



LOCOMOTIVE MODULE FITTING INSTRUCTIONS

Covering models manufactured between 1965 and 1980

For full information on the Zero 1 control system see the Zero 1 Operating Manual.

3rd Edition

HORNBY RAILWAYS



FITTING MODULES TO LOCOMOTIVES

Because with Zero 1 the track is permanently live always switch the Master unit off at the mains switch when not in use to avoid accidental short circuits.

General Instructions. Please read carefully before attempting to fit Module.

- 1 It is essential that the model is in good working order before a Module is fitted. Follow the instructions in the "Locomotive Operation and Maintenance" leaflet taking particular care to see that the commutator and surfaces of the running wheels are clean. It is also most important that the track is kept clean and free from deposits. If a 12 Volt D.C. Power Controller is available, use it to test the locomotive on the track. If a Zero 1 unit is the only Power Controller in use **DO NOT** attempt to operate the locomotive until a Module has been fitted.
- 2 Some steam outline models have their electric motor in the locomotive, some in the tender. Depending on the available space, the Module may need to be fitted in the opposite vehicle to the motor. When this occurs the locomotive and tender must be permanently coupled together. On some smaller locomotives the Module will have to be fitted in an adjacent closed van and this must therefore also be permanently coupled.
- 3 It is always necessary to remove a locomotive body to fit a Module. In a number of cases, minor modifications have to be carried out to locomotive and tender bodies to allow the Module connecting wires to pass from one to the other.
- 4 The "tables" on pages 3, 4 and 5 for steam outline models and on pages 14 and 15 for diesel and electric types show how to identify models by reference to the "running number" printed, labelled or engraved on the sides of the locomotive or tender. The "tables" cover the majority of model types produced since 1965 (and therefore many not currently available), and give key letters and numbers against each model which refer to explanations and diagrams following.
- 5 A "smoke" generator was fitted to some older type locomotives, this must be disconnected when fitting Zero 1. See page 13, diagram 39.
- 6 Operating lights are fitted in certain diesel locomotives. Refer to diagram 52 on Page 18 for details of wiring these models.
- 7 It will be helpful to have a pair of tweezers for handling carbon brushes and small parts. A small screwdriver, a pair of pliers, file and sharp knife will also be necessary, and where required, a soldering iron fitted with a 3-core mains cable.
- 8 See the rear cover of this booklet for further important information.
- 9 In case of difficulty, advice and Module fitting service can be obtained from the Rovex Service Centre in Ramsgate or from any Official Service Dealer. A small charge will be made for fitting, price on application.

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STEAM OUTLINE MODELS

Running Number	Description	Reference Number	Body Removal Code Loco Tender	Loco Modifications	Tender Modifications	Wiring Diagram	Module Position
6413	LMS Ivatt 2-6-0	R.324	A 1	11	29	35	In tender
7178	0-4-0T	R.255	A —	1	22	34	In van
7476	LNOR B12 4-6-0	R.150	A 2	12	30	35	In tender
7606	LMS 0-6-0T	R.452	E —	5	—	35	In locomotive
8477	LNOR J83 0-6-0T	R.252	E —	13	22	35	In van
8509	LNOR B12 4-6-0	R.866	A 2	12	30	35	In tender
8751, 8733	GW 0-6-0PT	R.041, R.300	J —	—	—	35	In locomotive
	GW 0-6-0PT	R.051	E —	14	22	39	In van. Smoke Unit occupies space in Loco body
16440	LMS 0-6-0T	R.052, R.301	B —	15	22	35	In van
25550	0-4-0T	R.455	A —	1	22	34	In van
25555	Lord Westwood	R.765	A —	—	—	35	In locomotive
30027	BR M7 0-4-4T	R.754	D —	16	—	35	In locomotive
31757	BR L1 4-4-0	R.350	C 3	3	23	35	In tender
34051	BR Churchill 4-6-2	R.356	C 3	17	31	35	In tender
43620 or 43775	BR 0-6-0	R.251	E 3	6	23	35	In tender
45192	BR Cl. 5 4-6-0	R.859	D 1	—	—	36A	In locomotive
46200/201/205	BR Princess 4-6-2	R.50, R.53 R.258	C 3	9	27	35	In tender
46400, 46521	BR Ivatt 2-6-0	R.857, R.852	A 1	11	29	35	In tender
47458, 47480	BR 0-6-0T	R.058, R.302	B —	15	22	35	In van
47606	BR 0-6-0T	R.52	E —	5	—	35	In locomotive
60022	BR Mallard 4-6-2	R.309, R.350	G 1	—	—	38	In locomotive
60103	BR A3 4-6-2	R.850	D —	—	—	34	In locomotive
61572	BR B12 4-6-0	R.150	A 2	12	30	35	In tender
70000	BR Britannia 4-6-2	R.063	C 1	18	32	37 or 38	In locomotive

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STEAM OUTLINE MODELS

Running Number	Description	Reference Number	Body Removal Code Loco Tender	Loco Modifications	Tender Modifications	Wiring Diagram	Module Position
6, 7, 9 or 27	0-4-0T	R.355	A —	1	22	34	In van
100	LBSC E2 0-6-0T	R.315, R.353	B —	2	22	35	In van
245 or 328	SR M7 0-4-4T	R.868	D —	—	—	35	In locomotive
690	LMS 2P 4-4-0	R.450	C 3	3	23	35	In tender
795	SR N15 4-6-0	R.154	A —	—	—	35	In locomotive
1542	Hiawatha 4-6-2	R.54	C 2	4	24	35	In tender
1757	SR L1 4-4-0	R.350	C 3	3	23	35	In tender
2021	0-6-0T	R.757	E —	5	—	35	In locomotive
2335	Hiawatha 4-6-2	R.54	C 4	4	25	35	In tender
3775	MR 0-6-0	R.251	E 3	6	23	35	In tender
4472	LNOR A3 4-6-2	R.322, R.845 R.855	D —	—	—	34	In locomotive
4657	LMS Cl. 5 4-6-0	R.842	D 1	7	26	38	In locomotive
4930 or 4983	GW Hall 4-6-0	R.313, R.759	A —	—	—	35	In locomotive
5112	LMS Cl. 5 4-6-0	R.061, R.840	D 1	7	26	37	In locomotive
5231	LMS Cl. 5 4-6-0	R.320	D 1	7	26	38	In locomotive
5541	LMS Patriot 4-6-0	R.311, R.357	D 1	—	—	38	In locomotive
5934	GW Hall 4-6-0	R.761	A —	—	—	35	In locomotive
6013	GW King 4-6-0	R.349	F 1	—	—	38	In locomotive
6024	GW King 4-6-0	R.078	F 1	8	—	38	In locomotive
6201	LMS Princess 4-6-2	R.258	C 3	9	27	35	In tender
6220	LMS Coronation 4-6-2	R.864	H —	—	—	34	In locomotive
6233, 6234	LMS Duchess 4-6-2	R.066, R.305	D 1	10	28	38	In locomotive
6244	LMS Coronation 4-6-2	R.871	H —	—	—	34	In locomotive

