BRITISH TRANSPORT COMMISSION
DIESEL PULLMAN TRAINS.

DIESEL ELECTRIC MOTOR COACHES
M.60090 - 60093, W.60094 - 60099

COACHES WITH AUXILIARY ENGINES
M.60730 - 60733, W.60644 - 60649

TRAILER COACHES
M.60740 - 60743, W.60734 - 60739 & 60744 - 60749

INSTRUCTIONS FOR THE OPERATION OF AUXILIARY POWER UNITS AND SERVICES.

INDEX.

The classification of the Auxiliary Power Services and Instructions for their control are set out under the following headings :

BRITISH TRANSPORT COMMISSION : BRITISH RAILWAYS

C.M.&.E.E. DEPARTMENT.

BRITISH TRANSPORT COMMISSION - BRITISH RAILWAYS : DIESEL MULTIPLE UNIT MAIN LINE DE-LUXE EXPRESS TRAINS.

Instructions for the Operation of Auxiliary Power Units and Services on London Midland Region 6-Car and Western Region 8-Car Trains.

The Instructions set out herein are to be strictly observed by Members of the Staff authorised to operate the Auxiliary Power Units and Services. Authority to operate the equipment does not necessarily infer authority to make adjustments and repairs to any item of equipment; adjustments or repairs should only be carried out by the trained personnel stationed at Terminal Stations, Sidings and Maintenance Depots, already appointed to undertake such work.

If, after carrying out these Instructions, a Power Unit or Service fails to function correctly, steps should be taken immediately to report the failure in accordance with the established procedure, as operates in the case of normal Steam or Diesel Rail Car trains.

Note : On the Western Region 8-Car trains, Power Units and Controls are located on the Second Class Parlour Cars. On the Midland Region 6-Car trains they are located on the First Class Kitchen Cars. To avoid confusion throughout these Instructions, both types of Cars will be referred to as the AUXILIARY POWER CARS.

INTRODUCTION.

The Power Units are mounted beneath the Auxiliary Power Cars and consist of a Diesel Engine Driven Alternator generating a 400 volt 3 phase 50 cycle supply, which supplies the power for the operation of the Auxiliary Services throughout the train. 24 volt lead acid batteries installed on each of the Cars supplies power for the operation of the Emergency and Standby Services for use when the Power Units are shut down.

INTRODUCTION (Cont'd).

External and internal controls are provided on each of the Cars on which the Power Unit is mounted, the external controls are provided to facilitate maintenance and servicing, and when the Power Unit is started from this position, electrical power supplies are not available.

During normal conditions it is only necessary to operate one Power Unit, the second Power Unit being held as reserve, but during times of pre-heating before departure and during service in severe Winter conditions, it may be necessary to operate both Power Units in order to provide the additional Heating current.

Each of the Power Units has its own set of Feeder Mains running throughout the length of the train and connected between Cars by means of Stone-Kheops couplings.

The first Power Unit started and connected to its Feeder Main provides the power necessary to operate all the services for normal conditions, and when it is essential to operate both Power Units, automatic control gear ensures that, should the first Power Unit or Feeder Main be shut down for any reason, the power supply is automatically connected to and supplied by the second Power Unit, but power for additional Heating will not then be available until the first Power Unit is re-started.

A comprehensive system of automatic protective devices are incorporated to safeguard the electrical and mechanical equipment, pilot lights fitted on the control panels located in the Auxiliary Power Cars, indicating if the Power Units and Feeder Mains are functioning satisfactorily.

To overcome the necessity of running the Power Units in specified Terminal Stations and Sidings, an independent external power supply has been provided at these points, and Instructions for the connecting and operation of the equipment controlling these external supplies will be found in the appropriate Chapter.

INTRODUCTION (Cont'd).

Note : Before attempting to start the Power Unit, it is important that the following checks are carried out :-

(a) Check that there is adequate fuel in the Fuel Tank which is suspended beneath the Car adjacent the Power Unit. The contents gauge is fitted in the side of the Tank and can conveniently be read from the side of the Car. As an approximate guide, the normal consumption for continuous running is $3\frac{1}{2}$-gallons per hour.

(b) Check that the Engine lubricating oil is up to the correct level indicated on the dip-stick. This is located to the left of the Engine Control Rack.

(c) Check that the Engine Fuel Feed Stop Cock is turned 'ON', that is, when the Stop Cock lever runs parallel with the fuel feed pipe.

(d) Check that the Starter Cable Isolating Switch has been switched 'ON' by turning in clockwise direction. This is located to the left of the Engine Control Switch Box adjacent the Power Unit.

(On occasions when the Power Unit(s) are about to be operated by personnel normally engaged on the train during actual running service, and prior to departure from Terminal Stations, Items (a), (b), (c) and (d) above, will have been checked by the appropriate Maintenance and Servicing Staff.)

CHAPTER 1.

STARTING AND STOPPING OF POWER UNIT(S) (EXTERNAL CONTROLS).

Note : When the Power Unit(s) are started by the 'External Controls' the Alternator does NOT supply power to any part of the train.

The Engine Control Switch Box is located on the underframe adjacent the Power Unit(s). Three buttons are fitted on the Switch Box, from left to right they are identified as 'START', 'STOP' and 'IDLING'.

It will be seen that at the rear of the expanded metal grid, which provides protection for the Engine Control Rack, there are three 'Solenoids' identified from left to right as the 'IDLING', 'FUEL ON' and 'PRIMING' Solenoids, coloured 'Black, 'Yellow' and 'Blue' respectively.

