# FITTING INSTRUCTIONS
# LHD Jaguar XK power steering

**Partnumber: 043.861**

Our electric power steering conversion has been developed over the past year to enhance our already successful engine driven pump system. The advantages of using an electric powered pump unit are quicker and simpler installation and a much better feel to the steering, giving a more positive feedback. This is due to the combined electronic and hydraulic sensing circuits built into the system, which supply just the right amount of hydraulic pressure needed by the steering rack to manoeuvre the vehicle under all conditions.

There are some other alterations required in order to fit this unit, in that the Dynamo and Voltage Regulator have to be removed and replaced by a high output Alternator. In order to do this the vehicle polarity has to be changed from Positive to Negative Earth. This will entail having to disconnect the electric clock as this is for Positive earth use only, and a check on the fuel pump to ascertain whether it has a later Positive Earth only unit fitted. Most vehicle owners have already done this to allow the fitting of modern radio / cassette / cd players or the installation of electronic ignition systems or alarm systems. It is also suggested that the existing Ammeter could be replaced with a Battery Condition meter (Voltmeter) although this is not essential. If the Ammeter is to be retained then the connections on this unit will have to be reversed, this is done by simply swapping wires from side to side. After installing the Alternator and wiring the Ammeter will only have a small amount of movement.
These instructions are broken down into 6 main categories.

1. Removal of old steering components
2. Modifications to steering column
3. Fitting steering rack and brackets
4. Fitting of Electric / Hydraulic pump
5. Fitting of Alternator
6. Wiring

**1. Removal of old steering components**

With the front of the car raised and on stands, or use a ramp if available, remove outer ball joints (track rod ends) from the steering link arms. The use of a press-type ball joint splitter will allow the ball joints to be reused. Remove the cotter pin from the pinion of the existing steering rack and remove mounting bolts. Remove the steering rack and also the existing rack mountings.

**2. Modifications to steering column**

Fit a modified/shortened lower steering column. The lower column requires modification to the lower universal joint yoke in order to fit it to the new steering rack, this entails stripping off the lower part of the UJ and replacing it with the supplied yoke. It may be preferential to replace the UJ at this time, if the unit shows any sign of wear. The lower column must be shortened by grinding off the weld at the lower end of the tube adjacent to the casting for the universal joint. Mark the upper and lower joints with some paint so that they can be realigned later. Using an angle grinder carefully removing material until the tube is released from the casting. Now cut off approximately 2 inches (50mm) of the tube and fit back into the casting. Line up the paint marks made earlier and tack weld the new joint of the tube and casting. Do NOT fully weld the joint at this time.

When refitting the lower column, the process is a reversal of removal, ensuring that the recess in the steering rack pinion spline and that the extended recess in the upper column is aligned with the pinch bolt holes in the lower column. Replace pinch-bolts and tighten, fitting new “nyloc” nuts.

**Continues next page >>>**

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**3. Fitting new steering rack and brackets**

Fit steering rack brackets using supplied 5/16" UNF x 1" setscrews, shake proof washers and plain washers to existing captive nuts in front chassis, where the old steering mounts were fitted.
It is necessary to remove 3/8" (10 mm) from the right-hand side of the steering rack tie-bar and 1 1/4 inch from the left-hand side before fitting track rod ends and locknuts. Fit feed and return steel pipes to steering rack pinion (forming the pipes to follow the steering rack on RHD vehicles) Fit steering rack to brackets using the supplied bolt's, washers and self-locking nuts. We have found through experience that when fitting the new track rod ends, wind on the locknuts and the track rod ends fully, then undo by 2 turns. Turn up the locknuts hand tight to the track rod ends and connect to the steering arms,
fit self locking nut and tighten.

**4. Fitting of Electric/hydraulic pump**

The exact location of the pump depends entirely on preference, but on RHD vehicles it is suggested that it is fitted behind the left-hand battery box, on the chassis and in front of the existing brackets for the brake cylinder if the car was manufactured left-hand drive. Fit the pump mounting bracket to the chassis, some modification is necessary to the bracket in order for it to fit your application using supplied self tapping bolts (drill size 3/16" or 4.5mm).
Mount the pump into the bracket and secure with supplied nuts and washers. Connect hydraulic pipes from pump to steering rack. It may be necessary to carefully bend the steel pipes to suit your application or better still form the pipes around a pipe bender. Secure to rubber pipes to the chassis section with "P" clips as necessary. Fill pump reservoir with T. Q. F. (automatic transmission fluid) to the required level. This will require topping up once the pump has been run.

