HIGH SPEED TRAIN
PART V

BRITISH RAIL
WESTERN REGION

B.R.33057/16.
D.T.S.67.

BRITISH RAILWAYS - WESTERN REGION.

HIGH SPEED TRAIN.

PART V.

NOTES FOR STUDENTS ON THE ANCILLARY EQUIPMENT ASSOCIATED WITH THE HIGH SPEED TRAIN.

C.M. & E.E. Training Unit,
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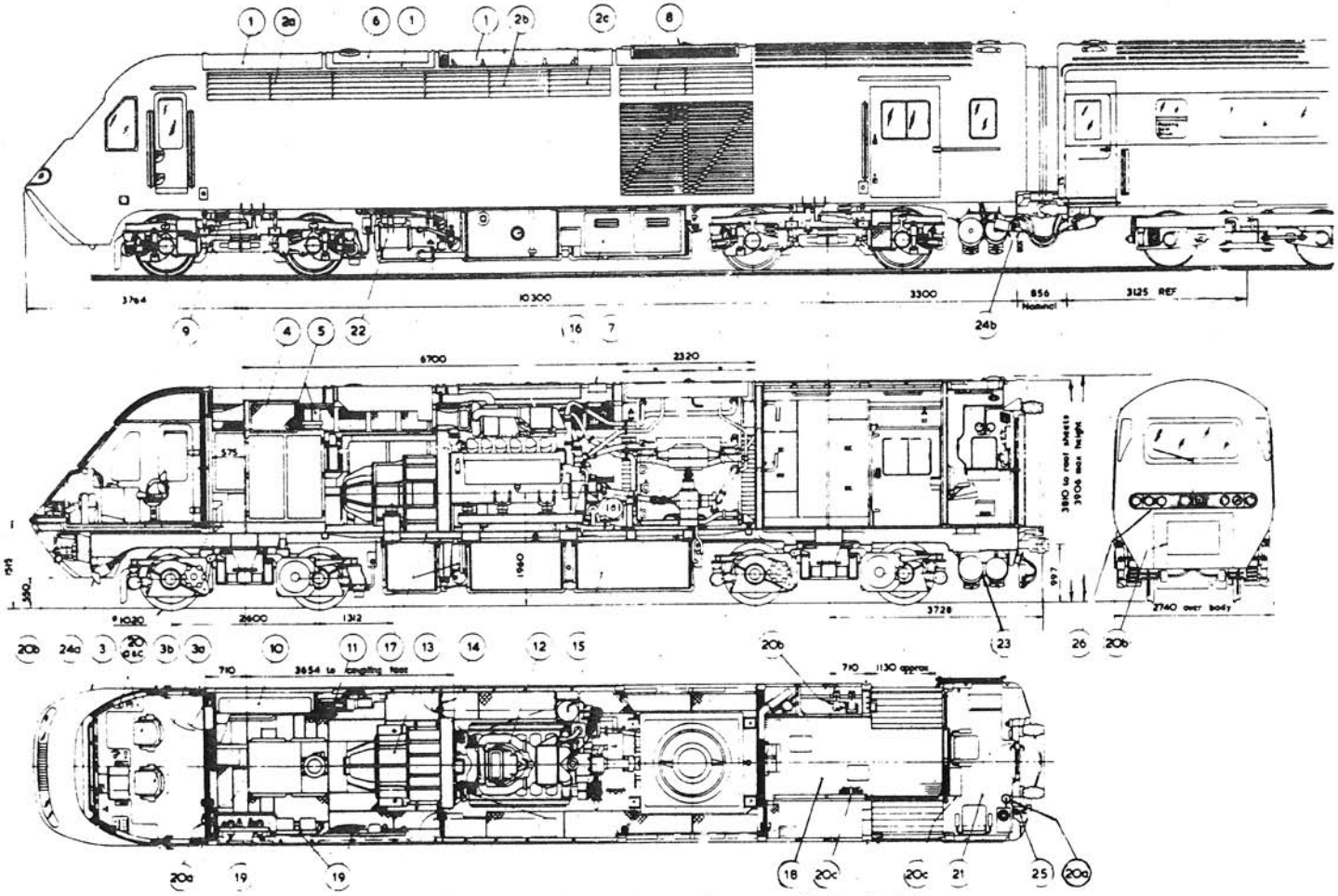


1 Translucent Roof Panels
2 Filtered Air Intakes for -
a Electric motors & clean air compartment
b Engine combustion
c Engine Room ventilation
3 Driving Cab with
a Driving position
b Assistant's Seat
4 Electric Control Cubicle
5 Resistance Unit & Short Circuiter
6 Silencer
7 Engine Room Fan
8 Cooling Unit
9 Flexicoil Suspension
10 Rectifier Unit
11 Battery Charging Unit
12 Paxman 'Valenta' Engine, 12 RP200L
13 Alternators
14 Clean Air Compartment Partition
15 Fuel Tank, 5 680 litre max^{m}
16 Battery Box
17 Spillage Tray & Collecting Tank
18 Luggage Van 1 tonne Nominal
19 Brake & other Pneumatic Equipment
20 Emergency & Safety Equipment
a Fire Extinguishers
b Towing & Propelling
20c First Aid & Safety
21 Guard's Compartment
22 Air Compressor
23 Main Reservoirs
24 Train Electric Supplies 415 V, 3 phase
a Shore supply
b Between cars
25 Parking Brake
26 Horns & Lights

FIG 1

B R class 253
POWER CAR FOR
HIGH SPEED TRAIN

HIGH SPEED TRAIN.

Power Car (Fig. 1).

The power car is of light weight welded steel construction and reinforced plastic is widely used for trim and in the mouldings of the cab nose section.

Cab layout is shown in Figure 4 and it is provided with an armoured screen, double glazed side windows and doors on both sides. Head tail and marker lamps are situated under perspex covers in the nose. Between the two sets of lamps is the horn grille beneath which are mounted the twin horns.

A nose door conceals the emergency coupling, air pipes, 36 way and 3 phase jumper sockets, also the cab air conditioning unit is mounted there.

At the rear of the cab a bulkhead door gives access to the clean air compartment in which is situated the control cubicle. On this cubicle front face are mounted the circuit breakers, low coolant level lamp, battery charge indicator, control cut out switch, power cut out switch, earth fault indicator and the fuse panel.

In one side wall is mounted the brake equipment and on the other are positioned the rectifier unit, traction motor blowers, battery charger and AWS equipment.

The main and auxiliary alternator and the exhaust trunking protrude into this compartment.

The following compartment houses the Paxman Valenta engine and immediately behind this is mounted the Marsten Voith cooler group (see H.S.T. Book 4).

At the rear of the vehicle is situated the luggage and guards compartments. Traction motor blowers, air conditioning control unit and emergency coupling gear are in cupboards on one wall. Also in luggage compartment are the nose and passenger emergency ladders.

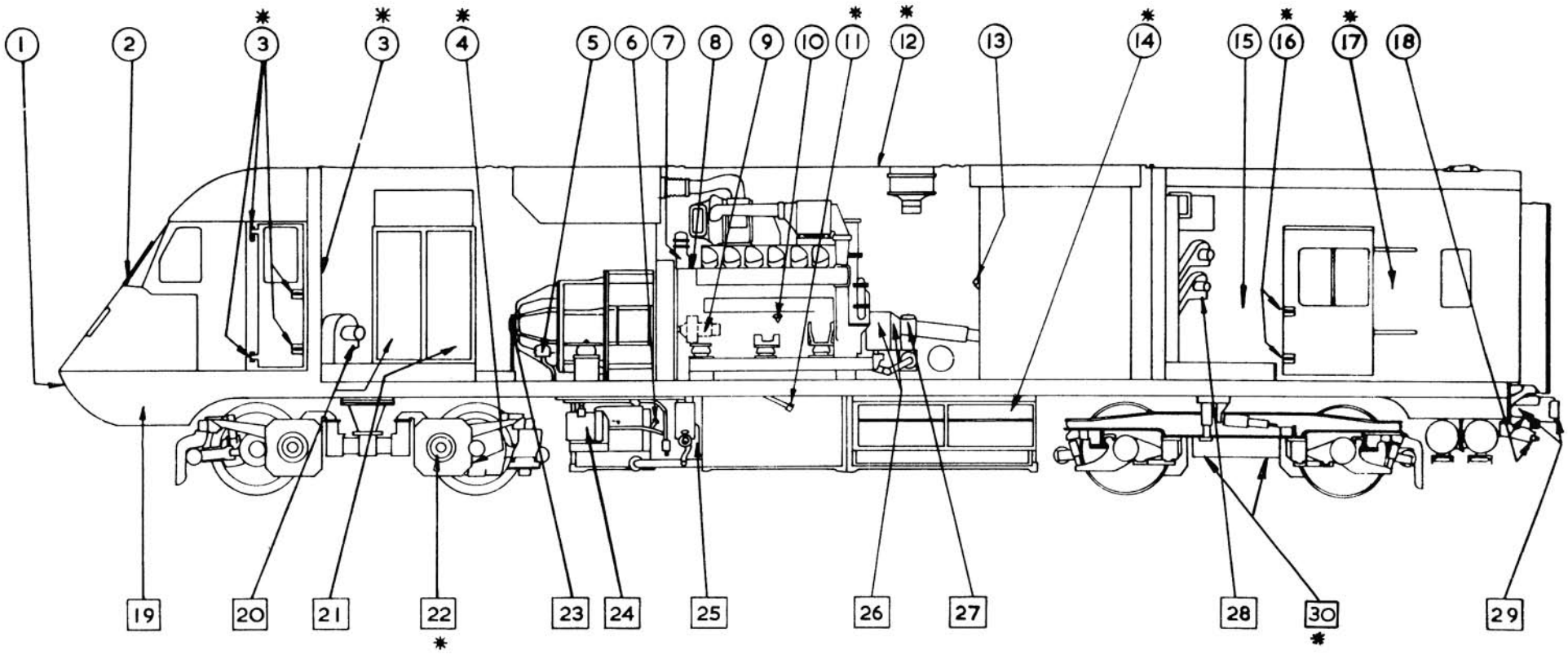
The guards compartment has two doors into the luggage and engine room corridor, and a further door that allows access into the train. In addition to brake equipment it is equipped with a driver/guards telephone, public address system, train supply 'OFF' button, train lights 'ON' and 'OFF' buttons and switches controlling guards compartment heating and lighting. Driver call buttons and light switches are mounted above both side, sliding doors.

The air compressor is externally mounted on the left hand side and the fuel lift pump on the right hand side.

There are two underslung aluminium alloy fuel tanks (originally three) one full width of the car, the other between the battery boxes. Fuel comsumption is slightly in excess of 1 gallon per mile.

Sole bar drain and fill connections are provided for various functions (Fig. 3 , Page 4).

The bogies and associated equipment are described in HST Book 2.



H.S.T. POWER CAR - LUBRICATION CHART

FIG 2

SHELL 429 OIL
TEXACO MULTIGEAR EP140
ESSO IL 1297A OIL
LITHIUM GREASE No 2 5% MD
" " No 3 Br Sp 673

○ OIL POINTS SHOWN THUS

□ GREASE POINTS SHOWN THUS

* POINTS FITTED ON BOTH SIDES &/OR BOTH ENDS OF POWER CAR BUT IS ONLY SHOWN ONCE ON THE DIAGRAM

NOTE ; GREASE POINTS ARE PROVIDED ON THE TIMKEN AXLE BEARING BUT THESE MUST NOT BE USED

H.S.T. POWER CAR - LUBRICATION CHART.