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STEAM OUTLINE MODELS

Running Number	Description	Reference Number	Body Removal Code Loco Tender	Loco Modifications	Tender Modifications	Wiring Diagram	Module Position
70000	BR Britannia 4-6-2	R.259	C 1 or 3	18	32	35	In locomotive
70013	BR Cromwell 4-6-2	R.552	C 1	—	—	36B	In locomotive
82004	BR 2-6-2T	R.59	C —	—	—	35	In locomotive
92166	BR Cl. 9 2-10-0	R.550	D 1	—	—	36C	In locomotive
92220	BR Evening Star 2-10-0	R.065, R.303	D 1	19	32	38	In locomotive
92220	BR Evening Star 2-10-0	R.861	D 1	—	—	36C	In locomotive
21C151	SR Churchill 4-6-2	R.869	C 3	17	31	35	In tender
2300	LMS 2-6-4T	R.055					Module fitting instructions are supplied with these locomotives
2744	GW 0-6-0PT	R.059					
2862	LNOR B17 4-6-0	R.053					
101	GW 0-4-0T	R.077, R.333					Not recommended for Zero 1
123	Caledonian 4-2-2	R.553					
270	Caledonian 0-4-0ST	R.057					
3046	GW 4-2-2	R.354					

KEY TO BODY REMOVAL CODES

STEAM LOCOMOTIVES

- A Undo screw at rear of cab
- B Insert blade upwards through slot of rear coupling bar and twist to release body clip
- C Undo screw on front footplate
- D Undo screw on underside at rear
- E Undo screw on left side near front
- F Undo screw on underside at front
- G Insert blade to release clips on cylinder blocks
- H Undo screw on underside at front and rear
- J Pull funnel upwards to remove top part from main body

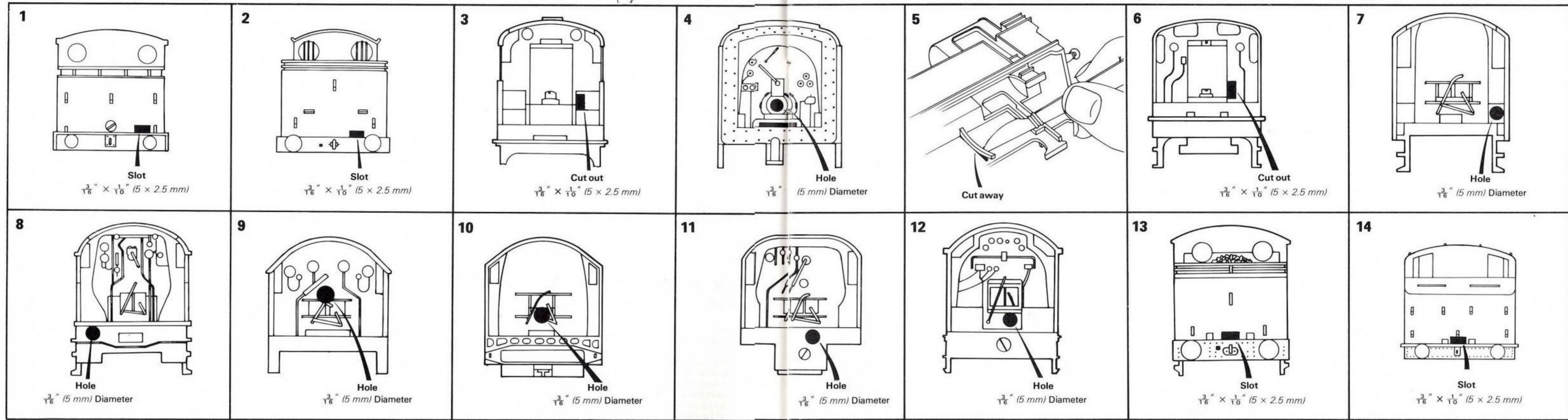
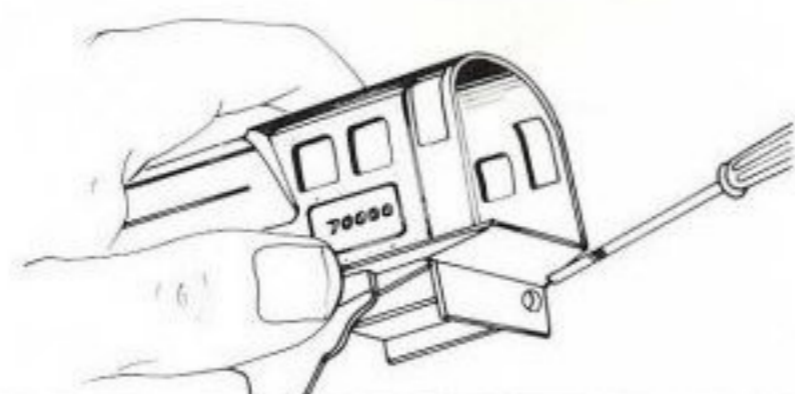
TENDERS

- 1 Insert blade at front between body and chassis and twist to release internal side clips
- 2 Undo screw on underside
- 3 Ease out "coal" and undo internal screw
- 4 Lift off whole tender top

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Locomotive Body Modifications (Diagrams 1 to 19)

The best way to make a hole in a plastic body is to drill it using a $\frac{3}{16}$ " (5 mm.) drill. If a suitable drill is not available it is quite easy to heat the blade of a small domestic screwdriver (about $\frac{3}{8}$ " wide) in the flame of a lighted match or candle and then to apply this to the body using a screwing motion for a round hole or a straight push for a slot. Depending on the thickness of plastic the blade may require two or three "heat-ups". Clean off any ragged material left with a sharp knife.

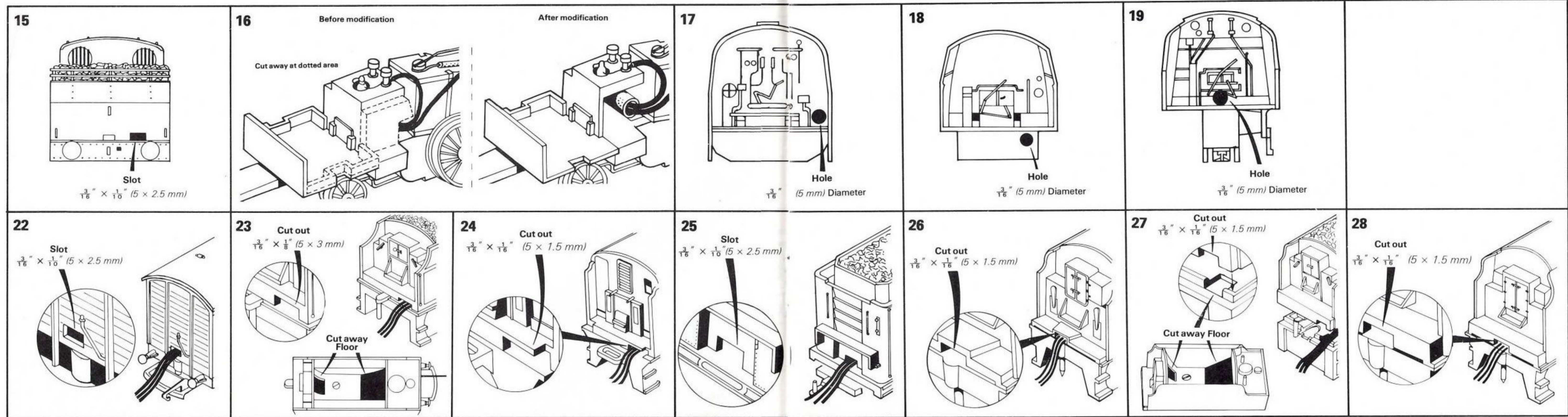


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Tender Body Modifications (Diagrams 22 to 32)

