COMET MODELS

MGB1 16mm x 26mm MAXON CORELESS MOTOR CROSSED HELICAL STEEL and PHOSPHOR BRONZE GEARS

This motor/gearbox combination offers the modeller several unique features, including the high power output of a coreless motor and the ability to 'drive-back' offered by crossed helical gears.

PLEASE NOTE

Coreless motors need a smooth DC power supply. A feedback controller will make it 'buzz'. If using it with a DCC chip then the CVs need setting to achieve that smooth supply. The current handling limit of the motor is **0.5A**.

The width of the gears used means that the overall width of the gearbox is 10.7mm. It will fit between the 00 frames of a Comet chassis, but may not fit other kit built locos.

NOTES ON USAGE OF MGB1

MGB1 is a powerful motor/gearbox combination that is suitable for use in large locomotives in 4mm scale. The motor is a 16mm diameter round can and so may not fit into narrow waisted fireboxes such as the Belpaire style found on Great Western locos such as the Castle and King. It will, however, fit in the firebox of LMS Princess and Coronation locos, and will also be ideal for locos such as the LNER A4 and W1 and for unrebuilt SR West Country/Battle of Britain and Merchant Navy locomotives. For other prototypes the modeller is advised to check clearances carefully before committing to fitting the gearbox to the relevant chassis.

The final drive gear in the gearbox has a diameter of approximately 16.5mm. After allowances for clearance over in-track features such as point crossings, that converts to a wheel diameter of approximately 5'0" in 4mm scale and thus the MGB1 cannot be used for models of prototypes with a driving wheel diameter smaller than this.

The motor is rated as 2W output and that high torque is to be welcomed when it is applied to traction, but if the model has a problem such as the valve gear jamming then it may cause further problems by distorting, bending or buckling the valve gear components rather than stalling. It is therefore the modeller's responsibility to ensure that the model is free running and Comet Models can take no responsibility for any damage caused to the model.

Crossed helical gears are intrinsically more efficient than a worm and pinion in terms of energy transmission, in that they transmit approximately 75% of the input power, whereas a worm and pinion transmit approximately 25%. There will be other losses in the gearbox and so this is not a figure to be expected of the gearbox as a whole.

The gearbox has a final reduction ratio of just over 20:1. Although this is less than we are used to in 4mm scale gearboxes the efficiency of the gearbox and motor mean that in trials it has been shown that a chassis can move when a voltage as low as 1V is applied to the motor. The comparatively low top speed of the motor means that a completed model will have a top speed roughly similar to many RTR models.

The use of crossed helical gears means that if the gearbox is correctly assembled then it has the ability to 'drive back', i.e. the motor can be used to turn the model's wheels or the wheels can be turned to rotate the motor. This latter feature is useful during the final painting and detailing of a model, but it also means that if a heavy train is taken down a gradient headed by a loco fitted with an MGB1 then the train will be able to push the loco and there is the risk of a 'runaway'. Take care when driving trains downhill!

ASSEMBLY INSTRUCTIONS

1. Carefully open out the hole in the gearbox etch until the nose of the motor is a close fit. Next open out the axle holes until the bearings are a close fit, and the holes for the 3/32" layshafts. Take care to avoid making the holes too big. Take your time with this and frequently check for fit, removing the minimum of material. This is best done using a five sided broach which will ensure that the holes stay on centre. Please note that if the holes drift off centre the performance of the gearbox will be affected.

2. The motor fixing holes may not need enlarging, but check at this stage and enlarge if necessary. File back any swarf from the motor mounting surface.

3. Check the pre-assembled gears and file flush any protrusion of the stub axles on which they are mounted. Solder the axle bearings in place with the flanges to the ***inside***. The bearings have a short reach so that the outer surface of the gearbox sides is almost flush. If building in 00 then the outer faces should be filed flush.

4. Bend up the gearbox sides and the two top flaps using flat pliers with the half etched line to the ***inside*** of the fold. The top flaps should fit between the sides. Tweak the sides with fingers and check with an engineer's square to ensure that they are both at 90º to the gearbox back plate and also parallel. Take your time to get this right since if the etch is assembled out of square this will affect the performance of the gearbox. When satisfied reinforce the joints with solder.

5. The gearbox can now be washed to remove any flux traces and dried on a radiator or with a hair drier.

6. Using Loctite Studlock or similar, fit the 'worm' on the motor shaft leaving a small space between the end of the worm and the front bearing to allow some end float. Ensure no Loctite enters the motor! Fix the motor in place using the screws provided.

7. Feed a layshaft through the upper holes in the gearbox, threading on the helical gear. There are several options to prevent the layshaft working itself out sideways, such as a small length of 0.5mm wire soldered to the side of the gearbox and bent until it acts as a keeper. Alternatively four washers are included on the gearbox etch that could be secured to the protruding ends of the layshaft on the outside of the gearbox, or the layshaft can be fixed to one gearbox side only using a small drop of superglue or Loctite.

8. The gearbox is a snug fit in a Comet 00 chassis and so the second layshaft will need to be trimmed (using a razor saw or similar) until it will fit between the frames. In most applications the frames themselves will be deep enough to act as keepers to prevent the layshaft working itself out sideways, but if not then use one of the methods described above. EM and P4 modellers have more width available, but should still check that the layshaft fits in the chassis before final assembly. Check for free running of the gearbox.

