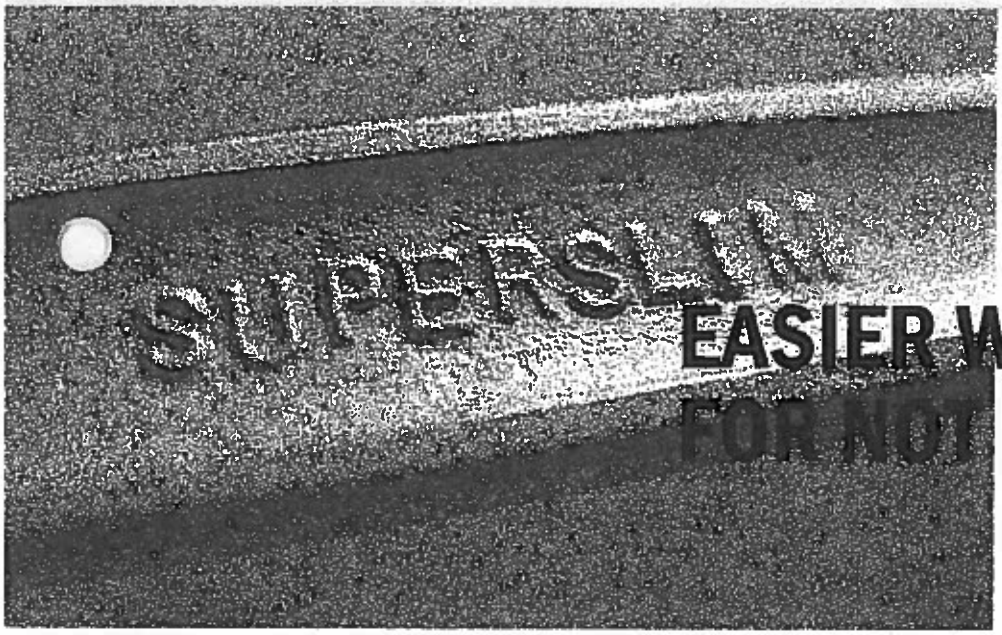
Dash Knob Removal

Another question that has an easy answer but is not immediately obvious is the removal of dash knobs as was asked recently by Andrew Katz when he posted the following: "I am changing out all the worn knobs on by BJ7 dash. They appear to be held on with a pin inserted into the hole. Frankly, I expected to find a small screw. How does one get these pins out? Unlike the door handles where you can just use a punch to push them out, the hole is only on one side."

The response from several Listers was that the pins do not come out. Just depress the pin slightly and pull the knob off. When you reinstall, depress the pin enough to get the new knob started and when it reaches the proper point the pin will engage into the hole that locks it in place.

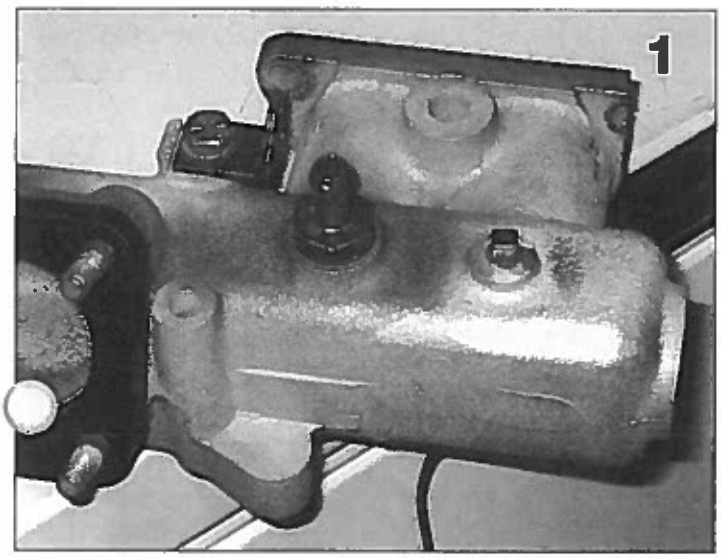


EASIER WHOA MUCH DOUGH

Jack Brashear
Little Rock, Arkansas
AHCA National Member

In late September 2005, I responded to a brake booster retrofit question that was posted on the Healeys Mail List. I posted back that I had used a popular aftermarket remote booster from a local street rod supplier to upgrade my 3000 Mark II BT7, and that the job was simple, relatively cheap, and really saved a lot of leg effort. I was so surprised at the number of List members wanting more detail on the project that I decided to submit the story to *Healey Torque*. However, two facts first: (1) There is nothing "concours" about this conversion and (2) I turn my own wrenches. This conversion could be expensive if you don't do it yourself. I make no assurance that this will work for you, but it works very well for me. That being said, here's the scoop.

Purchase a remote booster from a street rod supplier. Mine is by Haldex Midland, Catalog No. C3400G, but others may work just as well. This booster requires a minimum of 16 inches Hg manifold vacuum. My Healey has 18 inches of vacuum, plenty enough. The diaphragm can is about 7 inches in diameter, and it is advertised at 550 PSI output with 20 inches Hg vacuum. Since my vacuum was 18 inches, my boost is probably a bit less. Nevertheless, my leg effort is still significantly reduced and the old girl is lots more comfortable to drive. Be sure to buy a vacuum line check valve so that a backfire won't blow the booster diaphragm to shreds. Your booster vendor can supply this and it is only about eight bucks extra.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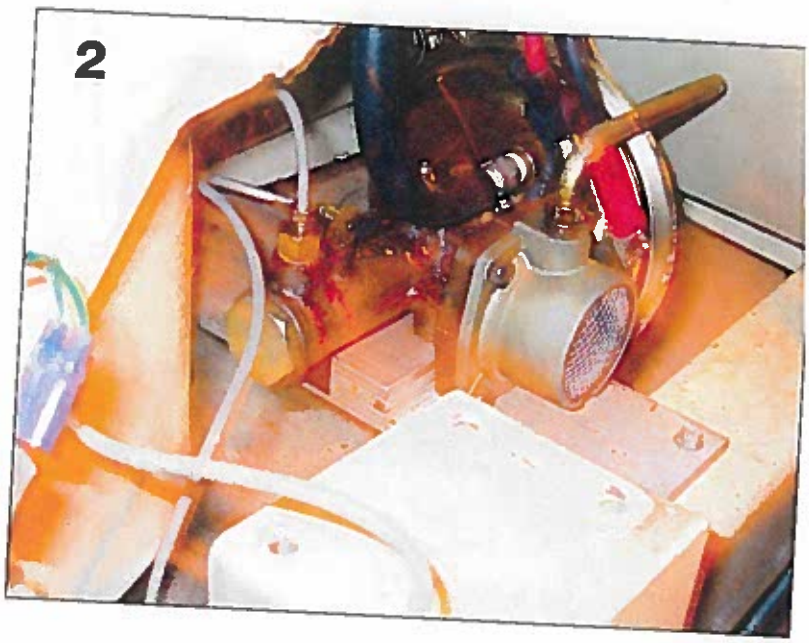
Remove the big brass plug in the top of your intake manifold for a port to attach a vacuum gauge if you're not sure about your own car's vacuum. [Photo 1] Replace the big plug with a vacuum hose fitting as seen in the photo. The fitting is common to many LBCs ("Little British Cars"). Mine was an extra for my Austin Marina. You'll need a copper crush washer for a good seal at the manifold. The new vacuum hose came from NAPA. Route the vacuum hose from the booster to the intake manifold as you wish, but keep it away from hot points and don't let it kink.

