online for "27mm CheckPoint Nut Indicator"

Wheel nut indicators are mandatory fitment to 4x4 vehicles and trucks in Safety conscious industries such as mining, fire fighting etc.

VARI Aftermarket Rotor upgrade

The Good news for every Iveco 55S17W operator is that a small group of very concerned owners has been pro-active in regards to the brake situation and has engaged the services of an Automotive brake engineer to redesign the rotor mounting system which will enable a larger diameter ventilated rotor. Once fitted this retrofit will also allow rotor replacement without the expense of dismantling the swivel housings, nor the need for otherwise un-necessary routine wheel bearing replacement.

This redesign, brings the brakes of the 55S17W into the 21st century. Something that Iveco themselves, apparently was either unable to, nor not interested in doing.

Shown at left, is the, right side front axle of the 55S17W with the Swivel Housing removed, This is the level of disassembly that is required just for a basic brake rotor replacement each 80-100,000km.

This sort of disassembly would not normally be required on a 4x4 unless for modification, to rectify damage or for a major overhaul. The fact that this needs to be done for a routine brake rotor service beggars belief.

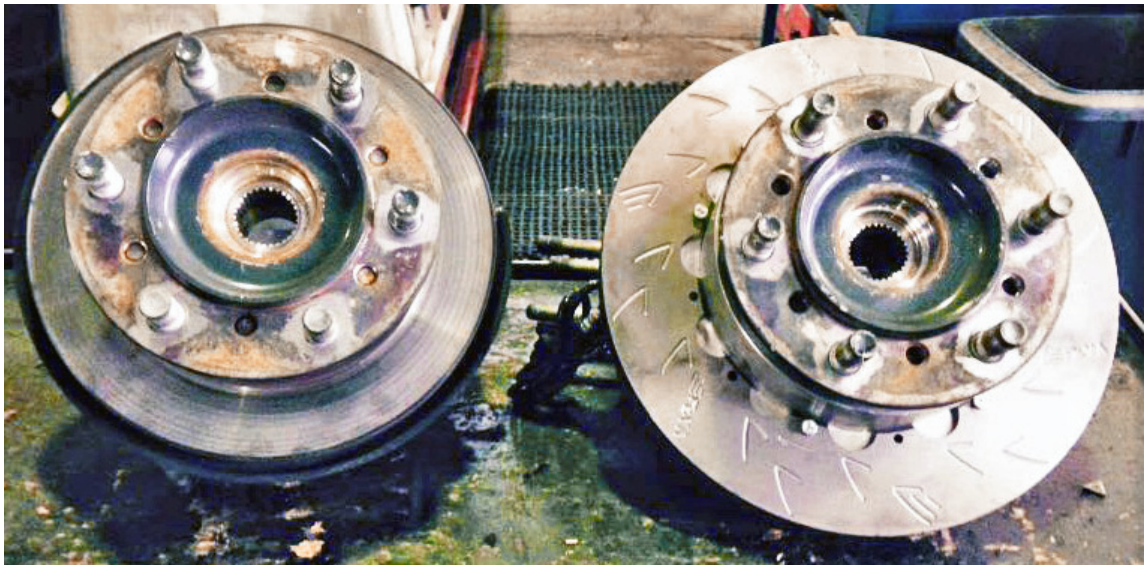
This only needs doing one time to install the VARI brake upgrade, thereafter routine brake rotor replacements are just a matter of removing the wheel and caliper, then unbolting the rotor - a 1/2 hour Job

The swivel housing is disassembled then the hub is pressed off the stub axle, which the workshop manual states is a destructive process to the $700 wheel bearing, giving access to the brake rotor. VARI substitute the original rotor for a machined alloy mounting 'hat'. Then the swivel housing is reassembled. The new VENTILATED rotor is a Flat Rotor which will fit over the drive hub from the outside.

Front Unit Wheel bearing Iveco part number 42558516
$741.00 EACH from Vexi plus shipping

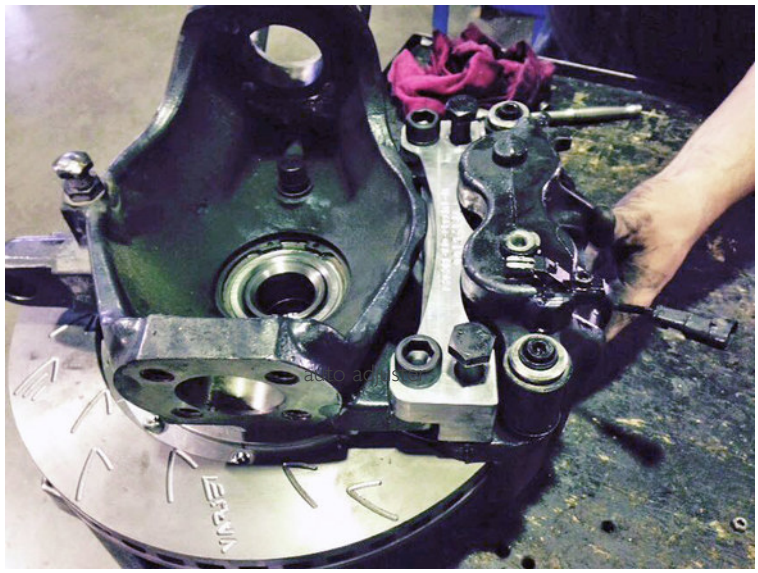
OEM is SKF BTH 1011 AB, 55x90x60mm

Genuine SKF from Simply Bearings $176.00 each
"Febest", DAC55900060-KIT , ebay $42.00 each



Comparison shows the standard equipment factory rotor at left, with the new flat rotor fixed to mounting hat on the right, noting the obvious difference in diameter.

Note that not only does the new Rotor fit over the outside of the drive hub but it is also Ventilated.

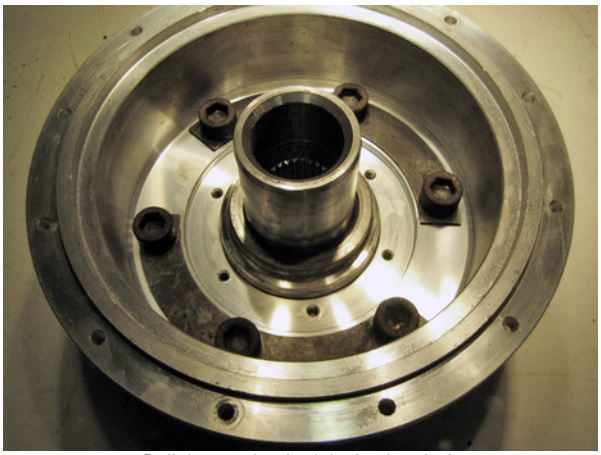


Inside swivel housing, shown at right with BHSS engineered CNC caliper adaptor

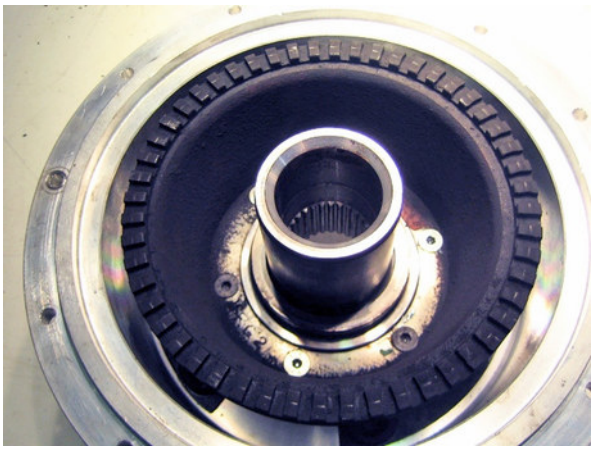
Vari Race Brakes have designed a CNC machined caliper adaptor to use the original caliper which has sufficient clamping force for the larger diameter rotor, there is a significant increase in mechanical advantage.

New EBC pads are fitted with the upgrade.

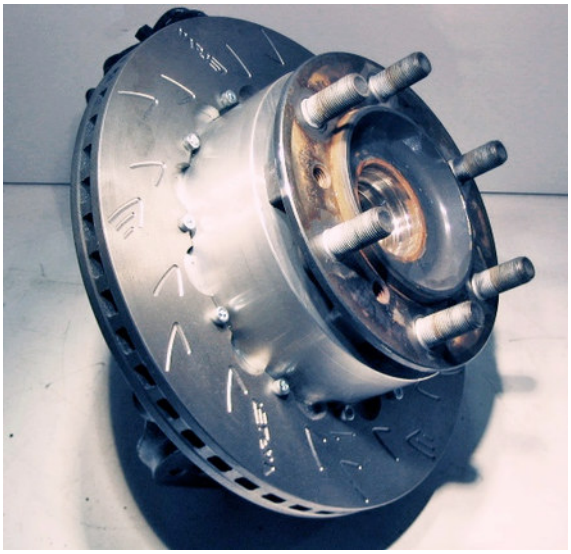
love it when a plan comes together !

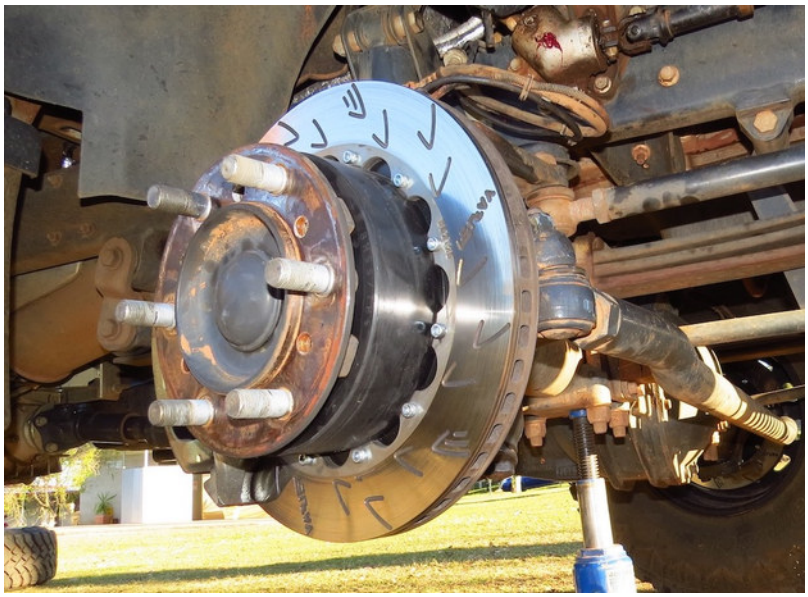


Bell (mounting hat) bolted to hub



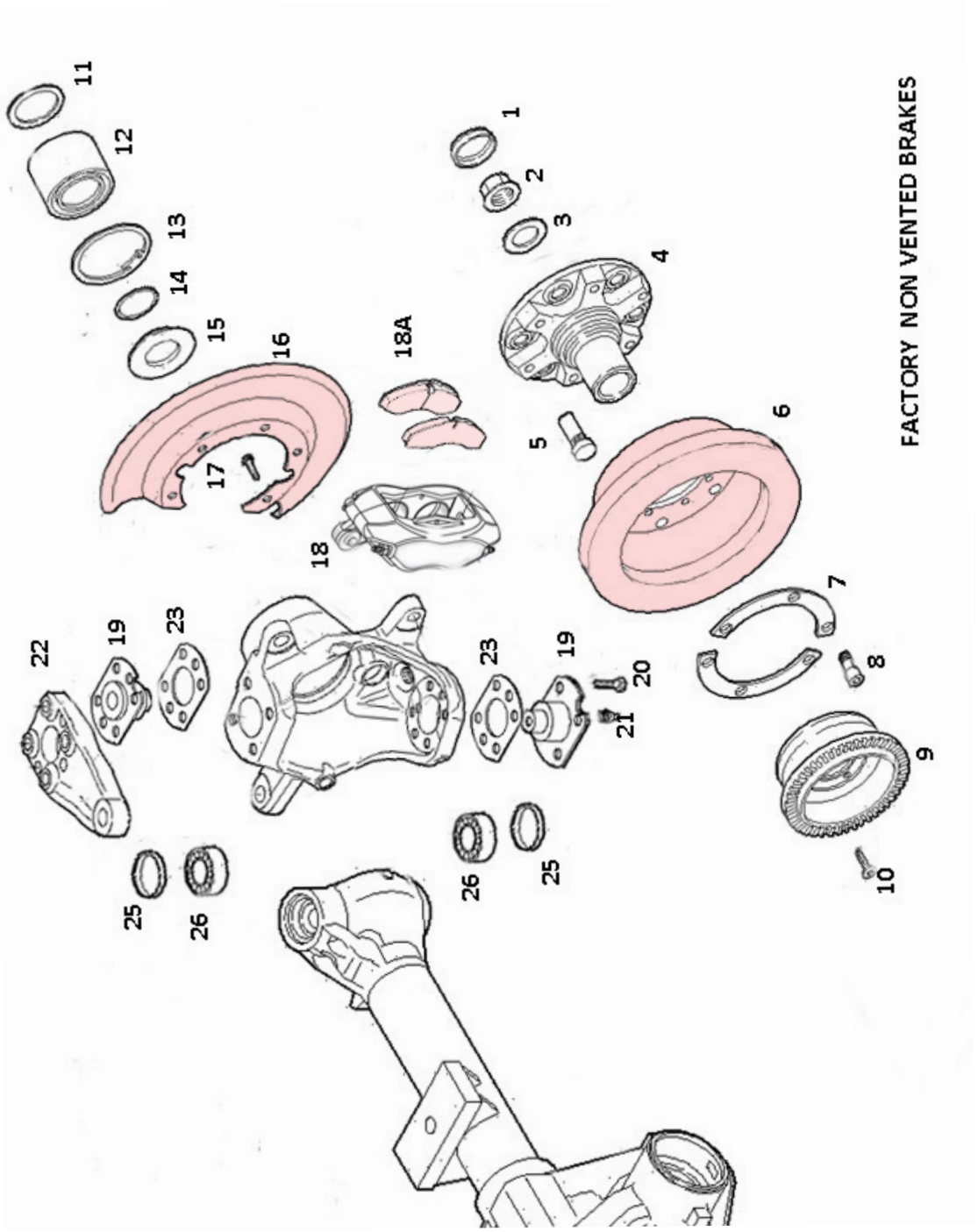
original ABS tone ring re-fitted





Key	Iveco Desc	Name	Iveco pn	Alt Part
1	Cover	Hub Cap	42558748	
2	Fastening Ring	Axle Nut	42558749	
3	Ring	Washer	42558750	
4	Wheel Hub	Hub	42558754	
5	Screw	Wheel Stud	42558755	
6	Brake Disc	Rotor	2558752	
6A		Flat Rotor		BHSS
6B		Rotor Hat		BHSS
6C		Rotor screws x12		BHSS
7	Half Ring		2558756	
8	Screw	Rotor bolt	2558755	
9	Support	ABS Drum	42558763	
10	Screw	ABS bolt	42558751	M6x16
11	Shim		42558758	
12	Wheel Bearing		42558516	SKF BTH 1011AB
13	Fastening Ring	Circlip	42558518	
14	O-Ring		42562627	
15	Washer		42558760	
16	Dust Cap	Backing Plate	42558762	
17	Screw	Bolt	42558761	
18	Brake Caliper Assy		42558806L 807R	
18A	Brake Pad Set		2996465	
18B		Brake Pads		EBC, DP14942
19	Ball End Pin	Swivel Pin	42558688	
20	Screw	Bolt	42558689	M14x30
21	Lube Fitting	Grease Nipple	42558679	
22	Lever	Steering Arm	42562619	
23	Shim		42558683/4/5	.1 .2 .35mm
24	Bearing Housing	Swivel Housing	42558686R...687L	
25	Ring	Wiper Seal	42558666	50x65x5
26	Diff Bearing	Swivel Bearing	42558667	SKF 32205 BJ2
27		Caliper Spacer		BHSS
28		Spacer Bolt		BHSS

Parts List refers to the diagrams on following two pages VARI Ventilated rotor upgrade deletes red parts on page adds green parts.


FACTORY NON VENTED BRAKES
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18A
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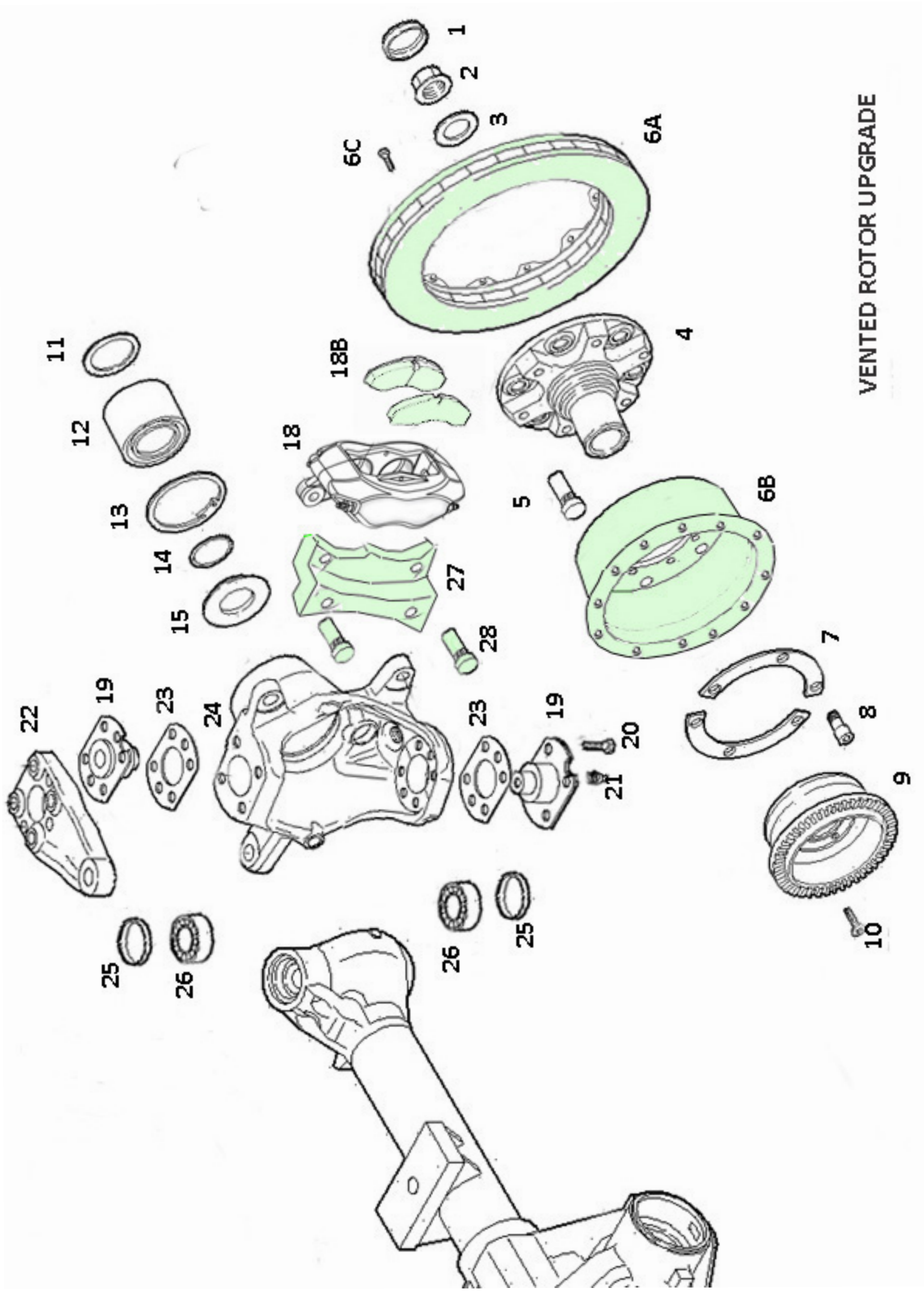
VENTED ROTOR UPGRADE
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6A
6B
6C
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11
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13
14
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18B
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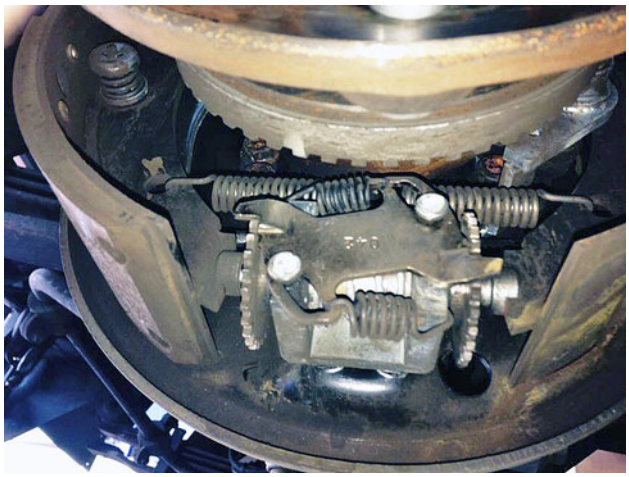
28

Rear Brakes

The Iveco Daily 4x4 55S17W has rear drum brakes, Even the new re-bodied Euro6 model still has the same rear Drum Brakes.

The hydraulic drum brakes are single leading shoe 270mm x 80mm with "automatic adjusters" (they don't work).

The truck is fitted with a troublesome rear load proportioning valve, or "correction adjuster" as Iveco call it, located above the rear diff. It is fitted to the 55S17W despite the fact that this anachronism is not needed on vehicles equipped with ABS.



