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British Rail

Train Crew Manual

Class 20, 26, 31, 37, 45, 47, 50 and 56 Locomotives

**General Information &
Driving Instructions**

Issue 6

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CONTENTS

Section	Page
1. Driving Controls	1
2. Instruments and Indicators	1
3. Starting the Engine	3
4. To move a Locomotive in Depots, Yards, Sidings etc. before entering traffic	4
5. Attaching to a Train	5
6. Changing ends, including locomotives in multiple	6
7. To move a Locomotive with a train attached into Service	7
8. To reverse the Locomotive	8
9. Instructions for operating Automatic Slow Speed Control equipment	
9.1 Class 47 Locomotives	9
9.2 Class 56 Locomotives	10
9.3 Class 20 Locomotives	10
9.4 Class 37 Locomotives	16
9.5 Class 26 Locomotives	18
10. To stop the Engine	19
11. Leaving a Locomotive on a Running Line	20
12. Detaching from a Train when in the front driving compartment	21
13. Conditions under which the Diesel Engines of Stationary Locomotives may be run in Stations	23

1. DRIVING CONTROLS

- 1.1 The power controls are mounted on the master controller and consist of:—
 - 1.1.1 A master key position. A master key must be inserted into this position and then turned before the controls can be operated.
 - 1.1.2 A master switch handle. This is mounted on the master controller and has four distinct positions i.e. OFF, REVERSE, ENGINE ONLY and FORWARD. The handle can only be moved from OFF when the master key has been turned and must only be moved when the locomotive is stationary. When moved to ENGINE ONLY power cannot be applied to the traction motors and the Driver's Safety Device (D.S.D.) is inoperative.
 - 1.1.3 A power controller. This is mounted on the master controller. It may not be marked or alternatively it may be marked OFF, ON, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, FULL, or have notch positions marked. A slight resistance or 'notch' may be felt as the handle is moved. The handle is interlocked with the master switch which cannot be moved unless the power controller is at the OFF position.
 - 1.1.4 Anti-slip button. This may be situated in the end of the power controller handle or on the desk. When depressed, the brake blocks are lightly applied to the wheels and pressure is registered on the brake cylinder pressure gauge.

2. INSTRUMENTS AND INDICATORS

- 2.1 Air and Dual braked locomotives.
 - 2.1.1 Vacuum brake pipe gauge, (not air braked locomotives).
 - 2.1.2 Vacuum reservoir gauge, (not air braked locomotives).
 - 2.1.3 Brake cylinder pressure gauge.
 - 2.1.4 Main reservoir pressure gauge. This gauge indicates the air pressure in the locomotive main reservoir. This is normally between 118 and 140 p.s.i. excepting Class 56 locomotives, in which it is between 8.5 and 10 bar. The gauge may form one half of a duplex gauge in some locomotives. The other scale

then indicates the pressure in the main reservoir pipe, which feeds the train, and will normally read 100 p.s.i. or 7.0 bar.

- 2.1.5 Brake pipe pressure gauge. This indicates the pressure in the locomotives brake pipe as set by the automatic brake valve or E70 brake controller position.

2.2 All Diesel Electric Locomotives.

- 2.2.1 Driving ammeter. This indicates the electrical current strength supplied by the main generator/alternator to the traction motors. The scale may be divided into a yellow sector and a green sector. Current readings in the green sector may be used continuously, whereas current indicated by the yellow sector must be limited to one hour during a particular duty.

Some ammeters have a red marking which indicates the over-load current.

2.3 All Diesel Electric Locomotives excepting Class 56.

- 2.3.1 Fault indicator. This is a blue light which normally glows dimly, but becomes bright in the event of a fault condition in the driven locomotive or a locomotive coupled in multiple.
- 2.3.2 Engine stopped indicator. This is a red light which normally glows dimly, but becomes bright in the event of the engine stopping in either the driven locomotive or a locomotive coupled in multiple.
- 2.3.3 Wheel slip indicator. This is an amber light which normally glows dimly, but becomes bright in the event of wheel slip. In some locomotives wheel slip is self correcting and this will be indicated by the indicator returning to the dim aspect.

2.4 Class 56 locomotives only.

- 2.4.1 Fault indicator. This is a blue light which changes to red in the event of a fault condition in the driven locomotive or a locomotive coupled in multiple.
- 2.4.2 Engine stopped indicator. This is a blue light which changes to red in the event of the engine stopping in either the driven locomotive or a locomotive coupled in multiple.

