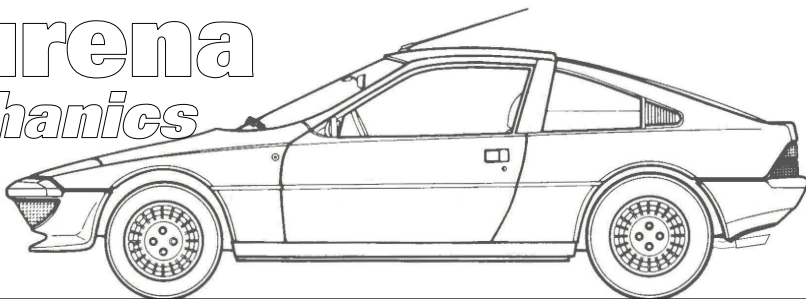


Murena

mechanics

Roy Gillard



Murena Ignition and power

First, a general run down. The 1.6 is fitted with an electronic Bosch distributor with part number 0.237.020.039 which has an LED and pickup mounted on the base plate, and a trigger plate is fitted to the rotor shaft just below the rotor arm. Four wide 'fingers' hang down from this plate and as the shaft rotates each finger will pass between the LED and pickup, triggering the amplifier to switch the coil off and cause a spark. The width of those fingers sets the dwell angle.

On the 1.6 (and 2.2) the base plates are similar to those used earlier with contact points in so far as they can be rotated slightly to adjust the timing. They have the centrifugal sprung 'bob-weight' system underneath, to advance the timing as the revs increase and also a vacuum diaphragm mounted on the side of the distributor to advance the timing with inlet vacuum changes. These two auto advance systems set the timing advance curves using calibrated springs and maximum advance limits for the respective engines.

Service requirements are that you should remove the rotor arm and put a few drops of oil down the centre of the rotor shaft occasionally to lubricate the mechanical advance system at the bottom otherwise it will eventually seize up.

A fault I have come across with the 1.6 model was that owing to the bushes for the centre shaft wearing badly, the shaft was oscillating as it rotated, and two of the fingers wore away and broke off because they were rubbing as they went through the narrow gap between the LED and the pickup. Check here for any excess play.

Murena 2.2

The Murena 2.2 distributor, part number 0.237.002.069 is similar but now the base plate has four fingers sticking upwards, and the four thin fingers hanging down from the rotating plate (the Reluctor) will simultaneously align with the four fingers of the base plate, every 90 degrees, and that will trigger the amplifier to switch off the coil and cause a spark. Instead of the LED and pickup there is a coil around the shaft with the base fingers, that creates a magnetic field and as the fingers align, a signal to the amplifier is triggered.

This distributor has a similar centrifugal auto-advance system underneath, and a vacuum diaphragm on the side of the body, and the same requirement in-service of lubricating the advance mechanism via the centre shaft, so please don't forget this. This oiling was previously done whilst replacing the contact points, but with these electronic versions not needing this regular replacement, oiling is often forgotten.

Murena 2.2S

The Murena S is fitted with a Ducellier distributor, part number 525405a or b and is similar to the Ducellier distributors fitted to the late Tagora 2.2 engines. Since there were only 480 Murena 'S' made, and there are only a few in the U.K. I don't have sufficient experience with these to know of any common faults with them.

Importance of Earthing

As with any electronics, the signals are tiny, and need to be protected from interference, so the wiring is shielded and the shielding needs to be earthed. Also the amplifiers need a good earth, and good contact with the mounting plate or chassis to take their heat away, so the back of the amplifier usually has a smear of heat paste to provide a good path for the amplifier heat to drain away to the mounting plate. This can dry out after time and reduce the effectiveness.

If you have any problems with the ignition system creating a decent spark, then you should first check the plugs, H.T. Leads, coil and wiring, as you would on any petrol ignition system. Make sure that these are in good condition, and please note the coil rating is different on the 1.6 and 2.2 and they are also different to those on non-electronic systems, so make sure you have the correct ignition coil.

In addition you need to check all the engine and ignition earthing points, and the amplifier mounting, probably renewing the amplifier rear coating of heat paste. When checking and cleaning all the earthing points to the chassis you need to clean back to bare metal since the galvanising can degrade this contact over time. One common place is where the engine wiring loom fastens to the chassis.

Advantages of electronic ignition

Unlike the previous 'points and condenser' designs, there can be no burning of the switching contacts, or wear of the heel that meant the gap got smaller over time. The great thing with electronic ignition is the consistent accurate timing and switching of the coil, and the timing should never alter.

Usually this is the case, and once the distributor has been clamped to give accurate timing, there is no maintenance required other than a few drops of oil down the centre shaft, say every 15,000 kms, and checks to make sure the clamp is still tight, and occasionally the diaphragm should be checked to make sure that it hasn't split.

As the diaphragm is connected to the carburettor and open to the intake manifold any time the throttle is open, any air leak owing to the distributor vacuum diaphragm being split, will not only mean the vacuum advance cannot work, but that there is a slight air leak that will weaken the fuel mixture going in to the engine. In just the same way that an air leak on the vacuum head light raise and lower system will cause a weak mixture, these need to be avoided as weak mixtures burn hotter and can eventually cause engine damage.