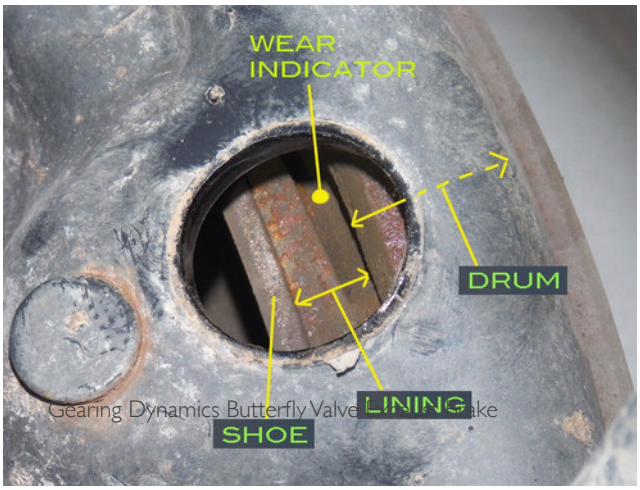
The recommended method to 'auto adjust' the rear brakes on this vehicle is drive in reverse, (in a safe place) stomp hard on the brakes, then drive forward and stomp hard on the brakes. It does nothing , the design is flawed , the Auto Adjuster DOES NOT WORK , never worked, even on a new truck.

Iveco Part Number 2996480, Rear Brake shoe set around AU $1750. they must be dreaming !!

Have them re-lined and radius ground for around $250 instead. A good reason to get all brake work done at a brake specialist rather than a "dealer"..

The rear brakes can be inspected for wear through inspection ports, under rubber covers on the rear backing plates. There are 2 covers on each backing plate so that the wear indicator on each shoe can be inspected.

This is a critical inspection. If the rear brakes are working correctly the shoes will last about 50,000km, in the case of the image above the brakes have done 45,000km with minimal wear, therefore brakes not working, & problem not noticed by trained staff during scheduled servicing.



When the linings wear down to the rivets the drums will be seriously damaged and the linings may separate from the shoes. The linings might look like they have much life left but need replacing when they only look to be half worn.

When the Linings are at 30% think about booking in for an independent brake service, there is no electronic brake wear indicator, no dashboard warning as there is for the front disc brakes. Unless you visually inspect the brakes your first warning is going to be a grinding or screeching noise as the rivets start chopping up your expensive brake drums. The yellow rivet is an accurate representation of its depth in the brake lining.

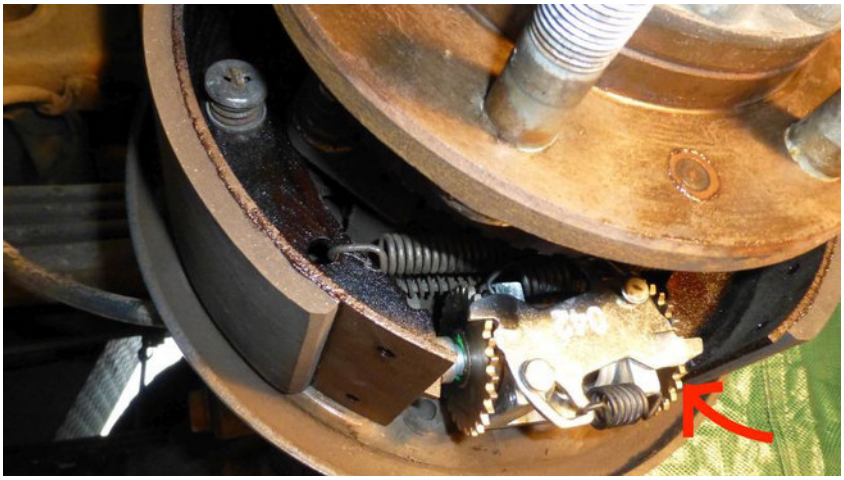

90% Brake Linings


30% Brake Linings


Stuffed Brakes

Aftermarket Bonded friction linings do not suffer the rivet problem.

Adjusting rear brakes

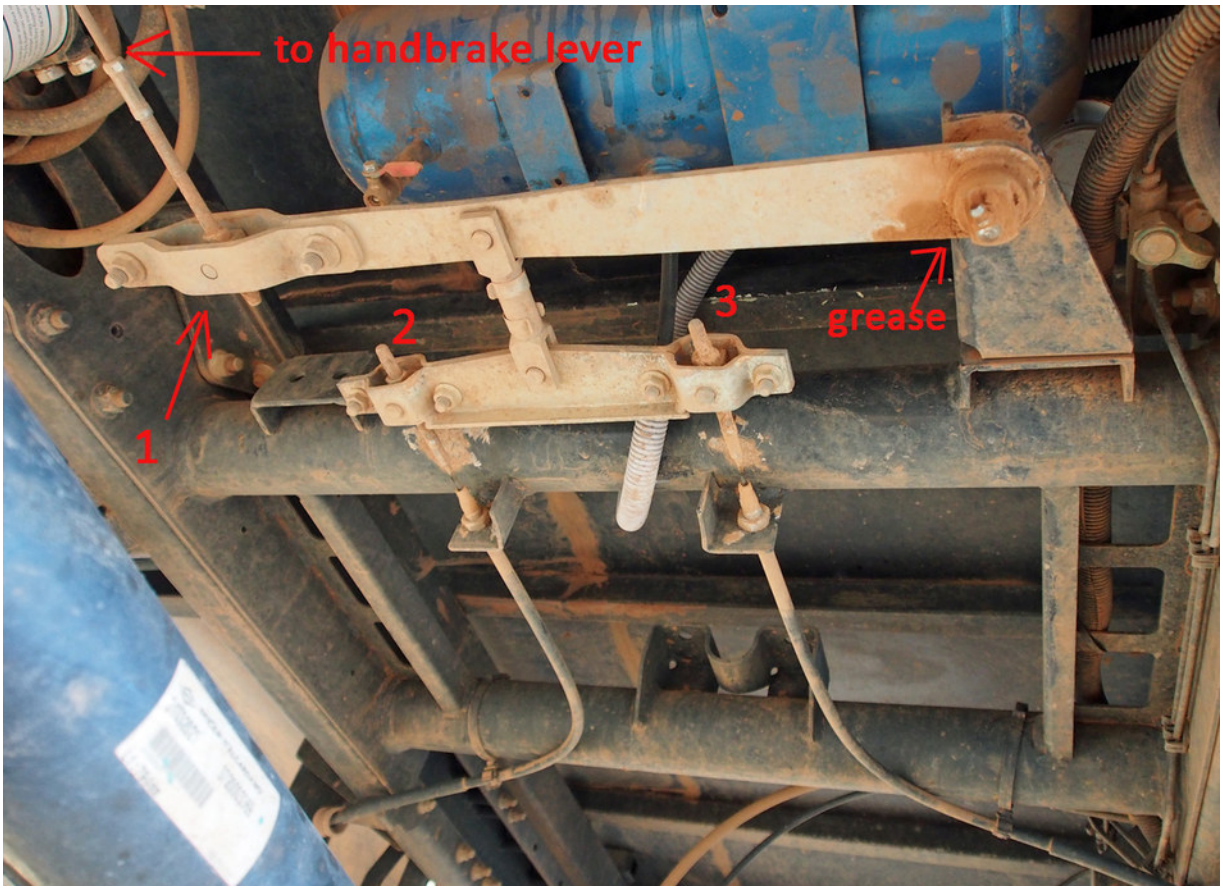


Since the auto adjusters don't work, and can't me made to work. (the design is flawed) manual adjustment is required.
From the factory only the leading shoe is able to be manually adjusted, there is no adjuster hole for the trailing shoe. To be able to adjust the both rear brake shoes a new hole (approx 18mm dia) must be drilled in the backing plate behind the trailing shoe adjuster. Use a suitable rubber bung or cork to cover it

Left side , and right side rear backing plates, note new rear shoe adjuster holes with corks

Pull the handbrake lever on 3 clicks then adjust evenly on the front and rear shoe until tight.
Put the screwdriver through hole onto the adjuster teeth and push lightly - if it skips over the tooth you are adjusting it the wrong way. The saw tooth only grip in one direction. That way when you release the handbrake the shoes will not be binding.

Make sure the Handbrake H frame is not binding be sure all the 6 pivot points (in following picture) are free to move, grease , WD40 etc .



Hand Brake

The handbrake usually requires no extra attention, strangely despite the inefficient foot brakes the handbrake works very well if the rear shoes are kept adjusted, but it should never be used as an emergency brake, it is only to be applied when the vehicle is stationary.

The handbrake bellcrank is serviced by one of only 6 grease nipples on the truck. Handbrake cable adjustments are made at points 1 2 and 3 per the image below.

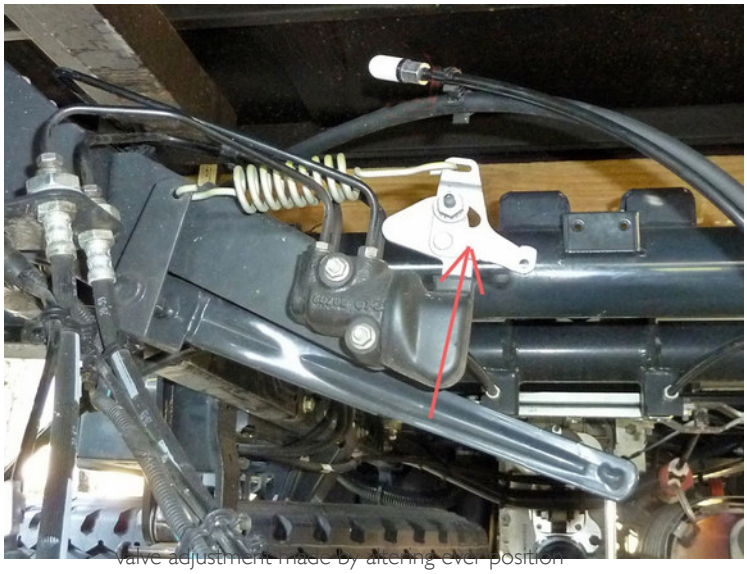
Prior to making any handbrake adjustment first check the condition of the rear brake shoes using the method described on preceding page.

1. Lift rear wheels off ground
2. Ensure the handbrake lever is 3 clicks up from the bottom position.
3. Adjust 2 &3 until turning rear wheels is difficult
4. Loosen adjuster 1 until handbrake lever has 8 clicks
5. operate lever 3 or 4 times to balance cables, then set handbrake lever all the way down
6. Tighten 2 &3 evenly until wheels become difficult to turn
7. Loosen 1 until handbrake lever operates to 3 or 4 clicks
8. Tighten lock nuts at 1, 2 &3

Rear Load Proportioning Valve

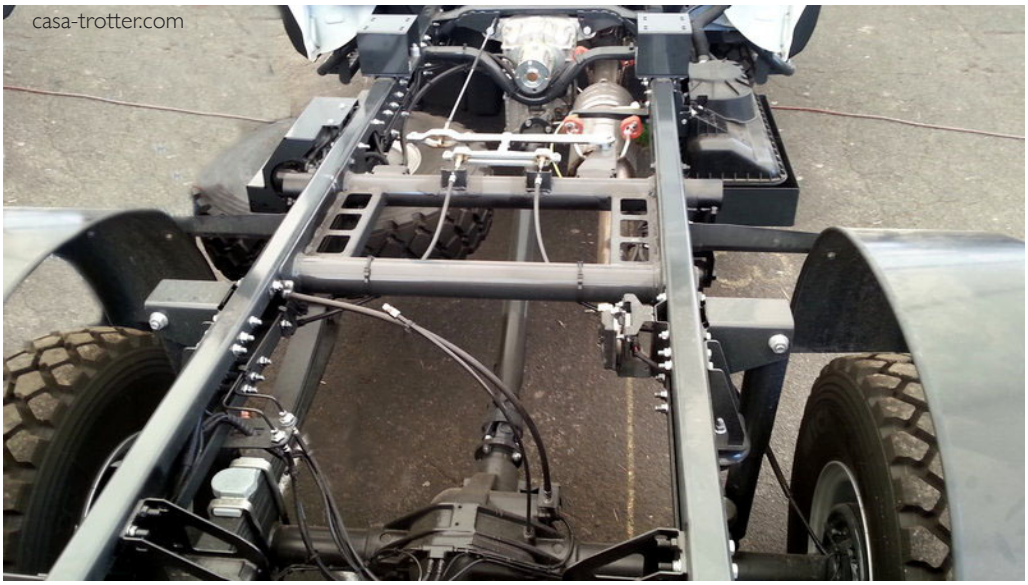
One of the issues that affects all 55S17W is the poor design of the 'Correction Valve', more commonly known as 'Rear Load Proportioning Valve' (RLPV). Not only is the valve almost always adjusted incorrectly to suit the vehicle load, but in most cases the valve does not work at all, furthermore the valve bracket is prone to vibration which causes fatigue fracture of the rear brake lines.

The purpose of the valve is to limit rear braking to a lightly loaded vehicle so that the rear brakes do not skid on a wet road. But ABS does a much better job of stopping a wheel from skidding so the Valve is completely un-necessary. In the case of the 55S17W that valve is doing is decreasing the power to the rear brakes at all times, with the rear brakes having almost no stopping power, even when loaded or with RLPV fully adjusted.



Valve adjustment made by altering over position

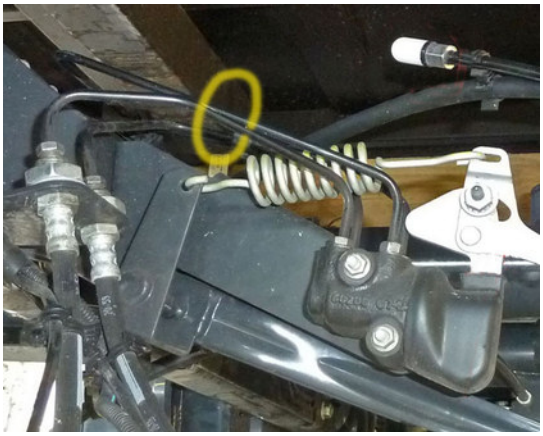
Apart from its incorrect application in an ABS equipped vehicle, there is another problem with the valve, either in it's design or construction, as it appears no matter which way the valve is adjusted on some vehicles there is no noticeable affect on rear brake performance.



Note the new 2015 Euro6 Iveco Daily 55S17W, is no longer fitted with the 'correction valve'

Brake Line Fracture

A number of these trucks have had brake line failures, the metal brake lines along the chassis have a habit of popping out of their plastic clips and are free to rub on bodywork etc. All brake lines need to be carefully inspected and fixed into their clips with cable ties as necessary. In many cases the brake pipes above the rear diff have also broken. The pipe from the rear load proportioning valve needs a stress relief loop or replacement with flexible brake hose.

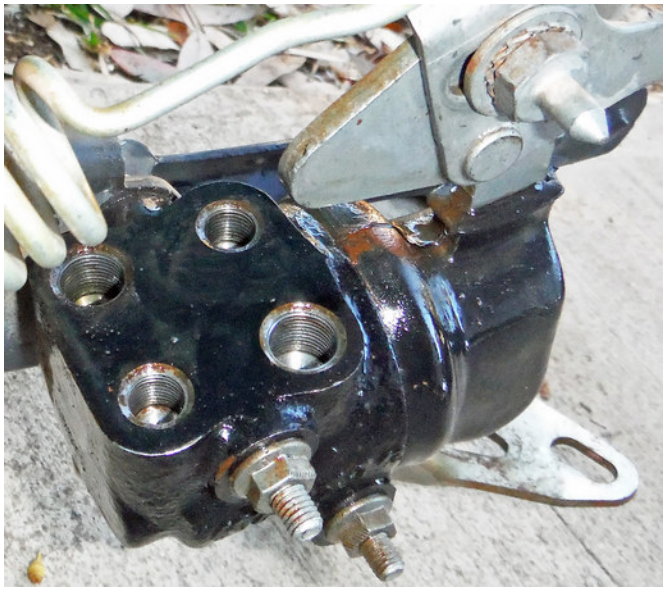


Iveco will not rectify any brake performance issues, other than to restore vehicle to original specification.

To make the brakes 'fit for purpose' the services of an independent brake specialist is required.

BHSS can 'modify' the RLPV so that it allows full rear brake pressure and retrofit flexible brake hoses. This solves both the Valve design issues and brake line fatigue problem.

Another approach is complete removal of the rear load proportioning valve (above) and re-plumbing the brake pipes directly into the rear brake hoses. This will require a new M10 pipe union with 'single flare' on one pipe as the RLPV has M12 union. The flexible hoses both use M10 union.

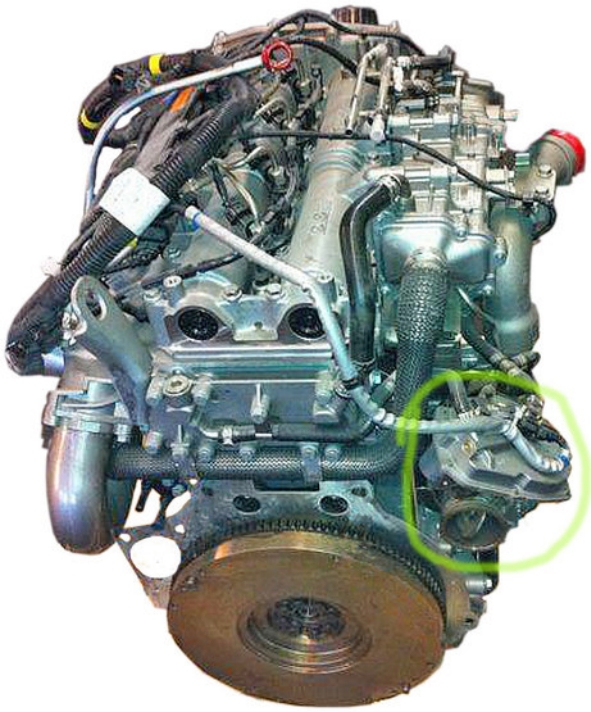


Rear Disc Brakes

Iveco Australian said it could not be done but here we have a practical and economical vented rear disc brake set up installed on a 2013 model using readily "available" off the shelf parts. The entire cost of parts about half the price of a set of genuine Iveco rear brake shoes. This conversion has been in reliable service for 4 years, no overheating, no fade, no worries.

Exhaust Brake

The Iveco Daily is the only vehicle in its class that does not come standard with an Exhaust Brake. From 2012 the Fuso Canter which uses the 4P10 Engine, (4P10 is the Mitsubishi designation of same FPT - F1C engine in the Daily) has an exhaust brake as standard.



The 55S17W has no exhaust brake and Iveco will not option an exhaust brake. The manufacturer will also threaten to void your warranty if you fit an exhaust brake. For a vehicle with such bad service brakes that is downright despicable.

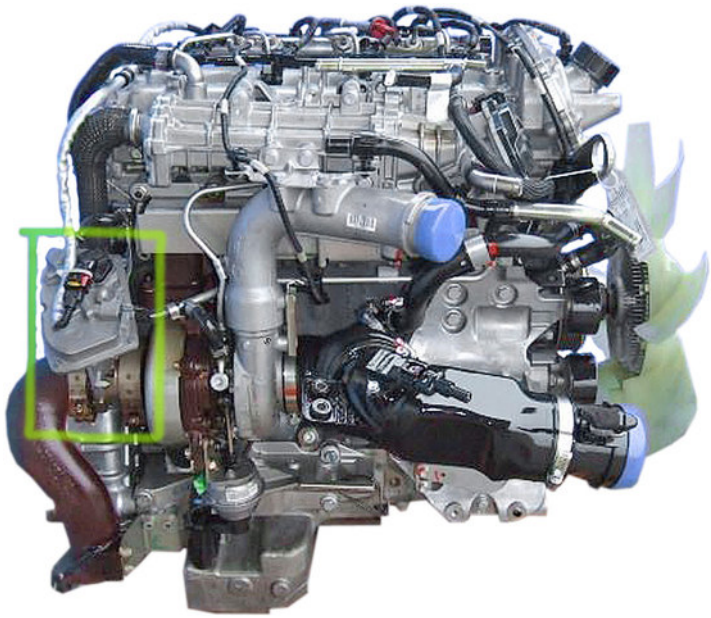
Image at left shows the factory fitted, electronically activated butterfly valve Exhaust Brake (circled) on the Fuso 4P10, mounted to the rear of the turbo. In this case a single VGT, but the compound WG Turbo version also has an exhaust brake as standard fitment.

Iveco will not give a valid reason as to why they will not allow the fitment of an aftermarket exhaust brake, they do acknowledge the same engine in the Fuso Canter has one so any argument that an exhaust brake will harm your, EGR, turbo or other engine component is not valid.

Because of the EGR valve, which it has been determined by independent testing, does not close at zero throttle the engine braking on these trucks is non existent and they do run away downhill very easily, particularly when towing.