For the brake hydraulics, remove the master cylinder-to-4-way-union brake pipe end from the 4-way union. [Photo 3] Remember that brake fluid is going to run out of the disconnected lines so make provisions for that little mess. You can straighten the brake pipe well enough by hand to make it look something like the photo. I used an inline connector fitting seen in the photo and just added a new brake pipe (about 15 inches long) to extend the pipe from the master cylinder straight to the supply port of the booster cylinder. By the way, there are two fittings seen in the photos that adapt the new brake pipe ends (3/8-inch threads) to the booster cylinder inlet and outlet ports which have larger (7/16-inch) threads. These fittings are also available at NAPA. They

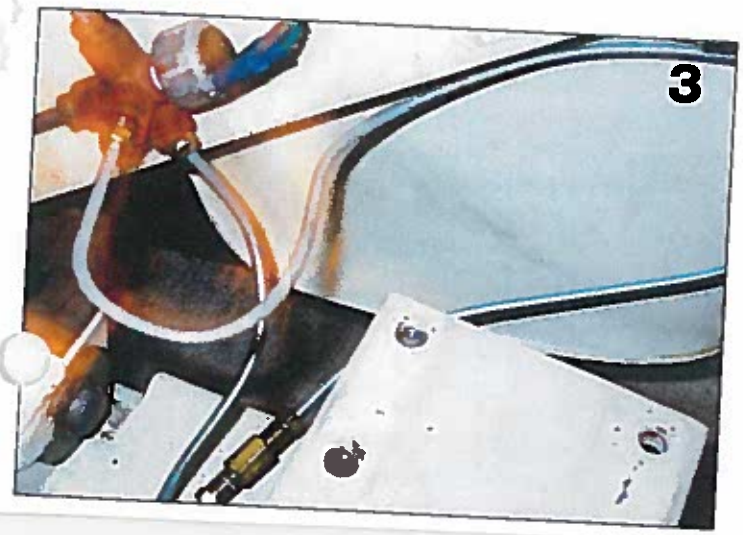
seal to the booster cylinder via copper crush washers, so don't forget to buy a few of these while you're at NAPA. Install another new brake pipe (about 18 inches long) from the booster cylinder outlet back to the 4-way union where you disconnected the first line earlier. Oh yes, the flared ends of the new NAPA brake pipes are compatible with the booster cylinder and the 4-way union.

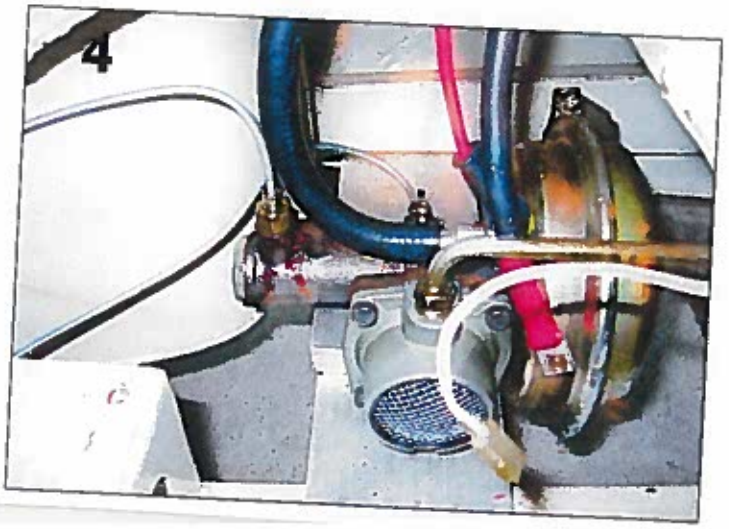
I use a ⅞-inch diameter master cylinder à la BJ8. I reckon the smaller master cylinders from the earlier cars would work as well, but I can't confirm this. It seems brake boosters were optional on Healeys at a time when smaller-diameter cylinders were still being installed by the factory. I had earlier switched to the BJ8 cylinder because of the Caddy El Dorado rear disks on my car, not because of the booster addition.

The mounting base is a 4 x ¼-inch plate of 6061T6 aluminum alloy – very strong stuff. Most any dealer in metals can provide this. I bought it 23-inch long and had three 3 x 4-inch pieces cut from one end to use for spacers. The three spacers are needed for proper clearance of the booster air filter above the mounting plate. They are 3 x 4 x ¼-inch of the same material. These can be seen in one of the photos. Drill two holes through the mounting base and the 3 spacers at 11/32-inch to match the spacing of the 5/16-inch mounting threads in the booster bottom, but don't mount the booster yet. [Photo 2 and 4] The inboard end of the mounting plate just rests atop the chassis rail and is held down with two 3/16-inch self-drilling sheet metal screws. By the way, I have a new Jule chassis so there is no center bead on the chassis rail. Be careful to measure your own car for the final dimensions of your mounting plate length. I used two ¼-inch stainless steel Allen screws that go through the lower fender flange. This is the only place I had to penetrate the exterior body work. Anyway, these attach a piece of ¾ x ¾ x 4-inch aluminum angle (from Home Depot) to the inner edge of the fender flange. The angle, in turn, supports the outboard end of the mounting plate. I used two No. 10 stainless steel Phillips screws with Nylok nuts to hold the angle and the mounting plate together very firmly. These are not visible in the photos. Remember to pre-drill the holes slightly oversize in the ends of the mounting plate before attaching it to the chassis rail and the aluminum angle. Now do a trial fitting of the mounting plate with the booster in place. Make any final adjustments to the mounting, refill the hydraulic system, bleed as usual, and you're set to go. Everything ends up tidy and really secure.



Modify what I did to suit yourself. Pretty simple, huh? My total expenditure was a little over $200. Well worth it, in my humble opinion. Good Luck! ***HM***





The Impossible Bolt

Recently, I wrote about replacing the throttle shaft bearings. My accelerator pedal had gotten sloppy way too soon again. I discovered that there was only one bolt on the driver's side bracket and that the whole bracket was flexing. Ideally you should pull the engine or cylinder head to get at this bolt. You can't see it underneath the car, either. Well, I fell back to regroup and think about this problem overnight. Pulling the cylinder head seemed a bit much to fix this problem. Additionally the bolt didn't want to start in this particular spot anyway.

Somewhere overnight the thought materialized that maybe if I pulled out the center console and transmission tunnel I could get at the two bolts. I guess it is not my favorite job, but I started in and had the tunnel out in about a half hour. When I took the tunnel out there was the bracket, right in view!

