COURSE NOTES.

INTERCEPTOR (GENERAL).

Introduction.

This course of lectures lasts 4½ days and covers all major assemblies, minor assemblies and operating systems on the 'J' Series Interceptor and S.P. models. Retrospective information on earlier models is also given where relevant.

Obviously, a course of such short duration cannot attempt to cover these subjects in fine detail, and, does not do so except where this is vital to the efficient servicing and repair of a particular component. Generally, detailed descriptions and service procedures are fully covered in the relevant workshop manuals.

The course does cover general descriptions and operating principles, techniques of service and repair, characteristics of the cars, observance of safety precautions, and, details of fault finding and rectification from accumulated experience.

Although course notes and literature are distributed it is essential that students make their own notes, particularly if the incidence of their work on Jensen cars is infrequent.

1. Workshop Manuals.

Due to the annual changes and modifications, particularly on carburetters (because of American exhaust emission regulations), it must be strongly emphasised that it is MOST IMPORTANT to ensure that the CORRECT Workshop Manual is used relative to the model of car being worked on. To assist on this point, a cross-reference identity chart is included with these notes. In several instances, carburetters and adjustments are almost identical, but the adjustment SETTINGS are DIFFERENT between model years, as are jet sizes.

Engine.

V8, Chrysler, 440 C.I.D., Hi-Performance. 'J' Series car engines have induction hardened exhaust valve seats, against the use of lead-free fuel. Hardening is in the cylinder head casting as separate valve seat inserts are <u>not</u> fitted. Hardness depth .050" - .080", treat lower figure as normal. If any valve seat cutting work is necessary, such cutting should be restricted to a maximum of .017" to allow about two-thirds of hardness depth to remain after the re-cutting is completed. If a valve seat is badly pitted or damaged (when lead-free fuel is in use) then the cylinder head must be scrapped, unless a specialist engineering firm can cut back the seats and insert a suitable valve seat ring of the correct hardness.

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Non-hardened exhaust valve seats in engines will rapidly deteriorate if used exclusively with lead-free fuel, due to the lack of lubrication qualities of the lead. If leaded fuel is available then valve seat life will be prolonged by its use in the proportions of 25% leaded to 75% lead free (or three fills of lead-free followed by one fill of leaded fuel) continued indefinitely as a normal habit.

Compression reduction; while seeking control of exhaust emissions the compression ratio has been reduced to 8:1, thus the correct grade of fuel for Interceptor models is "3 star". On S.P. models the high compression engine is retained and these have a C.R. of about 10:1, where it is essential to use premium "5 star" fuel to avoid problems with detonation and rough running.

Relation to gearbox; before carrying out any adjustments to the gearbox operating linkage it is MOST IMPORTANT to ensure that the engine is in good condition, correctly tuned, and, at correct idling speed. If this is not done, problems will arise with quality and timing of gearshift. Don't forget to energise carburetter solenoid and allow solenoid piston to extend (If provided), before adjusting gearbox throttle pressure link.

Exhaust heat riser; this unit is mounted in one exhaust manifold and is subject to very high temperature and small deposits of sediment from the exhaust flow. It requires regular service attention to maintain correct functioning of the carburetter choke "pull off". If the heat riser valve should 'seize up' in the open position, wait until the engine is cold then introduce some ROCOL (or similar) solvent through the holes adjacent to the valve spindle bushes. Manipulate the valve by its counterweight until the valve moves freely to the closed position. Check that both the bi-metal thermostat coil and the anti-rattle spring are in good condition. Test by starting engine and observing that exhaust issues from one tailpipe only (until engine is warm). Also, when engine is cool, by accelerating momentarily from idling when the counter-weight should move about half-an-inch clockwise and return.

Engine Noises.

Experience of noises on other makes cannot be relied on as a guide when dealing with the Chrysler unit. When dealing with apparent "piston-slap" or even "little-ends knock" do not be misled. On low mileage engines it is far more likely to be connecting-rod big-end bearings. The bearing shells for these are selected by computer on the production line and they are available in steps of .001" from standard to .003" undersize. Normal journal clearance is .001", clearance greater than .002" will usually make itself audible as any one of a variety of "apparent" other noises.

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Crankshaft end-float; some earlier engines (Mk.II Interceptors) suffered from an incorrect surface finish of grinding on the crankshaft endfloat thrust face. This resulted in early wear on the thrust bearing, usually not discovered until the endfloat increased, to a degree permitting contact between the Torque converter flexible drive plate studs and the back of the crankcase. Most of the engines concerned have been discovered and rectified, but the odd one may still remain on very low mileage cars. If discovered early, rectification is confined to replacement of the thrust bearing plates as initial wear onto the original plates corrects the surface finish on the crankshaft thrust face. If gross wearhas taken place then rectification involves crankshaft replacement as well, as the crankshaft thrust face will have been damaged beyond repair.

Investigate any unusual knocking or scraping noises immediately and check crankshaft end-float. Endfloat of .008" or more requires immediate investigation on crankshaft thrust bearings.

Other Items.

Occasional bad manufacture (usually incorrect hardening) has led to other faults.

Valve pushrods and rockers; incorrect hardening on rockers at pushrod pad can allow pushrod end to wear a hole through the rocker arm. Because cam followers are hydraulic, excessive wear (or clearance) at the rocker will not become audible as "tappet" noise. If a pushrod penetrates a rocker and remains stuck partly through, the resulting gap at the pushrod lower end can allow the hydraulic cam follower to "pop" out of its guide. The cam followers are subject to engine oil pressure and one follower "popping out" will cause drastic loss of engine oil pressure, and, could result in engine seizure from oil starvation.