**5. Fitting of alternator**

Disconnect battery. Remove wiring from dynamo and remove dynamo. Use existing dynamo bracket and use the tube supplied as a spacer. This will mount the supplied alternator in the correct position. Fit alternator and visually check to ensure alignment of all 3 pulleys, fit alternator drive belt and tighten to correct tension. DO NOT OVERTIGHTEN, as this will cause damage to alternator and / or water pump bearings.

**6. Wiring**

A DIY enthusiast can carry out this part, but if at all doubtful you should contact a local auto electrician.
Disconnect the Battery,
If your vehicle has already been converted to NEGATIVE EARTH you can go to the next paragraph. Remove the battery clamp bolts and clamp. Carefully lift the battery from the tray and turn around so that the battery terminals are reversed. Refit clamp and bolts. On vehicles fitted with bolt on battery post clamps undo the retaining screws and change over the clamps on the cables, otherwise it may be necessary to replace the battery cables. DO NOT RECONNECT BATTERY AT THIS TIME.

Your vehicle should be fitted with a Voltage Regulator mounted on the bulkhead. If the wiring to the Regulator is of the cotton braided type it may be difficult to identify the colours of the braid, if so, use a small piece of masking tape around each wire in turn and mark it with the terminal letter of the Regulator. Remove wiring from regulator and remove the regulator. Place the supplied connector block in place of the regulator, mark and drill holes for mounting, mount connector block. Place the supplied fuse block alongside the connector block, mark and drill holes for mounting screws, mount fuse block.

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**6. Wiring continued**

Connect Electric Pump wiring as follows:
Connect thick Brown wire to a good earth point.
Connect thick Red wire to fuse block.
Connect Yellow / Green wire to the Blue butt connector
Connect Green wire to A4 terminal on vehicle fuse holder, along with other existing green wires.

Cut off existing connectors on thin Yellow wire from terminal "D" and thin Yellow/Green wire from terminal "F", connect both wires together and connect to Blue butt connector, which should already have a Yellow/Green wire connected to it.
Cut off existing connectors on both thick Brown/White wires from terminal "B" and thick Yellow wire from terminal "D", fit supplied 8mm ring connectors (either blue or yellow to suit the wire thickness) and connect to a terminal of connector block.

Connect short thick red wire to opposite side of 80 amps fuse block to connector block. Connect thin Yellow/Green wire (originally fitted to dynamo) to small terminal on alternator. Connect thick Yellow wire (originally fitted to dynamo) along with the long thick Brown wire supplied, to large terminal on alternator. Carefully route thick Brown wire up to connector block. Connect the short thick Brown wire and the long thick Brown wire to the connector block which should already have a thick Red wire attached to it. Connect the short thick Brown wire to the starter solenoid and connect it to the large terminal to which the battery cable is connected. Please refer to the attached wiring diagram.

Once all wiring connections have been made, ensure that fluid reservoir is filled to required level. Reconnect Battery. Start engine and allow engine to run at a fast tick over around 1000 RPM for around 10 seconds. The Generator lamp should extinguish, the Alternator should be charging and the electric pump should be running. Switch off engine and top up fluid in Pump reservoir. Restart engine and turn steering from lock to lock to clear air from the system. It may be necessary to top-up fluid reservoir again after all air has been cleared from the system. If the fluid in the reservoir becomes foamed leave to settle for a short while so that a positive fluid level can be ascertained.

It should be noted that if the pump fluid runs low, the pump will stop running and no power assistance will be available for the steering system, this is a safety feature of the pump to prevent damage to the pump.

The electric pump will only operate once it senses an output from the Alternator and therefore will not run until the engine is running. However, should the engine stall once it has been running, the pump will continue to run gradually reducing in speed and hence hydraulic power, for around 20 seconds, proving the ignition is still left on. This feature has been found particularly useful when manoeuvring the vehicle when the engine is cold and has stalled; you still have power for the steering for this short period.

