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2007-2008.5 WK CRD FAQ: Jeep Grand Cherokee Diesel

Posted: September 3, 2013 in **Green Technology**, **Miscellaneous**
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*Note: This FAQ can be updated by readers (**last update: 5.9.14**) if you email me information (I'll try to verify and post the info in a timely fashion). As of 4/2014 I no longer own the CRD but have moved onto the new WK2 Ecodiesel.*

Purpose

A FAQ to provide readers information about the Jeep Grand Cherokee (USDM) (internal model description is (https://conflictedracer.files.wordpress.com/2013/09/crd.jpg)for the 2005-2010 Jeep Grand Cherokee is WK) with the 3.0 Daimler Benz CRD engine (engine code: OM642). Please note I will add to this post when I have time and have to make fixes / changes to my own vehicle. I also recommend going to JeepForum.com (http://www.jeepforum.com/forum/f67/) to ask questions and / or find more information. I simply created this post to help my own process and help others find information faster. See bottom of page for resources that may also help.

Background on the Diesel Jeep Grand Cherokee

In the US Jeep sold a Grand Cherokee from 2007 to 2008.5 with a diesel engine (the chassis model is known as WK and was produced from 2005 – 2010). The CRD engine was a Daimler Benz 3.0 CRD (Common Rail Diesel) the same as used in various Mercedes Benz sedans, SUVs and trucks including the Chrysler 300 sold outside of the US. Please note this engine is not the same as the upcoming 2014 (September 2013 release) WK2 EcoDiesel which is a VM Motori power plant (Fiat/ GM engine company based in Italy) even though they are both 3.0 turbo diesel powerplants. See this link for more info on the EcoDiesel (http://www.allpar.com/mopar/V6/VM-RA-diesel.html).

The WK weighs 4,900 lbs unladen (4wd) it is extremely heavy for a "mid-size" SUV and it is geared for

off roading and not fuel economy (Wranglers are notorious as well for poor mileage). That is why a diesel in these trucks makes so much sense. What is the real drawback with the WK CRD is the transmission was made for a gas engine and the final drive is too high for it. Running 70 mph you'll see 2,700 RPM which is way too high as 1,800 RPM this motor makes 376 ft lbs of torque. A 6th / 7th gear would have been perfect to give this very low RPMs at highway speeds providing even more superior fuel economy. Currently non tuned CRDs see up to 24-25 mpg highway and those who get an ECU reflash can get up to 26-28 mpg highway (of course all results are driver dependent). The better you are at maintaining your momentum and seeing farther away and slowing / maintaining speed strategically can result in much higher mileage. Another factor is actually breaking the engine in – as diesels with at least 25k miles on them gain efficiency similar to gas engines so your mpg should increase over time if you bought it from brand new.

Also if you plan on having the "dealer" work on it then make sure they have an experienced diesel mechanic work on your vehicle or see if the Mercedes Benz dealer can do the work as well (same engine).

Did you know that in order to "make the engine sound less like a diesel" the CRD has additional injection pulses whose sole purposes is only to make the engine quieter. The WK CRDs were built at the Jefferson North Assembly Plant in Detroit, MI and the engine was built by Mercedes-Benz at the Marienfelde Plant in Berlin, Germany.

OM642 Engine Specs:

- 2.985 liter (182 cu in) – 72 Degree V6 with a bore x stroke of 83 x 92 mm and a compression ratio of 18:1
- Finger Follower Actuated Valves with Hydraulic Adjusters
- Chain driven, 4 valves per cylinder, 2 camshafts per cylinder bank (DOHC)
- Oil jet cooled pistons
- Aluminum crankcase with cast-in iron cylinder liners (the engine is not solid iron and thus much lighter)
- 24,000 psi (1600 bar) fuel pressure
- 3rd Gen Piezo injectors (first use in US)
- Variable vane geometry turbocharger (actuator controlled)
- Electronic intake air throttle
- Electromechanical swirl control motor that vortexs incoming air to increase low end response
- Quick start glow plug system
- 9.5 liter oil capacity (with filter)
- 13.25 liter coolant capacity
- EGR equipped
- 30% greater fuel economy than comparable gas powered (Hemi) WK and 20% less carbon emissions
- 215 BHP @ 4200 RPM
- 376 LB-FT @ 1800 RPM
- Engine Weight: 474 Lbs. (215 Kg)
- Oil Pressure: @ idle: 16 psi / @3200 rpm: 52 psi

Why Diesel?

Diesels have a bad rap in the US b/c of several factors – GM tried to convert a gas v8 into a diesel engine in the 1980's which was an abject failure, and since the worlds transportation industry standardized on diesel as the fuel of choice they had much looser emissions standards for Noxious Emissions (Nox) allowing them to belch out black smoke giving light passenger diesel adoption at major hurdle to overcome. Today's diesels uses various emissions scrubbing equipment similar to gasoline engines in concert with a low sulfur fuel that is now standard in the US (i.e. Diesel #2). On the contrary as gas engines get direct injection, forced induction their costs are going up to make them compete better with diesels. An interesting study by the Southwest Research Institute (http://www.swri.org/3pubs/ttoday/Summer11/PDFs/ParticleEmissions.pdf) found that modern GDI engines have a significant increase in particulate emissions and are much dirtier engines than a modern diesel.