(a) Press the 'Start' button for at least three seconds.

(a) (i) The linkage mechanism at the top of the 'Fuel On' Solenoid will be seen to operate.

(a) (ii) The linkage mechanism at the top of the 'Priming' Solenoid will be seen to operate.

(a) (iii) The Engine should now fire and run up to the normal running speed of 1500 R.P.M.

(If the Engine fails to fire, wait for one minute before pressing the 'Start' button again. If after three such attempts the Engine fails to start and points (a), (b), (c) and (d), referred to in Introduction, have been re-checked, the Starter Cable Isolating Switch should be switched to the 'Off' position and the failure reported to the appropriate Maintenance Department.)

Idling Speed.

If it is required to run the Engine at idling speed (700 R.P.M.), having first started the Engine by use of the external 'Start' button, the engine should be allowed to run for at least two minutes at normal running speed.

CHAPTER 1 (Cont'd).

STARTING AND STOPPING OF POWER UNIT(S) (EXTERNAL CONTROLS).

Idling Speed.

(b) Press the 'Idling' button until the linkage mechanism at the top of the 'Idling' Solenoid on the Engine Control Rack has completed its stroke, by which time the Engine speed will have reduced and remained steady at 700 R.P.M.

Note : Idling speed can only be obtained by first running at normal speed by use of external 'Start' buttons.

STOPPING THE POWER UNIT(S) (EXTERNAL CONTROLS).

(c) Press the 'Stop' button for three seconds.

(d) The Engine will shut down.

Note : If the Power Unit(s) are started by use of the internal 'Start' buttons the pressing of the external 'Idling' or 'Stop' button will have no effect and the Engines will continue to run.

STARTING AND STOPPING OF POWER UNIT(S) (INTERNAL CONTROLS).

(e) Close the Feeder Control Isolating Switch on the Instrument and Indicator Lights Panel. This panel is located in a locked cubicle (B.R.1 Key) in the lobby of the Auxiliary Power Cars. Check that the Feeder Control Indicator Light is illuminated.

(f) Press the 'Start' button on the Diesel Control Panel for approximately five seconds. This panel is located in a locked cubicle (B.R.1 Key) at the side of the Instrument and Indicator Lights Panel.

The 'Fuel On' Light Indicator (Green) will light.

The 'Starting' Light Indicator (Green) will light and go out after approximately ten seconds.

The 'Low Oil Pressure' Light Indicator (Red) will light and go out after approximately ten seconds.

The Power Unit(s) should now be running at the normal running speed of 1500 R.P.M. and the Feeder Mains are 'Alive'.

CHAPTER 1 (Cont'd).

STARTING AND STOPPING OF POWER UNIT(S) (INTERNAL CONTROLS).

Note : If after pressing the 'Start' button for approximately five seconds the 'Fuel On' Light Indicator (Green) goes out or the 'Low Oil Pressure' Light Indicator (Red) remains illuminated, this indicates that the Engine has failed to start. After a period of approximately twenty seconds press the 'Start' button again. If the Engine still fails to start after three such attempts this Power Unit should be kept out of service. The Feeder Isolating Switch should be switched 'Off' on the Instrument and Indicator Lights Panel and the other Power Unit started up. The failure should be immediately reported to the appropriate Maintenance Staff.

(g) Check that the three local Alternator Indicator Lights are illuminated on the Instrument and Indicator Lights Panel.

(h) Check that the Exciter Voltmeter is reading between 24 and 26 volts.

(j) Check that the Alternator Field Current Ammeter is reading between 9 and 17 amperes.

(k) Check that the Alternator Line Voltmeter is reading between 390 and 410 volts.

(l) Check that the Alternator Line Current Ammeter reading does not exceed 190 amperes.

(If before starting from the Internal Controls it is found that the 'Fuel On' Light Indicator (Green) and the 'Idling' Light Indicator (Red) is illuminated on the Diesel Control Panel, this indicates that the Engine has already been started by the 'External' push buttons and that the Engine is running at idling speed (700 R.P.M.). Pressing the internal 'Start' button will cause the Engine to change from ilding to normal speed and the 'Idling' Light Indicator (Red) will be extinguished.)

In addition to the Controls and Indicator Lights described in the foregoing Instructions, the following Safety Devices and Warning Indicator Lights are incorporated on the :-

CHAPTER 1 (Cont'd).

STARTING AND STOPPING OF POWER UNIT(S) (INTERNAL CONTROLS).

DIESEL CONTROL PANEL.

Low Water Level Indicator Light.

Should the Engine cooling water fall below the pre-determined level, this Indicator Light will be illuminated and the Engine will automatically shut down.

Low Oil Pressure Indicator Light.

Should the Engine lubricating oil pressure fall below the safe working limit, this Indicator Light will be illuminated and the Engine will shut down.

Idling Indicator Light.

This is illuminated when the Engine has been started by operation of the external 'Idling' buttons.

INSTRUMENT AND INDICATOR LIGHTS PANEL.

Overload Indicator Light.

This lamp is illuminated in the event of an overload on the Alternator. The Alternator will be automatically disconnected from its Feeder Main and power will not be available from the Power Unit.

Overload Re-Set Button.

If the Overload Indicator Light is illuminated as above, wait for two minutes and then press the Overload Re-Set Button which will re-set the overload relay and the power supply will be available.