Fuel Pump operating pushrod; a batch of pushrods with ends not hardened were accidentally supplied to Chrysler and fitted. The lack of hardening causes accelerated wear effectively shortening the pushrod until it can no longer operate the fuel pump.diaphragm. This results in fuel starvation or complete loss of fuel supply (particularly on S.P. cars with higher fuel usage). Rectification is confined to replacement of the operating pushrod.

Exhaust manifold; Dodge Truck type not Chrysler car type, must be tightened evenly on all fixings not just on the easy ones. Failure to tighten evenly can cause manifold to crack straight down the middle.

Inlet manifold gasket (steel); if inlet manifold is lifted for any reason the gasket MUST be renewed. Reuse of old gasket can allow oil mist from camshaft chamber to percolate past gasket and be sucked into combustion chambers by manifold depression. Result is heavy oil consumption and thick blue exhaust smoke, oiled up sparking plugs and rapid build-up of carbon deposits. Gasket leakage in other direction can allow air to be sucked directly into cylinders, with consequent weakening of fuel mixture and poor running.

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Manifold "down" pipe; some engines had incorrect bolts fitted during production. Nuts work loose and - if not seen - down-pipe will eventually fall off. New thin nuts now fitted, but take care these nuts are so thin that a worn socket spanner can slip off.

Thermostatic Air Cleaner.

Double "Schnorkel" type with by-pass (for warmed air via 'stove'), Vacuum operated with thermostatic control by bi-metal valve, all designed to permit only warm air to enter carburetter. Thus allowing leaner mixture settings on carburetter jets and assisting control of exhaust emission pollution. Operation; when the engine is started from cold, manifold vacuum acts via pipes to close flaps in the air-cleaner intake spouts. The engine then can only draw air via the by-pass which - in turn - draws its air via the "stove". (Air duct around one exhaust manifold which warms the air as it passes through the duct). When the engine warms up and underbonnet temperatures rise to about 100°F, the bi-metal valve operates to allow air to exhaust the vacuum in one pipe, thus allowing the related flap to open and permitting direct air entry through that intake spout. As engine speed rises and reaches 80 mph in direct gear, (or equivalent r.p.m. in lower gears), manifold vacuum starts to decrease until it is negligible when the throttle is wide open. As the vacuum decreases, this is felt through the second pipe and the related flap starts to open, permitting direct air entry through the second intake spout. This second flap is wide open when the engine is at maximum r.p.m. and will close again when engine speed falls below 80 mph in direct gear. Once the first flap is opened by temperature rise it will remain open until the temperature underbonnet falls below about 100°F.

Ignition.

Electronic system; the basic circuits of the ignition system and their relationship remain the same, however, some primary circuit components are changed. There is a good description of the circuits in the 1973 workshop manual, but particular points meriting specific attention are given below.

Reluctor; part of distributor on centre spindle immediately below rotor arm. Provided with locating "roll pin" which must be in correct side of reluctor according to distributor rotation. Also, the "roll pin" should project about one-eighth inch below the reluctor base, and, this projection must engage in the slot provided. (In the centre spindle shoulder which supports the reluctor). If the "roll pin" projection does not engage in this slot, then it can lift the rotor arm causing a foul between the rotor arm and distributor cap. Handle the reluctor with care, it is brittle and liable to smash if dropped onto a hard surface.

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Air Gap; set distance between magnetic pole piece and passing reluctor blade, corresponds to contact-breaker gap on conventional distributor but does not move. Air gap should be set at .008", preferably using non-magnetic feeler gauge. If the air gap is set too close, there is a possibility of collision between the reluctor and pole piece on worn distributors. If the air gap is set too wide, slight reduction of the magnetic signal will be caused, and, if the gap is set grossly wide the weaker magnetic signal could cause misfiring at high engine speeds.

Electronic Ignition Control Unit; slight change in internal circuitry to improve cold starting, external appearance unchanged, new stores part number. Will not fit earlier models, only use on 'J' Series. When checking control unit on any model, always check that multi-pin connector is clean, dry and free of corrosion (Verdigris). Also check that multi-pin cap screw is present and suitably tight, do not overtighten. In cases of persistent mystery misfiring, check that electronic control unit has good earth between its casing and mounting on car, clean as necessary for good electrical contact. If any control units with blue coloured heat-sinks are found on S.P. models, check to see if distributor modification is required. (It should be!). If working with ignition ON, take care not to receive electric shock from switching transistor in centre of heat sink.

Spark Plug H.T. Cables; "J Series" cars use a new type H.T. cable with core of fine glass strands coated in carbon. The outer covering is either Hypalon or Silicone and the Hypalon cables should be fitted to the front four cylinders, Silicone to the rear four. These cables are very expensive but the Hypalon ones will last indefinitely without cracking or deterioration from underbonnet heat. ALWAYS detach cables by the spark plug connector, NEVER by dragging on the cable bodily because such treatment will fracture the cable core and render it useless. Present cables coloured black, future cables likely to be coloured orange, with Hypalon type fitted to all eight cylinders.

Electronic Ignition - Test Set (Chrysler Part No. C.4166 and Test Set Adaptor C.4166 - 1). Much time can be saved and frustration avoided by use of this test set when tracing faults on electronic ignition circuits. CAUTION: Note that the modified electronic ignition control unit used on the "J" series car CANNOT be tested unless the Adaptor is used with the Test Set. Once the adaptor is fitted to the test set, it is intended to remain permanently connected. The test set with adaptor can then be used to test all Interceptor models with electronic ignition, i.e. "H" series Interceptor and S.P., and

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"J" series Interceptor and S.P. To test without use of Electronic Test Set, see Jensen Service Bulletin No.112 dated December 1972.

Dual Ballast Resistor; this component was located on the inlet manifold adjacent to the carburetter base and the right hand bank of cylinders. In this position it was subject to excessive heat - soak causing deterioration of insulation, therefore the component has now been moved (J Series) to a cooler site at the side of the engine compartment, about halfway along the right-hand side adjacent to the bonnet closure edge.