- 2.4.3 Wheel slip indicator. This is a blue light which changes to red in the event of wheel slip occurring in either the driven locomotive or a locomotive coupled in multiple.
 - 2.4.4 A.W.S. indicator. This is a blue light which changes to red in the event of A.W.S. defects or when the A.W.S. is isolated, or when the master switch is in the OFF position.
 - 2.4.5 Parking brake indicator. This is a Dowty flag type indicator which states ON or OFF according to the setting of the parking brake. The indicator displays black and white cross hatching when the battery isolating switch is open.
- 2.5 Locomotives with electric train supply.
- 2.5.1 Electric train supply indicator. This is a white light which may have a letter H in black on the lens. The indicator is extinguished when train supply is not in use and is illuminated when the train supply is switched on. The indicator will become extinguished in the event of a fault which causes the train supply to be cut off. A dimmer switch is provided to enable the brightness to be reduced during darkness.

3. STARTING THE ENGINE

- 3.1 With the necessary preparation duties performed and the Slow Speed control set for normal operation in Classes 20, 26, 37, 47 and 56, move the master switch to ENGINE ONLY. In Class 56 locomotives check that the AWS indicator changes from red to blue, then press and release the reset button to silence the horn. After at least 30 seconds, or when the compressor stops in Class 47 locomotives fitted with E.P. starting contractors, press the Engine Start button or turn the Engine Start control until the Engine Stopped indicator changes to the running aspect. (See Clauses 2.3.2 and 2.4.2).

The engine room Local Start button can also be used to start the engine, but this will only start the local engine when locomotives are coupled in multiple.

Hearing protection **MUST** be worn if this method is to be used.

If the engine does not start within 30 seconds of cranking commencing in Class 37, 56 locomotives and 47901, the starter motor pinions will automatically disengage.

On Class 56 locomotives there is a delay of 30 seconds - and on 47901 10 seconds - to allow for engine priming, after the start button is pressed before the starter motors are engaged.

- 3.2 Ensure that the radiator shutters are opened on Classes 20, 37 and 50 before moving or when the engine becomes sufficiently warm.

4. TO MOVE A LOCOMOTIVE IN DEPOTS, YARDS, SIDINGS ETC. BEFORE ENTERING TRAFFIC

- 4.1 With the locomotive in operational condition, according to the appropriate instructions, test the automatic brake by making an emergency application, then test the straight air brake by making a maximum application. Check that the brake cylinder pressure rises on both bogies to its maximum on each occasion. (This check may be omitted if the movement immediately follows preparation).
 - 4.1.1 Check that no depot pipes and cables are connected, that no "NOT TO BE MOVED" targets are attached and that NO STAFF are working on, adjacent to, or underneath the locomotive.
 - 4.1.2 Check that all scotches are removed and THAT NO OTHER LOCOMOTIVES OR VEHICLES ARE FOUL.
 - 4.1.3 If taking over the locomotive, check the Repair Book.
 - 4.1.4 Check that the parking brake(s) are released, and that the straight air brake is applied until movement is ready to commence.
 - 4.1.5 Check that the main reservoir pressure is at least 118 p.s.i. or 8.5 bar.
- 4.2 Move the Brake Selector switch or cock to AIR PASSENGER or VACUUM PASSENGER on dual braked locomotives or to PASSENGER on air braked locomotives.
- 4.3 Switch the tail light on if running light.
- 4.4 Excepting Class 56 locomotives, move the AWS switch to ON and press and release the reset button to silence the horn.
- 4.5 Switch the marker lights on. The headlight, where fitted, should be switched on when in service.

- 4.6 When ready to move, depress the D.S.D. pedal according to the instructions in BR.33056/3. Move the master switch to FORWARD or REVERSE and release the straight air brake as described in BR.33056/3.
- 4.7 Move the power controller handle to the first power position and check that the driving ammeter registers traction current. For light running very little extra power will be necessary, but the power controller should be advanced as necessary.

5. ATTACHING TO A TRAIN

IMPORTANT: DRIVING MUST BE PERFORMED, WHEN COUPLING, IN THE DRIVING COMPARTMENT NEAREST TO THE TRAIN.

- 5.1 Approach the train and stop when the gap between the buffers is approximately 6 feet.
- 5.2 On receiving a hand signal from the shunter, apply the minimum power and make gentle contact with the train, using the straight air brake to control the movement.
- 5.3 Use extra power to compress the buffers and then apply the straight air brake. IMMEDIATELY the straight air brake is applied, move the power controller handle to OFF.
- 5.4 Move the master switch to OFF and remove the master key.
- 5.5 Move the automatic brake valve handle or E70 brake controller handle to EMERGENCY and keep the straight air brake applied during the coupling operation.
- 5.6 Check that the coupling has been performed correctly, in accordance with the General Appendix instructions.
- 5.7 Excepting single Class 20 locomotives, leave the driving compartment at the train end and change to the leading end in accordance with Section 6, "Changing Ends, including Locomotives in Multiple".

NOTE: It will not be necessary to perform Clause 6.1 because the master key has been removed as per clause 5.4 and the automatic brake valve handle or E70 brake controller handle will already be at EMERGENCY as per clause 5.5.

