

Brassmasters Scale Models

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MR/LMS/BR 4F 0-6-0

Prototype notes and instructions

FORWARD

The story of this kit for the 4F did not follow our usual path for our main LMS range of kits; originally it was to be a quick filler between two large LMS engines. It has turned out to be an awful lot more than that and we believe fully justifies the word at the top of this page.

Once we had decided to go for an inside cylinder locomotive with lots of visibility beneath the boiler we had to go for “working” inside motion – not to do this would have left us accused of dereliction of duty to the finescale modeller. Hence we embarked down the path of filling the space between the frames with something more complex than a few frame spacers. We quickly decided that we did not want to use a crank with all that entails on cutting and re-assembling the driven axle; instead we have used etches to simulate the effect of the crank in a way that gives a very convincing representation of the motion. The design is as simple as we can make it such that it is pinned and tabbed together with a minimum of solder. It may seem daunting at first but if you take it slowly step by step it will go together relatively easily.

Our next advance is in the instructions and diagrams accompanying this kit, where we have been accused of failing to come up to standard in one recent review. Here we decided to take advantage of the technology used to create the artwork and go for a completely different approach to that used in the past and by other etched kit manufacturers. When you read to the end of this booklet you will be wondering why we have forgotten to include the instructions. Don't worry – look at the set of drawings and you will see fully labelled and accurate drawings with the step-by-step instructions incorporated on each page. So all you need to look at as you build the model is one sheet of paper at each stage – it's almost like building a plastic kit!!

Finally, if that is not enough we are including a CD with each kit which contains a copy of all the notes and drawings but more importantly, close-up photographs of each stage of assembly and a sample of prototype photographs. As long as you have access to a PC we feel we can do no more.....

As ever, please let us know how you get on with this kit.

John Jennison

LMS/BR 4F 0-6-0 - Assembly instructions

Introduction and general notes

This kit is designed for use in 00 (16.5mm), EM (18.0mm) and P4 (18.83) gauges; all parts are included to enable construction although some modifications may be necessary for closer than scale frames and tight curves, and to allow for over scale wheel flanges. The basic design follows the prototype as closely as possible and therefore some clearances in some cases are tight. Different materials are used as appropriate for the details and strength of individual components

Resin

The smokebox/boiler/firebox are cast in polyurethane resin which is both durable and capable of accurately reproducing complex parts to a high level of fidelity. It can be glued using a high viscosity superglue or two-part epoxy and can be worked very much like polystyrene it easily cut with a razor saw or craft knife, fine wet and dry paper and any epoxy based filler can be used for finishing.

Note: DO NOT WORK ON THE RESIN CASTING NEAR A NAKED FLAME, BECAUSE THE PRODUCTS OF COMBUSTION ARE HIGHLY POISONOUS.

Before painting, a vinegar wash can be used (for approximately 20 minutes) to degrease, alternately "Flash" liquid in warm (not boiling) water is very effective. A ½ paintbrush will help to clean the nooks and crannies which cannot be otherwise be reached. All paints may be used, including cellulose, although enamels are easiest. We recommend an acrylic primer (that supplied by Halfords is very effective), and very light coats with an airbrush to achieve the best finish and retain the fine detail of the casting.

Brass

These parts are supplied on sprues and can be cut from the sprue with side cutters or a small saw and cleaned up with a file. The crossheads will have to be drilled out 1.0mm to accept the piston rod. The use of brass on the piston gland cover is to enable fixing of the slide bars with a higher melt solder than would normally be used.

White Metal Castings

White metal is a soft material, which is easier to clean to a smooth surface than brass castings and is ideal for those smaller parts that require good surface detail, but no great mechanical strength, such as chimney and dome. We have avoided white metal for parts that require soldering, and would suggest cleaning well before fixing with superglue (smaller parts) or epoxy.

Etchings

We have used nickel-silver throughout, since it is much easier than brass to solder and to paint. All bends are on the half etch line except where otherwise stated.

Wherever possible we have included spares of some components to allow for those parts which generally hide in the carpet or as can happen with the inside valve be soldered up solid.

NOTE most rivets on this model are depicted by the use of half etch overlays, but some require embossing from the rear. Although a rivet embossing tool may be used to form the push through rivets the variable spacing sometimes makes this a little difficult. We recommend resting the etch sheet on a piece of lead flashing (available from builders merchants) or hardboard and embossing with a blunt compass or needle.

