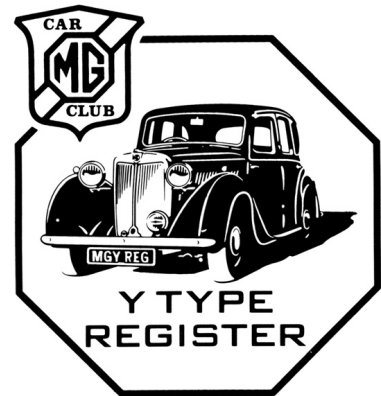
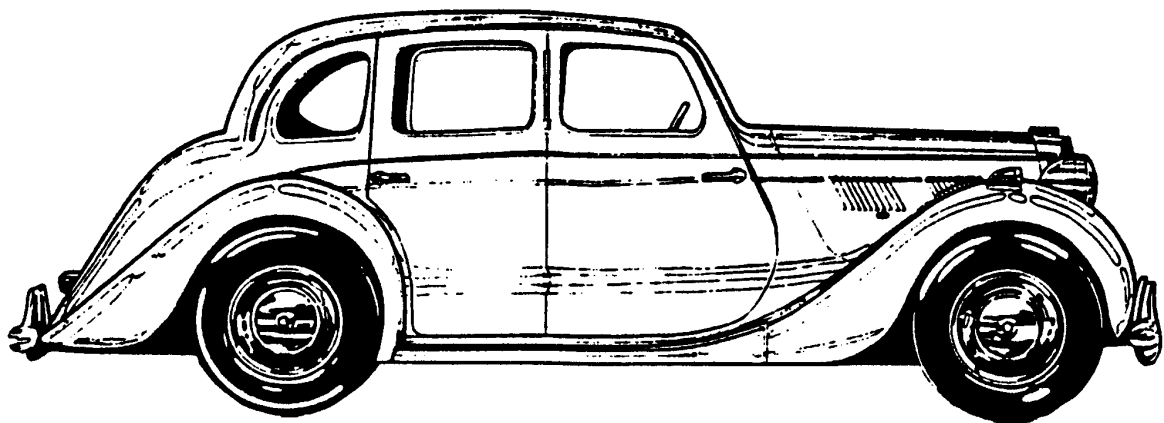




Y Sheet 1

STEERING COLUMN ELECTRICS

By Jack Murray



Acknowledgements

*“Y Type Steering Column Electrics” An article by Harvey Cole,
printed in ‘Bulletin’ (late 70’s)*

*Readers are warned that they attempt any mechanical or other modifications or
methods referred to herein at their own risk.*

I f in doubt seek the advice and assistance of a specialist.

M.G. Y Type Steering Column Electrics

In the process of rewiring a fellow enthusiasts YB, I encountered problems with the trafficator and horn circuits. Reference to my Workshop Manual was rather confusing as it shows details of the slip-ring unit that was fitted to early cars, up to Y 1261. The trafficator switch shown is also an early type and I would be interested to discover if this was changed at the same time.

In the early slip-ring unit the steering column wiring harness travels down the column as far as the slip-ring and is connected to it internally.

With the later version, the wiring harness travels the full length of the column internally, leaving the bottom of the column via a notch between two of the steering column coupling flanges. The harness then travels back up the outside of the column, in a protective casing, until it reaches the slip-ring unit. At this point, the wires separate and are soldered to brass strips which extend into the unit to the individual contacts.

It is common to find slip-ring units that are damaged and unfortunately, they are no longer available. If anyone, in their travels, stumbles across a hoard of Lucas spares, look out for boxes marked with the Lucas order no. 38254. You've found a gold mine! New units were supplied complete with the steering column wiring harness.

Confusion abounds when studying the wiring colours codes for these items. There are different colour codes for YA and YB but I have found, in practice, that steering column wiring and the wires from the slip-ring unit to their connection with the main loom seem to follow neither of these conventions. Consequently, any reference to colour relates only to those found on my car.