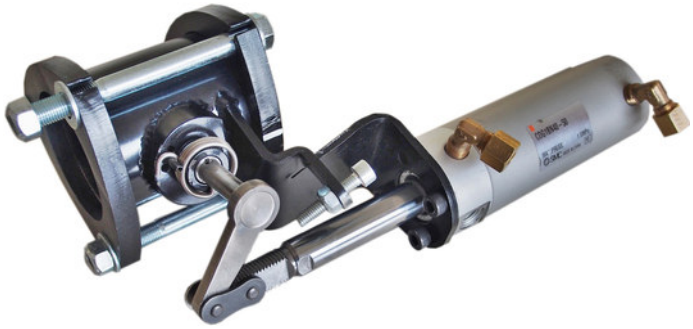
There is no safe way to descend a mountain highway with more than 10% gradient for more than 5 km with mixed traffic whilst driving an Iveco Daily 4x4 55S17W equipped with an original braking system, working to original specification, especially whilst towing.

Off road hill descents are no problem because the use of Low Range and a sufficiently low gear will hold the vehicle back. But on roads carrying mixed traffic traveling at an unreasonably low speed will cause a safety hazard to following vehicles.



Aftermarket Exhaust Brake

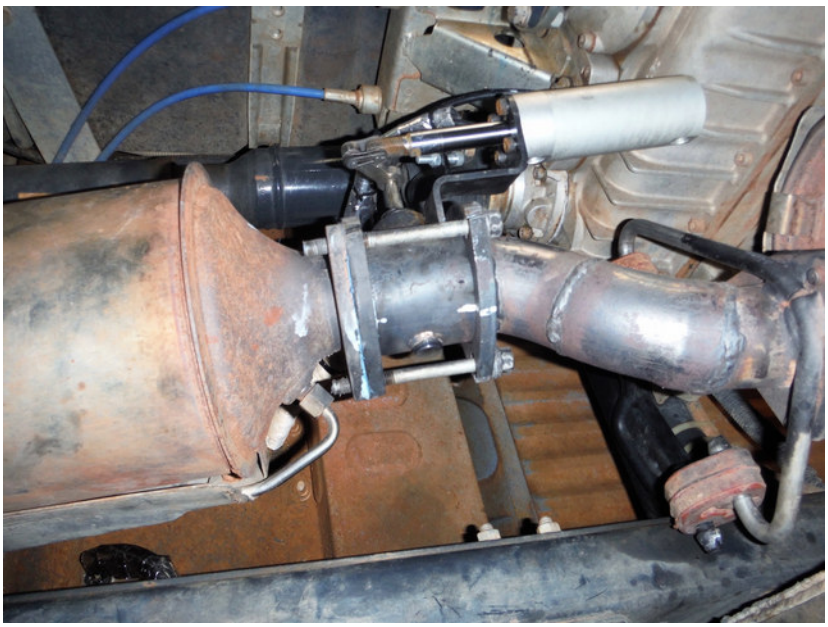
There are two Australian made Exhaust Brake kits available for retrofit to diesel vehicles, Gearing Dynamics in Geelong make a Butterfly Valve in 2 1/2 inch and 3 inch sizes. SGV in Sydney make a slide valve in various sizes.



Both companies have been advised by Iveco that fitment of an exhaust brake to their vehicle will void the engine warranty. No other motor companies have issued such advice.

However rumour has it that one Iveco dealer did have an exhaust brake fitted to a new Euro4 2WD Daily to be used as a 5th wheel tow rig, as the prospective purchaser would not pay for the vehicle unless one was fitted. Iveco Australia will not confirm nor deny that is the case, but definitely will not allow the fitment of an Exhaust Brake to the 55S17W under any circumstance.

For safety's sake at least one owner has taken the initiative to put safety ahead of any perceived invalidity to a warranty claim and installed a Gearing Dynamics Exhaust Brake Valve (EBV) to a 55S17W. More by luck than design their 3" vacuum operated butterfly valve is a perfect bolt on fit to the rear of the Iveco DPF.

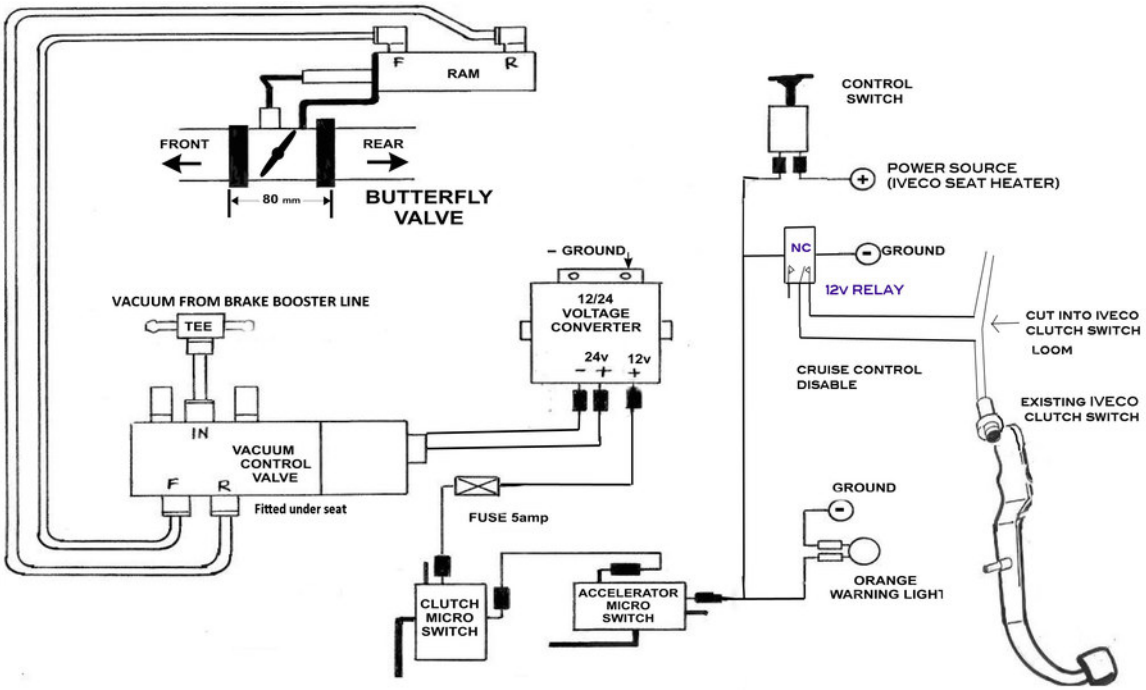


Most factory fitted exhaust brakes are mounted on the back of the turbo. Aftermarket exhaust brakes are usually further back in the exhaust pipe, which may cause a few error code issues. The DPF Delta P sensor values will go out of range, this is overcome by fitting 12V pneumatic cutoff valves in the DPF lines. The Lambda sensor also needs to be relocated to behind the Exhaust Brake to stop high Oxygen concentration level fault code during exhaust brake activation.

relocated Lambda sensor

lever mount Exhaust Brake button

The Gearing Dynamics kit includes microswitches for clutch and brake pedals. A relay is wired in to disengage the cruise control when the Exhaust brake is energised.



Iveco technical advisors believe that the EGR closes at zero throttle but, in operation this has proven to actually not the case, if the exhaust brake is operated whilst the EGR valve is still open there is the possibility of air flow value error codes.

To eliminate possible error codes and out of range sensor values the best course of action when installing an exhaust brake valve on the Iveco F1C is an EGR software delete and physical blanking of the EGR valve. As discussed previously EGR blanking alone does return significant natural engine braking to the 55S17W, the addition of an exhaust brake enhances that effect.

The Exhaust brake will hold back the Vehicle and Trailer combination on steep mountain grades so long as the engine is kept above 2500 RPM. The effect diminishes rapidly below 2500 RPM. However it is now possible to descend a hill in the same gear as was required to climb it. In conclusion the Exhaust Brake is not a 'brake' as such but effectively holds the vehicles speed downhill stoping the danger of a white knuckles brake smoking event, in short a very significant safety enhancement.

Gearing Dynamics 3" Exhaust Brake valve fitted to 55S17W

It is a sorry state of affairs that Iveco owners should need to risk invalidating their warranty and go to such lengths, to make a vehicle that passes ADR testing, fit for purpose and safe to use on the public road system.

Unfortunately Iveco has a blasé attitude regards customer allegations of poor brake performance. So long as the vehicle is compliant to the ADR regulations they seem unperturbed.

The brakes most definitely are not fit for purpose, and may will be the downfall of an otherwise fantastic vehicle.

Telma Electro Retarder

Iveco offers the Telma electro retarder as an option on the Daily 4×2 range. The electro retarder is installed in the prop-shaft between the gearbox and rear axle. It is in effect an electric brake that can be applied using a hand controller and helps to reduce the speed of the vehicle by slowing down the prop-shaft, basically having the same effect as engine braking but with much more power.

The reader may form their own conclusions as to why an optional electro retarder is offered on the 2WD Daily Range, but the Exhaust Brake is forbidden. No electro retarder option is currently available for the 4x4 55S17W.

Marcus and Julie Tuck after 18 months of operating their Iveco Daily 4×4 55S17W (affectionately known as 'Cuthbert'), like many other users are very disappointed with the brakes. The problems are not significant with general driving around flat and low-hilly areas where only minimal braking is required, but in descents of long, steep mountain roads the weaknesses manifest themselves with potentially very serious consequences.

Marcus and Julie Tuck's 55S17W "Cuthbert" on tour in Africa

With an understanding that inhibiting the EGR and DPF system is not possible in Europe, and to keep the truck as standard as possible Marcus decided to re-engineer and install a Telma electro retarder.

Electro retarder – Principle of operation

The retarder consists of a stator which has 3 pairs of electro magnets and is attached to the chassis. A shaft passes through the stator and has an aluminium rotor attached on either side of the stator, the prop-shafts are connected to either end of this shaft. When you require braking, you apply power to the electro magnets. Depending on the amount of braking you require, the power will be applied to either one, two or all three sets of magnets. The magnetic field generated by the electro magnets sets up eddy currents in the aluminium rotors. As the rotors are spinning, these eddy currents resist the magnetic field and this produces the braking effect. For a fuller description see: http://www.emrtech.co.uk/11.html . The advantages of this system are that there are no parts to wear-out and the heat generated in the rotors is dispersed by the airflow across the spinning rotor (the rotors have cooling fins).

Where to install

The conventional installation is in the prop-shaft leading to the rear axle. This has been done by Telma on the Daily 4×4 but their design has two disadvantages: first it requires the removal of the spare wheel carrier under the vehicle, and secondly it compromises the ground clearance and ramp-over angle. However, with a little lateral thinking Marcus has installed it above the rear axle and with a prop-shaft connection to the Power Take Off (PTO) on the Transfer Case.

Is the PTO strong enough?

Marcus is using the Telma AF30-35 electro retarder that produces a maximum torque of 350 Nm. The transfer gearbox has 4 available PTO options: 8693, 8694, 8695 and 8696. It has been unofficially established from Iveco that the PTO options have maximum transmittable torque of 120 Nm, 150 Nm, 350 Nm and 1900 Nm respectively. Option 8696 PTO was chosen as it has the highest transmittable torque and a drive flange fitting which allows a prop-shaft to be attached.

Attempts to contact Iveco to formally confirm these specifications resulted in the predictable "contact your local Iveco dealer" response. The local dealers either didn't reply at all, or replied with questions such as "what is a transfer gearbox?" This apparent ignorance of the basic Daily 4×4 vehicle does not inspire confidence in any further information that may subsequently be forthcoming!

To double check the specifications, Marcus had a detailed look at the design of the Transfer Case and PTO. The Transfer Case input shaft passes right through the upper shaft and is connected directly to the PTO without any gearing (a very strong design). The nose of the PTO drive shaft sits within a needle roller bearing, which is within the end of the gearbox's output shaft. There is a set of toothed cogs: one is attached to the output shaft and the other one slides on the PTO drive shaft to engage/dis-engage the power from the input shaft to the PTO drive shaft.

According to SCAM technical data (In the absence of any data from Iveco) the gearbox has a 1100 Nm torque capacity. The engine can produce a maximum torque of 400 Nm and the retarder can produce 350 Nm. From this it seems that the retarder produces less torque than the engine can put through the gearbox (the retarder would put through the same forces as driving in reverse), which is well within the limits of the input shaft's 1100 Nm torque.

The conclusion is that the PTO and transfer gearbox should be able to take the loads applied by the retarder.

Retarder with Telma supplied brackets

Design considerations for the installation:

1. The installation should not interfere with the original vehicle brake or transmission configuration.

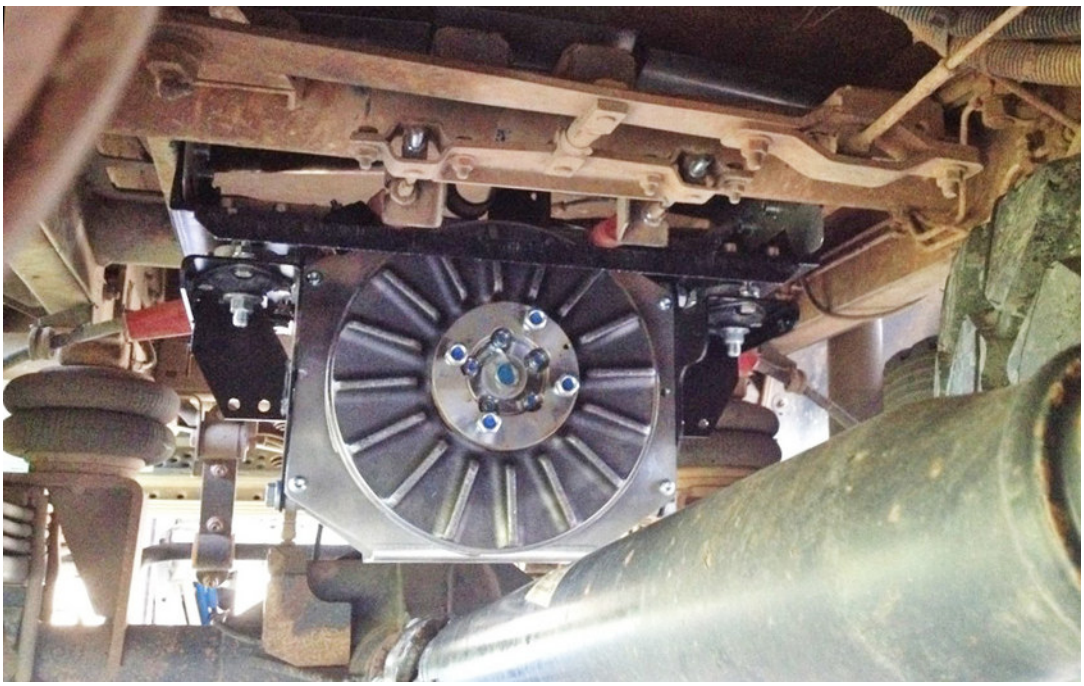
2. There needs to be clearance between the bottom of the retarder and the rear axle prop-shaft when the suspension is fully compressed and the retarder is at maximum deflection within its anti-vibration mounts.

3. Heat shielding is required for temperature sensitive components near the retarder's rotors.

The retarder is mounted between and below the two tubular chassis cross members, just forward of the rear axle. This section of the chassis is designed for mounting the hydraulic ram for a tipper-tray, so it is very strong. The approximate static load on either side of the chassis will be 35 kg. However, during maximum retarder braking this will change to an approximate down-force equivalent to 95 kg on one side and an up-force equivalent to 25 kg on the other side.

To allow for reasonable chassis clearances and to ensure the maximum retarder to rear axle prop-shaft clearance, the retarder has been mounted as far aft as possible. The vertical position has been a compromise between: the PTO prop-shaft angle, the clearance of the hand brake cables and the clearance of the rear axle prop-shaft. The hand-brake cables have a heat protection 'fire sleeve' fitted as a precaution to give them protection from the hot airflow coming off of the retarders rotors during extended retarder braking.

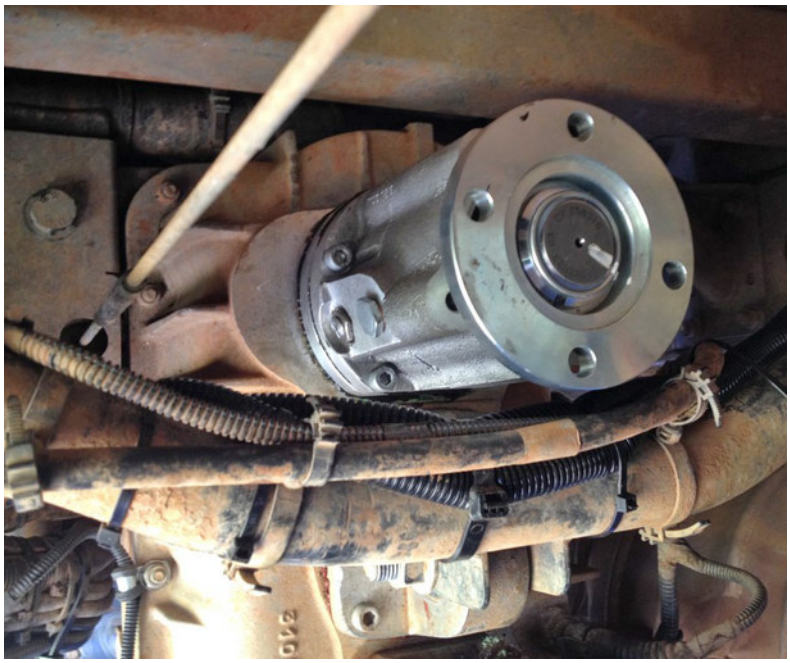
Bracket fitted with top heat shield and fire sleeve on handbrake cables



Retarder mounted in the chassis

To connect the retarder to the PTO, a complete front prop shaft is used. The front prop-shaft just happens to be the correct length and using it means that a spare front prop shaft is available should it ever be required in a remote area.

The PTO is designed to be engaged and disengaged using hydraulic pressure from the APU. However, in this application it is required to be permanently engaged. The PTO was therefore modified by 'shimming' the engagement piston into the engaged position (8 mm of shims allowing a small gap for thermal expansion). Blanking plugs were installed in the hydraulic and engagement sensor holes to seal the unit.



PTO installation

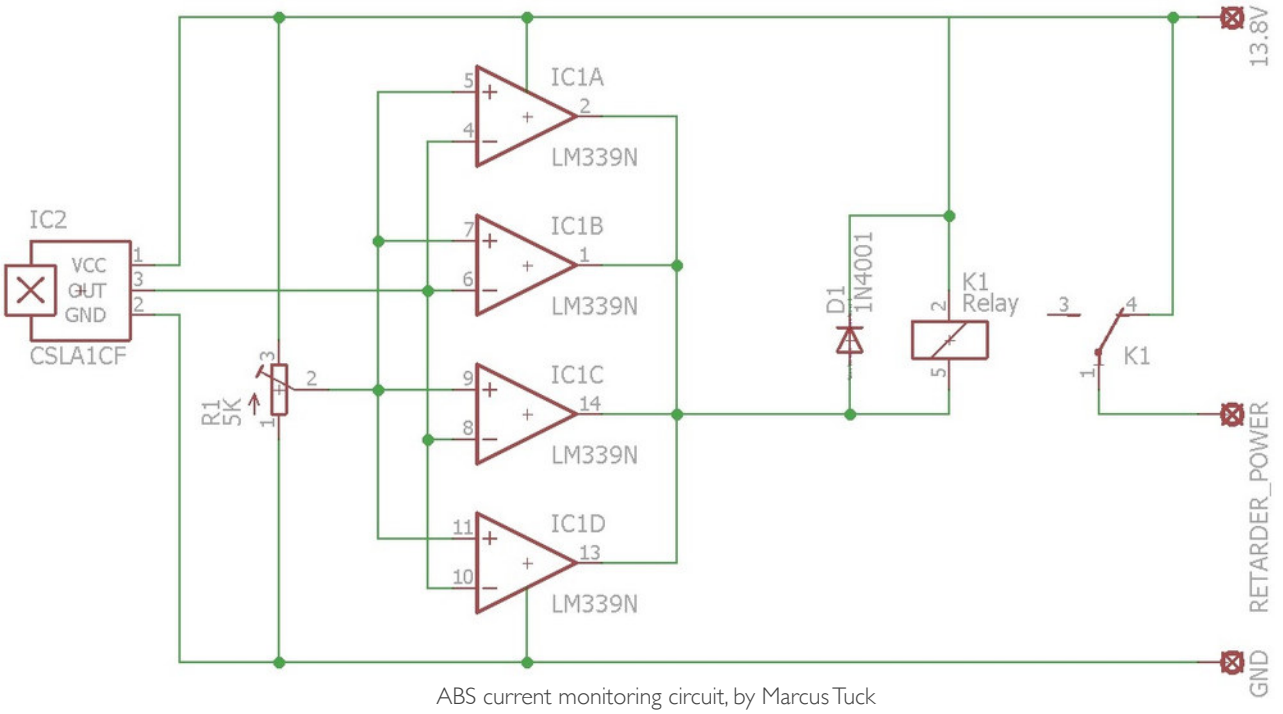
Electrical Installation

The electrical system consists of:-

1. the retarder with its 3 sets of electromagnets
2. a relay box to control the electromagnets in the retarders
3. a hand controller to select the braking force required
4. an indicator to show the braking force selected
5. a relay to activate the brake lights and disconnect the cruise control
6. an interface to detect ABS operation

The basic principle of operation is that the hand controller is used to apply either: no braking; 33% braking; 66% braking; or full braking. This is done by energising either: none, 1, 2 or all 3 sets of electro magnets within the retarder. The hand controller turns the relays in the relay box on and off as required. These relays then in turn, switch on and off the power required (32 amps each) by the electro-magnets in the retarder. When the retarder is on, there is an output from the relay box to drive a relay that turns the brake lights on (and disconnects the cruise control).