Electronic Distributor; some parts are now available as service spares i.e. Upper & Lower Plate/Pick-up Coil assembly, Reluctor, Rotor Arm, etc. These units are fitted to "H" and "J" series models, both Interceptor and S.P. The "H" series Interceptor ignition timing is 10° before T.D.C. and idling speed is 900 rpm with carburetter solenoid energised. When ignition is switched off, the carburetter solenoid moves and allows the throttle linkage to close slightly more, this stops the engine and effectively prevents 'after-running'. The "H" series S.P. uses a different system, and has a distributor solenoid energised by the starter circuit. When operating the starter, this solenoid operates to advance the ignition timing by 7° DURING STARTING ONLY. Before modification to distributor on "H" series S.P. cars, ignition timing is $2\frac{1}{2}$° before T.D.C. ($9\frac{1}{2}$° - 10° during starter operation). After modification to distributor, ignition timing is 7° before T.D.C. (14° during starter operation). The "H" series S.P. distributor modification involves fitting a second bob-weight spring, relocating the advance/retard link arm, resetting the advance/retard vacuum diaphragm and replacing the electronic control unit. Full details are given in Jensen Service Bulletin No.114, dated December 1972 and in Bulletin No.121 dated January 1973. This modification was incorporated during production from Chassis No. 1314913. Note, that in all instances of work on S.P. cars ignition systems, it must be verified by road test that detonation ("pinking") is NOT occurring. If any detonation is noticed the ignition setting must be fractionally retarded until the detonation is eliminated. CAUTION: It is essential that S.P. cars are run on Super Premium five star fuel.

All the "H" Series S.P. information (except distributor modification) applies to "J" series S.P. cars. On the "J" series Interceptor, ignition advance/retard is conventional by use of normal vacuum diaphragm. However, the carburetter is fitted with a throttle stop solenoid which is energised by the ignition circuit, solenoid operation is the same as for "H" Series Interceptor.

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CONVENTIONAL DISTRIBUTOR; "G" series Interceptor has wire link between distributor solenoid and carburetter curb idle stop. When throttle is closed to idling position contact is 'made' at curb idle stop, circuit is energised and distributor solenoid operates to retard distributor by 7° during idling. Ignition timing setting must be made with solenoid energised, ignition timing $2\frac{1}{2}$° before T.D.C., plus or minus $2\frac{1}{2}$°. "G" series S.P. is the same except that ignition timing is 5° before T.D.C. Note that the "G" series S.P. has twin contact breaker points. All "H" and "J" series cars have electronic distributors.

Engine Starter; a new faster cranking starter motor has been introduced on the "J" series car, this is to overcome some starting problems arising from application of exhaust emission equipment. External appearance identical to earlier starters but internal parts different, so do not attempt to interchange parts. This fast starter will fit earlier Interceptor models. Earlier model (slow) starters must NOT be fitted to "J" series cars. If a starter is being replaced under warranty, then the correct starter MUST be fitted as appropriate to the car model, e.g. "G" series car, "G" series starter or "H" car, "H" starter etc. When obtaining a starter motor from stores, always check for correct type BY PART NUMBER. Note that the new starter still uses a spur gear drive pinion, running dry, so a slight increase in noise is inevitable when the starter is working.

Carburation; "G", "H" and "J" series S.P. cars all use a Holley 'six-pack' carburetter, although this carburetter looks complicated it is only three twin barrel units mounted together. The centre unit corresponds to the primary part of a Holley 4160 carburetter (Interceptor), and the two outer units both correspond to the secondary part ofa Holley 4160. A full description of operation and adjustments with diagrams and photographs, is given in the appropriate workshop manual. Remember, it is most important that the CORRECT manual for the car is used, and, the cross reference identity chart will assist in cases of doubt. Note that the "J" series S.P. uses the same model carburetter with identical adjustments to the "H" series S.P.

"G" and "H" series Interceptor models use single carburetters, having four barrels - two primary and two secondary - built as one assembly. Both series carburetters are of the Holley 4160 type, but settings and adjustments vary between model years so - again - ENSURE that the CORRECT workshop manual is used when servicing.

Holley carburetters as used on both Interceptor and S.P. models are subject to settlement of gaskets, particularly at fuel bowl joints, allowing the fixing of primary fuel bowls to become slack. In turn, this causes carburation 'flat-spots' and

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rough running. Bowl fixing screws tightness should be checked during any service as a matter of routine. CAUTION: if air leaks have existed for some time the gaskets will have dried out and become brittle, when screw tightening will cause gaskets to split. Fitting new gaskets calls for further tightness checks later on. Note that "O" rings are fitted on the fuel transfer tube (Primary to Secondary bowl) and that these "O" rings are never reusable, new ones are essential and are available separately from carburetter gasket kit.

For persistent carburation 'flat-spots', the next check should be on fuel bowl floats height for equality and accuracy. Check for fuel spillage in venturi from primary and secondary jets, spillage indicates a high float level. A sight glass gauge is available for external wet checks on fuel level height in fuel bowls, Chrysler Pt. No. C4051. (Scale reads from TOP Downwards!)

Fuel supply; float needle valves are tipped with "Viton" material, always dry these before examination for wear as it is difficult to see any defect when they are wet with fuel. As minute defects can cause flooding problems, it is recommended that a magnifying glass is used for really close examination.