Now as long as the distributor clamp is tight, the timing should never alter, but some years ago the performance of my 2.2 engine had deteriorated slightly particularly at high revs, and I found my timing had altered although I couldn't figure out how. I reset it, and all seemed well and I assumed the distributor had just moved slightly so re-tightened the clamp and continued for a while. However, after a time the same thing occurred and again the timing had altered yet I still couldn't see how.

The Reluctor

On initial examination of the Reluctor, it was tight on the rotor shaft and appeared to be keyed to it. The shaft has a small groove down it, and a small round pin locked the Reluctor mounting to the shaft. However, I noticed that when the fingers were all aligned, so it was at the firing point, the rotor arm was no longer close to a segment in the distributor cap, and thus any transmission of the pulse from the rotor arm tip to the cap segments would involve a large jump, which then meant the power left for a spark at the plug was greatly diminished. I re-checked the security of the finger plate and it was tight.

I decided to check another 2.2 distributor to confirm that the trigger fingers, rotor arm and alignment with the cap segments should all correspond, and they did. That meant that my Reluctor had moved, but how if it was keyed to the shaft? On closer inspection, I found that the Reluctor was not itself keyed to the shaft, but it was fitted to a bush which was actually the part keyed to the shaft! So it had started to slip around on the bush, probably when the engine was really hot and the metal had expanded slightly. When cold it felt really secure.

I managed by carefully use of force, to rotate it back into the correct position, but you have to be very careful here as it would be easy to bend the fingers. Once back in the rough position of where they should be, I had to reset the timing which I had altered previously. A quick road test proved that the engine was fine again and producing all its power even at high revs.

I have since found a number of cars with this same problem, and it appears these faulty Reluctors were a known issue.

And it is not just the 2.2 Murena here, but with other cars fitted with variations of that Bosch distributor that had the same Reluctor plate, such as certain BMW, Mercedes and Volvo cars. Consequently there was a repair kit available at the time in the eighties. Now these are generally no longer available of course!

A few kits can still be found occasionally, either in Germany or the U.S.A. so if your plate is faulty and you cannot get the fingers back into the right position without damaging it, it may be still possible to get a new plate to correct the fault.

Once the Reluctor is back in the right position you need to secure it from moving again, and this can be done in a number of ways, but I would also suggest marking it in such a way that you can easily see if it ever moves again. One way would be to put a small white line across the finger plate and bush, with paint, or maybe a small carefully scratched line.

To secure it from moving, you could possibly use some Superglue dribbled into the join between the finger plate and bush, or if you are prepared to remove the Reluctor plate from the shaft, you can place the centre on a firm surface, and then flatten the bush edge onto the finger plate with a pin punch to lock them together. Possibly tapping a centre punch into the join such that it squashes the edges together should also have the same effect.

Since this Reluctor moving out of position is such an unusual and rare fault, I have now produced another technical article with pictures, to show it in more detail. Check out the Reluctor article.

Cont. over

Talking of the rev range brings me to the specifications of the Murena and the true power figures. If the engines are standard, then officially the 1.6 peaks at 65.74 kW at 5,400 rpm and the 2.2 at 84.32 kW at 5,800 rpm. This means that the power falls off above those revolutions and you need to change up a gear to continue to accelerate as quickly as possible.

You may have read in the very early road tests that these cars were taken to the 'red line' which is marked on the rev counter at 6,250 rpm but **no** standard engine can reach those revolutions in practice. Consider that the 1.6 would have to go a long way passed its peak of 5,400 to reach 6,250 rpm and even the 2.2 would have to go another 450 rpm to reach the red line! So either those test cars were not standard or the rev counters were exaggerating the true revs, or there were other reasons, even possibly the testers using 'journalistic licence'!

Once you exceed the power peak revs on **any** engine, the power drops off rapidly and any acceleration diminishes, and the acceleration is quicker in the next higher gear as the revs drop back into the climbing power band of the engine.

Now if the engine has had the standard camshaft changed and replaced for one with a better profile, then the engine should be able to breathe better and the rev range will generally increase. As an example, the Holbay Tornado camshaft profile on the 2.2 is sufficient not only increase the engine power but it will raise the revs where the peak occurs and it will easily rev above 6,000 rpm and even above the 6,250 rpm red line if you are not careful! No doubt something similar will result from a better camshaft fitted to the 1.6 engine.

Flywheel mass

The reason a flywheel is heavy is to smooth out the 4-cylinder engine power pulses, but the standard 2.2 Murena one which is the standard Tagora 2.2 one, is too heavy. Therefore a second improvement in real road performance can be done by lowering the weight of the flywheel.

The rate of engine rev pick up will improve if the flywheel is lightened, as it has less mass to spin up compared to the standard heavy Tagora saloon car one fitted. Matra themselves understood that to improve the performance of those last 480 cars they called the Murena S, they needed to include lightening the flywheel along with the other changes they made.

So if you are doing any work to the engine or power unit that involves removing the transaxle, even changing a clutch, then that is the time to remove the flywheel and have it lightened. Even a totally standard 2.2 will feel better with a lightened flywheel!

As an example of how much can be taken off, the 10 kg weight of a standard Tagora and Murena 2.2 flywheel can comfortably be reduced to 7 kg without harming the idle speed smoothness. I know this as I had it done many years ago on mine, and have been using it ever since. I have also done it on other engine re-builds and all the owners can sense the improvement.

So even if you only change the camshaft and lighten the flywheel of a 2.2 it will feel much quicker, even without any carburation modifications. However, once you have a better camshaft, carburettor and exhaust changes can improve it further.

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