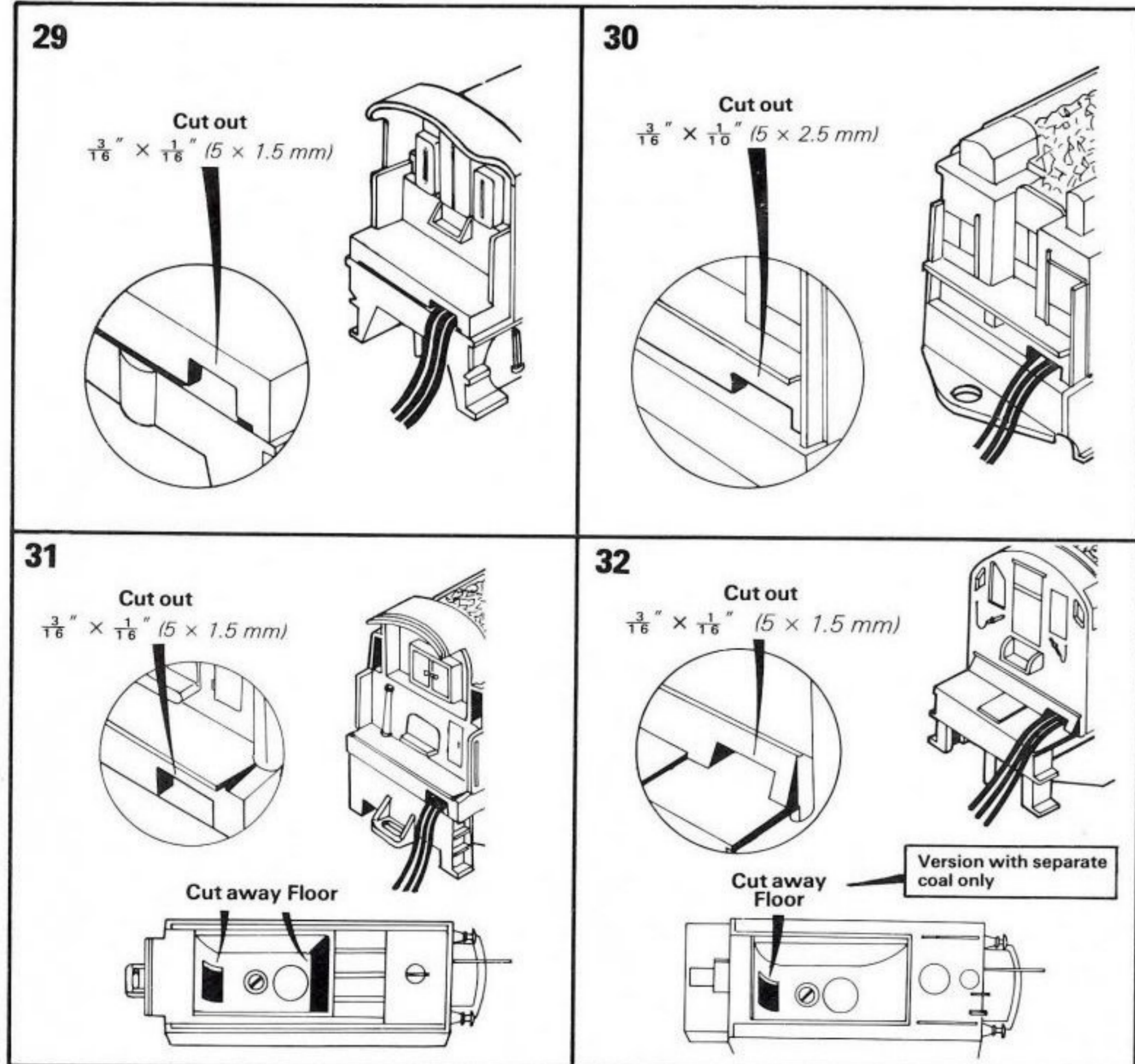
Where it is necessary to remove part of a tender interior, for example the shaded areas in Diagrams 23 or 27, this is best done by cutting with a sharp knife heated in a match or candle flame. It may be necessary to have three or four "heat-ups" to make a neat job. The slot at the front of the body can readily be cut out with a sharp knife. These jobs will only take a few minutes and should not be rushed.



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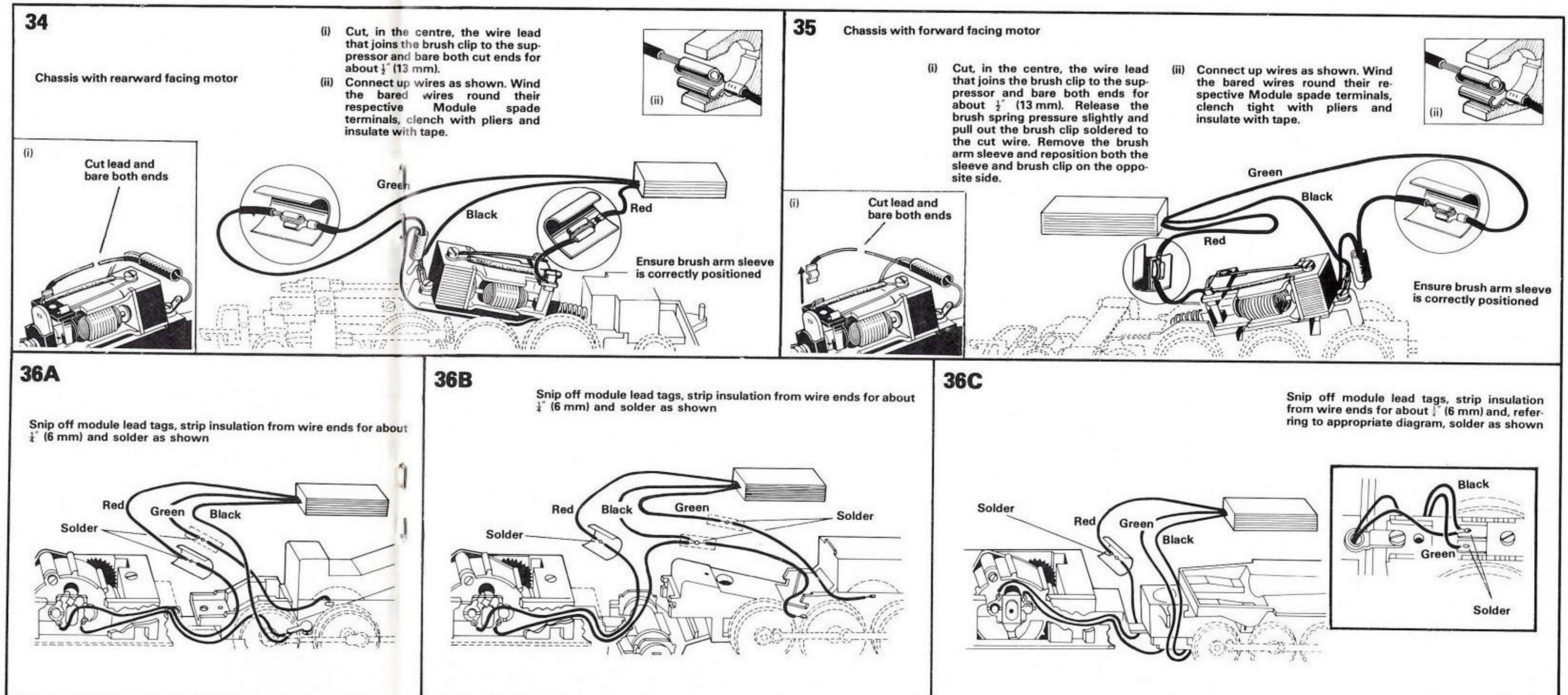
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Tender Body Modifications (continued)