Fact: Diesel has more energy density than gasoline. When comparing the potential energy 1 gallon of diesel fuel has 25% – 30% greater energy density than 1 gallon of gasoline (octane on gasoline has little to do with more power density). This in effect means for every combustion cycle a diesel uses 25% to 30% less fuel than a gasoline engine to make equivalent power. Another big advantage is that diesel engines are compression ignition (fuel is directly injected into the combustion chamber and under pressure it will ignite completely – no use of spark plugs strategically placed, dual spark plugs or 4 stroke method in order to burn unused fuel). Because the fuel ignites under compression it produces significantly more power at much lower RPM than an equivalent gasoline engine. So in order to provide the same amount of power a diesel can use 25-30% less fuel at much lower RPM than an equivalent gasoline engine. Combining these two major advantages the WK can get up to 50% better mpg under load (towing / hauling or lead foot drivers). No reason the world's transportation industry standardized on diesel power plants over a 100 years ago and have found no reason to switch.

Gasoline also may contain additives such as E10 / E15 ethanol blend of which 1 gallon of Ethanol has 25% less energy density than 1 gallon of gasoline meaning you may get up an even further drop in a gallon of E10/E15 pump gas b/c of this. Diesel on the other hand in the winter may have additives to prevent gelling which can reduce its energy density as well.

Why has it not caught on. Well the reasons above and the fact that diesel is not as widely available at most fuel stations. Diesel fuel also smells oil versus gasoline and is much harder to get clean up after (any spill takes a long time to clean and the smell will last a long time). Diesel engines cost more and manufacturers often charge a higher profit margin as well as they often require addition of costly option / luxury packages. It is more expensive to make a diesel engine than its gasoline equivalent but most often not by the difference in MSRP. for instance VW claims the cost of it's current TDI is only $800 more than a 2.0 Turbo gas engine. Gas engines also have the benefit of significant economies of scale and R&D over the past 100 years. However, as gasoline engines get turbos, direct injection, variable valve and cam timing, cylinder shutoff, intake / exhaust butterfly valves, parallel / series hybrid systems, etc. in order to increase its efficiency by adding more cost, complexity, and long term costs such as battery replacement. OEMs see diesel as a premium engine and often charge significant profit and force luxury / upgrade packages as part of the diesel option.

University of Michigan Transportation Research Institute did a 3 year (45k miles) and 5 year (75k miles) comparison to vehicles with both gas and diesel powered options. To read a copy of this report please follow this link (http://www.dieselforum.org/files/dmfile/20130311_CD_UMTRITCOFinalReport_dd2017.pdf). Please note the CRD and Ecodiesel (WK2 Jeep) are not on this report as they were not for sale at that time.

WK CRD Maintenance Info

A brief tidbit on WK maintenance. Please note the owner's manual has 2 different maintenance schedules. **Schedule A** is light duty use with normal driving meaning lots of medium to long trips without hard driving (towing or frequent stops). If you have a lots of stop & go, high or low temps, heavy duty use, off roading see **Schedule B:**

- Day or night temperatures are below 0°C (32°F)
- Stop and go driving
- Excessive engine idling
- Driving in dusty conditions
- Short trips of less than 16.2 km (10 miles)
- More than 50% of your driving is at sustained high speeds during hot weather, above 32°C (90°F)
- Trailer towing
- Taxi, police, or delivery service (commercial service)
- Off-road or desert driving
- Run Biodiesel > 5%

You can get more info from the owner's manual or WKJeeps Maintenance Page (http://www.wkjeeps.com/wk_maintenance.htm).

Changing the Oil:

The recommended intervals for changing the oil on a CRD is (Schedule A 12,000 miles / Schedule B 6,000 miles). For CRDs with the Diesel Particulate Filter (DPF) you will need to use a oil spec noted as 229.51 (same as Chrysler Material Standard MS-11106 and ACEA C3) which is formulated to produce low soot and be processed with EGR and DPF. One oil change is 9.5 liters which is just a slight fraction over 10 quarts and the manual recommends 5w-30 fully synthetic. Oil Filters WIX 57062 / Mopar 05175571AA and MANN HU 821x.

Potential Oils You can use if you have a DPF (229.51 spec):

- Mobil 1 ESP 5w-30 & 5w-40 (Pepboys carries this)
- Castrol SLX Professional OE 5w-30
- Total Quartz Ineo MC3 5w-30 (you can find this on eBay)
- Quaker State European Formula Ultra 5W-30
- Pennzoil European Formula Ultra 5W-30
- Valvoline Synpower MST 5w-30 & 5w-40

- Valvoline Premium Blue 10w-30 and 10w-40
- Redline Euro Series 5w-30 and 5w-40
- Liqui Moly Long Time High Tech 5w-30 (look for 229.51 spec)

If you have the DPF removed and disabled using a tune and a delete pipe you can use MB Spec 229.31 oil (see DPF Delete section below).

