Connoisseur Models On Line Catalogue Print Off
Motor & Gears Instructions, Hints & Tips Sheet

MASHIMA 1833 MOTOR & QUALITY 40/1 GEARSET

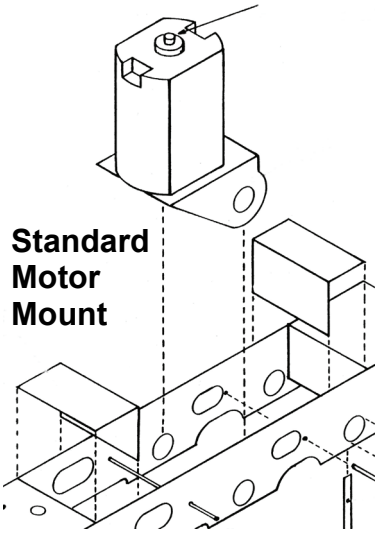
Pack Contains

Mashima 1833 Motor With Mounting Screws

Quality Cut Brass Axle Gear Wheel With Grub Screw Fixing

Quality Cut Steel Worm Gear With Grub Screw Fixing

Comprehensive Instructions



CONNOISSEUR MODELS MOTOR AND 40/1 GEAR SET INSTRUCTIONS

Setting up a motor and gear set to run sweetly is something of a black art that is mainly done by feel and experience. Knowing this is not a lot of use to you if this is your first loco, I hope that the following notes will be helpful.

Motor Mounts

Etched motor mounts tend to come in two different types. The fixed type are designed to be soldered solid between the frames and in effect become an extra frame spacer that gives rigidity at the most important part of the chassis. The majority of Connoisseur loco kits use this type.

They have fold down wings with holes in that fit over the bearings. The purpose of these wings is only to set the flat motor mounting plate at the correct distance away from the axle. It is important to solder the flat mounting plate to each chassis side with a good fillet of solder (if the mounting plate is slightly narrower than the chassis, fit a length of brass wire or waste etch to bridge the gap).

It is important that the mounting plate is as solid and rigid as possible. Some people just secure the motor mount by soldering the wings at the axle bearings. The problem with this is that the mount can flex when the motor has a heavy load applied and the gears try to climb out of mesh. An indication of this is when the loco runs sweetly in one direction but makes a loud grinding noise in the other direction. The gears will soon strip (the tops of the teeth will soon be knocked over or chipped off).

The other type is the floating or axle hung mount. This is narrower and designed to fit between the axle bearings, secured by the axle passing through it and the motor is restrained by a blob of silicon bath sealant on a strip fitted across the frames. The idea is that the sealant allows the motor to float and gives quieter running. I have never been convinced about this and prefer to solder this type of mount solidly to the side frames using strips of brass angle to bridge the gap. But some people swear by the floating motor method. Some of my Claymore kits use this type of mount.

I will describe the procedure for setting up a motor using my standard fixed mount, but most of the procedures are relevant to using a floating mount.

Motor Position and Angle

I suggest you build a locos body and chassis together. As construction progresses you can fit the two together to check clearances and spot potential trouble. The best point of construction at which to determine the position of the motor is when you have a basic chassis with axle bearings (unsoldered) and wheels fitted and the body at the point where the boiler is made up but not yet fitted.

Remove the driving axle and bearings. Offer the flat motor mount to the front of the motor to check that the slotted fixing holes match the holes in the motor and that the fixing screws will be easy to fit. If necessary slightly widen the slots or remove any etching cusp with a fine round file. Temporarily fit the worm onto the motor shaft and check that it will pass freely through the hole. If not file a nick into the hole to clear the grub screw. Open up with a tapered reamer the holes in the wings so that the axle bearings are a snug fit. Fold up the motor mount and temporarily screw the motor into place. Slip the motor mount between the frames and secure by fitting the axle bearings and a lightly oiled axle.

Offer the body and chassis together. You should now be able to rotate the motor/mount around the axle bearings until you find the correct angle for the motor. With the boiler removable you should be able to check that the back motor shaft and the pick up leads will not foul the underside of the boiler. With some locos it will be necessary to shorten the back motor shaft. This is best cut down with a slitting disc in your mini drill. Clamp the front shaft of the motor in the vice and make small nibbles (as if you were chopping a tree with an axe) into the back shaft with the slitting disc. In this way there is less risk of the disc snatching and shattering unlike trying to cut through in one go.

Once you are happy with the position of the motor. Spot solder the mount to a side frame to prevent it moving and then remove the motor. Now solder the axle bearings into place. You will need to reduce the side play on this driving axle to about $^1/_2$mm to enable the gear wheel to stay in mesh. Some kits include packing washers to pack out the bearings from the chassis sides but I find these a little fiddly to use. I prefer to slide the bearings out on the axle and then solder them proud of the chassis sides. If you use plenty of flux the solder will flow through the side frame holes and secure the motor mount. Then solder the top of the mount to each side frame with a seam of solder. As construction progresses ensure that the chassis can be pushed along with light finger pressure without the wheels and coupling rods binding up and skidding. There should then be no problems with fitting the motor and

pickups after painting the chassis.

Fitting the Motor and Gears

First stand the motor upright and put a spot of light oil (many tool merchants sell small hypodermic tubes filled with sewing machine oil) onto the front bearing and leave to soak in. I find that when the motor is new this bearing requires oiling two or three times over a short period and then it seems to hold the oil and only require oiling occasionally.

Fit plunger pickups and then fit wheels and axles into the chassis with the brass gear wheel mounted centrally on the driving axle. Some people file a flat onto the axle to allow the grub screw to get a better grip. Don't fit the coupling rods yet.