To ensure that the retarder is turned off while the vehicle is stopped, an indicator is mounted on the instrument panel, showing when the retarder is engaged. A buzzer is wired between the retarder brake light feed and the 'vehicle stationary' signal on the body builder connector. If the retarder is still engaged when the vehicle is stationary, the buzzer will sound reminding the driver to disengage the retarder.



ABS current monitoring circuit, by Marcus Tuck

ABS power cable through current sensing module

Most ABSs have an output that is activated when the ABS is actively controlling the braking and this signal is used to turn off the retarder during the ABS event. Unfortunately the Bosch 5.3 ABS does not have this output so Marcus has designed and built an electrical circuit to monitor the current; this circuit uses a hall-effect induction loop around the power cable going to the ABS. During normal operation, the ABS draws less than a couple of amps. But when its valves and pump activate during an ABS event, this current flow increases to between 10 and 60 amps! The circuit detects this higher ABS event current flow and turns off the retarder until the ABS event is over. This circuit is powered from an 'ignition on' feed via a 5 amp fuse.

Relay box wiring

Terminal V to indicator light to show retarder is working (I'm using the power level 4 light)
Terminal M to the earth terminal on the retarder (10 mm2 cable)
Terminal 1 to hand controller position 1 output
Terminal 2 to hand controller position 2 output
Terminal 3 to hand controller position 3 output
Terminal 4 not used with this retarder
Terminal E to M terminal
Terminal + to battery via 175 amp fuse (35 mm2 cable)
Terminal I to retarder terminal 1 (10 mm2 cable)
Terminal II to retarder terminal 2 (10 mm2 cable)
Terminal III to retarder terminal 3 (10 mm2 cable)
Terminal IV not used with this retarder
Terminal S to brake relay coil (86) and the positive terminal of the buzzer

Retarder wiring

In addition to the connection to the relay box listed above I have connected the earth terminal to a chassis ground with 35 mm2 cable.

Hand controller (HC) and power indicator wiring

The HC common terminal is connected to the Retarder Power output from the ABS current monitor circuit.
HC output
1 is wired to the relay box terminal 1 and the power indicator level 1 light
HC output 2 is wired to the relay box terminal 2 and the power indicator level 2 light
HC output 3 is wired to the relay box terminal 3 and the power indicator level 3 light
HC output 4 not used with this retarder. There is a small metal pin that can be put into the HC to limit the travel of the HC to 3 power positions as required for this retarder
Power indicator level 4 light is connect to the relay box terminal V
Power indicator common terminal is connected to ground

Buzzer

Positive terminal connected to the brake relay positive terminal (86) Negative terminal to pin 4 of the 20 pin body builders connector .Install a SPDT relay into the brake pedal switch circuit so that the retarder will activate the brake lights and disconnect the cruise control. There are 4 wires going to the brake pedal switch and are wired them to the relay as follows:

a. The two green wires numbered 8879 are not connected to this relay.
b. The blue wire number 1176 is connected to the 'normally open' (87) terminal of the relay switch.
c. The green wire number 8158 is cut and:-
(i) the end from the switch goes to the 'normally closed' (87A) terminal of the relay switch.
(ii) the other end goes to the 'common' (30) terminal of the relay switch.

With this configuration, energising the relay has the same electrical effect as pressing the brake pedal. It does not matter if the brake pedal is pressed while the relay is energised or vice versa. The coil of this relay (85) is connected to ground and (86) to the terminal marked 'S' in the relay box and the positive terminal of the buzzer. The relay should be mounted vertically so that any bumps while driving do not move the de-energised relay contacts as this would lead to the brake lights flashing and the cruise control to trip out.

Testing the Telma Retarder

To ensure the installation is safe and functional I carried out the following testing. Note that most of the testing was done with the half gear in neutral so that the full loads could be applied to the transfer gearbox and retarder connection without the vehicle in motion.

1. ABS Interface
a. Connect Iveco EASY and enter the ABS testing function.
b. Turn on the retarder and check indicator lights are on.
c. Test each wheel's ABS function in turn using the Iveco EASY. During the test the retarder should be turned off and the indicator lights go out. When the test finishes, the retarder should be powered back on and the indicator lights should come back on again.

2. PTO Oil Level

a. Run engine in 1st gear with the half gear in neutral.
b. Video the oil level through sight glass.
c. Note any level drop as the PTO section is filled with oil from the gearbox's internal oil pump.
d. Turn off engine and see if the oil level recovers.
e. Top up transfer gearbox oil as required.

3. Retarder Electrical

a. Do a full resistance check on the retarder.
b. Monitor the retarder earth current during static operation of the retarder through braking levels 1, 2 and 3 (with engine in neutral and idling).
c. Monitor the voltage drop at the retarder during static operation of the retarder through braking levels 1, 2 and 3 (with engine in neutral and idling).
d. Check the brake lights illuminate when the retarder is selected.
e. Check the retarder power level lights indicate correctly on the dashboard.

4. Physical installation

a. Run the engine in 1st gear with the half gear in neutral.
b. Video the retarder and transfer gearbox, looking at the mountings' deflections.
c. Hold 1500 rpm on the engine.
d. Progressively select retarder stages – checking the structures at each stage.
e. Select 2nd gear and repeat items c & d above.
f. Select 3rd gear and repeat items c & d above.
g. Select 4th gear and repeat items c & d above.
h. Select 5th gear and repeat items c & d above.
i. Finally increase engine rpm, in 5th gear with stage 3 retarder engaged, to 3200 rpm and check the structure is ok. This is equivalent to doing 110 kph (i.e 10% above the vehicle's speed limiter setting of 100 kph) and is therefore above the maximum braking torque and Hp which the retarder will have to absorb during use.

5. Road test

a. Ensure everything is still secure.
b. Test the retarder at slow speed first stage.
c. Test the retarder at increasing speeds up to 100 kph with first stage.
d. Test the retarder at slow speed second stage.
e. Test the retarder at increasing speeds up to 100 kph with second stage.
f. Test the retarder at slow speed third stage.
g. Test the retarder at increasing speeds up to 100 kph with third stage.

6. Final inspection

a. Check all physical fixings for security.
b. Check all structures for cracking or signs of wear or rubbing.

Conclusion

If you are looking for more powerful brakes that aren't going to overheat, the retarder is not the answer. However, if you want to be able to control your speed on hill descents and significantly reduce the wear on your brakes, the retarder is ideal. Telma advertises that normal brake-life on a truck increases by 400% when their retarder is used.

In most driving conditions the use of the brake has decreased by around 70%, so it is certainly a significant reduction in brake-wear! When for example, slowing down towards a junction or, approaching slower traffic on a motorway, only the retarder is applied with the foot brake at the final stages of a stop to come to a standstill. The retarder's action is very smooth and controllable with the 3 stages of braking. On down-hill runs it is very good for controlling speed, and while changing down through the gears it remains engaged keeping the speed under control.

Testing so far, has only been on hills on English roads (nowhere near as dramatic as the serious gradients that will be encountered in the Andes!) and only a couple of them had a stated gradient. On a 12% hill at approx. 5,800kg, a comfortable speed of 60kmh was maintained in 4th gear with the 2nd stage of the retarder engaged; the retarder's 3rd stage then slowed Cuthbert down without using the brake pedal. On a 15% hill also at approx. 5,800kg, the 3rd stage of the retarder was used to maintain speed. In both of these descents a lower gear could have been engaged to assist the retarder, but it handled the task well with the engine at very low RPM's.

In summary: hill descents are no longer the horrible experience they once were. Cuthbert can now descend under control, without the engine having to be held at high revs to maintain the speed. This allows the vehicle to travel at the speed of the surrounding traffic so that: (i) there is a much lower chance of following vehicles running into the back of the Iveco; and (ii) the normal brakes are kept cool ready for any emergency use.

Using the half gear greatly increases the retardation as the retarder RPM is increased. Descending a long 14% test hill in France, 50kph was maintained, with half gears engaged in the Transfer Case and 6th in the main gearbox, with the engine below 1500 rpm and no use of the brake pedal - it is so much better for hilly terrain now.

On the much steeper slopes, the combination of a lower gear and the retarder will provide a comfortable descent without the use of the foot brake and it will also be great on off-road tracks.

many thanks to www.tuckstruck.net

Suspension

The 55S17W has parabolic leaf springs all round, 3 Leaf on the front and 4 on the rear, the 4th rear spring is a heavy duty over-ride spring, which serves no purpose unless the truck is heavily laden, The 4th spring is also the cause of an annoying suspension squeak as its keeper rubs on the main leaf.

To clarify the difference between traditional semi-elliptic and modern parabolic leaf springs. Semi-elliptic springs consist of multiple constant thickness leaves sandwiched together along their full length creating a stiff spring pack with high load carrying capacity.

photo Robert Pepper

impressive as it is front droop is limited by shocker travel

original Gimon rear damper

Parabolic springs contain one or more tapered leaves, sandwiched together in the centre only, then each individual leaf tapering to the spring eyes but not in contact with each other unless via an insulating pad. This allows great load carrying capacity at the same time as improved ride and long travel compared to semi-elliptic springs. Parabolic's are also less prone to sag and give longer service life.

The extremely flexible parabolic's fitted to the 55S17W permit impressive wheel travel. The axle flexibility gives good stability and traction even in the most undulating terrain. The 'Gimon' shockers seem to be well matched to the vehicles role. Gimon is unknown as a shock absorber brand in Australia, but are well known in Europe for producing railway and heavy machinery suspension equipment.

The unladen 55S17W, especially without any rear body fitted is known being harsh and underdamped, but once laden the additional weight and well matched original damping give a very acceptable ride.

As we know the 55S17W was never trialled in Australia, and the vehicle we get here is the European Spec version (without the fuel heater) but the suspension almost seems as if were tuned for Australian Outback conditions, infact when combined with correct tyre pressures it handles the worst corrugations with superlative ease. No other 4x4 vehicle tested rides as well on outback roads, including the much more expensive bigger rigs such as Unimog and M.A.N. 4x4.

Suspension Squeaks

The suspension squeak is particularly annoying because the truck is relatively quiet and rattle free.
The parabolic springs themselves are noiseless by design, as are the poly-urethane shackle bushes. The cause of the rattle is usually the rear spring keeper rubbing on the edge of a spring leave but in some cases the front spring keeper can also be at fault.

rear spring keeper

evidence of rubbing

The keeper can be spread apart to prevent touching but then its purpose is meaningless, over time the leaves will move and the squeak may possibly reappear.

The Iveco Massif 4x4 has Teflon anti squeak pads on the sides of its spring keeper as original fitting. Note the example at right shows a semi-elliptical spring pack rather than a parabolic spring, Unfortunately Iveco did not carry this design feature onto the Massif's bigger brother !!

DIY squeak mitigation strategies include the use of ubiquitous kitchen chopping board and 32mm poly pipe.

Kitchen chopping board on front keepers

Standard suspension with front roll bar removed (for off road use only)_

Suspension Modifications

As good as the standard suspension is some owners do find a need to modify for their particular purpose, such as more weight carrying capacity or need to fine tune for better on-road handling.

For undulating mountain climbing, particularly in the Victorian High Country the front suspension could do with a little more travel, the existing dampers do limit the suspension droop somewhat, with the effect that the 55S17W does tend to lift a front wheel during undulating ascents.

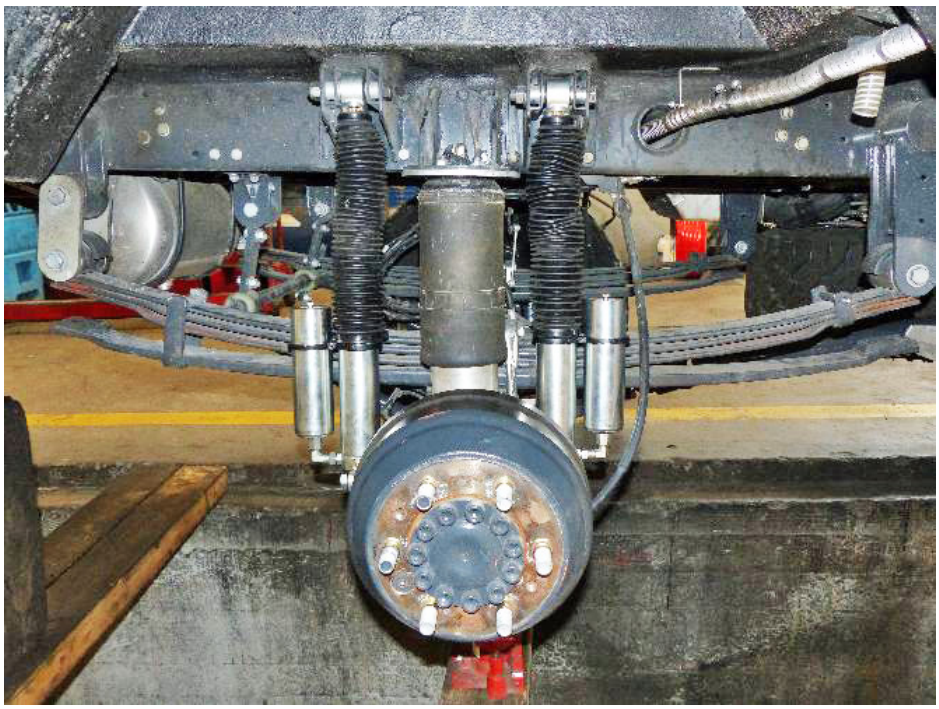
Now that the vehicle has been in the country a few years more Aftermarket options are becoming available. Amongst others EVA, (Expedition Vehicles Australia), offer an extended height front damper mount with King long travel coil over shockers. Travel Truck can fit progressive front bump stops or an extra front leaf to make the truck sit level, Sax Suspension do a revised spring set and AirBag Man have an airbag kit for the rear end, and Earthcruiser fit their own custom built shockers.

Air bags are great, especially when the rear helper spring is removed as they can be pumped up for extra load carrying capacity and let down to suit a lightly loaded vehicle.

There is a balance between load carrying and ride, more supple a suspension, the better it will be in any off road condition and the Original suspension setup comes pretty close to being ideal. Any modification that limits overall wheel travel or stiffens the suspension is not necessarily a good thing.

Shock Werx remote reservoir gas shocker


Citroen style hydraulic / accumulator


Overkill ?? Air Suspension over Parabolics, with double gas shockers !!

Steering

The 55S17W uses a beefy ZF 8090 recirculating ball, power assisted steering box.

At the bottom of the collapsible steering column the steering shaft rotation travels trough one universal joint where the shaft changes angle and exits the cabin through the floor. Note the absence any isolation flex disc, such as fitted to the 4x2 Daily range.

From new the 55S17W has an annoying rattle in the steering column and it is believed to be because of the omission of the flex disc. The flex disc is shown in Iveco Power Parts layout but not fitted in practice. Some steering columns have been replaced under warranty.

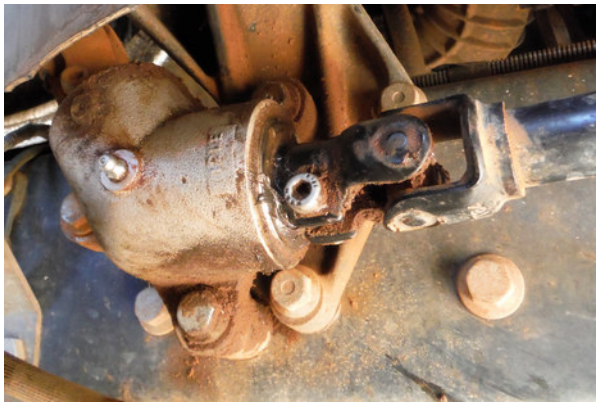
ZF 8090-955-206 Steering box

Under the cab floor is a pair of universal joints separated by a splined slip joint, sealed by a rubber gaiter, the slip joint accounts for the movement of the cabin on its isolation mounts.

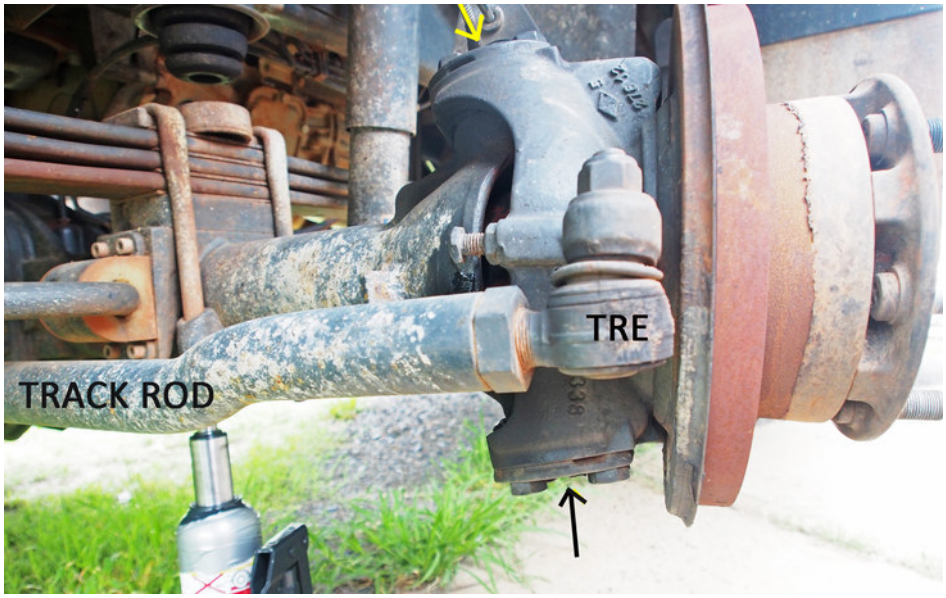
The steering shaft then changes direction through a 130° bevel gearbox, through another set of universals and a splined slip joint and finally into the Steering box.

The bevel box is fitted with a grease nipple, as are the upper and lower swivel housing bearings, (King Pins). The 5 grease nipples on the steering plus one on the hand brake bellcrank gives a total of only 6 grease nipples on the entire truck.

Steering points should be greased every 5-10,000km, 20 to 40,000km scheduled servicing is fine if you only need the truck to last until the warranty expires.



130° bevel gearbox



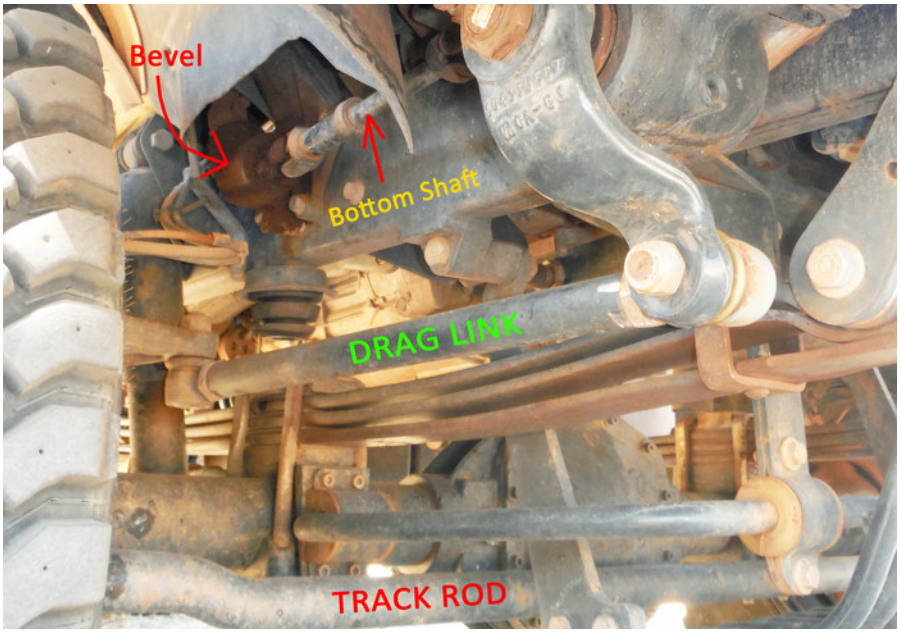
Swivel housing grease nipples indicated by yellow and black arrows

The Track Rod on the 55S17W is unusual in that it has a "cow-belly" or cranked configuration to clear the front of the diff and so is unable to be rotated through 360°, thus both Tie Rod Ends have a Right Hand Thread, both left and right side TRE are the same part number 42558696.

Therefore the Toe In can not be adjusted by rotating the track rod. To adjust the Toe In a Tie Rod End needs to be pressed from its taper in the swivel housing arm and individually rotated.

