

Fitting a New Exhaust to a Mk III Interceptor

by Duncan Clarke

The exhaust system on my Interceptor was in a very poor state and needed replacing. I decided to buy a complete stainless steel system from the Club Spares Section. The reasons were two-fold; firstly, it was the least expensive stainless system I had come across, and secondly, Alan Kempster had actually fitted one to his own Interceptor.

I also bought a pair of rear mounting brackets, having decided that I could modify the existing silencer cradles and treated myself to a set of stainless steel manifold bolts.

Replacing the exhaust system is easy: First remove the old one. . . .

The rear section was easy to remove, since most of it was

already absent. Loads of WD40 seemed to help.

Removing the front section was a different story. The manifold bolts presented a real challenge. The exhaust down pipe was held to the manifold with what appeared to be 15mm steel bolts and brass nuts. The brass was a bit soft, so all the spanners did was to remove all the corners. Drilling, sawing and hacking the brass nuts eventually achieved the desired result. Access is awkward, particularly to the nuts nearest the engine. The nut and bolt on the offside, nearest the engine, took the longest by far. [Editor's Tip: cut the exhaust pipe off about 2" under the manifold joint with a junior hacksaw. With

the curve of the pipe out of the way you should be able to get a socket and ratchet handle onto this particularly awkward nut.]

Then, fit the new one. . . .

I tackled the nearside first. I assembled all the bits on the ground first, to make sure that all the pipes would fit together easily. I then fitted the silencer loosely into the cradle. I used strips of aluminium to pad the silencer to fit the cradle.

The nearside front pipe fouled against the chassis member when attached to the manifold, and closer inspection showed that the down pipe is curved slightly differently to the original. I phoned Alan, (it was midday Christmas Eve. . .) and he suggested that

I examine the engine mountings. Sure enough, the rubbers were very flat indeed, so I ordered a set. Replacing these engine mountings was also straightforward, but access is very restricted. I guess that each side took about an hour and a half.

The exhaust system fitted together well, although some of the pipe ends needed deburring. The pipes between the silencers and the rear resonators are supplied over-long, so that they can be cut to length. I cut mine so that the resonators protruded as far as the outer edge of the bumper.

All I have to do now is get the engine running properly.



REGALIA NEWS

I now have the *Brooklands Books* back in stock, priced at £6.95 + 55 p for postage.

Our range of Jensen Owners' Club clothing has been expanded with the addition of a polo-shirt [it must have a hole in it! - Editor]. At present these are all white with red embroidery in sixes L or XL: price £10.50. If they prove popular, I will offer other colours later in the year.

Finally, I am seriously considering producing a JOC Club Christmas card - yes, I know it's only April, but these things

take time to organise! I need to know, *quickly*, whether YOU, the members, are happy to pay 55p per card, for a good quality card featuring a Jensen Interceptor pulling Santa's sleigh, against a suitable snow-scene. To have a club card manufactured will require a minimum print run of 5000 - so I do need to know, *now*, whether this figure is reasonable - the club cannot afford to be left holding many hundreds of cards over for next year! PLEASE let me know your views.

John Lane



Dave, Len and cars upholding the Jensen flag at Horseguards Parade in support of BBC 'Children in Need' appeal - Sept. 1988.

CLUB REGALIA

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Note: all orders must be pre-paid before despatch. (No telephone orders!)

Jensen Interceptor

Two different radiator caps?

Q Could someone please remind me of the arrangement for the radiator and expansion bottle caps, I currently have sprung caps on both, however I recall that one should be unsprung or am I completely wrong?

Kevin Ainsworth
Middlesex

A Radiator cap is fixed, expansion tank cap is the one with a spring.

Zac Marshall

Removing exhaust manifold in place?

Q Anyone being able to remove the Exhaust manifold (drivers side on a right hand drive) with the engine in place? Sure looks hard to get the bolts closest to the firewall. I need to replace the gasket as it's just started leaking.

daveAUST

A I undid the engine mount that side, (as instructed by other members), and jacked the engine up a small amount. I was also told by Appleyards that the nuts should be brass so I bought some with studs and replaced the rusty old steel ones. Looks good too and so much easier for the next time! Oh and don't forget to tweek the nuts up again a week or so after.

73Mark11

A I've found that a 14mm swivel headed ratchet spanner makes light work of the tricky stud next to the bulk head, and just deep reach sockets on the on the tricky ones. Swapped the gasket in about 35 minutes without needing to undo any engine mounts.

Scorhill

What does the 'Fuel Expansion Tank' actually do?

Q I think I have a fuel tank leak, black goo oozing, and a smell of gas when I save enough cash to fill the tank. So I will have to drop the tank to find the source of the problem. Looking at the parts manual the US spec Mk II has an expansion tank with a maze nest of vent pipes with one pipe going off to the engine. Since the tank and its many vent connections

are inside the car, it could potentially leak fuel or fumes?

I assume this is some sort of positive fuel tank vent system dreamed up to appease the EPA Gods and save the planet? Is it stuffed with active carbon? If not what does it really achieve? Is there a good reason why I shouldn't junk it and simply vent the tank outside the cabin?

Any help will be much appreciated.
Patrick Hiron
Montreal

A The expansion tank stores the fuel vapour and it goes to the charcoal canister behind the o/s headlights. When the engine is running a pipe connected to the carb draws the vapour into the engine to burn it off. There is a pressure valve on the tank which opens when the pressure is too high. This regulation came in earlier in the US I don't think it was fitted to MK IIs over here. My 1973 MK III has it. I think it became law in Europe in the early '90s. Your fumes will probably be due to perished pipes.

Mine had a rust hole in the filler neck where it is welded to the fuel filler bowl which took me a while to find I thought it was a leaking fuel cap. The clips joining the tube to the tank were also rusted solid letting the rubber pipe leak. I cut them off and fitted new clips.

Gordon Sinclair

The bouncing speedo

Q Bouncing needle and a 'ticking' from the speedo. Removed the cable from inside the car, looks in good shape but dry. Greased it and checked for any hard bends from the speedo to the transmission,

While its very quiet now, no ticking the bounce is still there, 10mph or more. Is the verdict a new cable?

Gary Boyd

A I replaced mine a couple of times and the new ones seemed to be no better.

When I needed a longer speedo cable because I fitted a different gearbox I has a specialist make one for me and when fitted the bounce completely disappeared. Perhaps if our suppliers are having them made in batches maybe the grease is going hard if they have been in stock for a while?

Steve Payne

A I found with mine it was the clip alongside the gearbox that was causing too tight a radius.

I removed the cable from the clip

and the speedo is steady.

Gordon Sinclair

A I had a bouncing speedo and, a cable change made no difference. Eventually, the speedo stopped working and it transpired that the head unit was worn out, eventually seizing up. Only after I replaced the head unit did the bounce stop.

I suggest spinning the cable in the head unit by hand to see how it feels (or feel how it feels!) before changing too many items and laying blame on something that is working just fine.

Martin Ritchie

Rear leaf springs — what to do?

Q Need some advice regarding the leaf springs. The set currently on the car are the originals and because they were protected with that denso tape type stuff, are like new. but they are showing signs of sagging when any weight is placed in the boot or rear passengers are present. I have heard that re-tempering is possible and have had a cost from a company who say they can do it. £100.00 per spring.

Having heard some nasty rumours regarding the supply of inadequate replacements, I was wondering if the re tempering is a good idea and does it last. Also can any one give some recommendation on a good replacement supplier? I have also considered coil overs and other types of ride adjust shocks, but have decided to keep to the original route.

Phil Hayes

A Lots of people have had problems with the new springs that are currently being supplied. The perceived wisdom is to stick with the old ones and have them re-tempered and possibly have the eyes re-rolled.

All springs are going to re-sag sooner or later — if you are worried about losing rear ride height it is always possible to fit longer hangers (if memory serves, 2" longer hangers give 1" extra ride height).

Who did you try for your quote? Rossendale Road Springs, in Rossendale naturally, and therefore not very far from you, offer a whole range of services. The owner has an Interceptor and is a club member.

Keith Andrews

A Speak to Steve Payne. After fitting about four sets of new leaf springs which were still sagging, he added some coil over springs/shocks, which is an excellent

way of leveling the car and improving handling. Several other people have done the mod successfully.

Kerry Moore

A Just thought I should **update**. A brilliant result. After fitting Spax adjustables it seems to have sorted the problem I had with the drivers side rear. It always had a sag, about 1 inch lower than the near side, also a creaking noise was apparent. But on inspection of the old one it was seized/very tight. Replacing the shock has stopped the creak and levelled the suspension. I can only assume that the old shock was not travelling back and allowing the suspension to right itself?

With the springs: re-tempering is the way to go as long as they are the originals. I had mine done at Jones springs in Birmingham. If I remember right, they cost only £55.00 each side and that included the delivery back, but I did drop them off, mainly so I could see the set up. (very good with years of experience). They know what they are doing, they have the original set points to re-arch exactly as they should be. When I asked how long they will last the he said they have not had any back in 20 years.

Phil Hayes

Rear window trim finishers

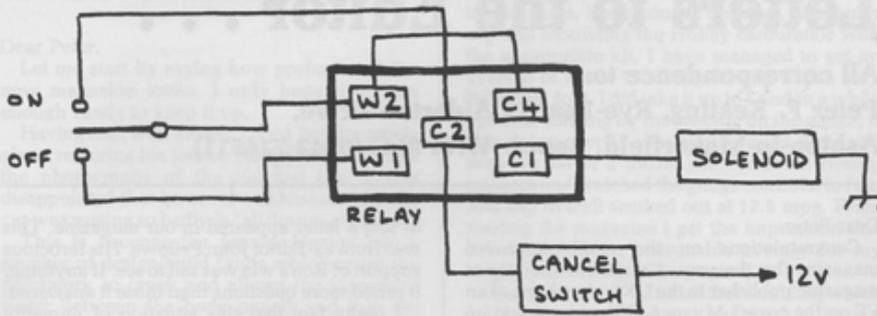
Q I have the small chrome joint cover for the backlight surround without a stud on it, I've seen a few that have been drilled through (ugly!), any suggestions how to fix a stud to it? I've used structural adhesive before for fixing parts and will give that a try. Don't think I could weld/braze/solder without having to rechrome it.

A I don't think you'll have any luck gluing them Their purpose is as a finisher but also as a locator to hold the two ends of the main stainless trim pieces together. They are invariably under tension (you'll have to tighten them up to get everything to fit snugly) and I cannot see an adhesive holding for any length of time.

The threaded stud should be welded onto the finisher, ideally Tig but Mig is fine. Mig better if it has stainless wire, but even ordinary mild steel wire will work. Just needs a quick zap. It will discolour the outer surface of the finisher, but as these are stainless steel (not chromed!) components, they are easily refinished and polished to as new.

Keith Anderson

FITTING AN OVERDRIVE UNIT TO A JENSEN-HEALEY



mounting rubber can be stiffened up by inserting a short piece of heater hose into the hole in the rubber that is revealed when the gearbox is jacked up. The total gearbox/overdrive capacity is 4.5 pints (SAE 20/50; additives like Moly slip must not be used). The speedo drive ratio in the Rapier overdrive unit is 4 : 14, whereas the Healey requires 4 : 13. It appears that a 13

tooth pinion is not available, so the speedo itself will need recalibrating. This will not correct the odometer, however, which will continue to read about 13% low.

The following is a list of the parts required when overhauling the gearbox, together with the Chrysler part numbers and prices (1983):-

ITEM	PART No.	PRICE (ex. VAT)
Mainshaft bearing	9197000	14.20
Mainshaft rear nut	71266920	0.93
Layshaft spindle	1235274	6.25
Layshaft spindle rollers (54 off)	79187233	1.08
Layshaft front thrust washer (4 sizes)	1224503/4/5/6	1.05
Layshaft rear thrust washer	5220868	0.95
Input shaft bearing	0188040	9.42
Input shaft bearing circlip	79207057	0.10
Input shaft bearing abutment (2 sizes)	9071158/9	0.20
Input shaft bearing oil seal		0.80
Input shaft rollers (23 off)	9187220	0.69
Top cover gasket (2 off)	1205886	0.14
Rear cover gasket	1236344	0.14
Front cover gasket	1224595	0.03
Overdrive gasket	K25638	0.03*
Overdrive cam circlip	79207036	0.09*
Propshaft oil seal	5220945	1.70*
		£37.80

Items marked * are for the overdrive (i.e. Sunbeam Rapier H120) gearbox. It may also be necessary to replace the baulk rings, synchro hubs and any gears that are worn. No special tools are required, but the following items are useful:-

Silver steel bar $\frac{1}{8}$ " dia. \times 6 $\frac{1}{2}$ " long.
 Silver steel bar $\frac{1}{8}$ " dia. \times 5" long (2 off).
 Silver steel bar $\frac{1}{8}$ " dia. \times 3" long.
 Hylomar jointing compound.
 Haynes Workshop Manual (Sunbeam Rapier H120).



by Mick Thomas

Hello again and welcome to the 'technical stuff.' I haven't had time to prepare a definite article, with getting the car ready for the International Weekend - so I'll answer several on-going members' problems - which is one of the reasons for having a technical section!

In the "Letters to the Editor" there is one concerning air conditioning from Tony Cartwright. Anyway, I ran into Tony at the Weekend and explained everything to him but for the benefit of other members I'll answer his queries here.

Never attempt to uncouple any of the pipework when the system is in operation as there can be anything up to 250 psi in the high pressure pipes. Drain the system through the charging valves on the compressor before working on the plumbing and wear eye protection, i.e. clear plastic goggles. The system is charged with a gas called Freon 12 and in itself is not particularly toxic but can cause severe eye

damage if liquid Freon comes into contact with said eyeballs. (This can cause an instant case of the "Ahhh! Glasshopper!" - those of you that have seen "Kung Fu" on the box will have to give that one a miss.) When Freon 12 is burned it does produce a highly toxic gas so don't smoke when working on the air conditioning and don't have any naked flames around.

The compressor itself is lubricated with a special oil called Shell "Claurus 33" - an equivalent oil is Castrol "Icematic 99." These are special refrigerant oils that dissolve in Freon 12 so ordinary oils should not be used which would result in severe sludging and eventual blocking of the system. To recharge the system requires the use of special equipment, i.e. test pressure gauges, Freon gas, vacuum pump, etc. so leave it to the experts.

Mr. A. Henry, you're on next. To fit the alloy wheels to a Mk. II requires the use of Mk. III top suspension arms. The Mk. II ones are pressed steel items whilst the Mk. III ones are forged items with less material around the top ball joint securing bolts. This is to clear the alloy wheel. They are a direct replacement but have the camber and castor angles checked and adjusted after fitting.

Paul Steentjes seems to have a problem with oil pressure but fails to mention which car has got the problem. Unless you've got a very early car, i.e. CV8 or early Mk. I Interceptor, you should have a windage tray fitted as standard anyway. Oil pressure loss on Chrysler engines - indeed any engine - at high rpm is more often than not caused by oil starvation resulting in aeration of the oil. To explain this problem, a big V8 crankshaft turning at 5000 rpm+ can hold as much as 8 pints of oil in a wind generated vortex around itself. In other words, the oil gets caught

up round the bobweights, etc. and doesn't get back to the sump. A windage tray helps by "scraping" the oil off the crank but can't cure the problem completely. Normally, the sump capacity of the V8 engine can just about cope up to approx. 6000 rpm but after that you need to modify the sump and oil pick-up to increase capacity.

If you've worn crankshaft bearings on your engine then the oil "leakage" through the bearings can easily be doubled resulting in the oil pump working overtime to keep up the flow. If the pump is worn to any degree it won't be able to. This can cause oil starvation in the sump, so I'd be tempted to have a look at the pump and bearings. (Fully grooved main bearings make this problem even worse because they require even more oil to work properly.) If somebody has been messing around with the engine there is a chance that the oil pick-up is not correctly located in relation to the sump pan, i.e. parallel and lying in the bottom of the sump. Could even be the wrong pick-up, i.e. too short! I can't understand your comments on high volume pumps because I've fitted loads of them to all V8 cars with no problems whatsoever. In any case, unless you increase sump capacity by at least 2 pints and fit a longer oil pick-up this is unlikely to cure your problem unless your oil pump is worn out. I agree with PFK - you have a definite fault!

I can't answer P. Moulding's queries on the heater controls without the use of the diagram that will be in the next issue so have patience and all will be revealed.

Well, that's about it for this issue and I promise the air conditioning and heater article will appear next time. See you soon.

MICK THOMAS



Technical Questions

by Mick Thomas

Well, the summer seems to have passed us by this year. The weather at the JOC Weekend left a lot to be desired, with much the same at the Northern section "do" at Harewood House on August 18th. However, us Yorkshire and Lancashire mob aren't put off with a bit of rain (after all, whippets have to be exercised and pigeons mucked out, whatever the weather!) which always results in club functions up North being well attended. A lot of the credit must go to Harry Hilton for all his hard work in organising such events, but members up here really do support the club and I feel the Northern section must be the best section in the JOC.

Anyway, on to air-conditioning! Yeah, I know we need air-conditioning like a hole in the head during this glorious summer but the article is written already so you'll have to sort it out for next year!

Start the motor, open the face level vents and turn the blower control to full speed. Note the temperature of the air and then turn the heat control to cold and press the a/c switch. This should result in the temperature of the air coming from the face vents becoming colder. If little or no change is noted then a few checks should uncover the problem.

Firstly, switch on the ignition, blower motor and a/c switch when a distinct click should be heard from the a/c compressor clutch. The face of the clutch should also move in and out when switched on and off. If nothing happens then trace the wire from the compressor clutch and disconnect it at the bullet connector. With a 12-volt test lamp check that the purple/blue wire is in fact live when the a/c is switched on. If it is, then re-make the connection and try again, making sure the connector is making good contact. If still no joy then the clutch field coil or clutch is duff and requires replacement. If, on the other hand, the purple/blue wire is not live then search out the a/c thermostat fitted next to the heater water valve under the offside bonnet catch. It's a small box with 2 wires attached by spade terminals - one wire in coloured blue/green and the other purple/green. Remove the blue/green wire and check to see if it's live. If it is then replace the wire and remove the other wire.

Now check the spade terminal on the thermostat without a wire attached to see if that's live. If it's not, then the thermostat is duff. If it is live then replace the wire on the thermostat and locate the Ranco control box (about 3" x 2½" with white plastic cover located under radiator panel on Mk. II and early Mk. III, on nearside inner wing "J" series onwards). You will discover two of these control boxes: you want the one marked "Cuts out on rise of pressure," visible through clear segment in plastic cover. Remove the single screw holding on the cover and remove cover. Inside can be seen two screw terminals with wires attached - one purple/green and the other purple/blue. Touch the test lamp on the purple/green terminal and check for live. If it's not live then there's a break in the purple/green wire between the a/c thermostat and the Ranco control box.

If it is live then check the other terminal for live also: if it's not live then the Ranco control is duff as it should only break the circuit when pressure in the a/c system rises to an undesirable level. If the green/blue wire attached to the a/c thermostat proved to be dead when checked then the problem most likely lies within the centre console.

If the blower motor runs OK then the fault will lie within the a/c switch itself or the green/blue wire from the blower switch to a/c switch. Wires can also become detached from these switches, causing the problem. If the blower motor doesn't work then it could be the five terminal relay at fault with either wires off or a burnt out relay. However, if the fuel lid doesn't work either then drop the glove box right down by removing the stop screw and look up behind the dash and you should be able to locate 3 fuse holders with brown wires attached. One of these protects the a/c, blower and fuel lid circuits, so remove all three and check fuses. If you've still no joy then check the wires on the solenoid underneath the battery tray because it's not unknown for the terminals to corrode and fall off. By the way, if you feel man enough to delve into the centre console to check the relay, etc. then arm yourself with a stiff whisky, 'cos it's a real "snakes nest" with wires falling off all over the place when they are disturbed - patience wins through in the end.

Right, that about covers the electrical side of the a/c and if the compressor clutch is operating normally then check items as follows. With the a/c switched off try to turn the centre of the compressor clutch. This should turn easily by hand. If it won't budge then the compressor is seized and requires depositing in the nearest rubbish skip (more likely on "V" compressor a la "J" series. York compressors seem more reliable). If the compressor turns OK then start the engine, switch on a/c - compressor should now be running. Find the receiver/dryer unit bolted to nearside inner wing just behind the radiator and you will discover there is a sight glass on top of the unit which may require cleaning with a cloth.

With the compressor running, look into the sight glass and observe the liquid

flowing in the system. If you can't see anything and there is no cold air blowing from the face level vents, then the system is probably completely discharged. If a constant flow of froth is evident then the system is partially discharged and requires recharging - a clear flow of liquid with occasional bubbles is acceptable if the a/c seems to be working OK. Recharging the system requires special equipment and checks for leaks using a halogen leak detector capable of detecting leaks down to ½ oz. per year is required. You will see from the diagram several other bits of equipment on the system but these require specialised equipment to check them properly.

As an aside here, have the system checked over and recharged once a year and never run any car with a/c without a good quality glycol based anti-freeze in the cooling system as it's possible to freeze up the heater matrix under certain conditions. Also, there seems to be a number of owners who are unaware of the fact that the a/c can be used to demist the interior on rainy days by closing the face vents and switching the blower to full with the a/c switch on and the heat control on "hot" or "defrost."

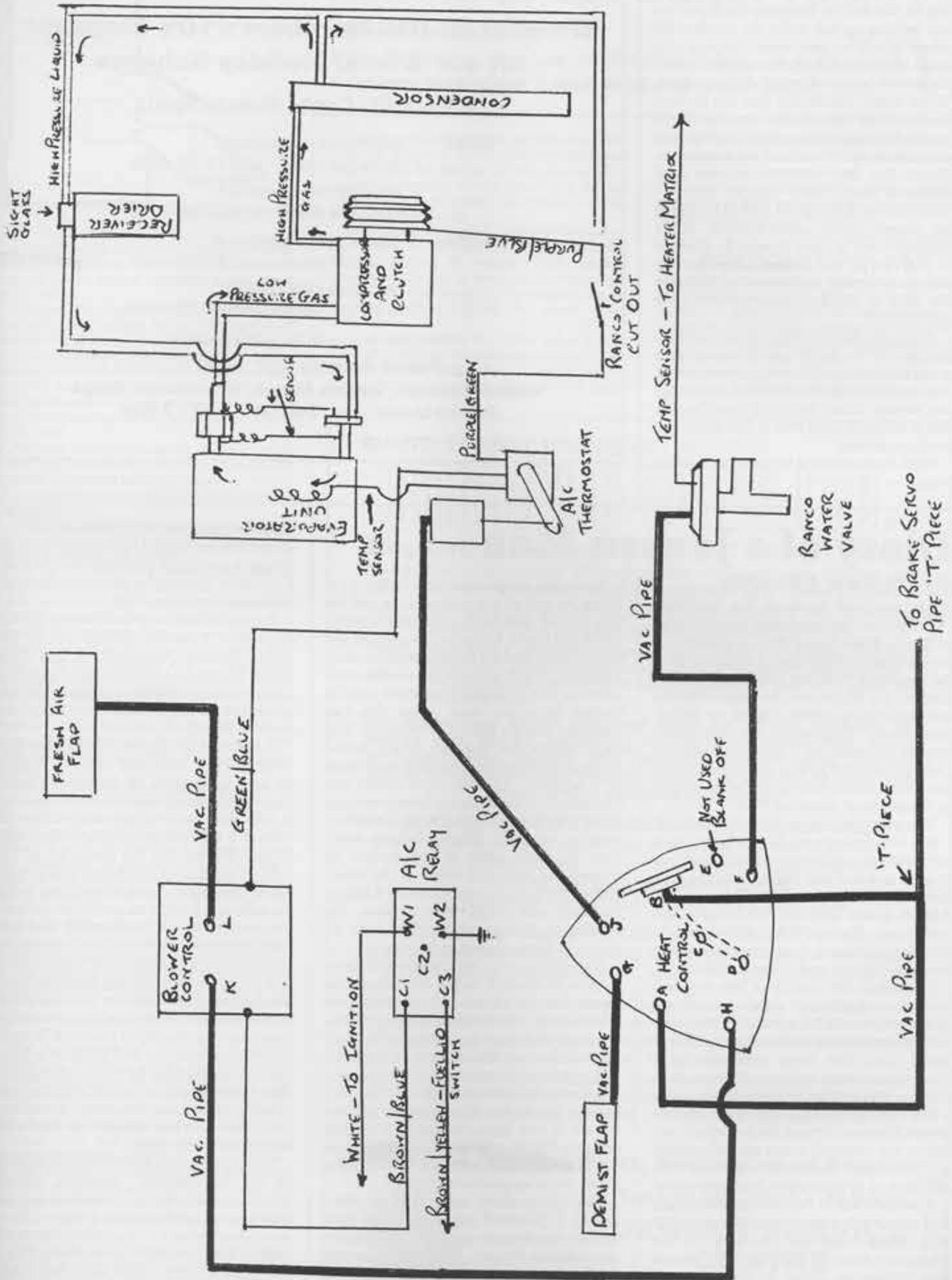
The heater on the Interceptor is normally very good, so if your's is not up to the mark then ensure the engine is getting up to temperature as a duff thermostat can cause heater problems. By far the biggest problem with heater system is the Ranco vacuum controlled water valve. It usually sticks on or off and leaks water. If the heater is constantly cold then remove the small bore rubber pipe on top of the Ranco valve and insert a vacuum gauge into the pipe with the engine running, set the heat control to "hot" and you should get a reading equal to manifold vacuum on the gauge. If nothing happens then either the heat control is duff or the pipes are not connected correctly on the back of the control.

If the vacuum reading is OK then the water valve is stuck closed and needs replacement. If none of the vacuum controlled functions seem to work then it's possible the small bore vacuum take off pipe has split where it joins the brake servo pipe under the scuttle behind the brake fluid reservoirs.