Fit worm onto motor shaft with grub screw nearest the motor body and leave about $^1/_2$mm gap between worm and motor bearing so that you can get some oil down onto the bearing. There should be a little end float (in and out movement) on the motor shaft. Fit the motor into the mount using the two small screws. You may find that a small jewellers screwdriver that has been magnetised by stroking with a magnet is helpful in picking up and holding the screws.

Wire up the motor to the pickups. Loosen off the grub screw and slide the brass gear out of mesh. Place the chassis on the track and apply a little power. Hopefully the motor should be turning over evenly and smoothly. Now push the chassis along the track, through curves and points, lifting the front or back wheels until you have proved all the pickups. Any hesitation in the motor running will highlight a pickup problem.

Gear Meshing

Centre and screw up the brass axle gear. Slacken off the motor mounting screws and press the worm with your finger down into the teeth of the axle gear. Re-tighten the motor screws. The gears should be hard in mesh with no movement between them. But it is important to have a little movement (backlash). So slacken one mounting screw and slightly twist the motor until there is a little free movement between the teeth of the gears. Then re-tighten the screw. The traditional way of producing backlash was to fold a cigarette paper in half and place this between the two gears as you pushed them together. When the paper was removed this provided the correct amount of gap. I have never bothered with this but it does provide a very good mental image for the sort of clearance we are looking for.

Place the chassis back on the track and apply power. Hopefully the driving wheel set will now be slowly and smoothly revolving with the gears emitting a quiet even noise. If it is a Connoisseur 0-6-0 driving on the centre axle the wheels are lifted just clear of the rail. Or if the drive is on the back axle lift the rear of the chassis up so that the wheels can turn freely. If you notice hesitation of the wheels or a marked rise in gear noise at one point in each wheel revolution back off the gear mesh slightly.

Adjusting A Running Chassis

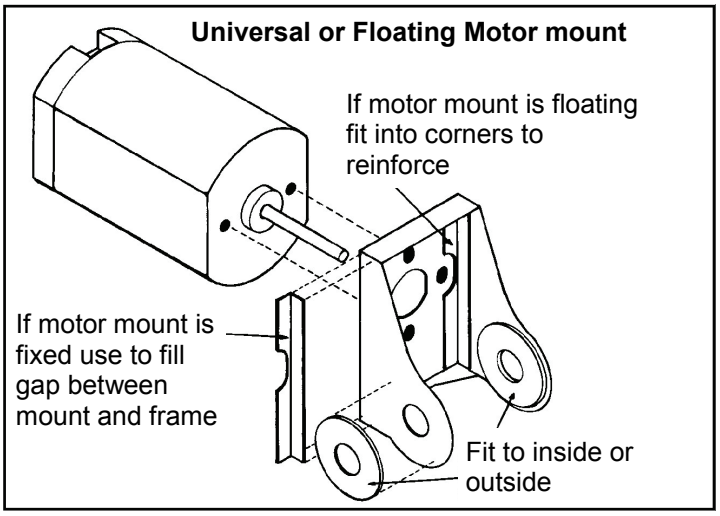
Now fit the coupling rods and place the chassis on the track. Hopefully it will run like a Swiss watch. If there is any hesitation first check that the rods are not binding. Reduce power until the chassis stalls at the tight spot. Prod the chassis on to make sure that it stalls at the same point on the next wheel revolution and then check the rods. You should find that one rod still moves freely in and out on the crankpins (crankpin bushes should be slightly longer than the thickness of the rods) and this side is OK. You should find that the rod on the other side is tight on the crank pins and this is where the problem is. Normally the problem is a crankpin screw that is not square in the wheel. Gently file oval the hole in the rod with a round file until it fits freely onto the crankpins. Refit the rods and check running again.

By getting the chassis running in three stages it helps to highlight a problem area. Now that the motor has some work to do in moving the chassis you can make final adjustments to the gear mesh.

If the mesh is too tight the gears will be noisy and will wear quickly. If too far apart they will be quiet but go very noisy under load as they try to climb out of mesh. This will knock the tops off the teeth and strip the gears. You are looking for a sound like the purr of a contented cat that is the same for each direction of running. Now oil all moving parts. I use light oil for the motor bearings, axle bearings and crankpin bushes. For the worm and gear wheel I prefer heavier oil that will cling around the teeth and I find that car engine oil is very good for the job. Half an hours running in each direction with a train of six or seven wagons should then run everything in nicely. Check that the gears are not wearing. You will probably see pronounced semicircular marks on the brass gear wheel but if you wipe off the oil this should turn out to be bright brass that has been polished by the steel worm and not wear.

There is a bit of a tradition of running in a chassis on the workbench for a number of hours with toothpaste on the gears. This should not be necessary with this quality motor and gear set.

The only slight problem you may experience is with the worm fixing. By necessity the grub screw is very small and the motor shaft is hardened steel. It should provide satisfactory fixing for most locos on most layouts but it is not unknown for a worm to be pulled off a motor shaft when pulling a heavy train. An alternative is to push the worm $^1/_3$ onto the shaft. Then pick up some superglue on a piece of wire and coat the inside bore of the worm. Then push the worm home. The problem is that the worm will then be on for life so I would only recommend this if you were having problems.



Open out the axle holes with a tapered reamer or broach so that an axle is a good fit. Then fold up the motor mount and offer it into place between the turned axle bearings. Depending upon the clearance available fit the large etched washers on the inside or outside. Solder these washers into place with a generous amount of solder so that a small amount runs into the axle hole. Now open out the axle hole again so that it forms a surface for the axle to rotate in. The forces that will be applied to this bearing surface when the loco is running are very small so we don't need heavy turned brass bearings. If fitting a floating motor determine motor position and then fit strip across chassis and secure motor with a blob of silicon.

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