In order to avoid any confusion over the colours, I have numbered the slip-ring contacts from 1 to 4, with no. 1 being at the top of the unit nearest the steering wheel. I have also numbered the appropriate connections on the steering wheel switch to match these – Refer to diagram 1.

To carry out fault finding procedures you will need to make up a test lead. Mine consists of two suitable lengths of insulated wire connected to a test bulb, each wire having a crocodile clip at the end. The overall length of my lead is about six feet. This may seem over generous but was governed by the fact that it had to reach from the battery to the trafficators in each door pillar. I didn't want to go to the trouble of removing these units from their normal position unless it was really necessary. Remember it is easy when using the test lead to inadvertently cause sparking by putting one end down onto the body while the other end is still connected to a live terminal.

Be Careful!

Before getting busy with your test lead, disconnect the live feed to the end cap of the petrol pump. This serves the dual purpose of preventing the float chamber from continually filling up each time you turn on the ignition and reduces the risk of igniting petrol vapour. It is also necessary to jack up the front wheels in order to be able to turn the steering from lock to lock and check out the operation of the slip-ring unit in various positions.

To simplify matters, I will deal with the trafficators and horn separately as the trafficator arrangement is identical for both YA and YB. In addition to the variation in the horn circuits between both models, the horn is not fed from the ignition switch and consequently fault tracing in this circuit involves slight differences.

If either or both trafficators do not work when the ignition is switched on and the steering column switch is operated, the following fault finding procedures may resolve your problems.

Test 1

Check Individual Trafficator Units

To check that the individual trafficator units are functioning, you need to remove the interior door pillar trim to expose them. Either remove the units completely in order to test them on the bench or test them in situ.

To do this, connect the test lead from the live battery terminal (-ve.) to the live terminal on each trafficator in turn. If either of the units fails to work, make sure that it is earthed to the body

satisfactorily. They should be earthed by their fixing screws. If this seems to be in order, then the trafficator itself is faulty and requires attention.

Test 2 **Check That You Have Supply to the Slip-Ring**

At this stage, leave all wiring to the slip-ring unit connected.

Turn ignition on.

Connect test lead from terminal 3 on the slip-ring unit to a good earth.

(I use one of the bonnet catch brackets as the metal is usually exposed; any signs of rust need to be cleaned off).

If the test bulb fails to light, check the fuse between A3 and A4 (control box on YA, fuse box on YB). Also check that the bullet connector to no. 3 on the slip-ring is secure.

Test 3 **Check Wiring From Slip-Ring to Individual Trafficators**

Leave all wiring to slip-ring connected as before.

Turn ignition on.

Connect test lead from terminal 3 to terminal 1 on slip-ring.

The right hand trafficator should work. If it fails to operate, there is a fault in the wiring between the slip-ring and trafficator. Check the bullet connectors near the slip-ring and those below the floor on the inside edge of the chassis level with the offside door pillar. If these appear sound and making good connections, then there is a fault in the wiring itself.

Repeat this procedure for the left hand trafficator by connecting terminal 3 to terminal 2 on the slip-ring. If the trafficators work as a result of these tests but fail to operate when the steering wheel switch is used then the fault lies in the slip-ring unit, the steering wheel switch or in the wiring between them.

Test 4 **Locating Short Circuits**

If the fuse between A3 and A4 blows when either of the trafficators is switched on, there is short to earth somewhere in the circuit between A4 and the trafficator itself. In this case it is useful to identify the approximate area in which the short is occurring. The following tests will give you a general idea of this but a more detailed examination of the wiring will be needed to identify its exact location.

I hasten to add that you may need a copious supply of spare fuses. (and cups of tea!)

Disconnect the wires to terminals 1, 2 and 3 on the slip-ring. (You may find it to your benefit if you label these wires or at least make a note of their colours and destinations).

Replace the fuse if it has blown.

Turn ignition on.

Connect test lead between the wires that were attached to terminals 1 and 3. Note what happens.

Repeat this test with the wires that were attached to terminals 2 and 3, not forgetting to replace the fuse if necessary.

If both trafficators operate and the fuses remain intact, the short to earth is in the steering column switch or the steering column wiring.