1. Nose Cover Hinges,Locks and Pins.
2. Wiper Pivots.
3. Door Locks and Hinges.
4. Traction Motor Gearcase.
5. Compressor Air Intake Filter.
6. Compressor Oil Filler.
7. Europa Governor.
8. Rack Linkage.
9. Starter Motor.
10. Engine Oil Filler.
11. Engine Oil Fill and Drain (on solebar).
12. Roof Catches and Linkage.
13. Radiator Fan and Gearbox Filling Plug.
14. Battery Box Hinges and Locks.
15. Emergency Couplings.
16. Guards Door Locks.
17. Guards Door Slide.
18. Jumper Connection Hinges.
19. Emergency Draw Gear.
20/28. Blower Motor Armature Bearings.
21. Reverser.
22. Traction Motor Armature Bearings.
23. Alternator Rear Bearing.
24. Compressor Armature Bearing.
25. Fuel Lift Pump Armature Bearing.
26. Vulcan Coupling and Cardan Shaft.
27. Priming Oil Pump Armature Bearing.
29. Buckeye Coupling.
30. Pivot Pin Parking Brake (normally shop to shop).

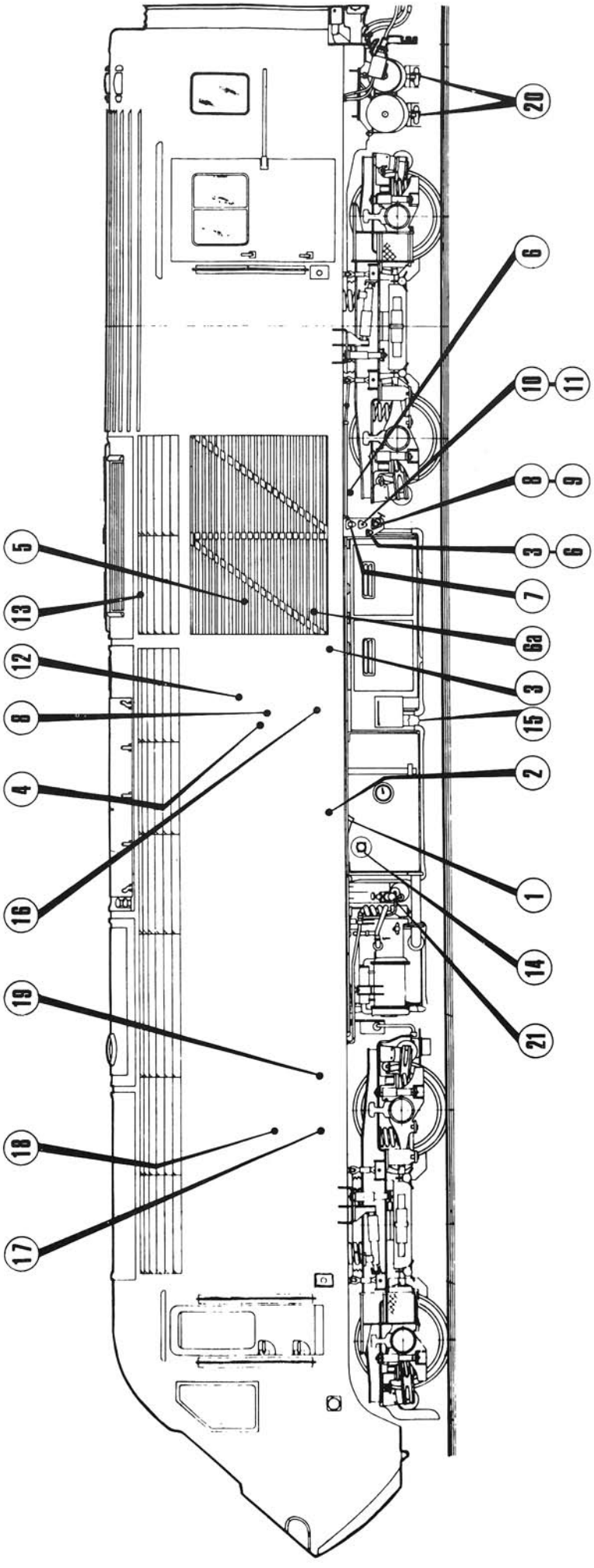


FIG 3 FILLING & DRAINING POINTS

LUBRICATING OIL SYSTEM		
POINT	DESCRIPTION	TYPE OF CONNECTION
1	ENGINE SUMP FILL & DRAIN - BOTH SIDES, OUTSIDE POWER CAR.	1¼" B.S.P LOCKHEED SELF SEALING COUPLING AVA 1152 J.
2	ENGINE SUMP FILL & DRAIN VALVE. - R.H.S ENGINE AT SUMP LEVEL	1 GATE VALVE
3	LUB. OIL FILTER DRAIN - REAR OF ENGINE AT DECKLEVEL & R.H.S. OUTSIDE POWER CAR	1" GATE VALVE PLUS 1 B.S.P. MALE OUTLET
4	LUB OIL SAMPLING COCK FREE END OF ENGINE L.H.S.	COCK
5	FAN DRIVE SYSTEM LUB. OIL FILLER - FRONT FACE OF COOLER GROUP	FILLER PLUG.
6	FAN DRIVE SYSTEM LUB OIL DRAIN BELOW COOLER GROUP ON ℄ & L.H.S. OUTSIDE POWER CAR	1 GATE VALVE PLUS 1" B.S.P MALE OUTLET
6a	FAN/BEVEL BOX HEAT EXCHANGER DRAIN	2 ½" GATE VALVES

COOLANT SYSTEM		
POINT	DESCRIPTION	TYPE OF CONNECTION
7	COOLANT FILL - BOTH SIDES OUTSIDE POWER CAR.	1½ SPECIAL SELF SEALING COUPLING.
8	PRIMARY CIRCUIT (ENGINE & RAD.) DRAIN - L.H.S. OUTSIDE POWER CAR & BOTH SIDES ENGINE	1½ STANDARD BAYONET COUPLING PLUS TWO ½" COCKS.
9	INTERCOOLER & R.H. RADIATOR PANEL DRAIN R.H.S. OUTSIDE POWER CAR.	1½ STANDARD BAYONET COUPLING.
10	L.H. RADIATOR PANEL DRAIN - R.H.S. OUTSIDE POWER CAR.	1½ STANDARD BAYONET COUPLING.
11	HEADER TANK OVERFLOW - L.H.S. OUTSIDE POWER CAR.	——
12	COOLANT SAMPLING COCK - FREE END OF ENGINE ON ℄	COCK.
13	RAW ANTIFREEZE & INHIBITORS TOP UP - FRONT FACE OF COOLER GROUP HEADER TANK.	½ SPECIAL SELF SEALING COUPLING.

FUEL SYSTEM		
POINT	DESCRIPTION	TYPE OF CONNECTION
14	FUEL FILLER - BOTH SIDES OUTSIDE POWER CAR.	LOCKHEED SELF SEALING COUPLING CM 1229
15	FUEL DRAIN - BOTH SIDES OUTSIDE POWER CAR.	1½" B.S.P. MALE OUTLET.
16	FUEL COALESCER/FILTER DRAIN - R.H.S. ENGINE.	COCK.

BRAKE SYSTEM		
POINT	DESCRIPTION	TYPE OF CONNECTION
17	BRAKE SUPPLY RESERVOIR - L.H.S. ENGINE.	COCK
18	BRAKE SUPPLY RESERVOIR - L.H.S. ENGINE.	COCK
19	BRAKE SYSTEM DRIP CUP L.H.S. ENGINE.	COCK
20	MAIN RESERVOIRS - UNDER VAN END OF POWER CAR.	AUTO. DRAIN VALVE - W'HOUSE TYPE FA2 PLUS MANUAL DRAIN COCK.

MISCELLANEOUS		
POINT	DESCRIPTION	TYPE OF CONNECTION
21	SEALING PLATE DRAIN BOTH SIDES OUTSIDE POWER CAR.	2" B.S.P. MALE OUTLET.

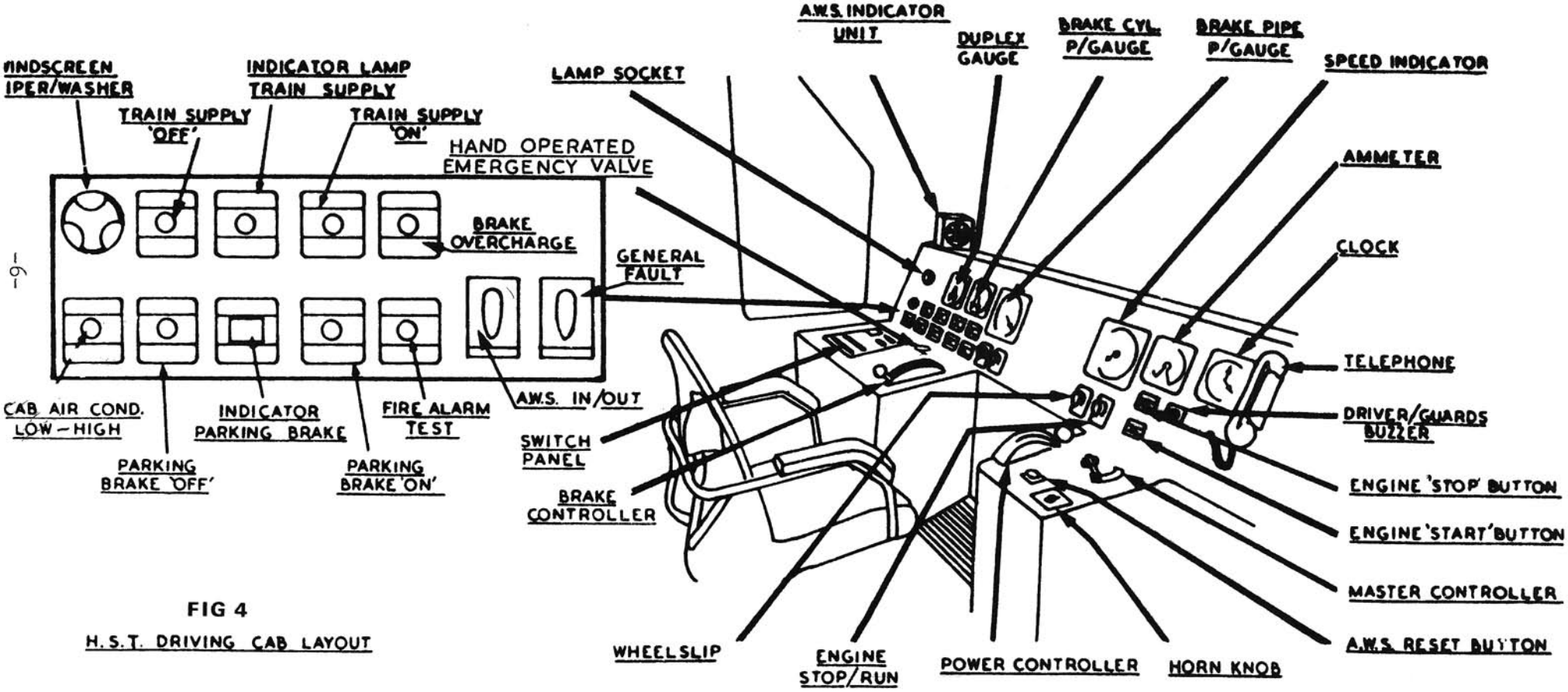


FIG 4

H.S.T. DRIVING CAB LAYOUT

LAYOUT OF BRAKE EQUIPMENT ON POWER CAR.