WARNING : Under no circumstances must the button be held in.

If the power supply is not restored and the Overload Indicator is illuminated again, the procedure for the shut down of this Power Unit must be carried out and the failure reported to the Maintenance Staff.

CHAPTER 1 (Cont'd).

STARTING AND STOPPING OF POWER UNIT(S) (INTERNAL CONTROLS).

INSTRUMENT AND INDICATOR LIGHTS PANEL.

Over-Voltage Indicator Light.

If the Feeder Main voltage rises above 500 volts, this light will be illuminated and the Engine will automatically shut down. The procedure for complete shut down of the Power Unit must be carried out and the failure reported to the Maintenance Staff.

The Re-Set Button for the over-voltage relay is fitted on the Fuse and Distribution Panel which is located immediately below the Diesel Control Panel, but Members of the Staff, other than Maintenance personnel, should not attempt to re-set, as investigation as to the cause of the failure should be carried out.

In conclusion, when it is found necessary to start both Power Units the identical procedure is carried out on starting the second Power Unit as on the first, and when the Feeder Control Isolating Switch is closed on the Instrument and Indicator Lights Panel for the second Power Unit, both sets of 'three' Local and Remote Alternator Indicator Lights will be illuminated on the Instrument and Indicator Lights Panel in both Auxiliary Power Cars.

As the first Power Unit started up will supply the priority power, the reading on the Alternator Line Current Ammeter for the second Power Unit will read not more than 70 amperes.

CHAPTER 2.

AIR CONDITIONING (HEATING-COOLING-VENTILATING).

INTRODUCTION.

Each of the Cars comprising the train are fitted with a self-contained Air Conditioning system to maintain each Car at a controlled temperature and humidity regardless of outside conditions. Briefly, the equipment consists of a mechanical refrigeration system comprising, compressor and condenser units mounted on the underframe, an Air Conditioning unit located in the roof of the Car consisting of, evaporator unit, a group of electric heating elements, and two centrifugal type blower fans operated by an electric fan motor. Electric heating elements are also fitted behind steel grids on the sides of the Cars at floor level.

The temperature within the Car is automatically controlled, the changeover from cooling to heating and vice versa is also automatically effected. Outside air passes through one stage of filteration and, blown by the centrifugal fans passes over the electric heating elements, over the cooling coils of the evaporator to be delivered into the air duct, discharging into the Car through the slot discharges which run at the side of, and parallel with the roof lighting panels, in the roof of the Car. The moisture content of the incoming air is reduced by its passage over the low temperature surface of the evaporator tubes, collected in the drip tray and discharged.

When air heating is required the air passes over the electric heating elements warming the air to a controlled temperature, passing over the cooling coils of the evaporator, which are inoperative during heating conditions. Part of the air delivered into the Car is allowed to escape to the outside atmosphere, through grids fitted at the bottom of the compartment swing doors, the remaining air passing through return ducts and filters to be re-circulated through the centrifugal blower fans in the Air Conditioning roof unit, a slight pressure being maintained in the passenger compartment.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (HEATING-COOLING-VENTILATING).

AIR CONDITIONING (OPERATION) HEATING.

In order to obtain Air Conditioning on any Car, one or both Power Unit(s) must be operating. The Air Conditioning Control Panel fitted in each Car is mounted in a locked cubicle (B.R.1 Key), located in the lobby end. Mounted on this panel are the controls by which the temperature requirements of the Car can be pre-set, and after pressing the 'On' button of the Air Conditioning Through Train Control Switch, located immediately below the Instrument and Indicator Lights Panel in each of the Auxiliary Power Cars, the Air Conditioning equipment throughout the train can be switched 'On' or 'Off' as required.

The Air Conditioning Control Panel is fitted with the following manual controls :-

Temperature Control Selector Switch.

Fan and Temperature Control Isolating Switch.

Time Delay Setting Dial.

The Temperature Control Selector Switch can be set in any one of three positions :-

Low, Medium or High,

and the temperature range of each position is :-

'Low' position maintains the Car temperature between 68 and 70°F.

'Medium' " " " " " " 71 and 73°F.

'High' " " " " " " 74 and 76°F.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (HEATING-COOLING-VENTILATING).

AIR CONDITIONING (OPERATION) HEATING.

To assist in the selection of the correct position, a dial type Thermometer is provided and is located at the side of the Air Conditioning Through Train Control Switch, on each of the Auxiliary Power Cars. This Thermometer records the temperature of the air drawn into the Car to pass through the Air Conditioning unit, and though the selection of the correct heating position must to a large extent be left to the discretion of the personnel normally engaged on the train during actual running conditions, in order that they may satisfy passenger requirements in any individual Car, it is only necessary to turn the switch to a higher or lower setting to obtain an increase or decrease in the Car temperature.

The following settings are found to be most satisfactory, and are recommended as a guide :-

Dial Thermometer Reading.	Selector Switch Setting.	Power Unit(s) required in Operation.
Below 45°F.	'High' position	Two
Between 50° and 55°F.	'High' "	One
Between 55° and 60°F.	'High' "	One
Between 60° and 65°F.	'Medium' "	One
Between 65° and 70°F.	'Low' "	One

During times of pre-heating the train at Terminal Stations or Depots, the Temperature Control Selector Switch should be set in the 'High' position, as for reasons explained (see Chapters 13 and 14 - External Power Supplies) only one Feeder Main will be supplying power to the Auxiliary Power Services.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (HEATING-COOLING-VENTILATING).