If the fuses blow on both the above tests, the short to earth is somewhere between the control box and the slip-ring unit.

If the fuse only blows when wires 1 and 3 are connected, the short is between 1 and the right hand trafficator unit.

If the fuse only blows when wire 2 and 3 are joined, the short is between 2 and the left hand trafficator.

Checking Steering Column Switch

Slacken the steering column adjuster and push the steering wheel as close to the dashboard as possible. Lock it in this position.

Remove the single set screw that holds the steering wheel switch in place. It is at the side of the steering wheel boss, almost level with the wheel spokes.

Gently ease out the switch unit.

You will see, at the back of the switch, a brown insulating disc with four wires held in place by small screws. If you peer under this disc you should be able to identify a terminal which has two brass strips attached to it. This is terminal 3, on diagram 1, and the wire that connects to it is the supply from A4.

The brass strips from this terminal cross the switch towards terminals 1 and 2, passing close to a cam in the centre of the switch.

If you operate the trafficator ring you should be able to see the cam operate against one of the brass strips, pushing it against terminal 1 or 2, depending on which way you turned the ring. Check that the operation of the ring in both directions causes the brass strips to make good contact with each of these terminals.

If you suspect that a good contact is not being made you will need to disconnect the four wires and remove the circular insulating disc in order to gain access to the brass contact strips. Label/number the wires before removing them and scratch identifying marks on the disc. (I'll bet someone's been there before!)

Clean up the contacts and carefully reshape the brass strips, if necessary, to improve contact. Be careful, as it is very easy to overdo this and make matters worse.

The fourth terminal, the one closest to the supply, is the horn. This will be dealt with later.

The switch mechanism is clockwork and beyond me although the Register does hold a stock of **replacement torsion springs** if your switch is not returning as it should because of a broken spring.

Testing Slip-Ring Unit

Remove the steering wheel switch as detailed previously.

Refer to diagram 1 and relate the numbers on the switch to your own unit. Numbering them may help. Turn on the ignition.

Connect the test lead between terminal 3 (supply) and terminal 1 on the switch. The right hand trafficator should work.

Similarly, connecting the test lead between terminals 3 and 2 on the switch should operate the left hand trafficator.

Although the switch is dangling freely, turn the steering wheel from lock to lock during these tests to ensure that the slip-ring unit is operational throughout its full rotation.

If the trafficators work then the steering column harness and the slip-ring unit are OK, and the fault lies in the steering wheel switch. Check it out as detailed in the previous section.

If the trafficators do not work then there is a fault in the slip-ring unit or in the wiring from the slip-ring to the switch.

Testing Steering Column Harness

The wiring from the steering column switch that disappears down the column, may cause problems over time. In my experience this wiring is rarely, if ever, replaced during a vehicle rewire. It differs from the main loom in that it is plastic coated and is likely to suffer from age related damage such as cracking or hardening. This may cause intermittent problems associated with wires touching each other or earthing to the column itself.

Three areas that may be suspect and in need of careful examination include:

1. Behind the steering column switch where the four wires leave the braiding and connect to the back of the switch. The harness is supported by a loosely coiled spring and the wires turn with the steering wheel.
2. At the bottom of the column where the harness changes direction and emerges between the two flanges. At this point the protective covering may be damaged or be pinched between the flanges, especially if you have recently renewed the rubber coupling bushes.
3. Where the four wires leave the protective cover near the slip-ring unit and fan out to be soldered to the bottom end of the brass strips that enter the unit itself. This area was originally protected by a rubber sleeve which may have disappeared over the years.

In order to check the wiring you will need a second test lead that is long enough to reach from the battery live terminal (-ve) to the slip-ring unit.

Refer to diagram 2 for numbering details.

Leave all wiring to the slip-ring in place.

Remove steering column switch from steering wheel.

Carefully slide back the sleeving referred to in 3 above and ensure that the soldered contacts are clean.

Connect one test lead from –ve. on battery to the soldered connection 1 below the slip-ring.