Cab.

Rocking type foot operated D.S.D. pedal.

Front of Driving Desk.

A.W.S. Indicator.

Parking Brake ON/OFF Buttons and Indicator.

Main Reservoir 10 bar (145 p.s.i.)/Reservoir Feed Pipe Pressure Gauge (Dual) 7 bar (101.5 p.s.i.).

Driving Desk.

Brake Control Handle.

Emergency Brake Valve.

Bogie 1 and 2 Disc Brake Cylinder Pressure Gauge, (Tread Brake Cylinder).

Brake Pipe Overcharge Button.

Air Brake Pipe Pressure Gauge, (6 ins).

A.W.S. Indication Light.

Master Handle (Forward: E.O., Reverse: OFF).

Master Key Position.

A.W.S. Reset Button.

Two Tone Horn, (4 position).

Control Cubicle.

Compressor Fuse (100A).

Circuit Breakers: "Parking Brake"

"Brake Control".

L.H. Side of Compartment (Alternator).

2 Triple Valves/Distributors and Brake Release Handles.

2 E.P. Valves for High/Low Speed 2-stage braking.

2 Isolating Cocks (Tread Brake and Disc Brake), 1 for each bogie.

A.W.S. Equipment.

L.H. Side of Compartment (Alternator).

Brake Pipe Pressure Control Unit and Isolating Cock.

Compressor Governor
Brake Pipe Control Governor
Low Main Air Governor
} Pressure Switches.

D.S.D.
Main Air Reservoir.
Compressor Governor.
Unloader Valve.
} Isolating Cocks.

A.W.S. Isolating Handle.

Auxilairy Reservoirs and Drain Cocks.

Auxiliary Guards Cab.

Pressure Gauges for Brake Pipe Pressure, and Reservoir Feed Pipe Pressure.

Emergency Brake Cock, connected to Brake Pipe.

OUTSIDE OF POWER CAR.

Front.

Brake Pipe and Reservoir Feed Pipe.

L.H. Side of Car.

Air Compressor.

R.H. Side of Car.

Drip Tank and Drain.

Compressor Unloader Expansion Chamber.

B.I.S. (Battery Isolation Switch).

Rear of Car.

Brake Pipe and Reservoir Feed Pipes.

H.S.T. PRODUCTION-SERIES TRAIN FORMATIONS

FIG 5

W.R. 9-CAR SET.

E.R. 10-CAR SET.

E.R. 10-CAR SET.

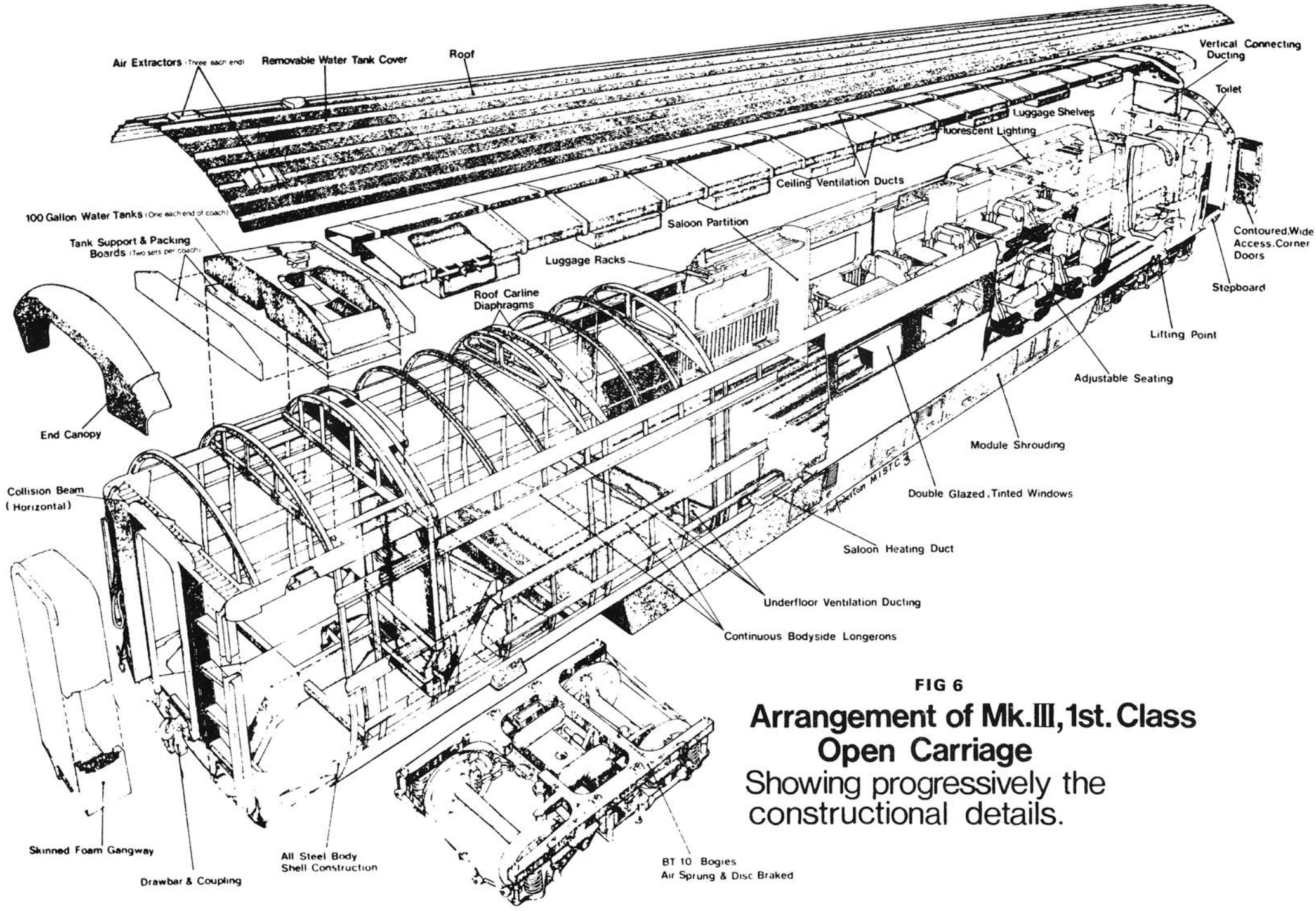
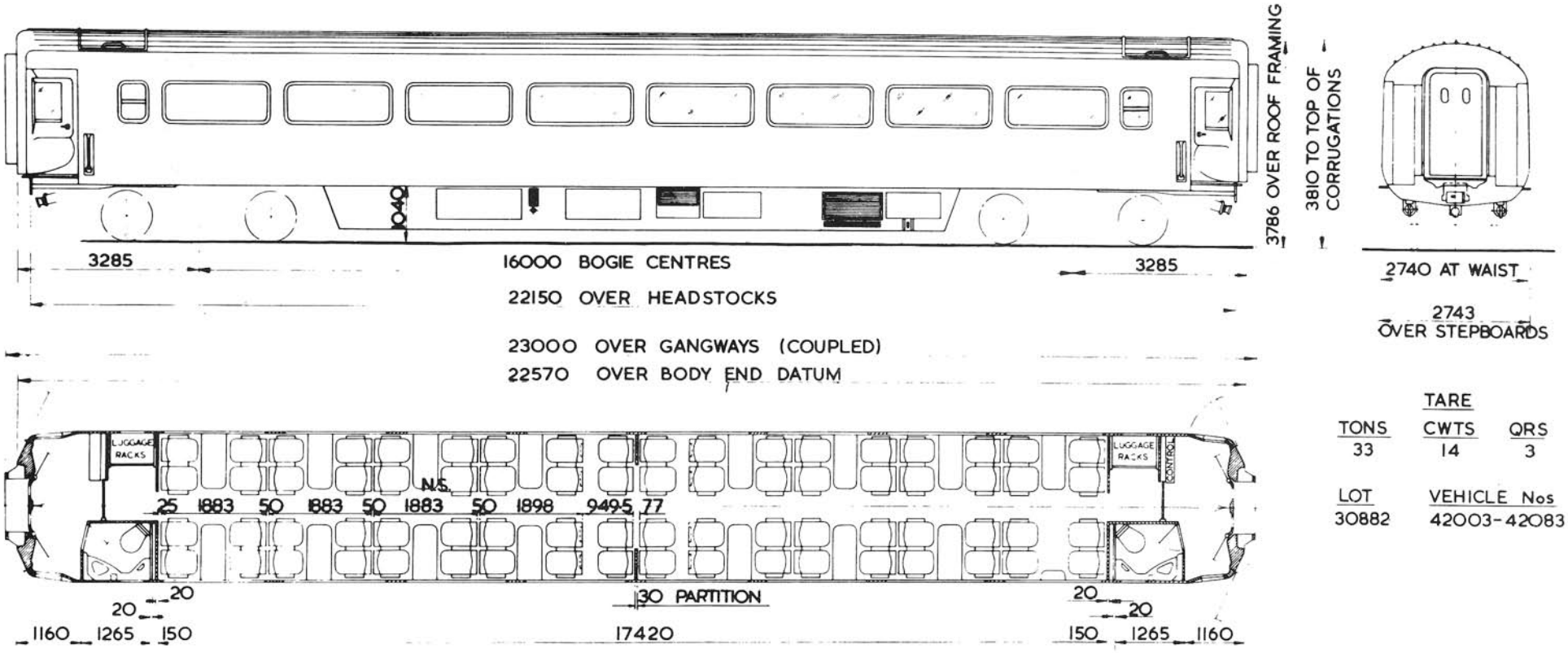


FIG 6

Arrangement of Mk.III, 1st. Class Open Carriage

Showing progressively the constructional details.