Rich running on idling without response from metering screws, or erratic running, hesitancy or poor performance. These symptoms can be caused by blockage of the idle jet tubes in the primary metering block. Because of small size permitting tight wedging of gum or foreign material, coupled with restricted access, it is very difficult to remove such blockage by air blast. To overcome this problem a modification to the primary metering block has been devised, it must be strongly emphasized that this modification should only be carried out by a SKILLED mechanic. Details are given in Jensen Service Bulletin No.116 dated December 1972. Note that this modification is not intended for "blanket" coverage of all vehicles, it is a method of rectifying only those vehicles suffering from idle jet tube blockage.

"J" series cars are fitted with a Carter "Thermoquad" carburetter. This unit has a main body of moulded phenolic resin (a type of plastic) having excellent heat insulation properties. It is designed to reduce heat transfer to the fuel and fuel temperatures are lower by as much as 20°F. This allows much leaner fuel/air mixtures to be used without greatly affecting vehicle performance, and, this fact directly reduces exhaust emission pollution. Full details of operation, servicing and adjustments are given in the workshop manual. Generally, the "Thermoquad" enjoys a good reputation for smooth running, reliability and freedom from troubles. CAUTION: At the top of the inner wall on the primary air horn there is a small triangular plate with a central hole, (Step-up 'Piston' Cover Plate) a screw head is visible through this hole. THIS SCREW MUST NEVER BE TOUCHED, the screw controls the main jet calibration and is used at Carter's factory for initial setting-up of fuel flow against exhaust emission regulations. This is done on a test-rig that exists ONLY at Carter's factory, if the screw is altered there is NO WAY in which it can be restored to its proper setting. Note that sufficient data has been given to Jensen Motors for test engineers to detect if the screw has been subject to tampering.

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Exhaust Emission Controls.

There are three main sources of pollution on motor vehicles, these are Crankcase vapours, Fuel evaporation vapours and Exhaust Gas emissions.

Various systems exist to control escape of pollution into the atmosphere, generally these systems use the vehicle engine as their energy source for operation, using heat, pressure or vacuum, singly or in combinations. Thus it is essential that the engine is kept in good condition and properly tuned, according to the makers specifications.

Control of pollution must comply with stringent laws governing pollution levels and systems reliability. These laws became effective in 1970 (U.S.A.) increasing in severity annually until pollution levels are reduced to a minimum in 1975 (U.S.A.).

Engineering knowledge in 1970 was insufficient to build vehicles meeting the 1975 requirements and experimentation with practical tests is still proceeding. Each year more is learned about pollution control, and, this knowledge is built into the following years' vehicles. Thus we get annual changes in engine design and particularly in carburation, which is why it is so important to use the CORRECT workshop manual by ANNUAL DATE. Any particular system introduced by a vehicle maker (U.S.A.), must pass certain reliability tests including 50,000 miles trouble-free operation.

All pollution control systems on one vehicle are designed as a complete "package" intended to meet the pollution regulations of the year of manufacture. Thus any "convenient" isolation of an individual part is likely to upset the operation of other parts and cause a variety of minor problems.

Several parts of the pollution control "package" on "J" series Interceptors have already been mentioned in these notes, i.e.

1. Reduced compression ratio (improved burning of lead-free fuel)
2. Harder exhaust valve seats (Durability when lead-free fuel is used).
3. Thermostatic air-cleaner (constant supply of warmed air to carburetter).
4. "Thermoquad" carburetter (leaner fuel/air mixtures from cooler operation).
5. Electronic distributor (durability, no C.B.points to wear out)
6. Electronic ignition unit (better cold starting with pollution "package" fitted).
7. Faster engine starter (better hot/cold starting with pollution "package" fitted).
8. Ignition H.T. cables (durability in higher temperatures underbonnet).
9. Exhaust Heat Riser (fast warm-up and smooth acceleration).

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Other direct control parts of the pollution"package" are:- O.S.A.C. (Orifice Spark Advance Control) system. The object here is to delay ignition timing advance by a few seconds on part-throttle opening when ambient temperatures are high. Ignition spark remains retarded for these few seconds and allows better (more complete) burning of fuel/air mixture. This reduces oxides of nitrogen (NOx) content in exhaust gas. Control is achieved by a temperature sensitive valve inserted in the vacuum pipe between the carburetter and distributor diaphragm. Temperature margin of operation is 8°F. Below 60°F the valve remains open and manifold vacuum acts through the pipe quite normally to operate the distributor diaphragm. The valve will close at a temperature between 60°F and 68°F, then when the throttle is partly opened, manifold vacuum will act immediately in the pipe as far as the O.S.A.C. valve. The closed valve will only allow a slow bleed of pressure out of the remainder of the pipe and the diaphragm chamber, thus delaying operation until the vacuum in this part of the system is intense enough to cause diaphragm movement. The delay period is 15 to 17 seconds. Manifold vacuum is not felt along the pipe at engine idling speed, because the vacuum port in the carburetter venturi is sited just above the primary throttle blade idling position, and is not subject to manifold vacuum until the throttle is partly opened. On closing the throttle, the O.S.A.C. valve is arranged to permit instant response at the distributor diaphragm. CAUTION: when testing O.S.A.C. system operation, DO NOT allow the engine to run and suck airborne dirt, dust etc., into the pipe when disconnected at the diaphragm end. Such material will rapidly clog the O.S.A.C. valve bleed holes and cause system malfunction. ALWAYS connect the vacuum gauge to close off the pipe before starting engine.

The O.S.A.C. valve is mounted at front of vehicle, adjacent to electronic ignition control unit, where the valve is subject to ambient temperature of incoming air.

E.G.R. (Exhaust Gas Recirculation) valve. The object here is to reduce peak burning temperatures during combustion, which will reduce oxides of nitrogen (NOx) content in the exhaust gas. This is done by allowing controlled amounts of exhaust gas to be introduced into the incoming fuel/air mixture, thus slightly diluting the mixture and lowering the burning temperature.