Replacing the bolt made my gas pedal work like new again. It seems I always have to solder one of the radio connections whenever I take the console out, but it's no big deal. Finally I vacuumed and cleaned my dirty fingerprints off the seats. Piece of cake, and hey, it makes the top slave cylinder bolt look a lot easier to do....

My new fuel pump is working very well. It makes the pump quiet, too. This job may have come from my feeling smug about how nice my car has been working. An oil change is almost due, and I promise to swap out that oil pump.

TECH TALK

by Steve Jekogian

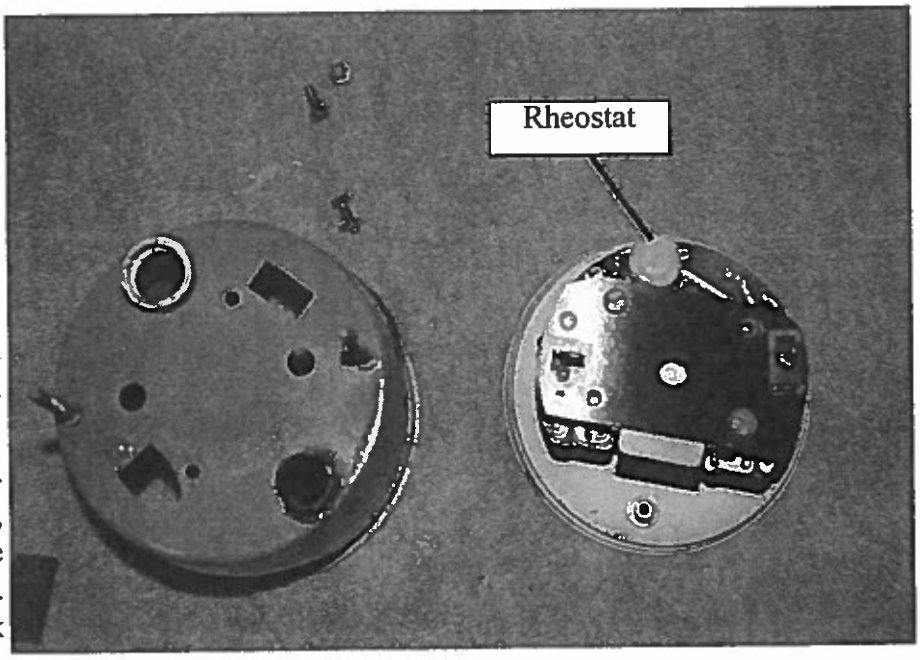
REV IT UP

Ever look at your electronic Tach and feel it is not accurate? Just think about it, a 40-year-old "precision gauge built by Smiths", subjected to unbelievable vibrations, cold, hot, very hot, electrical surges, and shorts. Add to that the banging around of the gauge during the dash replacement, and the years of bumbling garage station mechanics thinking, "all cars are negative earth." It is a wonder the electronic Tach works at all.

For years, I have heard the Tachs were adjustable but never took the time to venture into the "inner workings" of the unit until now. The Tach in my Green Healey was so far off that Tom Mulligan noticed it from the passenger seat. I could not get the car to idle at less than 1500 RPM and on the highway red line was at 65 MPH. Not right! So I hooked up a dwell/Tach, and indeed found it was 700-800 RPM's to high. I was planning to send it out for service, but decided to do some investigation.

First, twist the chrome bezel and glass to release it and then removed two screws on the back and the whole casing lifts off to reveal the "inner workings". Right on top there is a big rheostat for adjustment (see photo). It even has a slot on the back for a screwdriver. Never knew about it, neither did I. But which way to turn and how much was the question.

Hook up the white wire that circles around the post on the Tach, plug in the green wire, start the motor, and watch the dwell/Tach. You will have to hold the black ground wire to the back of the Tach to get it to work then just turn the rheostat slightly until your Tach matches the dwell/Tach. Then as they say in the workshop, manual reassembly is a reversal of disassembly. An easy, simple way to correct a common Healey problem.



One Approach to Restoration Part 37

Finishing Up!

By Roger Moment

Thanks to John Hodgman and Peter Svilans for their critical reviews and suggestions regarding this manuscript.

It is finally time to bring this series on restoration to a close. But we still have just a few details to wrap up before you take the car out for its first test drive.

We will install the turn signal switch, mention some points on the topic of mounting tops, and end up with a short discussion of your first drives. As before I will only touch on items where there is little or no information available and people often encounter problems. I consider other tasks for finishing the car to be fairly straight forward, though you will likely still need to do some research and consult other completed cars (hopefully, ones that are done correctly).

I will start with the turn signal switch, which has lots of tiny parts and often is incorrectly connected or adjusted for proper cancelling. However, once you understand how it operates, and how the bits are connected, you should be able to perform regular adjusting and enjoy trouble-free operation for a long time.

Photo 1: The stator tube is fixed at the steering box using a nut and split olive compression fitting. The split allows the sleeve to readily compress or loosen (when removing), without permanent deformation. Over-tightening can cause compression of the steel stator tube, making subsequent removal very difficult. The nut only needs to be tightened snugly enough so the switch doesn't rotate when the steering wheel operates the turn signal cancelling mechanism and oil doesn't leak from the steering box. An anti-rattle spring (far left) is used only on stator tubes with non-adjustable steering columns, to keep the tube and switch head from vibrating laterally.

Horn and Direction Indicator Control

The horn and direction indicator control assembly – the component in the center of the steering wheel that combines the turn signal switch and horn button, sometimes referred to as the "trafficator switch" – is essentially identical in construction on all Big Healeys.

Differences among them are related to whether the steering column is adjustable or not, the cosmetics of the visible bezel, horn button and direction lever, and configuration of the cancelling actuator. The assembly position is fixed, relative to the steering wheel, by a long stator tube through which the turn signal/horn wiring harness runs. On cars with adjustable columns, the top seven inches or so is a separate piece, keyed to a notch in the lower fixed portion, and able to slide in and out a few inches to permit adjustment of the position of the steering wheel.

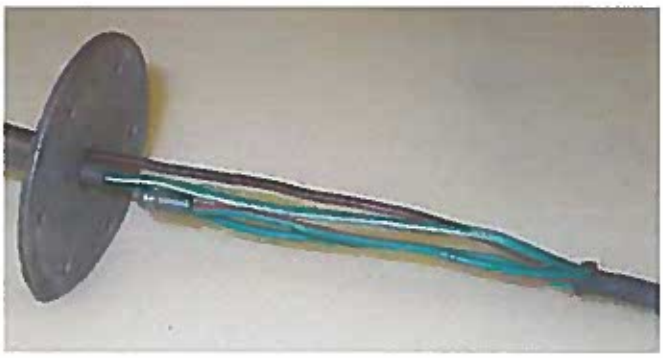
Non-adjustable steering columns On cars with non-adjustable steering columns, it is easiest to assemble the wiring harness, switch, and stator tube on the work bench before installing on the car.

Eyelets on new harnesses at the switch end do not have tangs to keep them in position (see Photo 3 below); also the eyelets may be noticeably larger in diameter than the originals, which reduces their separation when mounted to the switch terminals. This is why I strongly recommend transferring these bits from an original harness to the new one.