If the water valve leaks water then replacement is also required as they cannot be repaired. Replacement valves currently available are of a different design which unfortunately are either "on" or "off" with no intermediate position. The original Ranco water valve is now obsolete and no longer available. However, the replacement at least works so half a loaf is better than none.

Whilst on the subject of the heater it might be worth mentioning the plenum chamber drain tubes. These 3 tubes are located under the bonnet - 1 each side of the a/c evaporator and the third running behind the battery. It is important these tubes are kept clear as they drain rain water from the fresh air intake - if they get blocked then water will enter the car, soaking the foot-wells.

TECHNICAL QUESTIONS



TECHNICAL QUESTIONS

The fresh air flap seen in the diagram can be checked by dropping the glove box and looking up just under the windscreen where it will be seen about the size of a small letter box. Check this operates when the blower is moved from "off" to position "1" or "ram." The demist flap can be seen by removing the offside console carpet where the servo motor controlling it can be seen attached to the side of the heater box. Check this flap works when the heat control is moved from "hot" to "defrost." Flaps not working can be caused by seized up hinges, faulty servo motors, faulty control switch or pipes incorrectly attached to heat and blower controls. The diagram shows the correct position of the pipes on the back of the heat control and blower control.

Early Mk. IIIs and Mk. IIs can have the position "1" on the blower dispensed with so the blower doesn't work but the fresh air flap opens giving a "ram" effect. Later cars are already fitted with this modification and if required drop PFK a line and I will send the details.

Well, that's about it for now, so see you soon.

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Peter Adams (JOC No. 677)

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Diary of a Jensen Man . . .

By Andrew Edwards

We have all heard of the Le Mans 24-hour, but not many people know of the La Mans Grand Prix. It takes place on the Friday before the Le Mans 24-hour on the roads between Calais, Boulogne, Dieppe, Le Havre and Le Mans. Entries are confined to either French or British participants. There are (in my experience) always two winners – the British and the Gendarmes – the British win the race and the Gendarmerie take all the prize money in the shape of speeding fines.

This year I did not join in, firstly because I was not driving and secondly, because we were only cruising in an MG Metro at 85 mph and that was simply nowhere near fast enough. There were TRs, Jaguars, Astons, Rover V8s, the odd Porsche and one Jensen Healey. All matched against Peugeots, Citroens, Renaults with the odd Peugeot, Citroen and Renault thrown in!

I watched the Healey (a late 5-speed) overtake everything in sight – including a British registered Porsche 911. The order was soon reversed – the Porsche driver really didn't like being overtaken by a Healey. Some 10 miles further on both Porsche and Healey were behind us again – still scrapping. They had obviously followed the signs through the last town – my driver, the owner of a race and rally school at Silverstone, and fairly cognizant with this part of France chose a shorter route!

Without a doubt the most glorious sight and sound at Le Mans were the two 1935 V12 racing Lagondas charging up the Mulsanne Straight. Both privately owned and visiting Le Mans to commemorate Lagonda's only victory at Le Mans 50 years ago they were blatantly "posing" – and who could blame them!

It was the eighth consecutive visit to Le Mans by one of my companions and he was full of anecdotes. One particularly, still raises a grin. I was commenting on the curious way that the French organise their ablutions. A lady sits at a table at the open entrance to a large room which is equally divided by a low wall – one side *Les Hommes* and the other *Les Femmes*. The lady collects the "tips" as people leave. Quite why she is tipped remains something of a mystery. Anyway, it reminded my companion of an occasion three years ago when Michelins hospitality at lunchtime went to his head. Whilst walking away from his sixth glass of champagne he tripped and went full length in the grass. He lay there, his cap lying where it fell by his head, and simply went to sleep. On waking up 2 hours later there was 40 francs in loose change in his cap. . . .

An old 541 was air freighted in from Lusaka in Zambia earlier this year. The owner was the widow of a car enthusiast who had run it in Zambia for many years. As a sort of gesture in memory of his love of cars, the lady flew the car to England, had us restore it, and took it away again. What was truly remarkable was the fact that her late husband had actually entered the car in two East African Safari rallies and actually completed the full distance on one of them! There must be a record established there somewhere!

The independent radio station, West Sound, in Scotland have, as part of their weekly motoring programme, been restoring a Jensen Healey. More or less every single panel is being replaced and the engine rebuilt as well. I think the reporter who runs the programme owns the car and indeed he is paying personally for all the

parts. I suspect the radio station are picking up the labour charges. I am writing to West Sound to see if they are prepared to release a cassette; it could be useful to potential DIY restorers in the Club.

A little bird tells me that there is a 1967 Interceptor I manual gearbox out on the racing circuits. Apparently it has been rebuilt by Jensens and has a 550 bhp engine – amongst other things . . . apparently it is quick! (Yes, and it's featured this month, so there! – Editor).

A customer of ours from California, one Gregory Peck, was over recently. Whilst he was in England he bought an Interceptor III from a "dealer" in Southampton. It was dusk and raining at the time he viewed it but undismayed he parted with £2,600. He was on the phone to us the following day with overheating problems. Since there were some other things to be done he left it with us and flew back to California. (The car, incidentally, was destined for a close relative of his for whom he was buying it as a present). When I phoned him in California to tell him that there were great globs of weld all over the side of the engine where someone had tried to seal the huge cracks in the side of the block, he was not a happy man . . . and no, he is not the film star by the same name but an Englishman running a company that sells the "reg. number etched on the glass" franchise. Mind you, I bet it doesn't do him any harm having the same name!

The owner of this year's winning Healey at the International Weekend, David Booth, has bought an interesting car. A brand new, unregistered Jensen GT. I remember seeing it in a garage in Banbury back in 1977 – it wasn't for sale then. There is apparently some "final assembly" work to be done. David says it will take him about six months to get ready. Perhaps we will see it next June at Penns Hall.

Ventilation



Richard Fischer's SP

Interceptor electronic heater control

Many years ago the heater valve on my SP stopped working, and I was unable to obtain a direct replacement with the capillary control circuit and so replaced it with a simple vacuum operated valve. Since then I have only been able to have the heater either on or off. However carefully I moved the control it just went from full on hot to cold. I guess other people have a similar problem.

Tools you will need

In order to make this you will need the appropriate tools as listed below and a working knowledge of how to construct a circuit using stripboard. Tools required are as follows:

Essential Soldering iron, Multimeter, Side cutters, Solder stripboard, Track cutter, Pointed pliers, Drill and twist drills.

Desirable DC power supply, Tweezers, Solder sucker.

Parts list

I bought most of my parts from Maplin and I have included the Maplin part number where appropriate. All parts with a voltage spec need to be 20V or more apart from IC1 which is rated at up to 15V.

- Die Cast box 111x60x27mm N89BQ
- Solenoid-operated Vacuum valve – I bought a second hand valve on eBay (Vauxhall Omega fit)
- Wire – almost anything will do as it only has to carry ½ amp max
- Stripboard N99CF - I bought 100x160mm (only used a small portion of this)
- Grommets QT92A – select the correct size for the wire you use
- IC socket FZ45Y (I prefer to use a socket, but you can if you wish solder the IC to the board directly) R1 3k9 resistor M3K9
- R2 20k resistor M20K
- C1 & C3 0.01 µF ceramic capacitor BX00A
- C2 47 µF electrolytic capacitor VH32K
- C4 10 µF electrolytic capacitor VH24B
- D1 1N914 diode QL71N
- D2 and D3 switching diode QL80B
- L1 3mm red LED CJ66W
- LED mounting bezel YY39N
- IC1 NE55N Timer QH66W
- P1 1MΩ potentiometer FW08J
- T1 BD681 transistor N76AH
- Knob K14C
- Stripboard pins

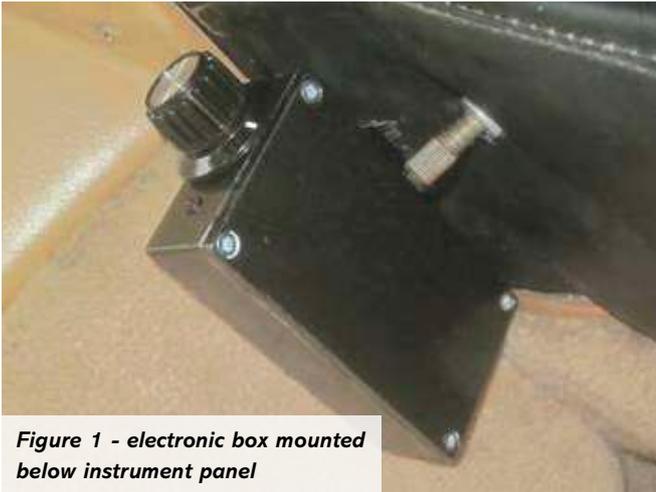


Figure 1 - electronic box mounted below instrument panel



Figure 2 - solenoid operated valve fitted near heater valve

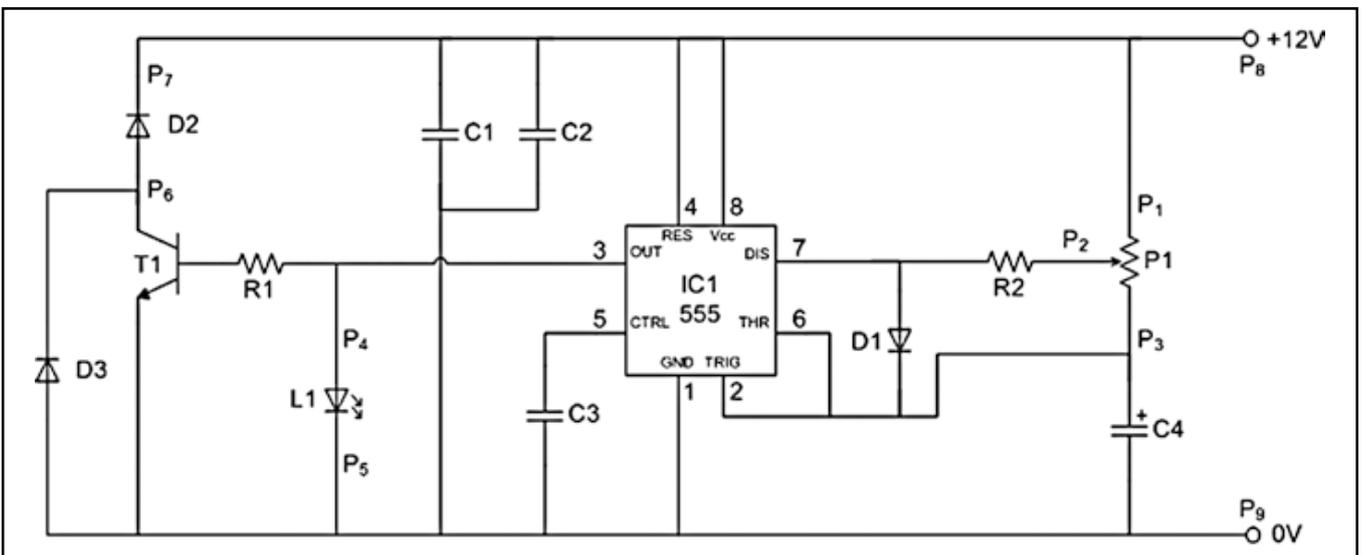


Figure 3 - electronic circuit diagram

Being an electronics engineer by trade and having recently retired from work, I decided to design something that would give linear heat control. I adopted a solution whereby the heater valve is turned on and off at a fixed period (~10 seconds) and you can adjust the mark space ratio from zero to one, thus enabling the valve to be pulsed on for a very short or relatively long time. I have found that this gives very good control over the heat level in the car and has the added advantage that you can adjust the temperature on defrost. I used a solenoid- operated vacuum valve (from a Vauxhall Omega) in series with the heater control valve, to allow electrical actuation of the heater valve. I mounted the electronics box below the instrument panel, and the solenoid operated valve under the bonnet near the heater valve as shown in figures 1 and 2.

The electronic circuit is relatively simple and is shown in figure 3. IC1 is a NE555N timer operating at a 10Hz period, and the potentiometer P1 adjusts the mark space ratio from zero to 100%. The LED L1 is mounted in the box and indicates the heating level. As the potentiometer is rotated clockwise, the LED changes from off to blinking on for a short period, then blinking on for longer and longer until it is on almost all of the time. R1, T1 and D2 and D3 are the driver electronics for the solenoid operated valve, which is connected via wires to pins P6 and P7.

Building the Circuit

Fig 4 shows the stripboard layout. This is a bit different to my layout as I was developing the circuit as I went along, which resulted in a far from optimum layout. The grid in figure 4 represents the hole spacing of 0.1". An X represents a cut track and the tracks run horizontally in the diagram. The blue circles are the mounting holes. I used M3 countersunk screws with brass spacers to hold the board clear of the box. If you are using a metal box, which I would recommend, it needs to be connected to 0 V as shown in fig 4. Ps denote stripboard pins. The straight lines are wire links and you can generally use the excess wire from the components as they are soldered in and trimmed for this purpose.

First cut the board to size (you can calculate the size from the 0.1" grid) and then drill the mounting holes. Then fit the components, ensuring you get the polarity correct where it is important, cutting tracks as you go.

I suggest you start by fitting IC1 and then work right, followed by working left until all of the components, links and cut tracks have been completed. **Do not fit link L1 at this stage.** This connects the timer circuit to the output stage. **Also do not insert the IC into to the IC socket if you have used a socket.**

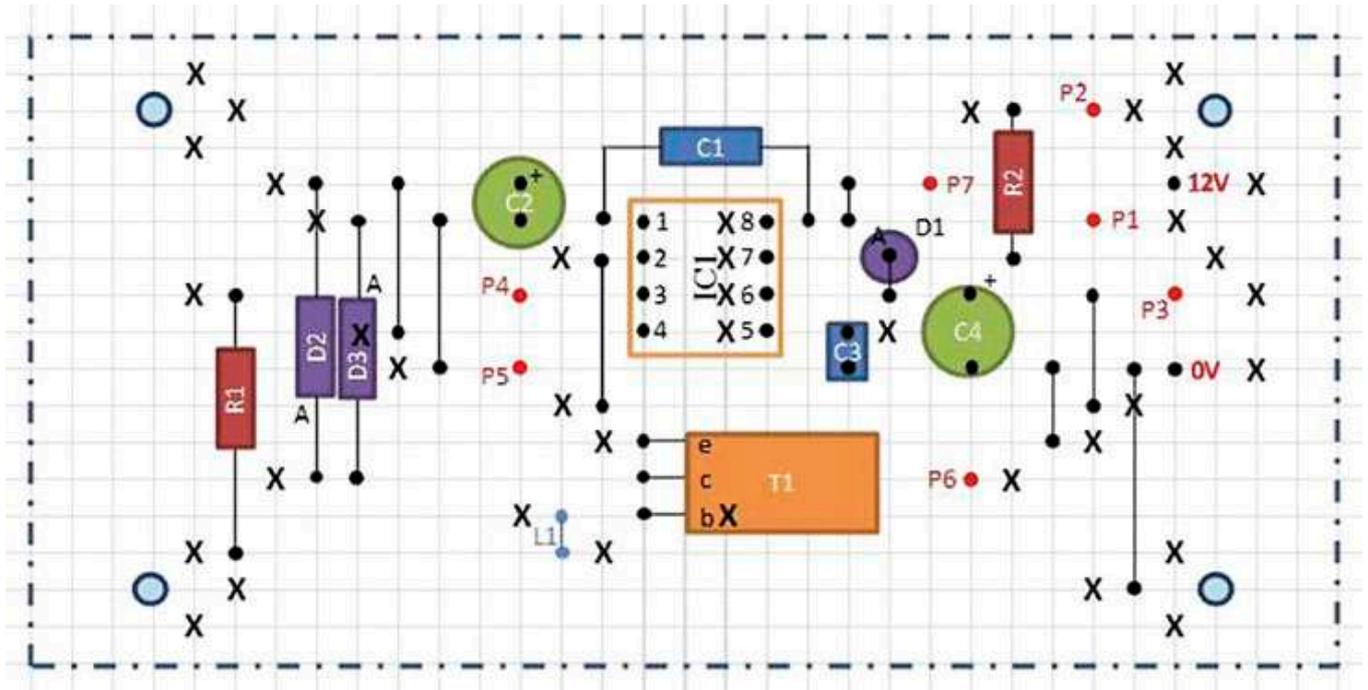


Figure 4 – stripboard layout

Testing the Circuit

The circuit board should be tested prior to fitting it into the box. The LED I specified has a built in ballast resistor, if you buy one without it you will need to fit an appropriate current limiting resistor in series. Temporarily connect LED, L1 to pins 4 and 5, ensuring the polarity is correct. An easy way to find the polarity is just to try it both ways round on a 12 V power supply. The lead connected to positive when it lights up needs to be connected to P4. Also temporarily connect the potentiometer, P1 to pins P1, P2 and P3, ensuring the centre potentiometer connection is connected to P2.

It is now time to connect the circuit to your power source, ensuring that you can monitor the current taken from the supply. Turn the power source on. The current drawn should be less than 1 mA. If not you need to find what is wrong.

Next turn the power off and insert the IC into the socket, ensuring it is round the correct way. Set the potentiometer to approximately mid-range. Turn on the power supply. Check that the current is less than 100 mA. If it is more than this there is a connection error you will need to find, and rectify. Turn the potentiometer fully clockwise, when the LED should be on almost all of the time. Now turn it fully anti clockwise, when it should be off either all the time or almost all of the time. If the operation is the other way round, i.e. the LED is fully on when anti clockwise, reverse the connections to P1 and P3. As the potentiometer is turned clockwise the time the LED is on should increase. Finally turn the potentiometer anti clockwise, and check that the current when the LED is off does not significantly increase when the potentiometer reaches its end stop. If it does increase, try changing R2 to a 33k resistor. Fit link L1 and check that the circuit still operates and does not draw more than 100 mA.

The next step is to test the solenoid-operated valve by connecting it directly across the 12V supply, and checking that the input pipe

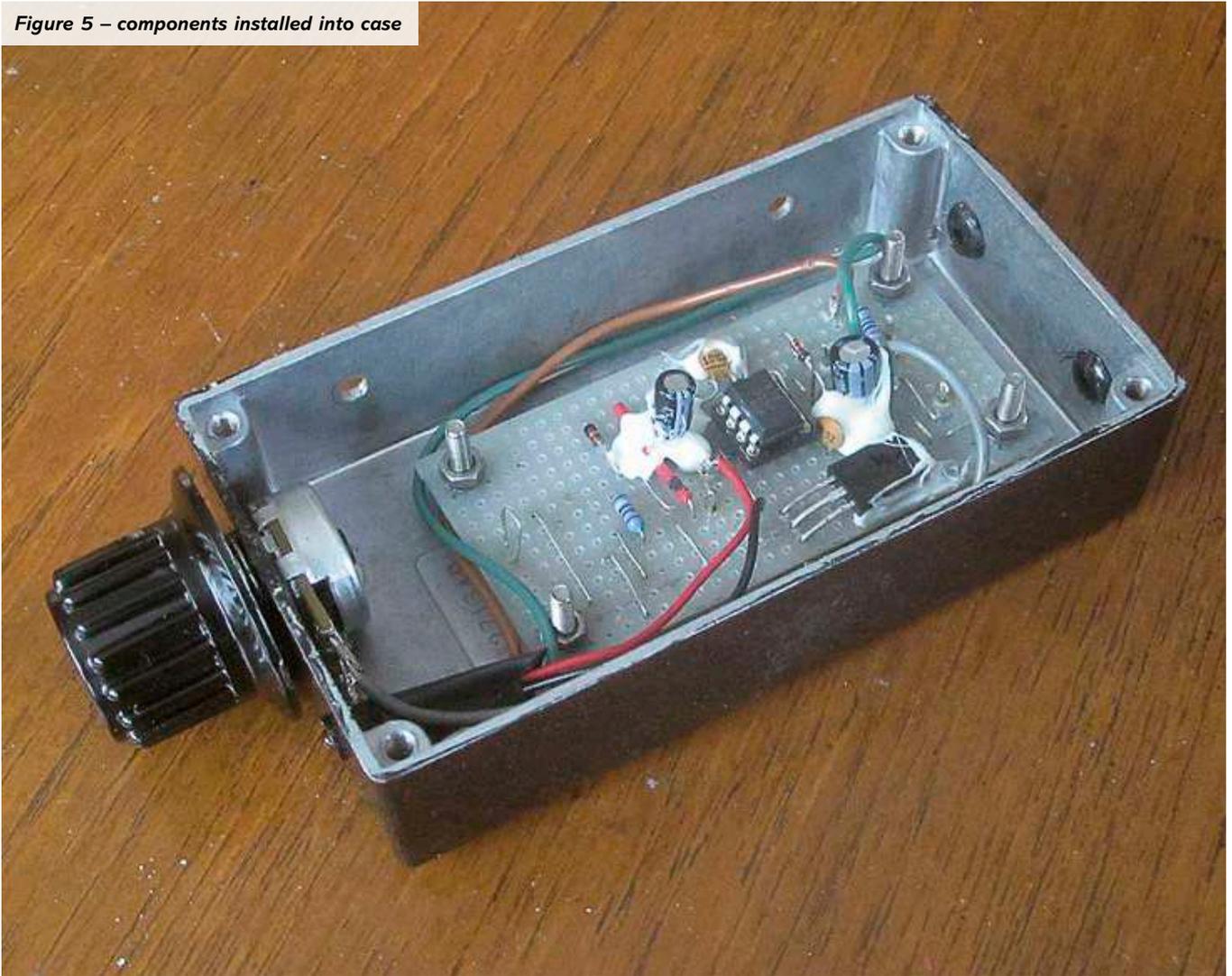
is switched between the two other pipes on application of 12V. Measure the current drawn from the 12V supply. The output stage of the timer circuit can drive approximately 1A, and so as long as it is less than this (a typical current for this type of solenoid is 250mA), it will be OK.

Temporarily connect the solenoid valve to pins P6 and P7. Turn on the power supply and check that the LED is operating as before when the potentiometer is moved from fully anti clockwise to clockwise and that the valve is also operating, by checking that the supply current increases when the LED is on. Measure the voltage between P5 and P6. When the LED is off it should be about 12 V and when the LED is on it should be less than 1 V. Turn the potentiometer fully clockwise so that the LED is on almost all the time and check with your finger that T1 is not getting too hot to touch. Leave the circuit running for about five minutes, occasionally checking the temperature of T1. If using an adjustable power supply, finally check that the circuit operates properly at 11V and 14.5V. Since there is significant vibration in a car environment, I fixed the larger components to the circuit board using a glue gun.

Final Assembly into the Box (See Fig 5)

Disconnect power supply leads, the LED, the solenoid operated valve and potentiometer. Drill holes in the diecast box for the potentiometer, LED bezel and cable grommets. Also drill holes for the circuit board mounting screws, and any other holes needed to mount the box in the car. I used self-tapping screws and ensured that the holes were in such a position that I could get at them with the box lid removed and the circuit installed. Ensure there is no swarf remaining in the box. Fit the potentiometer, LED and grommets into the box and then mount the circuit board, ensuring it is held clear of the bottom of the box, thus preventing short circuits. Check with a multimeter that the 0V pin is connected to the box. Temporarily fit power leads and the solenoid-operated valve, and check the circuit still works.

Figure 5 – components installed into case



Assembly to the Car

Fit the solenoid in a convenient spot; I fitted it where the original heater valve had been fitted (see fig 2). Connect the input pipe to the vacuum tube normally connected to the heater valve and connect the output to the heater valve with a new piece of tube. If you have a vacuum gauge, it is useful to connect it between the output pipe and the heater control valve so that you can monitor the operation of the valve.

Choose the location for the control box (see fig 1 for my location) and find a switched 12V wire nearby. A solid white colour indicates a 12V ignition switched wire. The oil light and fuel flap lamp both have a switched live connection and are relatively easy to get at. Connect 12V and 0V wires to the timer circuit of such a length they will reach to the identified switched live wire and a suitable 0V connection. Make up a lead to go between the solenoid-operated valve and the timer box, feed it through the bulkhead and connect it to the timer circuit. Disconnect the car battery. Connect the 12V flying lead to the identified switched 12 V supply. Connect the flying 0V lead to a suitable ground point. Connect the cable from the solenoid to pins P6 and P7.

Testing in the Car

Reconnect the car battery, set the original car heater control knob to hot, and start the engine. Check that the LED on time increases as the potentiometer is turned clockwise, and reduces as it is turned anticlockwise. Once the engine is warm, turn on the interior fan, turn the potentiometer fully anticlockwise, and check that the air coming from the heater air vents is cold (vacuum gauge reading should be 0 bar). Turn the potentiometer fully clockwise, and check that the air is hot (vacuum gauge reading should be ~-12 bar). Check that rotating the potentiometer anticlockwise results in the air temperature decreasing. At an eighth from cold it should be noticeably colder than on hot. If all is working turn off the engine, fit the lid to the box and you have finished.