Exhaust gas is obtained from the exhaust crossover tube, via a small port which is controlled by a piston attached to a vacuum diaphragm. The diaphragm is controlled by the size of a metered port at the carburetter, in the vacuum pipe connection stub. At low ambient temperatures exhaust recirculation is not required, so a temperature sensitive valve is connected to the vacuum pipe. At temperatures below about 68°F, this valve is open to atmosphere and this destroys vacuum acting in the connecting pipe. Note, the tiny size of the metered hole at the carburetter prevents atmosphere pressure from unduly weakening the fuel/air mixture. At temperatures above 68°F, the E.G.R. temperature valve closes its atmosphere part, allowing vacuum to intensify in the pipe and act on the diaphragm. This operates the piston and allows some exhaust gas to enter the inlet manifold, in proportion to the vacuum action.

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"J" series cars use the "Ported Vacuum" system, operated from a slot port in the carburetter adjacent to the throttle blades. Calibration of the diaphragm spring ensures that vacuum at wide open throttle is insufficient to operate the system. Positioning of the carburetter slot port above the throttle blades ensures that vacuum is not acting during engine idling. The "slot" shape of the port provides progressive vacuum action as the throttle blades are opened from idling position.

Electric Assist to Automatic Choke. Object of this system is to ensure that the choke is completely pulled "off" as soon as possible consistent with driveability, so as to reduce exhaust pollution caused by exceptionally rich fuel/air mixtures when the choke is operating. On earlier systems with purely mechanical choke "pull-off", if was found that the choke could remain partly "on" for comparatively long periods causing high levels of exhaust pollution.

The electric assist system uses three new components and one component redesigned. The new components comprise a 40 watt heater element mounted close to the choke "pull-off" bi-metal coil, a temperature operated double control switch, and, a new mounting bracket for the "pull-off" rod and bi-metal coil with the heater. The heat-well in the exhaust crossover pipe has been redesigned, formerly being a stainless steel cup, now replaced by a casting.

At ambient temperatures below 63°F, no electric assistance is provided, so because heat effect via the crossover pipe casting will be slower, then mechanical choke "pull-off" will be slower. At ambient temperatures above 63°F, the electric assist system is energised by one side of the double control switch via the ignition switch. This allows current - about 3 amps - to flow to the heater which warms the choke "pull-off" bi-metal coil, At the same time, the other side of the double control switch is being warmed by its own tiny heater, and, this causes the switch to open after 2 or 3 minutes and cuts off the current supply to the choke heater. By this time the choke heater has fully "pulled off" the choke by its operation on the bi-metal coil. CAUTION: It must be borne in mind that when the ignition is switched ON (and ambient temperature is above 63°F), then the electric assistance to the choke will start to operate immediately. If the engine is not started; the choke assist system will still operate through its cycle to open the choke and switch itself off. So no choke will be available if it is then necessary to start the engine, until the ignition is switched OFF and the choke assistance system has cooled.

Note, the choke heater must NOT be exposed to gross quantities of liquids, nor immersed in fluid of any kind, especially solvent cleaners. An electrical short circuit within the heater would be a short circuit of the ignition system.

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Crankcase Vapours. Regardless of fitting quality of pistons/rings in cylinder bores these is always a certain amount of "blow-by" from combustion gases. If left uncontrolled, these gases would either escape to atmosphere or would cool down rapidly allowing their moisture to condense into droplets, and, these would try and combine with the oil - mist or form acidic sludge. To prevent these undesirable things, crankcase vapour control was devised and has now been in use on many makes for a number of years.

Jensen cars use a circulatory air-scouring system, air drawn from the air-cleaner is conducted to one of the rocker covers and from there it passes down through the oil drain apertures into the crankcase. Passing through the crankcase the air sweeps away any gases from combustion "blow-by", carrying these up through the other side oil apertures to the second rocker cover. From there the gas laden air is conducted to a large vacuum port at the carburetter base and manifold depression draws it into the inlet manifold, where any combustible material is re-burnt before passing out at the exhaust. Various filters and flame-traps are incorporated in the crankcase scour circuit, and, these require regular routine service for efficient operation.

Fuel Vapours. Apart from the actual fuel loss, vapours from evaporation are a source of air pollution, so a system has been incorporated in the cars to catch all fuel vapour and conduct this to a special point for collection and use.

The fuel tank filler is sealed and an expansion tank is fitted to ventilate the main fuel tank. In case of accidental high pressure, the expansion tank is fitted with a pressure relief valve. Fumes in the expansion tank are conducted to the storage point, this is a canister of activated charcoal. Fumes from the carburetter fuel bowl are also conducted to the charcoal canister for temporary storage. The charcoal canister has a port open to atmosphere but covered by a fibreglass filter. When the engine is started, manifold vacuum acts through a pipe connected to the top of the canister, drawing air through the filter and open port and purging the charcoal of its stored fuel. This fuel is drawn into the carburetter and used.

The charcoal canister is located in the front right hand mudwing cavity, adjacent to headlights and air horn compressor. The fibreglass filter requires routine service replacement for efficient vapour control operation.

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Torque Flite Gearbox.

This type of transmission provides fully automatic operation on three forward gears and a reverse gear. Full details of operation, fault diagnosis, rectification and testing are given in the workshop manual. The Torqueflite transmission is built by Chrysler, who classify its use in Jensen cars as HEAVY DUTY, this classification makes it essential to carry out routine fluid changes, filter changes and brake band adjustments.

Four changes in the gearbox have been introduced on "J" series cars. A new flexible kickdown band is now fitted, but this kickdown band will NOT fit earlier gearboxes. The usual compressed paper type friction lining is used, but this is designed to work against a much smoother surface finish on the kickdown drum. If one of the new bands is forced into an earlier gearbox, the coarser finish on the earlier kickdown drum will cause accelerated wear on the new band lining, leading to early failure.