Steps:

1. Warm up the CRD with at least 10 minutes idling so the oil is warm. Shut the engine off and let it stand for 15 minutes so the oil is completely drained.
2. You can go underneath and drain it below with a 13 or 15 mm wrench (can't remember off the top of my head). Please note it will spill quite a bit due to the plastic shielding and a crossbar that is directly in the path of the draining oil. What I've found is that I can use some painter's tape to create a funnel and it will drain cleanly. Another method is to install an oil drain valve such as the Futomoto Oil Drain Valve (F-106) (http://www.fumotousa.com/). Once oil is draining remove the oil filter cap and remove the old oil filter (pay attention to the 2 o-rings to see how they fit on the housing). If you have the DPF the oil will be very black regardless of its age (making you think it's been tens of thousands of miles since the last time the oil was changed – don't worry as this is normal).
3. Once oil is drained you can reinstall the drain plug.
4. Go up top and remove the oil fill cap as well.
5. Install the new oil filter and put on the new o-rings (a very small one and a large one should have come with your filter). See how they orientate when you remove the old ones to ensure you install the new ones properly. A tiny screwdriver will help get them off – just be careful to not score the plastic.
6. VERY IMPORTANT: You will want to add half of the new oil to the oil filter housing hole to allow the new oil to coat the bearings on that side of the engine. I do this with the oil filter installed so it is quickly immersed in oil. Most oil change places (even the Jeep dealer may not know this). This is a pain as it takes a while for the oil to drain (over 5 minutes). Once you use 5 liters you can then add the rest through the normal oil fill.
7. Reinstall the oil filter and oil fill caps (keep the oil fill cap at the same orientation as when removed – the words should not be upside down).
8. Start engine and look for any leaks. Let idle for 5 minutes and shut off. Let stand for 15 minutes and then check oil level. Top off if needed.

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Changing the Fuel Filter: Every so many miles (50K schedule A / 25k schedule B) you should replace the fuel filter. It is located underneath the shroud in the v bank of the engine. MANN filter: WK842/23x

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Changing the Air Filter: One of the easiest and least messy jobs. If you need help with this then you are a true novice. Mopar Part #: 5018777AB.

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Serpentine Belt: One of the nice things about the diesel is the timing chain is good for the life of the engine and does not need adjustment. However the serpentine belt needs to be changed every 60k miles. Check out this DIY write up from Chirpz (http://www.chirpz.com/jeeps/belt/belt.html).

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Tire Rotation & Proper Inflation: It is recommended to get the tires rotated every 6k miles. I would recommend getting an alignment at least every 50k miles as pot holes can knock off alignment leading to abnormal tire wear and lower mpg. Also making sure your tires are properly inflated makes a big difference in the life of the tires and your mpg. I keep mine inflated to at least 36 PSI on all corners and when towing or hauling heavy loads (including loading up the family with gear on long trips) I inflate the tires to 40 PSI.

WK CRD Common Issues and Fixes

Weird Electrical Problems: Yes I said weird – like windows not operating properly, seat warmers not getting warm, getting CELs or strange messages like Service 4WD System. This could likely be from the battery especially if original as it causes all sorts when it gets end of life. Replace it quickly and cheaply $100 at local auto parts store. Put on dielectric grease on terminals and scrape the terminal clamps of any corrosion as well.

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Crankshaft Position Sensor: 2007 (maybe some early 2008 models) Model Jeep CRDs may have a faulty crank position sensor which can cause the engine to stall (may also be a bad harness – see paragraph below). If you try restarted the engine it will crank but won't restart. Jeep released a TSB (as well as Mercedes Benz did for the ML320 and Sprinter vans) describing the issue is located in this link (http://www.wkjeeps.com/tsb/tsb_wk_0900407.pdf). The part # you need for replacement is: 05175763AB. I never had this issue but I picked up my 2007 with 60k miles on it so it may have been done. It did not come with service records so just assuming so.

Another issue is a rubbed wire from the loom underneath the batter as the harness will wear through and into the wires causing a grounding error and a no start issue. If it's not the CPS it will baffle the dealer and most owners. See this link to JF to help diagnose this (http://www.jeepforum.com/forum/f67/3-0l-diesel-random-stalling-problem-1242535/).

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Leaking Elephant Hose Replacement (looks like the trunk of an elephant): It is located under the big plastic shroud and connects the throttle box to the turbo (also known as the intake charge pipe or turbo inlet hose even though its plastic tube). The early models came with an red or orange seal (can only see the color when removed) that would get gummed up with oil vapor from the Positive Crankcase Ventilation hose (small hose that runs from the passenger cylinder head bank to the intake hose right before the turbo). The oil would condense and become a liquid again and leak through the faulty seal when the engine was shut down. It would then drip down into the v bank of the engine where the swirl motor resides at the lowest point below the seal leak and oil would seep into the electrical connectors and cause it to fail prematurely (see **swirl motor** for more info on that). A Technical Service Bulletin was released to replace this tube but it was not recalled. The new part number of the black seal is: 53013672AE (called AIR CLEANER TO TURBO HOSE) and can be found at this link at Factory Mopar Parts.com (http://www.factorymoparparts.com/53013672ae.html). You can then decide if you want to

get rid of the PCV hose and vent to a catch can or the atmosphere. I choose the latter as the oil vapor still travels through the intake and intercooler leaving oil deposits and also gums up the Exhaust Gas Recirculation Valve (EGR) which can cause another failure.

(https://conflictedracer.files.wordpress.com/2013/09/crd-elephant-hose.jpg)
Black seal (updated) CRD elephant hose – intake.