Richard Fischer
Member No. 1506

TECHSHOP

INTERCEPTOR MK II AND III

HEATING AND AIR-CONDITIONING

FAULT-FINDING THE COMPLEX (IN THEIR DAY) SYSTEMS

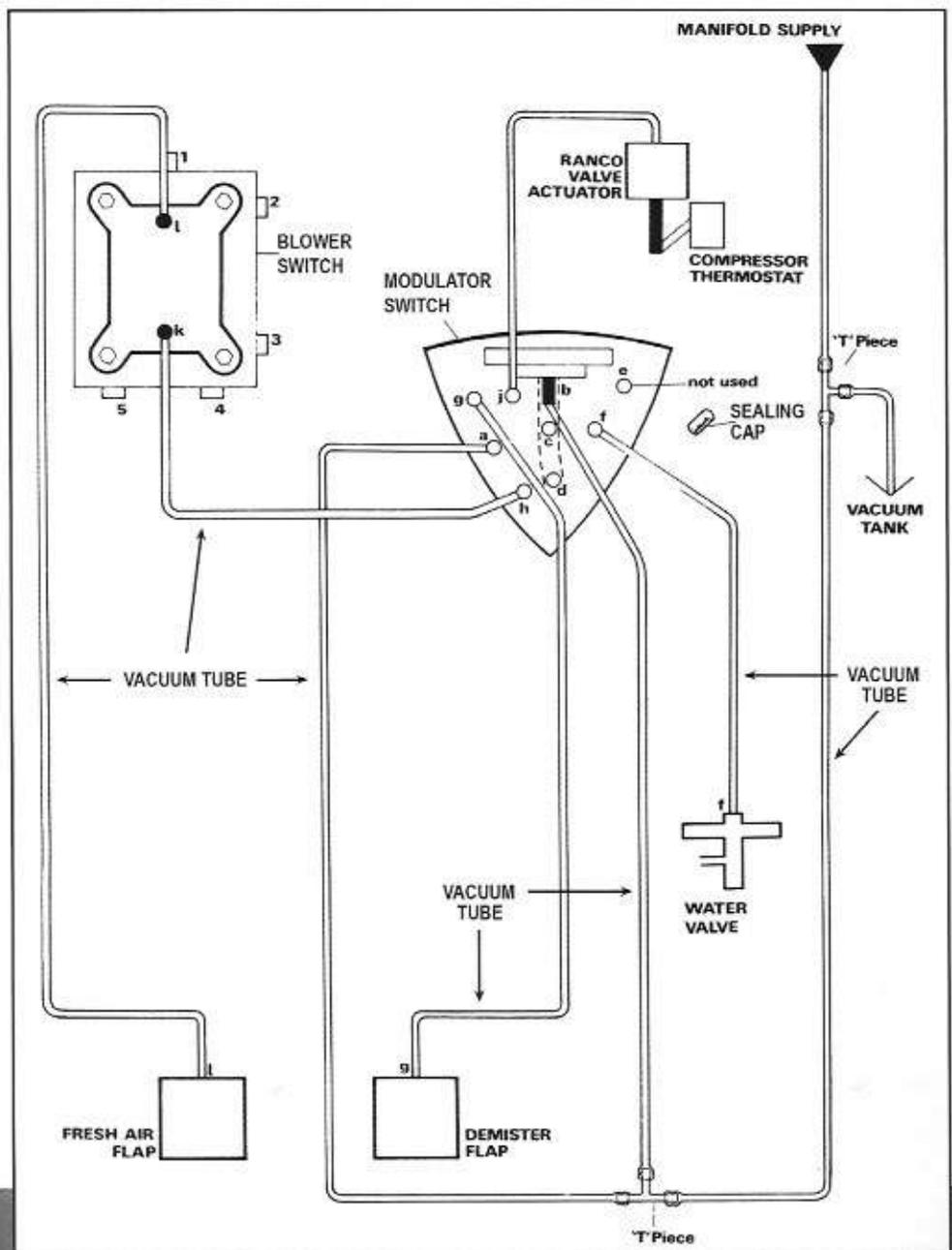
BY MICK THOMAS

START THE MOTOR, OPEN THE FACE LEVEL VENTS AND TURN THE BLOWER CONTROL TO FULL SPEED.

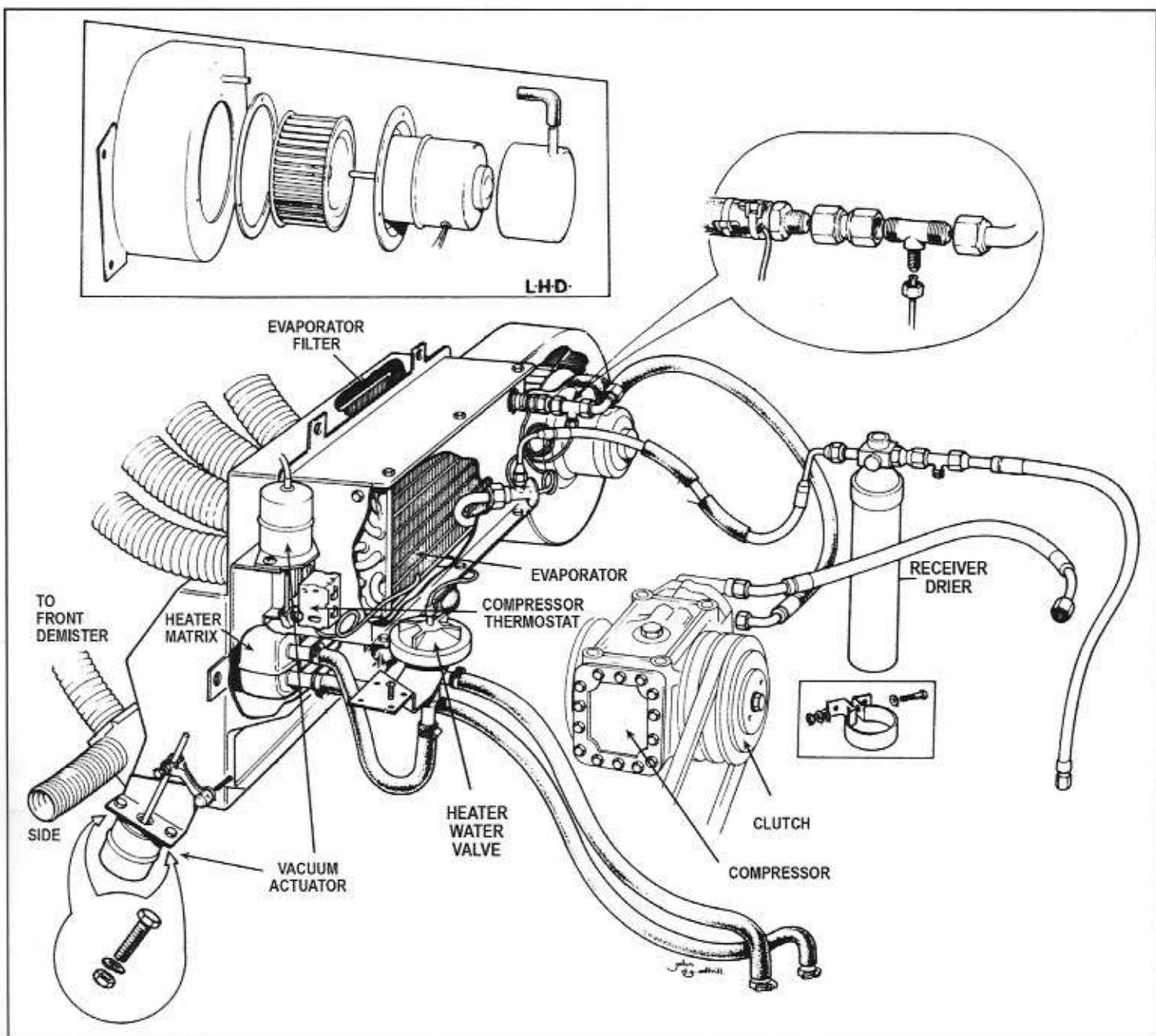
Note the temperature of the air and then turn the heat control to cold and press the a/c switch. This should result in the temperature of the air coming from the face vents becoming colder. If little or no change is noted then a few checks should uncover the problem.

Firstly, switch on the ignition, blower motor and a/c switch when a distinct click should be heard from the a/c compressor clutch. The face of the clutch should also move in and out when switched on and off. If nothing happens then trace the wire from the compressor clutch and disconnect it at the bullet connector. With a 12-volt test lamp check that the purple/blue wire is in fact live when the a/c is switched on. If it is, then re-make the connection and try again, making sure the connector is making good contact. If still no joy then the clutch field coil or clutch is duff and requires replacement. If, on the other hand, the purple/blue wire is not live then search out the a/c thermostat fitted next to the heater water valve under the offside bonnet catch. It's a small box with 2 wires attached by spade terminals — one wire is coloured blue/green and the other purple/green. Remove the blue/green wire and check to see if it's live. If it is then replace the wire and remove the other wire.

NOW CHECK THE SPADE TERMINAL ON THE THERMOSTAT without a wire attached to see if that's live. If it's not, then the thermostat is duff. If it is live then replace the wire on the thermostat and locate the Ranco control box (about 3' X 2.5' with white plastic cover located under radiator



When the Interceptor Mk II was introduced, it was so much more than a mere 'facelift' — raised bumpers and an all-new interior disguised what was under the skin — numerous improvements including a state-of-the-art heating & air-con system!



panel on Mk. II and early Mk. III, on nearside inner wing J-Series onwards).

You will discover two of these control boxes. You want the one marked 'Cuts out on rise of pressure,' visible through clear segment in plastic cover. Remove the single screw holding on the cover and remove cover. Inside can be seen two screw terminals with wires attached — one purple/green and the other purple/blue. Touch the test lamp on the purple/green terminal and check for live. If it's not live then there's a break in the purple/green wire between the a/c thermostat and the Ranco control box.

If it is live then check the other terminal for live also — if it's not live then the Ranco control is duff as it should only break the circuit when pressure in the a/c system rises to an undesirable level. If the green/blue wire attached to the a/c thermostat proved to be dead when checked then the problem most likely lies within the centre console.

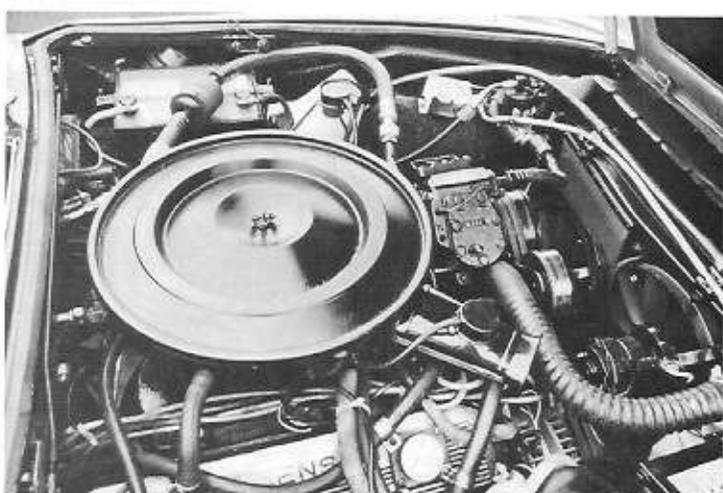
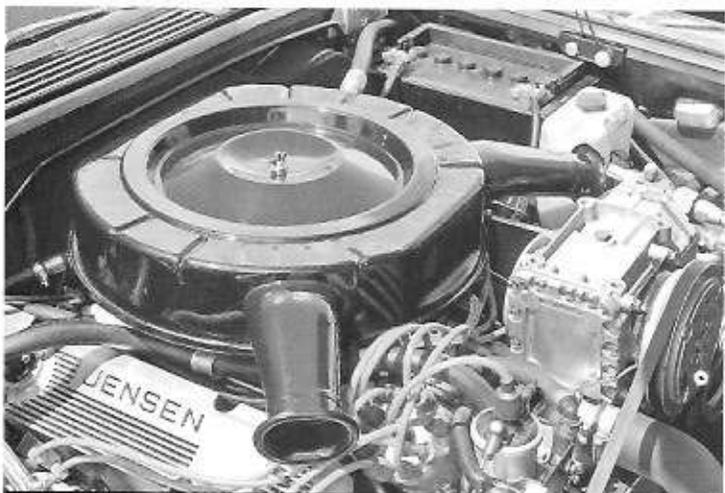
If the blower motor runs OK then the fault

will lie within the a/c switch itself or the green/blue wire from the blower switch to a/c switch. Wires can also become detached from these switches, causing the problem. If the blower motor doesn't work then it could be the five terminal relay at fault with either wires off or a burnt out relay. However, if the fuel lid doesn't work either then drop the glove box right down by removing the stop screw and look up behind the dash and you should be able to locate three fuse holders with brown wires attached, One of these protects the a/c, blower and fuel lid circuits, so remove all three and check fuses.

If you've still no joy then check the wires on the solenoid underneath the battery tray because it's not unknown for the terminals to corrode and fall off. By the way, if you feel man enough to delve into the centre console to check the relay, etc. then arm yourself with a stiff whisky, because it's a real snake's nest with wires falling off all over the place when they are disturbed — patience wins through in the end.

That about covers the electrical side of the a/c and if the compressor clutch is operating normally then check items as follows: with the a/c switched off try to turn the centre of the compressor clutch. This should turn easily by hand. If it won't budge then the compressor is seized and requires depositing in the nearest rubbish skip (more likely on 'V' compressor a la J-Series. York compressors seem more reliable). If the compressor turns OK then start the engine, switch on a/c — compressor should now be running. Find the receiver/dryer unit bolted to nearside inner wing just behind the radiator and you will discover there is a sight glass on top of the unit which may require cleaning with a cloth.

With the compressor running, look into the sight glass and observe the liquid flowing in the system. If you can't see anything and there is no cold air blowing from the face level vents, then the system is probably completely discharged. If a constant flow of froth is evident then the system is partially



Top left: Interceptor Mk II console showing heating and air-conditioning system controls (top right) the Interceptor Mk III console. Above left: Interceptor Mk II engine bay showing the York air-conditioning compressor (also fitted to early Mk III). Above right: the Chrysler V-twin air-conditioning compressor as fitted to Interceptor III from J-Series onward.

discharged and requires recharging — a clear flow of liquid with occasional bubbles is acceptable if the a/c seems to be working OK. Recharging the system requires special equipment and checks for leaks using a halogen leak detector capable of detecting leaks down to 1/2 oz. per year is required.

As an aside here, have the system checked over and recharged once a year and never run any car with a/c without a good quality glycol based anti-freeze in the cooling system as it's possible to freeze up the heater matrix under certain conditions. Also, there seems to be a number of owners who are unaware of the fact that the a/c can be used to demist the interior on rainy days by closing the face vents and switching the blower to full with the a/c switch on and the heat control on 'hot' or 'defrost.'

THE HEATER ON THE INTERCEPTOR is normally very good, so if yours is not up to the mark then ensure the engine is getting up to temperature as a duff thermostat can cause heater problems. By far the biggest problem with heater system is the Ranco vacuum controlled water valve. It usually sticks on or off and leaks water. If the heater is constantly cold then remove the small bore rubber pipe on top of the Ranco valve

and insert a vacuum gauge into the pipe with the engine running, set the heat control to 'hot' and you should get a reading equal to manifold vacuum on the gauge. If nothing happens then either the heat control is duff or the pipes are not connected correctly on the back of the control.

If the vacuum reading is OK then the water valve is stuck closed and needs replacement. If none of the vacuum controlled functions seem to work then it's possible the small bore vacuum take off pipe has split where it joins the brake servo pipe under the scuttle behind the brake fluid reservoirs.

If the water valve leaks water then replacement is also required as they cannot be repaired. Replacement valves currently available are of a different design which unfortunately are either **on** or **off** with no intermediate position. The original Ranco water valve is now obsolete and no longer available. However, the replacement at least works so half a loaf is better than none.

WHILE ON THE SUBJECT OF THE HEATER it might be worth mentioning the plenum chamber drain tubes. These three tubes are located under the bonnet — 1 each side of the a/c evaporator and the third

running behind the battery. It is important these tubes are kept clear as they drain rain water from the fresh air intake - if they get blocked then water will enter the car, soaking the foot-wells.

The fresh air flap seen in the diagram can be checked by dropping the glove box and looking up just under the windscreen where it will be seen about the size of a small letter box. Check this operates when the blower is moved from 'off' to position '1' or 'ram.' The demist flap can be seen by removing the offside console carpet where the servo motor controlling it can be seen attached to the side of the heater box. Check this flap works when the heat control is moved from 'hot' to 'defrost.' Flaps not working can be caused by seized up hinges, faulty servo motors, faulty control switch or pipes incorrectly attached to heat and blower controls. The diagram shows the correct position of the pipes on the back of the heat control and blower control.

Early Mk IIIs and Mk IIs can have the position '1' on the blower dispensed with so the blower doesn't work but the fresh air flap opens giving a 'ram' effect. Later cars are already fitted with this modification.

Mick Thomas

Brake Rebuild

INTERCEPTOR Mk II 1971 MODEL

by A. J. WILSON (514)
2, Westbourne Crescent, Bangor West, Co. Down Northern Ireland.

The rebuilding of a brake system assumes that one has Jacks, Stands and ability. There are no special tools required but if you don't have a good quality socket set you can stop now and go and get one. First contact Girling direct and obtain: (1) Brake Servicing Booklet, price 15p. (2) Parts List 151, illustrations no. 300, 59, 154, 179, and 187.

With these you can see the parts needed. I doubt if your main agent will have it all in stock so order and wait until it all arrives.

For cleaning everything a good solvent is necessary. I use I.C.I. Genklene. Now this is a tricoethylene type solvent though a cold one so if you use this take care, its vapour fumes are dangerous. I.C.I. will supply a safety leaflet if you ask for it.

Now to start. The master cylinder is as easy as it says in the book but check the bore; if it is not perfect, forget it, and replace the unit. The old unit can be sent to Girling for a report and repair but they are very slow on this. When the servo and cylinder are in and hooked up forget about the bleeding, you will do this along with the calipers.

Now, front calipers. When you remove each caliper make sure of the shim washers between calipers and their mounts. The need for a socket and ratchet is here when you remove the mounting bolts and they are very tight home!

Now the Flex pipes and the little metal ones should be replaced if they are original. Try to get the rigid pipes in S/S. The flex pipe can be made to aircraft standard. Source for these can be located in the "Thoroughbred & Classic Car" magazine or "Motor Sport."

Now to each caliper. If you look at it carefully you will see an item called a Dust Cover. This has a locating lip on it. Take a good look at it and you will see at the top of the piston bore a small groove to take the lip on the dust cover. Now, this little groove is the one which will cause trouble if it is not perfectly clean. It must be spotless, any dirt will prevent entry of this lip and cause the seal face to project and jam on the piston, obstructing its easy movement. These dust covers

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are not easy to install but if you neglect to clean the groove then you will have difficulties. Between the dust cover groove and the sealing ring slot there is a metal band, clean this to a shiny finish (I use 600 W&D). When all the cleaning and polishing is done, wash out clean, blow dry and flush again with new brake fluid. Remount on wheel, new pads, pins and clips. On the pad retaining pins a small smear of an ultra high temperature graphite anti-seize compound is worthwhile. Repeat for other side. You can now bleed as front and rear are independent. This will also bleed your master cylinder. You have a big system so make sure you have plenty of fluid.

Now the rear callipers. Do the hand brake system first as it is the worst part. The operation of this system relies on the parts running smoothly and easily. The clamping levers and operating lever must move freely and I mean just that. So the lever pivot pins may need to come out. Here you need two parallel punches size 1/8" and 3/16" to remove the spring pin the lever pivot pin. This lever pivot pin has a 2BA thread in the bore, clean this out and insert a bolt and pull the pin out. It isn't easy and I ended up clamping this 2BA bolt in a vise and drifting the calliper to get it out. Clean and polish this pin or replace and when re-inserting fill the threads full of grease or else insert a short 2BA brass screw, using Loctite in the threads for security. The side faces of these clamping levers and operating levers must also be clean and with a shiny finish. The threads on the tie rod must also be clean. Replace the clutch ring and the two retaining springs. I cannot stress enough the importance of making sure that all the pins in the system are shiny clean and coated with an ultra high temp. anti-seize compound, source a mill supplier or engineers' supplier, but it must be ultra high temp. Now do the pistons and seals as on the front and again clean, flush and replace the metal pipes.

Check the handbrake cable for stretch and if it has, replace. Take off the cross-over linkage, clean and re-assemble. Bleed the rear and this again will bleed your master cylinder for the second time so your system should now be in good order.

If anyone has any questions, drop me a line enclosing a S.A.E. (Automotive Oil Treatments Ltd., Watford, Herts, England, Tel: Watford 32477 will give the name of their local suppliers for High temp. Anti Seize.—Editor)

P.S. This may be of interest to those who put their car away for the winter. It has been found that on cars with disc systems in the U.S.A. (not necessarily Jensens but it could apply). We all know that brake fluid absorbs water and if this is left in a system over a long

period rust spots can develop on the brake pistons, causing sticking. It would be worthwhile to flush out the system prior to laying-up. Have any members experienced sticking brake pistons after long periods of non-use?

Keep The Home Fires Burning . . .

by MICK FORD, Chelmsford, Essex.

Having filled up my 541 with petrol and paid the bill I got back into the driving seat and was about to restart the engine when Ann, my 15-year-old, suddenly called out in alarm, "Daddy, quick — there's smoke coming from somewhere back here!"

Sure enough there was and acrid smoke began to pour out from behind the rear seat on the near side. Realisation sprang to my mind and I flicked off the 'Refuel' switch on the right of the dashboard. It had stuck in the 'on' position and for the last 5 mins. had been feeding a steady 12 volts to the petrol filler cap solenoid.

I got the family clear from the car in seconds and then drove as far from the petrol pumps as I could. With visions of a smouldering mass of wire and upholstery in the boot I got the bonnet up and disconnected the battery at about the same time as the pump attendant arrived with the fire extinguisher.

Fortunately we didn't have to use it, although there were still volumes of smoke there was no evidence of fire. I removed the body trim to check for damage proper and apart from the aluminium body of the solenoid there was no other damage at all. I guess we were lucky.

There is, of course, a moral to the story: that switch had been sticky for some time and all it needed was one spot of oil to free it!

As for the solenoid, it was of course a write-off. The wires and insulation and plastic and cap were completely melted. However, faced with the probable cost of nearly £20 for a new one I decided to have a go at rewinding it. I did this by making up a simple hand-operated coil winder. I managed to find an old H.T. coil lying about and I carefully dismantled this and wound the primary windings onto a bobbin. I then carefully transferred this onto the central core of my old solenoid using ordinary paper for insulation over each layer. I

connected each end to a small connector which fitted snugly inside the rubber end cover. The completed job looked very neat and worked perfectly on test.

I then refitted it to the car where it has been operating satisfactorily for nearly three months. I have promised myself that I will fit a special fuse close to the solenoid but have not had time to do this yet.

One thing: I do make sure that the dashboard switch is nice and free now!

(Fit that special fuse, Mick, because next time . . . !—Editor)

LETTERS to the EDITOR

Dear John,

My wife and I really must congratulate Norman Long and family for the organisation of the National Weekend at Penns Hall Hotel. We both enjoyed it immensely and look forward to the next National, hopefully a weekend held at Penns Hall!

—Bob & Joyce Knight, 22 Cowan Way, Widnes, Cheshire.

Dear John,

My wife and I enjoyed the National Weekend very much indeed and would like to thank Norman Long for a very good show. I would also like to thank Mike Lotwis for putting up with my badgering him with technical questions!

—Colin Kirk, Cleveleys, Blackpool.

To Norman Long & the Committee Members.

My young family and myself would like to thank you for a marvellous week-end at Penns Hall Hotel and hope we can meet again next year. I would also like to thank the members from this country and overseas who helped to make the week-end so enjoyable including the Jensen Healey member!

—Peter Williams (640), Burgess Hill, Sussex.

(. . . "including the Jensen-Healey member" That must be a private joke!—Editor)

Technical News . . .

by Mick Thomas

Hello again, everybody. By the time you read this you should have dried out after Christmas and once again resemble a human person. Being of sound mind and body again means you can work on the Jensen in that lovely warm garage that doesn't leak water, has no draughts and has plenty of room. (I could have added "and has adequate lighting" to that list but there is a limit even when writing pure fiction!). Anyway, let's have a look at the brakes 'cos it's a bit impractical carrying a ship's anchor in the boot.

This little lot concerns Interceptors and FF I, II and IIIs with Girling brakes. Obvious faults include sticking or seized caliper pistons, discs resembling a ploughed field, bulging, cracked, oil soaked flexible pipes and biscuit steel pipes (biscuits and rusted brake pipes tend to react the same way under pressure). Many a long hour has probably been spent bleeding brakes trying to get rid of a spongy brake pedal or excessive travel when nine times out of ten the problem is a direct result of a combination of the above faults. I'll go through a complete overhaul of the braking system and those of you not contemplating a complete overhaul can pick out the relevant bits.

First of all check the brake pedal is securely fastened to the operating arm and that it's fitted the correct way round, i.e. offset towards the centre of the car. If it's loose or fitted incorrectly tighten up the bolt at the back of the pedal and/or remove the pedal and fit it the correct way round. If the pedal rubber is in a poor state, ditch it and fit a new one. Next remove the brake pedal arm return spring attached to the stop light switch bracket and try to feel any free travel at the brake pedal. There should be some free movement; if there is refit the spring. If there isn't, adjust the push rod by loosening the lock nut and turning the rod to give approx. $\frac{3}{16}$ " free movement measured at the pedal - don't forget to tighten up the lock nut. Now have a look at the pin that connects the push rod to the pedal arm and ensure the split pin is in position and correctly fitted with both legs bent round the pin.

The next item to consider is the brake servo and master cylinder: whilst the brake servo is fairly reliable I have found in one or two cases that replacing the servo can effect a cure for excessive pedal travel (much to the amazement of Girling who still maintain there is no logical reason why this should be so but I write as I find). Do not consider this an option to cure excessive pedal travel unless the rest of the braking system is in perfect condition and you are convinced there is no air in the hydraulic circuits. However, I will explain removal for those who may be interested. The brake pedal box, servo, master cylinder and fluid tanks are easier to remove as one unit. First, disconnect the wires on the fluid tanks then remove the

two metal brake pipes on the master cylinder. Next remove the brake pedal 'cos it won't fit through the hole in the bulkhead. (FF owners, don't bother as the pedal is small enough to go through), remove the return spring mentioned earlier, disconnect the two wires on the stop light switch and remove the vacuum hose on the brake servo (FF owners, make a note of where all the vacuum pipes are connected from the vacuum control valve to the servo). There are six $\frac{1}{4}$ " bolts holding the pedal box to the bulk-head and the rearmost one also holds on the stop light switch. This one is a nut and bolt so you'll need a helper to hold one end whilst you turn the other (unless your arms are twelve feet long, of course). The other five bolts have captive nuts so there's no problem with these. Now remove the other four bolts in the pedal box flange (a good $\frac{3}{8}$ " drive socket set with a 12" extension is good news here); the remaining bolt is under the brake servo and screws into the front of the bulkhead.