A new hydrodynamic front pump seal is now fitted, this seal will further reduce leakage and has a longer life. It WILL FIT earlier gearboxes.

A larger filter unit is now fitted having 50% greater filtration area. This filter will provide a greater safety margin against blockage when service is overdue, it will also keep the hydraulic fluid cleaner for longer. It WILL FIT earlier gearboxes, although on some gearboxes the metal edge of the filter will touch the sump pan sides, Chrysler advise that this will not have any adverse effect.

The throttle pressure adjustment screw has been fractionally moved, about one inch from old site. The screw head now requires an "Allen" key, not a screwdriver. The locknut has been designed out by making the screw threads with a slight 'interference' fit, so the screw can be turned and will stay where it is set. CAUTION: Before making any throttle pressure adjustments it is absolutely essential that the engine is in good condition and properly tuned, also that the external linkage rod is correctly set up with the engine running at curb idle speed and carburetter solenoid energised with solenoid piston extended. Neglect of these points will cause bad gearshift timing and poor gearshift quality. NOTE, before doing ANY work on a Torqueflite gearbox ALWAYS check the level and condition of the hydraulic fluid.

Always ensure that the correct workshop manual - by annual date - is used, check the gearbox assembly number off edge of sump flange against the cross reference identity chart.

The tailshaft seal has to cope with large movement tolerance at tailshaft. The seal is usually oil-damp and the occasional odd spot of oil seepage is acceptable as normal, so do not replace seal unnecessarily.

Full sets of pressure seals and rings are available as service kits, all kit items should be used on overhaul of gearbox (except for clutch snap rings which are supplied in selective

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thickness in every kit).

Brake bands are expensive, so check carefully whether replacements are needed, always replace if doubtful. Band lining material is paper and should accept slight mark from fingernail pressure, extreme hardness indicates earlier burned condition calling for replacement.

F. F. cars, gearboxes can still be overhauled provided the mainshaft does not have to be removed e.g. For work on the Governor assembly.

If gearbox work is carried out for any reason, always carefully examine the connecting hoses in the gearbox cooling circuit. These hoses can swell internally under heat and pressure, almost closing off their inner diameter, while the outside appearance can indicate apparent 'good condition'. After major work on a gearbox, always carry out a cooling circuit flow test at the last union before the fluid re-enters the gearbox. It goes without saying that the gearbox cooling circuit must be thoroughly flushed as part of any gearbox overhaul, together with connecting hoses renewal.

Torque Converter.

If metallic debris has entered torque converter then this unit will probably be rendered unserviceable! When flushing out torque converter, always fully agitate flushing liquid within unit, also turn the turbine and stator to dislodge any foreign particles. Flush with clean solvent or kerosene and repeat until flushing liquid drains out clean. Always drain thoroughly and then remove any residue of solvent/kerosene by flushing with a half gallon of new hydraulic fluid.

A different torque converter is fitted to the "J" series Interceptor, this is a "high stall" type with a converter diameter of $10\frac{3}{4}$ inches. Stall test r.p.m. 2600-2900, ALWAYS observe appropriate safety precautions before carrying out any stall test, always keep test as short as possible to avoid overheating the transmission. Note, the "J" series S.P. car continues with the same torque converter and gearbox as used on the "G" and "H" series S.P.'s.

Steering.

Power assisted steering is provided on Jensen cars. Originally the MK I Interceptor was fitted with a system built by Gam Gears, however this system was prone to leakage and re-sealing was often ineffective. If it is decided to attempt a re-seal job, the B.M.C. 1850 range (Wolseley etc) kits will fit.

Mk II Interceptors were fitted with an Adwest system (early version), late Mk II's and early Mk III's were fitted with an intermediate system, while current Mk III cars are fitted with the latest Adwest system. The last changeover was made at Chassis No. 128 4663, note that different sealing kits are required for the three Adwest systems, before and after this chassis number.

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Identification details are given in Jensen Service Bulletin No.107 dated October 1972, as the external appearance of the steering racks is similar.

Steering racks and Valve bodies are NOT matched pairs and can be changed individually if required. CAUTION: The Jaguar XJ6 uses a valve body that appears to be identical, this is NOT TRUE the internal components are very different especially the torsion valve, so do not be tempted into dangerous substitution.

Hydraulic operating pressure is 1100-1300 lbs.in^2, a special line gauge tool with isolating tap is available for checking steering pump output and line operating pressures. CAUTION: always check that steering pump drive belt is correctly tensioned and in good condition. Line gauge - Chrysler Pt.No. C-3309D. Pump type is Chrysler Model 1.06.

Steering tightness, wander and rattles. Past problems with tightness have been caused by seizures of steering column pre-packed universal joints. This has been resolved by use of universal joints fitted with lubricator nipples. Wander is frequently caused by something relatively simple i.e. Incorrect front wheel track (toe-in), one front tyre badly worn (due to the incorrect track), incorrect tyre inflation, tightness or looseness of working components, sheer mechanical wear due to hard or long service, or accidental damage. Rectification methods are self-evident, but if any symptoms or secondary faults are found, it is ESSENTIAL that the root cause is traced and corrected. A steady pull to one side is usually the fault of rack leakage, where pressure is lost on one side of the rack piston giving a tendency for the rack to move in that direction. Look for "ballooning" of the rack end gaiter. Another cause of wander can be valve body trim. Centralise rack by using a suitable pin in the rack indent, accessible by removing grease nipple below the valve body, and move steering slightly until pin engages in indent. Jack front wheels off ground and start engine, if steering moves under influence of power assistance then there is a defect in the valve body. This could be a worn or loose trim pin, check for firm tightness of trim pin. CAUTION: Trim pins cannot be replaced as they are matched to the valve body. DO NOT touch the trim pin of the car is still IN WARRANTY. Steering rattles are generally from one source, from the steering rack thrust-pad requiring fractional re-adjustment, to further reduce free-play between the rack back surface and the thrust pad face. (best adjusted 'on the road').