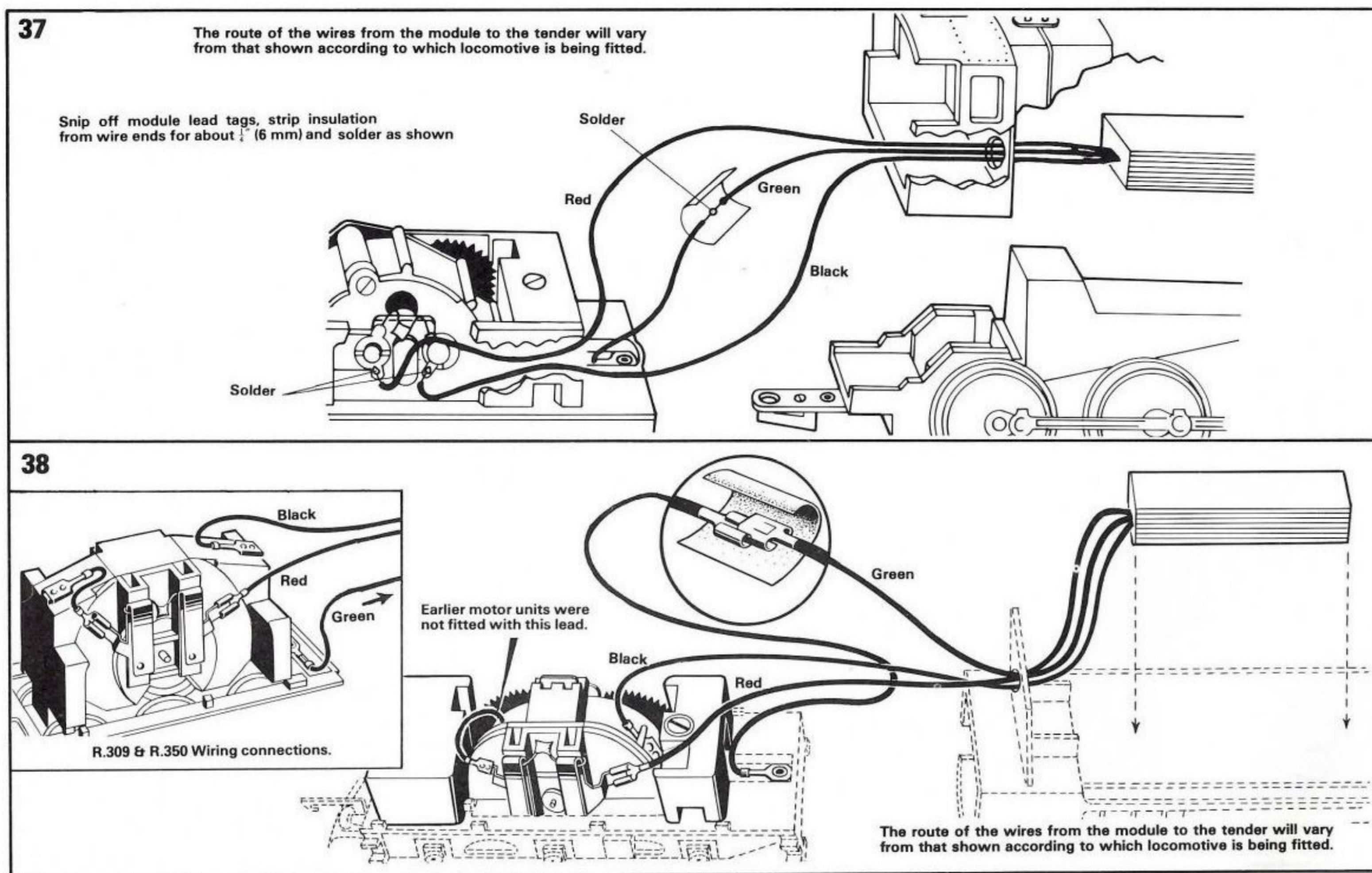


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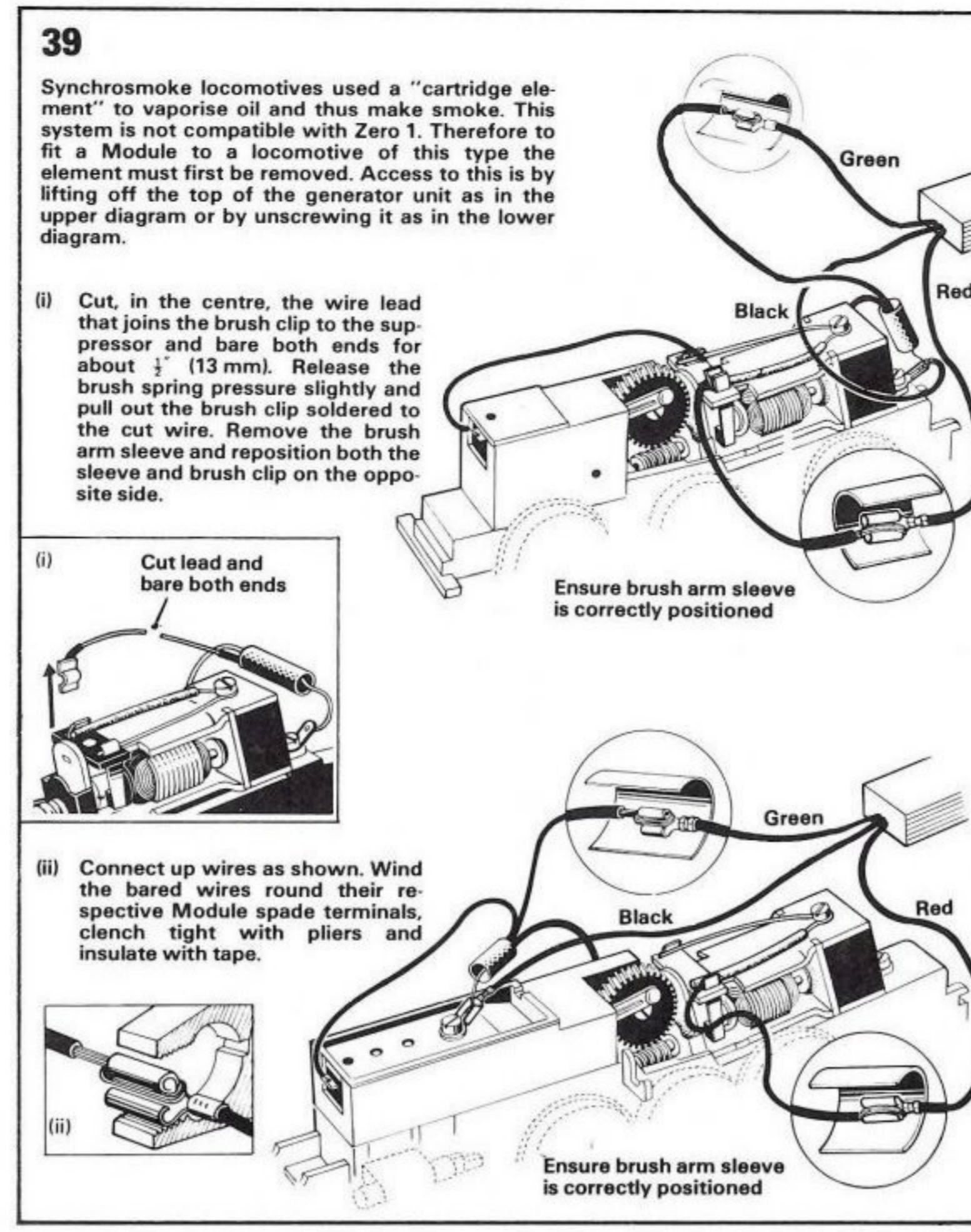
Module Wiring Diagrams (Diagrams 34 to 39) *Important—see also notes on page 13 before fitting*



