

## Introduction

Now that we have had the benefit of a years experience with the Zero 1 system we are issuing these notes to pass on this experience to dealers and users.

Zero 1 was a dramatic departure from anything we, or anyone else, had done before. It presented us with many dilemmas from the point of view of explaining how it worked, hence the series of advertisements in the Model Press before release. We decided to provide the instructions in the form of two booklets—"the Operating Manual" and "the Locomotive Module Fitting Instructions"—feeling that two booklets were less daunting to users than one monster, and we have no reason to change this opinion.

In the event, and as with any technical product, we found that there were areas both in the products and instructions, where modifications became desirable. A number of these have been implemented and here we catalogue them in order to bring the necessary information up to date for users of earlier equipment.

In addition we are including tips and suggestions for people who may run into difficulties. Zero 1 is a strong on-going product and there will doubtless be further refinements from time to time.

## Modifications

### The Master Controller R.950

1. It was found that certain tender-powered Hornby locomotives responded incorrectly to the "forward" and "reverse" buttons on the initial production run. In attempting to correct the Module Fitting instructions for these locomotives it became apparent that this was not possible on all versions.

The remedy found was to exchange the positions of the words "forward" and "reverse" on the Master Controller facia label and to modify the Module Fitting instructions for the non tender-powered locomotives.

The correct position of "forward" is nearest to the operator. A package consisting of red overstick labels and a current Module Fitting booklet is available to anyone having an early unit. Module Fitting booklets with black printed front covers should be scrapped.

2. The 16 Volt A.C. output for operating electric points and colour light signals is protected by a thermal cut-out whereas the 18 Volt A.C. track output is protected electronically. Cases have occurred where the two outputs have been shorted together resulting in damage to the unit. A modification is imminent whereby the 16 Volt A.C. output will be changed to 18 Volts pulsed D.C., electronically protected. This improvement will not affect the operation of accessories.

### The Slave Controller R.951

1. This unit initially had the "forward" and "reverse" buttons the same way as the original Master Controller. The black button nearest the operator should be "forward".

2. It had been intended to supply a 15 core extension cable to enable a Slave to be situated on a layout remote from the Master Controller. This plan has been dropped in favour of the Hand Held Slave Controller as it was found there was rarely enough space for Slaves away from the main control area.

### The Locomotive Module R.955

Modifications have been carried out to the capacitors incorporated into the Module with the intention of improving the abatement of electric "noise" which can interfere with the correct operation of the Module. It was hoped that this would avoid the need for having to install a special capacitor across the motor brushes. This stage has not yet been reached as far as older locomotives are concerned but it is intended to supply future models with superior capacitors which will not need to be replaced when converting for Zero 1 operation.

New type locomotives will be supplied with their own Module Fitting instructions and these will state whether or not a capacitor needs to be changed.

Loose capacitors will continue to be included in Module packs for use with older locomotives until the problem is finally resolved.

Instructions for coding a Module are amplified on the reverse of the Module packaging.

### The Green Operating Manual

The first edition carries the reference 04/234 A 1079 on the back cover. The second edition carrying the reference 4/234B 680 (and marked *Second Edition*) is substantially similar but has a few corrections, some clearer diagrams and some warnings. Users are recommended to obtain an up-to-date Manual from the Service Centre.

### The Locomotive Module Fitting Booklet

The first edition has a black printed cover and, as mentioned before, was superseded by the second edition with red printed cover. Both of these are now out-of-date and users are recommended to obtain the 3rd Edition, with blue printed cover, from the Service Centre. Reference 4/247B 680.

Pending the resolution of the capacitor situation, referred to in the Module notes, a separate sheet is included with the blue covered booklet detailing capacitor fitting arrangements. The current version of this sheet is printed in blue and carries the reference 4/258C 780.

### APT Leaflets

The original leaflet, reference 4/251 680, contained the correct instructions for Module fitting.

A modification was then carried out to the power car bogie which necessitated a revised leaflet, reference 4/251A 880. Unfortunately the wiring for the red and black leads was transposed in this version. The current and correct leaflet for APT is 4/251B 880.

In general, the instructions contained in the above booklets and leaflets will provide satisfactory operation of Zero 1. But the very nature of model railways is variety, in terms of locomotives, track layouts, environment, age and degree of maintenance, and inevitably conditions will arise where problems are encountered.

So here we list out notes of where we have met such problems and the steps we have evolved to overcome them.

## Problems

The majority of problems notified to us come under the headings of jerky running, slow running, lack of hauling power, frequent tripping of overload indicator and stop/start movement.