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(https://conflictedracer.files.wordpress.com/2013/09/1-watt-4-7-ohm-resistor.jpg)
1 watt 4.7 ohm resistor

Swirl Motor: Failure code is: P2015

Whether your Elephant Hose dripped oil into the Swirl Motor frying the electronics or it actually failed you have nothing to worry about. The swirl motor defaults to wide open regardless of its operation so if it failed in either way it will not affect driveability. In fact other owners who have had it fail like me see no noticeable decrease in low end performance where it was supposed to swirl the air creating a little more power at very low RPM.

The Fix is simply to buy a package (they don't sell them individually) of 1 watt 4.7k ohm resistors online or from a local electronic parts store. Should cost < $2-$3 in total. Remove the shroud and the intake pipe to get access. See Elephant Hose Mod Above for removal directions. On the drivers side bank of the engine under the turbo inlet you'll see a plastic clip with 3 wires running to it. Remove the clip from the swirl motor. Take one resistor and insert each end into the two middle wires. DO NOT PLUG IT INTO THE BROWN WIRE. Tape it up with electrical tape and tape it aside to reduce vibration. You can always also buy a much nicer alternative from a member on Jeep Forum that simply includes a matching plug to plug it in. See this link for pictures on how to put in a resistor to defeat the Swirl Motor failure (https://conflictedracer.wordpress.com/2013/04/24/jeep-grand-cherokee-crd-elephant-hose-and-resistor-mod/) and keep on trucking.


(https://conflictedracer.files.wordpress.com/2013/09/resistor-plug.jpg)
Plug & Play resistor which looks nicer.

Now if you want to actually replace the swirl motor Chirpz on JF has DIY instructions (http://www.chirpz.com/swirl/Swirl%20Project.pdf) and this link in JF for more info (http://www.jeepforum.com/forum/f67/swirl-motor-repair-step-step-07-crd-wk-1235895/).

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Oil Filler Cap: Make sure you check your oil filler cap as mine was leaking when I originally bought it and found that the two little prongs were bent too far. This maybe caused by having the oil filler cap 180 degrees off (i.e. upside down when you look at it installed). However looking at the prongs and the location where the tabs mounts they seem the same so the seal might leak. What is of concern is that the oil filler cap is directly above the alternator where the leaking oil dripped onto mine causing it to prematurely fail. Part #: 05175447AA.

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Warped Brakes: All WKs have this issue but we bought our CRDs mainly to get the towing power of V8 with the fuel economy of a 4 cylinder. Unfortunately this issue also plagued the WJ Grand Cherokees. In order to reduce the weight of the rotor Chrysler supposedly used a metal bonding process to use a lighter metal on the actual rotor itself and a heavier metal on the hub in order to reduce rotational inertia. Well this was a good idea on paper but after having to replace warped rotors with almost every brake change you get tired of it. Also once they warp they cannot be turned to fix the issue as the warping will come back even faster. Instead I upgraded to the Stillen 4 wheel cross drilled rotors and high performance pads. After a year with these brakes and over 10x towing a heavy load including hard stops and 2 emergency stops – fade was non-existent and no more warping. If you are interested in a kit contact Kolak on JeepForums.com (http://jeepspace.jeepforum.com/Kolak) as he is a brake dealer and can sell you a complete kit.

Brake Specs:

- Front — 12.9 x 1.2 (328 x 30) vented disc with 1.89 (48) two-piston pin-slider caliper and ABS. Swept area: 282 sq. in. (1820 sq cm)
- Rear — 12.6 x 0.55 (320 x 14) disc with 1.89 (48) single-piston pin-slider caliper and single-channel ABSB. Swept area: 257 sq. in. (1658 sq cm)

Old brakes – warped rotors.

Closeup of old fronts.

Installed front rotors – please note they look backwards but installed as per instructions. Works great after 30k miles, many towing a trailer. Put caliper back on and ready to go.

Info from Kolak: Stillen released their cross-drilled rotors for the WK/XK back about four years ago and I've been selling many sets. Odd as it may seem, there appears to be some problem with the stock rotors warping on the WK/XK and the Stillens will not only resolve that potential issue but improve overall performance, including stopping power and fade resistance. In fact the brake division leader at Still has a PHD in Metallurgy. Price for the front pair of rotors is $205.00 for the pair and the rear rotors are $200.00 for the pair. The Stillen Metal Matrix pads are an excellent pad compound with low dust, no noise, and excellent cold/hot stopping power. Price is $65.00 for the front set and $58.00 for the rear set. Contact Kolak (http://jeepspace.jeepforum.com/Kolak) for more info and let him know I sent you.

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Clunking when Acceleration from Stop or Slow Speed: This will not throw a DTC but can be because of worn front differential bushings. The best way to check is to take your smart phone and put it underneath the vehicle's front differential and put it on video so it records (face it up). Next step is to get in and put the WK in Drive and accelerate. Make sure you are going straight so as to not run over the phone (I disclaim any liability!). Get back out and watch and see if there's movement / shifting that looks concerning.