AIR CONDITIONING (STARTING).

(a) Set the Temperature Control Selector Switch to the desired position on each Air Conditioning Control Panel.

(a) (i) Check that the 'Supply No.1' and/or 'Supply No.2' Indicator Light(s) are illuminated on each panel. These indicate if No.1 and/or No.2 Power Unit(s) are supplying power to the Air Conditioning Control Panel.

(a) (ii) Switch 'On' the Fan and Temperature Control Isolating Switch on each panel.

(a) (iii) Press the 'On' button of the Air Conditioning Through Train Control Switch in either of the Auxiliary Power Cars.

The Air Conditioning systems on all Cars are now fully operative and under automatic control, and the following additional Warning Indicator Lights will be illuminated on this panel :-

The 'Fan Motor Pilot Light' indicating that the Blower Fans in the Air Conditioning roof unit are working.

The Air and Floor Heat No.1 and/or the Air and Floor Heat No.2 Indicator Lights, one or both of these Indicator Lights will light at the time of starting up the equipment, but will from time to time be cut in, and cut out, according to temperature requirements controlled by the automatic control equipment.

AIR CONDITIONING (COOLING).

No manual control is necessary for this during normal operational service, for when the equipment is operating under cooling control the refrigeration compressor is brought in by the automatic control equipment and the 'Compressor Motor Pilot Light' will be illuminated on the Air Conditioning Control Panel.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (COOLING).

It is, however, necessary to note that, when the 'Pilot Light' is extinguished for only short intervals of time, it is an indication that a lower setting of the Temperature Control Selector Switch is necessary.

During the cooling period the Air and Floor Heat No.1 and/or Air and Floor Heat No.2 Indicator Lights will be extinguished.

Pressure Gauges.

In the cubicle housing the Air Conditioning Control Panel on each Car, refrigerant high and low pressure gauges are installed, mounted at the side of the Control Panel. These are provided for use of Maintenance and Servicing Staff.

High Pressure Cut-Out.

This is mounted next to the high pressure gauge, and will operate if the pressure in the Air Conditioning refrigeration system exceeds 240 lbs. per sq.in. and will shut down the refrigeration equipment.

When this operates, a Red Re-Set Button extends at the side of the switch, which should be pressed to re-set when the high pressure gauge reading has fallen below 150 lbs. per sq. in.

Do not hold the button in.

Do not attempt to re-set the button more than once, but report the failure to the Maintenance Staff.

AIR CONDITIONING (OPERATION) VENTILATING.

During the heating and cooling operation, a periodic change of air takes place in the Car automatically. Should, however, it be found necessary to ventilate the Car to remove traces of tobacco smoke, fumes, etc., during periods when both Power Unit(s) are shut down, switch 'On' the Fan and Temperature Control Isolating Switch on the Air Conditioning Control Panel.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (OPERATION) VENTILATING.

Check that the Fan Motor Pilot Light Indicator is illuminated.

Press the 'On' button of the Air Conditioning Through Train Control Switch.

The Blower Fans in the Air Conditioning roof unit will now operate to cause a change of air to take place in the Car.

(This operation must NOT be allowed to continue for longer than five minutes, as the power supply for operation of the Blower Fans is supplied by the 24 volt battery beneath the Car and heavy demand is made on the battery which in the case of the Auxiliary Power Cars could result in insufficient power being available for starting the Auxiliary Power Unit(s).)

AIR CONDITIONING (OPERATION) STOPPING.

To stop the heating, cooling and ventilating system :-

Individual Cars.

Switch 'Off' the Fan Temperature Control Isolating Switch.

The Fan Motor Pilot Light Indicator will be extinguished.

The Air and Floor Heat No.1 and/or Air and Floor Heat No.2 Indicator Lights will be extinguished.

The system on this Car will shut down.

Through Train Control.

Press the 'Off' button of the Air Conditioning Through Train Control Switch.

Air Conditioning systems on all Cars will now shut down, extinguishing lights as for individual Cars.

CHAPTER 2 (Cont'd).

AIR CONDITIONING (OPERATION) STOPPING.

Note : After shutting down the Air Conditioning system, by use of the Air Conditioning Through Train Control Switch on completion of the daily working of the train, the position of the Temperature Control Selector Switch can remain unchanged, and no attempt made to pre-select the following day's setting. The Fan and Temperature Control Isolating Switch on each Car should be switched to the 'Off' position.

In conclusion, in order to ensure the maximum comfort for passengers and the efficient operation of the Air Conditioning system in each Car, it should be noted that as only the passenger carrying compartment of each Car is subjected to Air Conditioning at a slightly increased pressure and not the lobby ends, Kitchen corridors and Guard's compartments, every care should be exercised to prevent compartment end swing doors from remaining open for long periods due to obstruction by luggage, etc., etc., causing undue draughts and loss of Car temperature.

CHAPTER 3 : For attention of Pullman Staff and Guard.

LIGHTING (MAIN-EMERGENCY-STANDBY).

INTRODUCTION.

The Main lighting in the passenger compartments of each Car is provided by 230 volt - 5 ft. Fluorescent tubes located in the roof fittings, 110 volt incandescent lamps fitted below the compartment luggage racks, and individually switched table lamps fitted with 110 volt incandescent lamps.