9. The gearbox can now be fitted into the chassis and the axle and the final drive gear fitted. Before securing the final gear to the driven axle with Loctite check that the gearbox runs freely when power is supplied to the motor. Secure the final gear using the minimum amount of Loctite, ensuring none enters the gearbox bearings.

10. The width of the gears means that there is very little sideplay on the gears in the gearbox and it is essential that there is lubrication between the side faces of the gears and the inside faces of the gearbox, and on the layshafts. Use light oil such as clock oil and not grease or heavy oil. Once the gearbox is in use then periodically refresh this lubrication.

Comet Models is part of Wizard Models Limited, PO Box 70, Barton upon Humber DN18 5XY
Tel 01652 635885, web www.wizardmodels.ltd, e-mail andrew@modelsignals.com

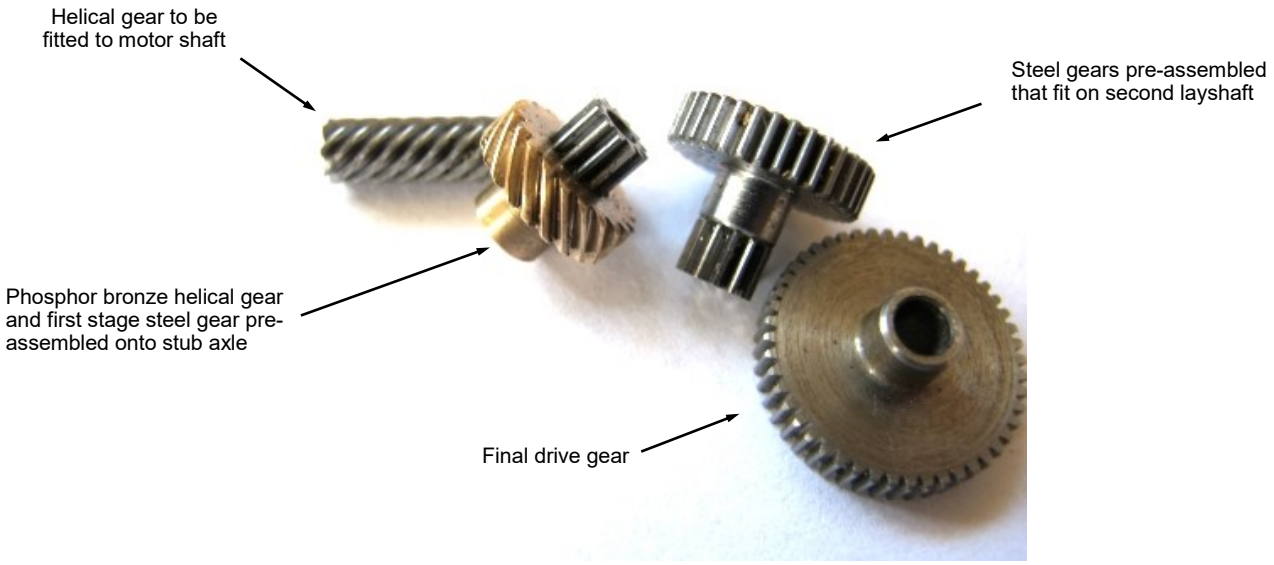

Figure 1 Component gears

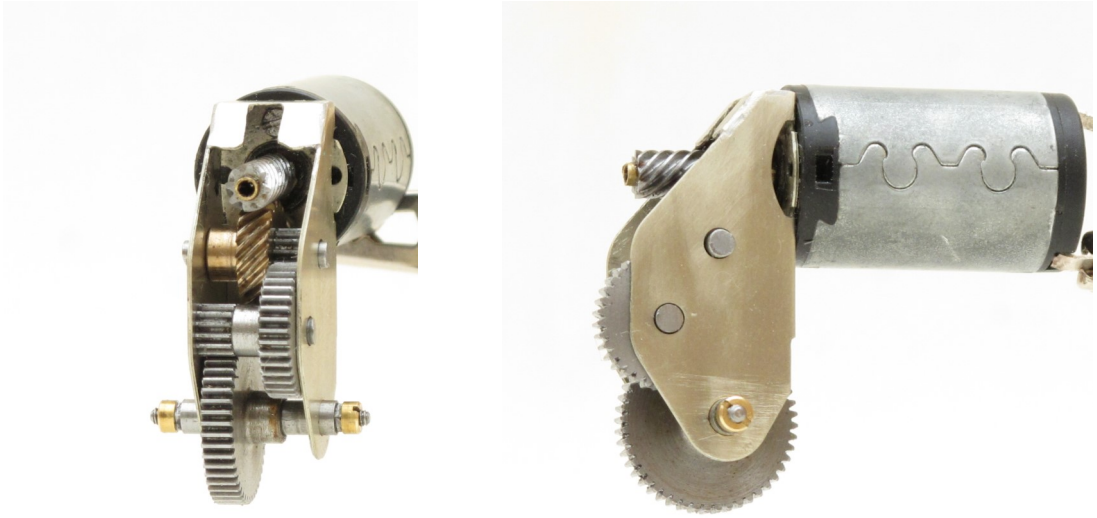

Figure 2 Assembled gearbox and motor

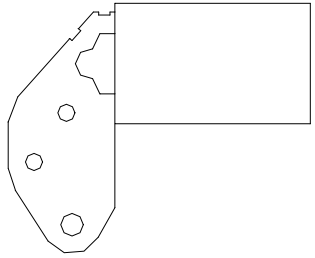

Figure 3 Side view of MGB1 drawn to scale