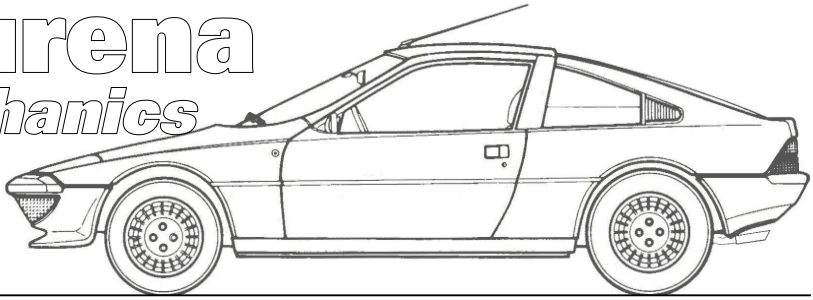
Murena mechanics

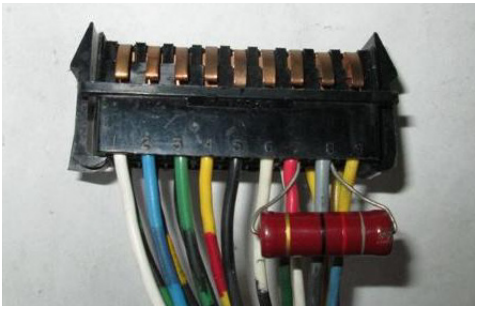


Roy Gillard

Ignition System Resistor

Every one knows that when you first turn on the ignition, the ignition warning light should glow brightly, and then once you start the engine it should go out. However, have you ever noticed how the Bagheera and Murena ignition warning lights are fractionally slower to come on and get to full brightness? You have to watch carefully for this tiny difference but it certainly does not come on immediately at full brightness, like normal ignition warning lights, and it is significant.

So what is the reason for this anomalous behaviour? Well, if any owner has had the instrument panel out, they should have seen that there is a resistor wired across the warning light connections, at the back of the plug that fits into the instrument panel. Why is it there? What is it for? Unfortunately, I have never seen or found any explanation in the workshop manual or amongst the Matra literature for this fitting, but I have a creditable theory; although if anyone has a better explanation, then I would be pleased to hear it.



Self energising alternators

First, there is something that many of you may not understand. The self contained alternators on most modern 12 volt vehicles initially require some current to start them working, and that is provided by the current that flows through ignition warning light. Once started they become self-energising afterwards. (24 volt systems can differ and it is not always the same in their case) This means that if the warning light is blown or not fitted for example, the alternator cannot work. However, even if the bulb is working, the alternator requires a particular current to energise itself, and therefore a minimum warning light bulb rating. For many years the warning light bulbs were 2.2 to 3 watt rating. This used to be the standard size bulb for instrument illumination and warning lights.

Possible reason for the resistor

Recently though, with the advent of smaller instruments and therefore smaller warning lights, the bulb sizes have also dropped. This means that their wattage has reduced too. The heat generated by a 3w bulb would probably be too much for the close surroundings in these compact instrument panels and would melt the plastic and

possibly cause a fire. Commonly the bulbs are now capless type 1.2w bulbs. These are fine for general illumination or the other warning lights but their current flow is insufficient for energising the alternators used. The manufacturer has therefore wired a resistor in parallel with the bulb to provide the necessary current. Both must be connected and in working order if your charging system is to energize properly.

It is this resistor that causes the slightly different ignition warning light effect since as you turn on the ignition, some of the current flows through the resistor as well as the bulb and therefore the bulb is slower to achieve its full brightness.

If the warning light bulb is blown or not fitted for some reason, or more likely the wires of the capless bulb are bent out of position and not making contact, the resistor will still provides a circuit to the alternator, and therefore some current, but it will probably be insufficient to get the alternator charging properly. However, since you don't have a working warning light, you can't immediately see that the system is not charging correctly*.

So if you seem to have a problem with the battery going flat even with the car in use, and you assume being charged, the first thing you should do is, using a decent multi -meter, measure the voltage across the battery when the engine is running. It should be between 13.4 and 14.4 volts. If it is, then you need to have the battery checked, especially if it is a few years old. If you can check the fluid level, then do, but many are now sealed so you cannot do that.

However, if the 'charging' voltage is lower than 13.4 volts you need to find out why as there is a fault in the charging system. It could be a poor connection in the wiring, or the alternator, most likely the voltage regulator, but first you should check the ignition warning light. Does it actually come on? Sometimes we get in and start up so quickly and it has become so automatic, that we fail to notice the bulb never actually came on! As you can now see from the preceding explanation, an unconnected or blown bulb may be all that is at fault.

Bulbs you can check fairly easily by sight or substitution, but the resistor needs an ohmmeter to check properly. However a simple test is to remove the bulb and check if you still have a circuit between the two sides (with the plug removed). If you do, the chances are it may be fine, but the resistance value really should be checked.