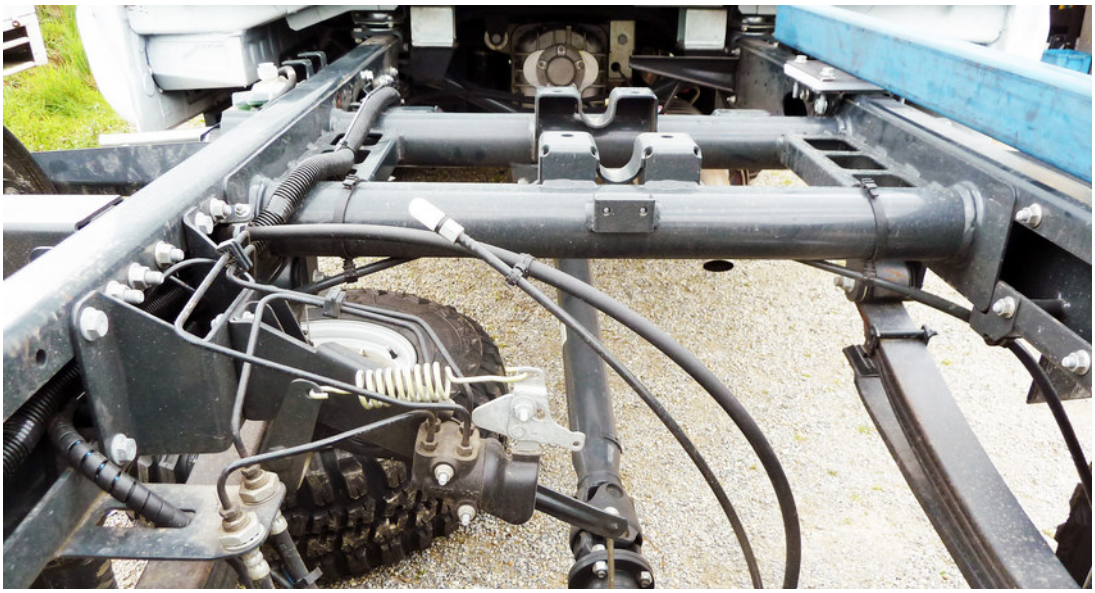
NOTE: Toe In adjustment in Iveco Workshop manual (2-4mm Toe-In) is incorrect. Constant 4x4 requires negative Toe-In (or Toe-Out) Correct adjustment is negative 1.0mm to negative 3.0mm.

The Drag Link however, does have Left and Right thread ends, to adjust steering wheel position.



Chassis

The Chassis produced by SCAM is virtually identical to the chassis used on the SCAM SM55 Light Tactical vehicle and bears no resemblance to any other chassis used on an Iveco Vehicle. Older Second Generation Iveco 4x4 Vans were based on an Iveco 4x2 chassis. The 55S17W chassis is a high strength 5mm 'C' section with returns. This makes a very strong but flexible structure capable of handling the most severe terrain.



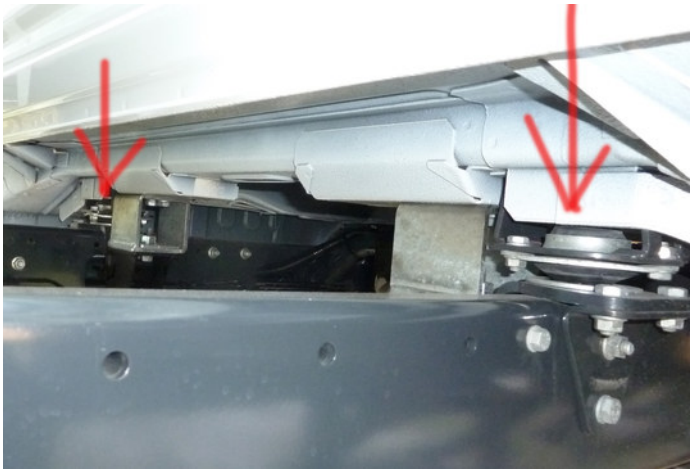
The rear section of chassis that contains tubular cross members is reinforced and somewhat more rigid than the open sided sections. The chassis channels make a convenient ducting for auxiliary cabling

Warning: Avoid drilling through chassis sides for the mounting of auxiliary equipment.

Existing holes have reinforcing 'anti crush' tubes welded inside between the chassis sides.

Where possible use existing bolts holes to fix a mounting bracket to then mount accessories to the bracket, per the example at left .

Because the Chassis is designed to flex during normal driving conditions consideration needs to be given to mounting of auxiliary tanks and bodywork. The Iveco Daily Cabin from the 2WD truck range is mounted to the SCAM chassis with 4 flexible rubber couplings, without flexible couplings the bodywork would itself begin to flex and rattle apart in short order. The rear cab mounts have safety devices to keep cab in place in the case of mount separation or accident.

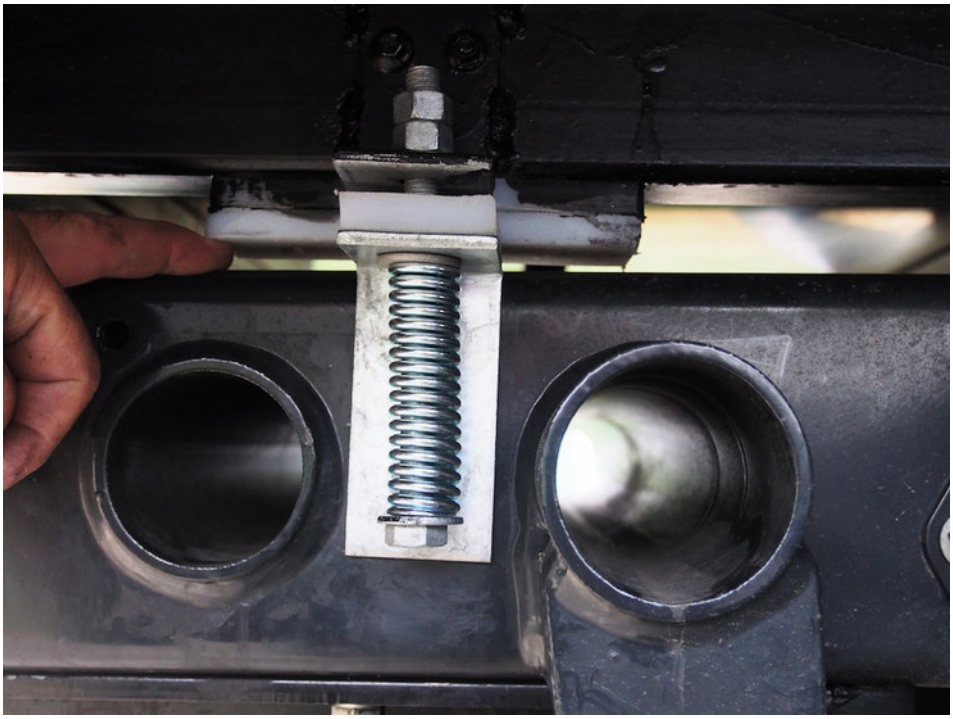


flexi mounts at rear of 55S17W Dual Cab,

Cab Front flexi mount

To demonstrate the degree of chassis flexibility refer to the image at left, front and rear opposite wheels are safely positioned on ramps to simulate one possible scenario of a mild off-road driving condition, the axles are slightly articulated, causing the chassis to flex or twist a little..

Considering the bullbar is fixed to the front of chassis, it will move as the front of chassis moves. The Cabin is on flex mounts which equal out the chassis flex across its 4 mount points, with all that in mind check the disparity between cabin to bullbar clearance indicated by each gap behind the headlight. Now extrapolate the flex through to the rear of chassis and the amount of flex becomes more significant.



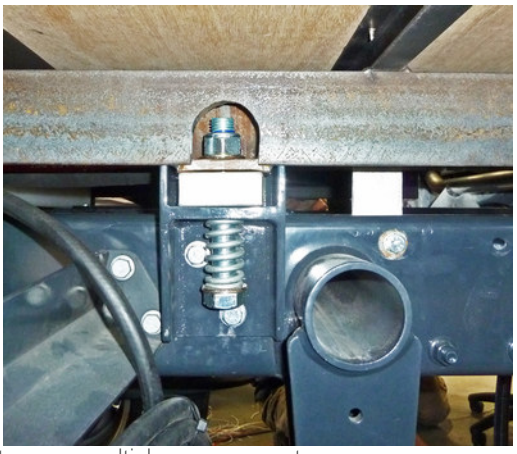
here is the amount of flex taken up by rear subframe mount, (truck on blocks prev. page)

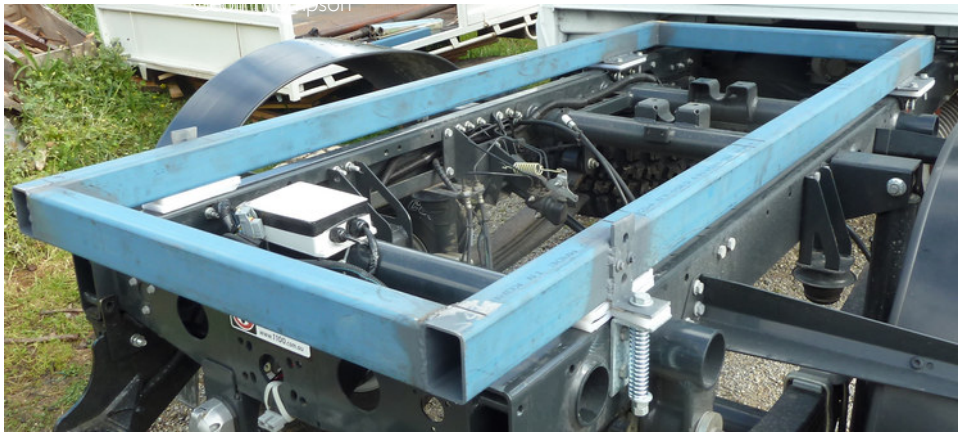
Not a bad amount of flext for a standard suspension setup

Rear body mounting

rear of EVA 3-point mounting system

Bodywork fixed to the rear of the 55S17W should be mounted on an independent rigid subframe. The subframe should be fixed in such a way that torsional movement of the chassis is not transferred to the subframe. Either by the use of a 3 point mounting system or via other suitable flexible couplings.


Traveltrucks kinetic mounting system uses multiple sprung mounts.


DIY subframe- front fixed, flexible rear with fishplates, re VSB 06 standards

Wheels / Tyres

There are two wheel & tyre size options available for the Iveco 55S17W. Neither of the factory wheel and tyre options is ideally suited to Australian conditions.

The Iveco road tyre is a 9.5-R17.5 Michelin XZY (32" overall dia) on steel 6" x 17.5" one piece rims.

On delivery the tyres are set to 110psi, on an unloaded truck this gives the new owner a bad first impression with a rough ride. Lowering the pressure on all tyres to 55psi helps slightly.

Unfortunately, 17.5" is a truck wheel size and only road pattern tyres with a high load rating are available for this size. Because of the heavy sidewall construction of these tyres they do not cope well with extended running at low pressures as is required in off road situations.

When fitted with the on-road tyre option the Truck is factory speed limited to 120kph

The Iveco off road tyre option uses 255/100 R16 Michelin XZL (36" dia) on 16 x 6.5 Tubeless Split Rim.

The XZL is an excellent off road tyre and would be well suited to Australian Outback conditions except for the fact that the tyre is virtually unobtainable here, few other tyres are available in this size, one being a much cheaper Chinese tyre, Yellow Sea YS20, a XZL copy but generally unavailable here too, Vehicles factory fitted with the off road tyre are Speed Limited to 100kph.

17.5" and 33" XZY road tyre

16" split rim with 36" XZL off road

The comfort and road handling of the 55S17W is greatly improved with 17 x 9" aftermarket rims and tyres.

Shown at right is relative comparison between a 35x12.5R17 Federal Couragia MT fitted to a 17x9" aftermarket rim, next to a standard 9.5-R17.5 XZY road tyre.

Due to fitment of aftermarket rims on a new vehicle purchase, near new / used original tyre and wheel packages are routinely available from Iveco Daily 4x4 Accessory vendors.

A selection of Australian approved aftermarket Steel or Alloy 17" rims are available from vendors such as Earthcruiser, Expedition Vehicles Australia or TravelTrucks. There is a large range of 4x4 tyres suitable for 17x9" rims, with 37x12.7R17" being the most popular tyre size. There are 4x4 tyres in 35, 36 and 37" diameters with the correct load and speed rating to suit this vehicle.

Walker Evans beadlocked alloy rim

Earthcruiser Alloy Rim

Traveltrucks 17x9 steel rim

EVA 17x9 Steel Rim

EVA Alloy Rim

At this time the most popular choice of aftermarket tyre used on the 55S17W in Australia seems to be the Hankook Dynapro RT03, 37x12.5 R17 MT 124Q LT. Load rating is 1600 kg at 160KPH.

On Road, the Hankook tyre is long lasting, relatively quiet and has great wet weather capability.

The tyre is classed as a MT, (Mud Terrain) but without the aggressive looking MT Lug patterns found on many Mud Terrains.

Off-road the Dynapro gives excellent traction on all surfaces and its sand performance is outstanding. Surprisingly wear resistant with no evidence of lug chipping after extended outback touring.

The 37x12.5 R17 MT is the most popular sized tire used on lifted 4x4 vehicles in USA which ensures it will remain a popular size for some time to come.

Dynamic Balancing Beads

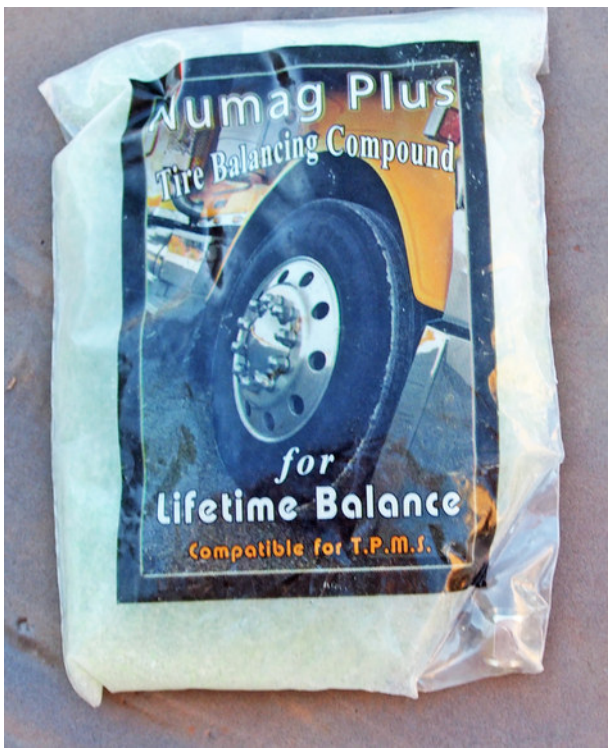
This wheel and tyre size is ideal to use internal dynamic balance media instead of the traditional wheel weights. Note the absence of any wheel weights in the images of the aftermarket rims.

Dynamic balancing, ensures the tyres are balanced for their entire lifetime and instantly compensate for dust or mud accumulation on the wheel.

Truck tyre balance media has traditionally been a powder but powder is unsuitable for 4x4 use as with regular deflation and inflation of tyres to suit off-road conditions there is the possibility of media loss as the tyre is deflated. Ceramic or resin beads such as "Numag Plus" or Australian "ABC Balance Beads" are ideal.

Use 6oz of media per 37x12.5R17.

Obviously Internal balance media is not compatible with puncture sealant liquids such as "Liquid Patch" "Tire Snot" etc.



Tyre Pressures

To adjust tyre pressures you will need a compressor and a good pressure gauge with a scale in the area of 0-60psi that will have easy to read graduations. A gauge with a scale of 0-150psi will be useless as the area that you will be needing in the range 20 - 50 psi will only cover a small quadrant of the dial.

The best tyre pressures for each vehicle will be different according to weight and tyre choice. It will be compromise between tyre life / road handling / comfort.

As a guide a laden 55S17W on 37x12.5R17 tyres would use rear tyre pressures of 45psi on road, 35 psi dirt tracks, 30psi on sand tracks and as low as 20psi on extremely soft, with the front tyres being 4-5psi less than the rear. Note these pressures are Cold.

To determine the absolute correct tyre pressure to get the most life out of your tyre, set your tyres to what you guess might be the correct pressure. Paint a line across the tread of each tyre and wait to dry. It should look like you had an accident with a line marking machine.

Drive on a sealed road for about 10km then check the paint marks (different distance for different paint type or road surface - you will get the idea).

If the paint is worn evenly the tyre pressures are perfect for that loading.
If the paint is worn away in the centre but visible on the edges the tyre is over inflated.
If the paint is worn on the edges but visible in the centre the tyre is under inflated.

If its not perfect first time, adjust pressure accordingly. Repeat the process until you have an even wear across the tyre. Wait till the tyres are cold, next morning is best and check and record all tyre pressures. That will be your benchmark best road pressure for that tyre, with that load. Remember that will be the best pressure for extending tyre life, but all things being equal will probably be right on for comfort and handling too.

No need to get pedantic and lower tyre pressures for every bit of gravel road, or sandy stretch, its a judgement thing, if you going to do a couple of hours on dirt sure let them down 5psi each, but no need to pump them up and down for every change in road condition. Running too low a pressure on bitumen is worse than running road pressures on dirt, keep speed below 80.

Correct tyre pressure management will enhance the performance of your 4x4 but also saves tyres, fuel and money.

Air Compressor

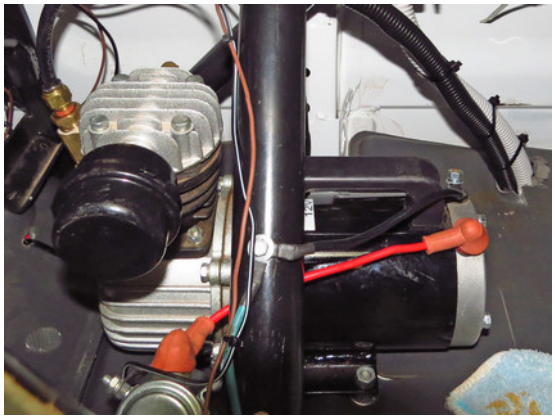
With the larger than normal tyres on your vehicle you will want a larger than normal Air Compressor, consider an On Board Air system, there is room under the rear seat of a Dual cab to mount a fair dinkum air compressor, and many locations underneath to mount an air receiver (tank).

Although a real truck compressor can be fitted to the optional engine (belt) driven PTO, a good 12v air is compressor a practical solution for OnBoard Air.

You could spend a couple of grand on the best portable compressor money can buy, (Oasis) and you wont regret it.

As a general rule with compressors, you get what you pay for, at a minimum anything under $300 for a portable compressor may not be up to the job.

onboard air manifold



compressor under back seat

receiver mounted under tray

Tyre Pressure Monitoring Systems

As the name suggests Tyre Pressure Monitoring Systems, monitor the pressure in your tyres, the information is displayed on a readout in the cabin.

TPMS are particularly useful if you are towing a trailer or caravan, as you will be less likely to feel the effects of one of the trailer tyre losing pressure whilst driving a truck especially in off-road conditions.

Each tyre to be monitored contains a pressure sensor transmitter. On the cheaper systems the transmitter is on the valve cap, convenient but problematic. The better systems have transmitters adhered to the rim inside the tyre or as part of the valve stem.

"Inawise" TPMS fits neatly into Ash Tray

In the event of an issue with the tyres, the display sounds an alarm and highlights the problem.

Speedo Adjustment

When fitting 37" aftermarket tyres the speedo does not need to be adjusted. Checking the Speedo against GPS will show the speedo to be 98% accurate with new tyres to 100% as they wear. However with the standard XZY road tyres the speedo is about 90-91% accurate, right at the edge of the ADR 10% limitation.

If it is desired to keep the original road tyres and have the speedo recalibrated, it can only be done by an Iveco Service centre by using EASY diagnostic equipment online with teleservices Italy.

Inner Mudguard Trim

The bottom edges of the inner mudguards will need trimming to stop larger tyres rubbing or catching on full lock, especially in reverse. Being thin plastic sheet they can easily be cut with good scissors. (be careful not to cut any unseen lines or wires behind).

Rear Mudguards

Heres a Good Idea! When building your you-beaut rear camper body Don't throw your crappy el cheapo rear plastic mudguards away. The cost a bloody fortune.

Vexi prices converted to AU dollars
504268858 Left $736.00
504324845 Right $859.00


original Mudguard

You would have to be absolute bonkers to buy a mudguard from Iveco.

Any Truck Parts supplier will sell you a pair of 600mm diameter plastic truck mudguards, any colour you like for around $80.00, (one shown fitted in the image at left) They are for dual wheel bogies so you may need to trim slightly for width.

Iveco Cabin

The cabin on the 55S17W is in most respects identical to that found on the 2WD Daily range so parts and problems are in common, with 2WD parts being more easily obtainable, and significantly cheaper than 4x4 specific parts.

The current body shape began in 2006 but the windscreen and body glass is common with earlier Iveco Daily models from 1999.

The Windscreen is Iveco Part Number 500316402, Pilkington 3471AGN.

Same Glass used from 1999 - 35S13 shown

A number of 55S17W have rust problems on the roof at delivery, something a new owner should check and as a matter of course present the vehicle to Iveco Service Centre for warranty rectification. The General Warranty on the vehicle is for 3 years or 200,000km but body corrosion rust is 3 years unlimited km.