The Kitchen and Pantries in First Class Kitchen Cars are equipped with 230 volt - 4 ft. tubes, and lobby ends, Kitchen corridors and passenger Lavatory mirror lights are provided with 110 volt - 18" tubes.

Main Lighting by 110 volt incandescent lights is also provided in the Guard's compartment of each Motor Car, tumbler switches suitably idented being located above the Guard's compartment doors for local control. Power supply for the Main lighting is available only when one or both Power Unit(s) are operating.

The Emergency lighting is provided by 24 volt incandescent lamps supplied by the 24 volt lead acid battery on each Car to provide lighting in all sections of the train when the Power Unit(s) are shut down, or in the event of failure of both Power Unit(s).

After operation of the Through Train Control Lighting Switch, fitted in each Guard's compartment, the changeover from Main to Emergency lighting and vice versa is automatically effected.

The Standby lighting provided in the Staff compartment, Kitchens and Pantries of the First Class Kitchen Cars is by 24 volt incandescent lamps. Power supply for this is from the 24 volt lead acid battery and can be operated independent of the Through Train Control Lighting Switch and are individually controlled by suitable idented tumbler switches, located on the corridor partition adjacent the Kitchen Pantry and Staff compartment doors.

CHAPTER 3 (Cont'd).

LIGHTING (MAIN-EMERGENCY-STANDBY).

To Operate Main Lighting.

When one or both Power Unit(s) are operating, the table lamps will be illuminated when their individual switches are operated.

Main Lighting.

Press the 'On' or 'Off' button of the Through Train Control Lighting Switch located in the Guard's compartment of each Motor Car, according to requirements.

Emergency Lighting.

When both Power Unit(s) are shut down and lighting is required, operate the Through Train Control Lighting Switch 'On' or 'Off' button, according to requirements.

Standby Lighting.

When both Power Unit(s) are shut down, or in event of the failure of the power supply, the Standby lights located in the Staff compartment, Kitchen Pantries and Guard's compartment, will be available by operation of the suitably idented tumbler switches provided at these positions.

Emergency Hand Lamps.

Electric hand lamps for use in case of emergency are carried in the Emergency Tool Cupboard located in the Guard's compartment of each Motor Car. These may be plugged into the 2-pin emergency socket, provided in the following positions :-

External : Standard B.R. emergency sockets, fitted each side of all Cars.

Internal : Inside the locked cubicle (B.R.1 Key) housing the Air Conditioning Control Panel, in the lobby end of each Car above the Control Panel.

CHAPTER 4.

BATTERY CHARGING.

Controls for the battery charging are fitted on the fuse and Distribution Panel. This panel is located in the locked cubicle, (B.R.1 Key), housing the Air Conditioning Control Panel on all Cars, except in the case of the Auxiliary Power Cars, where it is located below the Diesel Control Panel, and one or both Power Unit(s) must be operated in order to charge the batteries.

The following manual controls are fitted to the panel, which during actual running conditions should remain in the 'On' position :-

Battery Charge Isolating Switch.

Battery Contactor Switch.

The battery charging system on all Cars is such, that the battery is ordinarily kept approximately fully charged.

The Instructions for the maintenance, servicing and adjustments to the batteries and battery charging equipment contained in the Manufacturers Maintenance Manual issued to all Departments must be strictly observed, or serious damage to the battery will result.

An indication of the charge condition of the battery on any Car can be ascertained by switching 'On' the Through Train Control Lighting Switch BEFORE starting up a Power Unit, and noting the condition of the Emergency Lights in each Car. Any tendancy for this lighting to be dull, or below its usual standard, should be reported without delay to the Maintenance Staff.

CHAPTER 5 : For attention of Pullman Staff.

REFRIGERATORS (DEEP FREEZE AND DOMESTIC).

The Deep Freeze and Domestic Refrigerators are situated in the Kitchen of each First Class Kitchen Car.

The Domestic Refrigerator is provided with front and rear doors, allowing access from Kitchen or Pantry. Power for their operation is supplied by the Power Unit(s), one or both of which must be operating.

Located in the top corner cupboard (Pullman No.2 Key) fixed in the corridor (passenger compartment end) of each of the First Class Kitchen Cars are two Iron Clad Switches. The switch on the left-hand side is the master control switch for the Refrigerators, Sterilisers, Main lighting, and Exhauster Fans in the Kitchens and Pantries. The switch on the right-hand side is the 'On' and 'Off' control switch for the Refrigerators in that Car.

These switches should, for normal day to day running, remain in the 'On' position, as each Refrigerator is fitted with automatic controls pre-set by the Manufacturers, and are automatic in operation. Any failure occurring in connection with this equipment should be immediately reported to the Maintenance Staff.

CHAPTER 6 : For attention of Pullman Staff.

STERILISERS.

These operate when one or both Power Unit(s) are operating and are fitted in the Sterilising Sink, in the Kitchen and Pantries of each First Class Kitchen Car.

Each Steriliser is provided with a variable heat control switch fitted on the front of the Sink Unit.

Every care should be taken to ensure that the perforated protection plate provided with the Kitchen equipment is fitted in the Sterilising Sink and that the level of water is above the plate before turning the variable heat control switch from the 'Off' position, in order to prevent damage to the electric element and thermostat.

In the event of insufficient depth of water in the Steriliser Sink, the automatic Overload Switch will operate and switch 'Off' the electric element. When this operates a re-set button will protrude from the Steriliser Switch Box (seen from below the Sink), the switch should be turned to the 'Off' position, and the element in the Sink should be allowed to cool down, and the re-set button then pressed in and the electric supply will be restored.