The hole in the pedal box for this bolt is slotted so you only need to undo it a couple of turns (use a $\frac{7}{16}$ " flat ring spanner to reach it). You'll probably need to give the unit a good tug to free it because of the sealer between the pedal box and body but once free it's a fairly easy task to remove it from the engine bay. Once on the bench remove the split pin from the clevis pin on the push rod and remove the clevis pin. Now remove the four nuts holding the servo to the pedal box ($\frac{1}{2}$ " AF), thereby releasing the fluid tank support bracket and servo unit.

Next undo the two units holding the master cylinder ($\frac{3}{16}$ " AF) - and that's it. As an aside here, remember brake fluid is an excellent paint stripper so be careful; if you do happen to spill fluid on the paintwork wash off immediately with loads of clean water.

Refitting is the exact reverse but watch these few points. Apply seam sealer or "dum-dum" to the rear of the brake servo where it connects the pedal box and between the pedal box and bulkhead; start all bolts in their threads before tightening; use a new split pin in the push rod clevis pin and double check all nuts and bolts for tightness. Bleed the brakes, check all pipe unions for leaks and test the brakes before going on the road!

Next thing to check is the master cylinder and if it seems to be working properly leave well alone, unless there is evidence of fluid leaks between the master cylinder and brake servo and/or evidence of fluid transfer from one side of the cylinder to the other (this fault will become apparent as the fluid level in one tank rises as the other falls). If either of these two faults are evident or the brakes won't bleed properly the master cylinder requires renewal or overhaul. I won't go into the overhaul procedure here as the overhaul kit contains comprehensive instructions if you can get one. If you can't then you'll have to fit a new cylinder and the information in this

case is of no use. To remove the master cylinder with the servo in place, disconnect the two rubber pipes from the fluid tanks and plug them with $\frac{3}{16}$ " bolts to save a mess. Next remove the two brake pipes and then undo the two nuts holding the cylinder to the servo. Refitting is a direct reversal of removal but make sure all pipe connections are refitted in their original positions and check them for leaks with the brakes hard on with the engine running.

An important part of the braking system are the various vacuum pipes and connections under the bonnet so check all the hoses and connections for chafing, splits and security. (The system is designed to be "fail safe," that is, if there is a failure of the vacuum system, you'll have brakes but without servo assistance. Oh, yeah! Try stopping an Interceptor from 70 mph without the servo and you'll need both feet on the brake pedal and good rapport with the gods! Not to be recommended if you wish to see your next birthday. If you have cause to replace any of the vacuum hoses use only the correct hose - not bits of garden hose or heater hose, as they can collapse under vacuum, causing the said hair-raising experience.

Next thing to do is jack up the car and place axle stands under the chassis tubes, front and rear, and remove all four wheels. Now systematically remove and label each steel brake pipe on the car (e.g. four way connector to front offside flexible hose, etc.). Those of you not contemplating a full overhaul, check every inch of steel pipe for excessive corrosion - if in doubt, replace! A few tips on pipe removal may help here, firstly some of the unions will probably be impossible to remove with an open ended spanner so obtain a good pair of pliers and cut the pipe off as near to the tube nut as possible. Next soak the unions in penetrating oil and use a ring spanner or socket to remove them. If the nut is badly corroded you'll need a good pair of vice-grips to beat them into submission. Above all, try to avoid snapping off the unions in the calipers unless you're a whizz kid with a drill and taps. Don't be tempted to use stud extractors as they are bound to break off in the hole and then you're really up the Swanee 'cos they're made of hardened steel which makes them impossible to drill.

Another problem you'll come across is access to the pipes from the master cylinder to the four way connector attached to the front cross member. The pipes are held in place by metal clips which are impossible to remove with the engine in place so you'll have to bend them up with a screwdriver and tap them back into place. Ensure the pipes are securely fastened to the cross-member in this area, otherwise the steering column can rub them through, resulting in a quick search for that ship's anchor again.

Having removed all the pipes make up a new set identical in length, tube nut fittings and flare (either double or single) to the original pipes, using Kunifer 10 tubing which is a copper/nickel alloy guaranteed against corrosion. Being a

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copper alloy means it is easier to flare and bend than steel. If you haven't the flaring equipment then take them along to your nearest motor factors who will make a set up for you. Just one point here: all the pipe unions are UNF apart from "J" series cars with the German master cylinder which has metric tube-nuts on the two pipes that screw into the master cylinder. Ensure your supplier is aware of this fact.

Having obtained your pipes refit to the car, maintaining the bends and positions of the original pipes. Ensure the pipes do not foul on any moving parts and are clipped securely in position. Now Uncle Joe Girling designed the braking system on the Interceptor as a split circuit system; in other words if a pipe burst or something similar, then you would still have the other circuit to stop the car. Unfortunately, this is not quite true, because I have worked on two cars that suffered from burst brake pipes on the back axle because of corrosion and the brake pedal bottomed on the carpet before it could apply enough pressure to the front brakes to stop the car. It seems there isn't enough reserve travel on the brake pedal with one circuit out of action, especially if the floor carpet is all bunched up under the pedal - which it usually is.

Next on the agenda are the flexible brake hoses and if you're doing a full overhaul replace all three; if not, then give them a good going over by bending them back on themselves at the unions and check for cracks, cuts, bulges, splits, softening from oil contamination and the condition of the protective springs on the front ones. To replace, remove the metal brake pipe and unscrew the securing nuts but don't throw away this nut or the shake-proof washer because you may have to re-use them (it seems some hoses are packed with nuts and washers and some without, depending on how mean Girling was feeling at the time). When refitting ensure the hoses are not twisted and do not foul the front suspension, wheel or cross-member when moved from lock to lock. If required, bend the mounting brackets to give adequate clearance. One tip here on purchasing new hoses: don't be fobbed off with the wrong hose - make sure they're the exact length and use armoured hoses on the front. New armoured hoses may have a black nylon spring; these are better if you can get them because they don't rust. Early Interceptor IIIs (Chassis prefix 128) use a shorter hose than "J" series and later cars (Prefix 136 on), so ensure you get the correct one. This doesn't apply to FF cars because they are all the same.

Right, now to the business end of things: remove the front brake pads by extracting the small "hair-pin" clips and knock out the retaining pins; if they are seized in go easy otherwise you'll break the lugs off the caliper body. Pull out the pads and shims - if they are a tight fit fasten a good pair of vice-grips to the pad backing plate and tap the grips with a hammer to extract the pad. If the anti-rattle springs are missing obtain some new ones as they cut out pad

"chatter." Having removed the pads from both front calipers obtain some pieces of wood about $\frac{1}{8}$ " thick, cut to approximately the same shape as the pads and insert in place of the pads. Now pump the brake pedal until all six pistons have clamped the wood against the disc and then remove the wood. (This procedure makes piston removal a lot easier later on but if you have access to an air line you can blow them out with the caliper on the bench.) Those of you that have had the hydraulic system apart will have to bleed the brakes first. O.K. now you can remove the calipers by disconnecting the brake pipe and knocking back the tab washers on the mounting bolts or cutting the locking wire. Use a good fitting $\frac{1}{2}$ " AF socket to undo the bolts. Remove the bolts and caliper and catch any shims fitted between the caliper and the mounting bracket.

Now Mother Nature didn't build into our lungs the ability to process asbestos fibres so until evolution catches up, *don't blow brake dust all over the place!* (Girling produce a special cleaning fluid, but you'll probably not be able to track any down so use meths. Don't use any mineral based fluid such as petrol, paraffin, white spirit or turpentine, as this will cause damage to the rubber seals in the caliper.) You'll notice the caliper is made up of two halves held together by four bolts. Do not, under any circumstances, attempt to remove these bolts (these bolts are tightened to a specific torque when the caliper is made and you'll never reproduce this torque figure with old bolts with rusty threads - not enough torque and the caliper may leak and the bolts work loose; too much torque and the bolts may be overstressed, causing them to break under braking pressure, causing the caliper to fall apart. Reach for that anchor again!)

Extract the pistons by blowing out with compressed air, pulling out by hand (extremely unlikely), or levering with two screwdrivers in the dust cover groove. Be careful with this last method as the piston is easily damaged. If none of these methods work then use vice grips around the piston and with a twisting motion work the pistons out. This method will scrap the piston but at least it works. Remove the dust seal and then remove the fluid seal from inside the caliper bore - do not damage the seal groove. Check for rust between the top of the bore and the fluid seal groove. If rust is evident here remove with fine wet 'n' dry paper but do not rub the fluid seal groove. Wash out the caliper bores with meths and ensure bores and seal grooves are clean.

Check all the pistons for corrosion of the chrome plated surface and if not perfect obtain new pistons. You'll also need a seal kit and some grease suitable for use in hydraulic brake components. Lockheed market this under the name "Disc brake lubricant." Girling market an equivalent grease but double check it is suitable for rubber components. If you can't obtain either of these products then use clean brake fluid. *Do not use anything else whatsoever.*

Lubricate the fluid seals and fit them into their respective grooves. Next fit the dust boots to the grooves in the caliper bore. Lubricate the pistons and push them through the dust boot right into the caliper. If they jamb in the caliper do not force them in but remove to find the cause - use hand pressure only.

O.K. that's the front calipers sorted out, so now have a look at the discs. If they're badly scored or the braking area has been substantially reduced by rust encroachment on the disc then they'll either need skimming or replacement. As to whether your discs will skim depends on their condition but as a general rule, throw away any solid discs less than $\frac{1}{16}$ " thick or any vented disc with less than $\frac{1}{8}$ " each side of the vent holes after machining.

To remove a front disc prise out the hub cap, remove the split pin and unscrew the hub nut ($1\frac{1}{2}$ " AF). Pull off the hub whilst ensuring the bearing stays in the hub and replace the washer, nut and hubcap on the hub to prevent ingress of dirt into the hub bearings. Clamp the disc in a vice and undo the five bolts with a $\frac{1}{2}$ " socket. If the hub is tight in the disc wedge a wide chisel between the hub and disc behind a wheel stud - do not wedge between the mating faces and do not hammer the hub out of the disc by hitting the hub face where the bearing seal fits. Replacement involves cleaning the disc and hub mating faces of dirt and rust and fitting new spring washers under the retaining bolts. Refit the hub and adjust the bearings as follows: tighten the hub nut whilst spinning the hub and then slacken off the nut. Retighten the nut to just remove all the play from the bearing - do not overtighten. Fit a new split pin - the axle is drilled in two places with one hole offset from the other, allowing half a slot adjustment of the castellated nut.

Refit the brake caliper and any shims in their correct location, tighten the two mounting bolts to 65 lb/ft and bend up the tab washers or re-wire the bolts, whichever your car has. Reconnect the brake pipe. Use a new set of pads with machined or new discs and smear the backing plates, shims and retaining pins with "Copaslip." Do not allow any to come into contact with the disc or pad friction material. Refit the retaining pins, anti-rattle springs and "hair pin" clips.

Moving to the rear brakes, remove the calipers as per the front but you'll have to remove the handbrake connecting rods first. Rebuild the rear calipers using the same procedure as for the front. Strip down the handbrake mechanism and coat all pins, etc. with Copaslip. Work on one caliper at a time to avoid confusion. The swinging arms on the rear calipers must be able to move under their own weight so free off using duck oil, etc. Removal of the rear discs requires the use of a five leg impact hub puller. Remove the split pin from the hub nut and place a bar between the wheel studs so the bar is resting on the floor preventing the hub from turning. Undo the nut with a ring spanner (these nuts can be very tight but both hub nuts are right hand thread). Remove the washer and replace the nut flush with the end of

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the half shaft (this prevents the hub flying off and damage to the half shaft threads). Fit the puller using steel nuts on the wheel studs, tighten the puller centre screw and hit the end of the puller with a heavy hammer. If at first it won't budge keep trying and eventually it will come off. Once free remove the puller, nut and hub. Notice the disc is held to the hub with nut and bolts as opposed to just bolts as on the front disc.

If any of these locknuts appear loose on the bolt threads then replace with new ones (3/16" UNF Nyloc). Clean all the rust from the mating faces and fit a new or skimmed disc to the hub. Before refitting the hub grasp the end of the half shaft and attempt to pull in and out. The correct end float is 5 thousandths of an inch and a greater amount will have to be corrected by adjusting the amount of shims between the caliper bracket and the axle casing. Do not omit to correct this fault because excessive end float allows the discs to move in and out pushing the caliper pistons back into the caliper, causing

excessive brake pedal travel. Refit the hub to the half shaft, ensuring the Woodruff key is fitted correctly, i.e. the chamfered portion of the key should be towards the centre of the axle with the chamfered face towards the bottom of the slot. With the hub fitted the key should be flush with the end of the hub. If the key is fitted incorrectly the hub oil seal band will be damaged when the hub nut is tightened.

Replace the hub nut and washer and tighten to 175 lb/ft, again locking the hub with a stout bar through the wheel studs. If the split pin hole does not line up tighten the nut to the next hole - do not loosen the nut to line up the hole. Refit the calipers using new pads - ensure handbrake pads are fitted correctly with the cut off portion of the pad facing the edge of the disc. Adjust the handbrake mechanism before refitting the actuating rods and then attempt to fit the rods. If they won't line up slacken off the handbrake cable - do not loosen the handbrake mechanism. Bleed the brakes by opening each nipple in turn and pumping the brake pedal until all the air has been expelled. If difficulty is experienced in obtaining a good pedal try

bleeding one front and one rear brake at the same time which will sometimes dislodge trapped air in the master cylinder.

Well, that's about it but here's a few do's and don'ts:-

DO . . .

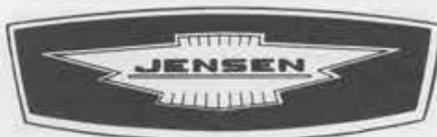
1. Make sure you tighten up all nuts and bolts.
2. Use only clean brake fluid.
3. Try to work as clean as possible when working on brakes.
4. Check the fluid level every day for at least the first week.
5. Have a helper handy to bleed the brakes. If using your wife to help, remember to keep control.

DONT . . .

1. Drive the car on the road unless you're confident everything is in order.
2. Allow mineral based materials into the braking system.
3. Forget to check all pipe unions for leakage with the engine running and the brake pedal held hard on.
4. Lose your temper with the wife - it could cost you dearly!

See you soon.

MICK



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AUTHORISED JENSEN DEALERS

541-R. (Runner-up: Lee Pilkington, 541).

Interceptor: Basil Westley, Mk I. (Runner-up: John Edwins, Mk I.)

Jensen-Healey/GT: Nigel Beck J-H. (Runner-up: R Langford, GT.)

As a token of thanks, Eric and Kath Neale and Lord Strathcarron were presented with delightful plant arrangements. Then, totally unexpectedly, came gifts for Elaine and I, a lovely surprise and our thanks to you all.

The three members' choice winners plus the GT of R Langford (as highest scoring runner-up), were then lined up with the two 1990 winners present – Ken Burch's 541 and Des Staples' Interceptor III, to contend for the Association of Norfolk Car Club's *Pride of Ownership* award. The three ANCC reps had a difficult task choosing a winner from these six splendid cars, but the trophy was finally awarded to the delighted Des Staples by Lord Strathcarron.

The frames for the rally mementoes (designed by Ian!) were donated by James Jackson (a JOC member) of **Framework**, Bury St Edmunds (0359) 51342. Thanks must also go to my dad Eric Abel, for taking the photos.

Raffle prizes: **Wilco Motor Spares**, Norwich (0603) 35274; **Car Smart Centres Ltd**, Bury St Edmunds (0284) 850755; **Regalia**, courtesy of Nigel and the JOC; thanks also to individual members who contributed prizes: James, Ken and Yvonne, Ron and June, Ian and our son Lewis.

Guests' presentations donated by Mel Glazer (JOC member) of **Long Melford & Pulham Market Garden Centres** (0787) 311889 and (0379) 676418. Feelie-bag prizes by Ian Abel. Photocopying undertaken gratis by **Bracondale Independent School for Boys**, Norwich (0603) 622590 or 624042.

Our most grateful thanks go to Alison and Dorothy for their much needed help on the day,



Len Boulton and Lord Strathcarron

It had been a marvellous day, and we'd like to thank everyone for making the rally such a success.

Ian & Elaine

Sponsors:

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Norfolk Numbers (cherished numbers dealer), (0953) 606760.

Ivan Chubbock Motor Engineers, Thetford (0362) 820416

and yet again we are indebted to Yvonne, because we just could not have managed without her (and neither could Ken – he had forgotten his roll-ups and kept pinching Yvonne's cigarettes...).

Finally, our warmest thanks to *everyone* who supported the rally. The success of the event was due to your participation and enthusiasm. It was great to meet you all, and we hope very much that you will join us again next year, at a new venue.



Brian Morrey on fitting copper brake pipes . . .

IS IT WORTH fitting copper brake pipes to our cars? Apart from the brand new Interceptors, all the Jensens are now well over 15 years old. I purchased a set of pipes for my Interceptor from **Automec** (0280) 822818. All pipes are fitted with brass ends and all are labelled as to where they fit.

I found the kit quite easy to fit, so I can do it anyone can. My mechanical knowledge is the same as that of a church mouse.

I removed the alternator and expansion tank for easy access; I also removed the master cylinder to renew the internals, but with the cylinder

that I bought the company (slight exaggeration), I invested in them.

With these stands the car can be turned in its own length, moved around as required, gives a working height of 18" and safely supports the car on the hubs. Great for storing your car through the winter. Give me a call if they are of interest.

Automec supply copper brake pipes for all Jensens. The average price is £60 inc VAT & postage. I can get sets for anyone interested for £45 inclusive. If you wish to deal direct, **Automec** are very helpful. The only problem I found initially was that the two front pipes were too short. This has



The Hercules Rola Stands . . .

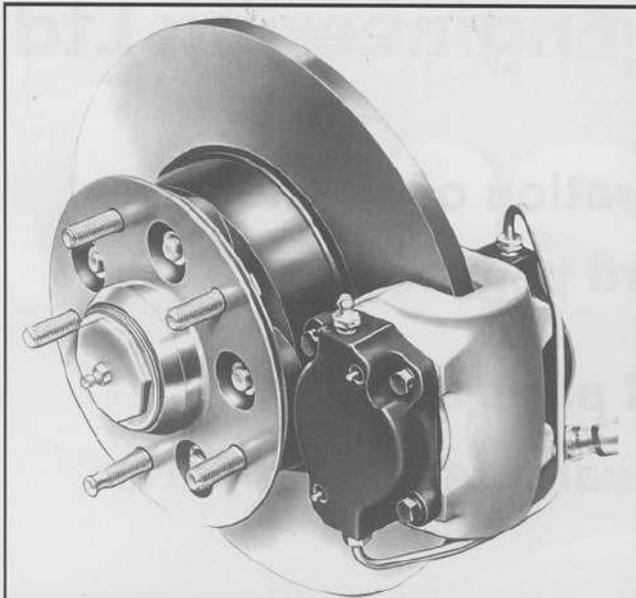
off I found it easier to fit the two pipes to it (at least have the connectors started on the threads).

Then feed the pipes into the correct location. Be prepared to cut old pipes in way of connectors, this way the old connectors unscrew easily. If you are careful in removing old pipes you can bend back existing clips and then reuse. I also used a few plastic cable ties to complete the job once the pipes were in place (all along the underside of the car and on the rear axle).

Naturally you have to jack up the car in a safe position and remove the road wheels. I used 'Hercules Rola Stands'. I was so impressed with these

now been rectified and also the connectors to the master cylinder were the wrong thread. This was because the Interceptor has either a Girling or a FAG master cylinder – you must specify when ordering. Finally I recharged the system with silicon fluid – it is fairly expensive at £19 per litre – if you buy this fluid make sure it is to Dot 5 spec. Advantages include the fact that it is inert and does not damage paintwork, it keeps the pistons lubricated and as it does not absorb water there should not be any more rusting and seized pistons.

Do not hesitate to call me if you have any queries.



DISC BRAKE JUDDER — The Causes? Alan Smith investigates

During my run along the straight recently during the *Le Mans Classic* I was doing over 125mph 'four up' when suddenly the chicane came up, some very hard braking was called for, this hard braking continued throughout the run, but very quickly a judder was evident during braking. This had also appeared during the Castle Combe runs.

Now I know you don't always use such aggressive braking but it did show up a deficiency in my brakes and you never know when good brakes are required. My investigations led me to *PowerStop Brakes Ltd* (01608 646837) who came up with the following:

After twenty-two years experience selling automotive brakes EBC have accumulated some interesting statistics and information about why brakes judder. First of all let us eliminate the reasons not connected with the pad and disc combination that can cause judder.

These are (1) imbalanced tyres and wheels, (2) loose steering linkages, (3) sticking calliper sliders, or (4) hydraulics or sticking master cylinder. These are mentioned in order of likelihood of their occurrence and it is fair to say that about three out of ten brake judder complaints will arise from the above four effects. The remaining seven out of ten reasons for brake judder will be down to disc related problems which are: *Disc Distortion* or *Lack*

of Parallel.

Disc Distortion (Run out when mounted on stub axle)

First of all we have to assume that when the disc is mounted to the hub that it is measured with a dial gauge and runs out perfectly true from the first day of installation. This is a critical element to how long the disc will last before problems arise, far more critical than most mechanics realise. Some disc manufacturers suggest a tolerance of 5/1000ths of an inch, which is way too large for this measurement. The maximum run out acceptable on a disc is 2/1000ths of an

inch. If run out above this figure is detected, remove the disc, clean the hub once again of any rust, scale or grit and rotate the disc one bolt hole and re-inspect. This procedure of checking for run out has a critical effect on other disc problems, which will be described later.

Even torquing of the wheel nut is absolutely essential. Uneven torque can twist or distort a rotor by a considerable amount and can result in disc run out and eventual thickness variation as described later on.

It is interesting to note that the rear wheel disc vibrations are normally felt through the brake pedal on application of the brakes and front disc distortion is shown up a steering wheel flutter. The only cure for a distorted brake disc is to have the disc re-ground or replaced.

With certain vehicles, using wide band brake pads, which have a tall profile, promotes a condition of 'dynamic distortion'. Brake judder is detected under heavy braking but at low speeds the judder goes away. This is because of differential heating of the disc between the outer and inner due to the differential rubbing speeds. The only way to avoid or minimise this problem is to use a pad with a higher thermal conductivity, i.e. a semi metallic (EBC Red grade), or EBC's latest V4 (Green) brake pad with high copper content. The effect of the higher metallic content stabilises

temperatures by drawing heat quickly away from the disc, which gives rise to the fact that many German manufacturers which use these wider band pads use semi metallic pads (in spite of their huge dust problems) for original equipment.

Lack of Parallel (Disc thickness variation)

We start off by assuming that all discs are perfectly parallel when they are produced. Lack of parallelism of the brake disc, however, can develop with discs which are fitted with excessive run out or that generate run out during their lifetime. Because the pad is always touching (or first touches) the disc at the highest point (maximum deviation of the run out). It gradually wears the disc thinner at the point where the pad is most often contacting. This has the effect of causing a lack of parallelism (thickness variation) of the brake disc of very small dimensions, which are sufficient to show up as violent brake judder. Our findings are that there is no way of avoiding disc thickness variation and brake judder unless rotors are mounted perfectly true to begin with.

It is sad to say that in all the instances that we have inspected and monitored mechanics fitting brake discs that hardly a single one bothers to clean the abutment face of the brake hub free from rust, scale and dirt adequately and that it is quite common for mechanics to allow 5-10/1000ths of run out to be present when the vehicle leaves the workshop. This is a recipe for disaster and will almost guarantee that violent brake judder will be the outcome within a short number of miles, even if, from the workshop the judder was not noticed due to the run out.

Conclusions

- 1) Discs must be mounted perfectly true within 2/1000ths of an inch.
- 2) All ancillary parts must be checked, calliper, piston, slider, wheel balance etc.
- 3) Lack of disc parallel due to poor set up run out is not covered by warranty.
- 4) Disc thickness variation is the major cause of brake judder.
- 5) Bad initial fitting is the cause of disc thickness variation.
- 6) Items 4 and 5 cause uneven pad wear and dusting.
- 7) Disc thickness variation of the smallest value has a critical effect on judder.

