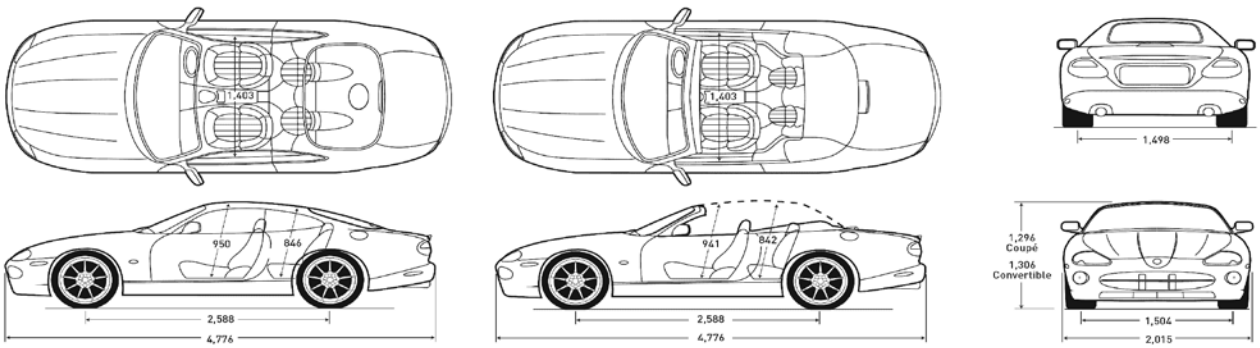
Jaguar XK8 Bible (2003 to 2006MY X103/X104) revised 03/21/2020 by Gary R. VanRemortel vanremog@gmail.com ***THIS ARTICLE IS FOR EDUCATIONAL PURPOSES AND MAY NOT BE SOLD, POSTED OR ALTERED, EXCEPT AS DIRECTED BY THE AUTHOR.*** **I am not a certified mechanic, all opinions expressed are my own, and I accept no responsibility for use or misuse of this information.** A big thank you to John Dee and his **'To the Garage'** YouTube channel for hosting this article on the Community Tab. Questions, comments, corrections, or additional content may be directed to the author. Ctrl F pulls up a search string.

2003-2006MY-XK8WorkshopManual.pdf 68MB file covering **VINs A30645 to A48684** may be downloaded from Jaguar XK8 X100 forum along with myriad other supporting documents. Jaguar Technical Service Bulletins often apply to a greater range of vehicles than Jaguar acknowledges. Changes made over the years have resulted in errors/omissions in both Jaguar and aftermarket supplier documentation, so items listed herein should be confirmed against your VIN prior to ordering. sngbarratt.com/us and terrysjag.com have parts diagrams and used items may be requested from jaguarheaven.com Gus Glikas' jagrepair.com site includes extensive well-presented repair procedures for a variety of early XK8s woes.

Acceleration (to 60mph): 6.3sec
Bore x Stroke / Compression Ratio: Ø86 x 90.3mm / 11:1
Brakes Front / Rear: Ø325x28mm vented slotted drilled disc / Ø305x20mm vented slotted drilled disc
Braking Distance (from 60mph): 118ft
Cd: 0.36 top up, 0.40 top down
Curb / Gross Weight: 3993 lb / 4783 lb
Engine: AJ34 4.2L (4196cc) DOHC aluminum alloy 32-valve 90° V8
Frontal Area: 23ft^2
Fuel Capacity / Range: 20gal / ~290mi @ reserve warning
Fuel Consumption (average): 17mpg top down
Lug Circle / Thread / Socket Size / Torque: Ø4.75" [Ø120.65mm] / ½"-20 / ⅞" / 75 lb-ft
Maximum Power / Torque: 294hp SAE @ 6000rpm / 303 lb-ft SAE @ 4100rpm
Maximum Speed (ECM limited): 155mph
Oil Circulation Volume @ Maximum Pressure: 10gpm @ 66psig
Turning Radius: 18ft
Wheels Front / Rear: ALY59794U85 Ø19x8" / ALY59795U85 Ø19x9" Chrome Atlas w/35mm Offset



Units = mm

1. Overview

Jaguar XK8s are among the most esthetically pleasing and superb GT cars ever designed. This modern classic, descended from the legendary E-Type, always draws attention and a rust-free preowned XK8 in good running condition can be a bargain, IF you can maintain it yourself. XK8s are not gratuitously complex and lack of a supercharger makes engine maintenance much easier than an XKR. Jaguar cuts part support 10yr after a model ceases Production, and items specific to a single model slowly grow scarce in the supply chain. Jaguar branded items are always higher priced than equivalent Ford items, so do good research. Many Mondeo items were common to Jaguars when they were Ford owned. Terms LEFT and RIGHT used herein are relative to driver's seated position.

Visually compare replacement and removed items and retain removed item during a prove-out period. Experts caution that aftermarket items may not always be accurate functional equivalents of OE. I buy either OEM or brand name aftermarket parts online. **COUNTERFEITING IS BIG BUSINESS, WITH 85% OF FAKES CURRENTLY COMING FROM CHINA. WHEN BRAND NAME IS IMPORTANT TO YOU, BUY ONLY THROUGH MANUFACTURERS' AUTHORIZED DISTRIBUTORS.**

NEVER DISCONNECT BATTERY WHILE IGNITION CIRCUIT IS LIVE, OR PERMANENT MAJOR INSTRUMENT CLUSTER DAMAGE WILL OCCUR. Lack of trained diagnostic personnel has led to a module replacement mentality (at high cost to consumer) at both dealerships and indie shops. If you can do basic electronic troubleshooting, rework under magnification and soldering, you can potentially save big bucks by repairing obvious damage to module(s) yourself. Only through 2002 it would seem, a VCATS label was affixed in spare tire compartment. Ref TSB 418-03. Last digits (/XXX) of installed modules indicate programming revision. When sourcing a replacement module, if you are able to match entire number, reprogramming may not be necessary, otherwise just match base part number, and dealership can do reprogramming. Some modules may alter, be altered or otherwise disable other modules, bricking your car. This is particularly true when replacing Major Instrument Cluster (IPK). Some online module sources claim an ability to do limited reprogramming.

Clearing existing ECM Adaptions can expedite adaptive learning process for engine functions. Ref TSB 303-01.

Clearing existing TCM Adaptions can reset adaptive learning process for shifting characteristics. Only a few low-cost scan tools can do this reset and it must then be followed by a relearn drive cycle. Ref JTB00145.

See jagshops.com for a listing of indie service shops. Some known US based module repair shops are:

- aesmodules.com in FL (BCM, ECM and TCM)
- autoecu.com in TN (Throttle Body and ABS)
- Darrell Turner in CA dario2rnr@yahoo.com 858-649-9090 (Power Seat Module)
- digitalautotech.com in CA (Major Instrument Cluster and ABS)
- ecudoctors.com in FL (ECM)
- goecm.com in TX (ECM)
- moduleexperts.com in FL (BCM, ECM and TCM)
- modulerepairpro.com in CA (Power Seat Module)

Raise front corners by positioning trolley jack cup over cross-brace bolt just behind each front wheel arch. Entire front end may be raised by jacking on Steel cross-beam directly beneath radiator, using a 2"x4"x18" wood block to provide bearing surface. Rear end cross-brace bolt heads are fine bearing points. Six ton rated Blitz Rhino plastic ramps safely raise car 6". Hood can stand straight up by disconnecting gas struts and placing shear bolts in hinge holes for safety. When disconnecting plastic connectors, warm them or they may crack. **Remove O-rings/seals using a smooth nonmarring tool and lightly lube prior to installation with Krytox RFE.** I use Permatex Ultra Grey and Blue Hylomar M gasket sealers. 120 grit WHITE 3M Roloc Bristle Discs are great for tidying up gasket sealing surfaces. I use a Sullivan Glow Fuel Bulb with some RC fuel line to suck old fluid out of brake and power steering reservoirs yearly, in lieu of flushing. Tool kit (beneath spare tire) should include Towing Eye HJA4333AC (M20-2.5 right-hand thread), often misplaced at initial dealer prep.

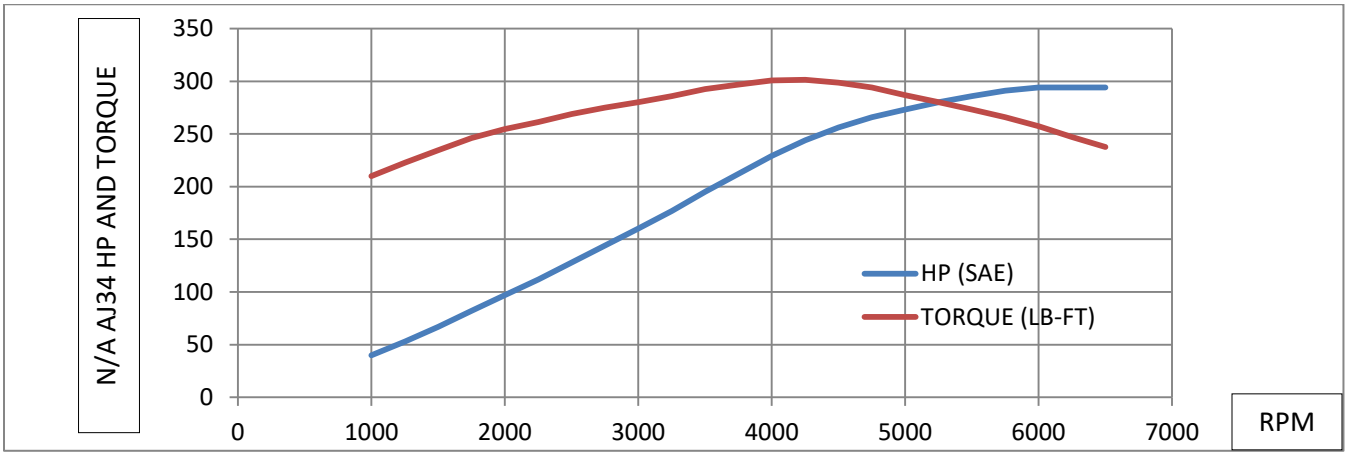
Take digital photos or video during disassembly, placing small items and fasteners in Ziploc bags labeled by subassembly. **Tape off or plug openings as soon as they are exposed and DON'T let fasteners and/or broken plastic pieces fall into unseen areas.** Rusty Zinc plated Steel bolts can be replaced with Stainless-Steel Hex Cap Flange bolts sold on Amazon. Turning fasteners counter-clockwise first can make finding thread start easier. Don't over-torque, as it is easy to strip metric threads in soft Aluminum castings. Fastener engagement in Aluminum should be 3X fastener major diameter (twice that of fasteners into Steel). Helicoil has thread insert repair kits. Unless otherwise stated, torque values in literature are for dry threads. When using anti-seize compound on fasteners originally specified to be installed dry, apply sparingly and reduce torque by ~25%. Install circlips end gap down to drain moisture. When working with electronic modules, wear ESD wrist strap and place in shielded bags for transport. Some Jaguar Forum postings can give rather dodgy advice, so be skeptical. Look for general agreement where it exists.

2. Body

US vehicles have damper type bumper mounts to meet low speed impact regulations. Convertibles have cross-bracing under engine bay and differential, stiffening members in rocker panels, tubular bars in rear sides of cabin and reinforced A-pillars to provide rollover protection. High-strength Steel front longitudinal members, seatbelt anchors, suspension mounting points, bumper mounts and side impact door beams are used, but there is still significant scuttle shake. Watch for paint cracking at welded rocker panel joint, indicating possible structural damage. Ensure door drains are open, wiper shaft rubber seals in place and windscreen underscuttle rubber drain pipes secure on nipples or water can enter firewall compartments, leading to damage.

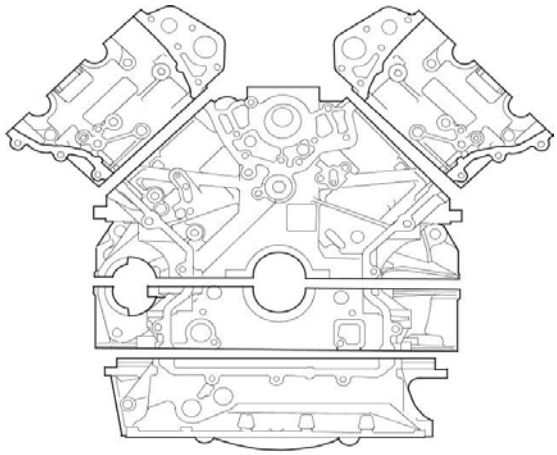
3. Engine and Engine Bay

Closed deck (no valley pan) AJ34 4.2L engine is compact, lightweight (441 lb), refined and strong running to its 6400rpm redline. Cross-plane spheroidal graphite cast Iron crankshaft runs in 5 plain bearings and Krebsoge sinter-forged steel connecting rods are fracture-split. Torque curve rolls off noticeably below 2000rpm. Cast Iron sleeves and other significant improvements over 4.0L engines were made, with the few remaining issues having easy DIY fixes. BSFC is 0.42 lb/hp/hr and warm cylinder compression is >200psig. Cold starting idle is ~1200rpm, dropping to ~650rpm in <45sec. Ref TSB 303-12.



Limited room between hood and engine prevents fitting a quality transverse strut tower brace, but triangulation bracing runs to firewall. Engine bay runs near ambient temperature while driving, quickly reaching >200°F at shutdown, staying quite high for almost an hour. Heat degrades electronic components, rubber and plastic, with greatest effect on items nearest engine and top of engine bay. All hoods should have had louvers like XKRs, electric pump and fan set to run for several minutes after shutdown. When engine is started cold, fans don't run at all, run slowly (in series) once thermostat opens at 190°F, and run full speed (in parallel) around 204°F or with A/C ON.

If you need to replace starter, top bolt is best accessed with oil filter and alternator cooling ducts removed.



4. Valve Train

Morse Hy-Vo primary chains and Aluminum-bodied tensioners better handle torsional load reversals in naturally aspirated Variable Valve Timing (VVT) equipped 4.2L engines. Chain guides need replacement at ~200Kmi. Harmonic Damper puller and crankshaft/camshaft locking tools are needed, but the job is not difficult, merely time consuming. Parts kit and all tools are available from christophersforeigncarparts.com Crankshaft primary chain drive gears are offset by half tooth pitch with inboard gear punch mark facing engine, outboard gear mark facing away.

Intake cams rotate up to 48° in 0.7sec. Gun-drilled camshafts, shimmed-for-life inverted bucket lifters and Ø5mm valve stems keep valve train mass and cam loads low. Intake and exhaust valve axes are 28° apart in Cosworth designed pentroof heads. Valve lift is 9mm and clearances are .008" [0.2mm] intake, .010" [0.25mm] exhaust. If engine oil pressure <18psig (1.25bar), VVT units have insufficient pressure to release internal stopper pin. Stopper pin locks camshaft to VVT unit to ensure camshaft stability at next engine startup. If a rattle is heard upon startup, shut engine down immediately and repair. Early AJV8s had a history of leaky valve seals. Ours should be better, but monitor oil consumption and tail pipe emissions. Mahle SS45961 are fluoroelastomer/Viton.

5. Ignition

Denso 32Bit electronic management system fires Denso single-bolt pencil coils. As of 2003MY, cylinder designations meet ISO standards, Bank-1 (right side) being cylinders 1, 3, 5 and 7 and Bank-2 (left side) being cylinders 2, 4, 6 and 8, front to back and firing order is 1-2-7-3-4-5-6-8. Ref TSB 303-29. Oil found within spark plug wells or on coil rubber boots is either leaking from valve cover ring seals or plugs were not properly torqued. Always verify gaps prior to installing and 'side gapping' may be useful to get a few more horsepower. Changing plugs is an easy DIY job taking ~45min. Identify plugs and coils with cylinder number to help in isolating problems.

ngk.com/product.aspx?zpid=9785

A flashing Malfunction Indicator Lamp (MIL) or Check Engine Lamp (CEL) signifies a faulty coil or spark plug, since unburned fuel going through engine can promote cylinder scoring and/or catalyst damage. Disconnect each fuel injector connector one at a time engine idling to check for rpm drop. Unresponsive cylinder(s) should have injector disabled to limp home. 4-pin coils allegedly send firing confirmation signals back to ECM to protect catalyst, but I wouldn't trust them to do so. With ~.040" [1mm] plug gaps, coils should last 100Kmi. If one coil has failed, the others are about to.