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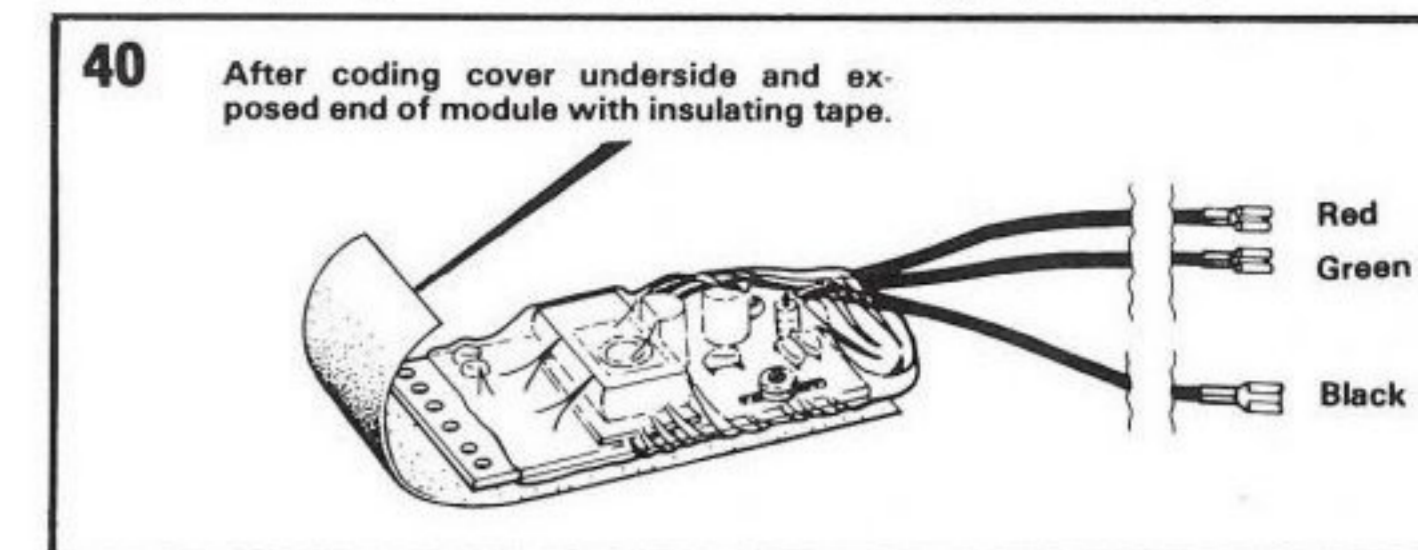


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- a The Locomotive Operating Module R.955 is supplied pre-coded number 1 and providing this is the number to be allocated to the locomotive no further coding action is required. If it is to be allocated any other number refer to the detailed coding instructions in the Zero 1 Operating Manual and carry out the necessary work before fitting.
- b The Module is supplied with Coding Wire, a short length of double-sided self-adhesive tape for securing it inside a locomotive or tender body, a length of single-sided self-adhesive tape for binding round and insulating wire joints (shown in wiring diagrams) and two Brush T-clips which are not required for all types of motor.
- c If the Module is to be fitted in a different vehicle from the electric motor, loosely position the Module (but do not secure it) and thread the 3 leads through any body holes or slots before making connections.



- d Make the connections according to the appropriate Wiring Diagram. It is a good idea then to test the model before securing the Module and replacing the body in case any connections have not been made correctly. Check that all electrical connections are clean and are making good contact. On locomotives using T-clips check that the brush arms are correctly aligned with the commutator. To ensure that sound electrical connections are always made it has been found advisable to recommend soldering the wire lead joints on certain locomotives.
- e When it is operating satisfactorily, secure the Module to a suitable part of the interior of the locomotive (or tender) with the double-sided self-adhesive tape taking care that it will not foul any moving parts and will not prevent the body and chassis fitting together correctly. Tidy up excess wire lengths into a "hank" and fasten with an elastic band or adhesive tape. The wires should not be tightened in such a way as to restrict the free movement of bogies or locomotive-tender articulation. Replace body.

DIESEL AND ELECTRIC OUTLINE MODELS

Running Number	Description	Reference Number	Body Removal Code	Body Modifications	Wiring Diagram	Remarks
3 or 5	Dock Shunter	R.253	A	41 & 43	46	Fit module in van
GM12	GM Class—Australia	R.318	B	—	50	
S311	VR 'S' Class—Australia	R.317	B	—	50	
D1062	BR Western Cl. 52	R.352, R.368	J	—	50	
1404	CP Rail Diesel	R.55	A	—	46	
D1520	BR Brush Cl. 47	R.060	B	—	49	Has metal chassis frame
1553	CP Rail Switcher	R.155	A	—	46	
D1670	BR Brush Cl. 47	R.073, R.328	B	—	50	Has plastic chassis frame
D1738	BR Brush Cl. 47	R.863	B	—	48	Has metal chassis frame
D2907	BR 0-4-0 Shunter	R.559	H	42 & 43	45	Fit module in van
E3001	BR Electric Bo-Bo	R.753	L	—	46	
D3010	BR Shunter Cl. 08	R.354	F	—	45	
D3035	BR Shunter Cl. 08	R.152	E	—	45	
3088	TC Switcher	R.155	A	—	46	
4008	TC Diesel	R.55	A	—	46	
5007	TC Double-Ended Diesel	R.159	G	—	46	
D5572 or 5578	BR A-1-A Cl. 31	R.357	K	—	47	
D6103 or 6110	BR Bo-Bo Cl. 29	R.338, R.080	D	—	50	
6124 or 6142	BR Bo-Bo Cl. 29	R.084, R.337	D	—	50	
D6830	BR Co-Co Cl. 37	R.751	N	—	47	Has metal power bogie frame
D7063	BR Hymek Cl. 35	R.758	M	—	47	Has metal power bogie frame
D7063 or 7097	BR Hymek Cl. 35	R.074, R.335	B	—	50	Has plastic power bogie frame
D7571 or 7596	BR Bo-Bo Cl. 25	R.327, R.072	B	—	51	

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DIESEL AND ELECTRIC OUTLINE MODELS

Running Number	Description	Reference Number	Body Removal Code	Body Modifications	Wiring Diagram	Remarks
13012	BR Shunter Cl. 08	R.156	F	—	45	
TR20071	TC Dock Shunter	R.353	A	41 & 43	46	Fit module in van
25241 or 25247	BR Bo-Bo Cl. 25	R.326, R.068	B	—	51	
27000	BR EM2 Electric	R.351	G	—	47	
37073 or 37130	BR Co-Co Cl. 37	R.369, R.751	B	—	50	Has plastic power bogie frame
42202	NSW Co-Co Cl. 422—Aust.	R.307	K	—	47	
43002 or 43010	BR HST Cl. 253	R.069, R.370	C	—	50	
47421	BR Brush Cl. 47	R.075	B	—	50	Has plastic chassis frame
W60095	Midland Pullman	R.555	P	—	46	
79079	Diesel Railcar	R.157	G	—	46	
VR	Diesel Shunter—Aust.	R.316	E	—	45	
SC49003	BR APT Power Car	R.704	Module fitting instructions supplied with locomotive			