6. CHANGING ENDS, INCLUDING LOCOMOTIVES IN MULTIPLE

- 6.1 Move the master switch to OFF and remove the master key.
- 6.2 Move the automatic brake valve handle or E70 brake controller handle to EMERGENCY and wait until the brake pipe pressure falls to zero. When applicable, also allow the vacuum to be destroyed. When this has been done move the handle to SHUT DOWN or NEUTRAL.
- 6.3 Move the straight air brake valve handle to OFF and check that the brake cylinder pressure holds.
- 6.4 Excepting Class 56 locomotives, move the AWS change end switch to OFF.
- 6.5 Switch the marker lights and headlight (where fitted) off and switch the tail light on, where necessary.
- 6.6 WHENEVER POSSIBLE, and when it is safe to do so, alight from the locomotive, closing all windows and doors and proceed to the other end.

If, FOR SAFETY REASONS, it is not possible to alight from the locomotive on either side, then hearing protection must be worn when passing through the engine room with the engine running.

The Brake Selector Switch(es) or Cock(s) of the locomotive(s) must always be set for the type of train to be worked, as shown in the tables in BR.33056/3. This should be done, where necessary, in the appropriate driving compartment(s) of Classes 20 and 37, or by entering the most convenient engine room door during the changing ends procedure. Additionally, the exhaust(er)s must be switched off in the rear locomotive of a multiple pair when working under vacuum conditions. Additionally, the exhaust(er)s of the leading locomotive must be switched on when working a vacuum braked train.

- 6.7 Enter the other driving compartment and apply the straight air brake.
- 6.8 Insert the master key and move the master switch to ENGINE ONLY. On Class 56 locomotives check that the AWS indicator changes from red to blue.
- 6.9 Switch the tail light off and switch the marker lights and headlight on, where fitted.

- 6.10 In all locomotives excepting Class 56, move the AWS change end switch to ON, then press and release the AWS reset button to silence the horn.
- 6.11 In all locomotives excepting Class 56, allow the main reservoir pressure to rise to 95 p.s.i., or 6.5 bar then move the automatic brake valve handle to RUNNING. Check that the brake pipe pressure rises to 72.5 p.s.i. or 5.0 bar and that the vacuum rises to 21 in. Hg., when applicable. Release the chamber side vacuum, when applicable, by the chamber release valve.
- 6.12 In Class 56 locomotives only, allow the main reservoir pressure to rise to 6.5 bar, then move the E70 brake controller handle to RUNNING and check that the brake pipe pressure rises to 5.0 bar.

7. TO MOVE A LOCOMOTIVE WITH A TRAIN ATTACHED INTO SERVICE

- 7.1 If an air braked train is to be worked, observe the brake continuity test as described in General Appendix.
- 7.2 Release the automatic brake and depress the D.S.D. pedal in accordance with the instructions in BR.33056/3.
- 7.3 Move the master switch to FORWARD.
- 7.4 After receiving the signal to start, move the power controller handle to the first power position and then release the straight air brake, noting that current is registered on the driving ammeter and that brake cylinder pressure falls to ZERO.

POWER MUST NOT BE APPLIED IF THE TRAIN MOVES IN THE OPPOSITE DIRECTION TO WHICH THE MASTER SWITCH IS SET.

- 7.5 When the traction current has risen to the maximum for the controller position, increase the power on Class 26, 45 and 47 locomotives to 3/8 of the full setting. On Class 20, 31, 37, 50 locomotives, increase the power, but do not allow the current to exceed the following figures:—

LOCOMOTIVE CLASS	MAXIMUM TRACTION CURRENT IN AMPS
20	1800
31	2000
37	2500
50	2400

When the current reading reduces after using the power controller as described above, increase the power in order to obtain maximum acceleration of the train. Care must be taken to avoid excessive speed of any part of the train on permanent speed restrictions. If traction current overload conditions occur on Class 20, 31 and unfurnished 37 locomotives the power controller handle must be moved back to OFF and then advanced more gradually. If traction current overloading occurs on Class 50 locomotives, the power controller handle must be moved to OFF and the OVERLOAD RESET button must be pressed. Power should then be applied more gradually.

If the rails are greasy, the power must be applied more gradually in order to avoid slipping. If slipping occurs on Class 20, 31 and 37 locomotives, the power must be shut off and sand may be applied. Power should then be re-applied more gradually. If slipping occurs on Class 26, 45, 47 and 50 locomotives, the power must be shut off and the anti-slip button should be pressed. The power should then be applied more gradually after which the anti-slip button should then be released. If slipping persists, the above process should be repeated and sand, where available, may also be used before power is re-applied.

Class 20, 26, unfurnished 37 (numbered 37120 onwards) and 45 have sand and anti-slip brake.