If driveshaft is badly out of balance or damaged, Crankshaft Position (CKP) sensor may pick up sufficient vibration to suspend misfire testing and prevent ECM from completing emissions monitor test. If random misfire DTCs are being thrown, but you detect no misfires during acceleration, have driveshaft balance checked. MIL/CEL ON at KOEO verifies ECM is getting power. Tachometer needle movement or MIL/CEL going OFF during cranking verifies CKP sensor is functional. Faulty CKP sensor AJ81284 (SMP PC366) causes ECM to inhibit fuel and ignition.

6. Lubrication

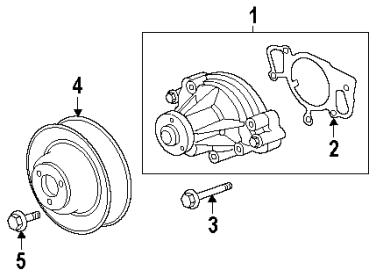
I use Pennzoil Platinum or Ultra Platinum 5W-30 in 5qt jugs from Walmart or Amazon and a Mahle Filter from Amazon every 5Kmi. The Euro oil has more additives so allows for a 7.5Kmi service interval. I use a FilterMag SS300 shopfiltermag.com and Fumoto F106SX (M14-1.5 thread) fumotousa.com oil drain valve. Tracer Products offers a leak locating kit consisting of dye and long wave UV black light. 4.2L cars all have oil coolers, so hoses running from front of engine to cooler should be inspected regularly and replaced every 10yr. Ref TSB 303-S846.

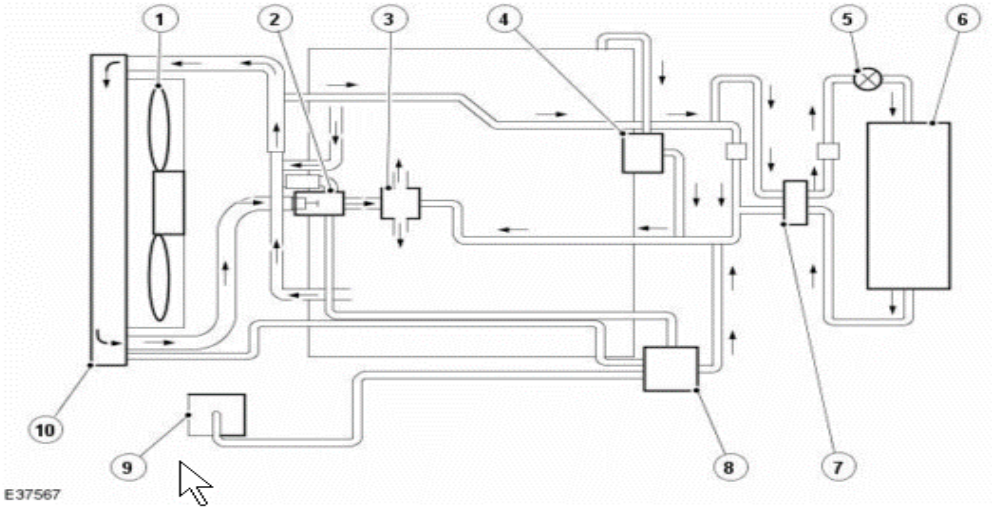
7. Cooling

OE coolant is Dex-Cool (orange OAT meeting WSS M97B44-D). Ref TSB 100-16. Peak Global Lifetime (clear/amber OAT) is getting good press, so I intend to changeover all my cars at next coolant service and remove Dex-Cool label. Pressure test system cold at 14.5psig (1bar) using Harbor Freight 69258 tester with ORANGE #5 adapter. Black #7 adapter can be used to pressure bleed brake system, as long as reservoir is kept topped off. Radiator should be replaced at ~180Kmi. PA66 (aka Nylon, Polyamide) expansion tank is robust, but float sensor LNA5740AB is toast by 90Kmi. To release sensor connector, push in on center of wire clip.

A low volume, split flow, high exchange rate cooling system allows engine to reach operating temperature (>190°F coolant temp) in <4min and block is claimed to vary <4°F corner to corner. Better thermal insulation than light Aluminum shields should have been used to protect cabin from engine, catalysts and center silencer heat.

14.5psig (1bar) capped expansion tank combined with atmospheric recovery tank low in right front wheel arch ensures pressurized portion of system never develops an air pocket. Keep atmospheric recovery tank >¼ full, and to make fill assessment easier, cut a Ø2" hole in rear of wheel arch liner ~8" up from rocker panel and install a plastic sheet metal plug. To inspect, remove plug and side lamp and shine a penlight in. If LOW COOLANT warning lamp comes ON, STOP, top off and ensure recovery tank is >¼ full. XK8 coolant system is not so convoluted as to require vacuum filling.





Item	Description
1	Cooling fan motors and shroud
2	Thermostat housing
3	Water pump
4	Throttle body
5	Heater water pump
6	Heater core
7	Water valve
8	Expansion tank
9	Degas bottle
10	Radiator

Check for seepage between coolant pump front and rear bearings, split seam and around mounting gasket. Black PA66 impellers on original pumps degraded in short order with Dex-Cool, leading to some overheated 4.0L engines. Ref TSB 303-60. Impellers were first changed to black Polyphenylene Sulfide (PPS) and then to white. 4.2L engines all got improved pumps, but since even PPS impellers have been known to spin on their shafts, aftermarket Aluminum impeller (X suffix) pumps became available. I suspect PPS to be more efficient and Aluminum to be more reliable. Pumps last for 120Kmi, should come with a quality metal gasket rubberized both sides and changing it is an easy 1hr DIY job. Change serpentine belt, thermostat, pump, check idler/tensioner pulley bearings and Outlet Pipe Assembly concurrently. Jaguar recommends replacing pulley bolts AJ81256 (Find No. 5) because they 'Torque Turn to Tighten' them. I used new bolts with Loctite 242 and torqued them normally for their thread size.

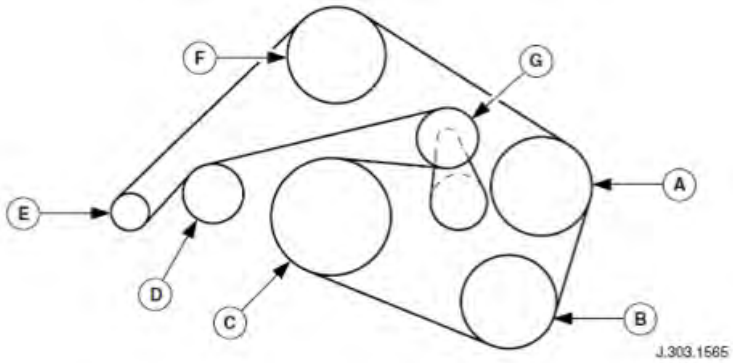
Outlet Pipe Assembly (OPA) on 4.2L engines differ from 4.0L, consisting of three separate glass-filled PA66 moldings (Thermostat Cover, Pipe and Duct), a four-piece thermostat, temperature sensor and seals. No Aluminum after-market version exists, so examine regularly for cracks and replace every 60Kmi. Remove intake manifold front plate to improve initial access to rear duct bolts and replace with Torx equivalents C2C42062 to make future removal easier. Upon reassembly, lightly seat all fasteners to compress seals, torque front pipe assembly first, draw bosses at pipe/duct top together with a spring clamp, then torque rear duct. OPA replacement takes ~1hr. OE 'constant tension' spring Steel hose clamps on large radiator hoses should be replaced.

Burp line from thermostat pipe to expansion tank sees substantial engine heat and I replaced it and short hose segment connecting rear nipple of expansion tank to tube going to atmospheric recovery tank with 5/16" [8mm] ID reinforced silicone hose from Z1 Motorsports. Valley hoses run in hot V-space passing coolant via 'octopus' hose to pump and heater matrix, with supply hose on right side and return on left. Replace small coolant lines to EGR valve and throttle body along with valley hoses. See Climate Control Section for 'octopus' hose details. Knock sensors may suffer permanent damage if immersed in coolant or power tools are used on them.

Main radiator is divided into coolant and transmission fluid portions. A thin A/C radiator sits in front of main radiator. Low in front is a power steering fluid heat exchanger and below that the oil cooler. Radiator drain plug Dorman 61138 is located at bottom of right end cap facing aft. It is molded black Polyethylene (PE) with M10-1.5 threads, has a rubber seal and barbs to retain it in port when unscrewed. Two rather fiddly square head bolts hold top of fan shroud against radiator. Wedge a bit of foam rubber or double-stick tape between their heads and molded radiator slots to ensure they stay put if fan assembly is to be removed. Radiators are exposed to road debris and fins will get crushed over time.

8. Serpentine Belt

Spring tensioner pulley is released using a ⅜" square drive breaker bar. Ref TSB 303-02. Replacement is an easy DIY job taking <15min. Tensioner and idler pulley bearings are good for 180Kmi.



A = Power Steering Pump
B = Air Conditioning Compressor
C = Crankshaft Pulley
D = Idler
E = Generator
F = Coolant Pump
G = Tensioner

9. Intake and Crankcase Ventilation Systems

Right front quarter panel intake snorkel feeds lower air box, up through filter, to upper air box w/integrated MAF sensor, into tube C2N1041 to rear mounted throttle body. Path is fairly restrictive due to bellows and two 90° turns. I've run a K&N 33-2190 re-usable filter in my stock air box for 90Kmi with no issues. Clamp bosses on lower portion of OE box XR823351 can crack from clamp stress and engine heat. Lower portion of naturally aspirated air boxes are unchanged and may be had for <$50 from salvage yards. $30 URO EAC8130 air box Instrumount often tears/separates with age. MAF sensor should be cleaned every 90Kmi using MAF sensor aerosol cleaner. Hood liner/insulator blanket droops with age and, if induction tube is not fully seated, bellows section crests can become damaged. Bellows section can also crack in sharp transitions, so check it regularly. Intake manifold Steel front cover inner surface can become pitted in seal contact area (especially with a catch can, because it doesn't get as oily) and leak. Apply DC4 grease to plate and seal. If you need an inexpensive smoke machine to locate intake leaks, build a Mr. Fusion shown on YouTube.

MAF should be ~3.6 lb/min at idle and ~11 lb/min at 2000rpm. Ensure plumbing and seals (including dipstick/breather pipe O-rings and oil filler cap) don't leak. Cam covers have internal mesh to help keep oil mist internal, there are no longer restriction orifices in ports, and full load/partial load breathers are reversed from 4.0L engines. A 26" Norma V2 NW10 full load breather pipe AJ87221 from Bank-2 connects to induction tube providing vacuum at full throttle, while a 30" Norma V2 NW15 partial load breather pipe AJ88622 from Bank-1 connects control valve AJ87773 to intake manifold elbow spigot, providing high vacuum at partial throttle. **Control valve sticking open can cause a rough idle.**

Breather pipes embrittle in engine heat and Jaguar eventually switched to heavier smooth bore molded pipe for partial load breather. I make and sell replacement AJ88622s if needed. My corrugated pipes are both more robust and more flexible than OE. I currently have only right-angle Norma V2 NW15 connectors, but if yours are in good condition, they may be reused. Markings on these connectors merely identify plastic as PA66 and percentage of glass fill GF30, for recycling purposes.

Crankcase ventilation draws some atomized oil into intake manifold, making a mess and degrading combustion. Some cars have cyclonic or labyrinthine devices to wring oil out of the airstream, but not XK8s. Tasan Racing's 2-Port Closed Catch Can (a Mishimoto knockoff) and Stainless-Steel barbed fittings amazon.com/gp/product/B017N4U596/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1 A spiffier looking Heinmo unit with a dipstick is available at a slightly higher price. Ensure can and plumbing are leak-free by testing in water. If you site it poorly, it may foul with water from combustion process, and could even freeze up in northern climes, leaving small full load breather as the only vent path. I capture ~2.5oz of oil every 5Kmi.

Configure as follows:

1. Remove internal filter and baffle from can
2. Place a small Stainless-Steel pot scrubber inside (IN/OUT markings can now be ignored)
3. Install ⅜" MNPT Stainless-Steel barbed fittings
4. Attach Ø¼" [6mm] fluorosilicone lined vacuum rated hose to remote drain petcock or Curtis valve
5. Remove OE partial load breather pipe AJ88622 from Bank-1
6. If breather pipe is OE corrugated, make .594"IDx.750"OD Black PA66 pipes using old connectors
7. If breather pipe is smooth bore, cut at rear transition to make two sections
8. Flare or bead ends by heating and forming and reinstall
9. Install Ø¾" [19mm] ID fluorosilicone lined vacuum rated hose joiners with spring clamps
10. Mount just above Bank-1 catalyst using fender washers against soft heat shield
11. Use a strong zip tie to bind heat shield to refrigerant pipe for support
12. Drain trapped oil at each oil change while warm and close drain petcock tightly



I find an Intake Manifold Vacuum (IMV) port useful in gauging general engine health. BARO — MAP = IMV. Cut brake booster pipe running from intake elbow in an accessible area and graft in a Ø¼" barbed Stainless-Steel tee, using a heat gun to soften pipe ends for barb insertion. **Plug free leg of tee and drill a small hole to both reduce danger of leaks and snub response to gauge if desired.** Cover with a tight-fitting high temperature Silicone Blanking Cap from Amazon.

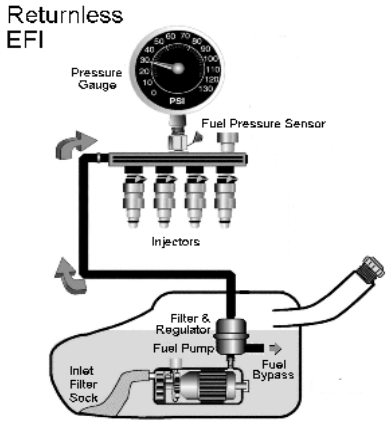
Intake elbow brake booster pipe fitting kit C2S15816 consists of three pieces, only two of which are needed. Brass ferrule pressed into Aluminum casting is best left as is unless obviously damaged, but black plastic locking insert and O-ring must be replaced every ~90Kmi due to heat embrittlement. O-ring ID seals against pipe OD and O-ring OD is where four 'release fingers/tines' bear when you press it in. Embrittled O-ring often breaks up and gets sucked through engine, leaving nothing for locking insert to release on. Cut off pipe end if scraped. Higher temperature 8.5mmIDx2.5mmCS Viton O-rings are available from McMaster-Carr. If throttle body is removed from elbow, booster pipe disconnected at passenger's side firewall compartment and port inside intake elbow plugged with a finger, you can test pipe for leakage or use a smoke machine.

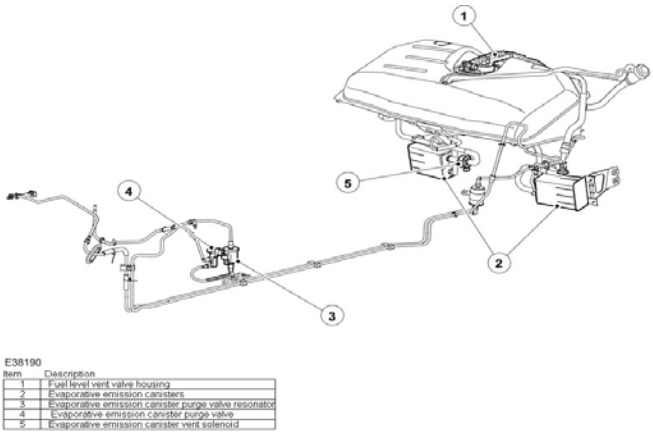
Intake manifold removal is as follows:

1. Pull fuel pump F5 in trunk fuse box
2. Remove engine cover
3. Remove induction tube
4. Remove breather pipes
5. Unbolt coolant expansion tank
6. Disconnect all sensor, fuel injector, throttle motor and MAP connectors
7. Unbolt EGR valve from throttle body
8. Remove throttle body from intake elbow as needed
9. Disconnect booster and vapor recovery pipes from intake elbow
10. Disconnect fuel supply line at fuel rail
11. Unbolt and remove intake manifold w/fuel rail
12. Installation is reverse of removal

10. Fuel System

Beginning 2003MY, a returnless fuel system was adopted from Ford with a new in-tank vane pump C2N1146, having integral float sensor and filter sock. Pump relies on fuel for cooling, so keep ¼ full tank, but don't overfill or you may foul vapor canister system. Canisters are mounted behind rear axle, so as rubber hoses crack over time, they can be easily inspected. Advantages of returnless systems are lower vapor loss and simpler plumbing with fewer opportunities for leaks. Reduction in circulated volume allows for a smaller fuel filter, but there may be a greater propensity for vapor lock. Engine intake elbow left side spigot is for Norma NW8 pipe coming from Purge Valve/Resonator in left front wheel arch, behind liner. Many OE Purge Valves have been superseded due to performance issues but LJG1515BB is current. Ref TSB 303-62am. This item is common to many Fords of the era (SMP CP523). **Valve sticking during opening/closing or plumbing leaks can cause a rough idle,** with fuel trims varying wildly. Jaguar specifies Premium (91RON) unleaded fuel.