Bullet connectors originally were soldered to the wires at the chassis end. On new harnesses these are crimped, so I would cut them off and solder on originals. Soldering these connections (rather than crimping) makes it easier to remove the bullets, if necessary, when installing this harness through the stator tube, or removing the harness in the future. Note that the wires are staggered in length to let the bullets nest more tightly.

Before installing the harness, check that the stator tube is clear and free of any grimy debris on the inside that could prevent the harness from sliding through easily. I recommend threading the harness through the tube before attaching to the switch to minimize any chance for damage to the Bakelite housing.

Photo 2: The wires are staggered in length so that the bullets can nest tightly when slid through the tube. They will compact better if the wires are not twisted, as shown here. All four bullets will just fit, as shown here, if there is no tape wrapped around them to attach a pulling wire. If you need, or prefer, to first thread a wire for pulling the harness through the tube, you will need to remove two or more of the bullets.



Trafficator switches have many tiny internal parts, and while it is relatively easy to make wiring connections, disassembly will present particularly daunting challenges. Therefore, you need to be particularly careful in your technique for connecting the wires so that the two terminals that are not supported by the internal contact from behind don't fall back into the switch body, which would then require a total teardown and reassembly – a task that not everyone is up to performing.

The accompanying photos illustrate which terminals these are and, I hope, will help you understand how to make wiring connections and minimize the changes of encountering problems.

On cars with non-adjustable steering, if you first threaded the harness through the stator tube, you must next string the large wavy spring and cast cancelling ring (in that order -- do not position them on the switch just yet) over the wires before attaching them to the switch. On the other hand, if you chose to wire the switch first, thread the cancelling ring and then wavy spring washer over the harness before mounting the switch to the metal base plate on the stator tube. Next slide the anti-rattle spring sleeve over the stator tube – it should be positioned near the top, just below the metal base plate.

The completed assembly of stator tube, switch and wiring harness can

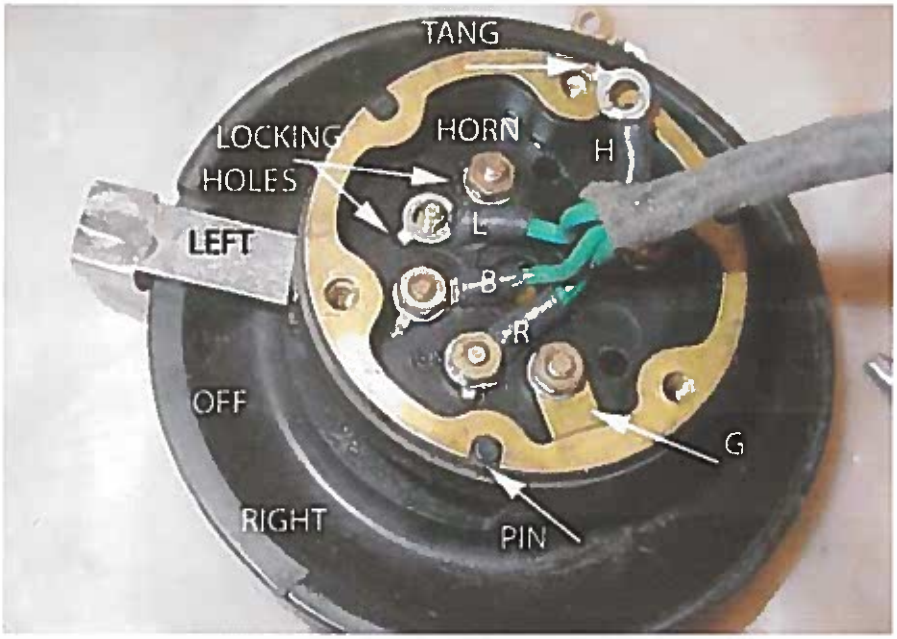


Photo 3: This photo of a partially wired switch shows key elements and helps to illustrate the procedure to be followed. There are four wires in the harness; for the horn (H), left turn signal (L), right turn signal (R), and power for the central turn signal switch contact (B). The direction lever has three positions, as marked. The central wire terminal (B) is supported from behind in all three positions of the lever, but the (R) and (L) terminals are only kept from falling into the switch body when the lever is in the respective signaling position. In the photo the lever is in the left position so that the appropriate wire can be connected to the (L) terminal. To avoid the lever accidentally moving to "off" you might use a piece of electrical tape (less likely to tear) to hold the lever over in position until the nut has been screwed down. Do not forget the tiny shake proof lock washers under each nut. The horn terminal is a screw that is accessed by removing the horn button. A second screw holding the horn contacts into the bezel is used to attach tab (G) of the grounding ring. Three Bakelite pins (see arrow) engage in holes in the metal stator tube plate to lock the switch body in position while three 5BA countersunk slotted screws are used to attach it to the switch body. Note the tiny tangs on each eyelet that engage holes in the Bakelite to hold the eyelets from rotating. Flexible insulating sleeves over the connector shoulders are thin to fit in the limited space. Refer to the Workshop Manual wiring diagram for which color-coded wire goes to the left and right terminals. The chrome switch lever, shown here, was used on all adjustable column switches, though the rest of the switch parts are identical to those used on non-adjustable steering column cars.

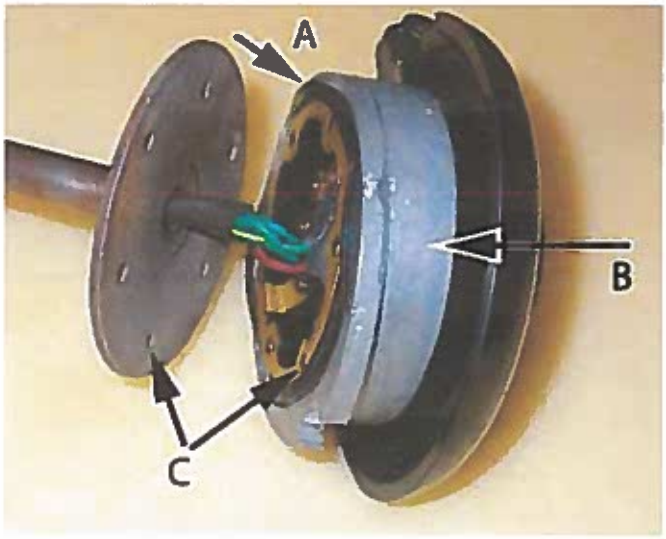


Photo 4: On cars with non-adjustable steering columns, a wavy spring washer (A) presses the cancelling ring (B) in position on the switch body. Three Bakelite pins engage mating holes in the plate and position the switch while the mounting screws are inserted.