CHAPTER 7 : For attention of Pullman Staff.

EXHAUSTER FANS.

The Exhauster Fans fitted in the roof of the Kitchen and Pantry of the First Class Kitchen Cars operate only when one or both Power Unit(s) are operating, except in the case of the Exhauster Fan located immediately above the cooking range.

This Fan is automatically switched on when the Propane Gas Main Supply Tap is turned to the 'On' position. Suitably idented tumbler switches for control of the other roof Fans are located inside the Kitchen and Pantries on the corridor partition.

CHAPTER 8 : For attention of Pullman Staff.

PASSENGER BELL COMMUNICATION.

The communication system in Cars forming the front half of the train has no connection with the system on those Cars forming the rear half, the train being equipped with two entirely separate, but identically operated systems.

Located in the corridor in each First Class Kitchen Car is the Bell Communication Panel, at each end of which is fitted an indicator light (Green), cancellation press switch, and a buzzer concealed at the rear of the panel.

When a call is made the buzzer will operate and one of the indicator lights on the panel will indicate if the call is from a passenger compartment fore or aft of the Kitchen. The exact location of the call is identified by an illuminated light (Green) above the caller's table, which after service, is extinguished by pressing the Cancellation Press Switch fitted on the table leg.

CHAPTER 9 : For attention of Pullman Staff and Guard.

PUBLIC ADDRESS EQUIPMENT.

To operate this equipment one or both Power Unit(s) must be operating.

The control equipment is fitted in the Guard's compartment of each Motor Car, and the loud speakers are located in the roof of all passenger compartments. The equipment consists of :-

Amplifier	- Located between Guard's desk and Engine Room Access Door.
Control Box	- Fitted adjacent to the Guard's desk.
Amplifier 'On-Off' Switch	- Fitted adjacent to Control Box.

To make an announcement :-

Open the Control Box, and if the Warning Indicator Light (Red) is illuminated, DO NOT switch 'On' the Amplifier 'On - Off' switch, as this indicates that the Amplifier in the other Guard's compartment is already switched on.

(1) Switch 'On' the Amplifier 'On - Off' switch (if permissible as above).

The mains 'On' indicator light will light in the Control Box.

Wait for about 30 seconds for the valves to warm up in the Amplifier.

(2) Switch on the Ready to Speak switch.

The Ready to Speak indicator light will light.

(3) Remove the microphone from its storage recess.

CHAPTER 9 (Cont'd).

PUBLIC ADDRESS EQUIPMENT.

(4) Press the black button on the side of the microphone and holding the microphone approximately 2" away speak normally.

The broadcast indicator light will glow indicating the volume of speech reproduction from the load speakers in the passenger compartments.

At the end of announcement :-

(5) Replace the microphone.

(6) Switch off the Ready to Speak switch.

(7) Switch off the Amplifier 'On' switch.

CHAPTER 10 : For attention of Pullman Staff.

PASSENGER AND WATER TOILET HEATERS.

One or both Power Unit(s) must be operating in order for warm or hot water to be available at the wash basins of passenger toilets.

At the commencement and completion of the trains daily workings, the water heaters may be switched 'On' or 'Off' in each Car by operation of the suitably idented tumbler switches, fitted on the Switch and Fuse Panel located in the cubicle housing the Air Conditioning Control Panel.

To obtain water, an automatic mixer suitably idented, is fitted above the wash basin. Turn the selector knob and allow it to remain in the selected position.

The water supply will be available for 30 seconds, when the automatic mixer mechanism will return the knob to the 'Off' position.

If more than three successive operations are made to obtain 'Hot' water, the knob should be allowed to remain in the 'Off' position for a few minutes before re-selecting for 'Hot' water.

CHAPTER 11 : For attention of Guard.

GUARD'S COMPARTMENT HEATING AND FOOD WARMING EQUIPMENT.

Heating and food warming facilities are only available when one or both Power Unit(s) are operating.

The heating of the Guard's compartment is provided by two vertical heaters fitted on the compartment partition, together with two suitably idented control switches.

A horizontal heater fitted in the 'foot-hole' below the Guard's desk is also provided with a control switch at this position.

A Guard's Food Warming Oven, together with control switch and warning light indicator, illuminated when the oven is switched 'On', is also located on this partition.

The cast iron Master Control Switch for the Heaters and Warming Oven is fitted immediately below the Through Train Control Lighting Switch in the Guard's compartment, and should be switched 'On' or 'Off' at commencement and completion of the trains daily working, as required.

CHAPTER 12 : For attention of Guard.

FIRE PROTECTION FOR AUXILIARY POWER UNIT(S).

If a fire occurs in the vicinity of the Diesel engine of an Auxiliary Power Unit, automatic extinguishing apparatus will operate to spray the engine. A warning Fire Alarm Bell will ring in the Driver's compartment and a warning light will be illuminated, indicating to the Driver which Auxiliary Power Unit is affected. The affected Power Unit will be automatically shut down. The Driver will bring the train to a stand, as laid down in Rule No.188.

An additional indication of the engine affected will be given by the Red warning light, which will be illuminated on a Fire Alarm Control Box, this is located adjacent to the engine, beneath the Auxiliary Power Car, and readily seen from the side of the Car.