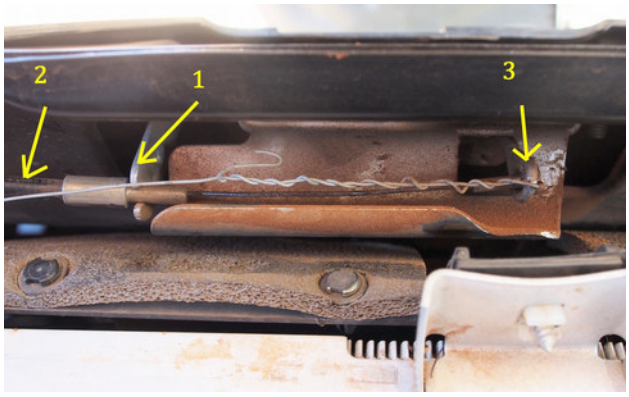
As the roof is out of sight it is unlikely to get much attention, but since this is known problem area it is prudent to take special care to wash and apply protective coating on a regular basis.

It appears most of these vehicles have been exposed to a salty environment at some stage, as the salt evidence on alloy and cad plated surfaces upon delivery of a new vehicle is a little disturbing. It seems pre delivery inspection at Iveco does not include attention to such detail.

Giving affected parts a scrub down with a salt mitigating solution such as Salt Away SX50 and then a through hose off is a good idea. (Keep solution away from electricals).

Bonnet Latch

Bonnet Latch cables are known problem area, keep your bonnet catch assembly well lubricated and regularly check the cable release end is secured firmly.



Refer to Image, at left, the Bonnet release cable (2) becomes dislodged when the aluminium keeper jaws (1) open or wear slightly, once the ferrule is out of the slot no amount of pulling on the bonnet release lever will open the latch. The bonnet is almost impossible to open in that case. A wise owner has caught wind of this problem and pre-emptively attached a cheat wire to the release catch (3) which can be grabbed from somewhere under the vehicle. This view is looking from the engine side behind the intercooler cowl.

Bonnet Gas Strut kit

The kit is made and distributed by Dave Anderson, they can be ordered from him by email: Lizzidman@icloud.com

Best value for money modification given the amount of time you need to spend opening the bonnet on these vehicles.

Cabin Filter

One of the really great features of the Iveco Daily is the excellent cabin filter, this is on the 2WD models as well so the filter elements are readily available. In the dirt it is so good to be able to pressurise the cabin with clean filtered air. Even if you never drive in tag along groups or convoy its great for oncoming traffic, especially the occasional Road Train.

The filter element is easily replaced by simply unscrewing the two phillip head screws indicated by arrows in the image above. The Air hood lifts off from two slots in the housing and the element is swapped in a matter of minutes.

On outback trips carry a few elements, when you start to smell dust time to change, 10,000km is about right.

Iveco Part No. 3802821
Ryco RCA256P

Absolute waste of money buying genuine Iveco Cabin Filters for 2 to 3 x the price of aftermarket, and no way your going to blow your warranty by using a more economical alternative here.

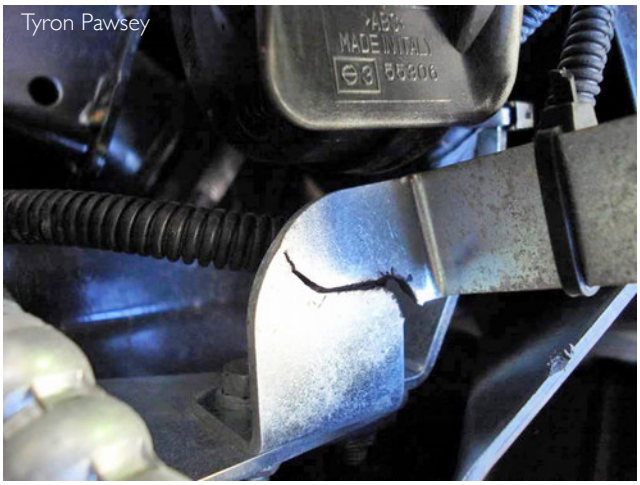
Pollen filter measures 292mm x 192mm x 30mm.

Horn Bracket

The Horn bracket is made out of the same quality material as the clutch cover bracket. Flimsy crap that has no place on a 2WD let alone a 4WD. Beware and keep an eye on it, not a matter of if its going to fall off - but when !!

Apparently they don't have corrugations in Europe !

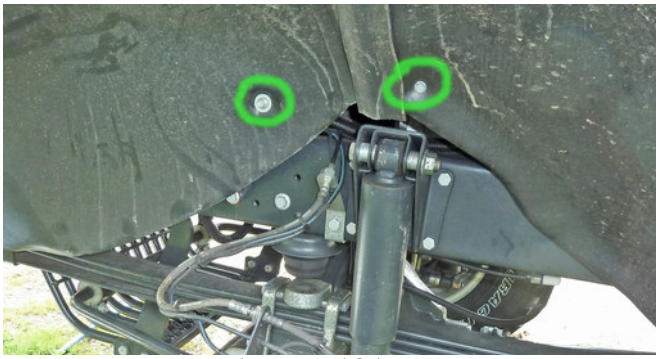
To locate horn sit on the floor in front of the drivers wheel and look up behind the low beam light.



horn bracket same as 2WD

Inner Mudguards

The flimsy plastic inner "mudguards" are 4x4 specific, labeled as 'engine protection' in the parts manual need regular removal to gain access for maintenance and inspection. The fixings routinely come loose and have been knows to fall away, Its prudent to use larger washers and some thread binding compound (eg. loctite) on the fixings.


inner guard fixings


left inner guards removed, same fixing points highlighted

Cabin Interior

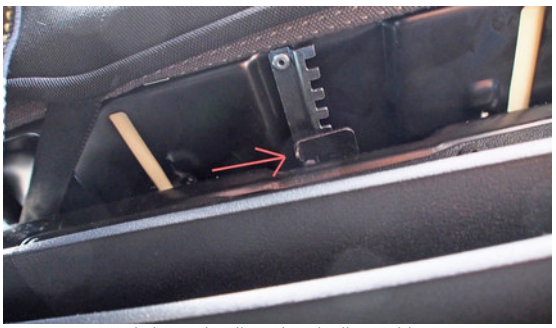
With the exception of the Transfer Case controls and Diff Lock buttons the Interior of the 55S17W is identical to the 2WD models. All Australian delivered 4x4's have the upmarket "comfort' display which includes climate control and an enhanced function trip computer and display panel.

Top Secret Seat Adjustments

Some things they forgot to put in the owners manual and Iveco don't bother telling you about!

Squab Length Adjustment

As good as ISRI seats are supposed to be, Truckies use them so they must be good, ..right?? One thing about driving the 55S17W is that it seems like one is perched ON the seat instead of sitting IN the seat. There is definitely the feeling that the seat squab (base cushion) is too short.



push lever in direction indicated by arrow,

There actually is a top secret adjustment to move the seat squab (base cushion) forward about 30-40mm. One small adjustment makes a huge difference, the seat is way better, goodness knows why its not in the manual, perhaps some OHS BS about jamming fingers ??

The squab can also be pulled all the way forward and completely removed for maintenance access under the seat.

Lumbar Support

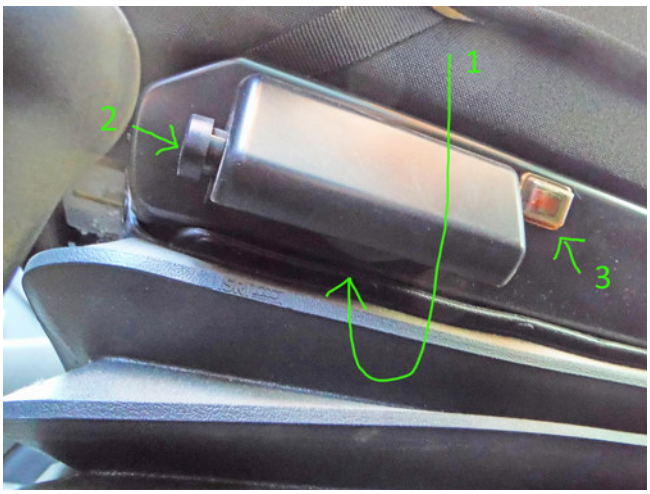
The ISRI seat has a squeeze bulb that will inflate a lumbars support pillow embedded in the lumbar area of the back rest.

Refer to the bottom left image. It shows the Lumbar pump at the front left bottom of drivers seat, passenger suspension seat has same on the front right (as seated).

(1) Air pump bulb just visible in photo

(2) Pressure release button

(3) Bum Warmer switch



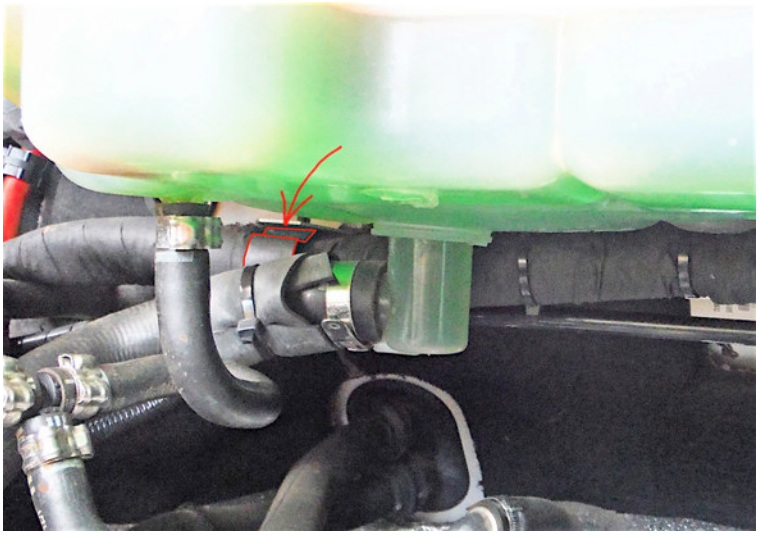
Friction / Rub Points

"Radiator Hose Cable Tie Rub Through" is a particularly common fault on some 4x4 vehicles, did someone mention LandRover Puma. There have been some Iveco hoses replaced under warranty due to Cable Tie or proximity to other sharp objects.

Give your Iveco a good check over especially around the hoses.

It seems Iveco don't have time to give your vehicle a thorough, pre-delivery checkout, one gets the impression they would rather deal with warranty issues than rectify possible future faults.

Cable Tie tang too close to coolant hose



Highlighted at in the image at left is the location of a cable clamp with sharp edges that rub directly onto the hose under the coolant header tank. The hose has been protectively wrapped in some inner tube rubber by the owner & cable tied in place.

Radiator hose / Cable Tie rub through

fixed using rubber shroud around hose

Electrical System

The electrical system on the 55S17W is almost identical to the 2WD models and is un-necessarily complicated. It runs a hybrid CAN bus / traditional system with a front mounted multiplexer for the tail light and trailer plug wiring, which seems to entirely defeat the purpose of the CAN bus system.

A CAN bus (controller area network) is an automotive wiring standard designed to allow devices to communicate with each without a host computer. CAN bus is one of the protocols used in the OBD-II diagnostics. The OBD-II standard has been mandatory on diesel vehicles since 2004.

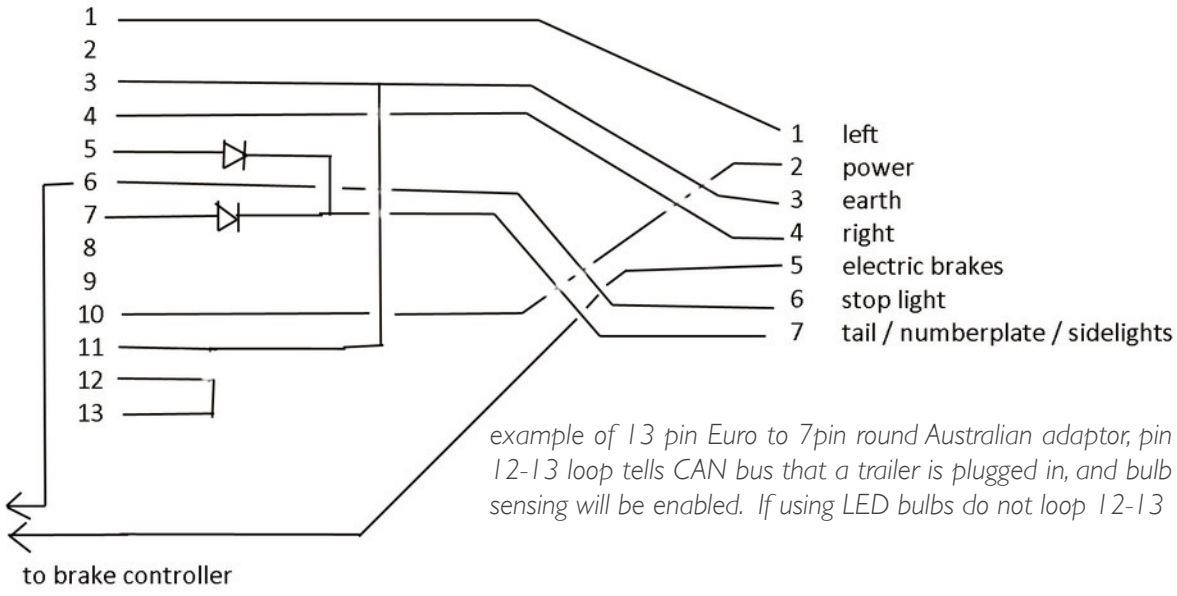
The Wiring is all Iveco except for the Diff Lock controller under the drivers seat which is courtesy of SCAM. Iveco EASY easy will diagnose most wiring faults and contains complete wiring diagrams for the vehicle, but unfortunately it does not interface with the SCAM Diff lock computer.

Trailer Plug Wiring

As usual with European Can bus vehicles the trailer plug is 13pin Euro and not compatible with Australian trailer or caravan wiring standards.

13 Pin Trailer Plug pinout & bulb wattage

Pin	Description	
1	Left Indicator	21W
2	Rear Foglight	42W
3	Ground	
4	Right Indicator	21W
5	Front left/rear right sidelights; left number plate ; left clearance light	5W
6	Brake Light	42W
7	Front right/rear left sidelights; right number plate; right clearance light	5W
8	Reversing Light	21W
9	Battery +ve	
10	Ign +ve	
11	Ground	
12	Trailer connection signal (Ground)	
13	Ground	



example of 13 pin Euro to 7pin round Australian adaptor, pin 12-13 loop tells CAN bus that a trailer is plugged in, and bulb sensing will be enabled. If using LED bulbs do not loop 12-13

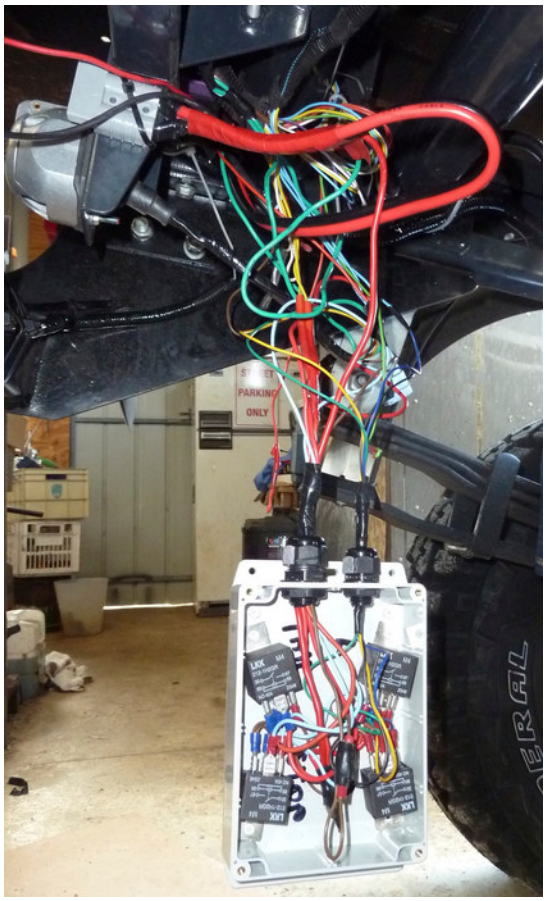
10W is the limit for tail / number plate / side light circuit, a mixture of LED and incandescent bulbs may be required to eliminate CAN bulb sensing errors.

Trailer Relay Box

For extended towing a trailer light relay box is recommended. A relay box will completely isolate any trailer / caravan wiring issues (which are not uncommon) from the vehicle electrical system.

The CAN bus will not notice a relay coil as any additional load.

The image at right is a of DIY relay box, in a waterproof enclosure, in the process of being spliced into the Iveco trailer socket loom, which is to be terminated in a standard Australian round 7pin trailer socket.



Battery

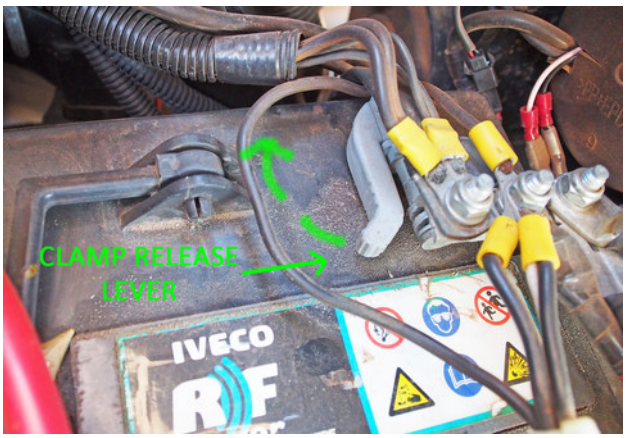
The Battery in the 55S17W looks like a sealed battery but is a "Low Maintenance" old technology 12Volt 100Ah 760CCA Wet Lead Acid battery. Iveco Part Number 504181743.

Measuring approx 170w x 345l x 232h, with bottom clamp grip. Don't pay $600 for what is essentially a garden variety battery. When the time comes replace your original with a modern maintenance free battery

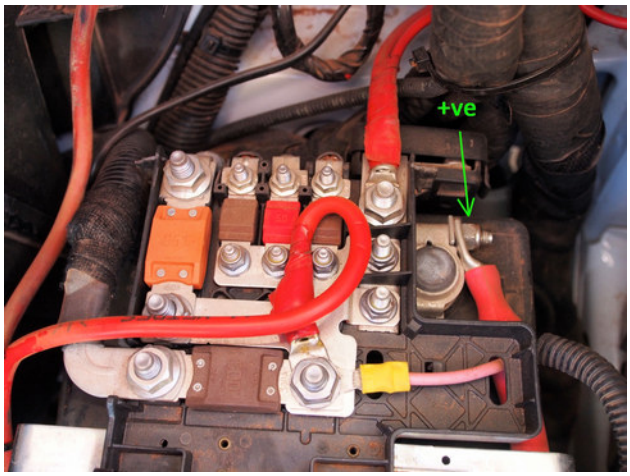
Any good 12V flat top battery that fits dimensionally and is at least 750CCA will be fine e.g., N87LZ so long as the terminal post are in the same location, particularly the positive post, as it holds the mega-fuse box and has a clamp down rail at the bottom. Most N87 size batteries have no lower hold down rail so a top style hold down clamp may need to be retrofitted. Also note, a Flat Top Battery is required because a battery with raised electrolyte filling caps will be unsuitable as the filling caps will be in the way of the master fuse box, but a sealed battery will not have that problem.

To allow access for battery removal the left hand headlight assembly must first be removed. Take the grille off with 4 screws across the top, the grill is located in sockets at the bottom, lift upwards to remove, then the bottom bolts that hold the headlight will be obvious, remove wiring as necessary then the headlight bolts and pry the headlight out, it will have a pull-apart ball and socket type device trying to hold it in place.

The troublesome Negative battery clamp has a cam action release lever, rotating anti-clockwise will release battery cable clamp but it may be the case that some aftermarket wiring needs to be removed from the clamp to allow battery egress.



These cam lock clamps are known to cause starting problems, best replaced by an aftermarket battery clamp.



The positive battery clamp is part of the mega-fuse panel, remove only after first disconnecting negative quick release clamp. Use a 10mm ring spanner. The fuse box has a number of spare positions for Accessory wiring.

The mega-fuse panel has a plastic cover (not shown). Mega-Fuses are readily obtainable at auto accessory stores

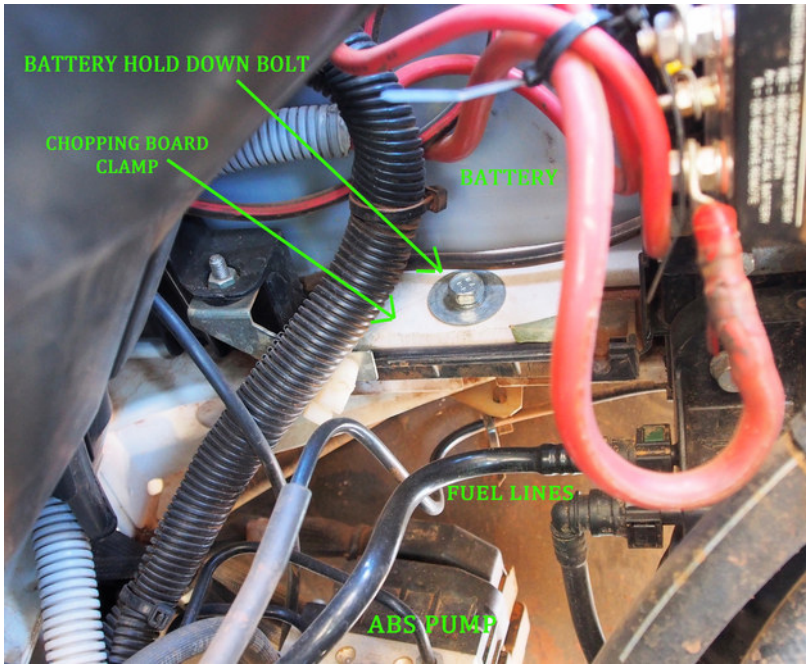
Refer to the Iveco Daily 4x4 Body-Builders manual for more details on attaching accessory wiring.