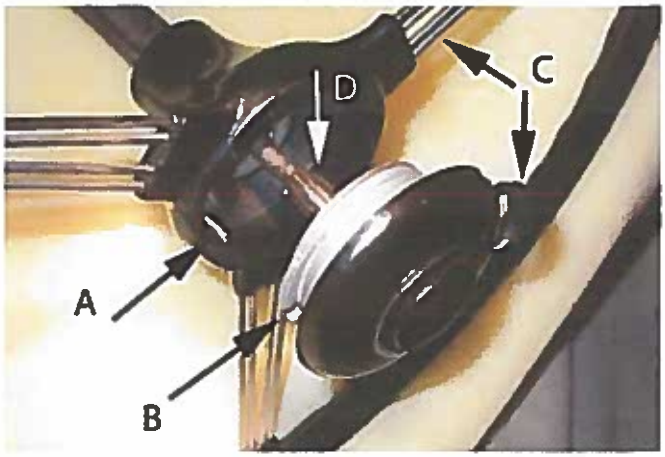


Photo 5: The prong (A) engages a notch in the cancelling ring (B) to cancel the direction switch. Note that the prong is 180 degrees across from the vertical spoke which is also in line with the switch lever (C). This photo was taken with the components off the car. This assembly is correct for Healey 100s with non-adjustable steering columns (i.e. after B. 1000). Note the black lever and the plain black horn button with smooth surrounding chrome ring. The anti-rattle spring, (D) is positioned fairly high on the stator tube before inserting into the steering column.

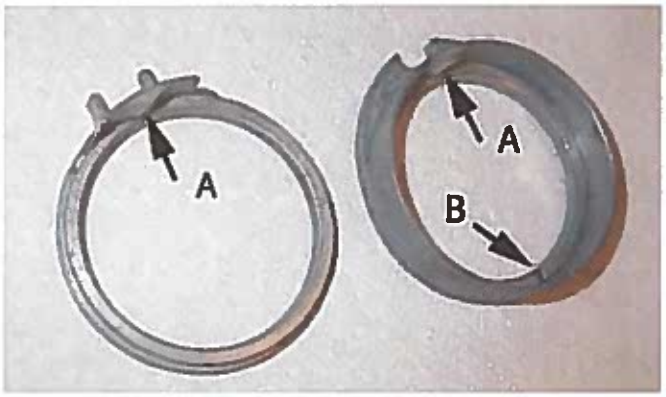


Photo 6: Two styles of cast ring may be found on Healeys. They are equivalent in function and fully interchangeable. Both have a notch that the prong (see Photo 5) engages, and an adjacent bump (A) on the inner surface that trips pawls to cancel the turn switch. The wide ring version has a slit (B) that allows the shape to be adjusted a bit. The narrow ring does not. Both versions ride against a narrow lip on the Bakelite switch base. They should fit well, with little excess play, and turn smoothly on the base.

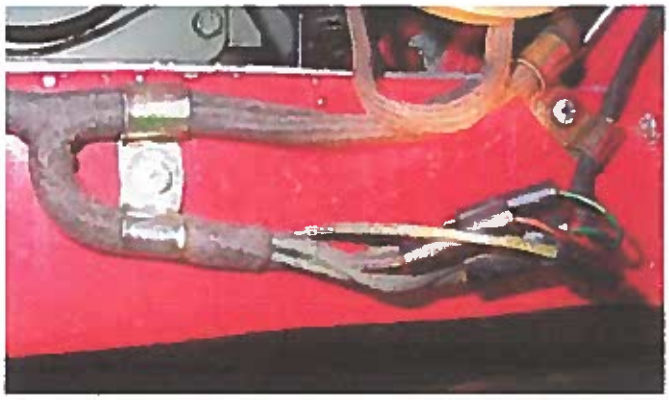


Photo 7: The turn signal harness is near the right edge of this photo, and joins the horn harness section against the front face of the frame cross member on Healey 100s.

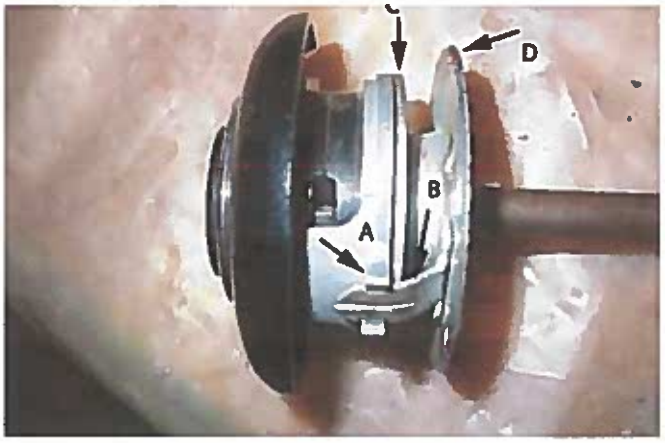


Photo 8: This switch has one of the two styles of cast cancelling ring, found on very early 100s (at least through BN1 C. 140274). A prong (B), attached to the rotating plate (D), needs to engage the notch (A) in the cancelling ring. The switch mounts to a fixed plate (C) using three 5BA countersunk screws as before. The switch in this photo has the narrow style cast cancelling ring.

now be inserted into the steering column. However, before doing so first remove the nut and split olive from the nipple at the front of the steering box. The bullet connectors should slide through the steering column easily, as the hole is larger than that in the stator tube. They should be twisted together and a tight wrap of tape put on the end to help guide them through the nipple on the steering box. As the tube emerges from the nipple, thread on the olive and start the nut. Position the switch so that there is a 1/16 inch gap between the back of the bezel and the edge of the steering wheel hub, and tighten the nut to hold the switch lever vertically in line with the steering wheel spoke.

Note: in Part 36 I discussed the importance of setting toe-in before orienting the steering wheel. If not done in this sequence, later toe-in adjustment will cause the vertical spoke to end up slightly off-center.

On Healey 100s the harness connects to the car's horn harness against the front frame cross member and is held with a P-clip. On 6-cylinder Healeys a special clip holds the harness against the "X" brace behind the grille (see Photo 12).

Adjustable steering columns The main difference between installing switches used with adjustable steering column Healeys and non-adjustable ones is how you feed the wire harness down the stator tube. In Part 28 I recommended inserting the long, fixed part of the stator tube on adjustable-steering cars into the steering column before mounting that on the chassis because its upper end stops well short of the hollow steering column shaft, and, when installing the switch, if it were to separate from the upper, sliding extension that the switch mounts to, it would be very difficult to fish out or push down into the steering box nipple where it is held by the nut and split olive. This then poses the problem of how does one guide the harness wires into the end of the fixed tube.

Before describing installation of these adjustable-column switches, I need to point out that two styles were used. On very early 100s a prong is welded to a rotating plate, which is part of the extension base plate assembly, and this prong engages a cast ring, with a wavy spring trapped in a recess – the same as with non-adjustable column switches described above. Starting sometime between August 18 and October 29, 1953 (earliest confirmed use: BN1 C.146497), the prong and cast cancelling ring were replaced with a heavy, formed wavy steel piece that is keyed to turn with the rotating plate. This wavy piece sweeps around the Bakelite switch base as the steering wheel turns, and trips extended pawls (used in all switches) to cancel the turn signals. This design is also found on all 100-Six and 3000 Healeys with adjustable steering columns.

On 100s, starting at chassis C.149930, and continuing through all remaining BN1 and BN2 production, the adjustable steering column was replaced with a non-adjustable one, which uses the fixed stator tube described above.