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Glow Plugs: These are common maintenance items on diesels (often have to do them every 100k or so) and only cost $20 each. These are controlled by the Glow Plug Module (GPM) which does the following: 1st is the preglow where GPM supplies battery voltage for 2 seconds to quickly heat up the glow plugs; 2nd is readiness glow where the GPM activates the glow plugs with a PWM signal to reduce voltage level; 3rd is the start glow (the most obvious one) when a cranking speed of about 120 rpm has been reached; 4th is the post glow where after a successful engine start the GPM provides heating pulses to

improve cold engine running and warm up quicker; 5th is the intermediate glow where the GPM will prevent the production of smoke and particulare matter under lean fuel conditions such as engine deceleration where combustion chamber temperature can drop due to low injected quantities; and 6th on modern diesel engines it provides DPF heating where glow plugs are heated to a temperature of about 850 degrees C (1562 F) which controls the diesel particulate filter regeneration phase.

If you live in a colder climate you'll have to change them more often than those who live in a warmer climate. It is important to fix them right away (if one goes it often leads to several others going bad) and may make sense to do all at the same time. You may also want to get a set and have in your toolbox for just in case.

(https://conflictedracer.files.wordpress.com/2013/09/glow-plug.jpg)
Beru (OEM) Glow Plug

Testing: To test a glow plug put on an ohmmeter and check resistance. If the resistance is low (3 ohms or less) then they are good but if it goes up to a high number 100+ then it is bad and needs to be replaced.

OBD2 Codes: The following CEL codes you will get if one goes bad: P0671 (plug 1), P0672 (plug 2 and so on), P0673, P0674, P0675, P0676.

Parts: The CRD glow plug is 4.4v. Mopar Part# 68102087AA – Bosch Part # 80047 – Beru part # 750 33010 244 – Mercedes Benz Part # 001 159 50 01 or 001 159 71 01). Please note that the Sprinter Vans allegedly uses a different glow plug (7.7v) than the WK so be careful when ordering. Also the glow plug module might go bad leading to more glow plug failures so you'll want to check on it as well (below). The Glow Plug Module Part # is: 68013182AB

How to Replace Glow Plugs:

(PASS)==FIREWALL==(DRIVER)

3 ———————————— 6

2 ———————————— 5

1 ———————————— 4

========GRILL=========

Instructions (should take 1 hour to do all 6):

1. Start with a hot engine (helps break resistance as you don't want to use a lot of force to remove them). I would also spray some WD 40 or Penetrating Oil such as Kroil or PB Blaster to help loosen it (like a day before as it will penetrate the coils due to the vibration). This will make a big difference when removing the plugs.

2. Remove Engine Shroud and Engine Insulation

3. Remove negative battery terminal and secure it so it won't flop back up and hit the negative terminal (like with a cloth).

4. Remove wire from Glow Plug (use long needle nose pliers and be careful not to break them or the tabs).

5. Use socket to remove glow plug (1/4 ratchet with 3″ extension and 8mm deep well socket). DO NOT EXCEED 20 FT LBS OF TORQUE as it will break the glow plug. If they are still snug then follow the below OEM instructions:

A. Heat up: Run the engine until it is warm or apply current to the intact glow plug through a separate cable for 4-5 minutes – this heats up the glow plug and burns it free.

B. Release: Apply a generous quantity of anti-rust agent or multi-functional oil to the base of the thread and leave to work in for approx. 5 minutes.

C. Unscrew: Then start a new attempt to unscrew the plug and use suitable tools to release the glow plug from the cylinder head. (Do not exceed the maximum release torque. Make sure you stop before you reach the breakage torque, if necessary start a new attempt by applying heat.)

6. Add some Anti Seize to threads for future changes

7. Put new glow plug in hole, using fingers to tighten (this way you know you are not cross threading). Once it is snug use the socket to tighten but do not exceed 20 ft lbs of torque.

8. Add some Dielectic Grease to terminals and reinstall Connector

9. Reinstall Engine Insulation and Shroud

10. Start Engine (code should go away immediately).

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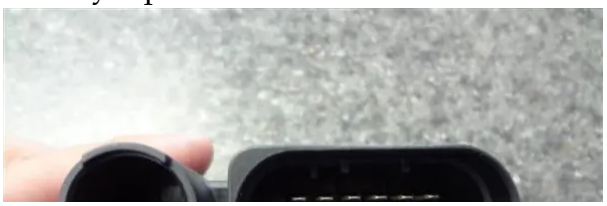
Glow Plug Module: Failure code: P1648. Sometimes the glow plug module will go bad (it controls all 6) and can lead to premature glow plug failure. The glow plug module activates the glow plugs based on the ECM inputs and a performance map. The glow heating is interrupted if no data transfer takes place with the ECM. Depending on coolant temperature, the ECM requests the instrument cluster to display the Wait to Start message. The Mopar Part # is 68013182AB – Mercedes Benz Part # A 642 900 28 00. Part is original Beru (same as OEM glow plugs). You can get these for $180 new. It is really easy to change out as it's takes two plugs and is sticky taped to the surface.