KEY TO DIESEL & ELECTRIC LOCOMOTIVE BODY REMOVAL CODES

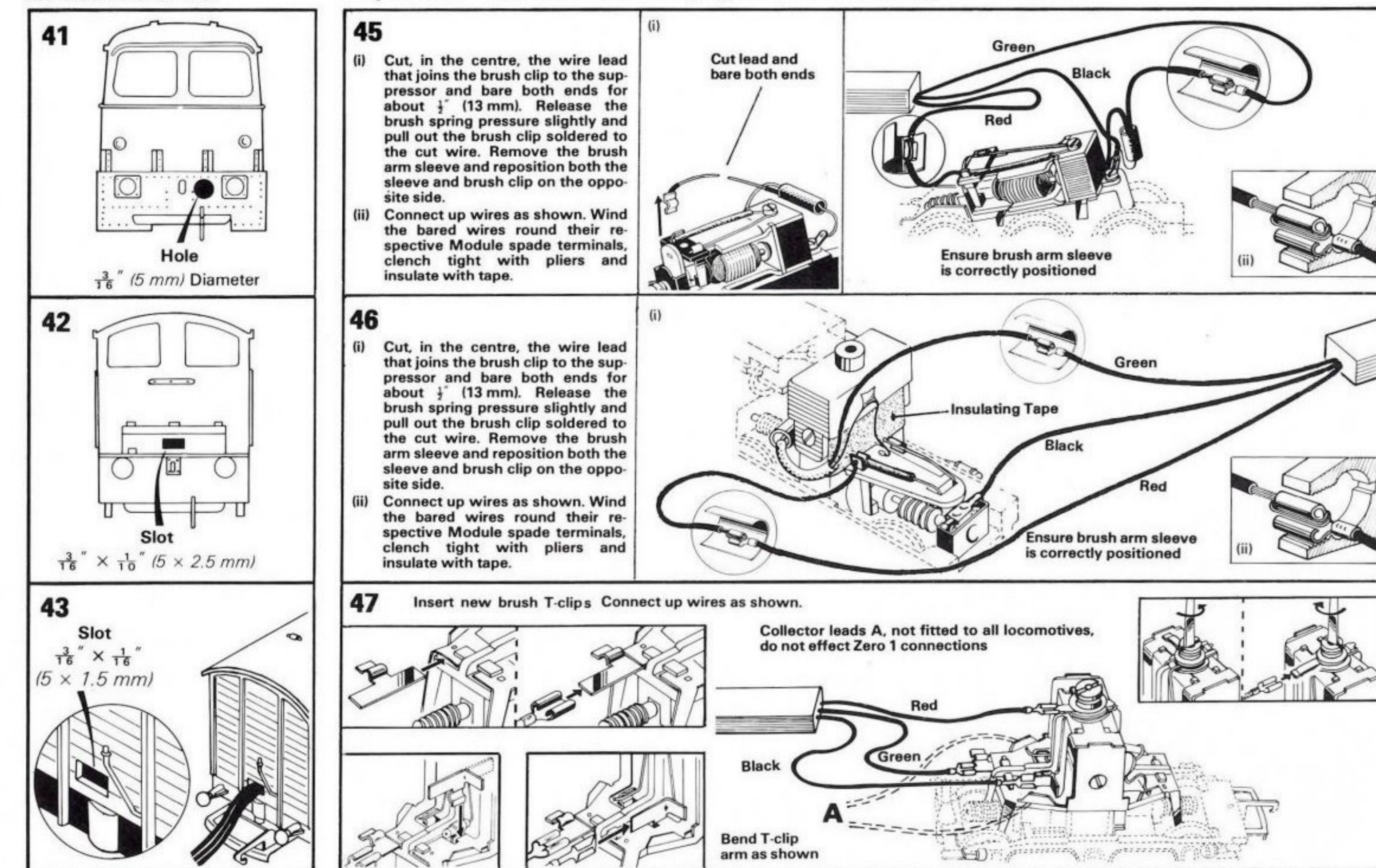
- A Undo screw(s) on top near cab.
- B Insert blade to release clips at bottom of cab doors.
- C Insert blade to release clips at bottom of cab doors and near louvres.
- D Insert blade to release clips at bottom of doors. Also release internal clips which retain window shell at centre, each side.
- E Undo body securing screw at rear of cab.
- F Insert blade under front buffer beam to release clip.
- G Undo screw(s) in roof.
- H Undo front coupling screw.
- J Insert blade to release clips at bottom of cab doors and 2 at centre.
- K Undo screw in centre of underside. Remove roof.
- L Undo screw up inside centre of body.
- M Undo screw in centre of base (if fitted) and release clips at bottom of cab doors.
- N Undo screw in centre of underside.
- P Undo screw in underside. Ease out front buffers to release body.

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Diesel Body Modifications

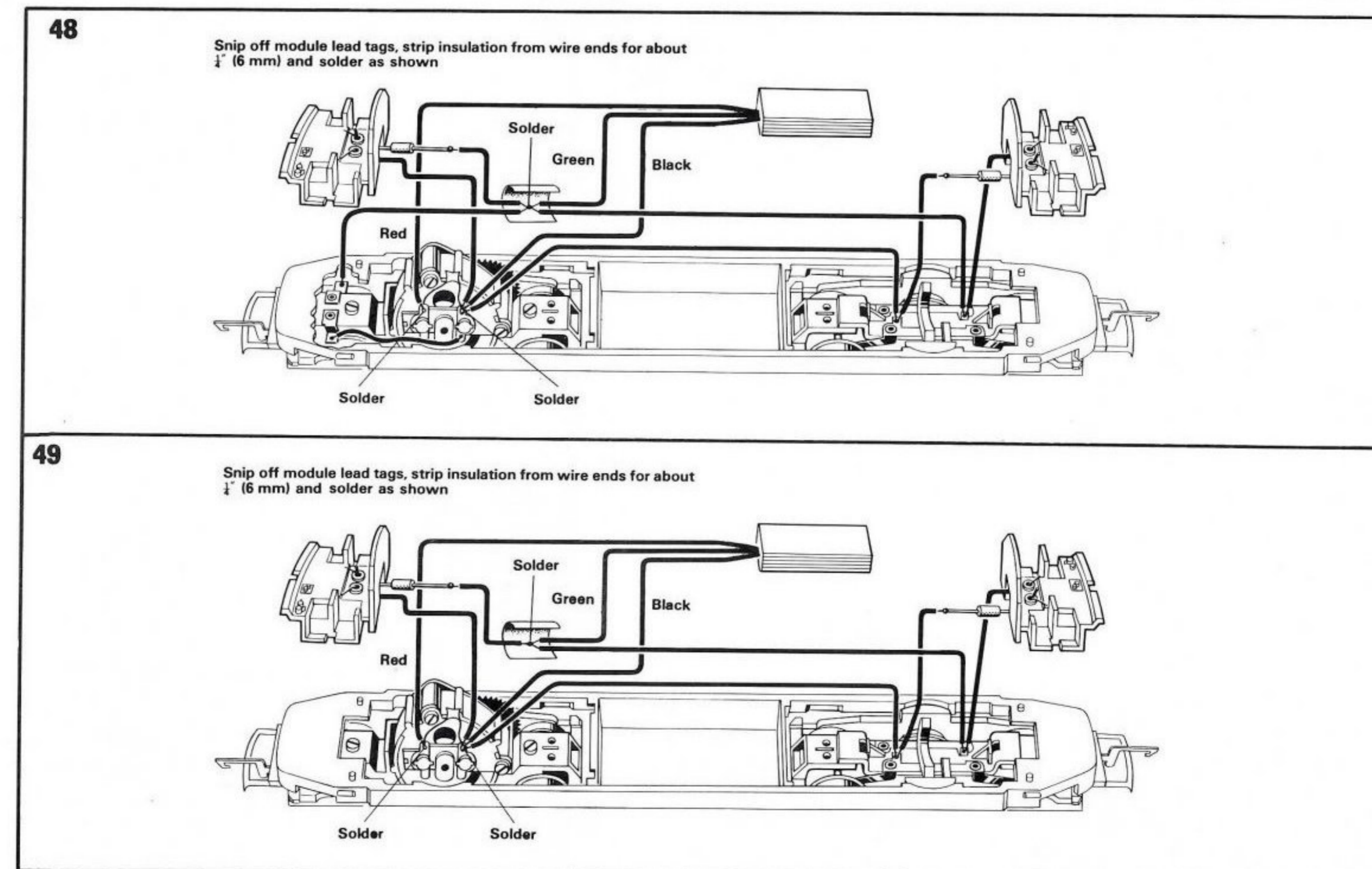
Module Wiring Diagrams (Diagrams 45 to 51)