Class 37001 - 37119 and refurbished locomotives numbered above 37120, 47901 and 56 have sand only.

Class 47 and 50 have anti-slip only.

- 7.6 When the train is moving, the power controller may be used as necessary in order to maintain the required speed. Some locomotives have the driving ammeter dial divided into green and yellow sectors. These locomotives must not be operated with the driving ammeter pointer in the yellow sector for more than a total of 1 hour during a particular duty.
- 7.7 When the train is to be stopped or the speed is to be reduced, apply the brakes in accordance with the instructions in "Braking Instructions", BR.33056/3.

8. TO REVERSE THE LOCOMOTIVE

- 8.1 Return the power controller handle to OFF.

8.2 Apply the brakes to hold the locomotive stationary.

DO NOT ATTEMPT TO REVERSE WHEN THE LOCOMOTIVE IS MOVING.

8.3 Move the master switch to the opposite direction of travel.

8.4 Release the brakes, then move the power controller handle as required.

9. INSTRUCTIONS FOR OPERATING AUTOMATIC SLOW SPEED CONTROL EQUIPMENT ON CLASS 26, 47, 56, 20 and 37 LOCOMOTIVES.

9.1 Class 47 locomotives.

9.1.1 With the engine running and the master switch at **ENGINE ONLY**, move the slow speed control switch to **SLOW** for the driving compartment required.

9.1.2 Select the speed required with the slow speed adjusting knob.

9.1.3 Depress the D.S.D. pedal.

9.1.4 Move the master switch to **FORWARD**, move the power controller handle to the $\frac{1}{4}$ power position and release the brakes.

9.1.5 Adjust the speed as necessary by reference to the speedometer, with the slow speed adjusting knob.

9.1.6 On falling gradients, partial braking by means of the automatic or straight air brake will be required to prevent over-speeding.

9.1.7 Power will be cut off automatically and the warning light will glow on the control unit, if the indicated speed exceeds the required speed by more than 2 m.p.h. or if a failure occurs in the control unit.

If power is cut off, move the power controller handle to **OFF** and apply the brakes. Move the master switch to **ENGINE ONLY**, cancel the warning light by turning the slow motion switch to **NORMAL**, then return it to **SLOW**. If the warning light glows immediately, there is a failure in the control unit. If the light does not glow, slow motion working may be resumed in accordance with the instructions above.

- 9.1.8 If the diesel engine is to be stopped, the slow motion switch **MUST** firstly be returned to Normal. Similarly the engine **MUST ONLY** be started when the switch is at **NORMAL**.

9.2 Class 56 locomotives.

- 9.2.1 With the engine running and the master switch at **ENGINE ONLY**, move the slow speed control knob to Position 1 for 0.5 m.p.h., Position 2 for 1.0 m.p.h. or Position 3 for 2.7 m.p.h. This will bring the slow speed speedometer into operation and on some locomotives, will give a slight application of the locomotive brakes.
- 9.2.2 Depress the D.S.D. pedal.
- 9.2.3 Move the master switch to **FORWARD**, move the power controller handle to the **ON** position and release the brakes. Movement beyond this position will cause the locomotive to revert to normal operation.
- 9.2.4 If the diesel engine is to be stopped, the slow motion control knob **MUST** firstly be returned to Position 0. Similarly the engine **MUST ONLY** be started when the control is at Position 0.
- 9.2.5 Power will be automatically reduced if the indicated speed exceeds the required speed. Conversely, the power will be automatically increased if the indicated speed becomes less than the required speed.

9.3 Class 20 locomotives.

9.3.1 Introduction

There are two different types of electronic slow speed control systems fitted to these locomotives, which require different operating techniques.

The first system was developed by the Sc. R. and is applied to locomotives 20179/181/184/191/192/193/198/199, 20201/202/203/204/205/206/208/211/212/213/216/217/218/219/220/221/222/223/224/225/226/227, some of which are now allocated to the L.M.R. and E.R.

The second, using the more sophisticated electronic equipment now available, is fitted to locomotives converted at BREL Crewe (67 locomotives) and BREL Glasgow (23 locomotives).

Both systems operate to a common principle, in that only the leading locomotive requires to be fitted with slow speed equipment - this being known as the MASTER LOCOMOTIVES, whilst the second, or SLAVE LOCOMOTIVE, is only required to provide the necessary tractive effort to move a heavy train away at low speeds.

The control of train speed is exercised by varying the strength of the main generator separate field, and hence its output, by electronic means rather than through the load regulator as it would for normal operation. A measuring device, known as a transducer, is mounted on the end of one of the locomotives axles and feeds a 'signal' proportional to the train speed into the electronic control system - known as the electronic 'rack'. This rack then varies the current passing through the separate field to maintain the constant speed selected i.e. 0.5, 1.0 or 2.7 mph. i.e. if the train speed is below that selected then the field current/output is automatically increased until that speed is attained. Conversely if the speed rises above that selected then the field current/output is reduced until the speed drops to that selected. Therefore according to the gradient and the load of the train, which becomes less as it is emptied or greater as it is loaded, the speed of the movement can be controlled to quite fine limits.