(https://conflictedracer.files.wordpress.com/2013/09/beru-glow-plug-module-2-small.jpg)

(https://conflictedracer.files.wordpress.com/2013/09/beru-glow-plug-module-small.jpg)–

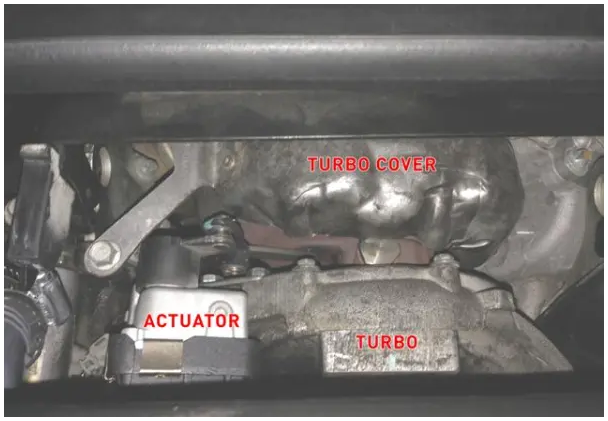
Turbocharger & Electronic Actuator (a.k.a. VGT actuator): The turbocharger on the CRD is a Garrett unit and has a boost pressure servo motor that controls boost pressure by varying the position of the guide vanes (we have a variable vane turbo). The servomotor operates in response to a PWM signal from the ECM. You will get a code and the CRD will go into limp mode – you may also hear a hissing sound.

The code you may get is: P0299 (Boost Pressure Regulation Control Range Not Reached) or P0046 (Boost Pressure Circuit Shorted) or P0234 (Turbocharger Engine Overboost) . You may also have symptoms of not being able to rev over 2,300 RPM or use more than 50% of the throttle at anytime as the actuator is malfunctioning and the CRD will go into limp mode. Don't worry about limp mode as you can still go up to 70 mph as the engine makes enough torque to keep it going – just don't expect to accelerate hard.

The actuator part # is 751154 but they are extremely expensive to buy new (if you can find them) but you can get it rebuilt at this turbo rebuild shop in Manchester, Ohio called **XS Boost Turbochargers** (http://www.xsboostturbochargers.com/products/jeep-cherokee-3-0l-reman-turbocharger-electronic-actuator-2007/) for $200 plus a $100 core. You may need to have the actuator synchronized with the turbo (as the company). See this thread for more info – and thank you forum member 2007CRD for the information (http://www.jeepforum.com/forum/f67/help-3-0-crd-p0299-code-1358214/). You can also get rebuilt turbos as well for approx $500 with $125 core. Part #: 761154.

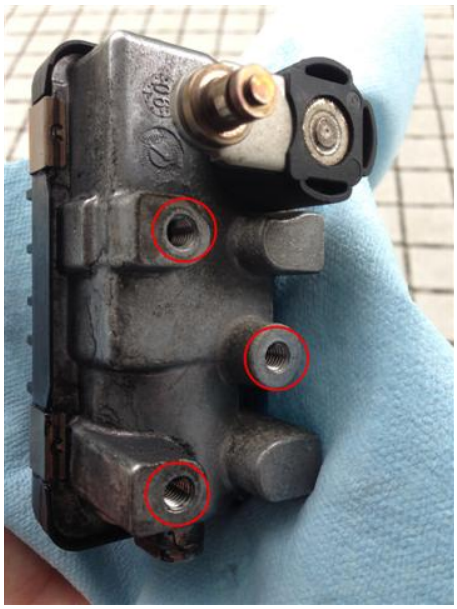
Instructions on how to change (from this link on JF (http://www.jeepforum.com/forum/f67/wk-3-0-crd-my-p0299-saga-how-i-fixed-1618385/)):

Tools needed: A 10 mm flex ratcheting wrench, snap ring pliers, 1/4" ratchet with 10 mm socket and a magnetic retrievers for any dropped bolts or to help catch one if it falls. The turbo is located at the back of the engine (when looking at it from the front of WK) by the firewall. You need patience and hopefully small hands. Credit to pixelcodex (Fernando) on Jeep Forums for the info and all photos.

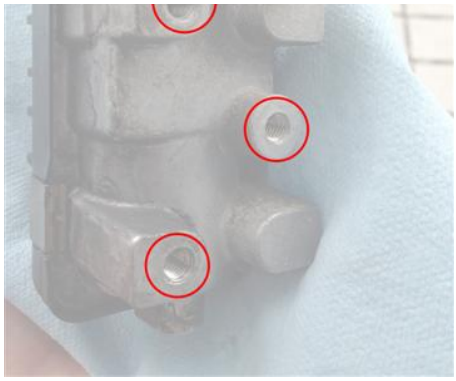


(https://conflictedracer.files.wordpress.com/2013/09/turbo-actuator-1-small.jpg)

Step 1: First thing you need to do remove the turbo cover (3 x 10 mm bolts). This will give you a little bit more room to maneuver there. Technically you only need to remove the 3 10 mm bolts as shown on the back of the actuator, the plug and the snap ring to pull the actuator, but I found that removing 2 additional bolts back gave me a bit more room to loosen and tighten the bolts.



(https://conflictedracer.files.wordpress.com/2013/09/turbo-actuator-2-small.jpg)Step 2: Orientate the servo arm and reinstall. Another small tip is I found that when I wanted to install the replacement actuator is that the lever came almost covering the top hole (faked here in the picture). This made it impossible to install the bolt or tighten. I thought about a solution when it occurred to me that it should reset to the top if I activated it. I plugged it in, turned the ignition on and sure enough, it reset and gave me room to install. Installing is the reverse, with the caveat the getting the bolts to bite can be a little challenging, specially for somebody with big hands like myself. I did not use the pliers to install the snap run, just pushed it in. After that, plugged it in and voila: WK running great again and a smile back on my face.