E38190

Item	Description
1	Fuel level vent valve housing
2	Evaporative emission canisters
3	Evaporative emission canister purge valve resonator
4	Evaporative emission canister purge valve
5	Evaporative emission canister vent solenoid

Anytime engine is shut down and started back up in extremely hot conditions with insufficient time to cool, vapor may have formed in dead-ended fuel rail, with winter blend fuel increasing this propensity. Little can be done to

insulate Steel fuel rail from conducted engine heat except to keep cooling air flowing through engine bay. If you get a lazy fuel injector, engine may start, **but idle roughly** until excess fuel burns off. A scan tool may show DTCs P0301 through P0308 and, if it happens again over a short period of time, you may get a MIL/CEL and DTC P0316. Injector cleaning and flow balancing may be needed.

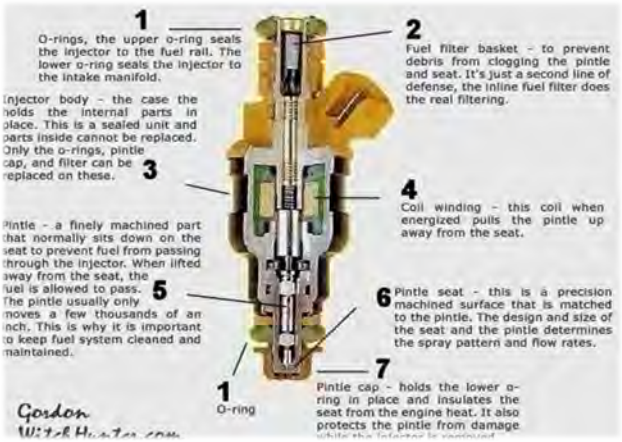
Ignition switch is typical four position, 0 = OFF, I = Aux/Acc, II = Ign ON and III = Momentary Crank. Positions II and III supply B+ to Fuel Pump Module (FPM) via F5 in trunk fuse box. There is no longer a fuel pump relay. Engine Control Module (ECM) reads fuel pressure sensor AJ87977 and temperature sensor LRA1600BA on fuel rail and commands FPM to duty cycle ground circuit from 5 to 50%, thereby regulating 55psi relative to MAP (or ~50psig at rail valve during idle at MSL). Inertia Switch C2N1918 tucked up behind kick panel just ahead of hood release shuts off fuel and opens door locks in a high impact accident. Reset top button when it is safe to do so.

Starting 2003MY, fuel filter has Ø5/16" [Ø8mm] straight tube with raised circumferential ridge to capture radial spring on Norma-Quick quick release fitting. A slick-surfaced tool like Lisle 39410 must be driven firmly/deeply into fittings to release.

To change filter, jack up left rear, remove wheel, pull F5 in trunk fuse box, start engine and allow to stall. Two 4" long extensions snapped together will reach 10mm headed nut holding filter bracket to underbody and release fittings. Fuel will not siphon out of tank with filter disconnected. Fuel in forward line will back-drain, but volume is small. Flow direction is shown on filter, rimmed end faces down and forward. Barbed fittings supplied with filter may be discarded. Ensure fuel rail Schrader valve core is well seated and quick disconnect fittings are snapped back together properly before reinstalling F5 and pressurizing fuel system to check for leaks. It's ~45min job.

Pulse Damper on hose near fuel rail smooths out pump pressure pulses. Disconnect line at fuel rail by unhooking safety clip and use Ø½" fuel line tool (310-D005 or equivalent) to release fitting. Unplug sensor and injector connectors and remove rail with injectors attached. On the bench remove each clip and injector. Mark each injector with cylinder number for reference.

2003-2006MY US market XK8s use orange Denso fuel injectors Jaguar AJ82353, Denso 195500-4280. These 20 lb/hr @ 43.5psig (3bar) injectors (also used by Land Rover, Ford and Mazda) have improved targeting and a cruciform array of 12 teeny tiny orifices that must be kept fastidiously clean. They are 13.6Ω impedance. Injector orifices and internal pintles accumulate varnish over time and valve action can become sluggish. mrinjector.us has new filters and injector-rehab.com has pintle caps 2-252. Screw a #10 sheet metal screw into each inlet filter and use to pry out. If you suspect individual injector firing issues, a Noid light (Lisle 27800) or current limited LED can confirm turn on pulses are being received from ECM.



If you DIY clean injectors, keep volatile solvents contained, ground static sources, keep sparks away and use a safe/low TURN ON voltage with <80% duty cycle to avoid overheating coils. When an injector shuts OFF, back EMF from collapsing flux field produces a sharp spike, so use a Cathode to B+ 1N4005 flyback diode in switched circuit as a discharge path. Replace 8mmIDx3.5mmCS upper and 9mmIDx3mmCS lower Viton O-rings. Reseat injectors individually into rail and reinstall retention clip before reattaching to intake manifold and final leak testing. There are many good injector cleaning/balancing services using ASNU or similar bench systems. I clean them ultrasonically outside in B-12.

11. Throttle

4.2L throttle body C2C20541 is all new, simplified and pretty trouble-free. Disconnect battery before cleaning throttle body. Clean using B-12 or other throttle body aerosol spray cleaner. ECM will relearn butterfly position once everything is powered back up. Electronic drive-by-wire throttle gives smooth accurate power delivery. There is a special tool and procedure in XK8 Workshop Manual for adjusting cable tension from pedal up to sender. More stylish pedal covers similar to those in Aston Martins are available from Ultimate Pedals.

12. Transmission

ZF 6HP26 gear box is robust and widely used in many rear-drive car brands. A planetary and Lepelletier gear set provides six forward gears (ratios 4.17, 2.34, 1.52, 1.14, 0.87 and 0.69) supporting engines up to 444 lb-ft of torque. When in reverse (ratio 3.40), ECM limits maximum throttle body opening to 18°. Limp home mode puts transmission in 5th gear.

Change fluid and filter/pan every 60Kmi. Unless you do a full flush through cooler lines, only ~6qt of the 10qt capacity will drain during filter/pan removal (remainder being trapped in torque converter, lines and cooler). Summit Racing sells adapters for cooler line ports on side of transmission if you wish to flush that way. Always loosen fill plug before drain plug. ZF Lifeguard6, Pentosin ATF1 and Redline D6 are acceptable fluids. I use only ZF replacement parts. OE filters are made by Filtran.

Raybestos, Gary Ferraro and Mickey Figueroa instructional videos are on YouTube. Document all clutch pressures before and after performing service/repair. Computer monitors input/output shaft speeds for rationality and increases fluid pressures to clutches automatically to compensate for wear and adapt to certain driving patterns. Verify TCM firmware is current, perform any repair work, replace filter/pan, refill fluid, clear adaptions, then do relearning cycle. Ref TSB 307-01 and JTB00145. If you get ZF bark during gear changes, approved friction additive may be needed. Original T27 headed filter pan screws often cam-out or break during first filter change, so replace with T40 headed fasteners CTSC 073610148601 installed with anti-seize compound. Examine magnets in old filter/pan for swarf. Access for refilling can be improved by replacing fill plug with fumotooildrainvalve.com FG2SX right-angle valve (M18-1.5 thread).

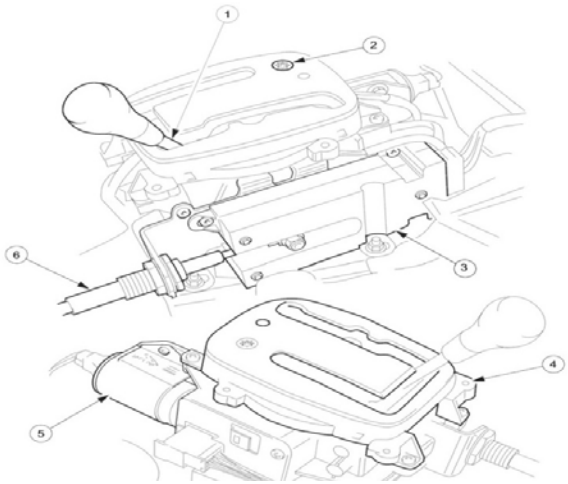
Sequence for fluid refill is as follows:

1. Raise vehicle level with engine cool
2. Engine OFF add fluid until it drips from fill port
3. START engine
4. Add fluid until it drips from fill port
5. Follow JTIS shift/purging procedure
6. Allow fluid to reach 40°C
7. Add fluid until it drips from fill port before reaching 50°C
8. Reinstall fill plug or close valve
9. Engine OFF

Shift device	Adaption limits Charge pressure	Adaption limits Quick charge time
A	approx. - 400 mbar to +350 mbar	approx. - 40 ms to 120
B	approx. - 400 mbar to +350 mbar	approx. - 60 ms to 100
C	approx. - 400 mbar to +350 mbar	approx. - 50 ms to 120
D	approx. - 300 mbar to +200 mbar	approx. - 300 ms to +200
E	approx. - 300 mbar to +300 mbar	-----

80% of faults are caused by a leaking bridge seal, tube seals or worn E clutch (4F85) pack and show up around 130Kmi. Other problems are lazy valve body solenoids, sticking accumulator pistons and worn internal bushings. To release the Mechatronic sleeve, pull the white tab handle. To drop the valve body, remove all T40 headed bolts. Valve body rebuild involves splitting it, cleaning everything, installing new accumulators, new separator plate and new solenoids. Always mark or otherwise document location of all check balls. There are several 6HP series transmission/valve body variants, so note codes on separator plate before ordering kit. thectsc.com sonnax.com and transtar1.com sell valve body refurb kits, job is doable without removing transmission, and you can save ~$1K as a DIY. Sonnax 95740-15K accumulator kit replaces OE pistons and rubber bumpers (which extrude and take a compression set) with new pistons and springs. When reinstalling Mechatronic unit on valve body and entire unit back in transmission, ensure shifter dogs engage rod. You should probably replace Mechatronic unit to solenoid foam gasket as well.

Remove screw/plug (Find No. 2) on shifter surround and defeat shifter lockout with ignition key to work around a faulty Brake Pedal Position (BPP) switch or solenoid. You may need to do this to tow the car if disabled or to get it on a transporter. After a time, solenoid (Find No. 5) can slap against housing as you apply brake in PARK and putting a block of EPDM foam inside will soften the stop.



In Sport Mode (shifter surround button UP and lit) higher rpm shift points suit a more assertive driving style and J-Gate allows selecting a lower limiting gear for better control in town and on mountain roads. Linear Switch Module (LSM, Find No. 3 above) gets intermittent >100Kmi and manifests as inoperative Sport Mode (no Sport Mode lamp), no J-Gate functionality (nor manual gear LEDs) and sluggish automatic shifting. It resets itself after two key cycles and may result from switch contacts sending implausible signals to TCM or from high fluid temperature (I can't determine which), since no DTCs or Limp Home warnings are set. If it becomes a chronic condition, DeoxIT Gold G5 may help, LSM may need replacing or some other action TBD. OE shifter knobs are pretty pedestrian looking, relative to rest of cabin, so check out British Autowood's products. Knob just screws off lower jam collar. Install using Loctite 242. ASL allows cruise control buttons to limit top speed in townships having speed cameras.

13. Driveline

Tubular steel driveline has a Guibo (or Roto-Flex Coupling) at transmission end and a center stabilization bearing for refinement. When replacing, critical balancing of driveline must not be disturbed. Mark all bolt positions, keep paired up with their specific nuts and don't allow anything to move until each item is restored to its original position. Study everything before disassembly and ensure you have it oriented correctly prior to reassembly. Coat with DC4 grease to keep rubber from drying out.

14. Differential

There is no drain plug and ½" square drive fill plug is in a difficult to access location on the 3.06:1 differential. Some owners have cut large holes in front wall of spare tire compartment in an attempt to gain access from trunk, with marginal success. Do fluid service at 120Kmi even if pinion seal hasn't started to leak. Unless you have a special installation, there were no Limited Slip Differentials installed in XK8s. Jack up rear of car (to let half shafts rotate freely) to grease U-joint Zerk fittings yearly and they should last over 200Kmi. They have a tendency to throw grease, so power wash rear axle area periodically.

15. Exhaust and Emissions

Exhaust manifolds are thin wall Stainless-Steel, attached with heat shields, long bolts and spacers to maintain proper tension and compensate for different coefficients of thermal expansion. This is a low thermal inertia system with closely coupled catalysts, and their Steel bodies rust badly. An electrically operated EGR valve plumbed between intake elbow and Bank-1 exhaust manifold was reintroduced in 2003MY for emissions compliance. Gaskets can leak and valve pintle sometimes sticks as valve ages. **EGR valve sticking open can cause a rough idle.**

O_2 sensor connectors mount on tabs behind throttle body. Each mated connector pair lifts straight up off mounting tab with a sustained pull, presenting just enough slack to release end latch and unmate. Remove sensors using a 22mm [⅞"] crowfoot socket, use anti-seize compound and torque to 33ft-lb. In order to match their wiring harness mates, upstream sensors should have grey connectors and downstream black, but not all do.

Air/fuel ratio (upstream) sensors are wideband (from 5:1 to 20:1) linear type. Wideband sensors operate around 1300°F and vary current from -5mA to +5mA. Lambda (Downstream O_2) sensors are conventional nonlinear narrow band type. They operate at 600°F with best accuracy from 0.4V to 0.8V (equating to ratios of 15.0:1 to 14.2:1) output. Both are 4-wire heated types and their lifetime is ~120Kmi.

Upstream sensors are easily accessible from above, but expansion tank must be removed to gain access to left side. Downstream sensors threaded into catalyst bungs underneath and are a bear to get out. I changed out at 136Kmi even though they were still working, but wish I'd done it sooner. I sprayed with CorrosionX Rust Penetrant over a period of weeks while continuing to drive the car, cut the wires off, used a 22mm socket, several wobble extensions and a long breaker-bar to loosen without having to remove exhaust system components.

Exhaust system is an extremely quiet, fairly restrictive, five box Stainless-Steel design. Pipes tuck up above rear axle, in rather tight bends. Replacing aft boxes with aftermarket straight-through pipes can get you a more aggressive sound, but irritating drones may result at certain rpms. There are also full 'Cat Back' systems, but they are spendy.

16. Electrical

Multiplexed electronics control various vehicle functions over a network of interconnected electronic modules operated by differential low current switching. Control commands are encoded at each output device to be utilized at a specific destination. This communications protocol enables many messages to travel over a differential pair of wires. Communication between various electronic control modules enables transmission shift program to be altered when traction control system is activated, helping maintain control under slippery conditions. When rear window defogger is switched ON, the message is acted on not only by appropriate heating coil control circuits, but also by engine management system. In this way engine idle compensates for increased drag of alternator.

