

HOT

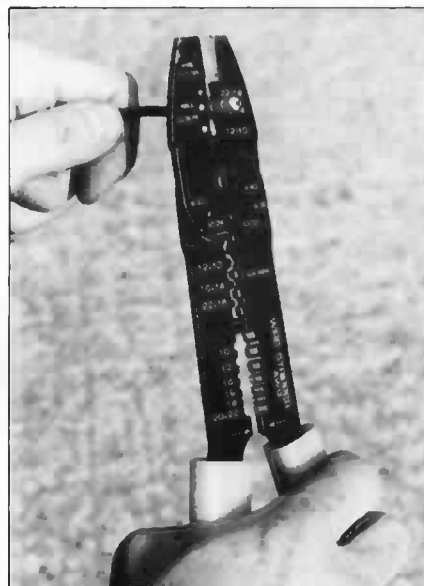
Reliable electricians are only a cable's length away. Follow **Jonathan Jones** as he weaves his way towards a new loom.

Don't look now but there's someone creeping up behind your chair, and in a moment he's going to leap out and yell BOO!

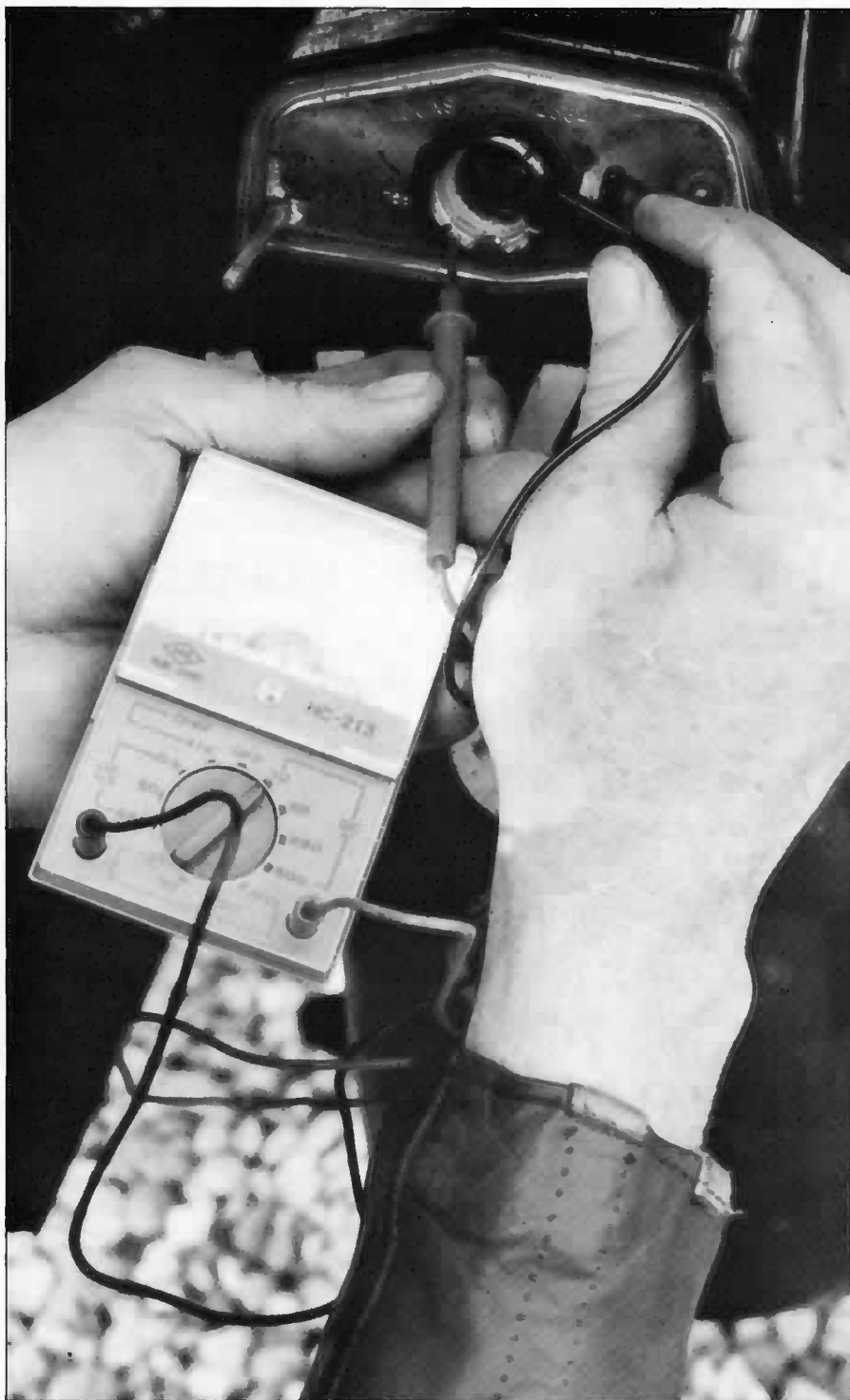
That's about as frightening as electrical faults ever get, yet the words volt, amp or ohm still have half the motor cycle population running for their crash helmets.

