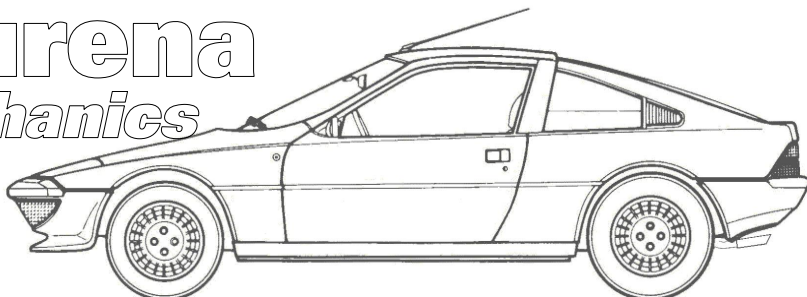


# Murena *mechanics*

Roy Gillard



## **Hand Brake Cables**

As some of you will know there are supposed to be three hand brake cables that fit various Murena. There are two listed for the 1.6 model and one for the 2.2 model.

There had to be something different other than length surely? However, they appear to be simply different lengths, but why? This has always puzzled me. It would have been useful to measure the various cars as well as cables to find out why they needed different cables, and I'm surprised none of the suppliers appears to have done this.

The rear brakes on both models are exactly the same. The 2.2 uses a slightly larger diameter disc, but that would have no bearing on the hand brake cable at all. The calipers and brackets that attach the cable to them are the same, the wheel base is the same, the hand brake lever and mounting are the same, and although the semi-trailing arms are a different design the only real difference is the track on the 2.2 is 20mm wider than the 1.6, which again would have no bearing on the hand brake cable.

The only possible reason for needing different length cables could have been altered forward mountings for the outer cables. Now that might be the case between early production 1.6 models, and later ones, but why is the 2.2 different?

## **Cable design**

When you have a cable made up of an inner cable and outer sleeve, the difference in length can be said to be the working portion. For instance, say we had an inner cable 2000 mm long and the outer sleeve was 1000 mm long. The working section is therefore 1000 mm. Now if you made the inner cable 1950 mm long (50 mm too short, possibly by mistake) provided it would still reach both items comfortably that it was meant to connect, if you made the outer sleeve short by the same amount, it would function exactly the same.

Similarly if you made the inner and outer say 50 mm longer than the original, it would still have that 1000 mm working portion and therefore function correctly just as if it was the 'correct' size.

However, if you had an inner cable too long but with the correct outer sleeve length, then you would have excess slack that would have to be compensated for, if possible. Alternatively if the inner was too short but the outer the correct length then the inner might not reach or be able to get the full range from minimum to maximum for whatever the cable operates.

Since no two cables are always exactly the same, it is one reason for some adjustment, to compensate for slight differences.

In the case of the Murena hand brake cables, the outer section is actually in two sections, but that does not alter the overall effect of the previously explained design.

The Murena inner cable has to reach from the caliper lever on one side, to wrap around the curved compensator attached to the hand brake lever via the adjustable rod, and back to the other caliper lever on the other side. This requires approximately 2.3 m of inner cable. The outer sections that fit between the brackets on the calipers and the clamping points on the chassis either side need to be roughly 650 mm long.

Now I have measured a few cables recently and been given a few measurements from others too, and for both 1.6 and 2.2 models; so what have I found? I have found that the working portion is 1012 mm plus or minus 8 mm for **all** these cables whether they have been supposedly for 1.6 or 2.2 models! Yes they have been different lengths of inners and outers for each model, but the working lengths were to all intents and purposes the same. Which is what I would expect as the cars are the same!

So one 1.6 cable for instance was 2270 mm with two 625 mm outer sections, giving a working length of 1020 mm (2270 minus twice 625) whilst a 2.2 cable was 2385 mm with two 690 mm outer sections giving a working length of 1005 mm. The difference in working lengths of just 15 mm or roughly half an inch is neither here nor there for a hand brake cable and can be compensated for on the adjuster.

Furthermore, I have not found any consistency between any of the cables I have measured so far - they are all slightly different!

## **Conclusion**

This seems to point to the conclusion that really one hand brake cable should fit all Murena no matter whether they are 1.6 or 2.2 models, certainly for all the post February 1981 cars. Maybe the very early 1.6 produced up until the 2.2 came out were different for some reason but I am yet to be convinced. I believe this was a mistake made possibly because someone measured a 1.6 and someone else measured a 2.2 and came to different lengths because they used different outer section lengths but never compared the two working lengths!