Connect the other test lead from terminal 1 on the steering wheel switch to good earth. The test bulb will light if this wire is O.K.

Repeat this test but with the first lead from the battery to soldered connection 2 and the second lead from terminal 2 on the switch to a good earth. Similarly, a lit bulb indicates that the wire is O.K.

Repeat for soldered contact 3 and terminal 3 on the steering wheel switch.

If the bulb lights on each occasion then the problem is likely to be with the slip-ring unit.

If the bulb fails to light or goes on and off when the steering wheel is turned then the column harness is faulty and will need removing for a closer inspection or replacement. See next section.

Inspecting Slip-Ring Unit

One reason for a slip-ring malfunction is that the contacts inside are not correctly aligned. This is usually because the outer column has been moved at some time and has been repositioned incorrectly.

The slip-ring unit consists of two distinct parts. The outer part which is visible and remains stationary, is attached to the outer column by 3 small grub screws. On it's inside surface there are four brass rings which are connected internally to the four terminals you can see.

Incidentally, if you can't see the four terminals or find access to them difficult, suspect that a previous owner has moved the outer column. You can reposition the outer column so that the terminals are accessible, but I'll come to that later.

The inner part of the slip-ring consists of two semi-circular plastic mouldings which are held in place, on the inner column, by two circlips. To the uppermost of these mouldings are riveted four brass strips, the ends of which are sprung and carry contacts that run against the brass rings previously described. These contacts should press against the rings throughout the full lock of the steering.

To ensure that the two parts of the slip-ring unit are not misaligned you need to check the measurement shown in diagram 2. Cut your own gauge from a piece of card. If your measurement differs from this, you will need to move the outer column. Proceed as follows:

Slacken off the bolt that holds the outer column in place.

You will find it behind the dashboard – it goes through the chromed clamp into the main steering column support bracket that is fixed to the underside of the bulkhead. Lever open this clamp. Slacken the clip that holds the draught excluder to the steering column.

The outer column should now be free to move although I have found them to be quite stiff on occasions. Grip the column on both sides of the dashboard and twist as you push/pull. This twisting action is important as a straight push or pull is likely to displace the sprung contacts inside the unit and you could compound your problems.

Check your measurement and retighten the column. Check again after tightening.

Use the same twisting movement if you wish to reposition the outer column in order to make the terminals on the slip-ring more accessible.

If the measurement described (diag. 2) is satisfactory the problem with the slip-ring could be that the brass contacts have lost their 'springiness' and are not making contacts with the rings.

It is possible, using the method detailed previously, to move the outer column upwards by about 3 inches until the outer slip-ring housing touches the bulkhead.

I should add that you cannot slide the outer part of the slip-ring unit downwards – even if you have a short enough screwdriver to access the three grub screws that hold the outer part of the unit to the outer column.

This looks to be a very tempting alternative but there is insufficient clearance between the inner and outer parts of the unit to move the outer section further than the $\frac{11}{16}$ inch towards the soldered connections.

Moving the outer column upwards will expose the brass contacts but is not a procedure I would recommend as you are likely to damage or bend the contacts in the process. **Great care is needed.**

Replacement of the outer column, in these circumstances, also requires care in order to avoid damaging the contacts or pushing them out of position – you could find yourself in a worse predicament than when you started.

In addition, you are not able to inspect the slip-rings themselves so you are only doing half the job anyway.

In order to carry out a thorough inspection and possible repair of the slip-ring unit, or to replace the wiring harness, I would advise removing the column from the car as detailed in the Workshop Manual. It's not that difficult and you will be able to take further advantage of the situation by renewing the rubber coupling bushes and perhaps the two felt bushes between the inner and outer columns.

If you decide upon this course of action use Vaseline to lubricate the internals of the unit before reassembly.

NOTE If you decide to remove the column from the car, take heed of the warning issued in the Workshop Manual with regard to the coupling bolts. On early cars (YA?) the lower flange is threaded and the bolts have to be unscrewed. Later cars (YB?) do not have a threaded lower flange and the bolts push through both flanges. My car is a 1950 model and the lower flange is threaded.