IMPORTANT - PLEASE READ BEFORE STARTING CONSTRUCTION

The instructions and drawings are a new departure for Brassmasters with the text being included within the drawings. Photographs have been taken of the construction of the test etches and although the test etch photographs show some minor variations they do show the construction of the model. The main difference you may find is in the fold-up spacer that goes under the smoke box; the original specification was for the slide bars to be fitted from the inside of the of the fold up etch however this was revised to be fitted from the outside and held in place with the brass casting covers. Brass castings were used to allow a lot of heat to be used to fix in place when soldering. (photographs of the test building and a selection of photographs of a real locomotive inside valve gear are on the CD)

We do not propose to tell anybody how to build the kit but some times fore warned is fore armed. The test model was built to 18.83mm standard and is not fitted with wheel spacers; there is minimal side play on all wheels and the model will go round somewhere around 3'6" radius curves. To keep the chassis width to a minimum please remove all the cusp from the etch spacers. If more free play is needed in 18.83mm then the model will have to be built with EM spacers. The rivets on the chassis overlay need to be reduced slightly to clear the rear of the crank pin head. The rear of the crankpin head also needs to be reduced to at least flush with the back of the wheel centre boss. Again in 18.83 the representation of the cork bungs on top of the crank bushes have to be kept to a small minimum, they can catch on the footplate on full suspension deflection.

The motor fitted is actually a Portescap 16 x 16 with a modified gearbox, if you need more information please contact us and we will be happy to supply details. The other gearbox used was a small gearbox from Backwoods Miniatures and a small Mashima motor (see photos). The actual wheels to be fitted will be Ultrascale but during construction we used an old set of wheels which allowed the constant removal and checking of the inside valve gear without having to worry about distorting the final driving wheels.

The chassis is built as normal, but the slide bar support spacer after being built up was left loose in the chassis. It can be sprung quite easily from the chassis and you will probably keep need to removing this as you build up the connecting rods and the eccentric rods. It is nigh on impossible to solder up all the forked joints if the spacer is left in the chassis, and it also gives you the chance to keep testing the free play in the rods. You can see from the photos and drawings it looks quite complicated but in practice it is quite easy. Due to the way the slide bar support bracket locks into the chassis and if the crossheads slide freely in the slide bars it may be possible to leave this part loose along with the slide bars to facilitate removal of the whole lot if necessary.

The kit does not pretend to represent the actual working valve gear but is a simulated version designed to allow anyone building the kit to have moving parts between the chassis which closely represent the actual valve gear and connecting rods. The concept is not to split the axle for the cranks; instead we have used a key along a brass tube to drive the cams which allows all the assembly to be continually tested to ensure it runs freely. Don't worry if you have difficulty with the valve gear – just "get off the bus" when you have had enough. In principle you can still build the valve gear up solid and allow the axles to revolve freely in the tube. For fully working inside motion the brass tube can be locked up with a pin through the tube into a hole in the axle or as we have done, soldered a 14BA nut into the key, cleaned it up to the shape of the key and used a 14BA bolt through the key and into a hole in the axle.

The front bearing needs to be reduced to about 3mm in length along with the hornguide; if modellers are not able to do this for themselves this will be done for them on receipt of a stamped addressed envelope and the return of one pair of bearings. The bearing also needs to be profiled as in the drawing this is to clear the slide bars when the suspension is flexed.

Building sequence

The building sequence which we have followed was:-

Chassis and slide bars but without overlays

Slide bar spacer built and checked for fit

Suspension the kit has been designed to have a sprung beam which runs the full length of the chassis. The wire supplied is 0.011 guitar wire but we have also tried 0.014 wire. Both sizes are readily available from a music shop you may like to make your own choice on how heavy you are going to make the model. When fitted the wire is quite substantial and you can do a fair amount of work on the chassis without it distorting the wire, after our test chassis had done the rounds at the exhibitions with everyone playing with it did become quite distorted. If you have no spare wire a piece of 0.33mm wire will hold everything in place until you are ready to fit the spring wire.

Coupling rods but leave tight - just check they fit

Connecting rods - check fit along with cam on the eccentrics building the brass tube and key, the brass tube to be just loose fit between the axle bearings. It may be the ideal moment to fit the 14BA nut at this time if going to use a bolt to locate the tube.

Build eccentric rods for the valve gear and forward and reverse gears both sides. We designed the spacers between all the parts of the valve assembly to use washers as supplied on the fret. However on the test model we used small pieces of tube for the spacers; these were formed in a small mini drill to reduce to the correct length. A small amount of tube is supplied in the kit.

Note on both the eccentrics on the coupling rods and eccentric rods for the reverser the slots in the cam are opposed to each other this will give differential movement for both the connecting rods and reverser. The slots in the cams have been design to fit either way, this is to help with spares as you can see from the parts, one set of the cams are in the shape of a cross this again is for spares just in case everything is soldered up solid. Please refer to the drawing.