Before installing an adjustable column switch, you will first need to attach the harness as described above. Next the stator extension is mounted to the Bakelite base, as before. The easiest technique to feed the harness into the fixed stator tube inside the column is to insert a long wire up from the steering box, put a small hook one the end and use electrical tape to fix the hook to the wiring harness so it can be pulled down the

tube. Because of the extremely tight clearance between the harness and tube, you will need to remove bullet connectors from the two shortest wires (and probably the third shortest as well) so there will be room for the tape.

Once the wire is threaded through the tube, and before inserting the switch into the wheel hub, check that the pointed set screws (two on 100s and three on 6-cylinder Healeys) that hold the rotating plate against cast bosses inside the hub are not protruding from their holes. Now you can guide the short stator tube over the end of the fixed one, rotating the switch head to engage the dimples in the short tube with the slot in the long one. Slide the switch in only part way, leaving a gap of about one inch between the bezel and the steering wheel hub – don't worry about the switch lever orientation, which may be far from vertical.

Next loosen the nut at the steering box to allow the fixed tube to rotate and turn the switch head so the lever points straight up. You should not need to apply strong turning force, as this could crack the fixed tube near the base of the slot. Do not over-tighten the nut and olive.

Before sliding the switch home, look into the gap and locate the prong (on earlier 100s), or wavy steel plate (later style switch). Use a screwdriver tip to swing them around so that they point vertically ***down*** inside the wheel hub. You can now push the switch assembly firmly against the bosses in the steering wheel hub and tighten the set screws. This locks the rotating plate of the cancelling mechanism to the steering wheel and also fixes the switch in position.

Finally, solder back the bullet connectors you had removed in order to feed the harness through the stator tube, and connect the trafficator harness to the one on the car. On 100s this connection is at the front crossframe, as shown for non-adjustable steering column switches in Photo 7. On 100-Six and 3000 Healeys, the connection is near the top of the "X" brace behind the grille.

With the turn signal and horn controls now installed, disconnect the battery and use an ohmmeter to conduct another electrical check of the entire system. Finally, reconnect the battery and check that the signals work as expected. If the lights operate on the opposite sides of the car from what you expect, the two green wires with tracers will need to be swapped where the trafficator harness joins the one on the car.

The last step in this task is to fill the steering box with the proper oil. The oil will fill up from the steering box into the column to a point level with the fill port in the steering box, so don't be surprised at how much oil you will be putting in it.

A postscript on turn signal switches

Many repairs and adjustments can be made on switches in completed cars without having to pull the wiring out of the stator tube.

On non-adjustable steering column cars, disconnect the bullets at the main wiring to create enough slack to allow the harness to be pulled about seven to eight inches up the column, and undo the nut and olive at the steering box, letting them slide down onto the wire.

Next, pull the switch and stator tube out far enough so you have access to remove the three screws that attach

Photo 9: This wavy steel cancelling design was used on later 100s with adjustable steering up to BN1 C.149929 when non-adjustable columns were introduced. The pawls (A) (common to ALL turn signal switches) were tripped by a heavy steel wavy plate (B) that is connected to the moving plate (C). The fixed plate (D) mounts to the Bakelite switch with three screws, as with all switch configurations. The tab (E) positions a thin cover plate to keep the mounting screws from falling out.

Photo 10: To expose the holes for inserting the mounting screws, a tab (E shown in Photo 9) is lifted from the notch and rotated to the side.

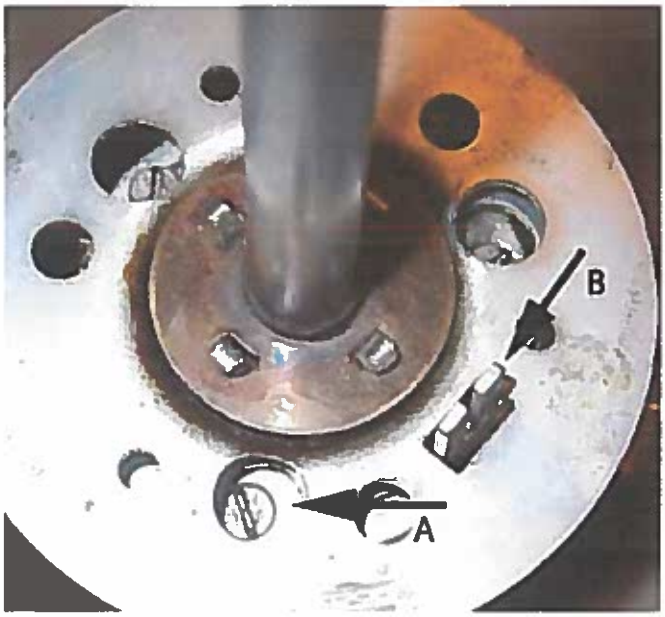


Photo 11: With the cover plate rotated, three holes in it allow access for installing the mounting screws. Tab (B) is part of the wavy steel cancelling piece.

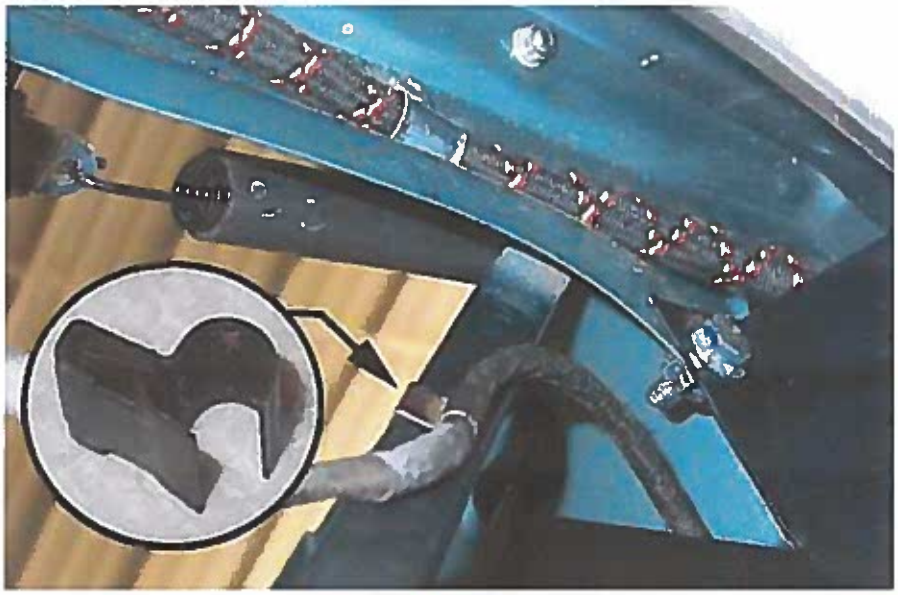
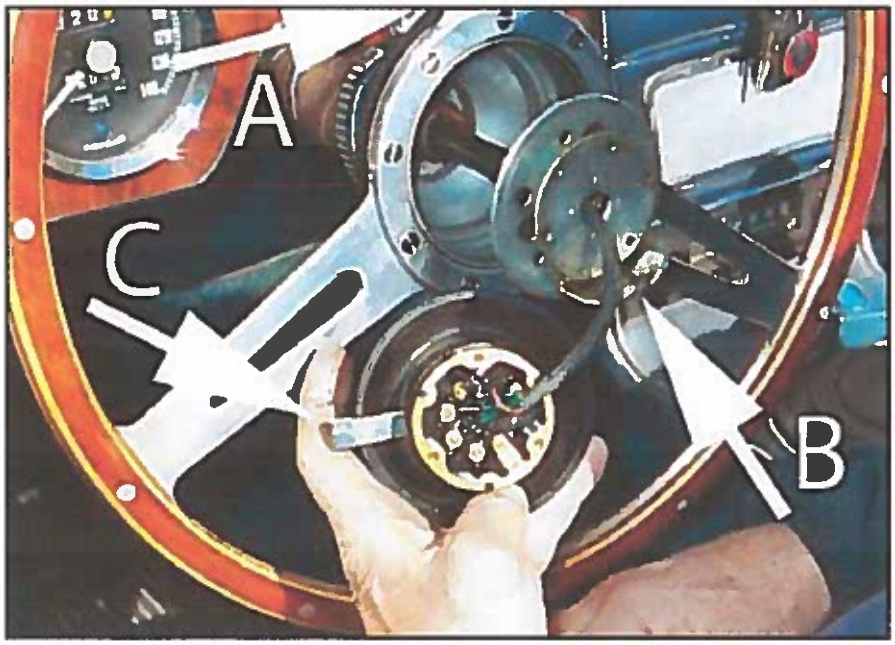