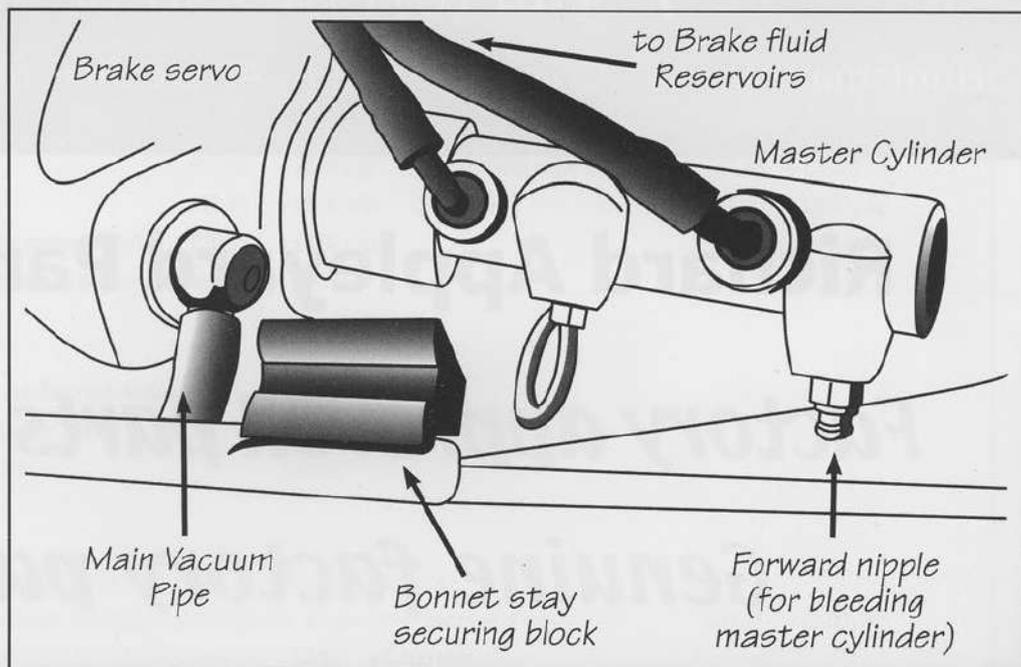
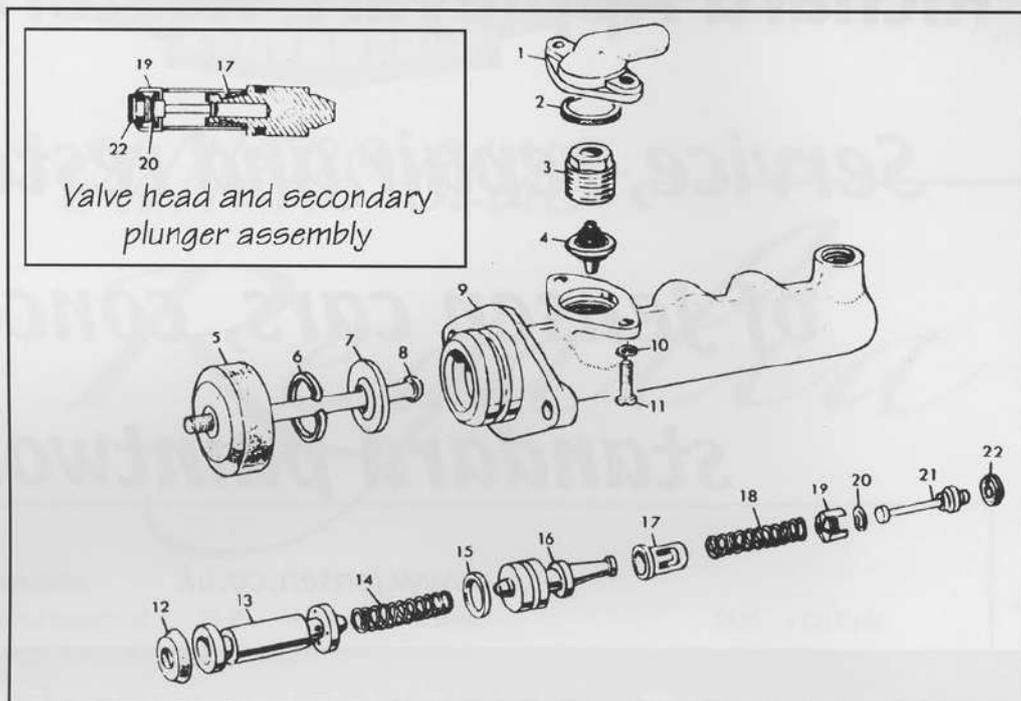
TECHNICAL

INTERCEPTOR III SPONGY BRAKES

IN MY ARTICLES ON Brake Judder I included a bit on how to bleed the brakes. Well even after doing this some owners still suffer from a soft pedal, spongy brakes or excessive pedal travel. After a lot of investigation by others, the industry, and myself, I think I have the solution. This mainly applies to the Girling or FAG master cylinders but may be relevant to others. These cylinders have a bleed nipple near the end (furthest from the servo).

On right hand drive cars, there was insufficient room for a complete nipple so it was cut short or replaced with a normal bolt. The master cylinder should be bled from here before and after anywhere else; there won't be room for a tube so you will have to let the fluid dribble onto a cloth on the down stroke of the pedal and then throw it away.

Now on the installation of the master cylinder on the relevant cars the front is higher than the rear. This means that any air in the system will work its way to the top. The top in our case is forward of the bleed nipple and is trapped, causing the problem. The paperwork with new cylinders says to prime the cylinder, or fill with fluid, before installation, this is one solution but not easy or ideal. Another solution is to get the back of the cylinder, where fluid enters and air can therefore leave, at the highest point. There are three ways I have come up with. One is to raise the



Earlier Interceptor Master cylinders (including early Mk III), do not have a facility to bleed the master cylinder itself (See top diagram), but later cars do (above). Because of the very tight space restriction, sometimes there is no nipple fitted; if there is a nipple fitted, it (on RHD cars), will be jammed against the Hardura sound-proofing felt.

back of the, well chocked, car, with a jack, a very steep hill or both and operate and tap the cylinder until the trapped air bubbles into the reservoir. Another way is to release the brake pipes near the cylinder,

take the cylinder off the brake servo, complete with the pipe-work and bend the cylinder up, using the flexibility of the pipes, to release the air. The third way is to relocate a nipple, on top and at the end, i.e.

the highest point, by careful drilling and tapping. I have identified the problem and I know my solution is not perfect so please let us know if there is an easier way.

Alan Smith

Steve Bowater tackles the thorny problem of leaking brake fluid reservoirs — this is one to watch out for — as the consequences can be explosive. . .

Now I know that it has been written about before, but it is important so I make no apologies for visiting this technical item again. *The brake fluid reservoirs are ideally located to deposit hydraulic fluid onto the very hot exhaust manifold.*

By the way, have you ever run the engine with no exhaust manifold on the engine? This definitely comes into the category of don't try this at home, however, there was one occasion when I had drive home with a broken manifold. I had taken my Interceptor to a local garage to have a new floor pan welded in place. It was in the days before I replaced the rear springs so the tail of the car was, well, lower than it should have been. On putting the car onto the car lift, the rear silencer didn't clear the metal ramp and it pulled the exhaust pipe rearward and in the process, broke the manifold. As the garage didn't have a spare manifold (what are garages coming to these days!), I drove the car home with a half dangling manifold where red hot gases could clearly be seen leaving the cylinders. Looking back at it now, I really shouldn't have driven it home, but, hey I was young then and invincible.

Anyway, back to those brake fluid reservoirs. Now I know that you can now buy new ones, but not being one to throw anything away unless absolutely well passed it's sell by date. I have an Interceptor III, so have the type of reservoirs which include a low brake fluid level warning built in, so even more places for the fluid to leak from! Even these are quite easy to rebuild, but be careful as the plastic has been exposed to obnoxious chemicals and high temperatures for a long time and they will be brittle.

The usual first sign of a leaking reservoir is a bubbling of the paint on the servo unit, which is located directly underneath the reservoirs. If this is happening, do something about it now, brake fluid is flammable! You can just rebuild the caps, but I removed the entire reservoirs, cleaned them out and replaced the flexible pipes to the inlet of the master cylinder.

Remember, brake fluid is hygroscopic so it is absorbing water all the time, reducing the boiling point of the fluid, with consequential loss in braking performance and causing corrosion on the inside of braking components. So if you haven't changed yours for a while, go on, do it over this winter whilst refurbishing your reservoirs.

Firstly, remove the electrical connections from the spade terminals and take the caps off the reservoirs. Cover the reservoirs with cling film being careful not to allow any contamination to

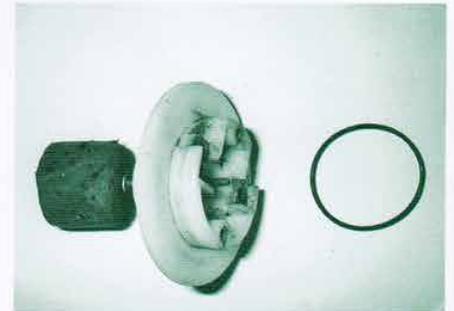


enter the brake fluid. Place the caps on clean cloth, on a clean work bench, then carefully remove the two screws on the black central cap. This black cap is likely to be very brittle so be careful not to break it. It is likely that the two screws will be corroded and difficult to remove, mine were. After several unsuccessful attempts to turn the screws anticlockwise, I tried turning one less than a quarter of a turn clockwise. This freed the corrosion and allowed the screws to be undone. Be very careful using this technique as it is very easy to turn the screw too far and strip the thread or, even worse, break the plastic pillar that the screw is in.



With these two screws removed, the black plastic cap can be removed. This will expose the electrical connections contained within a plastic housing.

The two spade terminals should now be removed by taking out the (almost certainly) heavily corroded screws. The removal of these screws is made more difficult because the plastic housing into which they are fastened is no longer attached to the rest of the lid. It is possible to remove the plastic housing from the lid before removing the spade connectors which makes the removal of the screws easier, but be careful as it is easy to catch the spade connectors on the lid and break the plastic they are connected to. The removal of the spade connectors took me several hours to complete as I really did not want to crack the plastic housing.



The reservoirs are now down to their constituent parts as shown in the main photograph below. The plastic housing has an O-ring around it to form the seal between the housing and the lid. Replace this with a new one. On the lid, make sure the large flat washer which forms the seal to the reservoir body is clean and making a good seal with the lid. Clean all the electrical connections before reassembling, being careful not to over tighten the screws. Replace the lid on the reservoir and reconnect the electrical connections.

When everything is back together, check it after the first few uses of the car just to make sure that all the seals are working.

Stephen Bowater
stephenbowater@aol.com





BETTER BRAKES FOR AN INTERCEPTOR

Ok, if you have made some upgrades to your engine -

or simply find your front brakes look a little weedy since you fitted bigger rims -

Then you might be interested in the following.



It was early 2011 and I wanted better brakes (for both the above reasons if I'm honest). My convertible had great brakes for a car designed in the late 60's but that was then, this is now. Having added EFI it starts and goes like a modern car with only the brakes not having the response of a "modern". As I drive it regularly good braking matters to me – and it is a change that can be easily undone if some future owner so desires.

I'd contacted a few people over a couple of years enquiring about what they'd done – but didn't want to have something cobbled together. I knew of the Interceptor R/S upgrade with AP Racing disks but they are not cheap nor could I find someone to talk to about them at that time. Then Dave Barnett let me know about a set from Hi Spec fitted to Colvin Holder's Interceptor 111 that you could buy off the shelf. Perfect! Maybe?

Having never heard of Hi Spec I googled them and without wanting to offend anyone, like many things on the web there were both good and bad reports. The good seemed to sum up the product, the bad tended toward the service side. I figured I could live with that as being on the other side of the world the only service I expected was for them to arrive.

With a strongly appreciating Kiwi dollar the price was right (approx. GBP1500 incl. shipping) and I ordered a set via Appleyards.



I was pretty impressed when the box arrived based on the apparent quality of the parts but the complete lack of any documentation rather let it down. There wasn't even anything on important details like "which

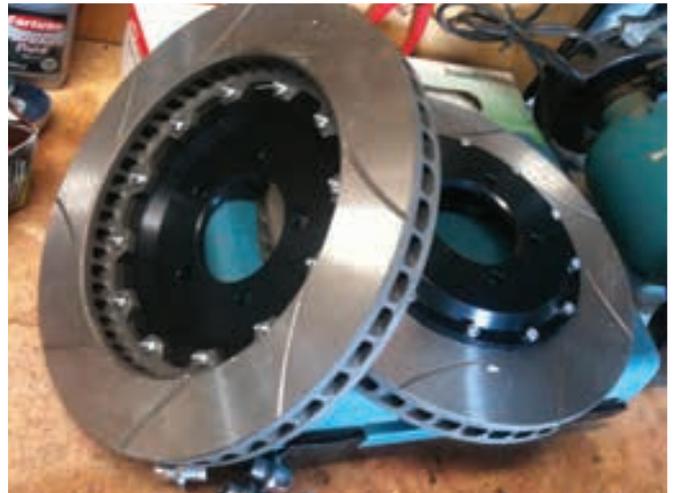
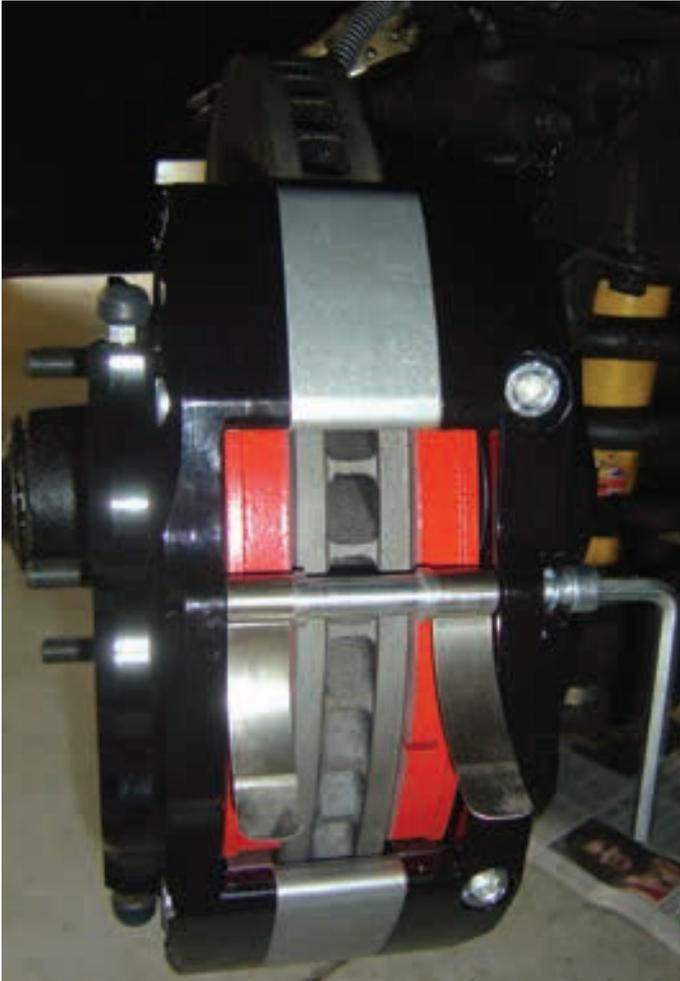
looked very nicely made and finished being their 6 pot monster callipers – in black (not so showy) and grooved not drilled disks. Hex key bolts looked good and I was soon away.

way the grooved disks went". That sort of thing would have been easy to include surely? Anyhow none of this was a showstopper and after a few emails I eventually got the data I needed (NOTE it is all on their web site nowadays) and broke out the tool box.

Car on to hoist, front wheels off, axle nut removed, flexible brake hose clamped with vice grips (as being replaced) and undone, calliper and disk unbolted pretty much summarises things. No special tools needed and all came apart easily.

In the Haynes tradition refit is largely disassembly in reverse. Bolt "bell" to disk and refit on axle. Mount calliper EXCEPT it doesn't fit! Whilst Hi Spec had provided a mounting bracket (with Jensen printed on it) no way did it hold the calliper properly so it could fit the @#\$\$%& disk! Now I was pretty pissed and feeling very very far from the UK and just waiting for the wife to comment

The short version of what happened next is



a few weeks later another bracket and correspondingly longer bolts arrived. These bolted on as they should have at the start, the EBC red pads were fitted along with the (supplied) new stainless flexible hoses. The braking system was flushed and bled (with the Dot5 fluid that was also supplied), wheels refitted, removed from hoist and taken for the first drive. I should say that through the "it doesn't fit" process) was sending Hi Spec pictures and they were not too bad on short email replies.

End result? A braking system for my Convertible the equal of a modern cars braking system.

Over the next few test drives, each gradually further (and faster) nothing fell off and nothing rubbed or came loose. What a relief. I next had a certified engineer sign it off and was then able to get into the bedding-in period (a key area that I thought Hi Spec might have provided some advice on).

The new pads certainly squealed (yes I did fit the anti-squeal pads) but after following the bedding-in instructions for about 500km the noise went. The initial "bite" was now strong and the brakes today whilst maybe not matching the 8 potters on my AMG haul me to a stop like a "modern".

As well as the 6 pot "Monster" callipers and much larger EBC red pads the new disks are larger – 330 mm to be precise. The new parts are significantly lighter than the originals also (and together



they have worked brilliantly for the few thousand Kms I've done since.

If you are contemplating something similar there is a key prerequisite. These things don't fit behind the standard 15in rims. If you want bigger brakes then you need bigger rims and the 17in. from Cropedy were my choice. Together they look pretty good too.

So to conclude, I'd have no hesitation in recommending them – my experiences are noted above but incorrect part aside Hi Spec's website now has all the other data I thought should have been provided in my box of goodies.

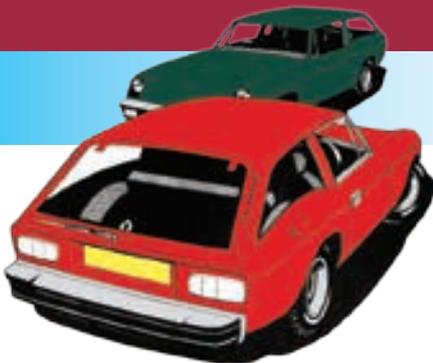
Hopefully Hi Spec has continued to improve because I think an off-the-shelf complete upgrade kit is something we are lucky to have on the market. No doubt Appleyard's stand ready to help and take your orders !

JULIAN BEAVIS

9072 New Zealand
julian.beavis@extra.co.nz



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RETRO-TECH

Alan Smith looks at tech advice from magazines past and brings them up to date

In the September/October issue you read about Stoneleigh and the three Interceptors that had mishaps either before or on the way to the show. Well it didn't stop there; on the way home Darren Strank's Healey suffered a frightening experience with a front wheel bearing failure, also a

'After fixing my rear wheel bearing, my front discs were next on the agenda. Whenever I put the brakes on, the front would wobble. The problem — warped discs. The solution — have the rotors turned.'

couple of years back Justin Roxburgh had a brake disc shear off on the way to the Chairman's garden party. Both could have taken advantage of an article by **Bob Epperson** published in the 1986 winter issue (number 69) entitled *JH/GT Front Discs/Pads*, it went like this:

After fixing my rear wheel bearing, my front discs were next on the agenda. Whenever I put the brakes on, the front would wobble. The problem — warped discs. The solution — have the rotors turned. This again is a job you can do on a Saturday.

While you're at it, check the pads and determine if they need replacing. Minimum thickness should be no less than 1/8 inch.

If you plan on having the discs turned it would be a good idea to

obtain some new inner bearing seals. When I did mine I found I had a bad seal. They cost little but a simple part can keep your car up on jacks. Buy one for each wheel before you jack it up and replace even if they appear to be okay. Steps:

1) Loosen the wheel nuts, apply hand break, chock the rear wheels, jack up the front, set front on jack stands and then remove front wheels.

2) Check the thickness of the pads by looking through the aperture in the brake caliper and determine if they need to be renewed (remember 1/8 inch minimum thickness).

3) Reduce the level in the fluid reservoir if you plan to renew the pads. This allows for fluid movement when pistons are pushed in when you install new pads.

4) Release the retaining clips, and remove the pad retaining pins.

5) Withdraw the pads and anti-squeal plate from the brake caliper. Note: Do not depress the brake pedal with the pads removed.

6) Clean the exposed faces of the pistons and recesses into which the pads fit then carefully push the pistons back into the calipers. If you plan to have the discs turned, take the following steps:

7) Pry off the grease cap, remove the cotter pin, and remove the castle retainer nut.

8) Remove the brake caliper attachment bolts and withdraw the complete caliper assembly. Note that at this point the caliper assembly is still held in place with the brake fluid pipe so be gentle and don't over bend it.

9) Remove the hub-retaining nut and ease the hub off the stub axle.

10) Pull out the outer bearing and store in a clean place (unless renewing).

11) To remove the inner bearing you will need to remove the collar that holds it in. Gently pry it off, as it is soft metal that bends easily. Earlier models come with an oil shield.

12) You will note that on the axle stub the inner bearing seal is on the stub - replace and clean up the dirt and grime. Note how it is positioned on the stub.

13) Take the disc to your local brake/machine shop and have them turn the disc (they should know the limits).

14) While your discs are being cleaned, clean your bearings (if not renewing) of the old grease and work new grease into the roller cages. Do not pack the hubs as grease may be forced past the seal to contaminate the brake linings or friction pads, and the bearings could overheat.

15) Refit the inner bearings and collar into the disc and refit the disc onto the hub after smearing the inner seal lightly with grease. Put the hub onto the axle, refit the outer bearing, washer, and retaining nut.

16) Adjust the hub bearings. Adjustment of the hub bearings is made by first tightening the hub retaining nut while turning the hub. Having taken up the play, slacken the retaining nut so that the hub is free to rotate without binding. Too loose and you will have front end wobble at about 60 mph. Retighten the nut by hand.

17) Re-attach the brake caliper. As the bolts that hold the brake caliper in place have locking nylon threads, you should replace them. Tighten the bolts to a torque loading of 33lb/ft.

18) Fit the retainer nut so that with the castle nut attached, the slot lines up with the pinhole and insert a new pin. Note: Excessive slackness after tightening the retainer nut may mean a bad bearing.

19) Re-attach the grease cap.

20) Refit new brake pads and the anti-squeal plates ensuring the arrows on the plates are pointing in the direction of the wheel rotation. Note that in item 6 the pistons

should have been moved in to allow for the new larger brake pads.

21) Insert the pad retaining pins and secure with the spring clips.

'A Jensen-Healey parts list page on the internet, not only are there exploded line diagrams but the original suppliers part numbers also.'

22) Pump the brakes several times to adjust the brakes and top off the brake reservoir with fluid if necessary.

23) Refit the wheels and don't forget to tighten the wheel nuts when the car is on the ground. You'd be surprised!

24) Road test the car. If you develop a wobble at 60 or so, you may not have tightened the bearings enough.

You will need to carry out steps 16, 18 and 19 again.

The above was written for the Healey/GT but the principle is the same for the Interceptor, C-V8 and FF but the torque figure for the calipers is 65 lb/ft.

Jensen-Healey Internet Parts List

One thing that is specific to the Healey/GT — in issue No.131, January 1997, Gary Schwer announced a Jensen-Healey parts list page on the internet, not only are there exploded line diagrams but the original suppliers part numbers also. Gary and Mike Dunstan compiled the pages, it's not fully comprehensive but still there and well worth the visit, the address is <http://www.web-masters.com/gms/>

Interceptor Starting

A problem or characteristic that keeps cropping up is starting an Interceptor. 'I have to pump the throttle up to ten times before starting.' is a popular phrase. If the carburettor is empty of fuel, no amount of pumping will put fuel into the intake (although I'm not sure if you get any suction from the accelerator pump). The only way to get fuel into the carb is by cranking the engine, and yes sometimes this

can take up to 20 seconds, especially on the later interceptors that have a vapour separator.

The technique I use is to crank the engine until a few seconds after the oil pressure warning light has extinguished, then pump the accelerator a couple of times and then crank again, hey-presto it starts.

The techniques for starting a hot engine is as in the handbook — part throttle and then crank the engine until it starts.

The reason for an empty carb is fuel evaporation, the engine gets very hot — and how many of us have still got that foil bag of insulating material between the inlet gasket valley and inlet? Another reason could be that you have a leaking fuel float chamber. Next time the carburettor is off or you suspect a leak have a look underneath for cracks or a seepage past one of the blanking plugs, both can be cured with well keyed Araldite or similar.

Another way to prime the carb is to fit an electric fuel pump, but my opinion is that if there was a drill for the oil pressure light coming on it would be to stop the engine, so why start the engine with no oil pressure to start with? So I prefer to prime the oil while I prime the fuel. I know this argument is debatable, so it's up to you.

JOC OPEN DAY BRITISH MOTOR HERITAGE CENTRE GAYDON SUNDAY 25th FEBRUARY 2001

All members of the JOC are cordially invited to the second Open Day to be held again at the Motor Heritage Centre, Gaydon.

Those members who attended last year's Open Day will confirm that this an event not to be missed. It is the intention to build on last year's successful formula but to introduce a number of new features. A detailed programme will be included in the next issue of the magazine. If there are any topics that YOU would like included in the programme please get in touch with either Alan Smith or Keith Andrews.



Internet Jensen

JOC Online:
<http://joc.org.uk>

Jensen Motors Ltd:
<http://www.jensen-motors.com>

Jensen Web Page:
<http://www.british-steel.org/jensen>

Jensen Mail Group:
The wonderful online technical support and chat group:
Send an email to:
jensen-cars-on@british-steel.org

JOC Berkshire Area:
<http://www.geocities.com/MotorCity/Downs/7907/>

JOC Wessex Area:
<http://www.jensen-oc.co.uk>

Jensen-Healey Preservation Society:
<http://www.jensenhealey.com>

John Cohen:
<http://www.jncohen.net>

Jencraft Tech:
<http://ourworld.compuserve.com/homepages/JENSEN>

Jensen Club
Another British club that is independent of the JOC:
www.jensenclub.com

John Wild's FF page:
<http://www.geocities.com/jensenff/>

Martin Robey:
<http://www.martinrobey.co.uk/>

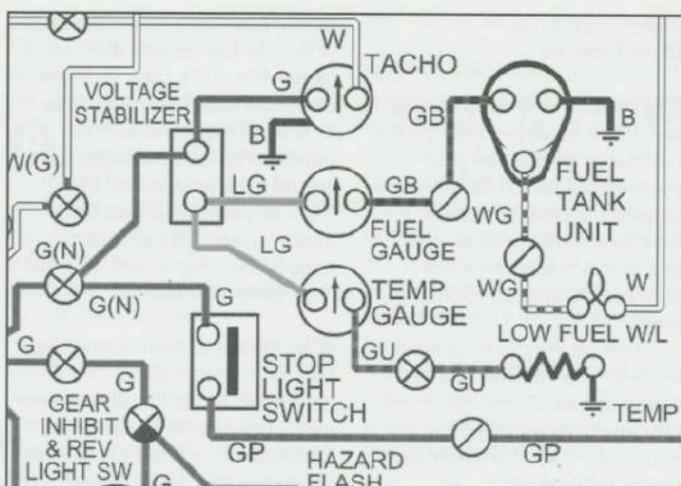
Cropredy Bridge Garage:
<http://www.jensen-cars.co.uk>

Tony Bailey's Jensen Brochures Page:
<http://www.british-steel.org/jensen/brochure/>

Jensen Interceptor Owners' Club:
<http://jjoc.org>

Jensen Owners' Club Denmark:
<http://www.adtention.dk/jensen.htm>

Jensen Car Club of Switzerland:
<http://www.jcc.ch>



The under-dash voltage stabilizer converts the fluctuating 11-14 volts from the battery to a fairly steady 7 volts; it feeds the temperature and fuel gauges to let them indicate a steady reading.