Electricians are only mechanical bits joined by wire. You don't even have to understand how electricity works to find a fault and rectify it, or to turn an unruly spaghetti of wiring into an efficient system.

We'll set aside charging systems for another time and assume that the battery has an infinite supply of energy. Basically, there are only two types of electrical components. One is the battery. We'll call the other a horn. The first supplies power, the second uses it:

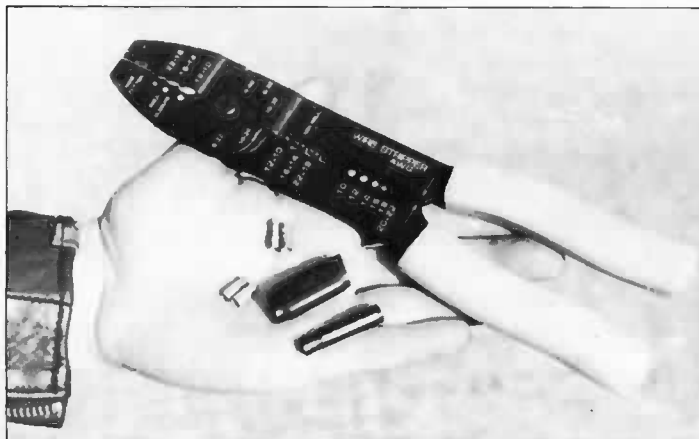


If you're crimping wire to connectors always ensure that you use the correct tool. Nothing else will produce a sound joint.

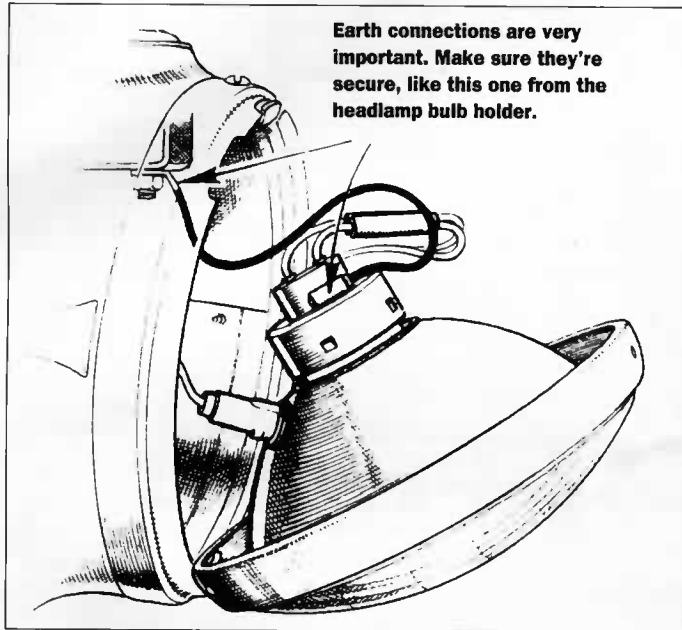


▲ Invest in a pocket multimeter — this one costs £7.95 from Maplin Electronics — and you're half-way to tracing any electrical fault.