Photo 12: A special clip holds the trafficator harness against an upper arm of the "X" brace on 6-cylinder Healeys. Connection to the main wiring harness is off to the left of the photo. It is important to check that no harness looming can rub against sharp metal panel edges. Note the bolts mounting the air upper deflector tab (right) and direction of insertion.

Photo 13: With the sliding stator pulled out several inches, you have easy access for removing the switch.



the switch head to the plate, and then push the stator back down, leaving the switch hanging in the cockpit by the wiring harness. Re-attach the nut and olive to stop additional oil from dripping out of the steering box. (You can use aluminum foil to form a trough to guide oil that will initially drain out into a collection pan.)

If you need to remove the steering wheel from a car with a non-adjustable steering column (for example to repair it or replace with a new one), it will be necessary to pull the stator tube out, but steering oil loss can be controlled by replacing the stator at the steering box nipple with a short length of 3/8 inch diameter steel rod (clamped in place with the nut and olive).

Removal of the steering wheel on cars with adjustable steering columns is much easier. After disconnecting the trafficator harness to create slack, you can leave the stator tube fixed at the steering box. Just loosen the steering wheel hub set screws and pull the switch and sliding part of the stator up far enough so that it will hang down from the hub. This allows easy access for rotating the cover plate and removing the three screws that attach the switch.

To disconnect the switch from the wiring harness, I recommend that you sit in the driver's seat. Before disconnecting the switch, drape a towel over your legs to catch any small bits that may

Photo 14: This photo of a BJ8 was taken while replacing the standard steering wheel with a wood one. First the steering was positioned with the front road wheels straight ahead with one of the steering wheel spokes oriented vertically. The new wheel was positioned onto the shaft with identical spoke orientation (A). The wavy steel plate (B) will be kept in the down position when the switch is finally inserted into the hub. When wiring the switch, the lever (C) is held to one side to prevent the associated terminal from dropping into the switch body while the connection is being made (see also Photo 3). Use of electrical tape to also hold the lever is recommended.

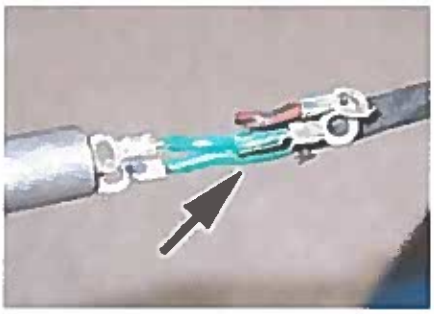


Photo 15. The short tube needs to be slid off the harness in order to remove the steering wheel. Fold two of the four wires back against the harness (arrow) to create more clearance for the eyelets to pass through.

accidentally fall as you work. The most important thing to remember is to hold the lever behind the left and right switch terminals in turn as you disconnect the wires to keep the terminals from falling back into the switch body. Be sure to replace the nuts onto each terminal before moving on to the next one. I find tweezers helpful for gripping the tiny lock washers and nuts. You can easily remove the switch from the harness and replace it using this technique.

If you want to remove the steering wheel you can slide the short tube off the harness and undo the circlip. Clearance for the four wiring eyelets to slide through this tube will be improved if you first bend two of the wires back against the harness.

Installation of soft tops

Few people will want to undertake installing tops on their car. How difficult this task becomes depends on how accurately the top is made and the installer's knowledge about top installation for your particular Healey model. Trim shops usually have the skills to do a good job, but may not understand all the details involved in the process. This is where additional information and guidance that you might provide can prove invaluable.

To fit a top on roadster models, the side curtains first need to be installed and fitted properly against the windshield. On convertibles, the side windows need to be raised. Tops have a number of seams that need to line up with the top bows, and how well they do depends on how accurately the top was made. There are some ready-made tops that fit very well, and others that do not. You should research the experience of others to identify which suppliers have tops with the best fit.

Other variations in top quality can include how the rear window is shaped and attached, details of how the side flaps are made on roadster tops, top material and color (inside cloth backing as well as the exterior), side openings where the top fits around side curtains or door windows, and more. There is a discussion of tops, bows, and latching hardware in the Healey Concours Guidelines that would be useful to reference, even if you are not interested in having your car judged (the Guidelines order form can be found at www.Healey.org).

When fitting the top, or having it fitted, here are a few things that you should be particularly aware of:

- Originally carpet tacks with medium size heads were used to attach material to wood bows, instead of the staples commonly used by trim shops. You can ask for tacks to be used and good shops will comply with your request.
- Attachment of the 2-inch wide webbing varies greatly among Healey models, so it is important to understand these differences. You will probably need to go over this detail with your trim shop to be sure that the fitter understands how your car is to be done.
- On all Healeys there will be some sheet metal screws (sometimes trim screws with cup washers) that thread into the bows. It is easy for the tapped holes to become oversize, or stripped in extreme cases, if you over-tighten them or don't use grease on the threads. These screws should just be run in snug. Repairing stripped thread holes can become a major issue if it has to be done on an otherwise finished car.
- Installation of tops on convertibles (BJ7s and BJ8s) is much more involved than on roadsters and the opportunity for stripping out sheet metal threads is high.
- Latching tops on 100s to the windshield requires a little attention if you don't want to deform the latch lever (early latch styles) or shear off the rubber buffers. This was discussed in Part 33 and is also covered in the Concours Guidelines Supplement 1 on Tops.
- On all tops, when attaching Tenax fasteners to their studs, grip the material adjacent to the Tenax base and pull the base down onto the stud. You may have to pull laterally until the spring-loaded Tenax button snaps down. Do not try to push the button down to engage the fastener, as the stud will crush the prongs inside the fastener and then it won't grip at all. This tip applies wherever Tenax fasteners are found (including tonneau covers and early arm rest pads).