A Zac, the stabiliser needs to have a good earth to the body to work correctly check this before replacing it. The output should be a fluctuating reading of about 7 volts. Also check the other connectors for good connections.
Gordon Sinclair

Interceptor Pulls to the Left

C When cruising on say a motorway, my car has a tendency to try to drift to the left. Nothing major, but if I take my hands off the steering wheel, she heads to the hard shoulder. The tracking has been adjusted and checked and has been judged to be perfect. Any ideas? **Richie Streeter**

A Get the tracking done again on a 4-wheel system. The rear wheels are not adjustable as such, but the whole axle can be out of alignment, say after rear spring replacement for example if the panhard rod was removed and/or adjusted.

If the axle is not aligned correctly (provided there's no chassis damage from a collision in the past), then adjusting the panhard rod is the method to get it straight again.

Plus the obvious tyre pressure effect, if the pressure is low on the left-hand front or rear tyre, the car will pull to the left. Now all you've got to worry about is that squeak from the

passenger seat (that's the problem in my car anyway)
Keith Anderson

A The obvious are, tyres including pressures (would have thought less on the left hand side, causing a touch more friction drag), brake binding slightly (again on the left hand side) not forgetting the handbrake pads as well. Have the wheel bearings been changed recently? Possibility of one of them being over tightened.

Damage to steering rack, from potholes, kerbing, etc. Have you changed wheels over, ie from left to right (dependent upon uni-directional tyres) to see if the problem transposes to the right? That's about all I can think of, however I'm sure there could be plenty of others. Just thought of another — was the car digitally tracked? As my wife has just pointed out, we have a massive problem with our Lexus and tracking and the difference between garages. Don't know if there is a standard calibration, but different garages have been miles apart in what they say is fine. **Lewi**

Jensen-Healey Electronic Ignition?

C Just wondering what the best electronic ignition would be to fit on my J-H and are there any modules available that fit inside the

distributor cap? Further to the above, has anyone fitted Aldon stuff? **Steve Magee**

A Some years ago I fitted a Lumination System to my MK1 and haven't had to look at it since. There are two parts, the optic sensor lives in the distributor and I managed to hide the separate electronic box inside the off-side chassis member, by the inlet to the air cleaner.

I needed to change the coil as well, and fitted the recommended Lumination one.

Altogether it was not a cheap option but well worth it with the hassle free motoring.
Bob Heydon

A I have followed Bob Heydon's route with HEA 4K and fitted the same system. As he says, it is essential to fit a matching coil at the same time, otherwise the 'reader' in the dizzy cap can burn out.

The reason why I have chosen electronic is, being somewhat kack-handed anyway, the thought of struggling with points, etc, with the dizzy placed where it is was too awful to consider!

Tony Marshall

A I have the Pertronix ignitor electronic ignition system. The complete system fits inside the distributor. I have had it for about a year and no problems at so far. **Neil 907**

Jensen-Healey throttle pedal weakness

C If you are the owner of either a GT or a Healey I may hopefully be able to prevent you from suffering the same inconvenient breakdown as we did. Check the weld on your throttle pedal!

If you lay in the drivers footwell and shine your torch up at the pedal box, concentrating on the throttle pedal you will see just above where the lower pedal joins onto the upper linkage it fixes onto a tubular piece of metal which allows the pedal to pivot.

Where the pedal fixes onto the tube it is held with two

(very small) blobs of weld, these failed on our GT and no matter how we all tried to perform a temporary repair we failed — miserably, and disappointingly, no one present had a mig welder secreted about their persons!

While your car is hibernating I would urge you to visually check your pedal welds as rectifying a potential problem now could save a long wait for the AA!
Simon Holloway

A The same thing happened to me a few years ago. I had to tie some wire to the throttle linkage through the window, and worked it by hand. It was very awkward steering, accelerating and changing gear at the same time, but it got me home. It's not to be recommended! I repaired the throttle pedal by sleeving it with a bit of metal tube and bolting it to the remains of the pedal. Strangely enough, I also had a donor car and the pedal on that had also been broken and repaired.

We are still going strong...
Dave Devine

Jensen-Healey instrument panel removal and temp sender location

C Can someone tell me how the instrument binnacle pops out? My temp gauge is broken and better that I sort it in this weather.

I've just had a quick look for the temp sender but can't seem to locate it (not around the water pump). Can someone point me in the right direction?
Steve Magee

A On my MK1 the 'instrument pod' is held in with two screws, one located in the top of the RH instrument pod, the other in the LH instrument pod.

You'll need to remove these and disconnect the oil pressure pipe and speedo cable from the rear of the instruments.

Disconnect the two wiring plugs located at the rear of the

INTERCEPTOR MK I BRAKE CALIPER CONVERSION



BETTER BRAKES FOR AN INTERCEPTOR

After 12 years suffering the rather poor braking afforded by the two-pot Dunlop calipers on Mk1 Interceptor FMA 729G, it was time to upgrade to something more efficient and to switch to the readily available Coopercraft four-pot alternatives on the front — Keith Andrews reports

Those members with Mk2 and Mk3 Interceptors who complain how poor their brakes are compared with modern cars should really try an early Mk1 with the two-pot Dunlop callipers inherited from the C-V8. Once you have seen the tiny pads you understand why constant anticipation and the allowance of lengthy braking distances are mandatory for us stoics. But then every cloud has its silver lining and the strange Dunlop handbrake mechanism with its much larger pads is rather more efficient than the equivalent Girling version.

Whatever you may think of your brakes the change to Girling brakes in 1968 was a quantum leap forward. When my Mk1 FMA 729G was rebuilt in the early 90s it acquired a Mk3 servo and master cylinder but retained a Mk1 pedal box with the apparent result that there is a much better mechanical cranking operation resulting in an ability to stop the car (just) even with a failing servo. I have always assumed that the pistons in the calipers were also rebuilt at that time. By 2002, after several years of my ownership and regular use plus a

rebuild of both the master cylinder and servo and new pads, together with pressure bleeding and proper adjustment of the push-rod within the servo, the brakes were really quite good and much better than the normal Interceptor standard. Pulling up nicely below 40 mph and above that locking up very quickly and producing a majestic but straight slide down the road putting flats on the Dunlop tyres until the older and slower mental processes remembered cadence braking.

My worry was that this could not go on and one day the brakes would revert to standard, and when that day finally arrived they were much worse. They did finally 'fail' coming down the Susten Pass on our second Swiss trip in 2004, albeit at the bottom, and only then because two stops in quick succession meant there was no cooling air passing round the calipers and so the brakes eventually overheated. This resulted in virtually no braking and a gentle but exciting (fortunately uphill) trip back to base. Stripping out the pads and de-glazing them followed by a total bleed

revealed that the servo was also u/s, and with the loan of a servo stripped from a from a crashed German car there was enough braking to make an 'interesting' journey home. On return the fitting of a rebuilt servo, new pads, and replacing the brake fluid with Castrol Response should have solved the problem, but only resulted in braking much worse than I had got used to over the previous two years. I did have great trouble fitting the new Allied Signal Durid pads as they were both too thick and too wide requiring a lot of filing down and forcing to get them into the calipers.

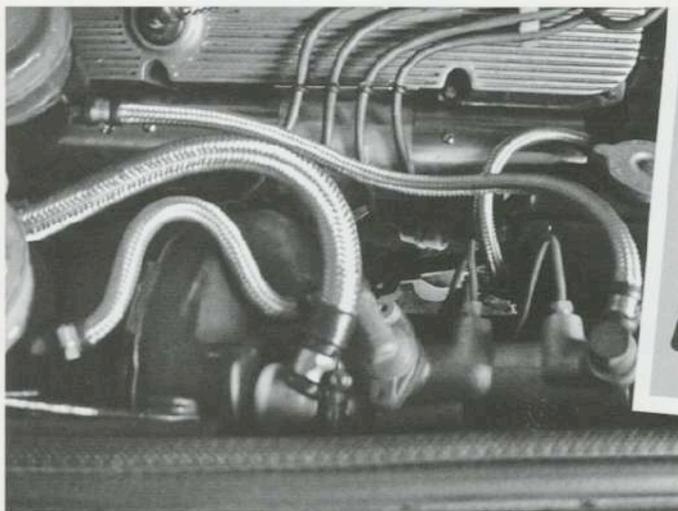
In retrospect this may have only added to the eventual problems. By early 2007 the brakes were positively feeble, little stopping power and a lot of pedal travel, and the only thing left I could think of was to adjust the push-rod in the servo which is an easy job for me as I have fitted longer flexible pipes from the reservoirs to the master cylinder.

It is not uncommon for Jensen owners to start on a simple job and end up undertaking a totally different and usually bigger task (i.e. more expensive) either out of need or of interest — in my case usually the latter. Sorting out the brakes really got under way as result of the decision to replace a blowing head/manifold gasket the weekend before using FMA to go to the Classic Car Show in July up at Newby Hall. I had been putting

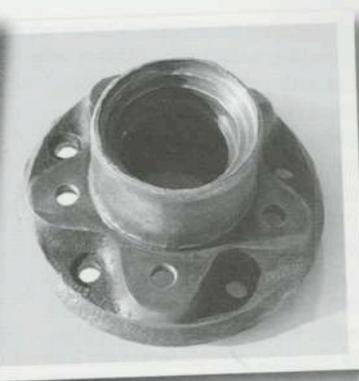
this job off for some time as it was the more awkward offside one and in any case it wasn't all that noisy, unlike the FF which also had an offside gasket that had been blowing longer and more noisily and which is more difficult to do (so drive faster and turn the radio up!).

So it was going to be a week of doing gaskets, or so I thought. While under the car and removing the nuts holding the manifold onto the studs I noticed that the inner face of the offside disc was swept over barely half the surface and compared unfavourably with the nicely swept and polished outer face. So a mental note to do something about the pads. Later while refitting the manifold I glanced at the inside of the front nearside disc and, horror of horrors, not only was there a very small contact area from the pad but worse still brake fluid running down the tyre and soaking into the wooden blocks under the wheel, and even worse grease all over the inside of the disc and callipers. I initially put this down to over-enthusiastic greasing of the steering and suspension but it looked like being more than a simple pad change job. I wondered if part of the problem was caused by the way I had forced the pads into the caliper to the extent that the inner pistons could not move.

Popped round to *Classiccar Automotive*, the brake people,



Once you have seen the tiny pads you understand why constant anticipation and the allowance of lengthy braking distances are mandatory; longer hoses from reservoir to master cylinder (above); damaged hub rim lead to seal leaking grease (right, top), and (right) how many different sizes of caliper bolts should you have?



conveniently only four miles from home, and no, they hadn't got a set of Dunlop callipers on the shelf but could rebuild mine in a week – so no Newby Hall show in the Mk1.

Apart from having little braking a secondary problem was also the length of travel in the brake pedal which I had found disconcerting as I always prefer a hard short pedal. When in doubt I always phone FF guru Dave for advice. Yes, adjusting the push rod would give better pedal, and the way to do it properly is put a clamp on three of the brake lines and then...

At which point he lost me and as I only have one brake pipe clamp I decided that I would leave it as it was or use the good old fashioned trial and error method of adjustment. No, filing

the brake pads down seriously to fit them easily into the calipers wouldn't do them any harm. No, degreasing the discs and having them skimmed to remove all the ridges on the rear face wasn't a good idea with very old discs, much better to buy new ones. No, my idea of upgrading to three-pot Girling calipers might not be a good idea because of potential problems lining them up with Mk1 hubs and discs.

But why not put Coopercraft four-pot calipers on the front and have confidence in stopping the car?

Did I mention earlier that early Dunlop Mk 1s are totally different animals from the rest of the herd? It's not just the big items at the front like the king pin and lever arm shock absorbers for the suspension and steering, nor the strange pre-Adwest

steering rack fitted to some cars, not even the Dunlop calipers, pistons and pads, but we also have totally different hubs and discs as well as it turns out!

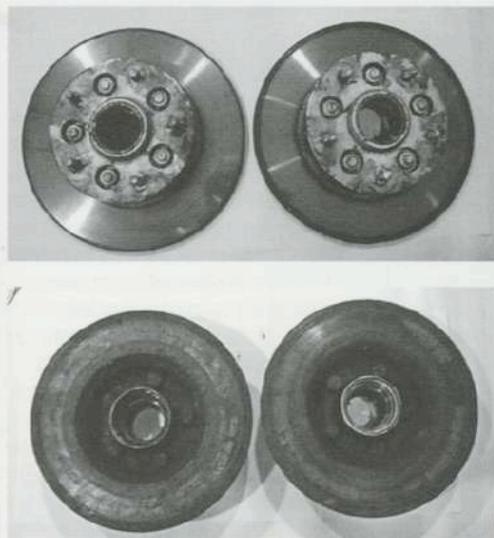
BODGED HUBS AND SEALS

Setting out first to remove the 'good' offside hub, disc and caliper I ran into an immediate problem — couldn't get the pads out that I had forced in before! No problem, just slacken the four studs holding each of the pistons to the calliper, then remove the two bolts holding the caliper to the adaptor plate, cut through the copper brake pipe and throw the whole assembly away. I know this sounds drastic but the existing brake pipe wends its way over and under the brakes as it feeds into the inner piston and then out and on to the outer one (it really is that different) and I had no intention of using any of the existing pipes nor the fittings nor even the flexible hoses. The hub/disc assembly came off easily enough and the larger rear roller bearing and the smaller front one conveniently fell out. Washing both in paraffin showed no wear, but I had already decided to replace them, the shells and the oil seals anyway. Then having wiped most of the old grease out of the hub I carefully drifted out the two bearing shells and the old oil seal, none of which showed any wear either and degreased the hub and then...

Then it became apparent that all previous work done on the hub and bearings had been carried out by an apprentice from the *Hannibal the*

Cannibal Evening Institute for Contemporary Mechanics, perhaps even by the master himself. The inner lips inside the hub on which the shells sit were all damaged and it was obvious that all previous 'drifting' had been done by brute force with a cold chisel and a lump hammer, but not quite to a point beyond but re-use, and at least the oil seal had been the correct one. The 'bad' nearside one was much worse and the seal lips would have needed machining to get the lips back to a usable state, but worse still an oversize oil seal of the wrong type had been made to 'fit' by hammering it into place resulting in serious damage to the rim in which it sits and that together with the seal disintegrating had led to the grease spreading everywhere. None of this was beyond repair but would have required careful welding and machining to achieve a workable profile. In the end I got a pair of replacement hubs from an early Mark 1 being scrapped by Andy Brooks that only needed minimal dressing to the shell retaining lips.

Getting a Mark 3 Girling hub and disc apart is easy — bench vice, socket and rigid bar, breaker bar plus a bit of force and the bolts that pass through the disc and bolt into the hub screw out. By now you just know that Dunlop hub and disc will be different, they are, and are held together by bolts that pass through both the disc and hub and have a Stayloc nut on the outer face. Attacking this as before should have threaded the nut off but I



Cause for further investigation:
The front brakes discs — front face nicely swept and polished by the pad contact — rear face swept over barely half the surface.

INTERCEPTOR MK I BRAKE CALIPER CONVERSION

had forgotten about Hannibal's alternative methods. The inside of the disc casting is thoughtfully provided with a raised lip by each hole, the theory being that a face of the head of the correct sized bolt fits against this and prevents it from turning. Unfortunately I was faced with oversize bolts with even larger heads that had been hammered into place so that heads sat on top of the raised lip which meant that not only did I have to double up with the socket and bars to remove the nuts, and then as the bolts would not slip or even screw out, hammer them out.

The discs had plenty of metal left and were true as far I could tell and in my opinion were re-usable. After a thorough clean it was off to Vector Engineering in Alsager for skimming and on to Niphos in Crewe for cadmium coating. One thing we are blessed with in Cheshire are a whole variety of small companies that worked for Rolls/Bentley or else were set up by former employees.

The pictures of the back of the finished disc clearly show the raised lip mentioned above that is designed to retain the head of the bolt to prevent turning. The cadmium coating prevents the edges of the disc and the other non-swept areas from rusting and any spray over the swept area comes off with the first brake application. The well of the disc being painted before assembly with that old favourite of mine, silver Hammerite.

I had already got some new spare studs that go through the hub to locate and hold the Rostyle wheel on and I reasoned that with 20 studs in two sets of hubs I ought to find enough good ones to make up a full set of 10. Those that came out of the replacements were a matching set and in good condition, but I still could not resist taking the set out of my old hubs and I was not to be disappointed – every conceivable size and shape, some of which really needed brute force to get them out. In passing I would mention that it is always better to run a spare wheel nut onto each stud before tapping it out to prevent damage to the thread, and also to grease the splines on the shaft of the stud and manually locate them with the splines in the hub before tapping them gently home.

The next job was to thoroughly degrease the two 'new' hubs, take them to Vector to be dressed, paint them with silver Hammerite, and finally to insert the new studs. (photo and e-mails of front and rear of new

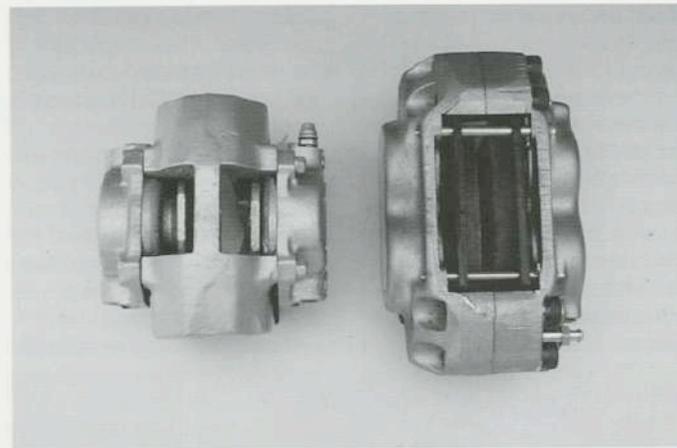
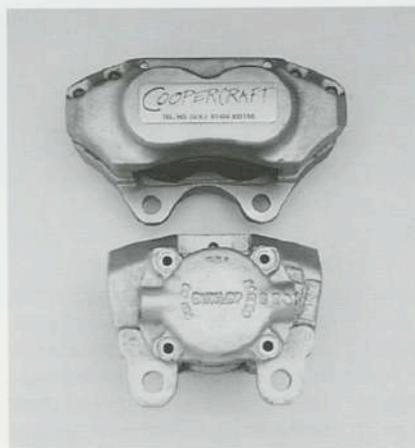
hubs, and the rear of the worst old hub that just about shows the damaged lips). Finally the new bearing shells and the correct oil seals, all pre-lubricated, were all pressed into place (no hammers!)

REASSEMBLY

And finally to the exciting bit, the reassembly, which I always find very easy and quick because generally you are using new and clean parts and new nuts and bolts. Using new and correctly sized high tensile bolts with a head face sitting nicely against the lip, lubricated with copper grease so that they slipped nicely through the holes in the hub and caliper (no need for force now), the nuts were all torqued up to the correct 50 ft. lb. With the new oiled bearings already in the hubs all that was necessary was to pack the hubs with Castrol LM grease, taking care not to over pack, and then slide to complete unit onto the pre-greased stub axle. The next job was to fit the thick hub nut washer and then the castellated hub nut. Here I'm afraid that I refer to type and do it the old fashioned way without torquing just by tightening the nut until the hub will barely turn before slackening it off one notch and dropping in a new stainless steel split pin. Finally, filling the hubcap with grease and tapping it into place – all to be re-done after a few miles of bedding in.

COOPERCRAFT KIT

The new Brake Kit Non-Vented-Jensen Interceptor MK 1 (to give it its proper name) supplied by mail order from Coopercraft cost the princely sum of £478.23 including VAT and postage and just the appearance compared with the Dunlop set was worth most of the money. They have an added advantage that the new pads supplied appear to be standard Interceptor 3 ones. Fitting is logical and easy and the instructions supplied are only there to make sure that you get the bleed nipples at the top, and if I remember correctly, to fit the calipers without spacers. However to ensure that I got a tight fit and that the callipers were accurately centred on the disc I did choose to refit my spacers. I also re-used the large bolts that hold the caliper onto the mounting plate after suitable cleaning and after some thought as to why they were not drilled through the head, as was the case on my Mk3, to take the lock wire that prevents the bolts unwinding. Eventually I decided to go ahead and use them with plenty of thread sealer



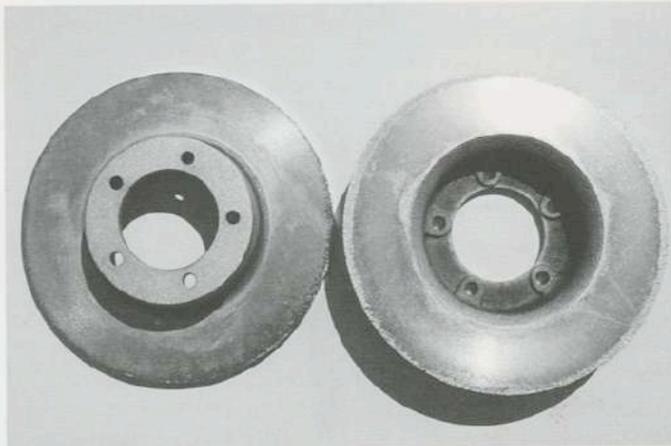
Hubs: original and refurbished.
Calipers: the new Coopercraft examples are considerably larger than the Dunlop originals.
Pads: again, the Coopercraft examples offer much more pad area plus the obvious extra efficiency of the four-pot caliper design.

and torque. If I had read the manual first it would have been obvious – the torque instructions are 55 ft lbs for Girling brakes but 85 ft lbs for Dunlop ones. The bonus was that fitting the pads and the retaining pins proved to be easy, admittedly with a small amount of copper grease to assist and also to make stripping easier in the future.

Funnily enough the hardest part of the job was fitting the new high-pressure stainless steel braided flexible hoses that I had purchased earlier. No problem with either getting the old hoses off at the union at the

brake line end or off the union on the swivel pillar. The problem was that the mounting brackets on the body and on the swivel pillar weren't facing the right way for my revised hoses nor for the short length of brake pipe that runs from the bracket on the swivel pillar to the caliper that had been made up earlier for me by a local garage. On full lock the hoses were catching on the inside of the wheels. In retrospect I could have saved a lot of trouble if I had thought it through earlier and had longer brake pipes made and relocated the brackets. However after a bit of bracket bending

KEITH ANDREWS



The pictures of the back of the finished disc clearly show the raised lip mentioned above that is designed to retain the head of the bolt to prevent turning. The cadmium coating prevents the edges of the disc and the other non-swept areas from rusting and any spray over the swept area comes off with the first brake application. The well of the disc being painted before assembly with that old favourite of mine, silver Hammerite.

and undoing the unions slightly and turning the hoses the problem was solved.

You may note from the picture of the finished set up that I am using 4mm wheel spacers to give a bigger track, really I just had a set left over from when I fitted alloy wheels on my FF2 where spacers really were needed to allow the wheels clear the calipers.

BLEEDING BRAKES!

Bleeding a brake system from empty is a tedious and expensive job especially as I use premium Castrol Response fluid. I have tried all methods of bleeding brakes with varying degrees of success. In theory pressure bleeding is best but the kit does not contain a cap for our reservoirs and my home made one leaked air pressure, and apart from which having the spare wheel on top of the engine to provide pressure is a pain. Suction bleeding using a Mytvac suction pump ought to work and is good at the start when there is a lot of air and some old fluid to remove, but towards the end air leaks in through the bleed nipple threads and the manufacturers suggestion of PTFE tape on the threads doesn't work either.

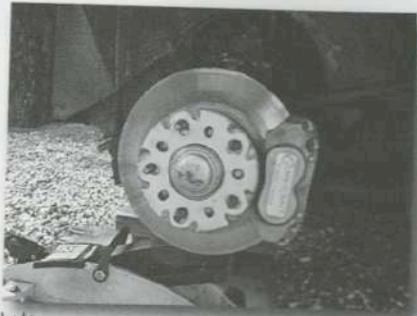
The two-person way of working is consistently the best but can lead to heated debate when the second person is not mechanically minded. I have found the best solution is to work on your own using the simplest bleed kit,

basically a plastic tube with a non-return valve. One day I will try the automatic bleed nipples.

CONVERSION A SUCCESS

All that remained was to fit the wheels, drop the car off the axle stands and take it for a test drive. So was it all worth it? Well, a qualified yes, not as startling an improvement as I would have hoped but certainly much better than they were, and all this bearing in mind that the pads and discs were not fully bedded in and a further bleed would be required.