Battery Hold Down Clamp

The battery hold down bolt is known to come loose, its out of normal view so unless routinely checked the bolt unscrews completely and falls away along with the hold down clamp.

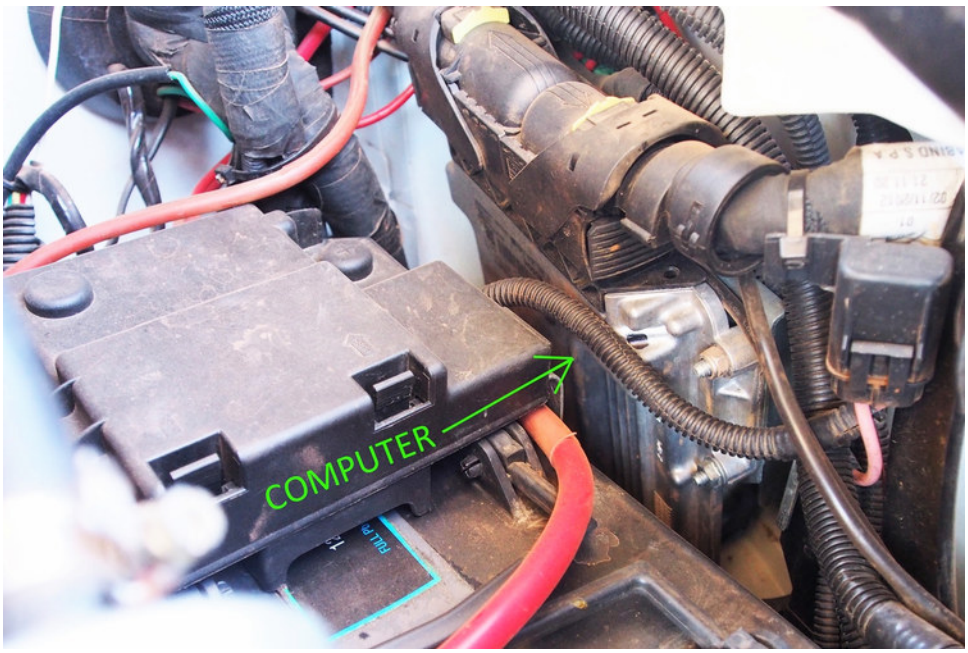
The clamp and bolt are unavailable as spare parts, the Battery Tray complete with bolt and clamp is one Part Number 3800314.

In the unfortunate case that you do lose a battery hold down clamp an alternative can easily be made out of kitchen chopping board, as in the case of the image below.



Warning: Old habits die hard, As with any modern vehicle do not wash any acid residue on or around the battery with a hose, a resultant dilute acid solution sprayed into electronic components or wiring south of the battery is going to cause problems 'down the track'. Clean battery with a mild alkaline solution on a cloth if required.

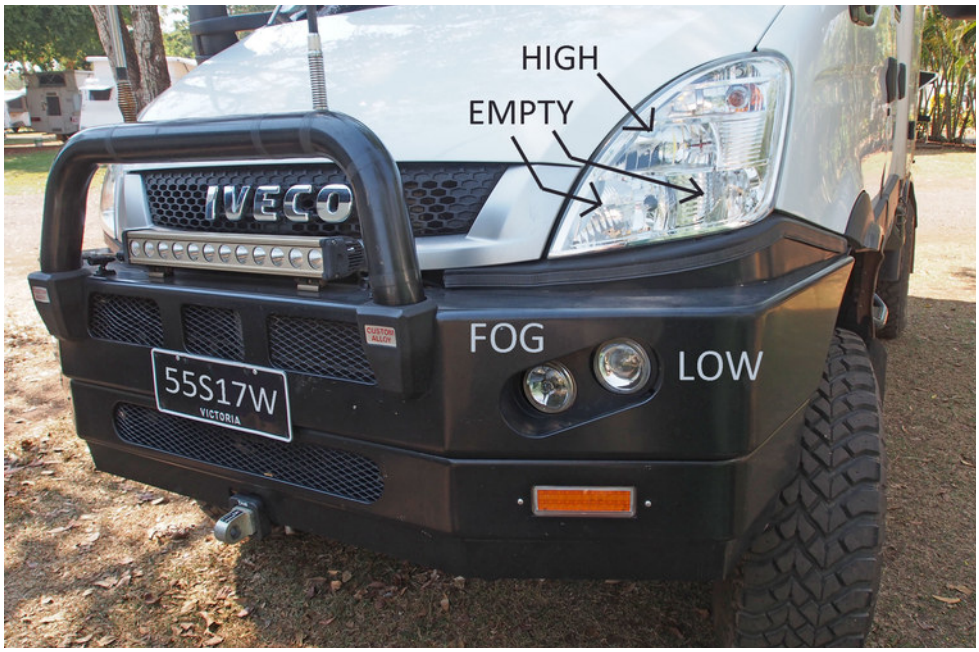
Note: The Bosch EDC17 Engine Control Unit sits directly alongside the battery. and ABS electronic module is below it.



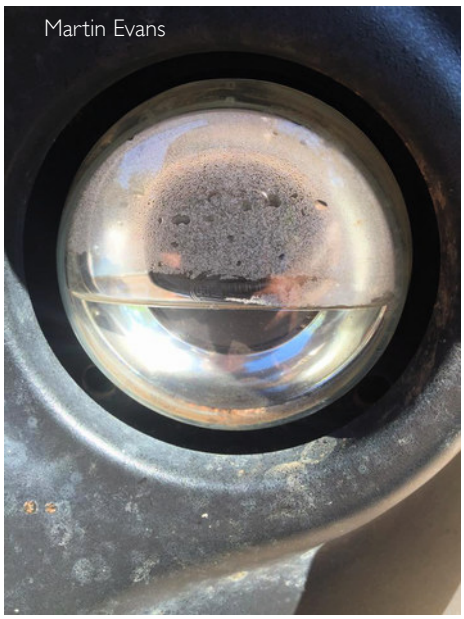
When Installing an Auxiliary battery have a think about selecting a size, capacity and terminal post layout, which will also enable mounting in the main battery compartment should the main battery fail in a remote location.

Lighting

The Main headlamp positions on the 55S17W are too high for Low Beam due to both European and Australian design rules. The 90mm Low Beam and Fog Lamps are mounted in the Bumper bar leaving the Low and Fog lamp position in the Main head lamps empty.



Fitment of Aftermarket HID lamps into the Empty housings almost make the addition of separate driving lights un-necessary.



The small Low Beam and Fog lamps in the bumper bar are a commercial Truck / Bus 90mm Halogen Headlamp. Not entirely suitable to 'off road' use as can be seen by the example at left after having engaged in some Arnham Land creek crossings. Not particularly an Iveco 'quirk' as time spent wading in any vehicle with non-sealed beams do suffer the same fate.

The existing Low Beam headlights are pretty ordinary as far as light output is concerned. Oncoming vehicles know you are there but thats as good as it gets. As far as the driver having any useable forward visibility at night on low beam, especially after dipping from HID's assisted high-beam - forget about it.

The ADR approved Narva 71988, shown at left is a direct replacement for the Hella Halogen H7 Low Beam unit in the 55S17W.

The LED Low beam is huge improvement over the existing Halogen, in reliability, much lower power consumption and most importantly - light output.

The Narva 71988 shown at left, is also fully sealed, waterproof to IP66.

H7 LED bulb retrofit into Hella 90mm enclosure,

Cree LED technology is seriously good. Superior lighting for lower power consumption. A variety of H7 LED bulbs, mostly from China, are available online. The example shown here is bulky but has heat sink cooling and does not need a fan or control box. It is easily retrofitted to the Iveco 4x4. It has proven reliable in outback conditions as with the original H7 Halogen bulb its weakness would is submersing it in deep water.

H7 Halogen vs H7 LED

Corrosion on original Low Beam headlamp socket shown at left, This vehicle has never been in salt. Reminder to spray everywhere with water repellent if you go near the beach. Salt Water Sucks !!

H7 LED mounted in Hella housing

The rubber cover needs to be cut away to suit the larger physical bulk of the LED. The original wire clamp will support the bulb adequately.

comparison showing original H7 Halogen bulb driver side versus H7 LED bulb .

Electrical Accessory Wiring

Caution: For those who traditionally fit their own electrical accessories, when working with CAN Bus system. Finding the nearest live wire or earth and connecting to it is fraught with danger. If the pick-up wire is part of the CAN Bus you could unknowingly cause expensive damage. Refer to the Iveco Daily 4x4 Body-Builders manual for details on attaching accessory wiring.

The 55S17W is not difficult to add accessory wiring to. The open chassis rails are ready designed cable ducts. Inside the cabin you can virtually poke a snake or length of yellow-tongue anywhere you would need to run some cabling. The Glovebox and centre document drawer pop out without tools, giving great access to concealed wiring. No need to drill holes in the firewall or body floor to pass cables or wiring. Under the rear seat of the dual cab are 3 large elongated cutouts in the floor, sealed over by a cork substrate covered over by the floor mat .

The firewall has a large rubber grommet where the main loom passes through above the battery. Around the main loom cable are a number of small pre perforated holes with an outer membrane which can easily be punched through with a screwdriver, then followed through with your accessory wiring.

Seat Belt Buzzer

It is an ADR requirement that the Drivers seat belt has an Audible or Visual warning device (buzzer or idiot light) to warn if the vehicle is in motion without seat belt buckled up. But the buzzer is bloody annoying when you need to jump in and out to move the vehicle short distances, or during off road driving without the seat belt. One of two plugs under the rear of the drivers seat in the seat belt buzzer, the other is the seat warmer.

Seat Warmer

The seat warmer is no use here but the 12v +ve ign feed under the seat is handy for powering small accessories, chargers, etc. It is supplied from A/C fuse 49, 15A behind the left speaker panel never install a higher rated fuse.

possible cable entry holes under rear floor

main loom firewall grommet

rear speaker cabling - too easy

Switch Panels

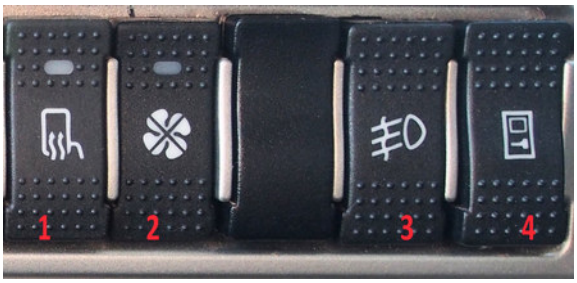
Iveco use their own proprietary switches, the Diff Lock switch panel (1) at top is mounted inside a standard Single Din enclosure. The standard Fiat / Philips radio uses another Din enclosure. The radio in the console at right has been replaced with an aftermarket radio / GPS.

The 10 switch locations in panel (2) will only fit Iveco switches, the Red Hazard switch is slightly larger will only fit the centre slot. An Iveco factory accessory light switch is available, to fit the blank switch positions. Part number 5801465646.

Switch panel (3) is an aftermarket Single Din 7- Carling switch panel. There are numerous carling switch styles available, with a plethora of 4x4 related icon printed on them.

The Diff Lock switches can be moved south to fit the spare proprietary switch locations in panel (2) making the way clear to fit a Double DIN enclosure panel tor a 7" GPS display or entertainment system.

Iveco Switch Designations



Iveco have left some of the proprietary switch designations out of the owners handbook. Switch (1) is Heated Mirrors
Switch (2) turns radiator fan off, useful for deep water crossings, but a emits a seriously annoying beeping sound.
Switch (3) Fog Lights
Switch (4) Locks & Unlocks doors, useful if you have Autoclose set

Aftermarket Radio-CAN-B issue

The original Fiat - Philips radio is part of the vehicles CAN bus architecture, it is coded into your vehicle, system and communicates with the Marelli dashboard computer. Fitting of an aftermarket radio will unfortunately cause a fault condition in the body computer. The fault has no symptoms but the original radio can be programmed out of the system only by Iveco Service centre with Iveco EASY.

If you have a Dashboard CAN B fault at any stage Iveco will not fix it claiming the Aftermarket radio is the cause, but that is not necessarily the case. Ask them to deprogram the Factory Radio from the vehicle, and by a process of elimination can show that then if a dashboard fault still exists, it was not the fault of Radio removal.

Double Din Radio

For Four Wheel Driving or Outback Touring the 7inch GPS display on a Double Din Radio is invaluable as they can easily be loaded with OziExplorer software and Topographic Maps. There are OziExplorer software versions for Android or WindowsCE head units and the topo maps, e.g., Hema maps will load on either system.

Relocating diff lock controls to make way for Double Din radio nicely fills up the proprietary switch panel.

A few DIY examples are shown here. The end result is a much better looking and more functional dashboard.

One of the proprietary blanking covers makes a great location for the Centre, Rear and Front diff-lock-engaged indicator lights.

The entire switch control panel is held in place by 3 screws, two are obvious under the bottom 1Din cover (the original Din buckets can be easily removed) the third screw is hidden under the centre 'fan control' knob which simply pulls off.

Double Din escutcheons or fascia for the Iveco Daily are available online, eBay search for "Iveco Double Din" will bring a result, a facia between 2006 to 2013 will fit, no guarantee you are going to get an exact colour match.

The European Radio Antenna plug is not going to fit the Chinese 2 Din unit (they are all made in China) but don't bother getting an adaptor, the Standard Iveco Antenna which is inside one of the mirrors is an absolute waste of time - won't work once you leave the big smoke! If listening to the radio is important to you fit an aftermarket radio antenna instead. There is a rubber grommet on the roof Ideal for installing a Rubber Duckie or similar Antenna.

Erisin 7610 Head Unit fitted - note: panel colour mismatch is not an issue

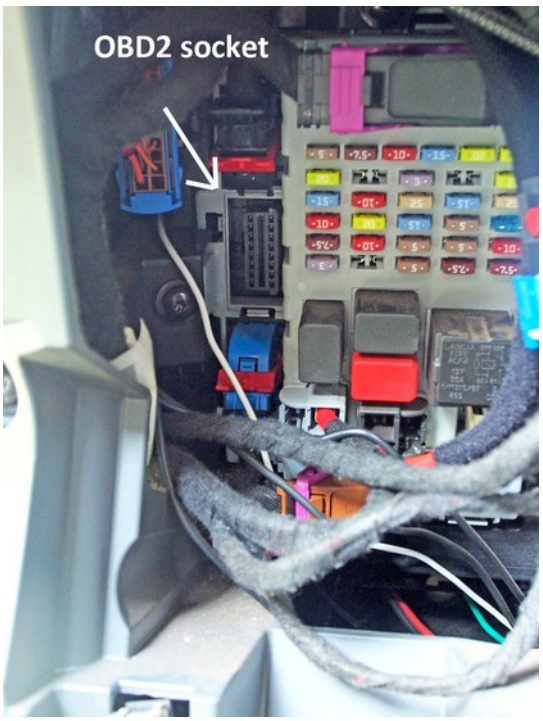
The Erisin 7610 Head Unit (Nissan Clone) is a great choice, it runs Windows CE so is compatible with OziExplorer and Hema Maps / Vicmaps etc, and includes the Iveco logo as one of the default startup screens. The way technology is that model is probably already obsolete. When deciding on a head unit, also consider one without a CD/DVD player as there is limited room for the bulky wiring needed behind the radio, a head unit without an optical drive should be shorter, another often overlooked consideration is to specify a unit with a non-glossy screen.

Iveco EASY

Iveco use a proprietary scan tool. That tool is not generally available for sale in Australia. It is leased to Authorised Iveco Dealers only, at an outrageous expense rumoured to be in the area of $5000 per year plus annual update subscription in the area of $3.5K. The device must be connected into Iveco Servers (Teleservices) to perform any software updates or program changes to the vehicle.

It appears that Iveco policy ensures that the diagnostic equipment is unavailable to Independent service personnel which ties you to have your services done only at Iveco Authorised service centres.

Of course these tools (and cloned copies) are available from overseas but because of Iveco's policy they attract outrageous prices over and above what one would pay for similar tools used for other brands. Privately sourced Iveco EASY devices with up to date software version can do everything an Authorised dealer can do except for updates and program changes, such as speedo recalibration, or removing Factory radio codes from Body Computer, etc.



Even at ridiculously high prices it still does make sense to buy your own diagnostic tool, you then have the freedom to get independent servicing done (by letting the Independent serviceman use your tool), and once warranty is over you have the freedom to do your own self servicing, the diagnostic tool makes fault finding very easy.

Also, when touring remote Australia the last thing you want is a engine or sensor fault and have the truck go into limp mode or worse, stop dead!! Plug EASY in, self diagnose, clear fault and your on the road again, or at least can call in the correct parts (if you don't carry them).

OBD2 (On Board Diagnostics) socket is in the fusebox behind the left hand speaker panel. The Iveco EASY device will work on any modern Iveco vehicle as well as its diagnostic functions, EASY can retrieve the entire sensor parameter history of the truck which is recorded in ECU, on the following pages is part of a saved data dump file from EASY.

Iveco Dealers can see all this data whenever you go in for service, if you abuse your vehicle big brother will know!! Note: You should ask Iveco Service Centre for a copy of your data downloaded at each service, Iveco can not refuse to hand over your data, it should be either printed or copied to USB memory device and handed to you. Service Centres will not necessarily tell you about or fix faults stored in memory, but you do have a right to this information.

```
Date.....................................................9/01/2015
Hour....................................................11:26:10 AM
DM_EURO4_ECS3.............................................. v1.0.17
E.C.U. version.........................................P_591 4.7.3


FAILURES IN THE ECU MEMORY:

1   TVA THROTTLE VALVE - SHORT CIRCUIT TO GROUND
    DTC: 7137 - OBD CODE: P2141

    STATUS: INTERMITTENT
    RIPETIZIONI: 4

    Enviromental Conditions:

    DTC                                        7137
    "LONGTERM" FAULT                            NO
    *** FIRST TIME ***
    ENGINE REVOLUTIONS Missing Label!             0            Rpm
    VEHICLE SPEED Missing Label!                  0          Km/h
    BATTERY VOLTAGE Missing Label!            13.04         Volt
    *** LAST REGISTRATION ***
    ENGINE REVOLUTIONS Missing Label!             0            Rpm
    VEHICLE SPEED Missing Label!                  0          Km/h
    BATTERY VOLTAGE Missing Label!            12.90         Volt



2D Map: Engine speed/Calculated load value
+------------+-------------------------------------------------------+
| 3600..4200 |    2m44s         16s          39s         3m40s      |
| 3000..3600 |    59m39s       19m31s      3h6m18s     3h43m28s    |
| 2400..3000 |  11h58m25s    10h3m14s     39h11m38s    68h59m57s   |
|    rpm-%   |    0..25        25..50       50..75      75..100    |
+------------+-------------------------------------------------------+

2D Map: Engine speed/Calculated load value
+------------+-------------------------------------------------------+
| 1800..2400 |  52h50m8s     57h52m10s    123h32m8s    156h21m48s |
| 1200..1800 |  50h42m2s     42h7m59s     24h13m4s     19h17m2s    |
|  600..1200 |  111h4m32s    48h42m55s      6h0m9s     2h10m56s    |
|    rpm-%   |    0..25        25..50       50..75      75..100    |
+------------+-------------------------------------------------------+
```

2D Map: Vehicle speed/Engine speed

126..151	3s	0s	0s	0s
101..126	11s	4s	31h17m10s	1h29m52s
76..101	1m36s	184h22m13s	72h50m5s	6m2s
km/h-rpm	600..1500	1500..2400	2400..3300	3300..4200

2D Map: Vehicle speed/Engine speed

51..76	3h8m8s	166h25m53s	16h46m41s	14m46s
26..51	19h22m17s	90h24m25s	11h29m16s	26m46s
1..26	70h46m49s	42h20m13s	4h20m6s	5m10s
km/h-rpm	600..1500	1500..2400	2400..3300	3300..4200

2D Map: Filtered flow resistance of the particulate filter/Simulated soot mass in particulate filter

0.35..0.42	46m22s	17m25s	2s	1m31s
0.28..0.35	4h36m2s	1h18m34s	1h48m8s	3h18m2s
0.21..0.28	17h24m1s	21h19m37s	55h1m20s	2h22m50s
hPa/(m^3/h)-g	0..15	15..30	30..45	45..60

2D Map: Filtered flow resistance of the particulate filter/Simulated soot mass in particulate filter

0.14..0.21	76h30m13s	129h3m36s	66h22m15s	3h29m32s
0.07..0.14	269h20m15s	145h50m7s	63h49m57s	3m14s
0..0.07	3h42m28s	3h19m44s	1h4m44s	0s
hPa/(m^3/h)-g	0..15	15..30	30..45	45..60

1D Map: The upstream temperature in Particle filter

	46h23m52s	48m31s	2h16m12s	1m19s
[deg C]	400..500	500..600	600..700	700..800

1D Map: Sensed engine coolant temperature

	65h42m25s	0s	0s	0s
[deg C]	99..106	106..113	113..120	120..127

1D Map: Fuel temperature

	139h33m31s	16h12m33s	29m2s	0s
[deg C]	50..60	60..70	70..80	80..90

1D Map: Calculated load value

	325h22m34s	193h52m23s	294h25m46s	56h32m50s
[%]	0..33.00	33.00..66.00	66.00..99.00	99.00..132

1D Map: Maximum rail pressure during last 10ms

	229h49m32s	195h22m58s	247h42m40s	164h49m7s
[bar]	100..550	550..1000	1000..1450	1450..1900

1D Map: Engine speed

	0s	0s	0s	0s
[rpm]	4200..4300	4300..4400	4400..4500	4500..4600

Single range timers and event counters

Description	Range	Timers	Counters
Engine speed	> 50 rpm	838h31m50s	2881
Engine speed	> 4600 rpm	0s	0
Sensed engine coolant temperature	-100 < deg C < 5	2m44s	6
Sensed engine coolant temperature	> 127 deg C	0s	0
Fuel temperature	> 90 deg C	0s	0
Current fuel pressure	> 1900 bar	0s	0
Vehicle speed	> 151 km/h	0s	0
glow plug control on/off status	> 1 -	3h49m42s	963
Fan speed set point	> 0.01 %	381h57m51s	18246
Status of fuel filter heater	> 1 -	0s	0
Barometric pressure	0 < bar < 0.80	0s	0
Barometric pressure	0.80 < bar < 0.90	3h48m48s	278
Desired PoI1 injection quantity	> 0.10 mg/hub	2h31m8s	122
Filtered flow resistance of the DPF.	> 0.42 hPa/(m^3/h)	0s	0
Active operation mode	> 1 -	0s	0

Data Integrators

Description	Unit	Value
Desired PoI1 injection quantity	mg/hub	5570918

Min Max physical values

Description	Unit	Min	Max
Engine speed	rpm	0	4204
Sensed engine coolant temperature	deg C	-3.60	105
Current fuel pressure	bar	0	1835
The upstream temperature in Particle filter	deg C	-3.80	790
Sensed pressure downstream of the particle filter	bar	-0.11	1.07

Engine data

Description	Unit	Value
Application parameter for total vehicle distance	m	44700363
Engine on time		837h21m13s
Application parameter for ECU operating time		886h25m43s
Total number of Engine revolutions.	r	91693000
fuel consumption per driving cycle [ul]	l	8010

Some interesting stats from the above gobbledygook, the data at the time of testing shows the truck has covered 44700363m, which is 44,700km (the truck speedo actually shows 45594km so that is a bit odd.
Total fuel used = 8010L which gives 17.57 L/100k.
Max engine speed = 4202 RPM (That would be screaming downhill in low gear-due to zero engine braking).
Speeding in the 126-151 kmh range for 3 seconds (strange the truck is speed limited to 120kmh) Note: This evidence is not admissible in a Court of Law.