It certainly would be worthwhile to visit the shop that you plan to have install your top and go over details you are concerned about to be sure that they understand how you expect the finished installation to look. You also may need to become involved in locating unusual materials or Healey-specific hardware, as most trim shops may not know where to find these items.

One tip on fitting tops on convertibles is that the rear edge of tops is attached, using "D" clips, to the rear edge of an inverted steel "J" strip, which in turn is held against the steel drip channel around the rear of the cockpit by sheet metal screws. Curvature of these nesting steel pieces makes it tricky to align the holes so that the screws will thread in easily. During fitting, the top's rear edge will be attached to the "J" strip which is then screwed to the channel. After pulling the top material by hand to test the fit, the "J" strip will likely need to be unscrewed and the top edge re-attached in a different position, followed by re-mounting to the drip channel.

This iterative process may require repeating a number of times, which means the sheet metal screw holes will be subjected to potential wear if the screw threads are not greased and the holes in the "J" strip and drip channel are not well aligned. Patience and not trying to run a screw in if it seems tight are keys to avoiding stripping screw threads.

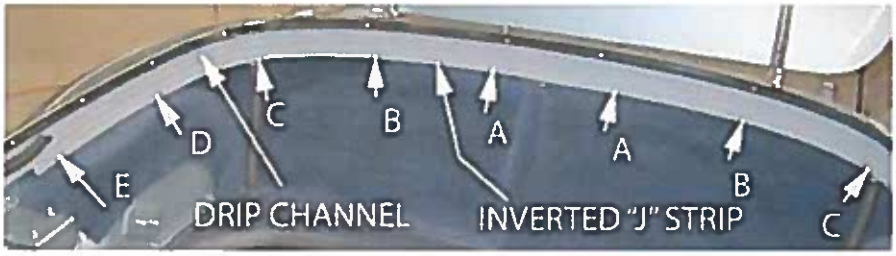


Photo 16: This photo of a BJ8, before the rear cockpit was trimmed, shows how the inverted "J" strip is loosely positioned onto the front edge of the drip channel. To draw the side screw holes rearward to align them with the drip channel, tighten screws starting at the rear center and working outward towards the corners (C), ending with screws (D) and (E). This sequence needs to be followed on each iteration with the top clipped to the rear edge of the "J". You will need to remove some of the multiple layers of material at the two seams next to the rear window where they wrap around the "J" strip. Extra material thickness at these locations will keep the strip from properly nesting against the drip channel and push the strip's ends forward, making hole alignment at (D) and (E) almost impossible. While clearance is a bit tight on the sides with the cockpit trimmed, there is access for tightening all screws. Grease the screws and make sure they run in freely so you don't damage the tapped threads. They only need to be made snug – don't over-tighten them.

Will you ever be done?

Throughout this restoration series (which also contains tips that I hope you will find useful for performing repairs or maintenance, as well as a full restoration) I have selectively presented information on areas of Healeys that people often ask about because these topics are not covered in Workshop Manuals or illustrated in sufficient detail in published photos or even Service Parts Lists. I consider other remaining assembly details that have not been covered fairly straightforward to complete. You will still want to study assembled cars (hopefully ones that are either original or have been restored with attention to getting details correct) and do research using the many books that have been published on Healeys, but there will be a few areas where you won't be able to readily find the answers you may be searching for.

Will you ever be "done" with your restoration? That depends on a number of things. There is always new information turning up about specific details, or more-accurate reproduction parts that become available, and if you are motivated to achieve the "nth" degree of correctness you will continually be tweaking your work. However, most importantly you should have a car that you are proud of and enjoy driving.

Your first test drives

Which gets me to the final topic I want to discuss, the process of test-driving the car to make sure it's in safe, running order to drive and enjoy

When working on a car over an extended period of time, it is easy for interruptions and long delays to cause you to forget where you last were when you stopped, or that you had screws and bolts you had left for tightening later. Earlier on in this series I suggested you try to avoid leaving fasteners loose "to be tightened later." If this is not possible, you should mark un-finished tasks with tape (blue painter's tape is not overly aggressive) and also put a reminder note where you will be sure to see it (such as on the steering wheel) before you might start the car for a drive.

When you first take you car out for a drive I believe your attention should be keenly focused on how it sounds and feels, with a heightened sensitivity for anything that doesn't seem right.

One thing to particularly listen for is any pinging, which would indicate the ignition timing is advanced too much. And don't forget to monitor your water temperature and oil pressure gauge readings, the latter especially at idle and above 2000 rpm (where you should see response of the pressure relief valve, or indication of excessive pressure -- e.g. 70 psi or above).

Initially there will be an odor, possibly strong, from paint curing on the engine and the exhaust system, and burning off on the exhaust manifold. These odors can persist for a while and be accompanied by lightly visible fumes. When you first notice them it is a good idea to stop and make a visible inspection so that you will be able to determine that there is nothing more serious going on.

Many people have described a "5-50-500" program of increasing the distances you drive so that you identify problems before taking off on an extended trip and don't become stranded far from home. I like to increase driving ventures with smaller steps: 5 blocks, 5 miles, 15 miles, 50 miles, 100 miles, 250 miles, and so forth. On these test runs, and for long trips, I always carry with me a Workshop Manual, an assortment of tools including a volt-ohm meter, and a selection of spare ignition bits and fasteners in a range of types and sizes. In addition I recommend having a fire extinguisher within reach in the cockpit.

Before heading out I always check fluid levels – brakes, engine oil, and coolant – and particularly look for any rags that I might have dropped, which could be lying on the exhaust system below the carburetters. Also, spend some time adjusting the timing and carburetion, following the Workshop Manual. It is safer to have the fuel mixture a bit too rich, than too lean, to avoid damage to pistons or valves. You should have previously adjusted the valve clearances, but checking them again might be worthwhile.

When I return from drives, I also check under the car for leaks. British cars generally will donate a few oil drips to the garage floor, but excessive amounts indicate the need for further watching and checking. Compare notes with other Healey owners to decide whether you have a serious problem or not.

Finally, experienced mechanics recommend that after 50 miles you change the oil filter to remove metal filings that accumulate during initial piston ring seating. At 500 miles you should change the oil (and filter, again), re-torque the cylinder head, re-adjust valve clearances, and re-check timing and carburetion settings.

To avoid excessive oil spillage, when changing the filter I prefer to separate the adapter from the block and remove the filter-adapter assembly as one unit. It is much easier to open the canister on a workbench, and if you need to replace the rubber ring gasket you will be able to observe that you thoroughly had removed the old one.

Congratulate yourself

Above all, be sure to take the time, whenever you get into the car, to look at what you have created. Once underway, don't just be focused on getting where you're going. Enjoy the journey. It's been a long time getting to this point where you can drive and enjoy your own restoration, and you have every reason to be proud of the achievement.