The equipment that a Driver requires to operate is basically similar for either system, consisting of a Slow Speed Select Switch (SSS) mounted on the control cubicle bulkhead and a Slow Speed Speedometer and Slow Speed Control Switch (SSCS) on each driving desk.

The first system incorporates a Slave Cut-out Switch (SCS) in the form of a push button located on the control cubicle bulkhead adjacent to No. 1 (forward) driving position, whilst the second has an additional position on the Slow Speed Select Switch (SSS) marked 'SSI'. The form that the Slave Cut-out Switch takes and its position is perhaps the best guide as to which equipment a particular locomotive has.

9.3.2 Operation of original Sc. R. equipment for locomotives in multiple.

When slow speed operation is required on arrival at the loading or discharge point then:—

- 9.3.2.1 Close the regulating air cocks between the two locomotives.
- 9.3.2.2 On the MASTER locomotive, with the engine running and the master switch at EO, move the Slow Speed Control Switch (SSCS) to SLOW SPEED.
- 9.3.2.3 Select the speed required on the Slow Speed Select Switch (SSS).
- 9.3.2.4 Depress the DSD pedal, move the master switch to FOR, release the automatic brake and open the power controller to the FULL position.
- 9.3.2.5 Once the train is on the move and particularly when discharge is taking place, the Slave Cut-out Switch (SCS) should be operated when the Driver judges that the tractive effort of the SLAVE locomotive is no longer required.

NOTE: Ideally the minimum current on the main ammeter should not fall below 500A to enable the slow speed equipment to function correctly.

- 9.3.2.6 Use the traction current limiting control knob and partial application of the automatic or straight air brake as necessary to control the speed during the loading or discharge operation.

NOTE: If the train comes to a stand during the operation and the power controller is therefore moved to OFF the Slave Cut-out Switch (SCS) is automatically reset by this movement. Therefore when the power controller is re-opened the SLAVE locomotive will again be under power and the SCS must be operated again as necessary.

- 9.3.2.7 When the operation has been completed and the train is brought to a stand then, with the engine running and the master switch at EO, move the Slow Speed Control Switch (SSCS) to NORMAL.
- 9.3.2.8 Ensure that the traction current limiting control knob is at FULL.
- 9.3.2.9 Open the regulating air cocks between the two locomotives.

- NOTES
- 1. This procedure for slow speed control is not a true multiple unit operation in that only the MASTER locomotive is using the slow speed equipment, whilst the SLAVE locomotive is operating normally at the equivalent of the ON position of the power controller i.e. engine idling as the regulating air from the MASTER locomotive is cut off by the closure of the cocks.
 - 2. If the SLAVE locomotive happens to be slow speed fitted its equipment cannot be operated from the MASTER locomotive i.e. there are no train wires within the jumper cables for this purpose.
 - 3. The controls of the SLAVE locomotive must always be set for NORMAL operation.

9.3.3 Operation of the later equipment for locomotives in multiple.

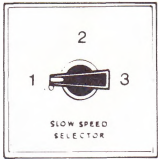
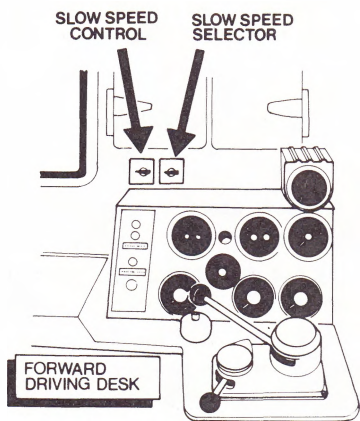
When slow speed operation is required on arrival at the loading or discharge point then:—

- 9.3.3.1 On the MASTER locomotive, with the engine running and the master switch at EO, move the Slow Speed Control Switch to the SS2 position.
- 9.3.3.2 Select the speed required on the Slow Speed Selector Switch.

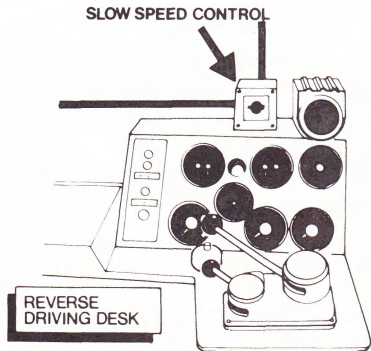
NOTE: This may be altered whilst the locomotive is under power.