(https://conflictedracer.files.wordpress.com/2013/09/turbo-actuator-3-small.jpg)–

Engine Block Heater: Rumor is that all US and CDN CRDs came with engine block heaters as standard equipment. I'm not entirely sure but the location to find your plug is on the passenger side firewall next to the air intake box. There is a wire tied to a clip on the side and if you pull that up you'll see a plug (there is a plug cover so you'll have to take that off). Also right underneath the area is a pass through flap to the passenger front wheel well where the plug threads through to connect to the AC power. Simply unwrap (has adjustable tie down) and work into this flap to plug it in. Check the plug for corrosion and clean if necessary. When done and ready to drive simply unplug it, reattach the plug cover, then push it back into the engine compartment and close the flap. Researching the warm up times needed is 2 hours will increase temperature of the coolant / oil to about 40 degrees Fahrenheit / 4.4 degrees Celsius. Any longer warmup is not needed but on cold nights when parked outside (fault of having 3 sports cars and a 3 car garage) I keep it plugged in so it's warm and in the morning I don't have to run out and plug it in.

(https://conflictedracer.files.wordpress.com/2013/09/block-heater.jpg)
Easy access to plug in and unplug (have stock rims / tires).

Popular Modifications

Elephant Hose Modification: By removing the PCV vent hose from draining oil vapor back into the intake charge tube you remove the oiling of the intercooler, EGR, and other critical components. The drawback is the Jeep will smell and might have some oil vapor smoke if you come to a stop after driving very hard. See this link on DIY on how to vent the hose to the atmosphere with $20 of parts: CRD

Elephant Hose Delete (https://conflictedracer.wordpress.com/2013/04/24/jeep-grand-cherokee-crd-elephant-hose-and-resistor-mod/). You can also do a catch can and vent back into the turbo via this link (provent) (http://www.jeepforum.com/forum/f67/wk-crd-2007-provent-question-got-pics-544549/?highlight=crd+provent+catch) and this link (generic style) (http://www.jeepforum.com/forum/f67/installed-billet-technology-catch-can-crd-1365765/index2.html).

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ECU Tuning: The biggest bang for the buck with the CRD is getting the ECU reflashed. There are several ECU reflash programs out there but the most popular seems to be Green Diesel Engineering. It not only increases power but your fuel economy as well as it removes injection cycles that were simply not needed for driveability but only to quiet the engine down for its users.

The Eco Tune will give you the following: increase in power to 250hp (up from 215); increase in torque 465 ft lbs at @1800 RPM (up from 376 ft lbs) along with a broader torque curve; increase in fuel economy of 2-4 mpg; reduction in turbo lag; swirl motor is deactivated so no longer a concern; and EGR is eliminated. Tune is approx $700 and you can also add in a DPF delete if you have a DPF delete tube (if you don't get rid of the DPF with the tune you'll either get a clogged filter or a CEL. They also have a hot tune that gives even more power / torque. Check out their website (http://www.greendieselengineering.com).

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Diesel Particulate Filter (DPF) Delete: Thanks to Chipz from JF, he created a great DIY DPF delete procedure. You can get a delete pipe on JF from tnadanzig who does a great job fabricating the pipes on a premade jig (so they all fit correctly). You WILL NEED a tune in order to use this as if you simply replace the pipe and do not have it done you will get an error and the CRD will go into limp mode. You will also need to get some gaskets from the auto parts store (bring in the pipe and have them fit a gasket to it). The instructions are located in this link (http://www.chirpz.com/swirl/DPF_Delete.pdf) and this link in JF has lots of useful comments. (http://www.jeepforum.com/forum/f67/dpf-delete-step-step-1490831/)

(https://conflictedracer.files.wordpress.com/2013/09/dpf-delete-pipe.jpg)

Here are improvements you should expect to see:

- Little added noise if you have a muffler still installed (idle and at speed).
- No change to smoothness and no increase in vibrations.

- Increase in power as a major bottleneck is removed from the exhaust.
- Reduction in turbo lag makes the CRD seem more peppy.
- 1-2 mpg increase in mileage.
- Cost is cheap for this pipe and $100 extra from GDE for the delete tune.
- You can buy 229.31 oil (and not 229.51) which is substantially cheaper ($7 a quart down from $11 a quart for 229.51)
- Oil also does not get all black and dirty looking as quickly (no longer need low ash oil) and you can go the longer oil intervals. 229.31 is designed to be an engine oil versus 229.51 which is designed for DPF equipped engines 1st, engine oil 2nd.