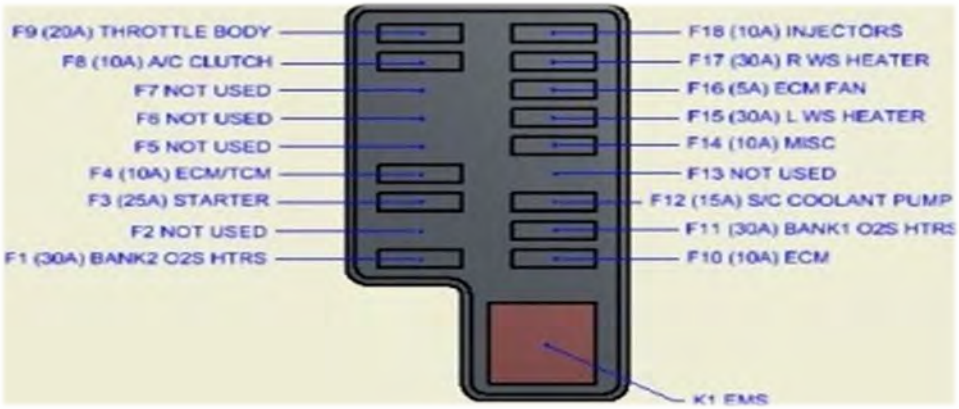
If you experience parasitic draw to the extent that it drains your battery in less than 30 days, the best way to troubleshoot is to put an ammeter in series with the negative battery cable. Anything greater than 50mA should be investigated. Pull fuses one at a time until you find the offending circuit(s). However unlikely, used vehicles purchased off car lots today may be equipped with GPS tracking devices to aid repossession, should you fail in making a payment. To locate such devices, look everywhere on the vehicle, especially underneath the chassis and under the dash.

Schematics available on Jaguar Forum are conventional and easy to follow. All switches and relays are depicted in their normal states/conditions. All inductive loads have internal protection to reduce control switch contact pitting. If a diode, ensure >10:1 front-to-back ratio. In a roadside emergency you can substitute a working relay from a trivial circuit for a faulty relay in a critical one. Referring to wiring colors, I found a few relays in my car placed on wrong mounts, so I restored them to agree with Jaguar documentation. Brown SPST relays LJA6703AA are most common. Notched/cutaway corner of fuse boxes indicates F1 position. Be aware that relay coils sometimes bring B+ in on Pin1 and sometimes on Pin2.

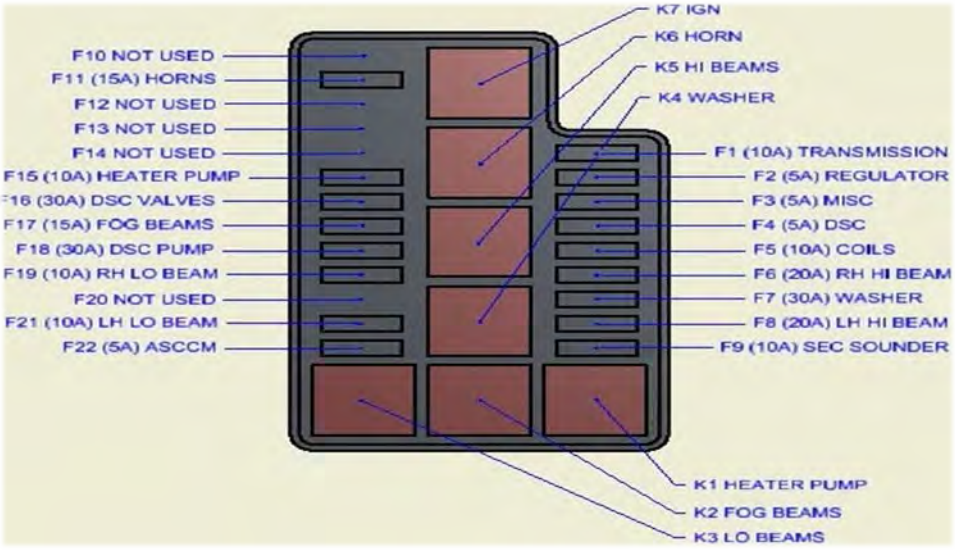
To perform a Hard Reset, do either of the following:

1. Remove F4 (10A) from Engine Management Fuse Box and wait >30min before reinstalling (erases only memory in ECM)
2. Disconnect battery negative cable, touch it to positive battery terminal for 60sec, then reinstall battery negative cable (erases memory in most modules)

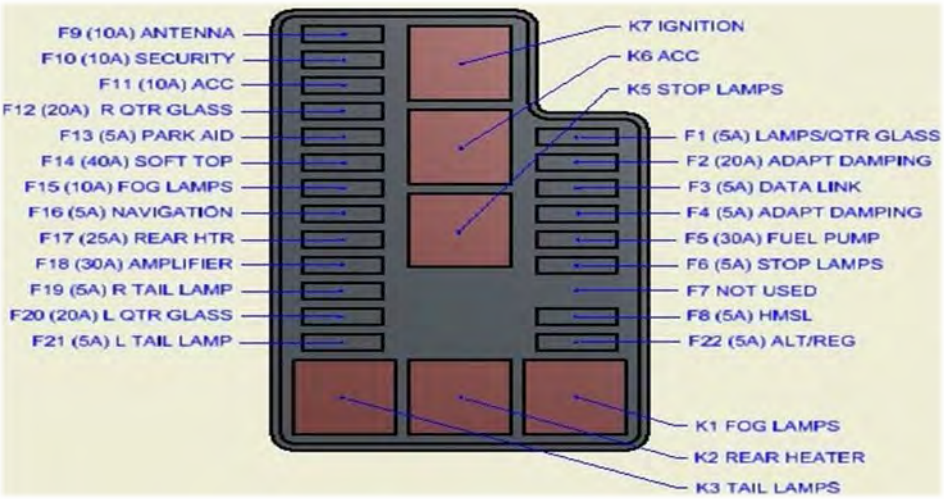
Ensure car is unlocked, windows down and keys in your pocket if you disconnect battery. If you mistakenly close trunk lid with battery disconnected, an external +12VDC source can be applied to engine bay power terminal near fuse box, or use manual key slot in right rear badge. DON'T try to start car with power connected in this manner or bad things can happen. High Power Module fuses are located in trunk. If starter refuses to crank, 500A fuse has likely blown. If ALL circuits are non-functional, 250A fuse has likely blown. If only a single circuit is non-functional, check its related fuse(s).



Engine Management Fuse Box (inside Right Firewall Bulkhead)



Engine Compartment Fuse Box (near DSC)



Trunk Fuse Box (near Battery)

Windows are frameless, drop slightly upon lifting door handle and bump back up into rubber seal upon door closing. **Turn Ignition OFF, then disconnect battery negative cable for 60sec before beginning repair work and reconnect upon completion, as many circuits remain live with Ignition OFF.** Any time battery power is restored, window positions need to be retaught. Sit inside, close both doors, turn Ignition ON (Position II), close window and hold switch until a click is heard, then lower window and hold switch until another click is heard. Close window to confirm drop upon door opening and rise upon door closing. Do this for both windows/doors. **If loss of BOTH window limits occurs repeatedly, there is either a problem with charging system or battery is suspect. Bogus OBD2 DTCs can be set and strange problems indicated due to a dodgy battery. If there is any doubt about battery condition, replace it, document and clear any DTCs, drive vehicle for a while, see which return and start diagnosis afresh.**

The battery vents outside through a tube and rubber grommet. Alternator C2C19630 contains a replaceable internal rectifier/regulator JLM20187 forced-air cooled through a fixed C-shaped tube and removable flared duct HJA4477AD (retained by a single M5 bolt) underneath. This duct blocks oil filter, is usually first item removed, last reinstalled during oil change and often misplaced by careless service personnel. It is split on aft end to allow center tab to capture tube and clips into radiator crossbar up front before bolting. If yours is MIA, you are out of luck, as they are no longer available. The alternator itself has no fan impeller, and every 20°F cooler you can keep rectifier diodes doubles their life.

Molded end retainer tabs on side marker lamps (and other similar polystyrene or polycarbonate lamp fixtures) stress-crack over time. Take them out, fill gap between tab and body with a small piece of rubber channel and reinstall to substantially extend their life. A small piece of EPDM sponge placed under fuse box cover latches can restore their mojo.

When you need to replace a power antenna mast, it is A068 $20 from antennamastsrus.com Chrome antenna nut has very small wrench flats down in rubber grommet and track teeth face aft. Antenna mast seal is C2N3698.



Turn signal sounds and other chimes are produced by a Ø2½" 65Ω speaker LXF2280AA on right side of steering column. Top down on a sunny day, sound is too faint to be heard and indicator lamps too dim to be seen. I installed a larger 35Ω rectangular speaker behind Adaptive Speed Control and Valet switch holes on underscuttle to better direct sound at driver and used a new Aspirator Grille GJA6100AA___ (add three-letter interior color code) to fill empty Valet switch hole. I still wish I could get greater volume, but I've found circuit to be too 'load sensitive' to get a secondary amplifier stage to work without causing oscillation.

If you get a 'Check Rear Lights' alert, check rear lamps IN THE DARK to ensure ALL are working, including redundant center tail lamps. If you get both 'Check Rear Lights' AND 'Cruise [Control] not Available' alerts, you have a faulty BPP switch. Internal micro switches Cherry DK1G-SND1 get flakey with age and their irrational outputs confuse ECM. Ref TSB 206-07. To access, remove driver's seat and dash underscuttle and lay on your back. Leave original Steel mounting bracket attached to firewall (loosening mounting nuts inside firewall compartment may be helpful, but DON'T remove or you will spend hours trying to get bracket back into mounting holes). Ensure ratcheting self-adjuster on new switch module is cocked as shown, so inner pawl (6:30 position as shown in photo below) rests against its stop. You'll need a short handled ¼" square drive ratchet, 8mm socket and dykes.

The procedure is:
1. REACH up through insulation blanket
2. FIND and UNPLUG cable connector
3. CUT zip tie
4. REMOVE lower nut
5. PRESS and HOLD brake pedal (starting engine can get pedal to initially go lower)
6. LIFT BPP switch clear of lower stud
7. SLIDE BPP switch down and out of top mount
8. Again, PRESS and HOLD pedal
9. FIT new BPP switch into bracket top mount and over lower stud
10. RELEASE and PULL pedal to the stop to allow ratchet to self-adjust
11. INSTALL lower nut and tighten
12. PLUG IN connector and INSTALL zip tie

Some soldered connections can become unreliable due to poor original workmanship or removal of Lead (Pb) from solder as a result of Restriction of Hazardous Substances (RoHS) efforts worldwide. Pure Tin (Sn) solder joints are brittle and can crack when overstressed. This is not generally a problem for most protected modules in cabin, but those in tough thermal and vibration environments (like engine bay) are at risk.

Modern wire insulation may be Soy-based due to Global Green Initiatives and rodents have been known to dine on it if they take up residence. I use Tesa wire loom tape instead of electrician's tape for binding wiring harnesses. Leave a folded end or you'll never find it again. Color coding in diagrams and manuals is abbreviated as follows.

B = Black	G = Green	K = pinK	LG = Light Green	LN = Light browN
LU = Light blUe	N = browN	O = Orange	P = Purple (Violet)	R = Red
S = Slate (Gray)	U = blUe	W = White	Y = Yellow	NCA = No Color Assigned

NW = browN with a White tracer/stripe. More info can be found at jcna.com/library/tech/tech0014.html

Molded plastic connector housings degrade with age and engine bay heat, eventually cracking and needing replacement. Contact release tools allow you to replace just the plastic housings, since contacts are generally still good. Not all housings have easily identifiable contact well numbering, so take photos prior to disassembly. FordTechMakuloco YouTube channel has a good connector unpinning video. Magnification and good lighting are key, otherwise you WILL break locking barbs. bmotorsports.com sells housings w/contacts, or you can buy pigtails to unpin. Go to their 'Connector Kit Quick Search' based on number of contact positions. For back-probing through rubber grommets/seals, use T-pins from the fabric store.

17. Security and Horns

Remote fob LJE2610AC from keylessentryremotefob.com takes a CR2032 battery and directions for replacement are in Driver's Handbook. Changing it DOESN'T require reprogramming, provided you don't push any buttons while battery is out.

Programming steps are:

1. Get in and CLOSE both doors WITHOUT LOCKING
2. PULL and HOLD high beam stalk AFT
3. INSERT key and TURN to AUX/ACC (Position I)
4. RELEASE high beam stalk
5. PULL high beam stalk AFT and RELEASE 4 times
6. Chime sounds and lamp illuminates on shifter surround, entering program mode
7. PRESS and RELEASE LOCK or UNLOCK on remote 5 times
   If programming two remotes, PRESS and RELEASE twice on one and thrice on the other
   If programming more than two remotes, total of all remote button presses must equal 5
8. Wait 15sec until chime sounds and lamp illuminates on shifter surround, exiting program mode
9. TURN Ignition key OFF (Position 0)
10. TEST all remote functions

To confirm body VIN against ECM VIN, put key in ignition, hold down A/B button on trip reset panel and last digits of VIN will appear in status panel.

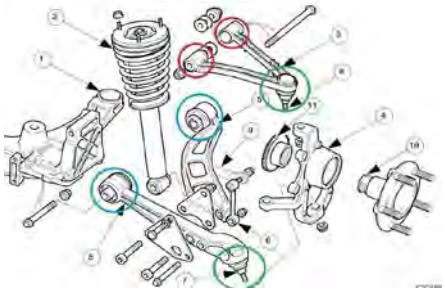
18. Suspension

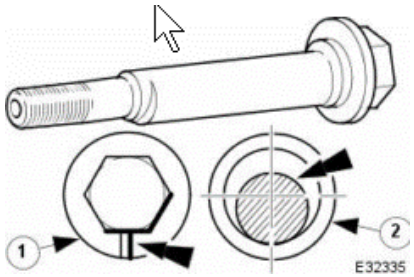
Jaguar's independent suspension design has long been among the most prized of the marque's traits. It relies on double front wishbones and control arm layout at rear. Front wishbones attach to a very light but rigid cast Aluminum cross-member attached to frame with bushings tuned to provide appropriate compliance when subjected to cornering loads. Forward portion of engine's weight is carried by hydraulic (oil filled) motor mounts attached directly to cross-member. Bolts attaching cross-member can seize in situ after years of galvanic action and must be replaced and anti-seize compound applied upon reassembly. Despite good design and progressive springs up front, low speeds produce a harsh ride over road surfaces such as brick or cobblestone and more so as components age. Anti-roll bar bushings are simple to replace from above, taking ~30min.

For our purposes Toe is in, Caster positive, Camber negative. Pay attention to Caster adjustment shims when changing upper wishbone bushings. Default shim location from Jaguar is shown below. Positive Caster tips vertical link axis backwards (like a motorcycle fork) for stability and Jaguar suggests a nominal 6.6º left and 7.3º right for North America. If your car drifts off low side of sloped road surfaces and your toe is set correctly, you need more Caster on low side (or less Caster on high side).

Four Stepped Washers CAC3533, two .063" [1.6mm] Blue Shims MJA1467AA and two .035" [0.9mm] Red Shims MJA1467BA are used each side, but are allocated differently. Blue shims affect Caster by 0.4º and Red shims by 0.2º. If you install urethane bushings having flush ends, large pattern flat washers supplied must be used instead of stepped washers. I have Powerflex anti-roll bar and upper wishbone bushings and they are virtually guaranteed to squeak unless lubed well inside with **Prothane Super Grease**, as nothing else stands up in rain. Ref TSB 204-16. Large washers hit brake line mounts during bolt removal and should be bent down or filed off slightly to clear. Some have torched old rubber out of lower mount bushings and cast their own in situ using Reoflex 60 liquid urethane.

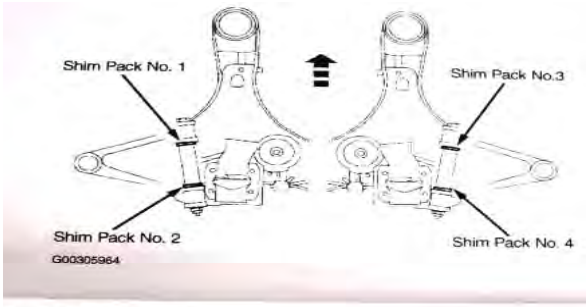
Upper wishbones theoretically provide fixed Camber of ~1º, but an eccentric bolt JZB100086 is available for lower aft wishbone, if needed. Bolt only has ~1º of authority, so it can't perform miracles. A radial ridge on bolt head skirt indicates peak of eccentric lobe. To change out this bolt, steering rack must be dropped slightly. A rough Camber check can be made using a smartphone running Clinometer app with car parked on any reasonably level surface. Total toe should be ~0.25º.