► The familiar bullet connector is still available, in either crimp or solder-on form.

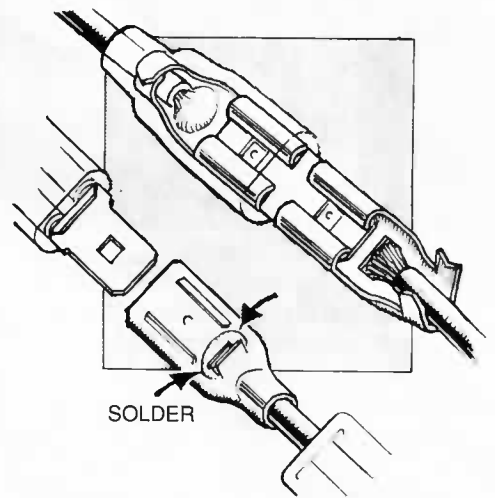


WIRING



Earth connections are very important. Make sure they're secure, like this one from the headlamp bulb holder.

Lucar or spade connectors are most efficient if soldered and then sleeved against the weather.



simplest way to go about solving the problem is substitution.

The finest substitute is a multimeter, like the pocket-sized one which Maplin Electronics sell at £7.95. It's equally at home

earth. The push-button interrupter completes the circuit by earthing the unconnected side of the horn to the handlebars.

Armed with those basics you will be able to trace any fault.

A single connection in the wiring loom that consists of bare wires twisted together under tape is one too many. Take up your crimping pliers, soldering iron and cable connectors. Renew!

There are two basic routes to a rewire. You can buy a ready-made harness, or gather together the raw materials and build your own, wire by wire. I always start from scratch. And whether you are converting from six volts to 12 or sticking with the system's original voltage, the method is the same.

If you are fitting a ready-made replacement loom, our series Hints and Tips for Motor Cyclists offered some sound advice on what to do in the July issue. My preference is to lay up the harness one wire at a time.

Here's what you do. Attach all the electrical components and interrupters to their positions, but remove the seat, tank and headlight unit. After referring to our section on cable size, Which cable do I need?, run a suitable cable along the frame's top tube, from battery to ammeter. Allow about 6in of extra wire at either end, plus a loop of slack where each cable passes the steering head. The golden rule is cut long. You'll waste a lot less wire by trimming off a few inches instead of having to run a completely new length.

Don't fit terminals at this stage. It only makes sleeving hard or impossible. Take a couple of pieces of masking tape, write batt/amm on the tape to identify the wire, and make flags of them around the ends of the wires.

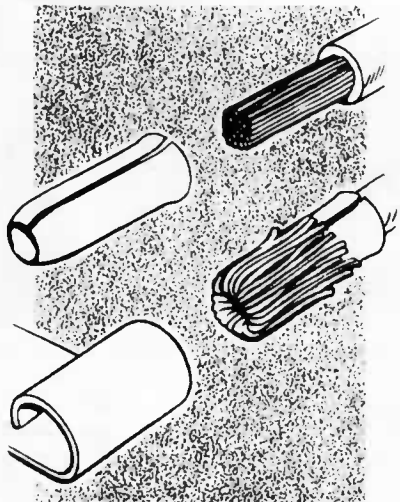
Even if you are using the original colour coding, you'll find flags much easier to use than a wiring diagram. The ▶

being a battery, a horn, a headlight or a bit of wire.

You can apply the example of two components joined by wire to every electrical component on your motor cycle. The only complication is that the frame often forms one of the connections. Why? Because it's already there and saves a few feet of wire per machine.