Certainly I was driving with a lot more confidence and the best recommendation is that if I had not already rebuilt the brakes on the Mk3 then I would fit the new type calipers onto it. In my opinion Coopercraft brakes are a must for the Dunlop braked C-V8s and early Interceptors. My set were described as 'non-vented Interceptor Mk1' calipers so I presume that there are sets for vented brake cars in which case there must be an



improvement in braking by moving from 3 pot to 4 pot calipers. But there is more yet to come on the topic of brakes.

area contacts...

The JOC 'Area Meetings' are run by enthusiasts for enthusiasts! Please support your local area — it couldn't be easier!

1) South Bucks/Oxon

Contact **Bill Smith**: (01844) 352349
jensenfordbill@aol.com

2) Midlands

For regular meetings & events contact
Steve Johnson (01746 766994)
stevej@geebee4.fsnet.co.uk

3) London

Contact **Alan Smith**: (01380 726876) or
areas@joc.org.uk

West London

Contact **Dave Devine** for local shows and
the Ace Café meets, 0208 8452765,
tidnab@tiscali.co.uk

South Thames

(covering Middlesex & Surrey)
Contact **Steve Hodder** (0206 3953514) or
stevhodder@blueyonder.co.uk

4) North-West

Contact **Harry Hilton**:
(01706) 655946 for details.

5) Kent / SE London

First Thursday of the month at the Danson-
Stables, Danson Park, Bexleyheath. 7.00pm.
Contact **Tim Clark** for further details
01322-333484 or 07956-271230
timspjensenclark@yahoo.com

6) Cheshire Area

Second Thursday of the month at 8 pm at
The Whipping Stocks, Over Peover,
Knuttsford. Please contact **Adrian Howells**
(01270 587778) for details.

7) Three Counties Area (Herts, Beds & Cambs)

Contact **Derek Chapman** (01480)
869270 jensen.cv8@virgin.net

8) Thames Valley

First Thursday of the month.
Contact **Brian and Joan Raper**
for details: (01256) 780718

9) Hants, Wilts & Dorset

Contact **Jan Cox** for details: 02380 555378
j.cox672@btinternet.com

10) Essex

The Maypole, Chigwell, Essex, on the 1st
Monday of the month.
Dave Barnett (01708) 456439 or
Keith Davidson (01708) 751982.

11) Cotswold Area

Contact **Zac Marshall**: 0117 979 2759.
Steve Payne: 01993 778174

12) Warwickshire

1st Thurs of the month, the *Moat House, Kings*
Coughton, on the A435 north of Alcester. Contact
George Zdanko: 01527 403955 (h) or 01789
766766 (office).

13) South Downs Area

The White Horse, Park Lane,
Maplehurst,
first Monday of the month.
Hugh Allen (01424 224440)
Simon Johnson (01403) 891208.

14) Cumbria

Contact **Ian Forster** 01434 381618

15 & 16) Wessex Centre

Contact **Paul Lewis** (01249) 446648 or
Jean Smith: (01380) 726876 for details of
next meeting.

17) Yorkshire

Contact: **Mark Maniatt** for details
0113 2607455
markjensen_yorksarea@yahoo.co.uk

18) Scotland

No area rep just now — anyone interested?
Contact **Alan Smith**.

19) Ireland: Iain Cuthbertson

tel: +353 86-8129400 (mob) or +3531
2873607 for details.
iain.cuthbertson@btanctec.co.uk

20) South Wales: Ed Pillingier

tel: 01873 840446 for details.

21) Lincolnshire/Humberside:

Contact **Simon Holloway** for details: 01790
753121

Maple-Leaf Area:

David Rodger, Ontario 905-889-1882, or
Robert Atkins, Victoria (250) 544-1702

Southern California Area:

Bob Adams
13139 Silver Saddle Lane, Poway, CA
92064, tel: 858-487-6371
blackdeath722003@yahoo.com

Eastern USA:

Bob Lasater
Tel: 540.547.4018
BOB@LASATERSUMPTER.COM

Jensen Car Club of Switzerland

Edgar Schwyn (Secretary):
Rotbuchstr. 12, CH 8006 Zurich
Tel/Fax: +41-(0)44-363 14 60

Germany: Klaus Pape

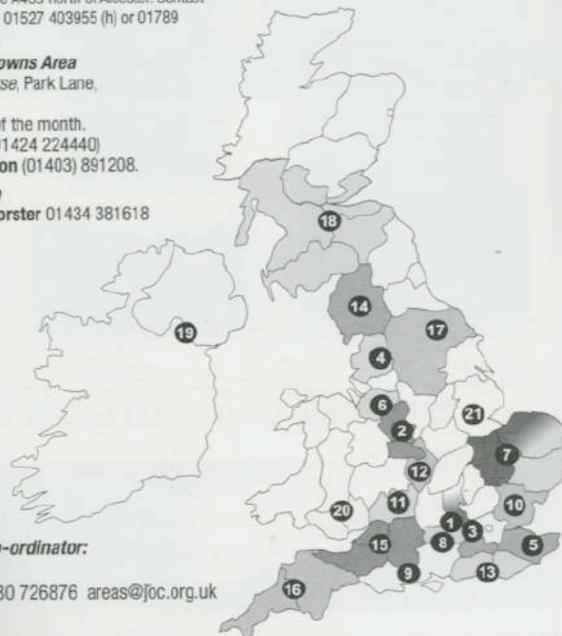
Belfortstrasse 4, D-45138, Essen, Germany.
tel: 0049-201-284822
fax: 0049-201-282010
e-mail: goev.pape@t-online.de

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Alan Smith:
tel: +44 01380 726876 areas@joc.org.uk

Tech Questions & Answers

Jensen Interceptor

Torqueflite Questions

Q I am planning to remove the gearbox from my MK III Interceptor in a couple of weeks time, in an attempt to fix a serious fluid leak that drips from the bell housing. Having carried out the probe test described in the manual, I believe the main culprit to be a badly worn pump housing oil seal.

I am picking up a full gasket and seal kit from Robeys tomorrow, and I plan to renew as many seals as possible whilst I've got the gearbox out. I have, of course, studied the relevant sections in the workshop manual, but would appreciate any tips and advice from anyone who may have tackled this job themselves.

Dean

A Just gaskets and seals? The front seal is easy to change, make sure you lube the seal when you install it, and make sure the converter is fully seated on the input shaft when reinstalling. I assume you know the converter lines up with the flexplate in only one position, we used to spray a dab of paint on one corner of the flexplate/converter to identify them when reinstalling.

The dipstick tube likes to cause grief, use the biggest o-ring you can on the bottom of the tube that will still fit into the hole.

Use a quality pan gasket and do not overtighten!

CrAZyMoPaRGuY

A As a heads up — if you are removing the gearbox with the vehicle on jackstands (as opposed to a lift) you'll need to get it up in the air fairly high. You need to rotate the transmission 90 degrees 'in-place' once once it is loose from the car to actually remove it from between the frame rails. It's an easy job, just like an old Dodge station wagon, other than that little trick.

I usually find a friend that hasn't helped me with this before to lend a hand — once the box is out of the car, I'd recommend a complete overhaul. Very inexpensive component wise and you won't need to remove it again for a while.

If a seal is leaking externally, it usually means something will be leaking internally as well.

Bruce K Bridges

Which Master Cylinder is this?



Q I have just extracted the above master cylinder from my Interceptor III Series 4 built January 1974. Is this the original one that would have been on the car at point of build? And is it a 1 inch or a 15/16 inch one?

I've heard a lot about ordinary master cylinders and FAG ones but don't know the difference. As you can see on one of the photos the part shows the stamp FAG S5069 and also has the numbers 57 and 23 to the left.

I am after one of two things — a proper specification master cylinder seal kit for this existing cylinder — or a new /reconditioned master cylinder which is the correct type for an Interceptor III built during the period January to April 1974.

Chris

A That looks identical to the FAG one fitted to my 1973 J series MK3 Interceptor. The good thing is the FAG cylinders are much cheaper than the Girling ones!

Martin R

A Yes, and they are new and not reconditioned and are cheaper than the reconditioned Girling cylinders. All the Jensen parts dealers will have them in stock.

Archie

Intermittent hard brake pedal

Q When first using the car (Int 3) in the morning, the brake pedal is often very hard, i.e. no power assistance which can be hair raising to say the least. When this happens it is accompanied by a hissing sound from the footwell. Sometimes happens when driving along also — touch pedal, nothing. Keep trying, power



Bleeding Brakes!

The brakes on my Mk 3 have been rubbish since I had the car, and no amount of Green Stuff pads, vented, cross drilled, grooved discs, and Aeroquip hoses made them any better.

They were always spongy and lacked stopping power. I suspected air bubbles were the problem, and had heard that Mk 3s were prone to air bleeding problems. I was told of the bleed nipple on the end of the master cylinder, which helped a lot, but didn't cure the problem 100%. The next was bleeding the brakes while the car was on a slope so the air travelled up hill.

I tried all sorts to no avail. It was MOT time on Tuesday, and I decided to have one last attempt (after seven years of trying) to get brakes I would be confident of during the test.

I was working on my own, so didn't do the normal trick of someone pumping the brake peddle. Instead I used a Mighty-Vac vacuum gun, with it's brake bleeding attachments.

I did the job in record time, and low and behold the brakes are spot on. The peddle used to travel halfway to the floor before doing anything, and then the stopping power was pitiful. Now the brakes start to bite at the top of the peddle, and the power is as you would want it.

So if you're suffering from poor brakes on your MK3 (and assuming the rest of the system is in good condition), then try using vacuum to do the job.

Kerry Moore

(vacuum) assistance comes back.

I think I read that it could be a perished seal in the pedal assembly but not sure where to start?

440Interceptor

A If you can hear a wooshing noise inside the car the servo is probably dead, there is a seal to stop it leaking around the input rod and if its leaking past there it is time for a new servo. There is a Jag servo that fits sort of, you will need to figure out the

mounting holes if you use it but it does work. The proper servo is available from the Jensen specialists.

You will need to remove the brake pedal and pedal box and which can be a bit of fiddle as some of the mounting bolts are hidden but once removed it's all fairly straightforward.

The rod from the servo to master cylinder will need adjusting to the correct length. You will need to bleed the brakes afterwards.

Steve Payne

Tech Questions & Answers

Jensen Interceptor

Torqueflite Questions

Q I am planning to remove the gearbox from my MK III Interceptor in a couple of weeks time, in an attempt to fix a serious fluid leak that drips from the bell housing. Having carried out the probe test described in the manual, I believe the main culprit to be a badly worn pump housing oil seal.

I am picking up a full gasket and seal kit from Robeys tomorrow, and I plan to renew as many seals as possible whilst I've got the gearbox out. I have, of course, studied the relevant sections in the workshop manual, but would appreciate any tips and advice from anyone who may have tackled this job themselves.

Dean

A Just gaskets and seals? The front seal is easy to change, make sure you lube the seal when you install it, and make sure the converter is fully seated on the input shaft when reinstalling. I assume you know the converter lines up with the flexplate in only one position, we used to spray a dab of paint on one corner of the flexplate/converter to identify them when reinstalling.

The dipstick tube likes to cause grief, use the biggest o-ring you can on the bottom of the tube that will still fit into the hole.

Use a quality pan gasket and do not overtighten!

CrAZyMoPaRGuY

A As a heads up — if you are removing the gearbox with the vehicle on jackstands (as opposed to a lift) you'll need to get it up in the air fairly high. You need to rotate the transmission 90 degrees 'in-place' once once it is loose from the car to actually remove it from between the frame rails. It's an easy job, just like an old Dodge station wagon, other than that little trick.

I usually find a friend that hasn't helped me with this before to lend a hand — once the box is out of the car, I'd recommend a complete overhaul. Very inexpensive component wise and you won't need to remove it again for a while.

If a seal is leaking externally, it usually means something will be leaking internally as well.

Bruce K Bridges

Which Master Cylinder is this?



Q I have just extracted the above master cylinder from my Interceptor III Series 4 built January 1974. Is this the original one that would have been on the car at point of build? And is it a 1 inch or a 15/16 inch one?

I've heard a lot about ordinary master cylinders and FAG ones but don't know the difference. As you can see on one of the photos the part shows the stamp FAG S5069 and also has the numbers 57 and 23 to the left.

I am after one of two things — a proper specification master cylinder seal kit for this existing cylinder — or a new /reconditioned master cylinder which is the correct type for an Interceptor III built during the period January to April 1974.

Chris

A That looks identical to the FAG one fitted to my 1973 J series MK3 Interceptor. The good thing is the FAG cylinders are much cheaper than the Girling ones!

Martin R

A Yes, and they are new and not reconditioned and are cheaper than the reconditioned Girling cylinders. All the Jensen parts dealers will have them in stock.

Archie

Intermittent hard brake pedal

Q When first using the car (Int 3) in the morning, the brake pedal is often very hard, i.e. no power assistance which can be hair raising to say the least. When this happens it is accompanied by a hissing sound from the footwell. Sometimes happens when driving along also — touch pedal, nothing. Keep trying, power



Bleeding Brakes!

The brakes on my Mk 3 have been rubbish since I had the car, and no amount of Green Stuff pads, vented, cross drilled, grooved discs, and Aeroquip hoses made them any better.

They were always spongy and lacked stopping power. I suspected air bubbles were the problem, and had heard that Mk 3s were prone to air bleeding problems. I was told of the bleed nipple on the end of the master cylinder, which helped a lot, but didn't cure the problem 100%. The next was bleeding the brakes while the car was on a slope so the air travelled up hill.

I tried all sorts to no avail. It was MOT time on Tuesday, and I decided to have one last attempt (after seven years of trying) to get brakes I would be confident of during the test.

I was working on my own, so didn't do the normal trick of someone pumping the brake peddle. Instead I used a Mighty-Vac vacuum gun, with it's brake bleeding attachments.

I did the job in record time, and low and behold the brakes are spot on. The peddle used to travel halfway to the floor before doing anything, and then the stopping power was pitiful. Now the brakes start to bite at the top of the peddle, and the power is as you would want it.

So if you're suffering from poor brakes on your MK3 (and assuming the rest of the system is in good condition), then try using vacuum to do the job.

Kerry Moore

(vacuum) assistance comes back.

I think I read that it could be a perished seal in the pedal assembly but not sure where to start?

440Interceptor

A If you can hear a wooshing noise inside the car the servo is probably dead, there is a seal to stop it leaking around the input rod and if its leaking past there it is time for a new servo. There is a Jag servo that fits sort of, you will need to figure out the

mounting holes if you use it but it does work. The proper servo is available from the Jensen specialists.

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Steve Payne

Tech Questions & Answers

Here you have the combined knowledge of all the Jensen Owners' Club at your disposal! The questions and answers this issue are primarily sourced from our terrific internet forum — now over five years old and over 60,000 messages posted!

So to get your technical questions answered, you can contact one of our technical advisors (see panel on

page 10), or post your question on the internet forum: <http://www.joc.org.uk/phpBB2/index.php>

or if you do not have internet access you can write to the Editor (address on page 5)

— you won't have to wait until the 2011 *Torque 7* though — they'll appear in our bi-monthly *Jensen* magazine also!

Jensen Interceptor

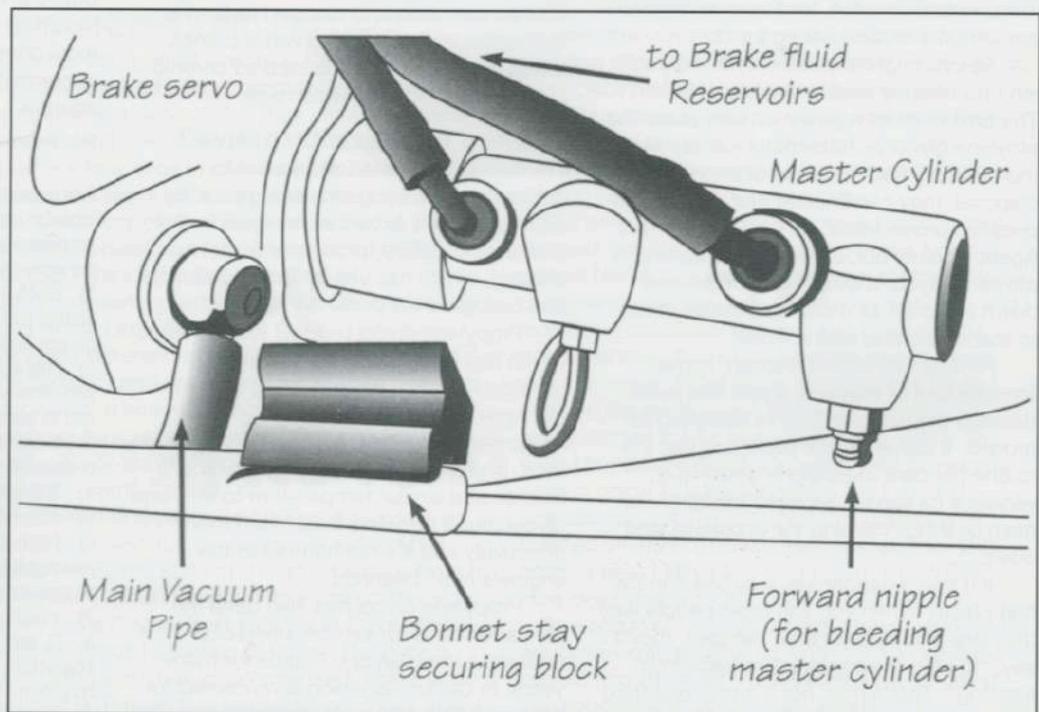
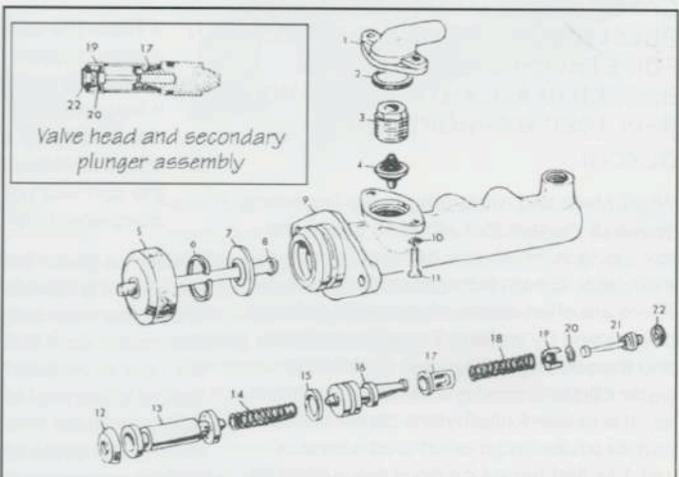
Even after bleeding your Interceptor brakes (bleeding brakes!) some owners still suffer from a soft pedal, spongy brakes or excessive pedal travel. After a lot of investigation by others, the industry, and myself, I think I have the solution.

This mainly applies to the Girling or FAG master cylinders but may be relevant to others. These cylinders have a bleed nipple near the end (furthest from the servo).

On right hand drive cars, there was insufficient room for a complete nipple so it was cut short or replaced with a normal bolt. The master cylinder should be bled from here before and after anywhere else; there won't be room for a tube so you will have to let the fluid dribble onto a cloth on the down stroke of the pedal and then throw it away.

Now on the installation of the master cylinder on the relevant cars the front is higher than the rear. This means that any air in the system will work its way to the top. The top in our case is forward of the bleed nipple and is trapped, causing the problem. The paperwork with new cylinders says to prime the cylinder, or fill with fluid, before installation; this is one solution but not easy or ideal. Another solution is to

Earlier Interceptor master cylinders (including early Mk III) do not have a facility to bleed the master cylinder (see diagram on right), but later cars do (below). Because of the very tight space restriction, sometimes there is no nipple fitted. If there is a nipple fitted, it (on RHD cars), will be jammed against the Hardura sound-proofing felt.



get the back of the cylinder, where fluid enters and air can therefore leave, at the highest point.

There are three ways I have come up with. One is to raise the back of the (well chocked) car, with a jack, a very steep hill or both and operate and tap the cylinder

until the trapped air bubbles come up into the reservoir.

Another way is to release the brake-pipes near the cylinder, take the cylinder off the brake servo, complete with the pipe-work and bend the cylinder up, using the flexibility of the pipes, to release the air.

The third way is to relocate a nipple, on top and at the end, i.e. the highest point, by careful drilling and tapping. I have identified the problem and I know my solution is not perfect so please let us know if there is an easier way.

Alan Smith

TECHSHOP

STOPPING POWER

ULTIMATE BRAKE OVERHAUL

ALL ASPECTS OF THE INTERCEPTOR BRAKING SYSTEM DESCRIBED

BY MICK THOMAS

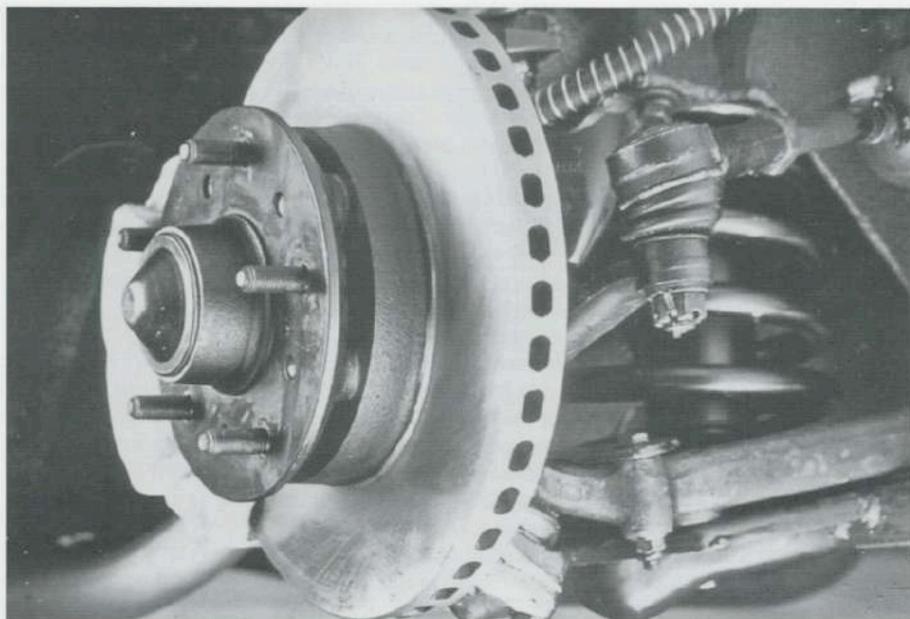
This little lot concerns Interceptors and FF, I, II and IIIs with Girling brakes. Obvious faults include sticking or seized caliper pistons, discs resembling a ploughed field, bulging, cracked, oil soaked flexible pipes and biscuit steel pipes—biscuits and rusted brake pipes tend to react the same way under pressure.

Many a long hour has probably been spent bleeding brakes trying to get rid of a spongy brake pedal or excessive travel when nine times out of ten the problem is a direct result of a combination of the above faults. I'll go through a complete overhaul of the braking system and those of you not contemplating a complete overhaul can pick out the relevant bits.

CHECK BRAKE PEDAL

First of all check the brake pedal is securely fastened to the operating arm and that it's fitted the correct way round, i.e. offset towards the centre of the car. If it's loose or fitted incorrectly tighten up the bolt at the back of the pedal and/or remove the pedal and fit it the correct way round. If the pedal rubber is in a poor state, ditch it and fit a new one.

Next remove the brake pedal arm return spring attached to the stop light switch bracket and try to feel any free travel at the brake pedal. There should be some free movement; if there is refit the spring. If there isn't, adjust the push rod by



loosening the lock nut and turning the rod to give approx. 3/16" free movement measured at the pedal — don't forget to tighten up the lock nut. Now have a look at the pin that connects the push rod to the pedal arm and ensure the split pin is in position and correctly fitted with both legs bent round the pin.

BRAKE SERVO

The next item to consider is the brake servo and master cylinder whilst the brake servo is fairly reliable I have found in one or two cases that replacing the servo can effect a cure for excessive pedal travel (much to the amazement of Girling who still maintain there is no logical reason why this should be so but I write as I find). Do not

consider this an option to cure excessive pedal travel unless the rest of the braking system is in perfect condition and you are convinced there is no air in the hydraulic circuits. However, I will explain removal for those who may be interested. The brake pedal box, servo, master cylinder and fluid tanks are easier to remove as one unit.

First, disconnect the wires on the fluid tanks then remove the two metal brake pipes on the master cylinder. Next remove the brake pedal I because it won't fit through the hole in the bulkhead. (FF owners, don't bother as the pedal is small enough to go through), remove the return spring mentioned earlier, disconnect the two wires on the stop light switch and remove the vacuum hose on the brake

Many a long hour has probably been spent bleeding brakes trying to get rid of a spongy brake pedal or excessive travel when nine times out of ten the problem is a direct result of a combination of faults.

servo (FF owners, make a note of where all the vacuum pipes are connected from the vacuum control valve to the servo). There are six 1/4" bolts holding the pedal box to the bulk-head and the rearmost one also holds on the stop light switch. This one is a nut and bolt so you'll need a helper to hold one end whilst you turn the other (unless your arms are twelve feet long, of course). The other five bolts have captive nuts so there's no problem with these. Now remove the other four bolts in the pedal box flange (a good 3/8" drive socket set with a 12" extension is good news here); the remaining bolt is under the brake servo and screws into the front of the bulkhead.

The hole in the pedal box for this bolt is slotted so you only need to undo it a couple of turns (use a 7/16" flat ring spanner to reach it). You'll probably need to give the unit a good tug to free it because of the sealer between the pedal box and body but once free it's a fairly easy task to remove it from the engine bay. Once on the bench remove the split pin from the clevis pin on the push rod and remove the clevis pin.