As you should all know by now the hand brake cable should be really free to move so that it does not impede the caliper levers from returning to their stops after use.

The original cable has the normal multi-strand inner metal cable running in a spiral wound outer metal cable that is wrapped in a plastic sleeve. Over time the plastic sleeve cracks and water gets in to the outer cable, and whilst the car sits unused or the hand brake is not used, the inner and outer cable corrode together, and the friction increases to the point where they become seized together. Sometimes the strands of the inner cable break and also help to jam the inner cable inside the outer cable.

Many years ago when things were designed to be maintained rather than thrown away, we had many things you could grease regularly at service intervals to keep them from deteriorating rapidly. Mechanics got lazy and didn't do the servicing properly often because greasing was considered messy, and owners who did their own servicing did the same. In time manufacturers decided it was also cheaper and stopped fitting grease nipples.

Even worse is that many things assembled by the manufacturers are done dry or with far too little grease, leading to easy corrosion and premature failure.

### **Better cables**

Many years ago I had a new hand brake cable made up for my Murena, rather than buy an 'off-the-shelf' item, because I could have a greaser included in the specification.

I could then grease the cable regularly which keeps the water out even if the plastic sleeve cracks, and keeps the inner cable sliding freely, giving you a smoother hand brake; plus it allows the calipers to work correctly so they self adjust correctly, and provided the calipers have also been overhauled correctly, the system will last years with very little maintenance.

Now I believe that we only need one size hand brake cable for all models, with the possible exception of the very early 1980 cars, although even these may not need to be different, but I need to take some measurements from one to make sure. If I am correct, then with only one cable required, we can standardise on one specification and if we include the greaser on each side, everyone will have a better hand brake cable.

The current cost is around £60 which is still less than the cost of an original from the usual sources without greasers, and you are getting a better product. Bagheera ones are virtually the same, just different dimensions. You do need to grease them occasionally of course, but surely that is better than having sticking brakes and having to replace pads and overhaul things far too often.

*Roy Gillard*

# Rear Brake Limiter Valve

### **Rear Brake Limiters**

I have had a couple of references to these from club members, so I thought I'd explain for those not aware how they work or why.

Limiters are necessary on cars without anti-lock braking. There are two valve types, the totally sealed valve used mostly on cars, and the lever arm operated types mostly used on vans and trucks but also used on some cars like the Espace as one example.

For the sealed type as used on the Bagheera, Murena and most small cars, it is a valve which is spring loaded open and when the brake fluid force in exceeds the spring force, the valve closes and shuts off any more brake force to the rear brakes. Hence it 'limits' the rear braking to stop the normally lightly loaded wheels locking.

The springs and porting are decided by the manufacturer and will work well for most situations but as they are set at design stage and are not variable, they won't stop the rear brakes locking under all situations, or allow maximum braking when conditions would allow greater force. Obviously they are a compromise.

This is one reason though for the better braking on the mid-engined Bagheera and Murena. Their rear drive combined with the greater proportion of the cars weight, allows a higher setting of this valve and more rear braking.

They don't usually fail provided there is fluid in the system which is changed regularly to get rid of moisture, but if left open to atmosphere or the fluid is so old there is lots of water in the system, then they can corrode and seize like anything else. Now you see another reason to change the brake fluid regularly.

The lever arm operated limiters are obviously similar except that the spring pressure can be varied by the movement of the arm. This allows the amount of braking force to the rear to be varied to suit a greater range of conditions.

So if the vehicle is fully loaded for example meaning there is a greater weight on the rear wheels, these can take a greater braking force before locking up. Under these conditions the arm will have rotated as it is linked to the body, which will be lower owing to the greater weight, and this delays the point at which the valve will cut off the brake fluid to the rear brakes.

You can see why these limiters are used more on SUVs, vans & trucks. These have a much greater disparity between empty and loaded weights, and therefore a much greater difference between the min. and max. braking force that can be acceptable.

With these limiters, they can fail if the link to the arm breaks or the arm rotation begins to seize, so these need a little maintenance to make sure they continue to work well.

Since anti-lock braking uses wheel sensors to detect when a wheel is about to lock, these systems don't need this valve as the control module will limit the brake pressure to any wheel about to lock.

*Roy Gillard*



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## **Murena Wiring Diagrams**

My wiring diagrams are accurate, coloured, A4 size and laminated. I have early or late Murena 1.6, 2.2 or 'S', with speakers in footwells or doors, and even German spec. versions so please specify exactly which you require.

*Roy Gillard.*