Veering to right or left on acceleration and/or deceleration, is usually caused by rear wheel "steer". This problem is a product of tyre heat growth coupled with differential-lock action, where tyres have been subjected to high speeds without increase of tyre pressure and have physically grown due to heat. Subsequently - when cool - one tyre can have 1½ inches greater circumference than its opposite tyre. Due to differential-lock action, both wheels are trying to revolve at the same speed, but the larger circumference on the one tyre is trying to make it travel further per revolution. As this is mechanically impossible, the car veers to one side. To rectify, take off the two rear wheels and place

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them on a level surface, vertically against a wall. Place a straight edge across the pair of wheels and check tyre height for equality. Check all wheels including spare - until two of equal heights are obtained, fit these to the rear axle.

Steering column is adjustable for column end-float at large nut near bottom of column. This nut is lightly sealed with a hot iron, re-seal after adjusting. Column is made by A.C. - Delco, collapsible on impact (or from misuse) the normal loading being borne on two nylon rivets. DO NOT hammer or apply undue force to column, especially not lengthwise, as once the nylon rivets are sheared there is no way to renew them and the steering column is then unserviceable.

The column outer case has steel mesh sections designed to collapse on impact, also the column fixing studs at the fascia bulkhead are mounted in nylon shear-slides designed to shear on impact and prevent injury to the driver. Do not forget these points during any accident damage inspection.

Steering Geometry & Suspension.

Jensen Interceptor and S.P. models use independent front suspension on coil springs, with conventional semi-elliptic leaf springs at the rear. The rear axle is located by Panhard Rod, and, all four shock absorbers are double-acting teledraulic. Camber and Castor angles are adjustable by addition or removal of packing shims, King pin Inclination is non-adjustable.
CAUTION: A slight offset exists on the rear axle towards the left hand side. DO NOT attempt to centralise the axle by "winding up" on the Panhard rod as this will put excessive strain on the rod brackets possibly causing a fracture.

The power assisted steering rack combines the functions of a drag-link and a track-rod. The rack end-links are fitted to conventional ball joints which locate in the steering track-arms, in turn, the track-arms are bolted to the suspension swivelling vertical links. The vertical link lower swivels are adjustable by shims, and, require routine service attention to accommodate the slight wear between the swivel balls and the seats. Neglect of this service attention can permit gross wear and early failure of the swivels.

Suspension creaking noises are usually caused by friction between the "Prescollan" bushes and adjacent washers on the suspension fulcrum shaft (upper). Rectification involves removal of the top wishbone, cleaning and re-lubrication of the "Prescollan" bushes and other moving parts. CAUTION: Use lubricant grease (Duckhams LBM 10) sparingly, as adjacent rubber parts will be adversely affected by lubricant contamination. Semi-elliptic springs on the rear axle are lubricated and wrapped during production, inspect the wrapping for road damage periodically and rectify as required.

Wheels & Tyres.

Wheels are made of a special alloy but this proved subject to tarnishing from salt and road filth, so the wheels are now treated with clear Polyurethane lacquer. Service is confined to inspection for high speed damage (impact from gravel, etc.,) and "touching-in" lacquer if required.

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Wheel Nuts. To ensure wheel security without overtightening, the wheel nuts must be fitted with a torque-wrench. Torque setting is 50 lbs.ft., note that overtightening will cause "mushrooming" at the nut inner end making it difficult (or impossible) to remove later.

Wheels MUST be fitted with INNER TUBES even though "Tubeless" tyres are used. The inner tube is a special type made by Pirelli and its use has been approved by Dunlop with their tyres. The inner tube must be the correct one to prevent heat build-up. (Pirelli 47.S. with T.R.11 valve). Note, correct valve type is important to match the aperture design in the wheel rim.

Tyres are either Dunlop (home market) or Pirelli (export markets). Wheel balance weights are SPECIAL and are only available from Jensen Motors, they are specially imported and have extra long tangs. Conventional weights with normal length tangs fall off within two or three miles, adhesive weights are not acceptable because of the car's high potential speed when adhesion can fail due to centrifugal force.

Crossply tyres were fitted to Mk. 1 cars, note that on F.F. models the Maxaret brake system is calibrated to crossply tyres (RS.8). Fitting of radial tyres to Mk. 1 F.F. cars will upset the brake calibration. Radial tyres were fitted as original equipment on Mk. 11 and Mk. 111 cars, and Maxaret braking on these F.F. models was calibrated for radials. Replacement Maxaret units cost about £120 each.

Unequal tyre size. e.g. One worn and one new, or one normal and one with "heat-growth" fitted to rear axle, can cause noise from the rear differential limited-slip unit as "wind-up" occurs. On a motorway, this would probably be a "clonk" noise as the limited-slip clutches operate to relieve wind-up tension, repeating every mile or so.

Fitting of radial tyres with their lower "roll" profile reduced car ground clearance slightly. To maintain the $5\frac{1}{2}$ inch ground clearance a plate was fitted under the rear axle to lift the car, and this fitment altered the angle between the propeller shaft and axle pinion. Because of this small angle change, on hard acceleration from standstill a slight vibration can be caused at 2000 - 2500 r.p.m. which can be felt within the car. This is a design characteristic on Mk. 11 and Mk. 111 cars which cannot be changed.

When Pirelli tyres are fitted they ride close to the rear wheel-arch valances, because of the rear axle offset a "foul" condition can occur between the tyre and the valance on full bump position. This has been resolved by "flattening" the valance edge instead of allowing it to stand proud.

Rear Axle.