The cams are soldered up and held in place with a piece of 0.7mm wire in the countersunk holes - this is more than sufficient. You will find that some solder will run between the parts - flood the outside of the cams with oil when soldering together to prevent everything from being soldered up solid. We have tried to include as many spares parts of the components as possible.

The original chassis did not have much metal above the rear hornguide - we have used here a scrap piece of etch above the hornguide - you will see this on the photos and drawing. To have redrawn this would have been no problem, but at the expense of some of the spares and we did not think was practical and are sure most modellers will prefer the spares.

Chassis overlay taking care with the rivet heads.

Before finally fitting the whole slide bar assembly make sure you fit the wires for the brake gear and brackets for the reversing shaft, again there is a lack of room for soldering up.

It now is a matter of preference on how to finish off the model to get it working

Footplate and above there are no real problems with this, watch that the wheels may catch on the bottom edge of the front cab spectacle plate on the suspension travel.

For Masochists

We have included the rods and cranks for the linkage between the reversing shaft and the oil lubricators - details are on the photos and identified on the etches.

Our philosophy in designing this kit has been to provide a detailed and accurate model which is a pleasure to build. Whilst it may take a lot of time to complete this kit, this will be probably no more than for other low tech kits on the market, since the need to correct sub standard or badly designed/manufactured components is obviated. We feel the time will be much better spent on this kit, since the resulting model will be to the highest standard of detail and accuracy.

Parts List

Etch 1

1	Main chassis left		38	Reversing shaft balance weights (round)
2	Main chassis right		39	Valve spindle connecting link left and right
3	Rear spacer	00-EM-18.83	40	Valve spindle crosshead left and right
4	Fold up smokebox spacer	00-EM-18.83	41	Springs centre
5	Vertical firebox spacer	00-EM-18.83	42	Springs outer
6	Horizontal firebox spacer	00-EM-18.83	43	Springs inner
7	Rivet overlay for firebox spacer	00-EM-18.83	Coupling rods	
8	Front spacer	00-EM-18.83	44	Front centre left and right and spare boss (plain)
9	Slide bar support spacer middle	00-EM-18.83	45	Front overlay left outer with boss (plain)
10	Slide bar support spacer rear	00-EM-18.83	46	Front overlay left inner with boss (plain)
11	Slide bar support spacer front	00-EM-18.83	47	Front overlay right outer with boss (plain)
12	Rear suspension link bracket		48	Front overlay right inner with boss (plain)
13	Front rocking lever bracket		49	Rear centre left and right and spare boss (plain)
14	Slide bar spacer chassis inlay left and right		50	Rear overlay left outer with boss (plain)
15	Firebox chassis spacer inlay left and right		51	Rear overlay left inner with boss (plain)
16	Slide bars left and right		52	Rear overlay right outer with boss (plain)
17	Slide bar overlays		53	Rear overlay right inner with boss (plain)
18	Connecting rod centre left and right		54	Front centre left and right (fluted)
19	Connecting rod overlay left and right		55	Front overlay left inner with boss (fluted)
20	Connecting rod overlay left and right		56	Front overlay left outer with boss (fluted)
21	Spare		57	Front overlay right outer with boss (fluted)
22	Connecting rod driving cam centre		58	Front overlay right inner with boss (fluted)
23	Connecting rod driving cam outer		59	Rear centre left and right (fluted)
24	Eccentric rods (backward and forward)		60	Rear overlay left inner with boss (fluted)
25	Spare eccentric rods		61	Rear overlay left outer with boss (fluted)
26	Eccentric rod driving cam left and right outers		62	Rear overlay right outer with boss (fluted)
27	Spares		63	Rear overlay right inner with boss (fluted)
28	Rocking lever		64	Reversing shaft brackets left or right dependant on drive
29	Rocking lever overlays		65	Reversing shaft brackets left or right dependant on drive
30	Rocking lever connecting link		66	Reversing lever fulcrum
31	Rocking lever connecting lever spare		67	Chassis extension 00-EM only
32	Suspension link left and right and spare		68	Chassis extension detail 00-EM only
33	Expansion link left and right		69	Washers
34	Lifting links		70	For masochists only, this is part of the linkage from the reversing shaft to the slide bar support bracket (see original photographic evidence)
35	Reversing shaft arms left and right (square)		71	Chassis overlays left and right.
36	Reversing shaft balance weights (square)			
37	Reversing shaft arms left and right (round)			