- 9.3.3.3 Depress the DSD pedal, move the master switch to

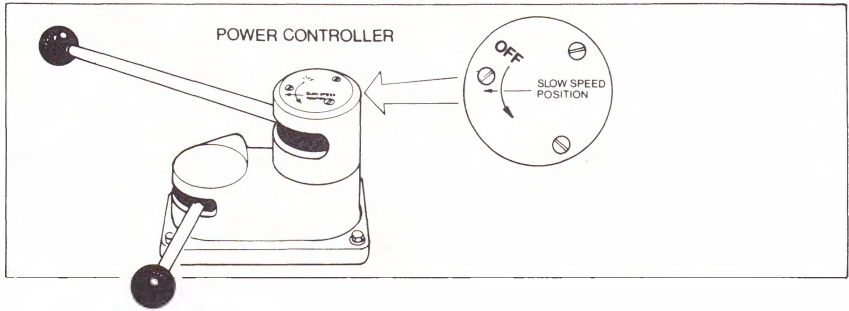
Class 20 Locomotives Modified Slow Speed Control
Later Equipment
Item 9.3.3.



SLOW SPEED
SELECTOR
1 = 0.5 m.p.h.
2 = 1.0 m.p.h.
3 = 2.7 m.p.h.



SLOW SPEED
CONTROL



FOR, release the automatic brake and open the power controller to the SLOW SPEED position.

NOTE: This is a specially marked position beyond the normal ON position.

9.3.3.4 Once the train is on the move and particularly when discharge is taking place, the slow speed control switch must be moved to the SS1 position when the Driver judges that the tractive effort of the SLAVE locomotive is no longer required. When loading is taking place and the weight of the train only requires the tractive effort of the MASTER locomotive, then the slow speed control switch may be set at SS1. As loading progresses then the tractive effort of the SLAVE locomotive may be required. The Driver will observe this condition by reference to the main ammeter and the slow speed speedometer - amps will be reading high yet train speed is falling, therefore it will be necessary to move slow speed control switch to the SS2 position. Once SS2 has been selected then the power controller must be moved to OFF (to reset the control relays on the SLAVE locomotive) and then reopened to the SLOW SPEED position.

9.3.3.5 When the operation has been completed and the train is brought to a stand then, with the engine running and the master switch at EO, move the slow speed control switch to NORMAL.

NOTES: 1. This procedure for slow speed control is not a true multiple unit operation in that only the MASTER locomotive is using the slow speed equipment, whilst the SLAVE locomotive is operating normally at the 'power' position equivalent to the SLOW SPEED position of the power controller of the MASTER locomotive. When the slow speed control switch is moved to the SS1 position then train wire 5 (through the jumper cables) is de-energised to in turn de-energise the Power Control Relay (PCR) of the SLAVE locomotives and so prevent traction power being obtained on that locomotive.

2. If the SLAVE locomotive happens to be slow speed fitted its equipment cannot be operated from the MASTER locomotive i.e. there are no train wires within the jumper cables for this purpose.
3. The controls of the SLAVE locomotive must always be set for NORMAL operation.
4. If the power controller is inadvertently opened to beyond the SLOW SPEED position then traction power is automatically cut off. To regain power it will be necessary to return the power controller to OFF and re-open it to the SLOW SPEED position only.
5. If the locomotive loses traction power due to an 'overspeed' or 'underspeed' trip associated with the slow speed equipment this will be indicated by illumination of the red 'fault latch' Light Emitting Diode (LED) on the Speed Sensing Module. The power controller must be returned to the OFF position and then re-opened to the SLOW SPEED position to reset the equipment.

9.4 Class 37 locomotives.

A. When slow speed working is required:

- 9.4.1 With the train at a stand, engine running and the master switch at ENGINE ONLY - move the slow speed selector switch to SPEED 1 for 0.5 m.p.h., SPEED 2 for 1.0 m.p.h. or SPEED 3 for 2.7 m.p.h. This will bring the slow speed speedometer into operation.
- 9.4.2 Depress the DSD pedal, move the master switch to FORWARD, release the brakes and move the power controller to the ON position. Movement beyond this position will have no effect on a single locomotive.

If locomotives are in multiple then the trailing locomotive (known as the SLAVE) will still be under normal control and its engine speed/tractive effort will increase as the power controller is opened beyond the ON position. The leading

locomotive (known as the MASTER) will remain under slow speed control.

Once the train is on the move, and particularly when discharge is taking place, the slave cut-out button should be pressed and released when the Driver judges that the tractive effort of the SLAVE locomotive is no longer required. This will remove traction power/tractive effort from the trailing locomotive although its engine speed will still respond to any change in the position of the power controller.

NOTE: The slave cut-out button is only operative in slow speed control and must be pressed and released only when the power controller is open to the ON position or beyond.

To re-apply power on the trailing SLAVE locomotive, the power controller should be moved to OFF and then back to ON.