Earthing Strap

This should not be overlooked as the function of all the electrical components previously mentioned relies on a satisfactory connection to earth.

The earth strap runs from the bottom clip that holds the protective casing in place, to one of the steering column coupling bolts.

Check both connections and clean to bare metal, ensuring that the strap is not broken.

I've noticed on some cars that this connection has been made below the bolt head on the upper flange of the coupling.

This could compromise the route to earth because of the insulating properties of the rubber bushes. In order to avoid this possibility I believe that the earthing strap should jump the rubber couplings and be connected to the nut on the lower side of the coupling flanges.

However, I have spoken to owners whose cars have the strap connected to the upper flanges and they seem to suffer no problems.

Horn – Fault Locating

The horn circuits differ between the two models because the YA was fitted with a single Lucas 'Altette' horn whereas the YB was fitted with Lucas twin windtone horns. As a consequence of the higher power consumption required to operate the YB horns, the circuit included a relay in order to protect the contacts inside the horn switch.

Incidentally, I was not satisfied with the sound produced by my single horn, it being rather disappointing 'beep'. I, therefore, decided to convert my car to the YB specification by fitting twin horns which have a much more satisfying round, full sound. I feel that this modification is much more in keeping with the quality of the vehicle and after all if the factory regarded it as an improvement, then it is good enough for me.

In order to carry out the following checks, a test lead is required made from a suitable gauge wire (28/30) with a crocodile clip at each end. A circuit tester containing a bulb may also be necessary to identify faults within individual wires.

If the horn does not sound when the horn button is pressed, the following tests may help to identify the source of the problem.

Before spending valuable time trying to trace a fault in the circuit, it is worthwhile ensuring that the horn itself is working

Test 1

Checking the Horns (See diagrams 3 & 4)

YA

Disconnect the two wires from the horn, ensuring that the supply wire is not resting against the chassis, and connect the horn directly to the battery. This may mean removing the horn from its location, on the chassis below the steering box, using a separate battery or making up extremely long test leads. The horn should work.

If it doesn't, the horn itself is at fault and will need inspection.

YB

The location of the horns on each side of the bulkhead enables them to be tested in situ.

Remove the screw holding the domed cover and take the cover off.

Disconnect the supply wires to both horns, taking care to ensure that they don't rest against any part of the body, and check that the earthing connection to each horn is good. Connect the test lead from the battery supply (-ve.) to the horn.

It should work. If the horn fails to work, inspect and clean the points and try again. Further failure may mean renewing the points.

Test 2**Approximate Location of Fault****(YA & YB)**

Once you know that the horns themselves are O.K. it is useful to identify whether the fault lies in the steering column or between the slip-ring unit and the battery (see diag. 3 or 4).

The method is straightforward and identical for both models.

Leave all wiring in place and connect the test lead from terminal 4 on the slip-ring (nearest front) to a good earth.

If the horn(s) sounds, the fault lies somewhere in the steering column so follow test 4 onwards.

If the horn(s) fail to operate then the fault lies between terminal 4 on the slip-ring and the battery. See test 3.

Test 3 Check Wiring Between Slip-Ring and Battery YA (see diagram 3)

Disconnect the supply wire at the horn and attach to this wire a circuit tester containing a test bulb. Connect the other end of this lead to a good earth.

If test bulb lights, the supply is O.K. and the fault will be between the horn and terminal 4 on the slip-ring.

Check that the bullet connector near the slip-ring unit is clean and that the wires are firmly held and making good contact.

Check both connections to the horn itself.

If the test bulb does not light, the fault is between the horn and the battery. Check the wiring and the fuse between A1 and A2 on the control box.

YB (see diagram 4)

Disconnect the wire to terminal C2 on the relay. Connect the circuit tester from this wire to a good earth.

If circuit tester bulb fails to light there is a fault in the wiring between C2 and the battery. Check the fuse box, A1 to A2 fuse, and the wiring. Be careful not to let the C2 wire rest against the body.

If the circuit tester lights then power is getting to the relay. The fault could be in the relay or the wires from C1 to the horns.