Front springs sag and upper mount sponge rubber isolators take a compression set over time, further increasing negative camber. Welsh makes a urethane version of upper shock mount. Ensure you can get upper shock shaft end nut loose using a Great Neck 25284 socket. If original nuts were over-torqued, a carbide disc may be needed to slice nut. Changing out a front shock takes ~90min. You need spring compressors, ratchet straps and a bench vise to further compress and stabilize unit while working. Nut covers omitted on later cars are NJA3975AB large and NJD3975AB small. Shaft bump stops MJA2150BA rot out and need replacement. Front Shocks are Bilstein 24-067263.

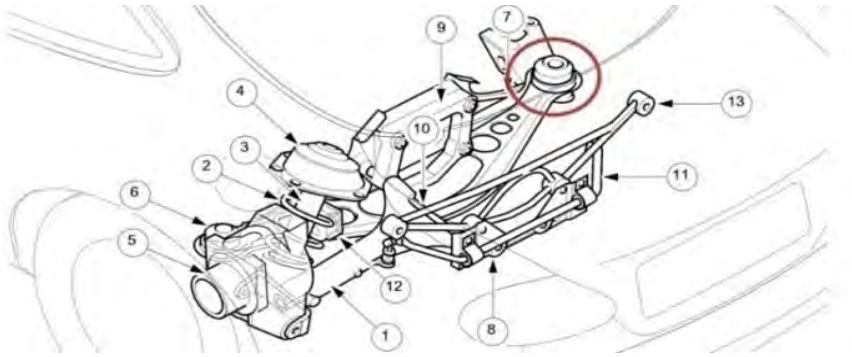
Front wheel bearings are robust sealed greased for life double cartridge type. DIY replacement is possible, although some might elect to replace entire spindles (Find No. 4 in above line drawing) rather than wrestle bearings out. A YouTube video shows front end job being done using no special tools.



Shim Pack Application (1)

Application (2)	Contents
Shim Pack No. 1, Left Front	2 Thick, 1 Thin Shim
Shim Pack No. 2, Left Rear	1 Thin Shim
Shim Pack No. 3, Right Front	1 Thin Shim
Shim Pack No. 4, Right Rear	2 Thick, 1 Thin Shim

Rear suspension utilizing a control arm design reduces a natural tendency to squat under acceleration. Springs are seated directly on lower wishbone, not shocks, which reduces friction for better ride comfort and noise isolation. Half-shafts serve as upper suspension links. Rear Camber is set at ~1º with a nominal Toe of 0.16º each side. Rear Camber is adjusted by changing half-shaft spacer/shim, with each 0.5mm change being 0.1°. Shims are CBC480635 with last two digits indicating thickness. Shims from 3.5mm to 7.5mm are ~$50 each, so it's best to measure what you have and proceed accordingly. Rear Shocks are Bilstein 24-067270.



Entire rear suspension sits on a stamped steel cross-member bolted to body through elastomeric bushings tuned to isolate road harshness. In addition, lower control arm pivots allow some rearward deflection when subjected to sharp impact like a pothole or bump. Anti-roll bar and drop-link bushings are simple to replace from underneath, taking ~30min. Due to limited space, a slim spring compressor like Sir Tools ST9050 is needed to remove/replace rear shocks. Rear wheel outer and inner bearings are not sealed and likely need replacement before 200Kmi.

19. Steering

Power assisted rack and pinion steering uses ZF Servotronic components. Jaguar's system has speed-sensitive variable power assist and variable rack ratio, delivering full hydraulic boost at low speeds for easy parking with assist diminishing as speed rises to give a well-weighted, confident feel at highway speeds. Due to high assist at low speeds and wide front tires, driving slowly on scalloped road surfaces results in just a bit of tramlining, but you can't have it both ways. While less sophisticated systems provide variable assist by cutting flow of fluid to steering rack itself, their effectiveness is hampered by a need to maintain sufficient flow for emergency evasive maneuvers at high speeds. To further refine steering feel during straight-ahead highway driving, steering gear valve incorporates a positive center feel torsion bar. Torsion bar twists slightly in operation, effectively programming an on-center position at small steering angles, improving stability in conditions such as crosswinds. When steering wheel angle exceeds a predetermined amount, torsion bar reaches end of its travel and control of assist levels is assumed by Servotronic system. Steering rack rate increases as limits of wheel travel left and right are approached. This makes parking less tedious, yet provides appropriate levels of assist — not overly sensitive to slight steering wheel movement — for good stability at highway speeds.

Column tilt/reach motors/drives don't always cycle properly and noise indicates a need for some spray lithium grease, usually on tilt drive. Motors are driven to their programmed positions or to stall limits with controller sensing this and powering them down. My memory positions are set full out/full down. Reach drive uses a short cable (like used for headrests) to turn a threaded shaft, and it eventually fatigues and birdcages if always driven to limit. If your cable goes bad, replace it with a 3.900" long piece of .219" (7/32") Stainless-Steel rod with last .850" of ends ground .150" square or buy a replacement JLM12187C.

I did the following to get the system to cycle as reliably as I could:

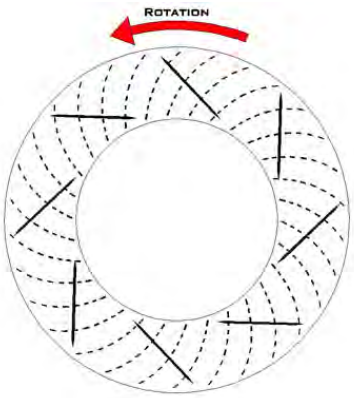
1. Drop underscuttle to access steering column lower reach motor
2. Cut White/blUe wire on connector going to motor
3. Solder in a 2.7KΩ series resistor and sleeve/tape
4. Reassemble and set column movement switch ON
5. Hit memory buttons to reactivate circuit and reset memory positions
6. Now lift will be followed shortly by retract

20. Brakes

Ate (Continental/Teves) MK25 4-channel Dynamic Stability Control (DSC) unit in a split front-rear arrangement is used along with their tandem servo/booster 03.7848-1801.4 and single pot calipers. System is equipped with Emergency Brake Assist (EBA) so, if in an emergency driver has not applied maximum braking effort, system will assist. Even with all of these good features, I still find this particular system somewhat anemic for a two-ton car. I would prefer to be able to stop 60 to 0mph in less than 100ft, so someday I may upgrade to a big brake kit. My understanding from Jaguar Forums is to fit Brembo type discs/calipers on the front of an XK8, one first must have at least 18" wheels/tires. Buy a set of XKR or Brembo calipers, XKR cross-drilled and slotted discs, XKR pads, XKR stainless braided PTFE hoses, and unions on eBay and a set of XKR front dust shields. Remove old front discs and calipers, block hoses to stop loss of brake fluid, carefully tap out existing brackets to M14-1.5 to accept new caliper bolts. Holes in standard brackets just happen to be correct tapping size, so once tapped out are ready to accept Brembo calipers. Rears are a straightforward change with a slight mod to existing dust shields to remove lip or get equivalent XKR shields.

I have stock diameter Centric Power Stop drilled and slotted discs, their ceramic pads and Goodridge braided fluid lines. Limits on rotor wear are 26mm front and 18.5mm rear. Relube caliper pins with high temperature ceramic grease or silicone paste, not normal service grease. System takes DOT4 fluid and I pressure bleed in JTIS recommended LF, RF, LR, RR sequence. If your rotors are directional (handed), ensure internal vanes face correct direction, drawing air in from hub and exhausting it at periphery.

Wheel speed sensors are conventional variable reluctance types connected to main harness by short link cables. Front link cables get flakey because steering flexes them to a greater degree. I felt a shudder in brake pedal and system set DTCs C1155 and C1233 when left front link cable became intermittent at 100Kmi, and right front went shortly thereafter.



Fuses F4, F16 and F18 in Engine Compartment Fuse Box supplying power to DSC unit are covered with orange plastic caps to discourage their mistaken removal leading to a braking/safety issue. All connections from DSC unit to hydraulic block are inductive and it just unscrews, but our hard lines are formed downwards, making it impossible to remove unit without draining and undoing. Harness connector has a sliding latch ejector/injector that must be pried out from end to unmate.

DSC requires all wheel speed sensors and pressure switches to be functional or system shuts down and turns on ABS warning lamp. Very badly worn wheel bearings can lead wheel sensors to produce anomalous outputs, confusing system and may cause transmission shifting issues. If you start to get strange transmission behavior, check bearing play at wheels first (especially rears). Circuit board solder joint fractures within DSC box have also occurred, with system throwing DTC C1095. The problem is easily rectified by hole-sawing a Ø1” opening into notched corner of cover to gain access to large pin solder joints most prone to stress cracking, and resoldering using 63Tin(Sn)/37Lead(Pb) solder. Then just RTV in a plastic plug.

DSC reduces torque to wheels by controlling throttle position, ignition timing and fuel supply. Automatic Stability Control (ASC) is operational at all speeds to enhance traction in slippery conditions. When wheel spin is detected, antilock electronic control module calculates engine torque reduction that won't cause tires to slip, based on information from vehicle's Controller Area Network (CAN). First, throttle angle is reduced, but because effect is not instantaneous, ignition timing is retarded and fuel to cylinders cut off until proper throttle position is reached. Both DSC and ASC should be manually switched OFF to power out of deep snow or when using tire chains.

21. Wheels/Tires

Wheel hubs should have been Zinc plated, as they get quite rusty from trapped moisture. I did my first brake job at 100Kmi, but wished I'd done it sooner. Use CorrosionX Rust Penetrant spray and a rotor puller as needed. Wire brush and give them a light coat of Rustoleum or Noxudol before reassembly. Wheels are hub-centric, so grease centering bosses to keep from sticking to hubs and put a drop of oil on studs. Two-piece 22mm OE lug nuts (nut with crimped-on dress cap) can spin or come apart. Ensure you can get them off when you need to. Replacement single piece 21mm nuts are Gorilla 73188SM with 79903 washers.

There is extra room for wider tires or wheels having greater offset in wheel arches. Increasing front track a bit improves handling and getting wheels more flush with wheel arches improves aerodynamics and appearance. I installed 20mm thick H&R 4085738 hub centric wheel spacers, effectively reducing wheel offset to 15mm. They work well for me, softening the ride a bit without noticeably affecting steering feel, tire wear or tramlining.

OE chrome wheels can experience plating separation, leading to air leaking from tire bead seating area. Ref TSB 204-06. Your tire shop needs to inspect plating in this area during tire mounting and advise you, **however this is a bad time to find out you need a new wheel**, so examine perimeter of center growler cap. If you see chrome separating (a raised area) in this region, then tire bead seating area is likely compromised. Newer wheels don't have this problem and may be recognized by grey epoxy paint instead of chrome plating in bead seating areas. Low profile tires make wheels prone to curb rash if you are careless. If you need new or refurbished wheels, some styles in Hollander catalog may still be available, but every year more are getting harder to come by. Specialty shops are capable of straightening bent wheels, fixing scuffs and replating or powder coating.

I run 32psig in driver's side and 30psig in passenger's side for best tire wear profile. During rebalancing, ensure tire shop removes balance weight adhesive residue and crap from your wheels using a wire brush before attaching new weights or they can easily sling off. Also ensure they pay attention to High or Heavy Spot markings when mounting new tires. Ref TSB 204-18. Lead (Pb) weights were discontinued in 2011 as part of Global Green Initiatives and three times as many Iron/Steel (Fe) or Zinc (Zn) weights are now needed to do the same job. OE wheel and engine cover growler badges supplied on my car were pretty cheesy. Nicer looking replacements MNA6249AB are available, and there are colors other than British Racing green, should you prefer.

I like Michelin Super Sport PS4 tires over the competition. Whatever you choose, front set will generally last 2X the rear. Remote pressure sensing devices are available to retrofit to your wheels, or inexpensive direct indicating caps from Amazon. If you have the Jaguar wheel locks, your socket and key wrench sit in the tool kit under the space saver spare. Rotating spare so 80psi writing on sidewall is right-reading presents an opening in rim concentric with socket recess. Drop socket in, open end up, then key wrench hex down. If hole doesn't align, rotate spare 180°.

22. Windscreen, Washers/Wipers

OE Triplex windscreen GJF8801BC (Fuyao FW02363 GTN is equivalent) on my car has both rain and light sensor apertures. Twelve 70mm GJB8812AA plastic strips, two 35mm GJB8812BA plastic strips, one LJD3850AA rain sensor gel pad and eight plastic windscreen underscuttle anchor nuts XR82312 are needed. To release rearview mirror from mounting cleat, remove plastic trim pieces, knock it forward and down with heel of your hand. When reinstalling, ensure mirror is fully seated, so you don't get image jiggle. Spring clip is riveted to mirror foot, gets loose over time and I tightened/stabilized it with some JB Weld. Test rain sensor to ensure it has not been damaged. Rain sensor has a somewhat dodgy service history, with many owners deciding it's just not worth the effort, but mine still works. Windscreen underscuttle attaches with 8 screws and black plastic shoulder washers that fall out from underneath, never to be seen again. I use black PA66 countersunk washers as suitable topside replacements. Along front edge of underscuttle runs a transverse hood seal that comes loose over time.

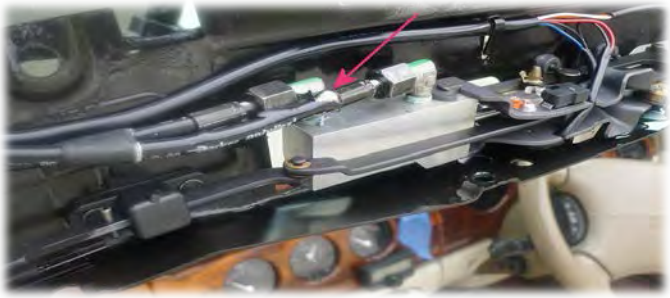
Wipers are 21" and have washer fluid tubing running to arm mounted nozzles. Passenger's side wiper shaft is in an area where hood trailing edge creates lift (like blowing across an open bottle). The longer you drive fast (>90mph), the more it wants to suck cap GJA8966AB right off, so use a little Gorilla Glue on it. Nut and shaft will rust due to trapped moisture, so give a shot of Noxudol and replace Steel nut with Stainless-Steel. I use PIAA Aero Vogue silicone wiper blade assemblies because they adjust to curves of windscreen (parked vs in motion) more effectively than do beam blades. Applying RainX yearly is good practice.

Washer nozzles on headlamp units can be adjusted, but after many years of washer fluid solids buildup, multiaxial joint is often frozen in a set position. Bases may also be cracked due to age. Try to get some light oil into ball and socket and it may be possible to free up enough movement to position them to your satisfaction, but that is by no means assured. Remove entire lamp unit and set on a bench with a short piece of rod fitting tightly in spray orifice. Rod should point toward lamp lens when correctly aimed. Test aim using a pumped stream of water before reinstalling. I have found washer assembly easy to release but quite difficult to get reseated without removing entire unit.

Washer fluid system lower filler neck-to-reservoir joint is a poor fit and can lead to leaking as rubber grommet dries out over time. Repair as follows:

1. Remove unit from left front wheel arch
2. Disassemble reservoir to filler neck joint
3. Remove large rubber grommet
4. Clean everything in vicinity of joint well with Isopropyl Alcohol
5. Butter up grommet outside and inside with Fusion brand urethane adhesive
6. Reassemble grommet, neck and reservoir
7. Reinstall and allow to cure in situ

Washer fluid not containing sufficient alcohol (Methanol was removed to render them less toxic) can foster bacteria growth in warm to hot conditions and specifically Legionella bacteria can be spread as mixture is aerosolized during use. Add 2 to 3 cups of isopropyl or denatured alcohol per gallon to fortify, cut road grime better and improve resistance to freezing during winter. More alcohol does everything better, but may degrade blades and paint in excessive amounts.



23. Convertible Soft Top

Soft top fabric and headliner are attached to a folding aluminum framework engineered to provide a low stack height. Due to rear space needed for stowage of soft top and actuating mechanism, rear seat back is more upright and seat can barely hold a small dog. Operation is by momentary rocker switch on center console and traveling <10mph. Latching, unlatching and window operation are all automatically sequenced, but you must hold switch button down through cycle completion. When using door key method to lower top, all windows are driven fully down. Benign creaking noises come from soft top latching sockets as body flexes over bumps.