9.4.3 If the engine stops for any reason whilst the locomotive is under slow speed control then the slow speed selector switch must be moved to OFF before any attempt is made to restart the engine. Similarly the switch must be at OFF before the engine is started under normal control e.g. during preparation.

9.4.4 Traction power will be automatically reduced if the indicated speed exceeds the required speed. Conversely traction power/tractive effort will be automatically increased if the indicated speed becomes less than the required speed.

Under light load conditions, or on falling gradients, a partial application of the automatic or straight air brake may be necessary to prevent over-speeding.

B. To revert to normal working:

9.4.5 With the train at a stand, engine running and the master switch at ENGINE ONLY - move the slow speed selector switch to OFF.

NOTES 1. If locomotives are in multiple, this procedure for slow speed control is not a true multiple unit

operation in that only the MASTER locomotive is using the slow speed equipment, whilst the SLAVE locomotive is operating normally according to the power controller position on the MASTER locomotive. When the tractive effort of the SLAVE locomotive is no longer required then operation of the slave cut-out switch will de-energise train wire 5 (through the jumper cables) to de-energise the power control relay of the SLAVE locomotive and so prevent traction power being obtained on that locomotive.

2. If the SLAVE locomotive happens to be slow speed fitted its equipment cannot be operated from the MASTER locomotive i.e. there are no train wires through the jumper cables for this purpose and the controls of the SLAVE locomotive must always be set for NORMAL operation.

9.5 Class 26 locomotives (26001 - 26007)

A. When slow speed working is required:

- 9.5.1 With the train at a stand, engine running and the master switch at ENGINE ONLY - move the slow speed selector switch to SLOW for the driving compartment required.
- 9.5.2 Check that the WARNING light is not illuminated.
- 9.5.3 Move the slow speed demand switch to 0.5 m.p.h.
- 9.5.4 Move the master switch to FOR or REV.

NOTES: 1. A period of approximately one minute is required for the equipment to stabilise. Any adjustments to the locomotive speed can be made by careful use of the slow speed demand switch. Similarly wheelslip may be countered by turning the demand switch to a lower range, raising it again to the required speed gradually when wheelslip has ceased.

2. If it is necessary to stop the diesel engine when operating in slow speed conditions then the slow speed switch **MUST** first be returned to the NORMAL position (unless there is an emergency).

Similarly the slow speed switch **MUST** be in the **NORMAL** position before the engine is started.

B. To revert to normal working:

9.5.5 With the train at a stand, engine running and the master switch at **ENGINE ONLY** - move the slow speed demand switch to **ZERO**.

9.5.6 Move the slow speed selector switch to **NORMAL**.

C. Failures of slow speed equipment:

9.5.7 In the event of the prescribed speed being exceeded by 2 mph. a **LOCOMOTIVE OVERSPEED** will occur, indicated by a complete loss of traction power and illumination of the equipment warning light in the engine room.

To reset the overspeed equipment:

(a) With the train at a stand, engine running and the master switch at **ENGINE ONLY**, move the slow speed selector switch to **NORMAL**.

(b) Check that the warning light is extinguished.

(c) Return the selector switch to **SLOW**.

9.5.8 If traction power is not regained, or if power is lost and the warning light is illuminated without overspeed occurring, then an equipment failure may have occurred. If the equipment will not reset and the warning light is again illuminated then the slow speed control unit is defective and slow speed operation is no longer available. Revert to normal operation.

10. TO STOP ENGINE

10.1 Move the power controller handle to **OFF**.

10.2 Move the master switch to **OFF**, then press the **STOP** button.

10.3 As an alternative, the engine may be stopped by the engine room stop button (where fitted) or by the governor over riding lever.

Hearing protection MUST be worn if this method is to be used.

IMPORTANT: If the engine of a Class 26, 45 or 47 locomotive stops, when on full load, the master switch must be moved to the **ENGINE ONLY** position **AFTER** the train has been brought to a stand. When the train has been standing 2 minutes, the handle must be returned to **OFF**. In the event of an outbreak of fire in **ANY** locomotive, the train must be brought to a stand as soon as possible. The master switch must then be moved to **OFF** and the engine must be stopped immediately the train stops. The fire must then be dealt with as described in BR.33056/7.

11. LEAVING A LOCOMOTIVE ON A RUNNING LINE

If it is necessary to carry out Rules or other duties which are away from the vicinity of the train then:

- (i) Move the automatic brake valve handle to **EMERGENCY**, or depress the emergency brake plunger, and observe that the brake cylinder pressure rises to its maximum.
- (ii) Fully apply the straight air brake.
- (iii) Shut down the engine, unless it is required to provide an electric train supply.
- (iv) Move the master switch to **OFF**.
- (v) Remove and retain the master key, noting that the brake cylinder pressure is holding.
- (vi) Apply the parking brakes in all driving compartments.