Unfortunately the frame wire has some properties which make it less than ideal. It's usually covered in efficient insulators — paint or rust. At the steering head bearings or around an instrument panel grease or rubber mountings may form an insulator that can break the circuit. So it's a good idea to run a length of cable between the battery's earthing bolt and the headlight shell.

Other parts which fall into the same category as our horn — users of power — are the head, tail, brake and instrument lights. Odd one out is the ammeter, which is merely an indicator taking the place of a connecting wire, and telling us which way the energy is going. The rest of the bits fall into the category interrupters, which temporarily break the wires between the battery and the power users. For convenience, all but one of our power users is permanently joined to the frame, while the interrupters are fitted in the wires. Odd man out is the horn, permanently joined to the battery wire but not the frame



Not all bullet connectors are crimped on or soldered, like this headlamp bulb holder earth connection.

the same functions as a gearbox sprocket and a rear wheel.

With a sprocket, the connection is provided by a chain. The battery is connected to the horn by wire, but like a chain drive, the circuit is incomplete without a return run. So a second wire connects the opposite battery terminal to the corresponding horn terminal.

It's that simple. If the horn doesn't work there are four possible faults: the battery, the horn, the wires between them, or the connections. Exposing the culprit is a matter of elimination. The

HOT WIRING

flags can be taken off as each wire is joined, leaving the colour codes for future tracing.

British marques did without fuses until the late Sixties. We suggest you fit one. A fuse can provide a weak link in the electrical chain if corrosion develops in the holder, yet it is a vital safeguard.

Take the back end of that ammeter wire to one end of a fuse holder, and attach a suitable battery terminal to the other. Don't connect it yet. A few twists of wire around the top tube will hold cables in place temporarily.

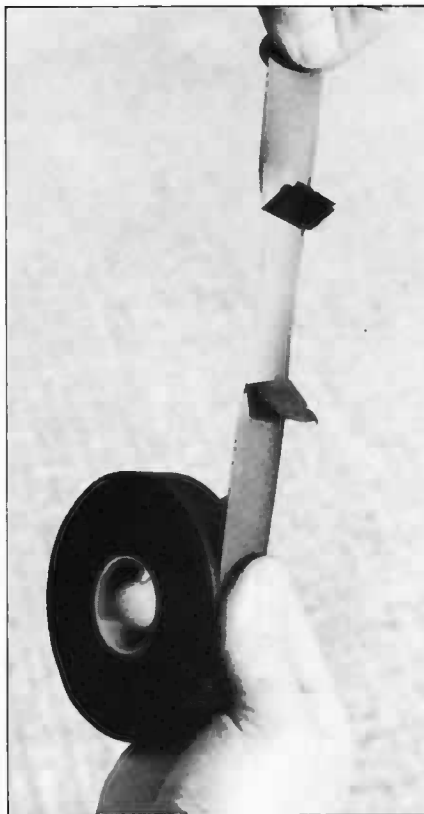
Take a second run from the same ammeter terminal to the horn — either terminal — binding it with tape where it leaves the original wire, which will depend on the position of the horn. The tape will make it easier to get each wire emerging from the harness at precisely the right spot when you come to the wrapping stage. Now run a wire from the second horn terminal to the push button, tucking it alongside the battery wire where appropriate. Attach identification flags to the ends, and you have completed wiring the first component.

Next in the circuit is the cable from the ammeter to the lighting switch. As there are any number of designs for this interrupter, consult a wiring diagram for your machine. Failing that, the multimeter can be used to look for a contact that is not connected to any of the others in the off position, but connects with them in turn as it is switched.

If you continue methodically from one component to the next, the rewire should present no problems. Run all the cables, including one from the earthing bolt, to the headlamp shell. I take an

Which cable do I need?