Disconnect the two wires from C1 on the relay.

Label these or note their colour and destination.

Join the C2 wire to one of the C1 wires if their length allows. Otherwise use the test lead. The horn should sound.

Repeat this but connect the C2 wire to the other C1 wire with similar results. If both horns work, the wiring is O.K. Check the relay.

If either horn fails to work, the fault is in the wiring between C1 and the horn itself.

Test 4**Relay & Wiring From Relay to Slip-Ring – YB Only**

In order to ensure that the relay is functioning satisfactorily, disconnect the wires to C1.

On pressing the horn, the relay should make a distinctive clicking sound indicating that the contacts inside are functioning.

If there is no sound the relay may be faulty.

To check the wiring from W1 on the relay to the slip-ring unit disconnect the wire to W1 only. Connect a test lead from terminal W1 on the relay to a good earth. Failure of the horn to sound indicates a fault between W1 and the slip-ring.

Check the wiring and the bullet connector near the slip-ring.

Test 5

Check Slip-Ring Unit (YA & YB)

Remove the steering wheel switch from the steering column (pages 3 & 4), leaving the wiring in place. Identify terminal 4 on the switch unit (see diag. 1) and connect a test lead from this terminal to a good earth on the body.

If the horn sounds both the slip-ring unit and steering column wiring are O.K. and the fault is either in the switch or the earth strap at the foot of the column.

If the horn does not sound, check the slip-ring alignment as detailed on pages 5 & 6.

Test 6

Earthing Strap (YA & YB)

To check out the earthing strap, repeat test 4 but connect the earth end of the test lead to a suitable area of bare metal inside the steering wheel hub. If the horn fails to sound now but it was working satisfactorily in test 4, check out the earth straps detailed on page 7.

Test 7

Horn Push Switch (YA & YB)

If the horn works in tests 4 & 5, then the problem lies in the switch.

Carefully lever out the chrome retaining ring that holds the push button in place.

Clean up the sprung brass contacts below the button and clean the copper contact ring on the back of the button. Re-assemble and try sounding the horn. If it fails to sound you will need to remove the wiring that runs from the back of terminal 4 into the switch.

This wire has a loose insulating cover that may need replacing.

Clean up the contacts and re-assemble making sure that the wiring connections are sound.