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Turbo Resonator Delete Pipe: place holder (check JF for member tnadanzig for more info)

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Engine Tune: I had to finally replace the DPF as I believe the previous owner used the wrong oil with it (requires 229.51 spec) and if you get it done at a fast lube place they don't know anything so don't take them there! I went with the Green Diesel Engineering (http://www.greendieselengineering.com/) Ecotune which bumps up power from 215 to 245 HP and Torque from 376 ft lbs to 440! It also gets rid of turbo lag and further improves economy by 1-2 mpg. I also added the DPF Delete with the delete pipe from CB Engineering (tnadanzig on JF). The process is pretty quick and includes the flash programmer. The pipe removal is a pain (takes a couple hours and old bolts on exhaust rust so spray some penetrating lube on them days in advance). Also have a BFH just in case. Once the DPF was removed and the new tune installed it was better than before. What needs to happen is you drive it for several days and the computer learns and once it is done then the power really shows. After the 2nd day the Jeep was chirping all 4 tires on launch accelerates like a scalded cat. In fact I am getting worse mpg b/c I'm on the throttle so often now to enjoy the shove. I did get a best of 17 mpg towing my enclosed trailer with the tune with a bad cross wind.

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OBD2 Gauge / Scanner: I am currently in process of adding an OBD 2 Scanner / Gauge Reader called UltraGauge (http://www.ultra-gauge.com/ultragauge/). It costs $75 shipped and is substantially less than other comparable scanners. It has the ability to read up to over 100 gauges. When I installed mine it says it has 59 gauges but the mileage is wildly inaccurate which I have to "calibrate" the fuel economy gauge which is recommended for diesel engines. I'll report back as am currently in this process and have to run the tank down to zero which takes quite a while (sometimes 2 weeks before I need a fill up).

Did the first calibration test of the UltraGauge. It was pinging me saying I used 22 gallons when my gauge wasn't even at halfway. Used 11.205 gallons and entered into device. Well before the configuration it noted 11.2 mpg average and now after 21.1 mpg. It involved a lot of city driving and a brief stint towing the racecar to from storage to the garage.

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Pro Lite Build on a CRD?: Yep! There is one in progress by tnadanzig so Check out this link (http://www.jeepforum.com/forum/f67/cb-eng-pro-lite-build-2324081/) for build progress and photos. This things going to be badass!

Recalls

Safety Recall N23 / NHTSA 13V-175 Transfer Case Actuator (Summer 2013): Transfer case actuator may have a failure causing the WK to shift into neutral including when parked. If getting this recall it may affect 4WD Low engagement. See JF for more info.

More WK TSBs / Recalls (http://www.wkjeeps.com/wk_tsb.htm)

Fuel Economy

The CRD gets better mpg than either v8 and the v6. It is not a question of if but a question of why (read above Why Diesel). Looking at data on Feuly.com 2007 CRDs log in 23-24 mpg averages whereas the v8 average is 14 mpg for the Hemi and 17 mpg for the 4.7 flex fuel. The gas v6 engine gets 17 mpg.

Reference Information

Fault Codes (sometimes called OBD Code): Since the CRD is OBDII (standard since the mid 90's) here's a breakdown of the Diagnostic Trouble Code (DTC for short). Follow these links for WK Jeep DTCs: WK Jeeps Trouble Codes (OBD2) (http://www.wkjeeps.com/trouble_codes.htm) OR JF Trouble Codes. (http://www.jeepforum.com/forum/f67/diagnostic-trouble-codes-obd-ii-details-734714/) The below is a description of DTC code format:

First digit structure is as follows:

- Pxxxx for powertrain
- Bxxxx for body
- Cxxxx for chassis
- Uxxxx for class 2 network

Second digit structure is:

- P0xxx Government required codes
- P1xxx Manufacturer codes for additional emission system function; not required but reported to the government

Third digit structure is:

- Px1xx measurement of air and fuel
- Px2xx measurement of air and fuel
- Px3xx ignition system
- Px4xx additional emission control
- Px5xx speed and idle regulation
- Px6xx computer and output signals
- Px7xx transmission
- Px8xx transmission
- Px9xx control modules, input and output signals

Fourth and fifth digit:

- Fault (00 to 99)

Types of DTC's: There are two categories of DTC's that apply to OBD II. They are listed below with Type A being the more severe.

Type A

1. Emissions related.
2. Requests illumination of the MIL after one failed driving cycle.
3. Stores a freeze frame DTC after one failed driving cycle.

Type B

1. Emissions related.
2. Sets a Pending Trouble Code after one failed driving cycle.
3. Clears a Pending Trouble Code after one successful driving cycle.
4. Turns on the MIL after two consecutive failed driving cycles.
5. Stores a freeze frame after two consecutive failed driving cycles.

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Diesel Range Anxiety?: You can get a phone App called Gasbuddy where you can do a map search for diesel stations from your current location. The App also provide name of station and prices as well as you can route it with your maps. Also note that you'll often see cash / credit price differences at large fuel stations off highways.

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Great Sites for More Information:

www.JeepForums.com (http://www.jeepforums.com)

WK Online Owners Manual (http://www.jeep.com/en/owners/manuals/)

WK Jeeps Website (http://www.wkjeeps.com/kmenu.htm)

WK Jeeps CRD Page (http://www.wkjeeps.com/wk_crd.htm)

Firefox

JeepGarage.com (http://jeepgarage.org/f5/)

WK VIN Coding (http://www.wkjeeps.com/wk_vin.htm)

Special Thanks to JF members (credited above).

*Note: This FAQ can be updated by readers (**last update: 5.9.14**) if you email me information (I'll try to verify and post the info in a timely fashion). As of 4/2014 I no longer own the CRD but have moved onto the new WK2 Ecodiesel.*