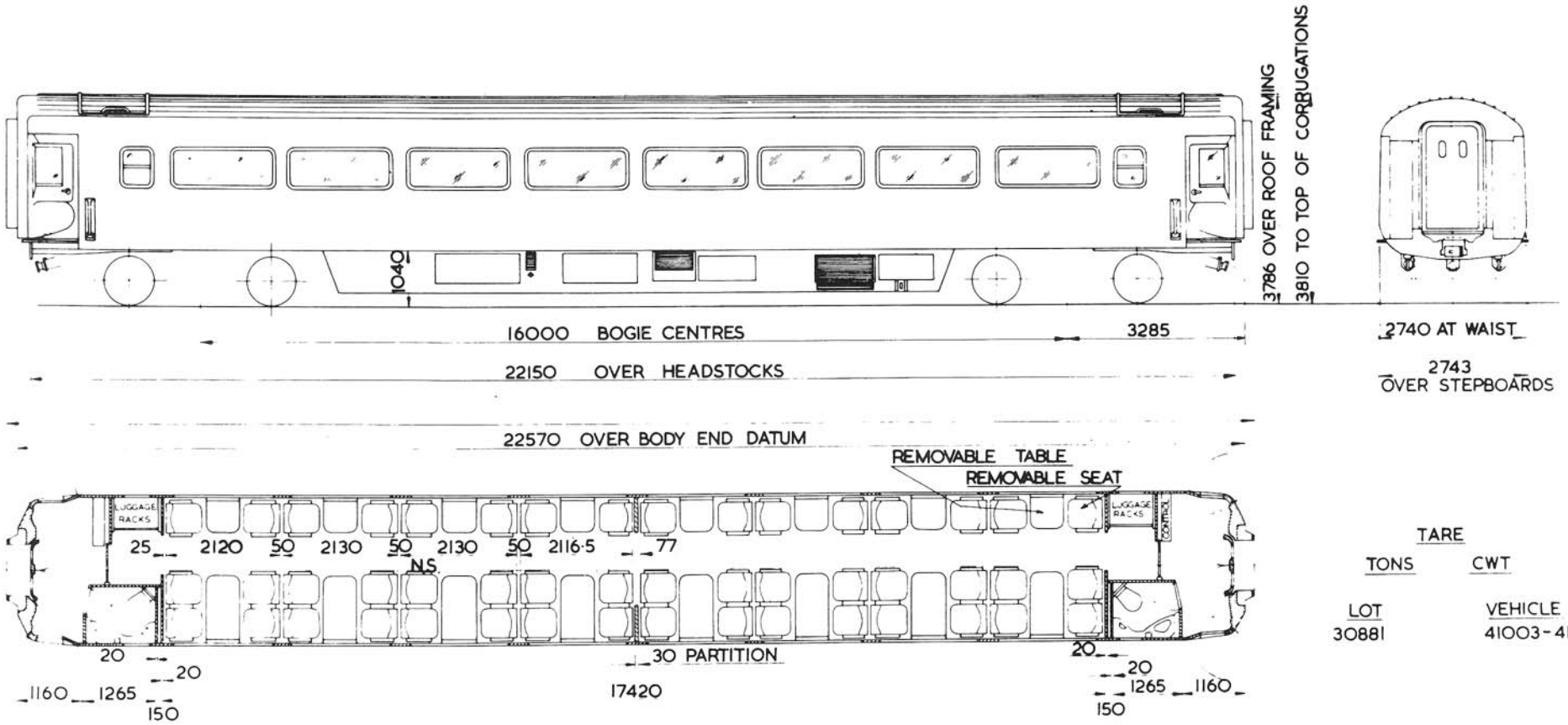


TARE		
TONS	CWTS	QRS
33	14	3

LOT	VEHICLE Nos
30882	42003-42083

2 SALOONS. 72 SEATS
2 TOILETS
2 LUGGAGE BAYS

FIG 8
OPEN SECOND



48 SEATS
2 TOILETS
2 LUGGAGE BAYS

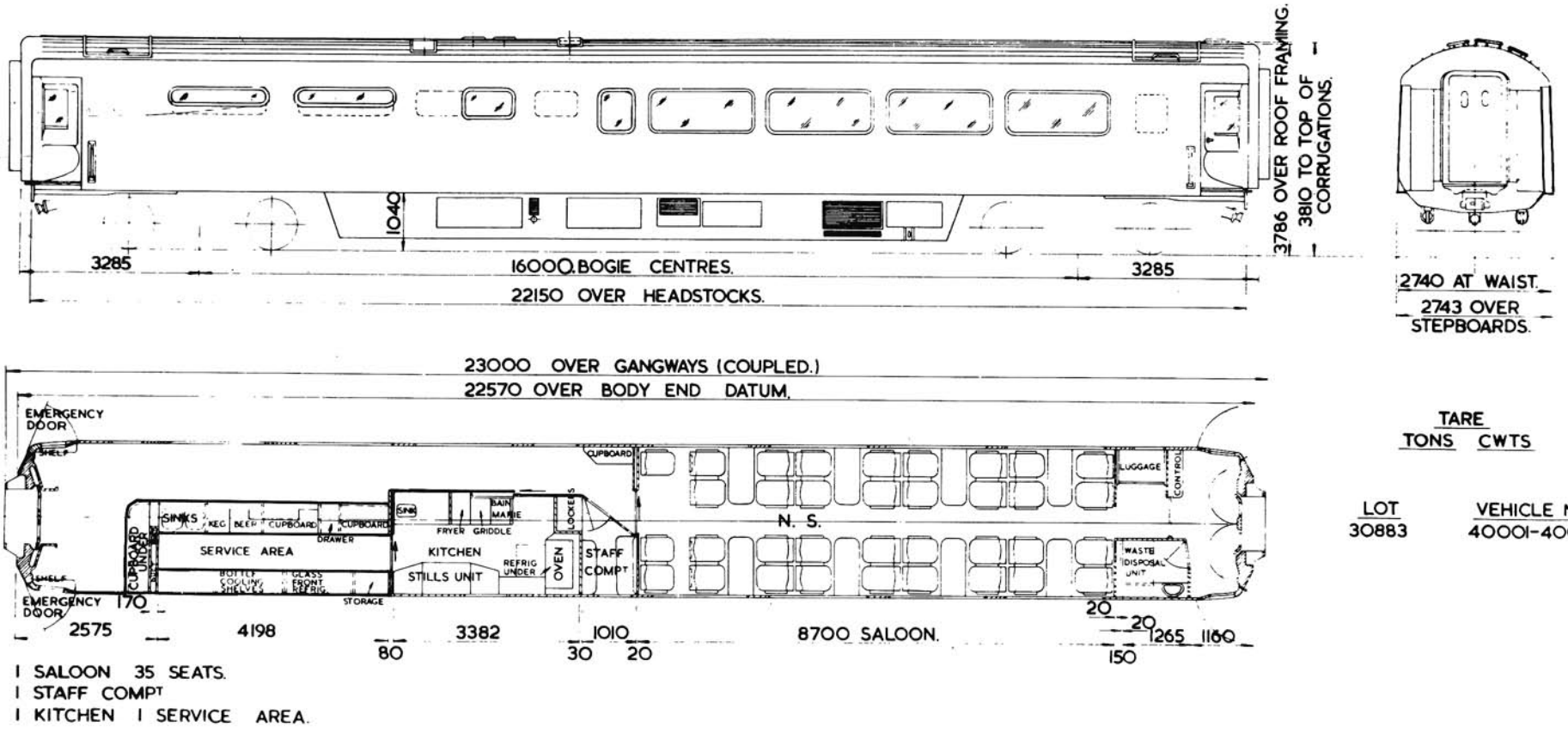
TARE
TONS CWT

LOT
30881

VEHICLE Nos
41003-41056

FIG 7
OPEN FIRST

FIG 9
R.S.B. CATERING VEHICLE



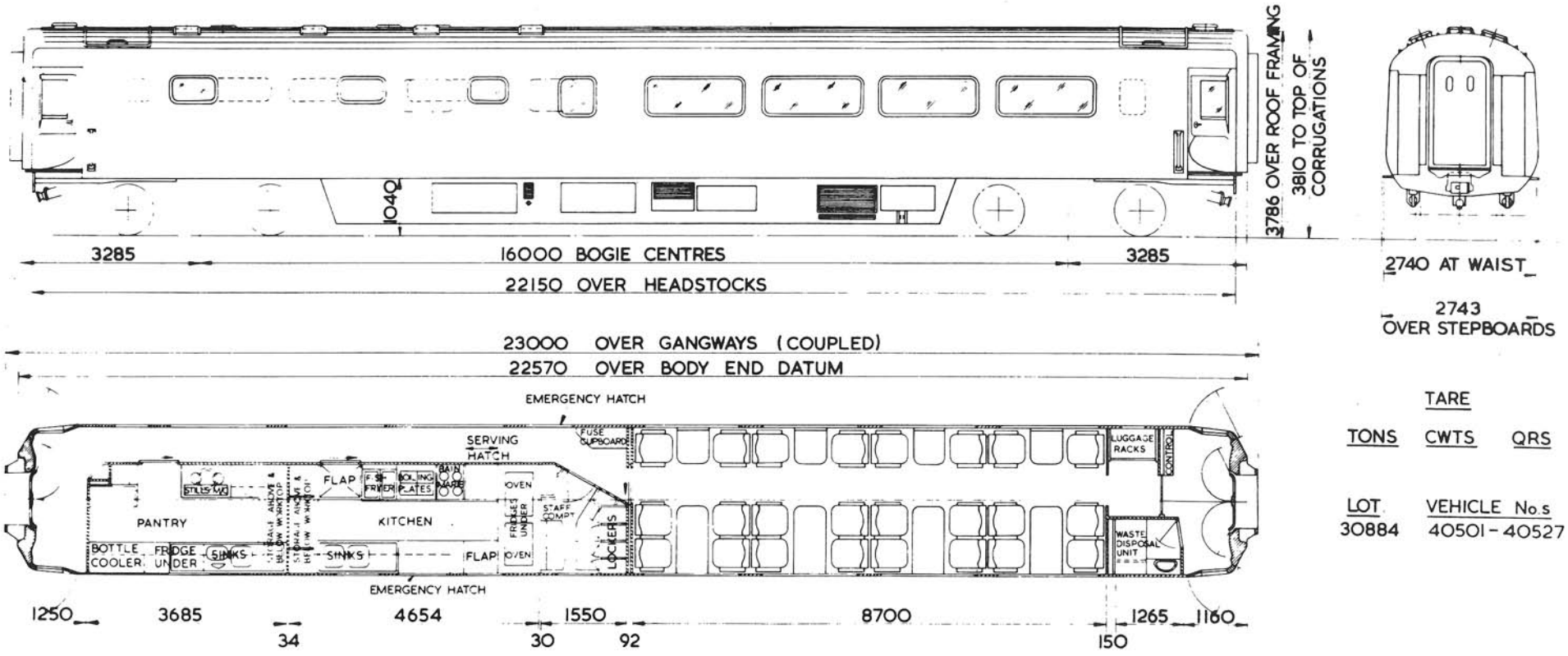
TARE
TONS CWTS

LOT 30883

VEHICLE Nos. 40001-40027

1 SALOON 35 SEATS.
1 STAFF COMPT
1 KITCHEN 1 SERVICE AREA.

FIG 10
R.U.K. CATERING VEHICLE



TARE

TONS	CWTS	QRS

LOT	VEHICLE No.s
30884	40501 - 40527

24 SEATS. 1 SALOON.
1 STAFF COMPT.
1 KITCHEN.
1 PANTRY.

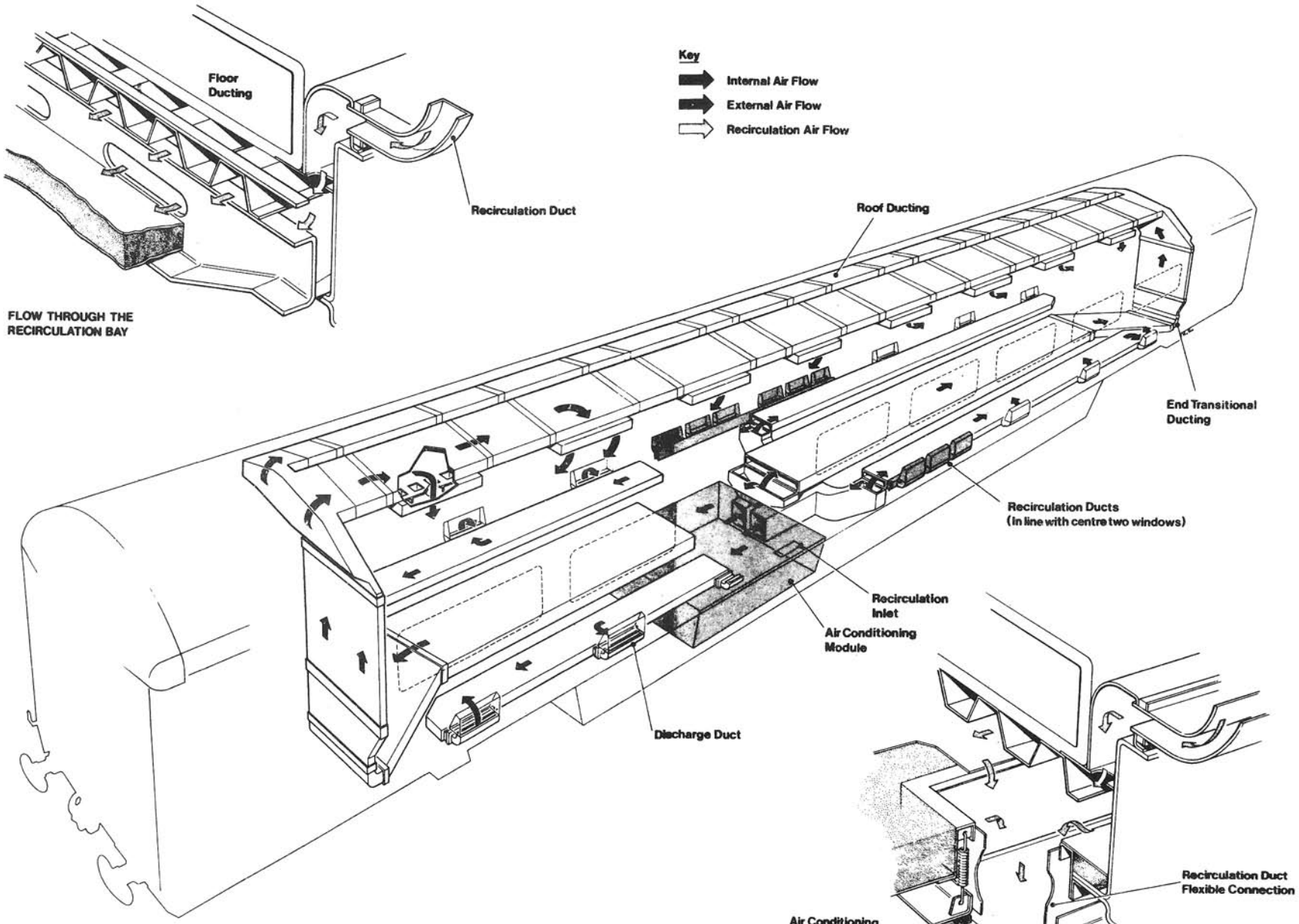


FIG 11

Mk. III Carriage (Day Coach) Air Flow Diagram & Ducting

MARK III COACHING STOCK WITH B.T. BOGIE.

Introduction.

The coaching stock comprises two types of day vehicles, open second and open first; in addition there is a restaurant and buffet car (Figs. 6 - 10).

All are built with a 75'5" steel body, so designed that speeds up to 125 m.p.h. may be achieved.

The vehicles are fitted with air operated disc brakes with an anti-slide feature incorporated, thereby preventing the wheels from locking due to excessive brake forces.

The overall weight of the vehicle is 33 tons.

Air springs are used as the secondary vertical suspension, together with hydraulic dampers. The primary suspension is by trailing arm and coil spring for each wheel and hydraulic dampers.