Important—see also notes on page 13 before fitting

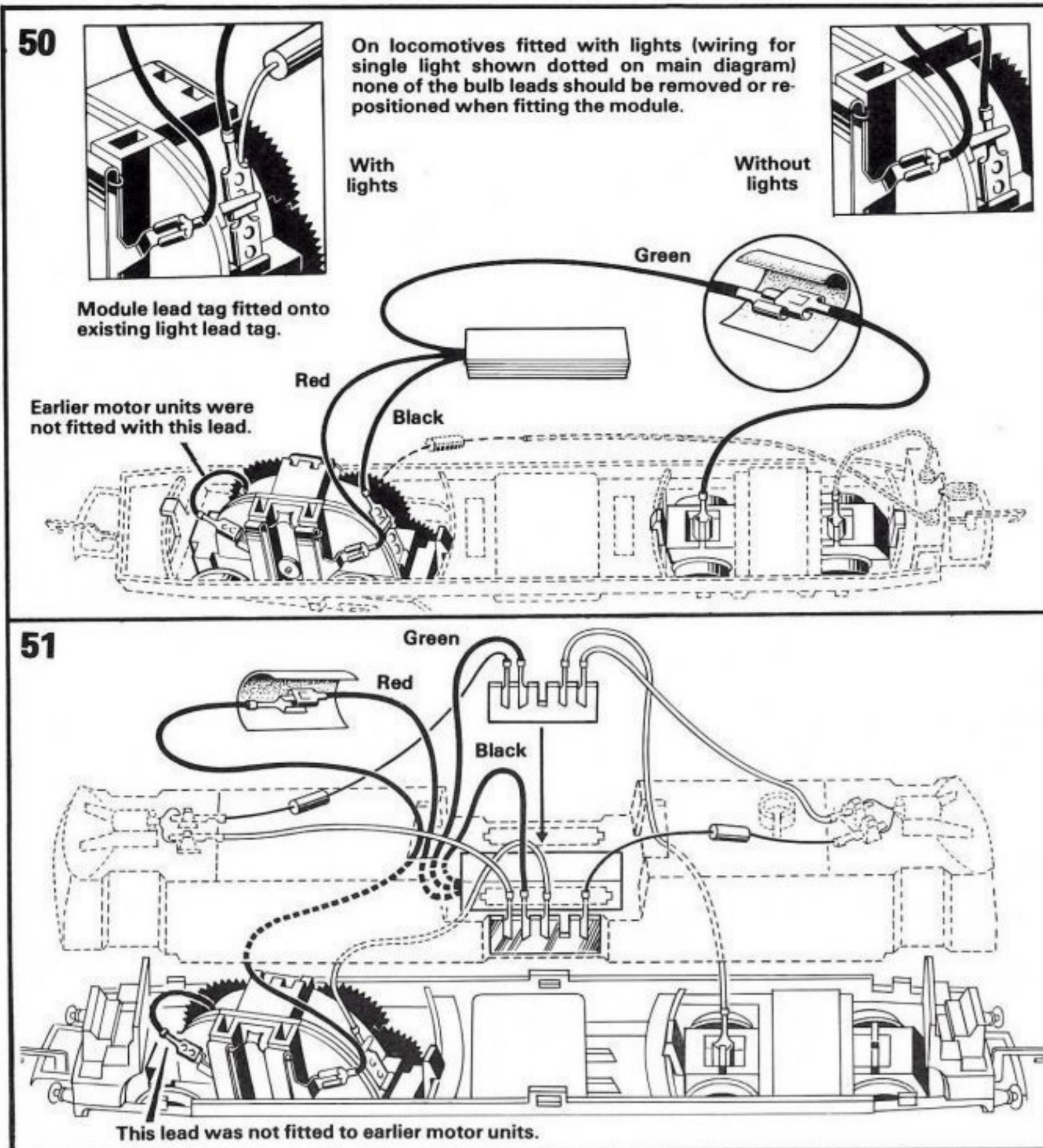


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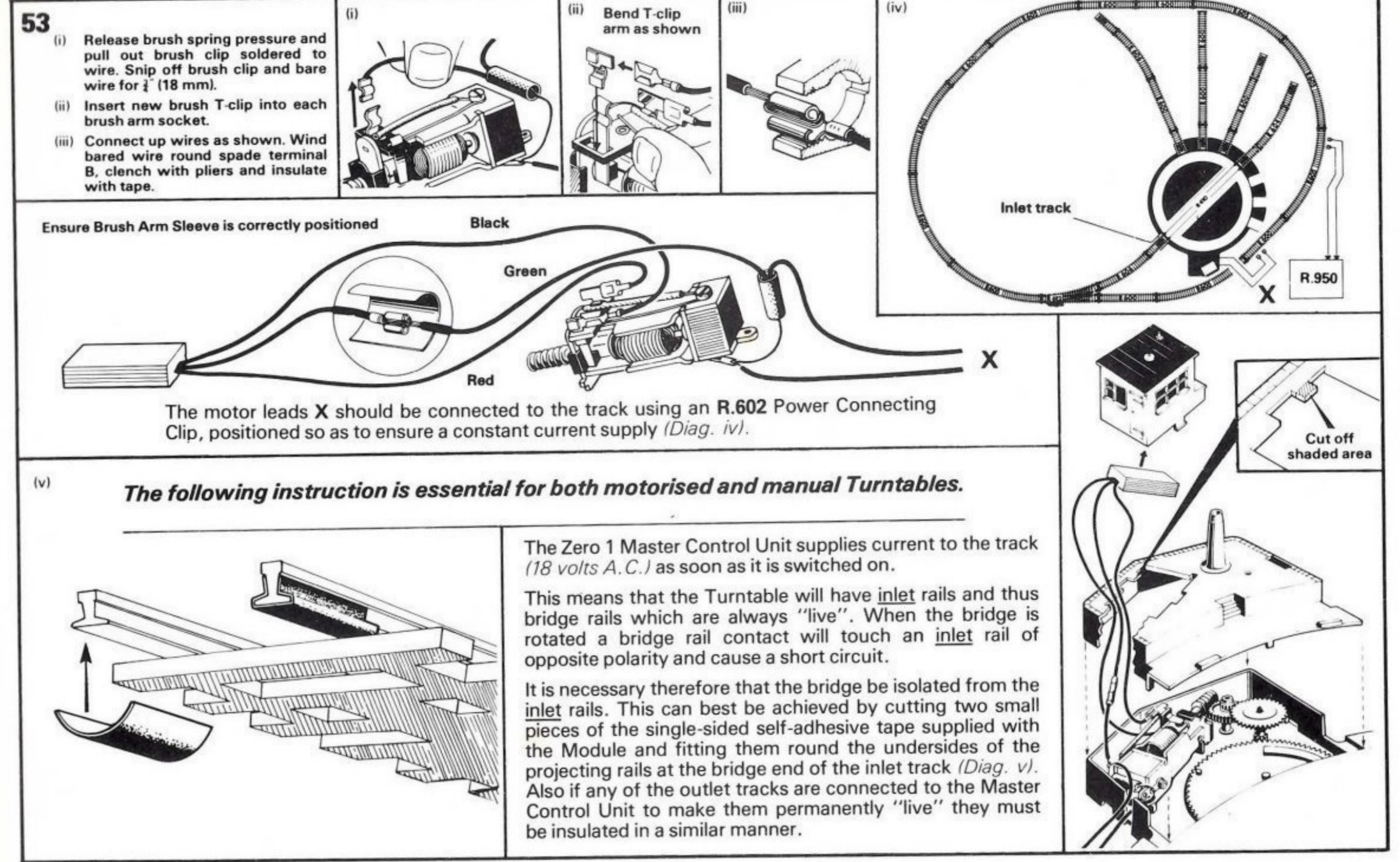
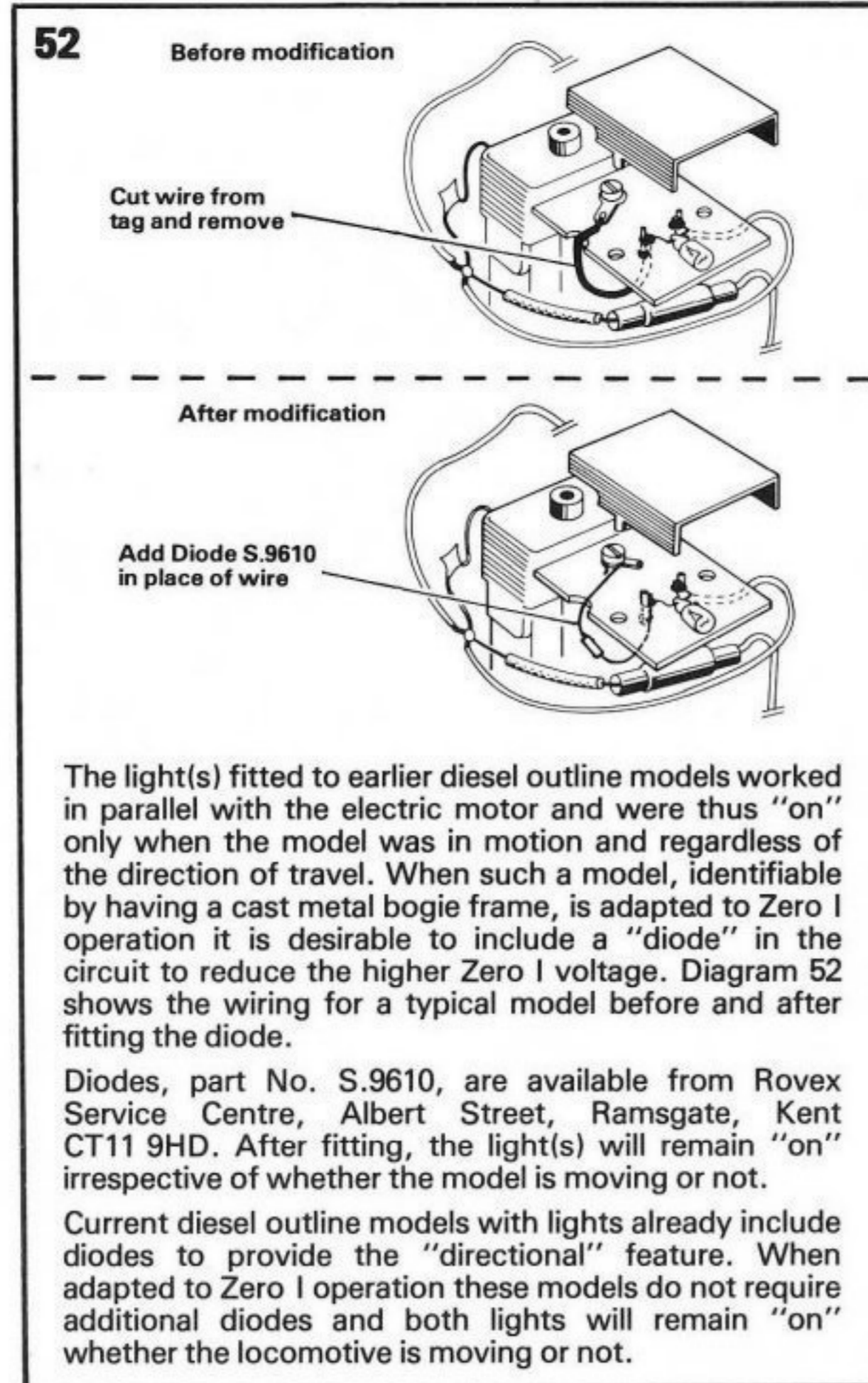
Important—see also notes on page 13 before fitting



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Further Useful Information to Ensure Dependable Operation

If for any reason the Master unit is switched off at the mains socket it should not be switched on again for at least 30 seconds.

Electronic equipment of this type is of necessity extremely sensitive. Any "arcing" due to poorly made or dirty contacts can cause interference which may result in a loco performing erratically. The Zero 1 system will not improve the running performance of a locomotive if that loco is a poor runner initially. It is essential that the following points are carefully noted and any necessary action taken to ensure trouble free running.

The Track

(i) All parts of the electrical circuitry must be kept scrupulously clean. It is recommended that the track surfaces, particularly the top face and the inner edges of the rails (i.e. the areas which come into contact with the wheel tyres), be wiped over regularly with a "Scotch Pad" or similar non-abrasive type of cleaner which will remove the dirt and grease without damaging the protective coating of the steel rails.

(ii) Ensure that all fishplates are secure and are making good contact with the rails.

The Module

(i) When coding a module it is a good idea to wind the coding wire a couple of times through the appropriate holes. Always ensure that the wire is firmly pressed down onto the copper surrounding the hole, thus making good contact. Never use solder to code a module as heat from a soldering iron will damage the bonding of the delicate electronic components on the module circuit board.

(ii) After folding any excess length of module leads the resulting "hank" should be housed as far away from the module as possible in order to avoid any possible "inductive" effect.