Now remove the four nuts holding the servo to the pedal box (1/2" AF), thereby releasing the fluid tank support bracket and servo unit. Next undo the two units holding the master cylinder (9/16" AF) and that's it. As an aside here, remember brake fluid is an excellent paint stripper so be careful; if you do happen to spill fluid on the paintwork wash off immediately with loads of clean water.

Refitting is the exact reverse but watch these few points. Apply seam sealer or 'dum-dum' to the rear of the brake servo where it connects the pedal box and between the pedal box and bulkhead; start all bolts in their threads before tightening; use a new split pin in the push rod clevis pin and double check all nuts and bolts for

DANGER WILL ROBINSON — DANGER!

Classic cause of Interceptor underbonnet fires:

The hose connecting the brake fluid reservoirs to the master cylinder sitting too close to the exhaust manifold.

As can be seen in the photograph, in this case the right-hand reservoir hose is sitting very close to the manifold. If the hose melts and/or burns, then the brake fluid from the reservoir is deposited straight on to the ultra-hot exhaust manifold. **Check yours now!**



tightness. Bleed the brakes, check all pipe unions for leaks and test the brakes before going on the road!

MASTER CYLINDER

Next thing to check is the master cylinder and if it seems to be working properly leave well alone, unless there is evidence of fluid leaks between the master cylinder and brake servo and or evidence of fluid transfer from one side of the cylinder to the other (this fault will become apparent as the fluid level in one tank rises as the other falls). If either of these two faults are evident or the brakes won't bleed properly the master cylinder requires renewal or overhaul. I won't go into the overhaul procedure here as the overhaul kit contains comprehensive instructions if you can get one. If you can't then you'll have to fit a

new cylinder.

To remove the master cylinder with the servo in place, disconnect the two rubber pipes from the fluid tanks and plug them with 5/16" bolts to save a mess. Next remove the two brake pipes and then undo the two nuts holding the cylinder to the servo. Refitting is a direct reversal of removal but make sure all pipe connections are refitted in their original positions and check them for leaks with the brakes hard on with the engine running.

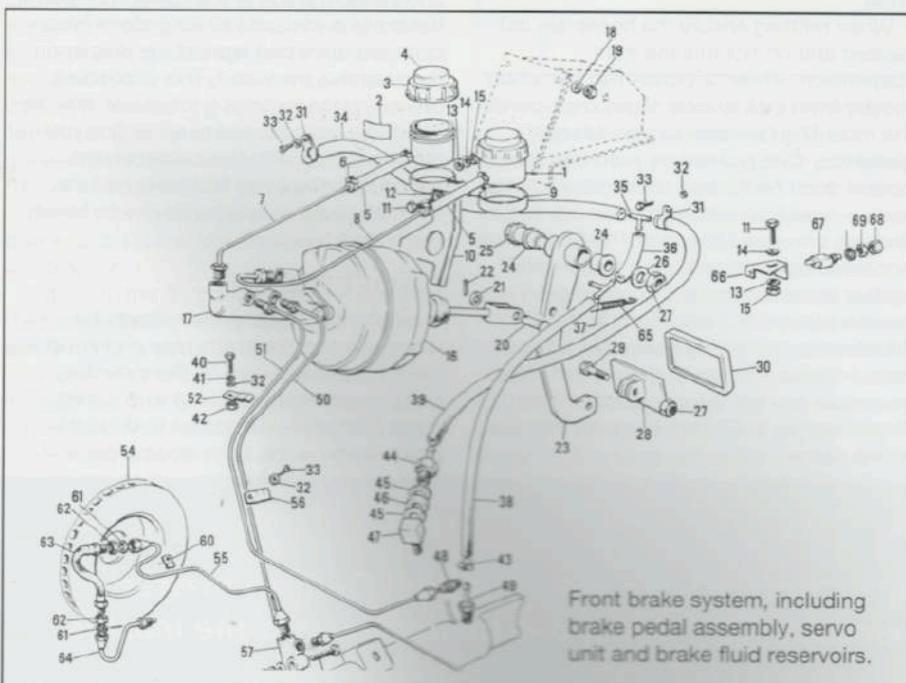
An important part of the braking system are the various vacuum pipes and connections under the bonnet so check all the hoses and connections for chafing, splits and security. (The system is designed to be 'fail safe,' that is, if there is a failure of the vacuum system, you'll have brakes but without servo assistance. Oh, yeah! Try stopping an Interceptor from 70 mph without the servo and you'll need both feet on the brake pedal and good rapport with the gods! Not to be recommended if you wish to see your next birthday.)

If you have cause to replace any of the vacuum hoses use only the correct hose — not bits of garden hose or heater hose, as they can collapse under vacuum, causing the said hair-raising experience.

METAL BRAKE PIPES

Next thing to do is jack up the car and place axle stands under the chassis tubes, front and rear, and remove all four wheels. Now systematically remove and label each steel brake pipe on the car (e.g. four way connector to front offside flexible hose, etc.) Those of you not contemplating a J full overhaul, check **every inch** of steel pipe for excessive corrosion — if in doubt, replace!

A few tips on pipe removal may help here. Firstly some of the unions will probably be impossible to remove with an open ended spanner so obtain a good pair



Front brake system, including brake pedal assembly, servo unit and brake fluid reservoirs.

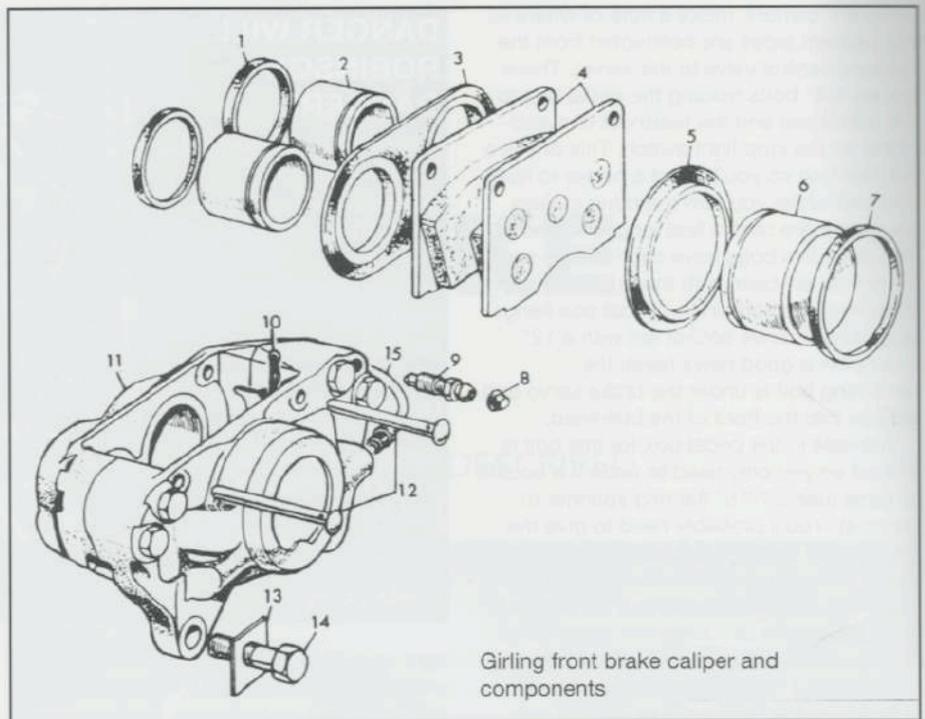
ULTIMATE BRAKE OVERHAUL

of pliers and cut the pipe off as near to the tube nut as possible. Next soak the unions in penetrating oil and use a ring spanner or socket to remove them. If the nut is badly corroded you'll need a good pair of vice-grips to beat them into submission. Above all, try to avoid snapping off the unions in the calipers unless you're a whizz kid with a drill and taps. Don't be tempted to use stud extractors as they are bound to break off in the hole and then you're really up the Swanee because they're made of hardened steel which makes them impossible to drill.

Another problem you'll come across is access to the pipes from the master cylinder to the four way connector attached to the front cross member. The pipes are held in place by metal clips which are impossible to remove with the engine in place so you'll have to bend them up with a screw-driver and tap them back into place. Ensure the pipes are securely fastened to the cross-member in this area, otherwise the steering column can rub them through, resulting in a quick search for that ship's anchor again.

Having removed all the pipes make up a new set identical in length, tube nut fittings and flare (either double or single) to the original pipes, using Kunifer 10 tubing which is a copper/nickel alloy guaranteed against corrosion. Being a copper alloy means it is easier to flare and bend than steel. If you haven't the flaring equipment then take them along to your nearest motor factors who will make a set up for you. Just one point here: all the pipe unions are UNF apart from J-Series cars with the German master cylinder which has *metric tube-nuts on the two pipes that screw into the master cylinder*. Ensure your supplier is aware of this fact.

Having obtained your pipes refit to the car, maintaining the bends and positions of the original pipes. Ensure the pipes do not foul on any moving parts and are clipped securely in position. Now Uncle Joe Girling designed the braking system on the Interceptor as a split-circuit system: in other words if a pipe burst or something similar, then you would still have the other circuit to stop the car. Unfortunately, this is not quite true, because I have worked on two cars that suffered from burst brake pipes on the back axle because of corrosion and the brake pedal bottomed on the carpet before it could apply enough pressure to the front brakes to stop the car. It seems there isn't enough reserve travel on the brake pedal with one circuit out of action, especially if the floor carpet is all bunched up under the pedal (common).



Girling front brake caliper and components

FLEXIBLE BRAKE HOSES

Next on the agenda are the flexible brake hoses and if you're doing a full overhaul replace all three; if not, then give them a good going over by bending them back on themselves at the unions and check for cracks, cuts, bulges, splits, softening from oil contamination and the condition of the protective springs on the front ones. To replace, remove the metal brake pipe and unscrew the securing nuts but don't throw away this nut or the shake-proof washer because you may have to reuse them (it seems some hoses are packed with nuts and washers and some without, depending on how mean Girling was feeling at the time).

When refitting ensure the hoses are not twisted and do not foul the front suspension, wheel or cross-member when moved from lock to lock. If required, bend the mounting brackets to give adequate clearance. One tip here on purchasing new hoses: don't be fobbed off with the wrong hose — make sure they're the exact length and use armoured hoses on the front. New armoured hoses may have a black nylon spring; these are better if you can get them because they don't rust. Early Interceptor IIs (chassis prefix 128) use a shorter hose than J-Series and later cars (prefix 136 on), so ensure you get the correct one. This doesn't apply to FF cars because they are all the same.

BRAKE PADS

Right, now to the business end of things: remove the front brake pads by extracting the small "hair-pin" clips and knock out the retaining pins; if they are seized in go easy otherwise you'll break the lugs off the caliper body. Pull out the pads and shims — if they are a tight fit fasten a good pair of vice-grips to the pad backing plate and tap the grips with a hammer to extract the pad. If the anti-rattle springs are missing obtain some new ones as they cut out pad 'chatter'. Having removed the pads from both front calipers obtain some pieces of wood about 3/16" thick, cut to approximately the same shape as the pads and insert in place of the pads. Now pump the brake pedal until all six pistons have clamped the wood against the disc and then remove the wood. This procedure makes piston removal a lot easier later on but if you have access to an air line you can blow them out with the caliper on the bench. Those of you that have had the hydraulic system apart will have to bleed the brakes first.

CALIPERS

Now you can remove the calipers by disconnecting the brake pipe and knocking back the tab washers on the mounting bolts or cutting the locking wire. Use a good fitting 5/8" AF socket to undo the bolts. Remove the bolts and caliper and

All the pipe unions are UNF apart from J-Series cars with the German master cylinder which has *metric tube-nuts on the two pipes that screw into the master cylinder*. Ensure your supplier is aware of this fact.

catch any shims fitted between the caliper and the mounting bracket.

Now Mother Nature didn't build into our lungs the ability to process asbestos fibres so until evolution catches up, don't blow brake dust all over the place! Girling produce a special cleaning fluid, but you'll probably not be able to track any down so use meths. Don't use any mineral based fluid such as petrol, paraffin, white spirit or turpentine, as this will cause damage to the rubber seals in the caliper.

You'll notice the caliper is made up of two halves held together by four bolts. Do not, under any circumstances, attempt to remove these bolts (these bolts are tightened to a specific torque when the caliper is made and you'll never reproduce this torque figure with old bolts with rusty threads — not enough torque and the caliper may leak and the bolts work loose; too much torque and the bolts may be overstressed, causing them to break under braking pressure, causing the caliper to fall apart.)

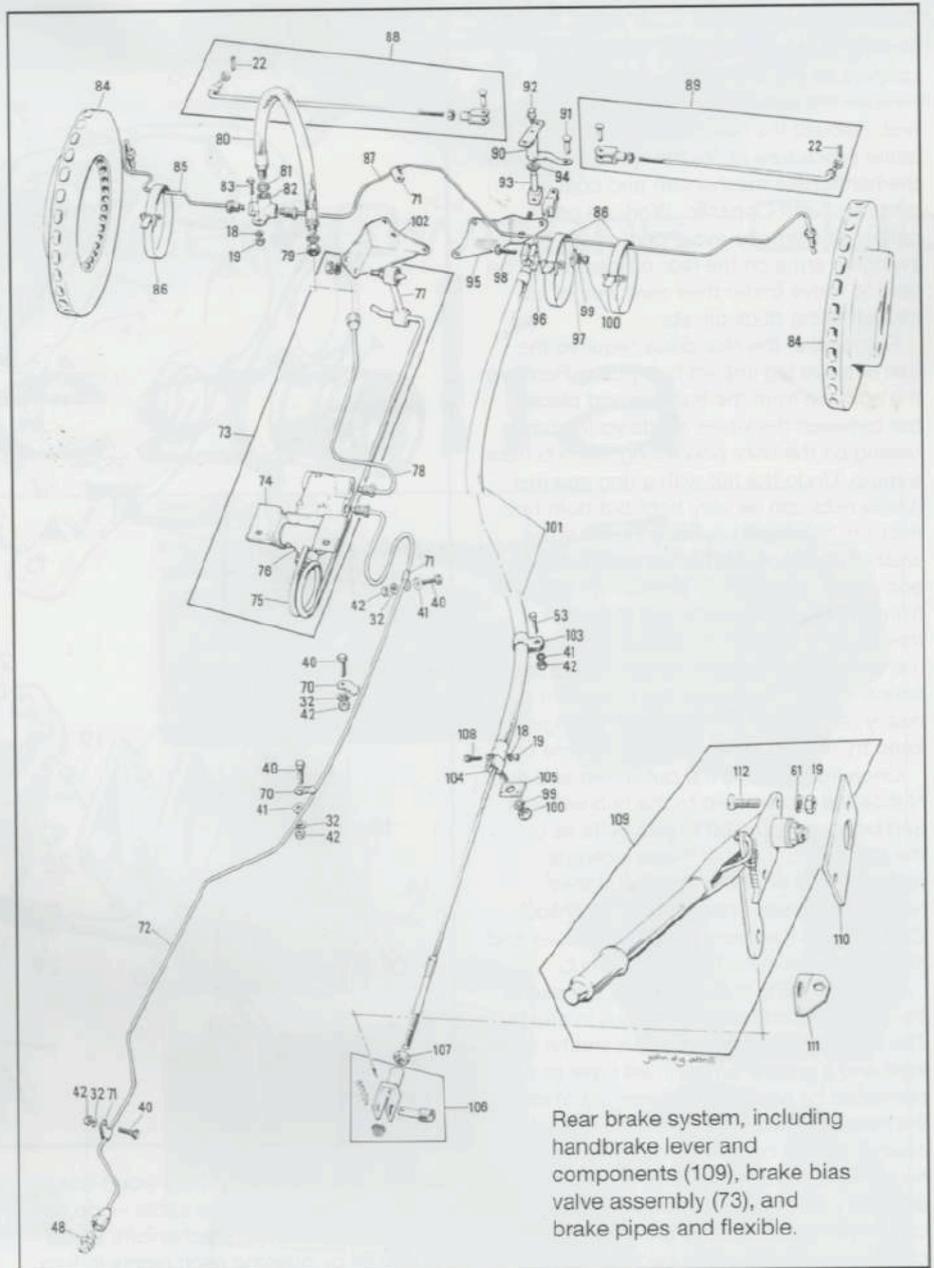
Extract the pistons by blowing out with compressed air, pulling out by hand (extremely unlikely), or levering with two screwdrivers in the dust cover groove. Be careful with this last method as the piston is easily damaged. If none of these methods work then use vice-grips around the piston and with a twisting motion work the pistons out. This method will scrap the piston but at least it works. Remove the dust seal and then remove the fluid seal from inside the caliper bore — do not damage the seal groove. Check for rust between the top of the bore and the fluid seal groove. If rust is evident here remove with fine wet 'n' dry paper but do not rub the fluid seal groove. Wash out the caliper bores with meths and ensure bores and seal grooves are clean.

Check all the pistons for corrosion of the chrome plated surface and if not perfect obtain new pistons. You'll also need a seal kit and some grease suitable for use in hydraulic brake components. Lockheed market this under the name 'Disc brake lubricant.' Girling market an equivalent grease but double check it is suitable for rubber components. If you can't obtain either of these products then use clean brake fluid. *Do not use anything else whatsoever.*

Lubricate the fluid seals and fit them into their respective grooves. Next fit the dust boots to the grooves in the caliper bore. Lubricate the pistons and push them through the dust boot right into the caliper. If they jamb in the caliper do not force them in but remove to find the cause — use hand pressure only.

DISCS

That's the front calipers sorted out, so now have a look at the discs. If they're badly scored or the braking area has been substantially reduced by rust encroachment on the disc then they'll either need



Rear brake system, including handbrake lever and components (109), brake bias valve assembly (73), and brake pipes and flexible.

skimming or replacement. As to whether your discs will skim depends on their condition but as a general rule, throw away any solid discs less than 7/16" thick or any vented disc with less than 1/8" each side of the vent holes after machining.

To remove a front disc prise out the hub cap. remove the split pin and unscrew the hub nut (13/16" AF). Pull off the hub whilst ensuring the bearing stays in the hub and replace the washer, nut and hubcap on the hub to prevent ingress of dirt into the hub bearings. Clamp the disc in a vice and undo the five bolts with a 5/8" socket. If the hub is tight in the disc wedge a wide chisel between the hub and disc behind a wheel stud — do not wedge between the mating faces and do not hammer the hub out of the disc by hitting the hub face where the bearing seal fits. Replacement involves cleaning the disc and hub mating faces of dirt and rust and fitting new spring washers

under the retaining bolts. Refit the hub and adjust the bearings as follows: tighten the hub nut whilst spinning the hub and then slacken off the nut. Retighten the nut to just remove all the play from the bearing — do not overtighten. Fit a new split pin — the axle is drilled in two places with one hole offset from the other, allowing half a slot adjustment of the castellated nut.

Refit the brake caliper and any shims in their correct location, tighten the two mounting bolts to 65 lb/ft and bend up the tab washers or re-wire the bolts, whichever your car has. Reconnect the brake pipe. Use a new set of pads with machined or new discs and smear the backing plates, shims and retaining pins with 'Copaslip'. Do not allow any to come into contact with the disc or pad friction material. Refit the retaining pins, anti-rattle springs and 'hair pin' clips.

continued on following page>

ULTIMATE BRAKE OVERHAUL

REAR BRAKES

Moving to the rear brakes, remove the calipers as per the front but you'll have to remove the handbrake connecting rods first. Rebuild the rear calipers using the same procedure as for the front. Strip down the handbrake mechanism and coat all pins, etc. with Copaslip. Work on one caliper at a time to avoid confusion. The swinging arms on the rear calipers must be able to move under their own weight so free off using duck oil, etc.

Removal of the rear discs requires the use of a five leg impact hub puller. Remove the split pin from the hub nut and place a bar between the wheel studs so the bar is resting on the floor preventing the hub from turning. Undo the nut with a ring spanner (these nuts can be very tight but both hub nuts are right hand thread). Remove the washer and replace the nut flush with the end of the half shaft (this prevents the hub flying off and damage to the half shaft threads). Fit the puller using steel nuts on the wheel studs, tighten the puller centre screw and hit the end of the puller with a heavy hammer. If at first it won't budge keep trying and eventually it will come off.

Once free remove the puller, nut and hub. Notice the disc is held to the hub with nut and bolts as opposed to just bolts as on the front disc. If any of these locknuts appear loose on the bolt threads then replace with new ones 7/16" UNF Nyloc). Clean all the rust from the mating faces and fit a new or skimmed disc to the hub.

Before refitting the hub grasp the end of the half shaft and attempt to pull in and out. The correct end float is 5 thousandths of an inch and a greater amount will have to be corrected by adjusting the amount of shims between the caliper bracket and the axle casing. Do not omit to correct this fault because excessive end float allows the discs to move in and out pushing the caliper pistons back into the caliper, causing excessive brake pedal travel.

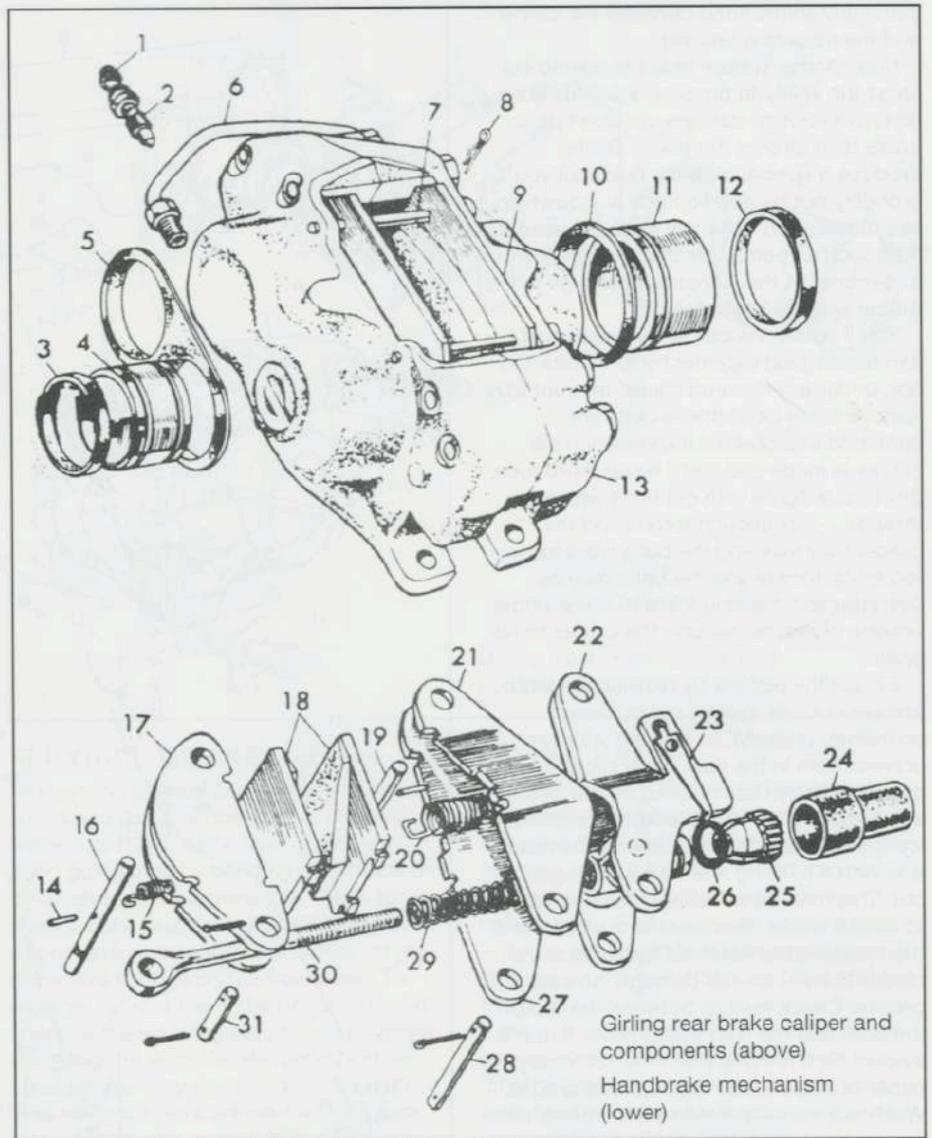
Refit the hub to the half shaft, ensuring the Woodruff key is fitted correctly, i.e. the chamfered portion of the key should be towards the centre of the axle with the chamfered face towards the bottom of the slot. With the hub fitted the key should be flush with the end of the hub. If the key is fitted incorrectly the hub oil seal band will be damaged when the hub nut is tightened.

Replace the hub nut and washer and tighten to 175 lb/ft, again locking the hub with a stout bar through the wheel studs. If the split pin hole does not line up tighten the nut to the next hole — do not loosen the nut to line up the hole.

HANDBRAKE MECHANISM

Refit the callipers using new pads — ensure handbrake pads are fitted correctly with the cut off portion of the pad facing the edge of the disc.

Adjust the handbrake mechanism before refitting the actuating rods and then



attempt to fit the rods. If they won't line up slacken off the handbrake cable — do not loosen the handbrake mechanism. Bleed the brakes by opening each nipple in turn and pumping the brake pedal until all the air has been expelled. If difficulty is

experienced in obtaining a good pedal try bleeding one front and one rear brake at the same time which will sometimes dislodge trapped air in the master cylinder.

Mick Thomas

DO AND DON'TS

DO:

1. Make sure you tighten up all nuts and bolts.
2. Use only clean brake fluid.
3. Try to work as clean as possible when working on brakes.
4. Check the fluid level every day for at least the first week.
5. Have a helper handy to bleed the brakes. If using your wife to help, remember to keep control.

DON'T :

1. Drive the car on the road unless you're confident everything is in order.
2. Allow mineral based materials into the braking system.
3. Forget to check all pipe unions for leakage with the engine running and the brake pedal held hard on.
4. Lose your temper with the wife - it could cost you dearly!