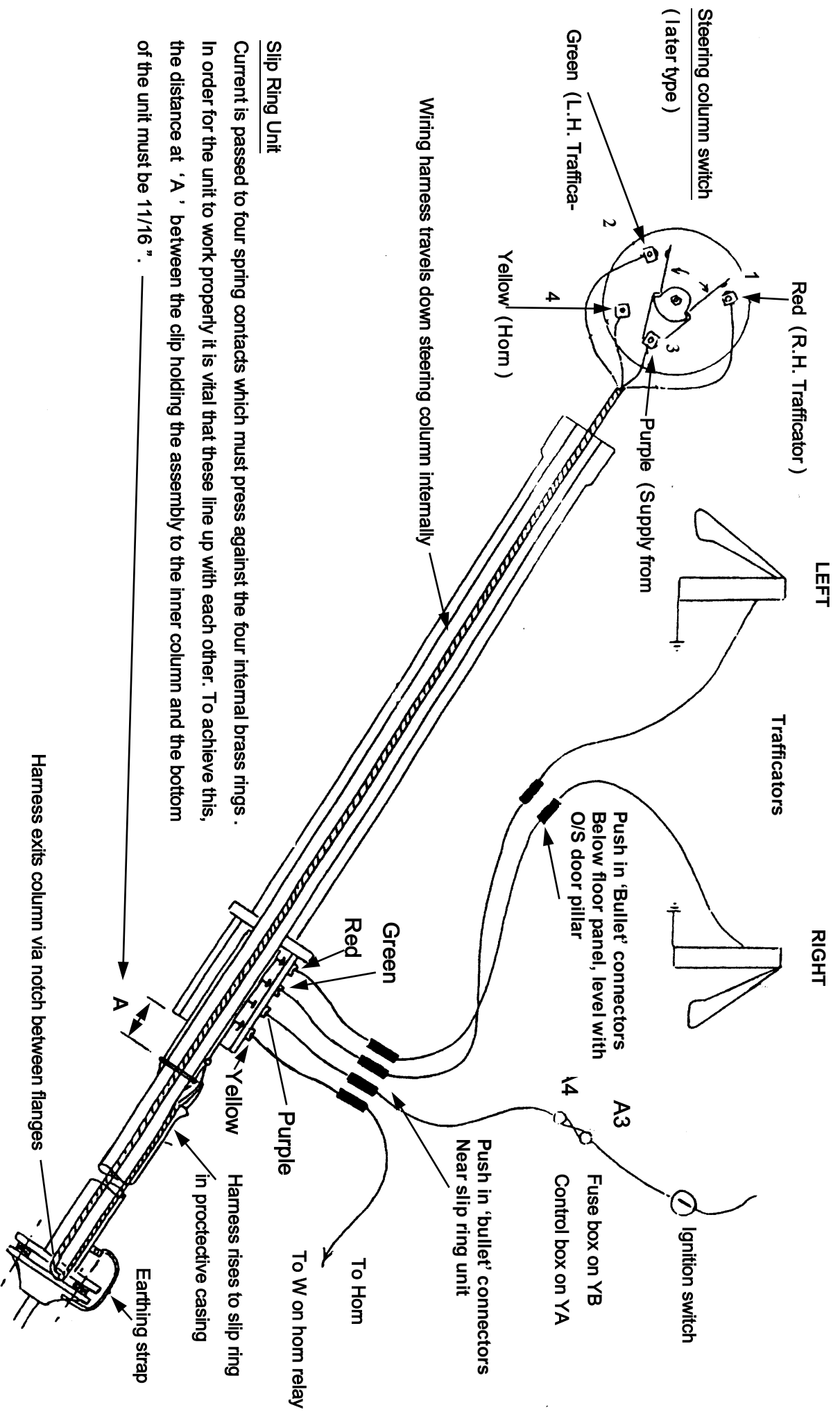
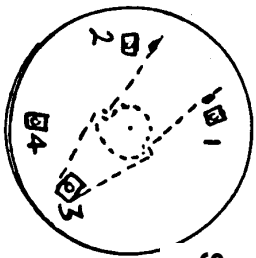
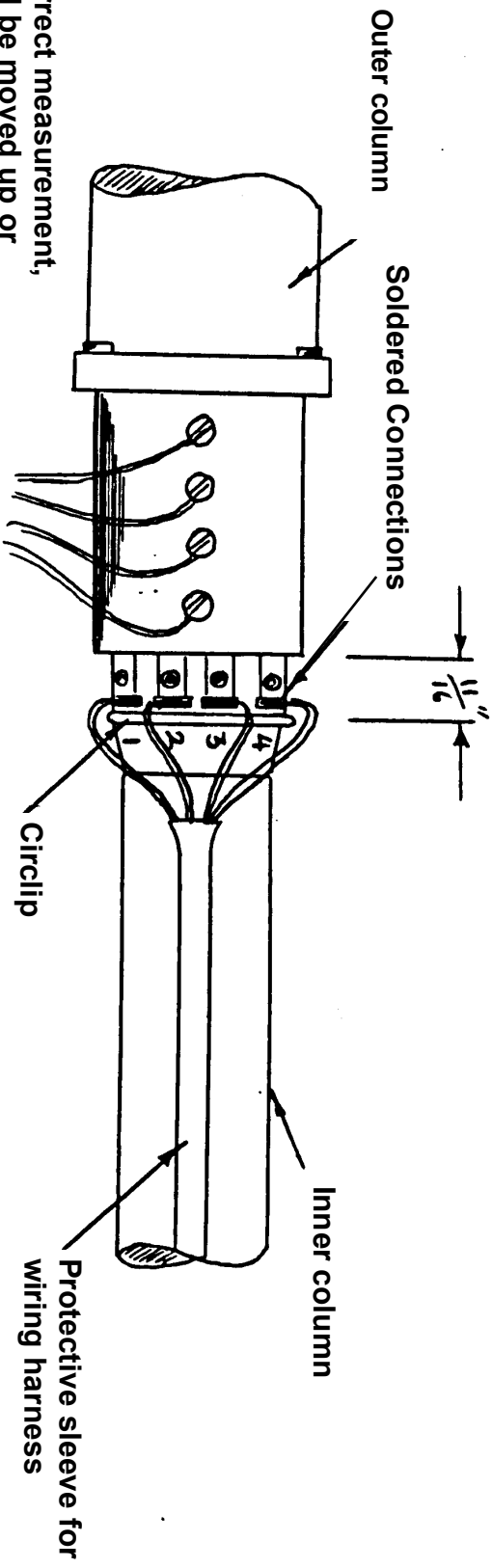