All of these are most probably due to unsatisfactory electric circuits.

Conventional 12 Volts D.C. operation is comparatively tolerant of dirty contacts, loose fishplates, oily commutators etc. The voltage drop caused by such factors is readily overcome since most Power Controllers will produce up to 15 Volts at maximum setting.

Zero 1 operation is particularly sensitive to voltage drop and this is not easy to detect on a normal voltmeter due to the special A.C. waveform used. But it is a fair assumption that, if any of the symptoms quoted above are present, there is an undesirable element of resistance in the circuit.

### Track Circuit

The first stage, therefore, in tracing the cause of a problem is to carry out a thorough check of the main track electric circuit even if this has been operating satisfactorily by 12 Volt D.C. conventional means. The plugs on the Master Controller output leads that fit into the power connecting clip sockets should be scraped clean as should the power connecting clip contacts that face onto the undersides of the running rails. Fishplates that may have become loose through frequent handling are easy to replace and spares are available from the Service Centre under reference S.3923. The running surfaces of the rails must be thoroughly cleaned.

### Locomotives

The electric circuit through a locomotive (and tender if tender-powered) has, inherently, several points where resistance can build up leading to a voltage drop that will adversely affect Zero 1 operation. A simple test for a model, before fitting a Module, is to check its running performance from a 12 Volt D.C. conventional Power Controller. If it performs steadily and smoothly when the power is set at 6 Volts it will most probably be satisfactory on Zero 1. If it does not, it will be necessary to strip it down and clean it. See overleaf for details of procedures to follow.



## 1. Direct drive locos with X.03/X.04 type Motors.

### (a) Chassis

Remove the body and detach the motor unit by undoing the securing screw behind the magnet. Degrease the entire chassis (not the motor) to remove any deposits from the pick-up surfaces of the wheel tyres, the inside faces of the insulated driving wheels, the bronze collector arm(s) and from where the driving axles bear in the chassis. We recommend using Peco Electroclean, Servisol or any other proprietary electrical contact cleaner available in Aerosol cans. Spray the complete chassis, rotating the wheels and allow to drip dry for about 5 minutes. Whilst the motor is out check the chassis for free running and adjust the tension of collector arm(s) so that they make a firm contact without acting as a brake.

### (b) Motor

Remove the carbon brush units from the motor and clean the surface of the commutator using a "cotton bud" dampened with the contact cleaner fluid. Hold the "cotton bud" against the commutator and rotate the motor shaft by twisting the worm gear. Remove any deposit from the commutator slots with a pin. Check the carbon brushes for wear and, if necessary, fit replacements, part No. X.67. Slightly spread the brush retaining spring to increase the pressure of the brushes on the commutator if it is an older model.

Re-assemble the motor into the chassis and test run on a 12 Volt D.C. conventional system. The model should run smoothly at a setting of 6 Volts or less. Apply the tiniest drop of oil to valve gear pivot points and axle bearings.

### (c) Module Fitting

Whilst the diagrams in the Module Fitting Instructions are satisfactory in most cases, a more refined method is shown in Diagrams A. The differences are in the shortening of the Module wires, the complete replacement of the original capacitor and the soldering of the connections. See the notes on soldering below. This method will provide better protection against voltage drop and the shortening of the wires enables a Module to be fitted in the bodies of the R.300, R.301 and R.302 locomotives instead of having to go in a permanently coupled goods van. It does however, make it more difficult to re-locate the Module in another locomotive should this be desired later.