NOTE: If it is required to check for loss of air brake pipe pressure on a train conveying Mark III coaching stock then the automatic brake valve should be moved to **FULL SERVICE** rather than **EMERGENCY** in order that the passenger communication audible indicators may be heard.

In the case of Guardless Trains which may have to be left unattended, a sufficient number of vehicle handbrakes must also be applied to ensure that the train will remain secured if the power brake leaks off, if either of the following conditions apply:

- (a) On gradients steeper than 1 in 100 before leaving the vicinity of the train.

- (b) On gradients between 1 in 100 and 1 in 200 if the train is liable to be left for more than 15 minutes after the compressors have been disabled by engine shut down, loss of power supply or placing of the master switch to OFF.

NOTE: See Working Manual, Part 6, Section C10, for instructions regarding the application and release of wagon brakes.

12. DETACHING FROM A TRAIN WHEN IN THE FRONT DRIVING COMPARTMENT.

12.1 If the train is fitted partially or fully with continuous brakes.

- 12.1.1** With the electric train supply “off”, move the automatic brake valve handle to **EMERGENCY**.
- 12.1.2** Indicate to the shunter that the brake pipe hoses and train supply jumpers (where applicable) may be uncoupled.
- 12.1.3** When the shunter gives a hand signal, to indicate that the locomotive air brake pipe cock has been closed, or the vacuum hose has been placed on the dummy plug and that the buffers may be compressed, move the automatic brake valve handle to **RUNNING**.
- 12.1.4** Check that the locomotive brake releases.
- 12.1.5** Move the master switch to **REVERSE**.
- 12.1.6** Apply sufficient power to compress the buffers, then apply the straight air brake and **IMMEDIATELY** move the power controller handle to **OFF**.
- 12.1.7** When all pipes, jumper cables and drawgear have been uncoupled and the shunter gives a hand signal to draw away, move the master switch to **FORWARD**, release the straight air brake and move the locomotive away as required.

12.2 If the train is not fitted with continuous brakes:

- 12.2.1** Move the automatic brake valve handle to **EMERGENCY**.
- 12.2.2** Allow the shunter to apply sufficient hand brakes.
- 12.2.3** Move the automatic brake valve handle to **RUNNING**.

- 12.2.4 Move the master switch to REVERSE.
- 12.2.5 When the shunter gives a hand signal apply sufficient power to compress the buffers, then apply the straight air brake and IMMEDIATELY move the power controller handle to OFF.
- 12.2.6 When the drawgear has been uncoupled and the shunter gives a hand signal to draw away, move the master switch to FORWARD, release the straight air brake and move the locomotive away as required.

NOTE: 1. References to shunters apply to any person who may perform coupling or uncoupling operations.

2. If in the rear driving compartment during the uncoupling operations e.g. when in a terminal station etc., the opposite directions of the master switch to those stated above must be selected.

13. CONDITIONS UNDER WHICH THE DIESEL ENGINES OF STATIONARY LOCOMOTIVES MAY BE RUN IN STATIONS

LOCOMOTIVE FUNCTION	*HEATING SEASON WITH NON-AIR-CON- DITIONED STOCK		*NON-HEATING SEASON	
	Arrival End Of Platform	Departure End Of Platform	Arrival End Of Platform	Departure End Of Platform
TRAIN LOCOMOTIVE	Until uncoupled from the train. To be restarted 2 mins. before empty stock is due to be worked out.	Engine to be shut down after testing the brakes. To be restarted 3 mins. before departure time.	Until uncoupled from the train. To be restarted 2 mins. before the empty stock is due to be worked away.	Engine to be shut down after testing the brakes. To be restarted 3 mins. before departure time.
EMPTY STOCK LOCOMOTIVE WHERE NO STATION SHORE SUPPLY IS AVAILABLE	Continuously for train supply purposes (if required) until the train locomotive is coupled. To be restarted 2 mins. before the departure time of the train.	Engine to be shut down after testing the brakes. To be restarted 3 mins. before departure time.	Until uncoupled from the train. To be restarted 2 mins. before the train is due to depart.	Engine to be shut down after testing the brakes. To be restarted 3 mins. before departure time.
EMPTY STOCK LOCOMOTIVE WHERE A STATION SHORE SUPPLY IS AVAILABLE	Until uncoupled from the train. To be restarted 2 mins. before the train is due to depart.	Engines to be shut down after testing the brakes. To be restarted 3 mins. before departure time.	Engines to be shut down	
TRAIN LOCOMOTIVE MAKING NORMAL STATION STOP		To run continuously		To be shut down if the stop is to exceed 5 mins. and no vehicles are to be attached. To be restarted 2 mins before departure.

IMPORTANT: When air conditioned stock is in use, a continuous electric train supply must be provided to the train, during all seasons, by either a shore supply or the locomotive.