Erection cylinders are located outboard of rear seat back behind reinforcing bars and speakers. Right-side cylinder has actuating/limit switches and it's possible for control system to get hopelessly confused if it doesn't get switched levels in correct sequence. The top froze up and refused to budge once, but it reset itself after another ignition key cycle. Some have had upper brackets work loose from erection cylinders. Ref TSB 501-11.

Pentosin CHF11S green synthetic fluid must be used. Soft Top hydraulics are driven by a PowerPacker brand pump spiking to 1600psig. OE hoses will eventually degrade, leading to the dreaded 'Jaguar Green Shower'. Three hacks have emerged in valiant attempts to solve this issue; (1) The two 0.1Ω 50W series resistors voltage dropping method, (2) The LSI pressure relief valve method, and (3) The Dennis White pump internal spring tension reduction method. Even with a reduction in peak pressure, crappy black PVC jacketed OE hoses deteriorate, resulting in end fitting crimp failure. It is not a matter of IF, just WHEN it will happen. System pressure and ambient heat your car sees over time ARE contributing factors. A drop of green fluid hanging from overhead console grating and/or on your shifter surround is a sign to take immediate action.

Don't replace hoses with OEM or you'll need to repeat when they fail again. Higher quality hoses of smaller OD rated for >20,000psig and other soft top components are available from tophydraulics.com Hose replacement is tedious, but not difficult, taking ~8hrs (I did it leisurely over four days), because much of interior needs dismantling to access. DIY will save you BIG bucks. You will need to replace left door tread plate fascia and top off fluid, but pretty much everything else is reused. Marvin Johnson at jaguartoprepair.com travels about the US doing this job in one day at a reasonable price. thejagwrangler.com has a spiffy modification that allows remote control of soft top using headlamp button on your remote. Soft top headliner will not withstand rough treatment or scrubbing to clean and replacing it is a tough 4hr job for a young flexible small person. Ref TSB 501-13.

24. Interior

Adjustable headrest OE seats are a poor design and, though adequate for freeway driving, they fail big time in cornering. Maybe earlier model seats are better. Seat bolsters are not shaped to cup your bum or upper body and you slip slide away in turns. There is a fix that adds clips on seat risers to reduce end float. Ref TSB 910-07a. Seat control modules mount under front of seat base, and after years of seat flexing, their lids crack, leaving them laying on floor or housing abrasion wears PCB edge traces away. A replacement lid/cover C2N3565 is available. Ref TSB 419-17. **Transfer programming label from old cover to case.** When replacing these, it is a good idea to put rubber washers between lid and bracket, use Loctite 222 on studs and only tighten nuts snug so seat flexing won't break them again. Range of seat motion is limited for long legged drivers, only going back as far as rear seat bolster allows. There is just enough room in front footwells for my size 12s. With top up, there is little headroom and I'm 6'2" with an extra lumbar vertebra. I have seat base fully down both front and back and well reclined.

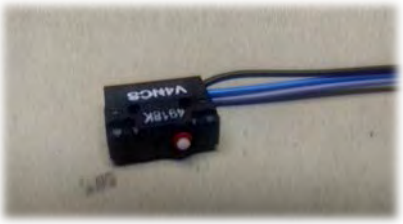
Headrest drive cables can be troublesome, but Reverend Sam made TSB 501-58 into a video on YouTube describing shortening drive cable sheath to allow cable to fully engage drive spindles. Pull internal cable out, use a Dremel tool with a carbide cutting disc to girdle sheath near center and use a good quality Ø½" semirigid heat shrink tubing having a meltable adhesive inner wall (M23053/4-105-0) to rejoin it and this fix will last forever. An alternative is to have longer tach drive internal cables made.

Headrest drop is controlled by a micro switch on seat frame. Release lever allows seat back to tilt forward, releasing micro switch to trigger headrest retraction. When seat back is returned to normal position, headrest should resume its preprogrammed position. Micro switches are snapped onto seat frames facing driveshaft tunnel and can be easily knocked out of alignment during vacuuming of interior. Micro switch leaf needs to squarely contact frame edge to actuate. If your latch pin sleeves have broken up, press some of the same PA66 tubing used for smooth bore breather pipes over shanks and reinstall using Loctite 242. **JUST MAKE ABSOLUTELY SURE** seat latch fully engages and locks onto your now slightly greater OD shanks. Chase latch out with a Dremel sanding drum as necessary. Driver's seat lumbar bladder was sited wrong for my back, but was easily remedied by changing zip tied height of bladder relative to its rubber mounting web.

The cup holder is completely laughable and easily broken, but a rebuild kit GNA7692AB is available. Ref TSB 501-06. Console armrest cover foam gets compressed, leather starts to ripple and begin to look shoddy. Cross-linked polyethylene or EVA foam is what you want to use. Sam's got this and some other DIY activities covered in YouTube videos too.

Door weatherstripping can split where front of window glass exits above exterior mirror and at rear just above latch. Replacement cost is significant and installation laborious. Instead, at front, trim off split sharp corner and smooth it into a more rounded shape with a Dremel sanding drum. For aft split, get Permatex 80338 Black Rubber Sealant and thin it with Toluene as necessary. Clean and scrub repair area well using Acetone, a Scotchbrite pad or Dremel sanding drum to get any release agents off and give surface some key/tooth. Tape back side of any split areas together before you start. Using an acid brush or airbrush, apply sealant in multiple thin wet coats until cosmetically satisfied with the result.

'Rubber edging' bumpers inside doors keep glass from rattling and they wear out in time. Window track adjustment screws are hidden behind puddle lamps and speaker grilles. Rear quarter glass adjustments are less accessible and should only be made after front glass has been set correctly. Rear quarter glass leading edge rubber doesn't always meet parallel to trailing edge of door glass, leading to wind noise and regulator mounting holes don't allow enough adjustment without drilling out. Ref TSB 501-52. Lube window tracks with 3M silicone paste or spray as needed. Door card upper casing brackets C2N3836 and C2N3837 break as a result of slamming, but are easily replaced. Ref TSB 501-57. If a window repeatedly fails to bump back up upon door closing, and you're sure battery is strong, switch C2N1908 must be replaced. Ref TSB 501-54. Indications of switch corrosion are alarm sounding or puddle lamp of offending door flashing ON and OFF at odd times on a rainy day. OE switch (Burgess V4NCSET11C2B109) is no longer available from Jaguar. Instead, buy Burgess V4NCS, cut off BLUE wire, transfer actuator from old switch and mount using 2-56x.500" screws and locknuts. Note that wires of new switch come off opposite end vs OE item. If both doors suddenly behave the same, you likely just have a weak battery.


Door handle gaskets JLM12031GSK and JLM12032GSK will crack due to years of UV exposure. MTC brand are made of softer plastic, don't fit quite as well as OE, but they don't crack. Use some double-stick tape to stretch and affix gasket to handle assembly. Replacement is ~45min job each side. Two 7mm hex headed bolts retain assembly from inside. Pawl/arm is a snap fit on lower ball mount. Door check arm bracket can loosen at door jamb creating a snapping sound. Remove bolt, reinstall using Loctite 242 and torque ~5ft-lb [60in-lb].

Cover King makes a nice velour dash mat. Use Gorilla Glue to bond Velcro anchors down. Vanity mirror lamps are powered only with visors stowed in clips. Were my car not a convertible, I would install a dash cam. I have seen all manner of rocks and road debris tossed about by tractor trailers these days and when I travel the Interstate top down, I roll windows up for extra side protection. Honeycomb trunk floor has two positions. Upper accommodates a full-sized spare and gives a flat floor whereas with a space-saver spare while lower gives greater center depth.

25. Restraints

Onboard active restraint system monitors cabin occupancy to optimize deployment of airbags in an accident. Dual seat bolster airbags for both driver and passenger are provided, along with MP853A type seatbelt pretensioner clock springs on B pillar to take up slack at impact. The mostly black w/yellow clip connectors used on airbags and clock springs are available from Amazon for just a few dollars. A Steel blade moves through a Hall Effect Sensor installed under driver's seat during forward and aft seat adjustment. This tells Restraint Control Module if seat is too close to steering wheel to deploy second stage output to airbag, reducing chances of injury that might occur. All squib connections have shunting features/clips to render them safe when disconnected by shorting contacts together, so static discharge won't set them off unintentionally. Some connectors even have built-in ferrite beads to block voltage spikes. All connectors have Gold plated contacts to ensure low circuit resistance or an SRS fault is logged during ignition ON prove out.

No portion of SRS system operates ignition OFF, so if anyone must remain in car when parked roadside, keep ignition ON for safety. At ignition ON prove out, number of blinks SRS lamp makes before steady ON indicates problem code (Example: one blink, pause, then three blinks indicates 13, it then repeats). Ref TSB 501-55.

12 - RCM internal failure
13 - Crash data memory full
14 - RCM open circuit
15 - RCM version conflicts with OCS
16 - OCS sensing fault
17 - OPS sensor fault
18 – Passenger's Airbag Deactivate indicator circuit fault
19 – Steering Column Airbag circuit fault
21 – Passenger's Dash Airbag circuit fault
22 – Driver's Side Airbag circuit fault
23 – Passenger's Side Airbag circuit fault
33 – Driver's Belt Pretensioner (clock spring) fault
34 – Passenger's Belt Pretensioner (clock spring) fault
42 - Front Impact sensor circuit fault
43 – Driver's Impact sensor circuit fault
44 – Passenger's Impact sensor circuit fault
49 – Driver's Seat Track position out of range
51 – Driver's Belt latch switch circuit fault
52 – Passenger's Belt latch switch circuit fault
53 - Airbag audible warning circuit fault
54 - RCM configuration failure

26. Climate Control

Heater matrix 'octopus' hose is a known problem area. This hose directs a portion of engine coolant to heater core via a Control Valve and Aux Electric Pump. Check Valves (one in octopus hose and one in heater core outlet line) prevent backflow. IMO Jaguar engineers should not have located Norma Push and Seal R20 plastic connector on supply side where they did, as it broils between heat from Bank-1 catalyst and EGR pipe, degrading internal O-ring. Initially an occasional coolant drip just boils away on catalytic converter, leaving no trace. You may smell coolant when you shut down engine, but never find a puddle. Pressure testing cold at 14.5psig (1bar) for several hours with a clean dry shop towel placed under connector can identify this problem. Internal O-ring seal is an odd French R-16 size (19.8mmIDx3.6mmCS) if hose and connector are otherwise in good condition. AS568-211 (.796"IDx.139"CS) seal in Viton is probably an acceptable sub.

Releasing Norma connectors is not complicated, but if you break either of them, 'octopus' hose will require a few tedious hours to replace. Engine heat makes PA66 brittle over time, but separating while warm reduces likelihood of breakage. Place a tub under area. For supply side connector, apply a little silicone spray to connection, merely push down on ribbed tab, rock it back and forth slightly, while sliding it and sleeve back TOWARD hose. Once fully retracted, grip hose, rock it vigorously back and forth, pulling until released from outlet pipe AJ83928. While you have it apart, ensure pipe is absolutely clean and smooth or IT WILL LEAK. A short piece of firesleeve 7569K16 from McMaster-Carr placed over hose before reassembly will provide some future protection. Lime green shipping collar on new hose connector is discarded after mating. Return side Norma connector is different and requires prying two barbs apart using round nose pliers while separating. Heater core outlet hose is intentionally flattened in the sharp bend.

Service life of Auxiliary Pump brushes is around 120Kmi, as it runs anytime Climate Control system is turned ON. Binding of impeller against divider plate can occur and motor rotation doesn't necessarily mean magnetically coupled impeller is actually pumping at nominal 3gpm. Impeller axle should be just slightly longer than impeller to prevent binding. Eurton Electric 33E brushes fit if you shorten them by .150". YELLOW wire is B+. There is just enough room to remove firewall Instrumounted valve and pump bracket from engine bay. Two nuts and two bolts underneath and two nuts at top need to be removed first. As long as you have motor apart, verify flyback diode has >10:1 front-to-back ratio. Heater core should be backflushed with fresh water at a safe 14.5psig (1bar). Shorter tube is heater core outlet. When power is OFF control valve is open, power closes it. Failure mode of control valve is sticking either open or closed.

Climate Control System has an internal diagnostic mode. Begin with Key IN, Ignition OFF (Position 0):

1. PRESS and HOLD RECIRC and AUTO buttons as you START engine
2. RELEASE RECIRC and AUTO buttons after engine starts
3. Display flashes, verify all display elements functional
4. PRESS and RELEASE AUTO button to read first fault code
5. If Zero, there are no stored codes. For a list, see Jaguar Forum
6. PRESS and RELEASE FACE button to scroll through remaining codes
7. PRESS and RELEASE FACE and HEATED REAR WINDOW buttons together to clear each code
8. PRESS and RELEASE RECIRC to perform actuator check
9. PRESS and RELEASE FAN/OFF button to exit diagnostic mode

Most common fault code is 11. On driver's underscuttle close to console a small grille hides a thermistor and aspirator/blower for climate control system to reference. Take it apart and power up blower to ensure it still works. Clean thermistor with Isopropyl Alcohol, and reassemble. If you wish a continuous indication of external temperature during present drive cycle, push and hold EXT button for a few seconds.

A/C is conventional and low-pressure charging port is up near firewall. Always hold refrigerant can upright (and agitate) to introduce R134a vapor/gas into line (not liquid) or you may damage compressor seals. Newer non-piercing auto shut-off cans require a DVA1 adapter.

27. Cleaning/Protection

Keep hoses and other rubber items (except serpentine belt), well coated with silicone spray for longest life. I use CRC 03040 (Fastenal and Grainger carry it) for large area coverage and Easy Rider RT630A for coating small bushings, because it is thicker.

If your car is a daily freeway driver, XPel protective film should be applied to protect front end from road FOD. Inexpensive Chromed or Carbon-fiber wing mirror plastic covers are available, since painted ones eventually suffer road rash. Adhere them using a good adhesive, as peel-and-stick tape won't last. I'm not a fan of the bucky-beaver teeth or Chrome splitter vane in grille opening, so I removed them. Cable trough along left side of engine bay, plastic rocker panel covers where they undershoot wheel arches and front splash guard all tend to fill with road debris and should be power washed regularly.

I use Armorall leather wipes to clean, then Surf City Garage Voodoo Blend Rejuvenator to treat leather. Outboard driver's seat bolster and surrounding area will have color coat rubbed off by your bum long before any other leather surface wear is evident. I use Leather Colourant restorative dye from Furniture Clinic to recoat these worn areas. New seat skins are available from gahh.com and topsonline.com

Apply Noxudol 750 anti-corrosion cavity wax on and/or into all places subject to moisture ingress using included snaky hose. Remove plastic front wheel arch liners for access and apply wax in these areas too. If you can get car up on a lift, look for lower areas prone to road salt or rusting (not on braking surfaces or items that must move freely). Steering linkage U-joint knuckle has a tendency to rust badly. Other protectants or ceramic nano-coatings may be needed depending on prevailing climate and where your car is stored.

For soft top external cleaning and protection, I use Raggtopp once a year. I use little foam ended makeup/touchup brushes to fill paint dings and a Meguiar's K2000 Mirror Glaze Unigrit sanding block to dress and level. Before using, soak sanding block in water for a day until it sinks. Instead of clay, I use a synthetic clay pad, a Porter Cable 7424XP DA for cutting, P21S wax and a rotary for polishing. For tire sidewalls, I use Lemon Pledge.

28. Body Lighting

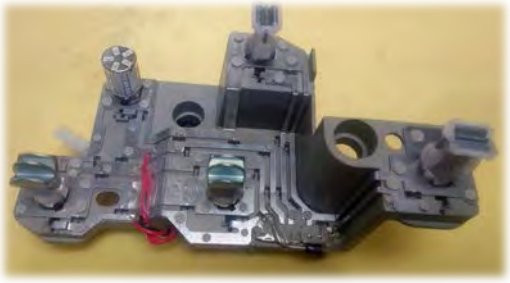
Headlamp lenses are prone to road FOD damage because they are non-safety glass, quite sharp when shattered. Install 3M XPel protective film or you may soon be buying a $260 lens (left LJA4651BA, right LJA4650BA). Position, turn signal and main beam bulbs are changed through clear top port cover, while dipped beam and fog lamp bulbs are accessible through front wheel arch access panel. If you need to remove an entire front lamp assembly, one 8mm hex bolt is on core support, a T40 screw underneath and one 13mm nut near grille opening. Lower screw is reached by removing front wheel and wheel arch liner, but in a pinch steer wheels to limit and remove access panel. Unplug wiring and pull automatic headlamp washer end tabs forward to release. Projector lamp beam cutoff metal plates are available to convert UK XK8s to EU/US.