Switch 'Off' the Starter Cable Isolating Switch adjacent the External Engine Control Switch Box.

Turn 'Off' the Engine Fuel Feed Stop Cock adjacent the External Engine Control Switch Box.

After ensuring that the fire has been extinguished, the small metal tab with loop provided on the front of the Fire Alarm Control Box should be pulled off to expose a switch, which should be placed in the 'Off' position, so stopping the Fire Alarm Bell, extinguishing the warning light and preventing the Engine from being re-started.

This isolating switch does not cut-out the re-setting thermostat and should this operate through a recurrence of fire on the engine, the Alarm Bell will ring and the warning light will be illuminated. In this event, the fire will not be extinguished automatically.

It is essential, therefore, that the hand operated fire fighting equipment in the Driver's compartment be brought into use, as a matter of the utmost urgency, after the train has been stopped.

The fire should be reported without delay to the Maintenance Staff.

CHAPTER 12 (Cont'd).

FIRE PROTECTION FOR AUXILIARY POWER UNIT(S).

WARNING : When the automatic extinguishing apparatus has operated, avoid inhaling a concentration of the gases given off, which has a faint smell.

Avoid touching the liquid with skin or clothes.

As the gas is heavier than air, the concentration will be at low level near the ground.

(See General Instructions and Notices to the Appendix to the Operating Instructions, regarding First Aid Treatment to Persons Contaminated by the Fire Extinguishing Medium used in the Automatic Appliance.)

CHAPTER 13.

EXTERNAL POWER SUPPLIES (FULL SUPPLIES).

To overcome the necessity for running the Engines of the Auxiliary Power Unit whilst the train is standing at certain Stations and Depots, an independent External Power Supply has been provided at these points.

By the provision of track side equipment, working in conjunction with electrical equipment fitted on the train, the Full External Supply is arranged to supply power to one Set of the train feeder mains, enabling those Auxiliary Power Services to be operated on the train which are available when one Power Unit is operating under normal conditions.

The Stone-Kheops socket on the train, to which the Full External Supply is connected, is located on the underframe at the front (left-hand side) of each Power Car, and when connected, supplies power to the feeder main normally supplied by the Power Unit on the Auxiliary Power Car at the rear end of the train.

Immediately before arrival at a Station or Depot, therefore, the leading Power Unit should be in operation, and if both Power Units are working the rear Power Unit must be shut down. This will ensure the minimum interruption of the Auxiliary Power Services when changing over to Full External Supplies. When the Full External Supply has been connected at the leading end of the train, the Power Unit at this end must be shut down.

Approximately five minutes BEFORE the Full External Supply is DIS-CONNECTED from the train in preparation for departure, the Power Unit nearest to the buffer stops (next to the Power Car to which the Full External Supply was connected) should be started up and remain in operation until the train has travelled well clear of the Station, when the Power Unit on the leading Auxiliary Power Car can be operated, and if conditions do not necessitate both Power Units to be in operation, the Power Unit at the rear of the train should be shut down, so ensuring that arrival requirements at the destination are already complied with.

The Full External Power Supply socket at the front of each Power Car is fitted with a dummy plug, which under running conditions must be replaced, and securely locked in position, when the Full External Power Supply has been dis-connected.

CHAPTER 13 (Cont'd).

EXTERNAL POWER SUPPLIES (FULL SUPPLIES).

TO CONNECT FULL EXTERNAL POWER SUPPLY TO THE TRAIN.

1. First ascertain that the Power Unit at the far end of the train has been shut down.

2. The Feeder Control Isolating Switch on the Instrument and Indicator Lights Panel for this Power Unit MUST be placed in the 'On' position.

3. The Feeder Control Indicator Light will be illuminated, but will be extinguished when the External Power Supply is connected to the train.

4. Proceed to the External Power Supply Control Panel located on the Station platform or Depot.

5. Operate Isolator Switch 'A' to 'On' position.

6. Operate Isolator 'B' to the 'On' position.

7. Switch on the purple light isolator. When the purple light is illuminated this indicates that the plug on the 30 ft. supply cable is securely connected in the stowage socket on the bottom of the panel.

Note : At Western Region Stations and Depots this purple light is located on a control panel at the source of the supply.

8. Withdraw the plug on the 30 ft. supply cable from the stowage socket on the bottom of the Panel.

9. The purple light indicator will be extinguished.

10. Uncoil the supply cable from the stowage brackets provided and proceed to the front of the Power Car preventing the plug from touching the ground or coming into contact with water, ballast, etc.

CHAPTER 13 (Cont'd).

EXTERNAL POWER SUPPLIES (FULL SUPPLIES).

TO CONNECT FULL EXTERNAL POWER SUPPLY TO THE TRAIN.

Note : The plug contacts of the External Power Supply cable (30 ft.) are only 'ALIVE' after they have been inserted into the supply socket on the train.

11. Unlock and ratchet out the dummy plug fitted in the External Supply socket on the front (left-hand side) of the Power Cars.

12. Insert the plug on the 30 ft. supply cable into the train socket, ratchet 'HOME' twice and lock in position.

13. The indicator light (Red) on the External Power Supply Control Panel will be illuminated, indicating that the External Supply is connected to the train.

Note : The feeder control indicator light on the Instrument and Indicator Lights Panel as previously mentioned will be extinguished.