Each coach has seat and table fixing rails running the full length of the floor and bodyside so seating can be varied as required. Standard arrangements give a layout of 48 seats for 1st Class and 72 in 2nd Class.

A train electrical supply of 276v 33⅓ Hz to 415v 50 Hz is fed from either power car throughout the train. This supply is used for train heating, cooling, battery charging and for the catering equipment in buffet and restaurant vehicles.

All auxiliary equipment is in modular form and is mounted in underfloor modules enclosed within a skirting between the bogies.

Brake Module.

The main equipment to supply the brake system on each coach is housed in the "brake module". It is situated on the No. 1 or 'A' side of the coach at No. 2 end.

Air isolating cocks are located inside the modules for isolating the suspension and air operated doors. These cocks are indicated on the module door concerned.

All Test Points:- Points for air suspension to load proportional relay valve and brake cylinders are external. (Schrader connections No. 1 side).

Brake System.

The brake system is the B.R. standard 2 pipe system with a Davies and Metcalfe Oerlikon distributor - EST 4F/AL26/5/H.G.B., type 5, and a load proportional relay valve fitted to each coach.

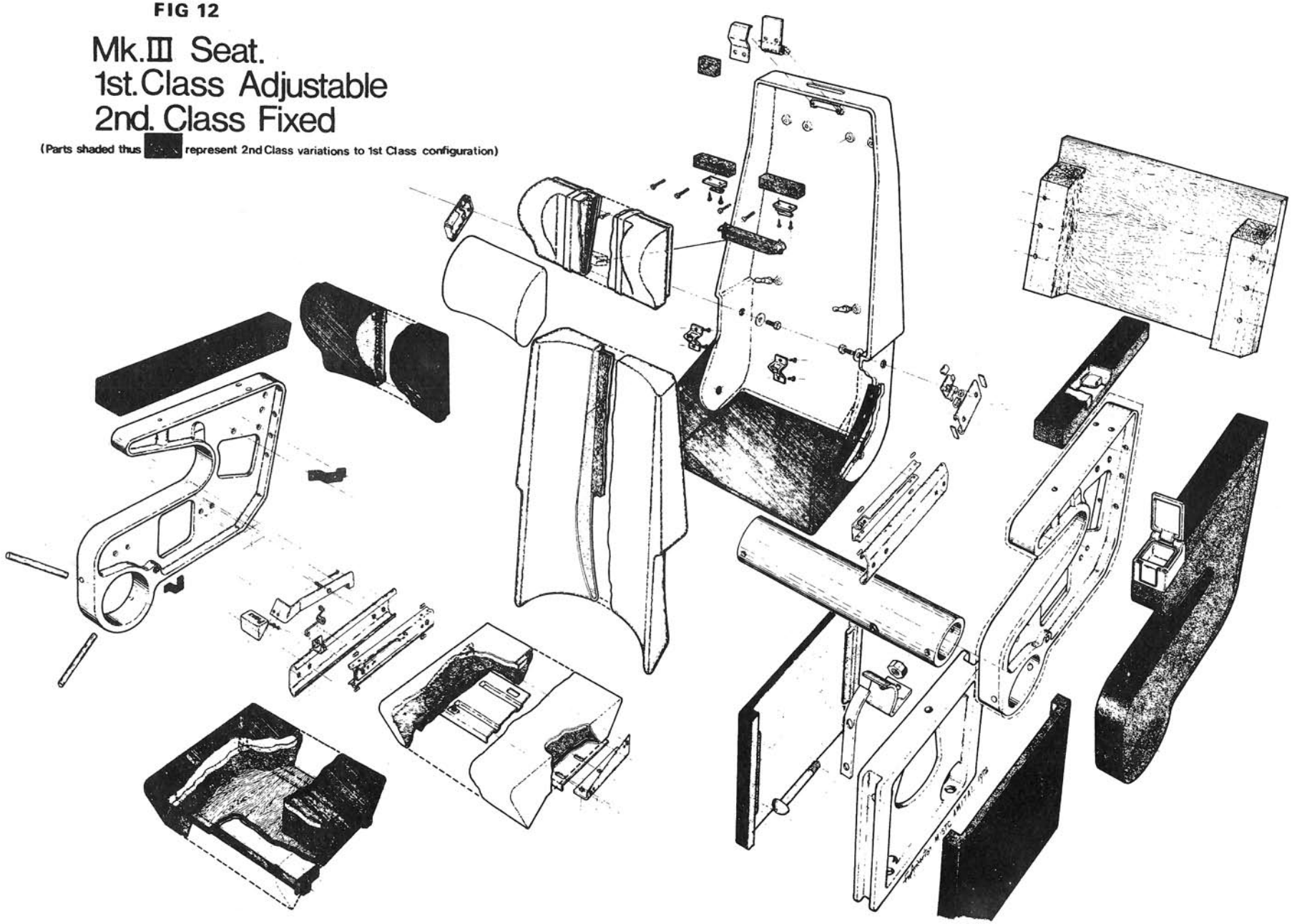
A "one stage" braking (speed) control system is operative.

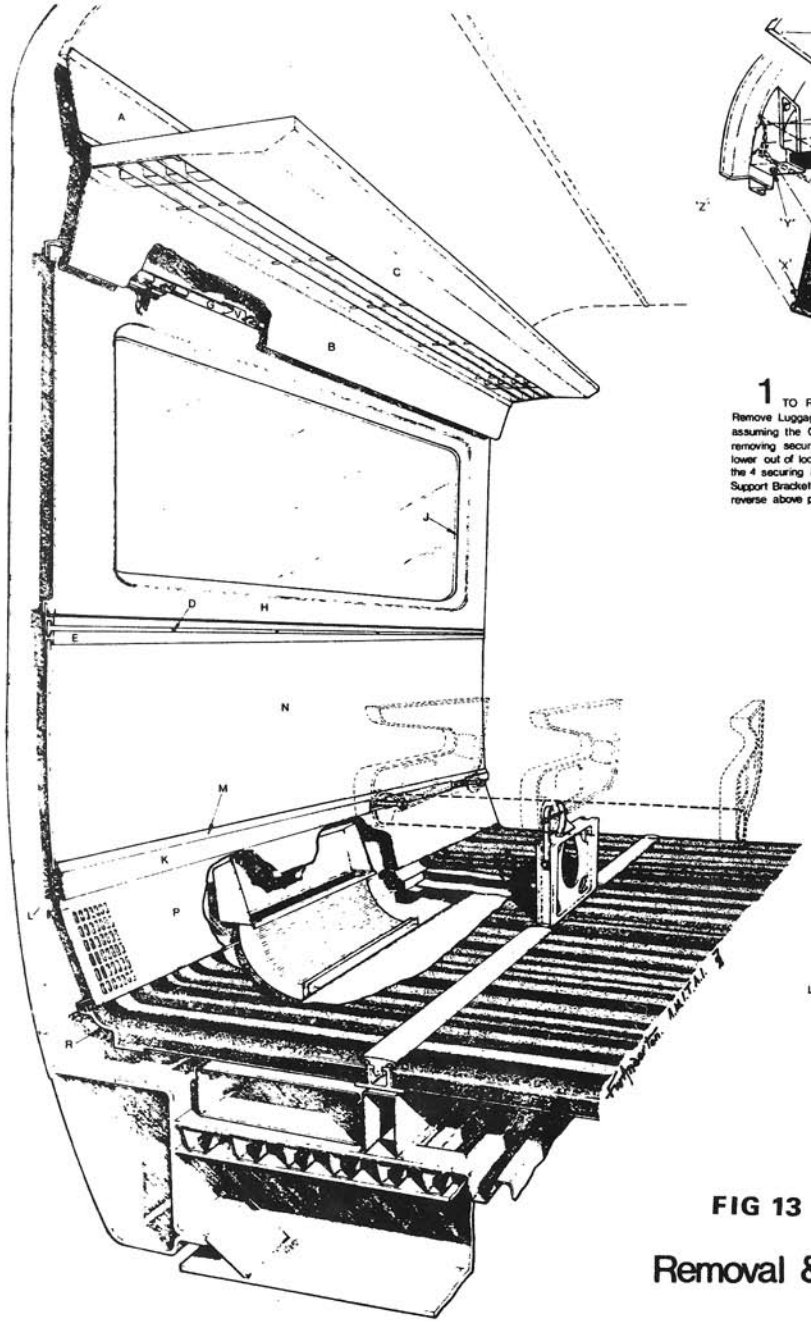
A Girling disc brake cylinder, with automatic slack adjuster unit S.A.B., type CALL 2-190, is fitted to each wheel of the two four wheeled bogies.