## 2. Ringfield Motor, Diesel and Electric outline locos.

### (a) Cleaning

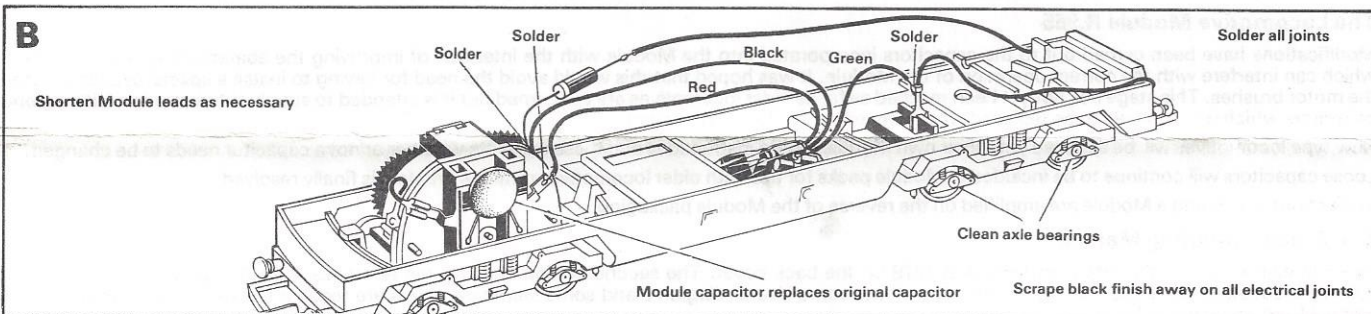
Remove the body and detach the Non-Powered bogie from the main chassis. Unclip and ease out the diecast centre of the bogie from the plastic frame. The wheel and axle assemblies should be cleaned, removing any dirt or grease from their running surfaces. The axle location slots in the diecasting should also be cleaned and any black finish on the faces in contact with the axles should be scraped off. Also scrape off any black finish from the prong onto which the wire spade terminal slides. Refit the non-powered bogie and remove the powered bogie from the main chassis. Detach the outer frame to give access to the wheels. Insert a screwdriver blade between the back of an all-metal wheel and the motor housing and twist. This should cause the opposite wheel with the plastic centre to come off the axle and allow this to be withdrawn from the motor housing. Clean up the axles and bearings with the contact cleaner fluid. Whilst the model is dismantled check whether the carbon brushes are in good condition and if not replace them, part No. S.8319

### (b) Module Fitting

Use Diagram B for wiring. The principle is similar to that in the Module Fitting booklet, but requires the Module leads to be shortened, the original capacitor to be replaced and the connections to be soldered. See the notes on soldering below.

### Note

Electric outline locomotives with pantographs are suitable for Zero 1 operation but **ONLY** through track supply. Do not attempt to feed Zero 1 into an overhead catenary system.



## 3. Ringfield Motor, Tender-drive locos.

### (a) Cleaning Locomotive

Remove the body but before cleaning the chassis assembly drill a hole .078" (No. 47 drill) in the top of the chassis (see Diag. C) which will be used to secure the green lead of the Module with a self-tapping screw No. 2 x 3/8" (S.1070). Clean the chassis assembly as described for Direct drive locos in section 1a above, ensuring that any swarf from the drilled hole is removed.

### (b) Cleaning Tender

Remove the body and detach the outer chassis frame. Use a screwdriver blade to prise off the wheels as described for Diesel outline models in 2a above. Clean up axles and bearings in the same way. Check the carbon brushes and replace if necessary.

### (c) Module Fitting

Diagram C shows a refinement of the method in the Module Fitting booklet.

Shorten the green lead on the Module and replace the spade terminal with an 8BA tag washer, part No. S.5228, soldering this on.

The red lead fitted in the tender and running from the brass contact pin to one of the brush retaining arms must be dispensed with by cutting at the pin end and detaching from the other end.

### Note

On certain models with metal coupling bars these may be electrically 'live'. If two similar locos (or tenders) are running together, for example in double heading, a short can be caused. A new coupling assembly with plastic bar is in course of preparation and will be available through the Service Centre early in 1981, part No. X.1502. The fitting of this replacement assembly will overcome this comparatively rare problem.

### Soldering

In the context of Zero 1 Module connections we recommend using a 12 Volt 15 Watt iron (ORYX or ANTEX). This can be powered from a standard 12 Volt Power Controller. Suitable flux is Bakers Fluid or Fluxite. Parts to be soldered must be clean and free from grease or oil.

The first job is to "tin" the area of each component that is to be soldered. For a wire lead, strip off the insulating coating, twist the strands tightly together and dip into the flux. Bring the solder and the hot tip of the iron to the wire and on touching, solder will flow along the wire. Remove iron and solder and the wire will now be "tinned". In a similar manner "tin" the other component.

If possible, twist connections together before finally soldering, this making it easier to handle during the operation.

To effect the soldered joint re-flux one part, bring both components together and touch with the hot tip of the iron. As soon as the solder flows remove the iron and blow on joint to cool it. Test the join by gently pulling. "Dry" joints (bad ones) can occur, causing a high resistance and these can often be detected by eye as they tend to be dull in colour instead of bright. If this happens, re-soldering must be carried out.

For those unfamiliar with soldering it is a good idea to make practice joints before attempting a Module installation.

### Zero 1 for Non-Hornby Models

Information is being prepared on methods for fitting Modules to non-Hornby locomotives. It is hoped to issue a leaflet in the early part of 1981.