In the event of an overload on the train, the overload relays will operate in the External Power Supply Control Panel and the power supply will be automatically switched off. Press the overload re-set button on the Control Panel and if the supply is not restored, report the failure to the Maintenance Staff immediately.

All the Auxiliary Power Services available under ordinary running conditions, with one Power Unit in operation, are now available by operation of the respective controls, as outlined throughout these Instructions.

TO DIS-CONNECT FULL EXTERNAL POWER SUPPLY FROM THE TRAIN.

Approximately five minutes before dis-connecting the Full External Power Supply from the train, fully operate the Power Unit in the Auxiliary Power Car (next to the Power Car to which the Full External Power Supply was connected).

CHAPTER 13 (Cont'd).

EXTERNAL POWER SUPPLIES (FULL SUPPLIES).

TO DIS-CONNECT FULL EXTERNAL POWER SUPPLY FROM THE TRAIN.

14. Unlock and ratchet out the External Power Supply plug from the External Power Supply socket on the train.

15. The indicator light (Red) on the External Power Supply Control Panel will be extinguished, indicating that the External Supply is dis-connected from the train.

16. Coil up the 30 ft. cable on to the stowage brackets provided and insert plug into stowage socket on the External Supply Control Panel.

17. The purple light indicator will be illuminated, indicating that the plug is secure in the stowage socket.

18. Operate Isolator 'B' to the 'Off' position.

19. Operate Isolator 'A' to the 'Off' position.

20. Switch off the purple light isolator when the purple light indicator will be extinguished.

21. Replace the dummy plug into the External Power Supply socket on the train, ratchet 'HOME' and lock in position.

WARNING : It is of the utmost importance for all Staff to note that under no circumstances should the train be moved whilst the Full External Power Supply is connected to the train.

CHAPTER 14.

EXTERNAL POWER SUPPLIES (RESTRICTED SUPPLIES).

As in the case of the Full External Power Supply, the Restricted Power Supply feeds one Set of the train 'Feeder Mains'.

The Auxiliary Power Services, available for operation whilst the Restricted Supply is connected to the train, are restricted to Battery Charging, Domestic Refrigerators and Deep Freeze, and the Main Lighting throughout the train.

A Restricted Power Supply Connecting Socket is provided on each of the First Class Parlour Cars, so arranged as to be positioned each side of the train.

The sockets are of the 'Push On' type and are swivel mounted so that in the event of the train being moved whilst the supply is connected, the socket will take up the correct position for withdrawal of the plug.

The control equipment for operation of the Restricted Power Supply fitted on each First Class Parlour Car comprises, a pre-charging load panel, an indicator lamp and the Restricted Power Supply Socket, all of which are located on the underframe at the side of the Car.

The track side equipment at the Station or Depot comprises a supply panel fitted with Supply Indicator Lights, Overload Re-Set Button, Isolation Switch and suitable length of cable fitted with Power Supply plug.

If the Auxiliary Power Unit is operating and the Restricted Power Supply is connected to the train, automatic control equipment dis-connects the feeder main from the Power Unit, and the Engine will continue to run, and remain under the control of its External and Internal Engine Controls for maintenance and servicing purposes.

The Air Conditioning Systems on each Car, if operating, are also automatically dis-connected throughout the train, and remain inoperative whilst the Restricted Power Supply is connected.

CHAPTER 14 (Cont'd).

EXTERNAL POWER SUPPLIES (RESTRICTED SUPPLIES).

TO CONNECT RESTRICTED POWER SUPPLY TO THE TRAIN.

1. Uncoil the supply cable from the stowage brackets provided on the track side.

2. Raise the spring loaded cap of the Power Supply Socket on the train and insert the plug of the supply cable.

3. Switch 'On' the isolating switch on the Supply Panel.

4. The Supply Indicator Lamps will be illuminated on the Supply Panel if a Power Supply is available.

5. The Load Contactor Indicator Light, fitted on the Car adjacent the Power Supply socket, will be illuminated. This indicates that the Restricted Power Supply is connected to the Train Feeder Main.

Note : In the event of an overload on the Cars, the overload relays will operate in the Supply Panel and the Power Supply will be automatically switched 'Off'. Press the overload re-set button on the Supply Panel, and if the supply is not restored, report the failure to the Maintenance Staff immediately.

TO DIS-CONNECT THE RESTRICTED POWER SUPPLY FROM THE TRAIN.

6. Withdraw the Power Supply plug from the Power Supply socket on the train.

7. The load contactor indicator light on the train will be extinguished.

8. Switch 'Off' the isolating switch on the Supply Panel.

9. The Supply Indicator Lamps on the Supply Panel will be extinguished. This indicates that the Power Supply has been dis-connected.

10. Coil up the supply cable on to the stowage brackets provided.

CHAPTER 15 : For information of Pullman Staff.

LOCATION OF FULL AND RESTRICTED EXTERNAL POWER SUPPLY EQUIPMENT AT STATIONS AND DEPOTS.

The Full and/or Restricted External Power Supply equipment is located at the undermentioned Stations and/or Depots :-

London Midland Region.

Full Supply.

London - St. Pancras Station

Manchester - Central Station

Reddish Electric Traction Maintenance Depot

Restricted Supply.

London - Kentish Town Carriage Maintenance Depot (Cattle Dock Sidings)

Reddish Electric Traction Maintenance Depot

Western Region.

Full Supply.

London - Paddington Station

London - Old Oak Junction

Bristol - Temple Meads Station

Wolverhampton Cannock Road Sidings