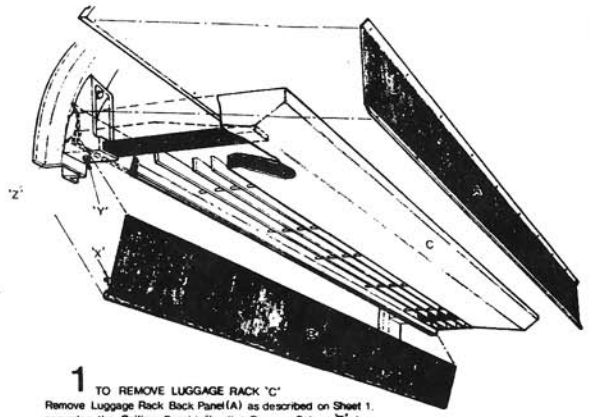
FIG 12

Mk.III Seat.
1st. Class Adjustable
2nd. Class Fixed

(Parts shaded thus ▪ represent 2nd Class variations to 1st Class configuration)

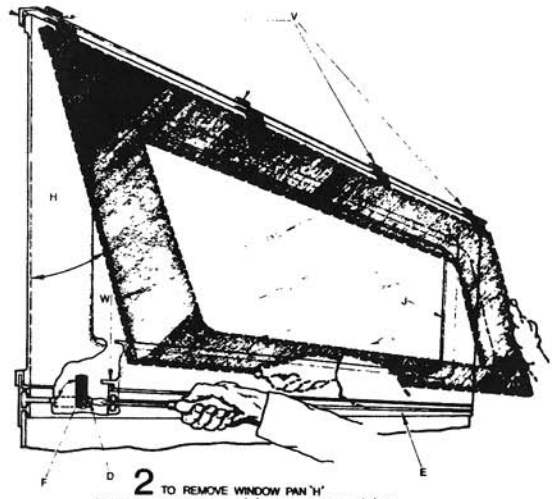






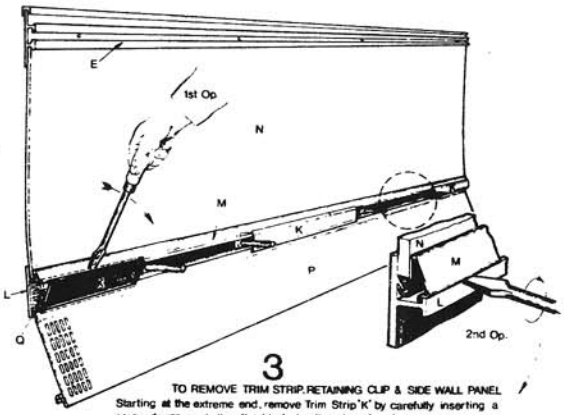
1 TO REMOVE LUGGAGE RACK 'C'

Remove Luggage Rack Back Panel (A) as described on Sheet 1, assuming the Ceiling Panel is "in situ". Remove Pelmet 'B', by removing securing screws in flange 'X' at rear of Pelmet & lower out of locating slot in underside of Luggage Rack. Remove the 4 securing Bolts 'Y', (2 to each Support Arm), in the Support Bracket 'Z'. Withdraw Rack 'C' evenly. To replace Rack reverse above procedure.



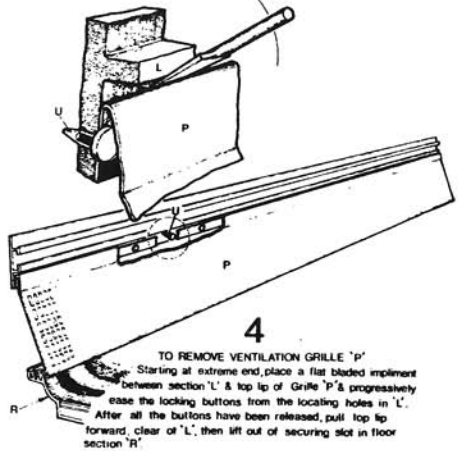
2 TO REMOVE WINDOW PAN 'H'

Rotate the 4 toggle screws 'D' in the extruded rail 'E' to disengage Toggle catches 'F' from slots in the bottom flange 'W' of the window pan 'H'. Ease window pan forward at lower edge, (shown shaded), until clear of extruded rail. Lower window pan until tongues 'V' are clear of Top Rail 'G' locating slots. To replace window pan reverse above procedure, ensuring that the edge sealing rubber 'J' is correctly seated.



3 TO REMOVE TRIM STRIP, RETAINING CLIP & SIDE WALL PANEL

Starting at the extreme end, remove Trim Strip 'K' by carefully inserting a screw driver or similar flat blade impliment, easing downwards until the spring (as shown 'Q') is free, then pull Trim Strip clear. To remove Retaining Clip 'M' again apply a flat bladed tool (as 2nd Op., enlarged above), twisting the blade whilst lowering down, as indicate by arrows, lifting lip out of flange in section 'L'. Proceed down the length of 'M' until free. Pull panel 'N' forward until clear of flange in 'L' then lower out of locating slot in 'E'. To replace, reverse above sequence employing a hide or plastic faced mallet to re-locate items 'M' & 'K'.



4 TO REMOVE VENTILATION GRILLE 'P'

Starting at extreme end, place a flat bladed impliment between section 'L' & top lip of Grille 'P' & progressively ease the locking buttons from the locating holes in 'L'. After all the buttons have been released, pull top lip forward, clear of 'L', then lift out of securing slot in floor section 'R'.

Note:- Before operations 3 & 4 are carried out it is essential that the seating is removed.

FIG 13

Removal & Replacement of Luggage Racks & Lower Panels

The usual distributor isolating lever and reservoir isolating cock are fitted to each coach. Brake release levers are fitted on either side of the vehicle, outside of coach apron.

Girling wheel-slide prevention equipment is fitted to each axle.

Passenger Emergency Brake.

Passenger emergency brake operating handles are provided. There are six in each coach, one in each of the two toilets and two in each of the saloon sections of the coach.

When the handles are pulled out a reduction of the brake pipe pressure results and hence a brake application on the train. As long as brake pipe pressure is available an audible indicator will sound on the coach concerned.

The apparatus (passenger emergency application box type P.E.V.1) is reset by inserting a carriage key beneath the operating handle which has been used.

An isolating cock is provided behind module door 'Q'.

Sliding Doors.

The internal automatic sliding doors are normally air operated and controlled by a switch under the floor mats adjacent to the doors.

Air pressure is supplied from the reservoir feed pipe at a reduced pressure, 22 - 25 p.s.i. Air pressure supplied only opens or closes the doors and is then exhausted from the operating cyliner. Speed of door closure is controlled by the air flow regulating valve.

In the event of a failure of the air supply the doors at either end of the coach may be opened or closed by operating the door handle in the usual way. An electrical isolating switch is provided in each vestibule situated above the electrical panel.

The Secondary Suspension.

This is provided by compressed air and hydraulic dampers. Two bellows like air springs are fitted at each side of the bogie (there are 2 four wheeled bogies per coach) and when air pressure from the reservoir feed pipe (7 bar supply) is fed into the springs they expand vertically and form an air cushion.

A levelling valve on each side of the bogie adjusts the air pressure in the springs to maintain the coach at a constant height under all load conditions. When the springs are deflated the coach lowers on to a rubber cushion within the spring units.

An indication that the coach is at the correct level is to observe the position of the levelling valve operating lever which should be parallel with the coach body, also the air suspension indicator arrows should not be in line.

The load proportional relay valve receives air pressure from an "averaging relay" valve which is controlled by air pressure within the springs, thus brake load is related and proportional to the load.

In the event of a suspension failure, caused by air leaks, isolating

cocks are provided to enable bogies to be isolated.

DISTRIBUTOR VALVE (EST 4/F/AL26/5/H.B.G., TYPE 5).

Function.

To pass air from the auxiliary reservoir (7 bar supply) to the coach brake cylinders in proportion to the reduction of the "brake pipe" pressure (A.A.B.P. auto air brake pipe) with respect to the load on the coach.

The distributor valve receiving a signal to apply the brakes does this by passing air to separate brake cylinders on each wheel, but the amount of air will depend on:-

(a) the load in the coach.

(b) the deceleration rate of the wheels.

British Rail lay down that the braking effort must not exceed 85% of the tare (unloaded) weight and must not be below 50% of the gross (loaded) weight.

Load Proportional Relay Valve.

This valve is integral with the distributor and is interconnected through drilled and cored ports. It is also connected via an "averaging relay" valve with the air springs in the air suspension system.

Purpose.

When a brake application is required this valve adjusts the brake cylinder pressure in proportion to the load on the coach. This is achieved by using the air suspension pressure to provide a measurement of the weight of the coach in terms of air pressure.

The load is measured on one bogie only, thus assuming that the load is evenly distributed.

Air Suspension Averaging Valve.

Purpose.

A means to measure the "averaging" pressure in the two respective air springs and quickly reflect any change in that pressure due to a change in total load. This is accomplished by incorporating this valve between the two air springs and the coach distributor.

Method.

This valve is fed with control air pressure from the air springs on each side of the axles. It also receives a feed of air from the reservoir feed pipe supply (7 bar) which comes from the suspension reservoir.

The valve produces an average output pressure which is proportional to the total load, being equal to half the sum of the two control pressures in the air spring suspension "bags".

Air Suspension Levelling Valve.

Purpose.

To maintain a constant platform height above the rail level and an effective spring rate which is matched to the load.

Method.

Four two stage levelling valves are used, two per bogie. The valves are horizontally mounted on the bogie bolster and the actuating lever by which the valve is operated is connected through linkage to a point on the spring plank.

Operation.

The normal setting to the actuating lever is parallel to the valve body. In this position the air in the spring bellows is held at a constant pressure.

UNLOADING the coach causes the lever to rotate downwards which allows the valve to exhaust air pressure from the spring bellows.

LOADING the coach causes the lever to rotate upwards which allows the valve to increase spring bellows air pressure.

Wheel Slide Prevention (Girling).

Two Types (Self-powered and Coach Battery Powered).

Purpose.

This system decreases the tendency for wheels to lock and slide when the brake is applied at high speed, particularly in adverse weather conditions.

Charging Valve.

Allows the auxiliary reservoir and feed to the distributor to build up pressure to 5 bar before this valve opens to supply the suspension system. In the event of a serious leak on the suspension system this valve will close and protect the supply for braking.

Pressure Regulating Valve.

Set at 1.5 bar to give a reduced air pressure supply to the air operated doors system.

Compensating Valve.

Operated if the differential between the two stage reservoirs is greater than 1 - 1.25 bar.

Square 'D' Pressure Switch.

Connected to brake cylinder feed pipe. The contacts of this switch create circuits to:-

Fresh Air Dampers. Closed for a limited period of 2 minutes maximum.