The standard cable numbering system gives information on the number of strands and their diameter. For example, a heavy cable, suitable for battery feed and ammeter connections, would be a 44/0.30. This has 44 strands of .30mm diameter wire, with a total cross sectional area of 3.0mm². Its current-carrying capacity is 27.5 amps. For side and tail lights use a 14/0.30 which has a capacity of 8.75 amps. Headlamps need a heavier cable like 28/0.30 with a capacity of 17.5 amps.



Buyer's guide

Armour Motor Products, 784 Wimborne Road, Bournemouth BH9 2HS (0202 519409). Complete wiring harnesses for British classics.

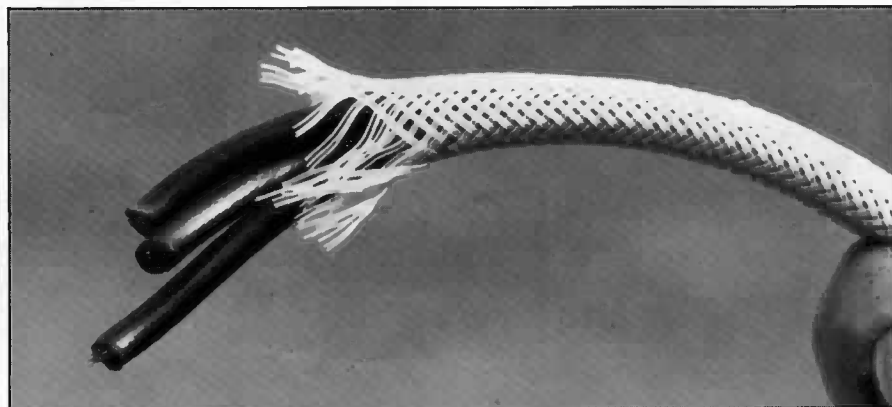
Maplin Electronics. Catalogue from W H Smith or by calling 0702 554161 with your credit card number. Meters, cable, sleeving and fittings.

Merv Plastics 201 Station Road, Beeston, Notts NG9 2AB. Send your address and a 1st or 2nd class postage stamp for a free catalogue of wiring materials and helpful information.

Motorcycle Electrical Services Unit 10, Ladbroke Park Industrial Estate, Millers Road, Warwick CV34 5AE. Manufacturers of wiring harnesses.

◀ **Self-amalgamating tape stretches to form a neat, tough outer layer when wrapped around the wiring harness.**

▼ **Braided sleeving in nylon or glass fibre is the modern alternative to cotton. The extra protection of an outer sleeve around the steering head is still vital.**



earth back to one of the studs on the rear light, too. Add a couple of spare wires to the main harness. There's nothing more annoying than having to add an external wire after you've bound up the harness.

Self-amalgamating tape forms a neat, tough outer layer when wrapped round the harness. Start with the auxiliary leads and work in towards the main harness. The final run of tape along the main bundle will trap all the loose ends. Follow up with short lengths of heat-shrink tubing where the separate wires emerge from the main wrapping at each component. For the best of both worlds — a similar look to a cotton-covered harness with modern materials — use braided sleeving in nylon or glass fibre. The extra protection of a heavy sleeve is still essential where the main loom runs out from under the tank and into the headlamp shell.

Now choose and fit terminals to suit

each component. Detachable parts like the headlight bayonet and rear light will also need connectors, and here the choice is yours. The bullet type is still available in crimp or solder-on form. Whatever you use, a smear of petroleum jelly will help to prevent corrosion.

When all the components are connected and your earthing point has a good contact with the frame, join up the battery after consulting your wiring diagram or personal preference for positive of negative earth. Nothing you have done so far will be affected by this except the ammeter, and if that shows a charge when you switch on the headlight and touch the flying lead of the fuse to the non-earth side of the battery, simply swap over all the ammeter connections.

Finally, test each of the power users in turn. If everything works without any smells of hot plastic or a blown fuse, you did it! Believe me, you'll have no trouble at all with that charging circuitry. ■