Diagram 1



Steering column switch

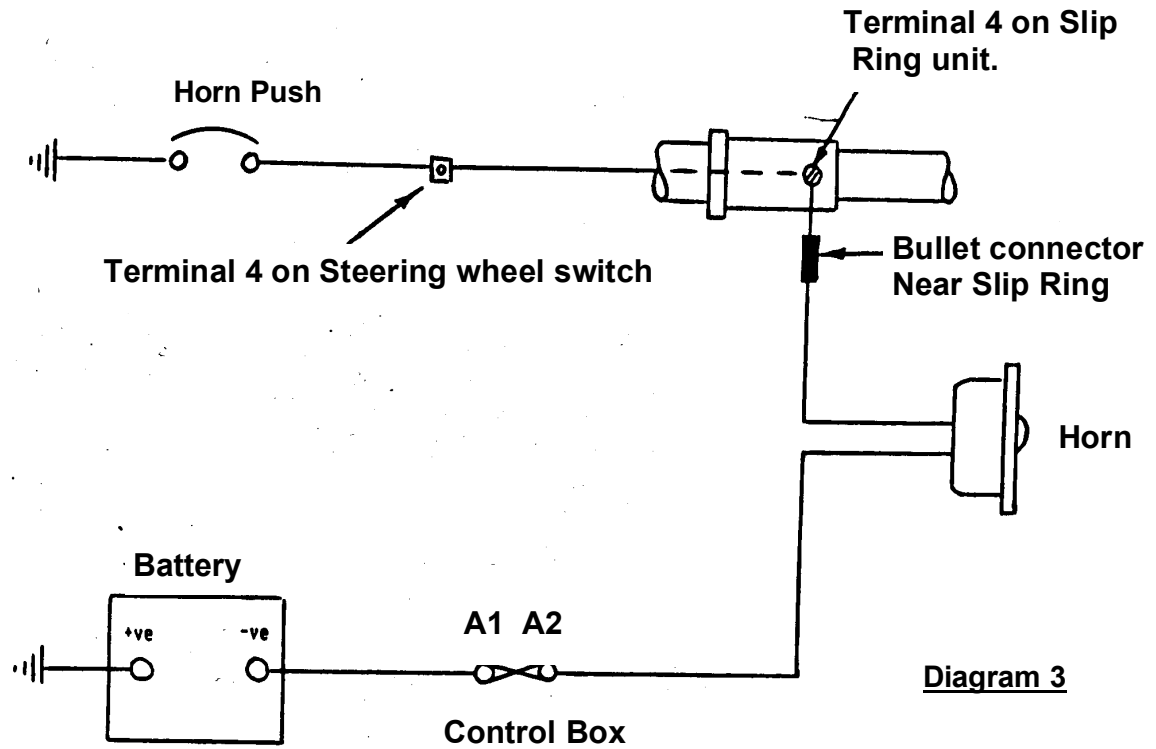
This measurement is taken from the bottom edge of the slip ring unit to the circclip



To achieve the correct measurement, the column should be moved up or down using a twisting motion.

Slip Ring Location & Adjustment

Horn Circuit YA



Horn Circuit YB