The highest coolant temp recorded = 105c
DPF temp = 790c that is very disturbing. Aluminium melts at 630c, paper and dry grass ignite at about 250c.

WARNING: Do not drive your DPF equipped vehicle through dry grass or spinifex.

Other OBD2 Scanners

Iveco have added coding to the OBD2 that prevents the use of generic OBDII tools for specific tasks. However It is possible to interrogate the electronic sensor outputs with Android Torque Pro and ELM27 OBD2 dongle. This can be useful to monitor engine temperatures etc.

For servicing and fault finding even Professional Scan Tools can not crack into the Iveco firewall. According to the ACCC this is anti-competitive. The OBD protocol was originally developed. and introduced by law so that any mechanic could have the necessary equipment to service any vehicle.

Operating your Iveco Daily

The Iveco Daily 4x4 is quite different to any other 4x4 Vehicle or Truck and the differences need to be taken into consideration when driving, whether On Road or Off road. It is Important to familiarise yourself with the idiosyncrasies of this vehicle. For longevity of the Transfer Case it is important to understand the operation and limitations of Low Range gears. (nothing in Iveco handbook or Workshop Manual about this)

On Road

You have the most commanding driving position of any vehicle that will fit into a regular parking space. As far as eyeball level is concerned you are almost into Prime Mover territory. By all means use the height to your advantage, especially in traffic, but drive carefully and deliberately, car drivers will dangerously cut in front of you, after all - who wants to be "stuck behind a truck".

Your Vehicle has the worst brakes and longest stopping distance of any modern vehicle on the road - you do not have the excellent brakes that most trucks do and the dickhead that cuts in front of you certainly will not know that! Remember if you run into somebody's rear end, as far as the law is concerned you are 100% to blame. Good idea to get yourself a Dash Cam.

Half Gears

Half gears are a nice feature of this vehicle, No other 4x4 in Australia has such a device. The "Half Gear" (under-drive) is useful when driving uphill (or downhill) with many bends or on rough roads when towing. The half gears have a synchro-mesh and can be changed with the vehicle moving by pressing the clutch pedal and shifting the Green lever forward. There is a Neutral position between High Range and Half Gears. The gear change is stiff to begin with but will loosen with use and time. Do not force the gear change.

Low Range may be used for slow manoeuvring when "On-Road" hard surfaces, for example reversing a trailer up a steep driveway, boat ramp etc. to avoid riding the clutch. Never change into Low range (Red knob) whilst moving.

Off Road

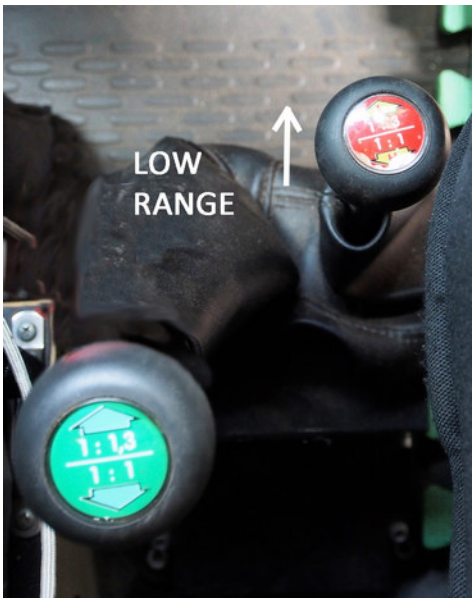
What is "Off Road"? Google says "away from the road; on rough terrain".
"only one in eight 4x4 owners has ever driven off-road".
Off road driving in Australia, except on Private Property is in the most part Illegal, so there is a problem with the definition of "Off Road". Any publicly gazetted road or track that is on a map, (including beaches) is a Road. So more like only one in eight hundred 4x4 owners have ever driven off road !!

Four Wheel Driving

You do own one of the most capable 4x4 vehicles in the world. There is no need for aggressive FourWheel driving, Be gentle to your Vehicle and the Environment, All the features of your vehicle will start to gel when you get off the blacktop. Your suspension, gearing, track to wheelbase ratio, tyre ground pressure, diff locks and centre of gravity combine together to create an awesome all terrain machine. There is no terrain response computer, traction control, descent control (your dreaming now). The driving is all done by You!

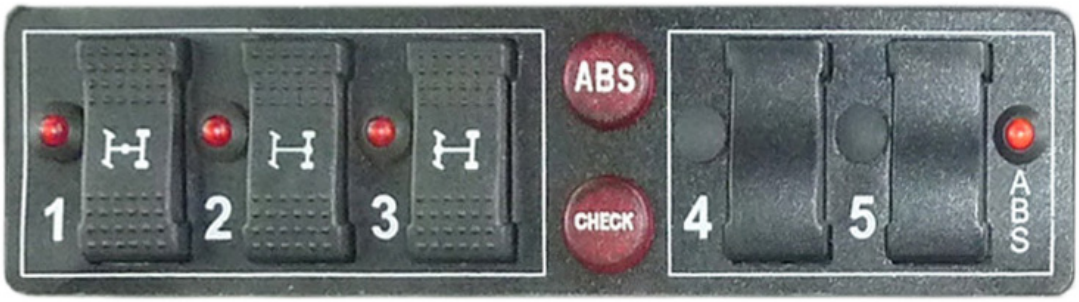
Low Range

There is no synchro-mesh on Low Range, the Vehicle must be stopped and clutch depressed to engage Low Range. The Low range shift gate is short, there is no Neutral between High and Low.



Diff Locks

The 55S17W is constant Four Wheel Drive, Never engage the Centre Diff Lock on Sealed Roads or smooth hard surfaces. The Centre Diff is located inside the Transfer Case and it needs to be treated with care.
The owners manual does not fully explain the diff lock operation.



Unfortunately the Diff Lock has some computer control built in. It runs through the SCAM Diff Lock controller under the drivers seat, and is the only Computer in the vehicle that Iveco EASY does not interface with. There is no way to reprogram the SCAM Diff Lock computer as SCAM don't answer Emails or Phone Calls about Iveco product.

The standard DiffLock AFAM computer logic is flawed:

- The center Diff lock must be engaged before the rear diff lock will engage.
- The front diff lock can not be engaged unless the rear diff lock is engaged.
- The center diff lock can not be engaged at speed, you must slow to below about 40kmh before the computer will allow center diff lock.
- The center diff lock automatically disengages over 70kmh.
- The rear diff lock will not engage above 20kmh, automatically disengages over 40kmh.
- The front diff lock will not engage above 15, automatically disengages over 30kmh.

There are clearly times on Outback gravel or corrugated roads where speeds 85-90 kmh are the go and it would be bloody fantastic if the Center Diff Lock could be engaged. Having to sit on just under 70kmh to enjoy the benefits of CDL is just too frustrating.

This truck Shines on Corrugations and Braking distances are greatly improved on Gravel or Dirt when ABS is deactivated, due to the fact that a "Bow Wave" or what is effectively a wheel chock made from dirt builds up in front of a skidding tyre. So having CDL disengage at 70 kmh is bloody stupid.

Idiot proof means you cant activate CDL on bitumen at speeds over 40kmh, which would obviously bugger it up in no time. There are also times where you will want Rear Diff lock engaged at speed, having it drop out at 40 is a pain in the bum.

Front diff lock Idiot rules, not so bad!! An annoying beep accompanies the Front diff lock activation light, not that you need it. If you can't tell the front locker is activated through steering wheel feedback you should not be driving.

Long Grass

Warning: Avoid operating your 55S17W in long dry grass or undergrowth. Check regularly for grass or flammable material trapped or built up around exhaust.

The Owners Handbook states on page 149:

The fire warning is reiterated on page 191 of the handbook, and in the side bar on page 229.

Dry grass flashpoint is about 250°c, The DPF operates at 750°c+

You have bought a Four Wheel Drive vehicle in "Good Faith" with every expectation that you will be able to use it in "Off Road" conditions, including driving through, stopping on and even setting up camp on grass, leaves, pine needles etc. Driving through Spinifex grass is almost unavoidable if touring Outback Australia.

Carry a Fire Extinguisher and be prepared to use it. Refer DPF Removal Strategy - page 21

This is not a good Look

DIY Maintenance/ Scheduled Servicing 55S17W

The Owners handbook describes the scheduled maintenance routine on page 239. thus:

For On Road	M1	40,000km
	M2	80,000km
	M3	120,000km
	M2	160,000km
	M1	200,000km
	M4	240,000km then M1 and so on

The routine seems more suited to a heavy fleet transport use but definitely not suited to the 55S17W. This vehicle, with its issues, weather they are percieved or otherwise, needs regular inspection and maintenance.

For 'Off Road'	M1	20,000km
	M2	40,000km
	M3	60,000km
	M2	80,000km
	M1	100,000km
	M4	120,000km then M1 and so on

This is also inappropriate. The Iveco "Off Road" service routine is terrific from an accountant's point of view, especially if the vehicle is for business use and is expected to be replaced as soon as warranty period has expired.

For an owner that wants to keep the vehicle long term, and expects to have trouble free use the first service should be completed at 5000km and routine services every 15,000km thereafter.

Grease points, particularly the swivel bearings need to be greased every 10,000km and 5000km in Off Road conditions.

For the long term owner The Bremach T-Rex routine is a much more sensible maintenance program and is summarised below;

ENGINE MAINTENANCE IVECO F1C Euro5

Replace oil every 30,000km
Replace Oil Filter every 30,000km
Check Air Filter every 30,000km Replace 60,000km
Replace Fuel Filter every 40,000km
Replace PreFilter every 20,000km
Replace timing chain every 400,000km
Every 5,000 km: Drain the fuel filter to get rid of condensation.

Reduce all by half for Off Road use.

COOLANT INSPECTION

The cooling liquid level should be between the "MIN" an "MAX" sign on the coolant tank when the engine is cold. – Top up with a mix composed of 50% radiator anti- freeze (as per Spec. SAE J1034) and water.

Use this mixture all year round to avoid corrosion to the system. The cooling liquid should be changed every 3 years.– Quantity: Approx. 11 litres

GEARBOX

Every 20,000 km – Verify the oil level
Every 40,000 km – replace the oil in the gearbox.

TRANSFER BOX

Every 15,000 km
– Inspect for possible oil leakages, verify there is no longitudinal/vertical movement of the flanges. (transfer case mounting bushes)

Every 10,000 km, – Verify the oil level,
Every 30,000 km, – Substitute the oil in the transfer box.

FRONT AND REAR AXLE DIFFERENTIAL.

Every 15,000 km – Inspect for possible oil leakages,
Every 30,000 km – Substitute the oil.

POWER STEERING

Every 10,000 km – Inspect all steering elements, particularly the universal joints shaft and the splines on the steering shaft,

Every 20,000 km – Check the oil level in the power steering reservoir, undo the cap and verify the "Min – Max" on the cap dipstick.

Every 60,000 km – Renew the oil and the filter. To drain the system, turn the engine on, fill in with new oil the tank and keep steering from lock to lock until when the steering becomes smooth and easy to operate.

Power Steering Fluid: ATF Dexron.

FUEL FILTER

Every 80,000 km – Life-time filter (T-Rex has disposable UFI filter).

Every 5,000 km – Drain the fuel through the drain plug to get rid of water condensation.

– Bleed the system after substituting the filter or after draining the water condensation.

In order to do so proceed as follows:

Position the ignition key ON. The electric pump for the fuel intake starts and turns itself off after approx 10 seconds. Position the ignition key OFF and wait for approx 10 seconds (during these 10 second the engine unit will save the data).

Position the ignition key ON and repeat the whole procedure twice. Once this is done it is possible to start the engine.

For vehicles that are used with fuel which has an unclear origin (i.e. diesel mixed with water) and or fuel that is possibly polluted (i.e. from canisters, drums etc.) substitution interval for the diesel filter should be reduced to 5,000 km.

NOTE: Filter maintenance intervals must be absolutely respected. Damages to the injection that should result from incorrect maintenance will not be repaid by Iveco warranty on engine parts.

The pre-filter has to be checked daily with a visual check of the 1 pipe condition. Depending on the dirt level, the filter has to be emptied weekly or monthly.

FRONT & REAR LEAF SPRINGS

Every 10,000 km – Inspect for silent block wear and tear (rubber bushings in the leaf spring eyes).

WARNING: Run the above inspection weekly if the vehicle is driven off road.

KING PIN

Every 20,000 km - Apply grease to the greasing nipple of the front knuckle bearing with a Grease Gun,.

WARNING: Grease at least daily the king pin if the vehicle is used on muddy terrain or to wade rivers/ streams.

NOTE: Always clean grease nipple before greasing

BRAKES

Weekly - Check the fluid level on the master cylinder reservoir. The level decrease is caused by the brake pad wear. A warning light will go off on the dashboard when the level is close to the MIN level.

Renew the brake fluid every 2 years. Brake fluid: Super DOT4.

MAINTENANCE WHEN USED OFF-ROAD

Inspect regularly (daily/weekly) and verify that the following components function correctly if the vehicle is used in rough conditions i.e. off-road:

- All mechanical components (visual check).
- Connect all flexible hoses and pipes (visual check, inspect for possible damages
- Radiator fan damages caused by damaged engine supports.
- Engine supports.
- Gearbox and transfer box supports.
- Intake and exhaust pipes.
- Leaf spring, shock absorber and anti-roll bars (Stabilizer).
- Steering box and steering rods.
- Cardan shafts.
- Fuel and oil tanks.
- Cab suspension.

LUBRICATION PROGRAM

The following lubrication program must be followed scrupulously to safeguard the correct functionality of the respective mechanical parts.
WARNING: Lubrication must be carried out with a Grease Gun.

Every 10.000 Km
- King Pins (2 pcs. per side)
- Hand brake leverage (1 pc.).

If used in rough conditions, muddy surfaces or after wading.

Daily:
- King Pins (2 pcs. per side)
- steering angle box (1 pcs.)

Parts Reference

The parts listed here are items that may need changing during the ownership of the vehicle, the list is by no means complete. Parts with a tick √ notation should be carried as spares when traveling remote or away from major service centers, Parts with a 'O' notation are optional carry items, "C" are consumables and "L" have a limited lifespan, most of the rest will need changing at some stage of the vehicles life, even if you don't have the ability to fit part a local garage may be able to.

Part	Iveco PN	OEM	ALT	
Oil Filter	2995655		Ryco Z141 Ryco Z516 (small)	√C
Air Filter	1903669		Donaldson P828889 Wesfil WA5019	√C
Fuel Filter UFI	500054702		Ryco 2705P Fuso MK667920	√C
Cabin Filter	3802821		Ryco RCA256P	√C
Battery	504181743		N87LZ	C
Iveco rocker panel Switch	5801465646			
Fuel Pump - 12V	69503673	Bosch 0 580 464 127	500366053 also fits	OL
HP Pump	504342423	Bosch 0 445 010 545		L
LP Regulator	42567116	Bosch 0 928 400 757	Ford 8C3Z9J307A	L
Injector	504385557	Bosch 04451160059		L
DRV	504384251	Bosch 0 281 006 032		L
HP Pressure sensor	504382373	Bosch 0 281 006 158		
Crank sensor	504129943	Bosch 0 281 002 778		√
Cam sensor	504048261	Bosch 0 281 002 667		√
MAP	504307953	Bosch 0 281 006 049		OL
MAF	504301164	Bosch 0 281 066 056		OC
Coolant temp	500382599	Bosch 0 281 002 209		

Part	Iveco PN	OEM	ALT	
Oil Switch	504310254			
Turbo Mod Valve	5801259656	55228986		
DPF sensor	504102810	Kavlico 604 102810	Ford 1415606	L
EGT Mid CAT	69502946			
EGT Front CAT	69502363			
Lambda	504135503	BOSCH 0 281 004 026		L
coolant press	69502214			
Engine belt	504092335		6PK1215	
A/C belt	504087247			
Radiator Hose Top	504344502			OL
Radiator Hose Bottom	504086541			OL
Intercooler hose to TVA	504338263	warning, Iveco lists both intercooler hoses as "water hose"		L
Intercooler hose to turbo	504338273	see note above	common with 2009 on 2WD	L
Bottom Turbo drain hose	504360053			L
Top Turbo Drain hose	504360054			L
clutch hydraulics	5801386404			OL
windscreen	500316402		Pilkington 3471AGN	
brake shoes	2996480			C
Brake Drum	42558503			C
tierod end L&R	42558696			L
Drag Link end L	504245265			L

Part	Iveco PN	OEM	ALT	
Drag link end R	504245268			L
Wheel Bearing front / rear	42558516	SKF BTH 1011 AB	Febest, DAC55900060 (kit includes axle nut &circlip)	C
ivel Bearing	42558667	SKF 32205 BJ2		L
Brake Pads	504329186		EBC DP12942 LPR GDB1534	CO
Brake Rotor	2558752		see page 63	C
Brake Pad Wear Indicator	42548195		Bendix BWS1044	CO
Transfer Case output seal	42559750		68 x 52 x 8mm Viton seal	√L
TC tool	99355047			√
TC output nut	42559758			O
TC Low Range circlip	42567335	(this circlip has high fault rate)		L
TC mount bush	42559937		SuperPro SPF0108 Toyota 9038518021	C
Diff seal tool	99374459			√
Diff pinion seal	42558469		CORTECO 12017026B JOHN DEERE AL159591 generic viton 60x90x10mm	√L
intermediate UJ	42566476			L
F/R prop UJ	42535251	Carraro 30.17x82mm	Moog 456, 1.188" x 3.228"	L
DPF	504131264			CL

Part	Iveco PN	OEM	ALT	

Compatible Lubes & Fluids

Engine Oil	Penrite Enviro+ DL1 (DPF removed) Penrite HP5 Full Synth
Gearbox Oil	Castrol Syntrans-Z Penrite Progear 75W-85
Transfer Case	Castrol Syntrax universal plus 75w-90 (GL5)
Diffs	Mineral 85W-140EP GL5 - any name brand
Coolant	Green (NON OAT) coolant, Castrol Nulon etc
Brake Fluid	Penrite Super Dot4
APU	Penrite LDAS
Grease	Any NLGI-3 grease
Power Steering	Any DexronIII

Useful Internet References

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http://earthcruiser.net.au

Expedition Vehicles Australia
http://www.expeditionvehiclesaustralia.com.au

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www.facebook.com/groups/1944264565832765/

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http://www.traveltrucks.com.au

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http://www.tuckstruck.net

Quantum Tuning
http://www.quantumtuning.com.au

Vexi
http://www.vexi.co.uk/parts/iveco

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