All bulb sockets on XK8s are standard types (non-CK). Color temperature is expressed in Kelvins, 3000K being warm white (typical of incandescent or halogen), 4500K natural (cool) white and 6000K daylight white (having a slight blue tint). I prefer natural (cool) white bulbs if available, because warm white light looks dingy to me and bluer light is inferior in rain. Highest lumen output is produced between 4500 and 5000K.

Lamps shown below in RED are on Fault Warning System, and LEDs will need 6Ω >50W resistor in parallel, otherwise they are sensed as open or will hyperflash, in the case of turn signals. LED tail lights only need 12Ω >25W resistors. I converted items in GREEN to LEDs and Low Beams to Morimoto 4500K H1 Xenon bulbs in H1 HID kit from headlightexperts.com Many experts advise against HIDs or LEDs in reflector applications because they blind oncoming drivers. Most LED bulbs are polarity-sensitive, whereas Audew 4350379652 LEDs (2825 replacements) are not, and they have a nice frosted lens. Their contacts are too flat though, so make a center peak to improve retention in socket. Taben 4B-FB-009-36mm LEDs work in Vanity Mirrors, but are Ø8mm vs Ø6.5mm, so Aluminum reflectors in fixtures need some protective clear packing tape covering, otherwise they will short out, blowing driver's side fuse box F7 (15A). My Glove Box lamp socket/switch had wiring reversed and BA9S-TH3-12V-CW LED from Amazon wouldn't illuminate until I corrected polarity.

Single GROUND contact in rear lamp units is marginal in carrying total load (~10A) of all incandescent bulbs lit for long periods in hot ambient conditions. A separate wire connected from unit GROUND circuit to Chassis can solve this, but is unnecessary if converted to LEDs. Photo below is of early version fixture, but new units are similar. Jaguar provides a redundant rear center bulb powering only the lesser filament. This can be swapped for a faulty position/stop lamp in a pinch. I added a 5A rated solar panel diode from stop lamp circuit to rear fog lamp circuit, allowing them to act as redundant stop lamps. Wires shown in photo connect to external resistors.

Bulb Location/Function	Industry Item Number	Bulb Type/Description
• Dipped (Low) Beam outer (2)	H1 55W Halogen, 35 or 55W HID	STR projector housing
• Front Fog (2)	H1 55W Halogen	STR reflector housing
• Front Position (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• Front/Rear Side Marker (4)	2825 5W Incandescent or 100lm LED	T10 wedge
• Front/Rear Turn Signal (4)	7507 21W Incandescent or 520lm LED	AMB BAU15s
• Glove Box (1)	3893 4W Incandescent or 70lm LED	BA9s
• Interior Footwell (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• Interior Map (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• License Plate (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• Main (High) Beam inner (2)	9005 65W Halogen	RA reflector housing
• Puddle (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• Rear Fog inner (2)	1156 27W Incandescent or 280lm LED	BA15s
• Reverse inner (2)	1156 27W Incandescent or 280lm LED	BA15s
• Side Repeater (2)	2825 5W Incandescent or 100lm LED	T10 wedge
• Tail center (2)	2357 28W/8W Incandescent or 300lm LED	BAY15d
• Tail/Stop outer (2)	2357 28W/8W Incandescent or 300lm LED	BAY15d
• Trunk (2)	6418 5W Incandescent or 220lm LED	SV8 festoon in LJA5380BA
• Vanity Mirror (4)	6439 3W Incandescent or 100lm LED	PLX festoon



29. Panel and Switch Illumination

Neo wedge lamps backlight most instrument/switch panels on dimmer circuit. Each OEM has their own design for these, they vary in wattage, are called different names and there are no common identification numbers except for physical sizes being T3, T4 and T5. T3 (Ø3mm) neo wedge lamps consist of T-1 (Ø.125") or T-1⅛ (Ø.145") bulb in Ø8mm base, while T4 (Ø4mm) consist of T-1¼ (Ø.156") bulb in Ø10mm base. T5s are not used in XK8s. Neo wedge lamps drawing >100mA should not be used due to high heat effect on surrounding plastics. Filaments in old bulbs become quite delicate, and if one has failed, replace all lamps in the vicinity. It may be beneficial to reflow/add solder on their PCB lands. Colored filters can be removed and reused by working a dental pick around base and carefully nudging off.

Some owners convert four large bulbs to LEDs, but I'm against individual LEDs used to backlight panels not originally designed for them, as hot spots, poor dimming or irritating flicker can result. Incandescent lamps are highly resistant to voltage spikes, produce a warmer light that is easy on the eyes and should be rated **≥5000hr**. Warning lights are not on dimmer circuit, so could be converted to brighter LED equivalent patriotgaming.com/led-bulb-5994.html Just make sure polarity is correct or they won't light up to warn. When reinstalling Instrument Cluster/Warning bulbs, press in firmly before turning.

Shifter surround, soft top and window control switches are positioned where drinks may get spilled, and soaking in Isopropyl Alcohol and blasting with compressed air will clean them up. To access console panels, remove shifter surround (4 socket head cap screws), console (4 Torx screws) and radio stack surround (6 screws). All wiring unplugs for easy removal.

PCB Instrument Bulb Location/Function	OE Item Number	Bulb/Base Type/Description
• Center Console Switch Emergency (1)	LNA5180BA (no sub)	WHT T4 neo wedge
• Center Console Switches (5)	LNA5180CA**	BLU T4 neo wedge
• Climate Control (7)	JLM20308*	BLU T3 neo wedge
• Climate Control center (1)	JLM20309*	GRN T3 neo wedge
• Climate Control LCD (2)	JLM11965**	BLU T4 neo wedge
• Driver's Seat Memory Panel (1)	LJA5180DA**	BLU T4 neo wedge
• Instrument Cluster (4)	194LL (3.78W)	plugs into large twist-lock base
• Instrument Warning (4)	E73 (1.12W) or LED	plugs into small twist-lock base
• Window Switch Panels (2)	LNA5180CA**	BLU T4 neo wedge

*Alternate is JKL JNW1-JW10 (swap out colored filter)
**Alternate is JKL DNW1-DW10/12.5MM/BLA

Soft Top Switch backlight alternate JKL CTB1-CW1345/39-56-5D, soldered with JKL 39-02-5A filter.
ASL and Sport Mode Switch backlight (2) alternate JKL 8098SBP, soldered with JKL 39-02-5A filter.
ASL and Sport Mode Switch RED ON LED (2) SunLED XLM2MR11W, soldered.

Colored Filter: For T-1 and T-1⅛ bulb JKL 39-02-5A (BLU), 39-02-4A (GRN) and 39-02-7A (WHT)
For T-1¼ bulb JKL 39-04-5A (BLU), 39-04-4A (GRN) and 39-04-7A (WHT)

30. OBD2 and Problem Diagnosis (Not all Scan Tools Support all Modes)

Mode $01 Monitor Status and Live Data Parameter IDs (PIDs). Engine Control Module (ECM) provides current live powertrain data values, not default/substitute data that manufacturers might use in their 'enhanced' data-streams. 'Not Supported' indicates vehicle doesn't support a given monitor and Not Complete indicates insufficient drive cycles have been made for test to complete.

Mode $02 Freeze Frame Data. ECM provides freeze frame data. This is raw data stored when a Diagnostic Trouble Code (DTC) is set. Includes a full list of PIDs supported by vehicle under test.

Mode $03 View Emissions DTCs. ECM provides emissions related powertrain (PXXX) DTCs. They may be first fault of Type A (1-trip) DTCs or second consecutive fault of Type B (2-trip) DTCs. If a previously failed continuous test now passes for three consecutive tries, ECM will turn Malfunction Indicator/Check Engine Lamp (MIL/CEL) OFF. DTC remains stored in memory until a specified number of drive cycles are completed without recurrence, upon which it is automatically cleared.

Mode $04 Clear DTC(s), Freeze Frame and Monitor Results. ECM clears/resets emissions-related diagnostic information. It clears not only DTCs, but also associated freeze-frame data, readiness monitors and turns OFF MIL/CEL. Clear only after repair is completed and ready to be proved out during test drive. This doesn't clear Keep Alive Memory (KAM).

Mode $05 Oxygen Sensor Monitor Tests. ECM provides oxygen sensor monitor test results for early OBD2 vehicles. Newer Controller Area Network (CAN) vehicles provide this data in Mode $06.

Mode $06 Monitor Test Results. ECM provides access to on-board monitoring test results for specific continuously monitored (misfire monitoring) and non-continuously monitored systems. There is NO industry standard data set for Mode $06 tests. The only way to understand what you are seeing is to use a scan tool that defines all data for you or to print out Mode $06 information from a shop manual.

Mode $07 Pending DTCs and Continuous Monitor Test Results. ECM provides access to emission-related DTCs detected during current or last completed driving cycle. It allows scan tool to access DTCs stored on first drive cycle after ECM reset.

Mode $08 Control of Onboard Systems. ECM allows a scan tool to have bidirectional control of an onboard system or test. Currently used for Fuel EVAP system testing on some vehicles.

Mode $09 Vehicle Identification Number (VIN), ECM calibration information and In-Use Performance Tracking (only MY2007 and up). ECM provides vehicle identification number and calibration numbers from all emissions-related electronic modules. This can determine if firmware is current or requires updating.

Mode $0A Permanent DTCs (only MY2010 and up). ECM provides access to emissions-related DTCs with permanent status after a clear/reset emission related diagnostic information service. These are DTCs only ECM can clear. Even if a successful repair has been made and DTCs cleared in Mode $04, these will remain set until ECM has completed its own system test.

JTIS Workshop Manual has applicable DTC listings at beginning of some chapters. Having a list of both Generic and Jaguar specific DTCs is helpful when you do get an illuminated MIL/CEL. OBD2 sets P1111 when all systems are 'in the green' and P1000 if all tests have not completed. A smog check cannot be completed until sufficient cycles are driven for all emissions tests to complete after a DTC clear/reset. I have both Innova 3160e and Foxwell NT530 scanners. Smartphone apps like Torque Pro and Carly allow for cordless monitoring of OBD2 parameters. Record live data at varying speeds when your car is running correctly to baseline normal readings. Don't start replacing things on a single occurrence of a given DTC. Log it, view freeze frame data, clear data and monitor to track trends over time. Especially, watch Long-Term Fuel Trim (LTFT) for both banks and see that PID values change during engine operation.

Erratic DTCs may set if B+ is weak. Systems depend on each component doing its job(s) correctly and consistently. Work to develop a good diagnostic sense and attempt to correlate DTC(s) to a given bank, then to a module failed items have in common, and finally to a single sensor or component (often a damaged wire, bad contact, cracked solder joint or faulty capacitor). Some items can be swapped between banks to see if the problem follows. Try to change only one thing at a time. The simplest answer to a given problem is usually correct. Don't break other items while attempting to fix your original problem. Modern cars are snap together, designed and built for ease of assembly, not ease of repair. Be careful to disassemble as few things as possible and replace cheapest suspect item first.

P1582 Flight Data Recorder DTC is set by one of these issues and requires a dealer erase:

- An inertia switch activation event occurred
- A restraint deployment event occurred
- A throttle failure caused logging of limp home mode
- Engine started and stumbled, logging a fault
- Engine failed to start, logging a fault

Normal range OBD2 Live Data (KOER):
Fuel 1: OL = Open Loop until CL = Closed Loop (after brief warm up)
Fuel 2: OL = Open Loop until CL = Closed Loop (after brief warm up)
Calc Load: <100%
ECT: <230°F
STFT B1 (lost @ key OFF): -10% (leaning) to +10% (enriching)
LTFT B1 (retained @ key OFF): -10% (leaned) to +10% (enrichened)
STFT B2 (lost @ key OFF): -10% (leaning) to +10% (enriching)
LTFT B2 (retained @ key OFF): -10% (leaned) to +10% (enrichened)
FP: ~55psi (relative to MAP)
MAP: ~10inHg @ idle
RPM: 650 to 6400rpm
Speed: <155mph
Advance: <50°BTDC
IAT: <130°F
MAF: <32 lb/min
TP: <100%
O_2 Sensor B1 S2: cycles from 0.1V (lean) to 0.9V (rich)
O_2 Sensor B2 S2: cycles from 0.1V (lean) to 0.9V (rich)
MIL/CEL: OFF
Lambda B1 S1 Equiv Ratio: 0.9 (rich) to 1.1 (lean)
Lambda Current B1 S1: -5mA (rich) to +5mA (lean)
Lambda B2 S1 Equiv Ratio: 0.9 (rich) to 1.1 (lean)
Lambda Current B2 S1: -5mA (rich) to +5mA (lean)

31. Condition Inspection

1. Overall Condition and Mileage. Look at driver's seat leather, cup holder/center armrest and pedal rubber. Does car look reasonably clean and well cared for? Vehicles around 100Kmi are the best candidates. Look for coolant-free oil and oil-free coolant. Ensure door and body panel colors match, body is free of dents/scratches and there are no unpleasant odors.

2. Service History and Seller Evaluation. Look for either parts receipts and labor invoices or seller mechanical knowledge and ability. Speak to whoever maintained car and reality check claims made (trust, but verify).

3. Cooling System. Check coolant level. Pressurize cooling system when cold for an hour at 14.5psig (1bar) to check for leaks. Start car and observe exhaust during initial start and warmup. Inspect fans, radiator fins and hoses for good condition and proper operation. Engine should come up to temperature in ~5min with needle in center of gauge range and stay there. Fans should cycle from OFF when cold, to Series (Slow) when warm and to Parallel (Fast) when hot or A/C turned ON.

4. Engine Condition, Fluid Leaks and Noises. Look for conditions indicating neglect or incomplete maintenance. Remove covers and disconnect each coil in turn to observe rpm drop. Engine should crank and start readily. Perform compression checks (~200psig). Borescope cylinders. Check MAP with OBD2 scanner at idle. Listen for unusual tappet or primary chain noises. Check oil level and condition.

5. Engine Bay. Look for cleanliness and attention to detail. Are all fittings and parts OE or better? Inspect each firewall compartment. Look for evidence of plugged drains or standing water in compartments. Ensure covers are intact with two tabs and retainer. Check brake and power steering fluid levels and condition. Look for proper engine mount condition with a quick stab of throttle.

6. Drivetrain. Look for Guibo condition and leaking seals. Read transmission adaption values.

7. Suspension. Bounce on each quarter panel to observe damper compression and rebound authority. Examine shock mounts.

8. Steering and Brakes. Look for centering tendency, absence of slop and good braking authority. Look under car to ensure there are no caliper leaks. If you can get each wheel up in turn, check ball joints, bearings and observe smooth rotation.

9. Wheels and Tires. Visually evaluate tire type and tread, check for curb rash, correct pressures and condition. Look for bent wheels and separating chrome plating.

10. Electrical and Lighting. Ensure all systems operate to spec both day and night. With engine running, check B+ (it should be ~+14.3VDC at idle and ~+12.8VDC engine OFF). With key ON, ensure that all Instrument Cluster indicator lamps are ON and that they all go out shortly after engine start. Check to see that dimmer controls dash and door switch lamps. Ensure battery terminals are free of corrosion.

11. Entertainment Center and Instruments. Ensure all items operate to spec and radio antenna extends, retracts and stops. Operate all panel buttons and steering stalk functions both sides.

12. Soft Top. Cycle soft top and observe action. Pump should not sound labored and top should close/open in <20sec. Check for proper window sequencing. Check external fabric, headliner condition and ensure soft top cover is available. Ensure any dash mat is well attached.

13. Interior and Seats. Inspect for leather condition, seat and steering column movement/position memory, lumbar inflation function and ensure headrests drop as seats are drawn forward and restore upon return. Ensure floor mats have plastic retention hooks. Verify that glove box lid closes properly and locks.