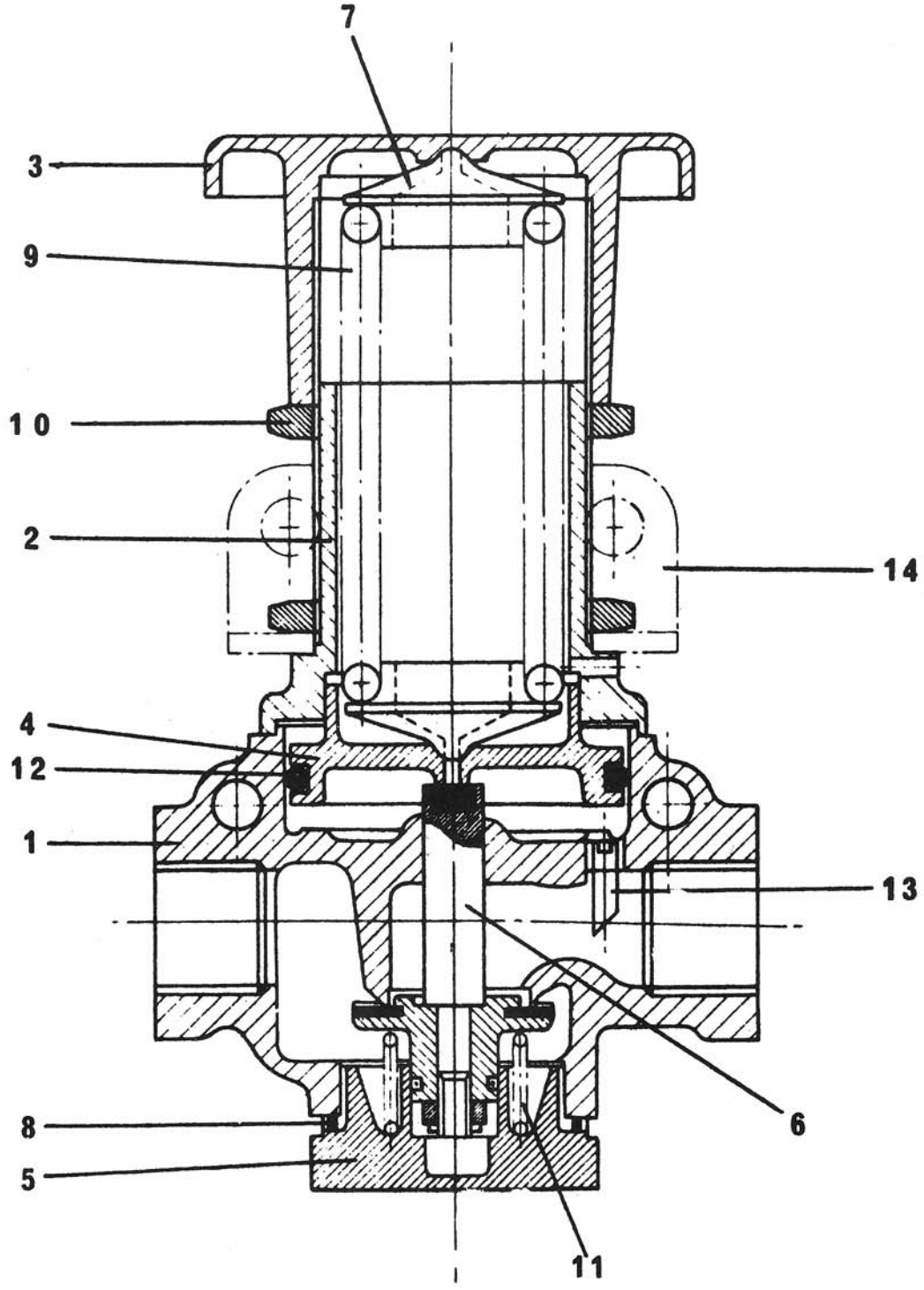


FIG 14

S/R4 ½" PRESSURE REGULATOR

Ill. Ref.	Martonair Ltd Pt. No.	Description	Quantity per Illustration	B.R. Cat. No.
	S/R4 (MOD) RFE 035035	½" PRESSURE REGULATOR, Complete Comprising:-		64/1407
1	S/P11982	Body, Regulator	1	
2	S/P11983	Cover, Top	1	
3	S/P11984	Handle, Adjusting	1	
4	S/P11985	Piston	1	
5	S/P14628	Plug	1	
6	QF/R4/00	Seat Assembly, Top & Bottom		64/1410
7	S/P11989	Carrier, Spring	2	64/1484
8	MOR/2125/7	Ring, "O"	1	64/1409
9	S/P11993	Spring	1	
10	S/P11994	Nut, Lock	2	
11	ME	Spring	1	64/1485
12	MOR/149/6	Ring, "O"	1	
13	S/P15454	Tube, Venturi	1	
14	S/P14146	Bracket	1	
N.I.	S/P1514/4	Washer, ¼" Dia, Internal Shakeproof Matl. Steel Finish Black	4	
N.I.	S/P1522/5	Screw, Hex. Hd., ¼" BSF x ⅝" LG. Steel Cad. Plate & Passivate	4	
N.I.	S/P14018/1	Lable	1	
N.I.	S/P14394	Washer	2	
N.I.	S/P15083	Plug, ⅛" B.S.P.	1	

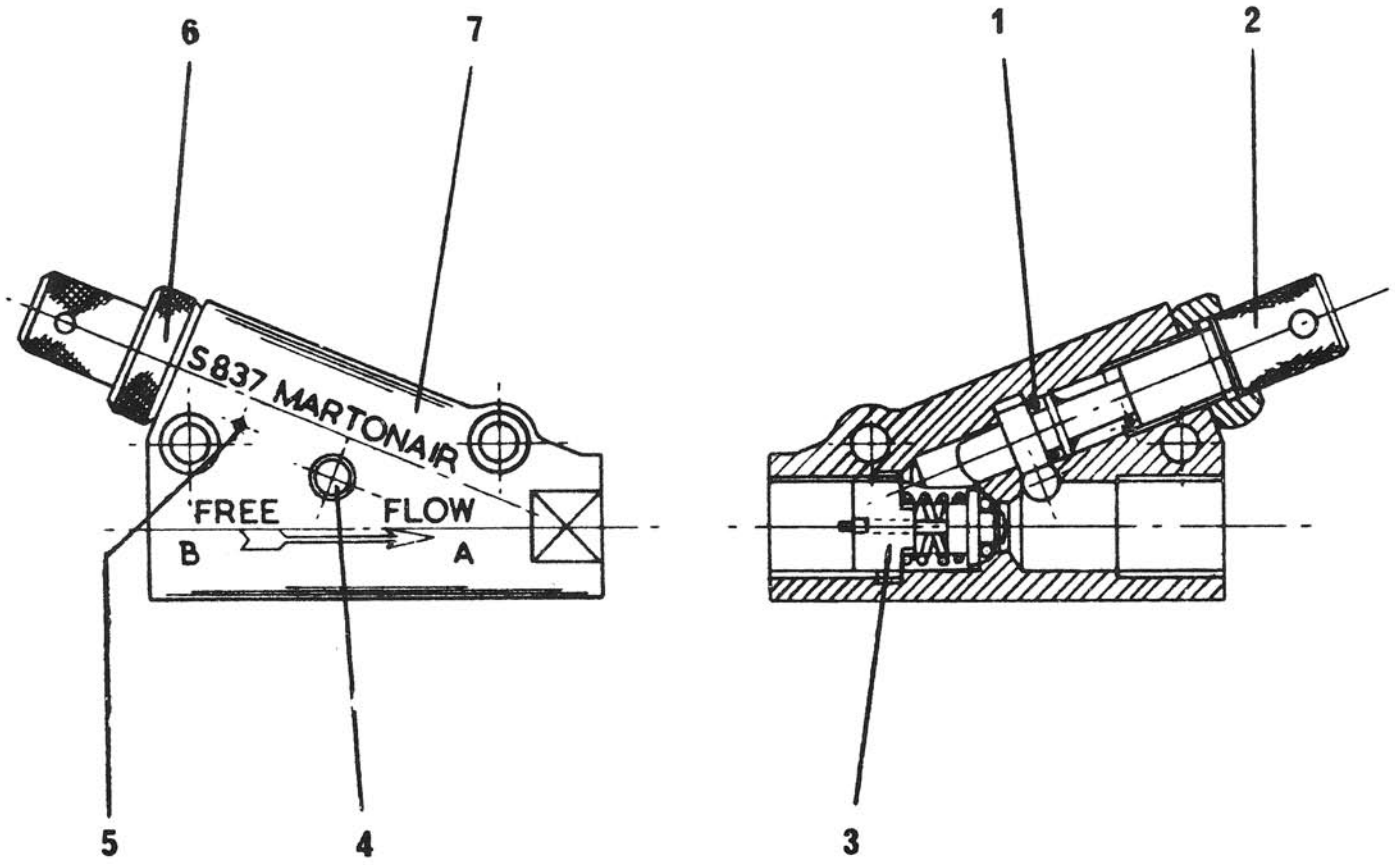


FIG 15 S 837 ¼" FLOW REGULATOR

Ill. Ref.	Martonair Ltd Pt. No.	Description	Quantity per Illustration	B.R. Cat. No.
	S/837	¼" FLOW REGULATOR, Complete		64/850
		Comprising:-		
1	MOR/104/6	Ring "O" 7/32" I/DIA x 1/16" Secn	1	64/1483
2	S/P10844	Pin, Regulating	1	
3	QS/869	Valve Assy. Non-Return	1	
4	S/P1572/7	Screw, Grub, ¼" B.S.F. x 3/16"	1	
5	S/P1582/26	Pin, Grooved 1/16" Dia x ¾" Long Mills Type GP1	1	
6	S/P10369	Nut, Lock	1	
7	S/P10843	Body	1	

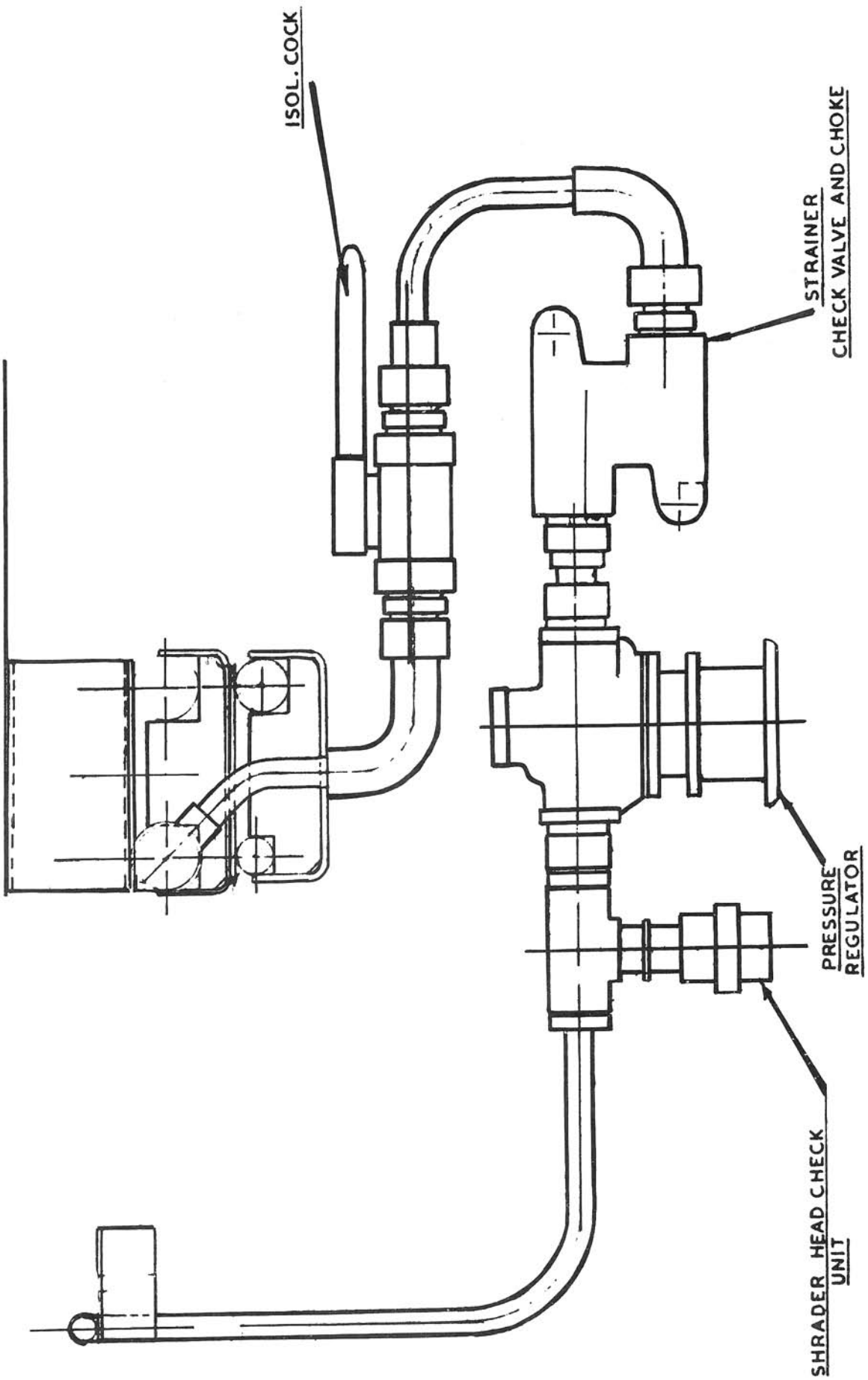


FIG 16

AIR SUPPLY TO VESTIBULE DOORS (UNDERFLOOR)

AIR OPERATED VESTIBULE DOORS.