This is a conventional unit built by Salisbury Axles and it incorporates their "Pow-r-lok" limited-slip differential.

To check operating tension on limited-slip unit, jack up one rear wheel clear of ground and chock remaining wheels, release handbrake and turn raised wheel with a torque-wrench. The limited-slip clutches should operate at approximately 50 lbs.ft. (a variation of 10% is acceptable).

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Ratcheting or graunching noises from the limited-slip unit are usually caused by dry clutches jumping between load and dry friction. A very high percentage of these problems can be cured by draining the axle oil and refilling with B.P. "Limslip", NOTHING ELSE! After this operation run the axle for at least 1000 miles, noises usually disappear long before this (at about 200 miles or so). If noises still occur after the 1000 miles has been covered, then the axle will be examined by a field engineer.

In cases of oil leakage from input pinion seal, remember the pinion bearings are pre-loaded by use of a collapsible spacer. To re-use this spacer after replacing oil seal or pinion flange, the flange nut MUST be tightened accurately with a torque-wrench to 160 - 180 lbs.ft.

Another source of "clonk" noises (mentioned earlier under "unequal tyre size"), can be excessive end-float on axle half-shafts. Allowable end-float is .002" - .005", check by removing brake calliper assembly and moving half-shaft by pushing and pulling on brake disc, check total movement with a dial gauge. If excessive end-float exists, adjust by removing appropriate amount of shims at half-shaft bearing cover. After any work on shims or half-shaft bearings, remember to refill the bearing chamber with grease until grease exudes from the vent hole. This indicates that the chamber is full and bearing lubricated, also preventing entry of dirt, any excess pressure created on working will be relieved by the vent. CAUTION: At any time when removing a rear hub assembly, it is usually necessary to use a puller to draw the hub off the half-shaft taper. Take car if applying "shock" blows with a mallet (to break the taper's hold) as it is very easy for such "shocks" to force the half-shaft inward, squashing the centre thimble in the differential.

Brakes.

Interceptor and S.P. models are fitted with disc brakes all round. The footbrake is hydraulically operated via a tandem master cylinder and servo assistance is provided (vacuum operated). Disc pad adjustment is automatic. The handbrake operates mechanically to independent callipers on the rear brake discs and the pads are automatically adjusted.

'J' series cars have an electrical pad-wear warning system where a contact wire is buried in the lining pad and as the pad wears this contact is gradually exposed. When the lining pads are almost fully worn, the contact can touch the brake disc when the brakes are applied. This completes a circuit which illuminates a warning light on the instrument panel. This same warning light is used to indicate application of handbrake, low level of brake fluid, and, incorporates a test button for the lamp bulb.

Brake pedal effort; on Mk. 11 cars a $\frac{7}{8}$" dia., master cylinder was used and coupled with vacuum then available, produced light progressive braking. On Mk. 111 cars a Load-Conscious Valve was introduced requiring a greater reserve of brake fluid, so the master cylinder size was increased to 1 inch. At the same time, application of exhaust emission control equipment caused a reduction in available vacuum, reducing assistance given by the brake servo. These facts combined to create a "harder pedal" and some complaints were made. On 'J' series cars, available vacuum has been increased so servo assistance will be greater, also the master cylinder size is being reduced to 15/16" (this size being specially made by Girling for Jensen cars). So light pedal pressure

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and progressive braking has been restored. NOTE, some early 'J' series cars are fitted with 1 inch diameter master cylinders, current production uses the 15/16" size. Parts CANNOT be interchanged, nor can early systems be changed for current systems unless the owner is prepared to pay for complete brake system replacement.

A conversion master cylinder (Dunlop to Girling) is available for Mk. 1 F.F. cars. Full details are given in Jensen Service Bulletin No. 102/2 dated July 1972.

The "Load Conscious Valve" is sensitive to the load in the car and uses this sensing to control hydraulic brake pressure to the rear wheels, the unit is designed to prevent the rear wheels "locking" on brake application (with danger of skidding) especially when unladen or lightly laden. Details of adjustment are given in Jensen Service Bulletin No. 9/71/6 dated 2nd September, 1971.

Note:- Because of Load Conscious Valve operation, it is essential that the car is standing on its wheels when any BRAKE BLEEDING is being carried out, DO NOT attempt bleeding operations with the car raised and the wheels hanging. Always ensure that BOTH brake fluid reservoirs are kept "topped-up" during bleeding operations and check between work at each wheel station.

Work from the longest brake line (one rear) progressively to the shortest line. Remember, a "tandem" master cylinder is fitted, if difficulty is experienced in obtaining a "good pedal" it may be necessary to bleed front and rear wheel stations together.

For cars used almost exclusively for town work in the hands of considerate drivers, slightly softer material brake lining pads are available. These are MINTEX M.78 type and they can be fitted on recommendation of a Field Engineer. The set of M.78 pads will normally be charged for and subsequent replacements are paid for as normal. Except where a car is brand-new when the first set of pads will usually be supplied free.

CAUTION: Current brake callipers are the same as those fitted to the 3½ litre Rover. Obviously, Rover lining pads will fit but NEVER BE TEMPTED TO USE THEM. While perfectly good for the Rover, such pads are inadequate for the Jensen's speed and weight and substitution IS EXTREMELY DANGEROUS.

Heating & Air Conditioning.

A sophisticated system is provided as a standard item on 'J' series cars. It offers a range of air temperatures within the car, automatically controlled to the level preset by the driver. Air conditioning can be operated or isolated, as desired, according to air humidity.

Safety Precautions.

No work on air conditioning systems should be attempted by untrained personnel. Many skilled mechanics are nervous of air conditioning systems because of rumours and vague stories about the effects of refrigerant on the human body. While refrigerant does have to be handled with care, it is no more dangerous than, say,

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