(iii) The optimum method of making connections between loco and module is by soldering them. It will be found that this method allows the leads from the module, in some cases, to be reduced in length. It is advisable to make temporary "dry" connections initially, in order to establish the most suitable length, before soldering is carried out. Always use a 15 watt earth tipped soldering iron for this task. Under no circumstances should a soldering iron with a twin core mains cable be used.

Tender Drive Ringfield Locomotives

(i) The point of contact between the pony track pivot boss, or Tender drawbar, and the diecast loco chassis must be free from dirt and grease. Any black finish on either component at this point should be scraped away carefully to expose the base metal.

(ii) The area of the pony truck or tender drawbar which comes into contact with the head of the Pivot screw must be free of dirt and grease. Any black finish in this area should be scraped away carefully.

(iii) Ensure that the phosphor bronze spring collector contact attached to the pony truck or drawbar and the brass contact pin on the tender chassis are clean, making good contact, and are correctly aligned.

(iv) The driving gears on the motor unit should be only lightly lubricated, any excess oil should be removed carefully.

Diesel Ringfield Locomotives

(i) The non-powered bogie diecast chassis should be unclipped and eased out of the plastic bogie frame. The wheel and axle assemblies should be checked and any dirt or grease removed from their running surfaces. The axle location slots in the diecast chassis should also be cleaned and any black finish on the faces in contact with the axles should be carefully removed.

(ii) The driving gears on the motor unit should be only lightly lubricated, any excess oil should be removed.

Enquiries regarding spares and service should be addressed to:
Rovex Service Centre, Albert Street, Ramsgate, Kent, CT11 9HD.

ROVEX Limited