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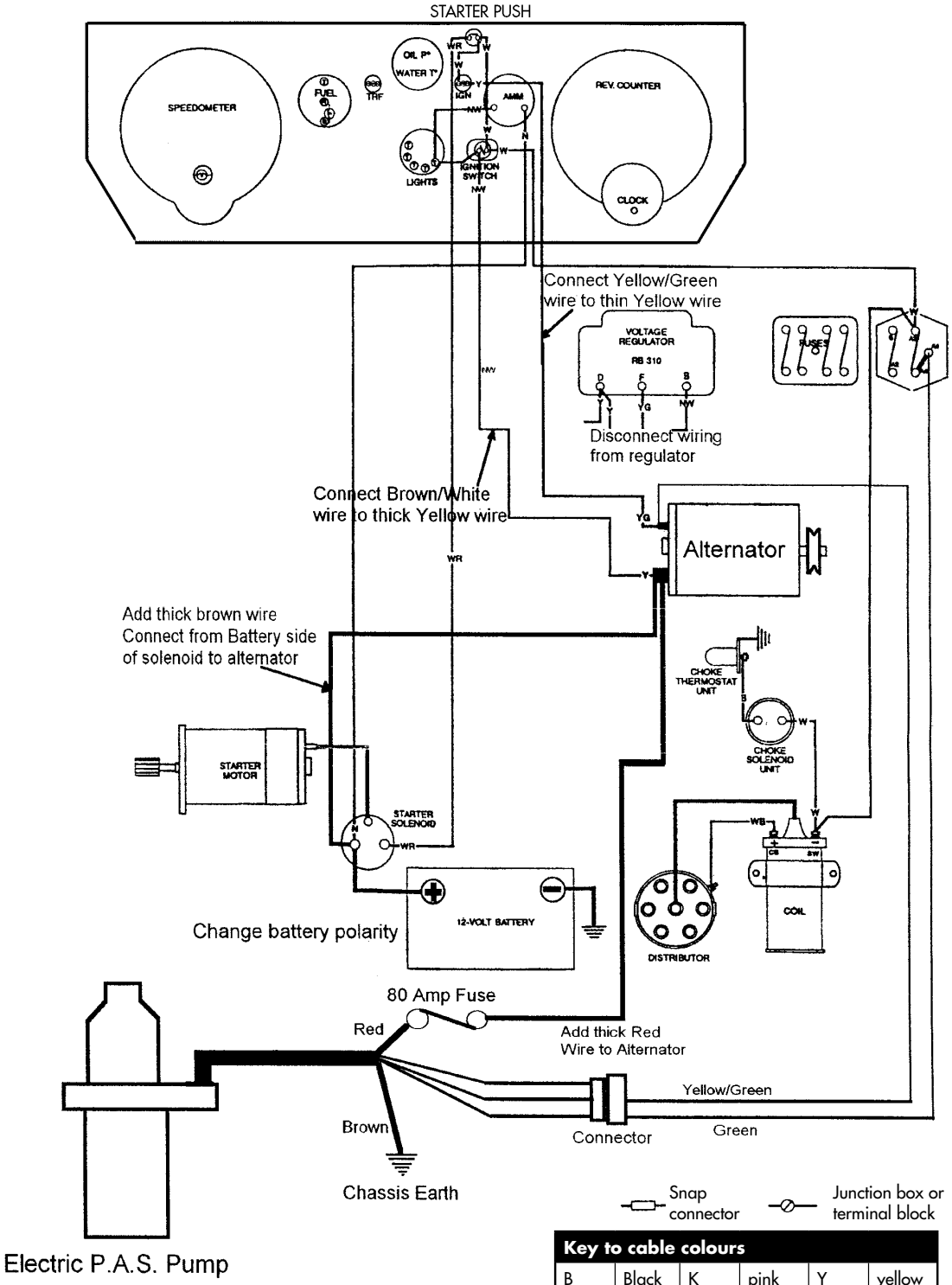


| Key to cable colours | | | | | |
|---|---|---|---|---|---|
| B | Black | K | pink | Y | yellow |
| U | Blue | P | purple | L | light |
| N | Brown | R | red | D | dark |
| G | green | W | white | S | slate |