14. Body, Paint and Corrosion. Operate all doors, trunk lid, hood, fuel filler door and all locks both manual and remotely operated via key fob. Look for nicks and overall finish condition. Inspect rocker panel welded joints.

15. Glazing. All Jaguar windscreens will have a degree of pitting, but ensure glazing is otherwise in good condition with a minimum of chips and no cracks. Check for window drop as each door is opened and rise as it is closed. Ensure windows roll all the way up, all the way down and rear window heater is functional.

16. Plastic and Rubber. Look at all plastic and rubber items in engine bay, under car and window and door seals.

17. Missing Items. Ensure alternator cooling scoop is in place under car and passenger's side wiper arm pivot cap is not missing. Ensure there are two black keys, a single green valet key, tool kit and compact spare in good condition.

18. Smog Reports. Review for trends. Check miles per gallon on dash display and see if it makes sense. Ensure there are no alert lamps illuminated and no squawks on message panel. Check exhaust tips for excessive carbon buildup.

19. OBD2 Scan. With your scanner attached, drive car somewhere and shut it down for a few minutes. Start it up and drive it back. It may take multiple drive cycles before OBD2 system logs a DTC. Capture ~10min of live scanner data on the road. Look particularly at coolant temperature, long term fuel trims, O_2 sensor readings and readings indicating catalyst condition.

20. Test Drive. Engine should idle smoothly and take throttle readily with no stumble or surging in any gear. Low end torque should be apparent and steering should be neutral and not twitchy. At low speed, suspension should be firm and at freeway speeds (and up) car should be well under control regardless of road conditions. It should corner as though on rails with virtually no lean. Shift into manual (J gate) under a variety of conditions and observe results. There should be smooth shifting and exhaust note should remain a low burble with no popping even under aggressive downshifting conditions. Engage and disengage cruise control, ASL and sport mode functions. Note all gauge readings and recheck miles per gallon on dash computer display.

32. Jaguar XK8 Service	Every	Or
Change Oil, Filter and drain Catch Can	5Kmi	4-6mo
Add Berryman's B-12 to Full Fuel Tank	5Kmi	
Inspect Wiper Blades (21") and fill Washer Fluid	5Kmi	
Inspect Tire Tread and Pressure (32psig Cold)	5Kmi	
Inspect Engine Cooling Fans (Off/Slow/Fast)	5Kmi	
Inspect Brake Pads, Rotors and Hand Brake	5Kmi	
Inspect Rubber Boots for Damage	5Kmi	
Inspect Mirrors and Central Locking System	5Kmi	
Inspect Seats, Headrests and Safety Restraints	5Kmi	
Inspect Horn, Headlamps, Fog Lamps and Hazard Flasher	5Kmi	
Inspect Lamps and Interior Controls	5Kmi	
Inspect Air Conditioning, Heating and Rear Defogger	5Kmi	
Replace Brake and Power Steering Fluids	30Kmi	2-3yr
Lubricate Hinge Points and Door Locks	30Kmi	
Silicone Spray Rubber and Noxudol Rust Prone Areas	30Kmi	
Grease Rear Half-Shaft U-Joints	30Kmi	
Clean/Replace Air Filter	30Kmi	
Replace Transmission Filter Pan and Fluid	60Kmi	4-6yr
Replace Expansion Tank and Cap	60Kmi	
Replace Thermostat and Outlet Pipe Assy	60Kmi	
Replace Spark Plugs	60Kmi	
Replace Fuel Filter	60Kmi	
Replace Battery	60Kmi	
Replace Coolant	60Kmi	
Replace Coolant Pump	90Kmi	6-9yr
Replace Serpentine Belt	90Kmi	
Replace Upper and Lower Coolant Hoses	90Kmi	
Replace Engine Side Oil Cooler Hoses	90Kmi	
Replace Upper Front Shock Mounts	90Kmi	
Replace Upper Control Arm Bushings	90Kmi	
Replace Front Wheel Speed Sensor Cables	90Kmi	
Check Intake Elbow Booster Pipe Fitting for leaks	90Kmi	
Clean Fuel Injectors and Mass Air Flow Sensor	90Kmi	
Replace Brake Pedal Position Switch	90Kmi	
Replace Starter Relay	90Kmi	
Replace Anti-Roll Bar Bushings	120Kmi	8-12yr
Replace Upstream Air/Fuel Ratio Sensors	120Kmi	
Replace Crankcase Breather Pipes	120Kmi	
Replace Soft Top Hydraulic Hoses	120Kmi	
Replace Front Shocks	120Kmi	
Replace Valley Hoses	120Kmi	
Replace Heater Pump and Octopus Hose	120Kmi	
Replace Differential Fluid	120Kmi	
Replace Ignition Coils	120Kmi	
Replace Cam Position Sensors	150Kmi	10-15yr
Replace Guibo	150Kmi	
Replace Radiator	180Kmi	12-18yr
Replace Ball Joints and Track Arm Bushings	180Kmi	
Replace Power Steering Hoses and Rod Boots	180Kmi	
Replace Rear Shocks	180Kmi	

33. Engine Bay Mating Connectors

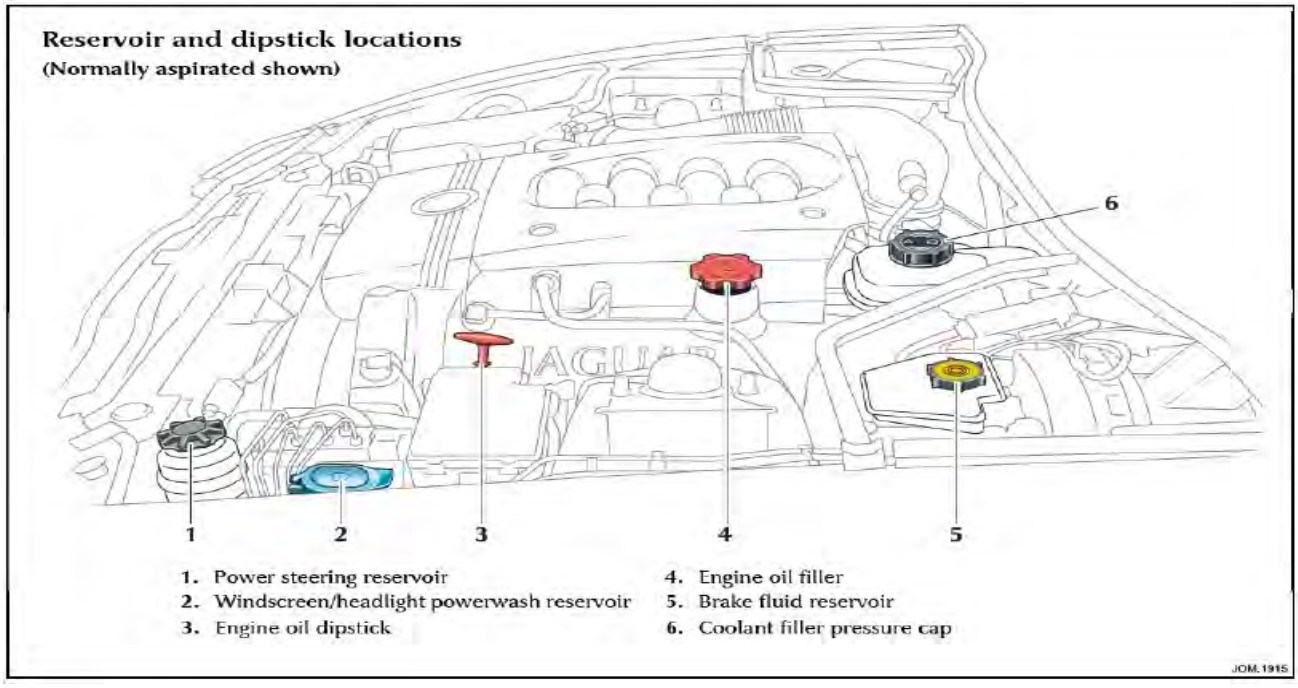
Cam Position Sensor (2 Socket Black Plug) (2)	SMP S1263
Coolant / Fuel Temp Sensor (2 Socket Grey Plug) (2)	SMP S2034
Crankshaft Position Sensor (2 Socket Black Plug)	SMP S824
Fuel Injector (2 Socket Black Plug) (8)	SMP HP3945
Fuel Pressure Sensor (3 Socket Black Plug)	SMP S821
MAF Sensor (5 Socket Black Plug)	Yazaki 7283-1057-30
MAP Sensor (4 Socket Black Plug)	Ford WPT-1339
Oil Pressure Sensor (1 Socket Plug)	SMP S940
VVT Solenoid (2 Socket Black Plug) (2)	SMP S1415

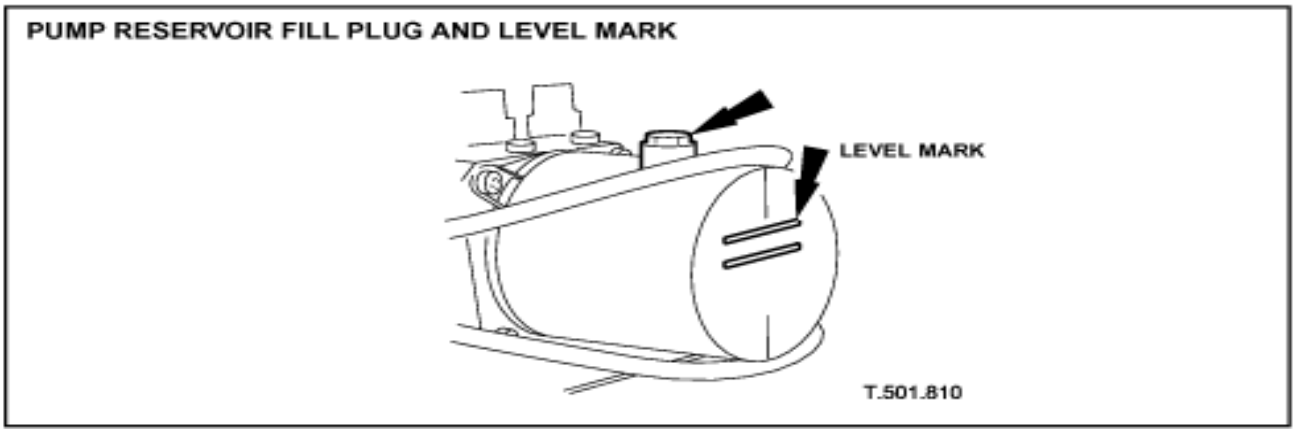
34. Common Replacement Items

ABS Harness Front Left / Right (1ea)	LJG3410FC / LJG3410AC
Battery	Duralast H8-DLG
Brake Pedal Position Switch	LJB6420BB
Cam Sensor Bank-1	NTK 73687
Cam Sensor Bank-2	NTK 73629
Coil (8)	NGK 48927
Coolant Outlet Pipe Assembly	AJ89486
Coolant Pump	AJ88912X
EGR Valve	SMP EGV1110
EGR Valve Coolant Hose	AJ88513
Expansion Tank w/MJA4440BA Cap	MJD4400AB
Front Shock Shaft Bumper (2)	MJA2150BA
Front Wheel Bearing (2)	Timken 510010
Fuel Filter	Mahle KL83
Fuel Pump	Airtex E8648M
Fuel Rail Pressure Sensor	AJ87977
Fuel Rail Temperature Sensor	LRA1600BA
Guibo	Eurospare CBC8996
Half-Shaft U-joint (4)	JLM1388
Heater Aux Pump	MJA6710AA
Heater Control Valve	MNA6711AC
Knock Sensor (2)	NTK 73014
Linear Switch Module	C2N2467
MAF Sensor	SMP MAS0188
MAP Sensor	SMP AS388
Octopus Hose	MJA6728AC
Oil Filter	Mahle OC602
Radiator Coolant Hose Left / Right	C2N1173 / C2N1174
Reach Motor Drive Cable	JLM12187C
Rear Inner Bearing and Race (2)	Timken Set45
Rear Outer Bearing / Race (2ea)	Timken LM503349A / LM503310
Relay (15)	LJA6703AA
Serpentine Belt	Gates 6PK2310
Spark Plug / Gap / Torque (8)	NGK IFR5N-10 Laser Iridium / .040” / 20 lb-ft
Tensioner / Idler Pulley Bearing (2)	Timken 6203-2RS
Throttle Body Coolant Hose	AJ88519
Throttle Body to EGR Valve Hose	AJ88092
Transmission Filter/Pan	ZF 0501216243
Upper Front Shock Mount (2)	Welsh MJA2170BD
Oxygen Sensor Upstream (2) / Downstream (2)	Denso 234-9029 / Denso 234-4798
Valley Hose Left / Right	NNE3946CA / AJ86326

35. Fluids

Brake	Motul RBF600
Coolant/Distilled Water 50/50	10qt Peak Global Lifetime
Differential	2qt Redline 75W-90 Synthetic
Oil	8qt Pennzoil 5W-30 Synthetic
Power Steering and Soft Top	Pentosin CHF11S
Transmission	Redline D6 or ZF Lifeguard6





36. Crank, No Start (Checklist assumes all wiring and hoses are intact and functional)

1. **Battery.** Ensure RED cable on Battery Positive (B+) post and BLACK cable or braided strap from Chassis (GND) on Battery Negative (-) post are tight and corrosion free. Verify engine cranks easily or check for ~12.5VDC at engine compartment using voltmeter. If battery is weak, charge or replace.

2. **Fuses.** Check Engine Control Module (ECM) and Fuel Pump related fuse(s). Replace with fuse of same rating.

3. **Fuel Supply.** Verify correct octane fresh fuel in tank. Fuel gauge readings can't always be trusted. Locate fuel pressure test Schrader Valve on injector rail, remove cap, place shop towel under valve and use screwdriver blade or key to press center pin, releasing fuel pressure. Turn Ignition key ON briefly while listening for fuel pump to prime injector rail. If no sound, fuel pump, control module or fuse may be faulty. If sound WAS heard, attach gauge to test port and read fuel pressure >40psig. If pump ran, but did not pressurize fuel rail, pump may be faulty, fuel filter may be plugged or Fuel Pressure Sensor (FPS) is faulty. To confirm a fuel problem, crank engine while directing propane into intake.

4. **Neutral Safety Switch.** Many vehicles have a switch allowing engine to start only when shifter is in Park or Neutral with foot on brake, but this generally prevents cranking as well. Wiggle shifter vigorously back and forth or try Neutral to see if this has any effect. Switches can become intermittent if contacts become corroded or damaged.

5. **Security Immobilizer.** Verify security immobilizer has not disabled fuel pump power due to tampering (blinking panel security lamp). Reset with remote fob or at driver's door using key.

6. **Inertia Switch.** Verify inertia switch is not tripped, inhibiting power to fuel pump due to impact. Operator's Manual tells how to reset. Switch can become intermittent if contacts become corroded or damaged.

7. **Crank Position (CKP) and Cam Position Sensor(s) (CPS).** Crank starter briefly to see tach needle registers rpm or Check Engine Light (CEL) goes out. If neither occurs, one of these sensors may be defective. Loss of either sensor type will disable fuel and ignition.

8. **ECM.** Turn Ignition ON briefly to see that CEL illuminates, confirming power to ECM. A faulty Engine Coolant Temperature (ECT) sensor could erroneously indicate over-temperature where none truly exists, but this seldom prevents engine start. If ECM doesn't power up, it may be defective.

9. **OBD2 Scan.** Connect scan tool to Data Link Connector (DLC) near driver's knee bolster and turn Ignition ON. If scan tool cannot establish a link, either B+ to DLC is not present or ECM is defective. Check DLC fuse(s). B+ should be present on Pins 9 and 16 Ignition ON. Scan for DTCs and take appropriate action(s).

10. **Ignition/Spark.** Test for spark on all cylinders during cranking. Use spark gap tester or similar to avoid electric shock. If all fail, problem is something upstream they have in common, like ECM.

Notes:

- Cranking with accelerator floored clears a flooded engine by cutting OFF fuel injection.

- Pull connector to EGR valve and tap lightly to ensure it is closed at idle. Internal damage or corrosion can affect valve opening/closing, but this can only be assessed by removal.

- Non-functional injection results from clogged/faulty injector or not receiving firing pulses from ECM.

- Leaking intakes, faulty injectors and/or faulty MAF/MAP sensors can cause difficult starts, but rarely no starts.