This resistor is shown on the original factory master wiring diagrams, but it was missing in the workshop manual and consequently I never found it on any of the early copies that became available.

This was one reason I drew up my own wiring diagrams. I had also found some mistakes even in the original diagrams along with the fact that there simply were not enough diagrams to cover all the options or differences throughout the life of the Murena.

Instrument meters

*Earlier I stated that if the bulb was not working, we cannot immediately see if the charging system is working or not. You might say 'but the Bagheera and Murena are fitted with a small charge meter'. The problem is that these are not proper voltmeters. They are short scale damped (and approx.) voltage indicators.

Owing to the design and damping they rarely shows true voltage, unless that voltage has remained the same for some length of time, and even then they are not always that accurate. This is the main reasons they rarely have a scale printed on them. In our short scale version, they only read between about 10 and 17 volts. They might have red and/or green segments, to indicate where the pointer should be, but when we need to diagnose any electrical system problems, technicians **always** use proper meters to see the actual readings.

You may have noticed for example that when something that draws a large current is switch on, such as the radiator cooling fan, or the heated rear window, or even the headlights, the meter needle drops often into the 'red' zone. That is usually because the poor connections in the system have reduced the voltage getting to the meter. If you were to check the voltage at the battery at that moment you would find it is still being charged correctly!

I have more than once checked a Murena electrical system and found a loss of as much as 2 volts between the battery voltage and what the voltage indicator is reading! This is why you cannot totally rely on it. In every case, by cleaning and re-tensioning every connection in between the battery and the instrument panel, the meter has started reading higher and more accurately. So this is something every owner could do to improve their car.

Charging System

There is one more thing that you should understand about car charging systems. Although this does not happen as often as a complete failure to charge, when an ignition warning light glows, it can indicate an over-charging failure. You may indeed notice the charge meter going high, not low.

(I experienced this only recently in my Espace and just as the voltage started to shoot up, so the headlights got brighter and brighter until they both blew simultaneously! It happened so quickly I could do nothing to prevent it.)

If the car was fitted with a proper ammeter like we used to have in cars before the seventies, you would see this effect more easily. As the bulb starts glowing, the ammeter would swing, but it could go positive as well as negative!

Why do we no longer have ammeters? Partly it is down to the high current outputs we now have from our charging systems, the way ammeters work, and the way they have to be wired, but in the end it all comes down to cost, as with many lowered standards or reduced fittings.

The ignition warning light bulb is like a current flow meter, so if current flows **either** way it will light up. This happens when the voltage is higher one side than the other. Generally if the alternator starts failing, and the voltage on that side drops, then with the higher battery voltage on the other side, current will flow and the bulb illuminates. The less voltage the alternator is putting out the brighter the bulbs glows.

However, the same applies but in reverse if the alternator starts overcharging. That side of the bulb will now be higher than the battery voltage side, so current will again flow through the bulb but this time in the opposite direction. The higher the over-charge the more the bulb glows. You might ask why the higher voltage from the

alternator does not make the battery voltage higher and therefore the voltage both sides of the bulb remain equal. It is simply that the battery has a large capacity and so it does not change quickly, so the nominal voltage remains for some time. Yes, it would eventually creep up but the alternator change is immediate.

Any over-charging for any length of time, will heat the battery and boil away the fluid and buckle the plates, It can also damage voltage sensitive things like radios, so these should be switched off immediately. Even switched off, anything that has a live feed would still be subjected to the high voltage, but our cars have little or nothing that would be affected, unlike say a modern car with all their electronics.

Modifications

Often, especially with older cars like ours where it is generally easier, owners add electrical accessories or make other 'improvements', which change or add to the wiring. If you do this, please, **please**, make a note and hopefully a drawing of your wiring modifications and keep them with the car. If ever you or someone else has to diagnose an electrical problem, there is nothing worse than seeing lots of non-standard wiring and nothing to indicate what has been done!

I might even incorporate it into one of my wiring diagrams for you, if it has been done properly, and you ask nicely.

(On a similar vein, if you change the body colour, **please** make a note of the new paint colour code in the handbook, as this will be invaluable to any subsequent owner.)

Roy Gillard.

Espace automobiles Matra

Museum Opening times:
It is open all year round, except 1st January 1st May and 25th December. It is open every day except Tuesdays.

Mon. to Friday 09.00 - 12.00 14.00 - 18.00
Sat. & Sunday 10.00 - 12.00 14.00 - 18.00

Tickets: €6.00 per person
Groups of 15 persons: €4.00 per person
Over 15 persons: 1 free entry
Child: 8yrs to 16yrs: €4.00
(*details correct at time of print*)

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Murena Wiring Diagrams

My wiring diagrams are accurate, coloured, A4 size and laminated. I will produce a diagram specific to your car whether Murena 1.6, 2.2, early or late and maybe a German specification. or an 'S'; so please contact me and specify exactly what you have.

Roy Gillard.