Description.

The vestibule doors on these coaches are electrically controlled and air operated, the supply of compressed air being obtained from the main reservoir pipe, via a filter non-return valve and a hand operated reducing valve (Fig.16). The electrical control circuit for opening and closing of the doors incorporates a mat switch; should this fail the doors can be opened manually using the door handle.

Equipment.

(a) Air Actuator.

This consists of a Peters double acting long stroke actuator for the opening and closing movement of the vestibule door, and is situated above the door. This is described later.

(b) Martonair Flow Regulator.

This valve allows the air to flow to the air actuator, and is fed via two E.P. valves, one for open and one for close. The valve allows free flow for door opening and a restricted flow for door closure (Fig. 15). Normal opening time is 2 seconds and closure not more than 10 seconds. This valve is mounted on the respective control panels in the vestibule ends.

(c) Reed Switches L1 and L2.

These switches are operated at the extremities of the door movement; L1 when the door is fully opened, L2 when the door is fully closed.

(d) Relays DR1, DR2 and DR3.

DR1 and DR2 relays are 110 V D.C., DR3 relay is 24 V D.C. These relays energise and de-energise the associated control circuitry to give the required operation of the vestibule door.

(e) Resistors.

R1 and R2 form a potential divider circuit to give a 24 V supply for relay DR3.

(f) Capacitor.

C1 forms a time delay for de-energising the door open circuit.

(g) Mat Switch.

This is a very sensitive switch, which is concealed under the mat that extends either side of the vestibule door.

Plumbing.

Access panels are provided for the basin pipe work and hot water hot water tank (Fig. 19), also a full length panel conceals the flush valve and isolating cock (Fig. 20).

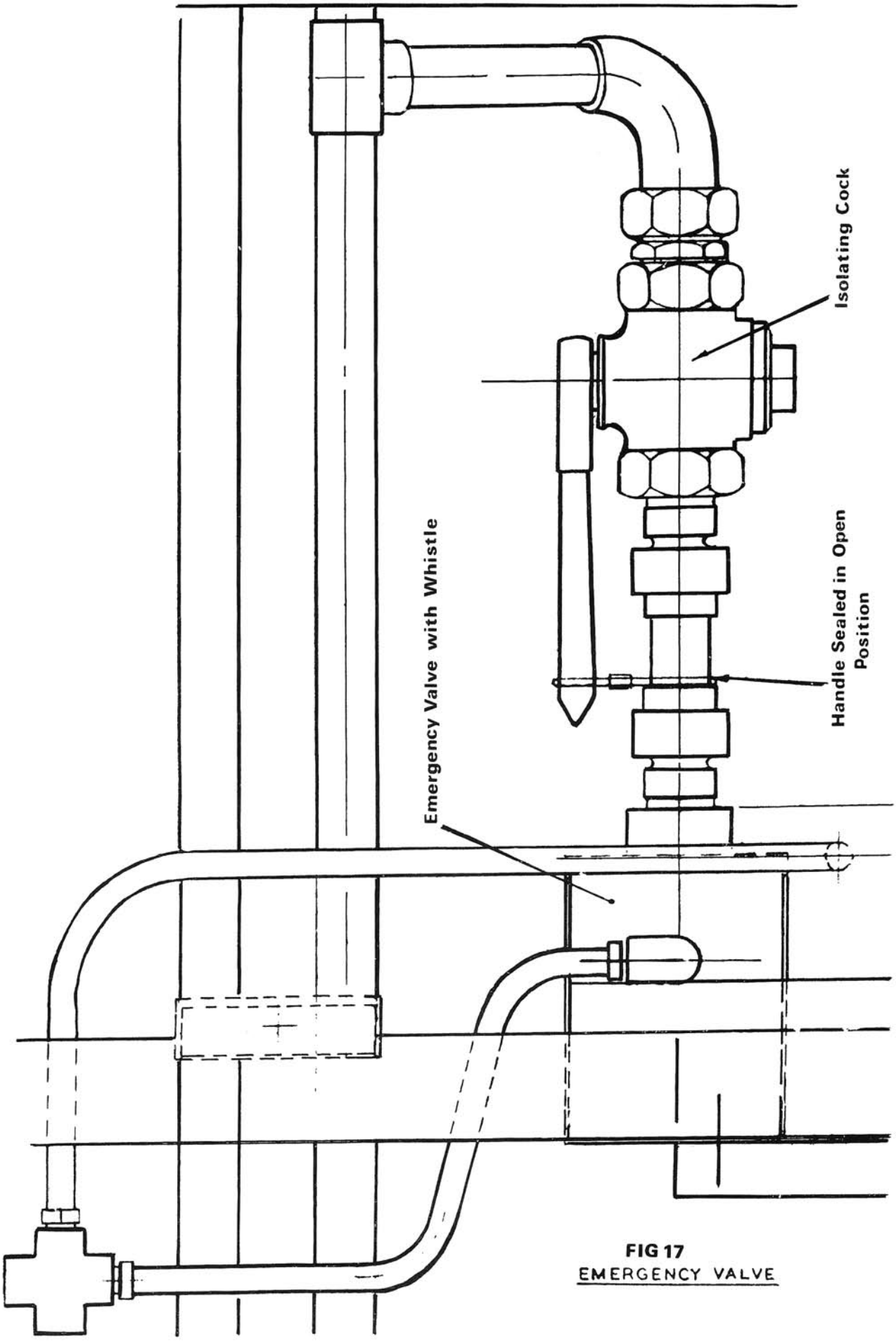


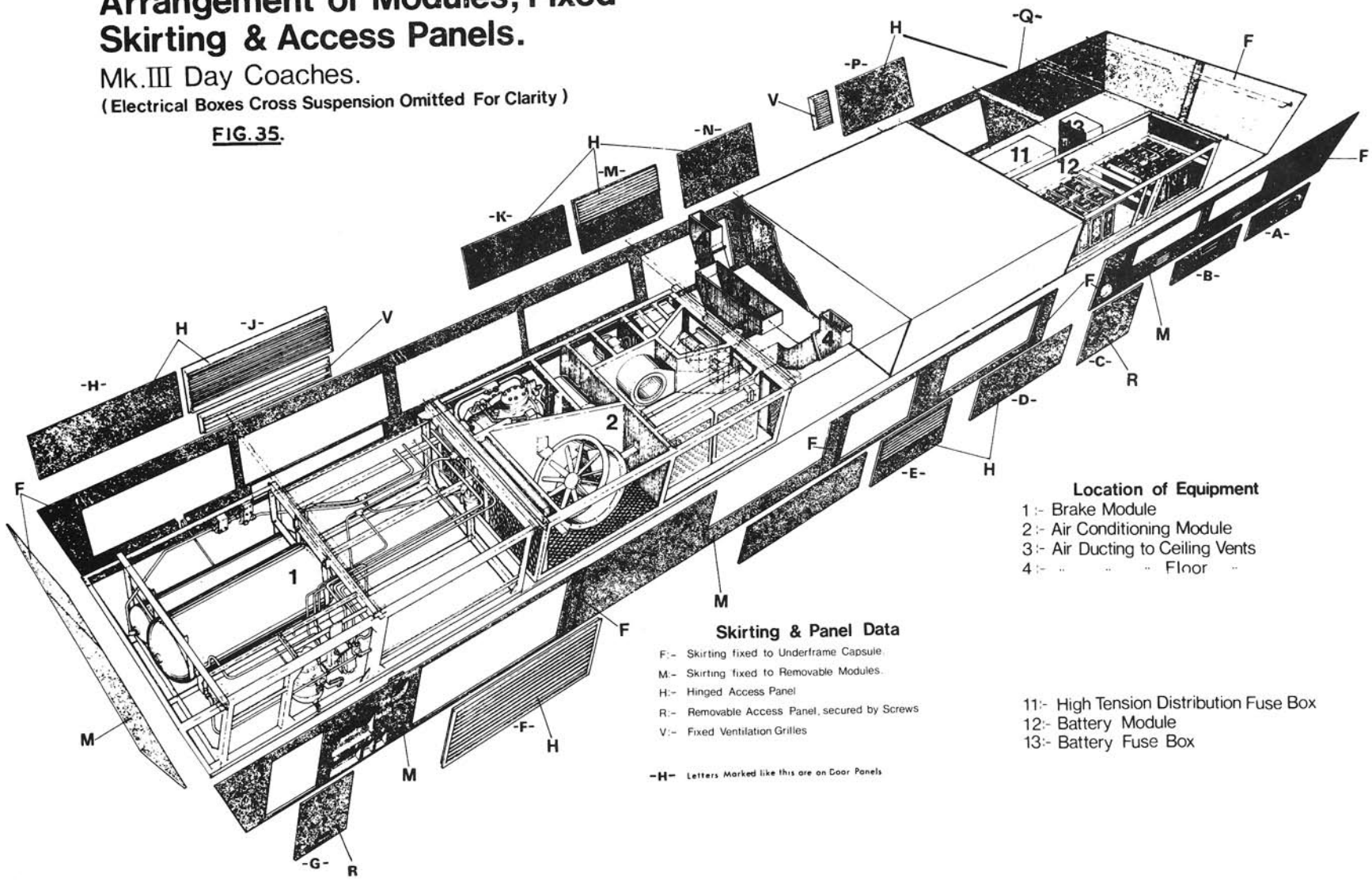
FIG 17
EMERGENCY VALVE

Arrangement of Modules, Fixed Skirting & Access Panels.

Mk.III Day Coaches.

(Electrical Boxes Cross Suspension Omitted For Clarity)

FIG.35.



Location of Equipment

1 :- Brake Module
2 :- Air Conditioning Module
3 :- Air Ducting to Ceiling Vents
4 :- " " " Floor "

Skirting & Panel Data

F:- Skirting fixed to Underframe Capsule.
M:- Skirting fixed to Removable Modules.
H:- Hinged Access Panel
R:- Removable Access Panel, secured by Screws
V:- Fixed Ventilation Grilles

-H- Letters Marked like this are on Door Panels

11:- High Tension Distribution Fuse Box
12:- Battery Module
13:- Battery Fuse Box

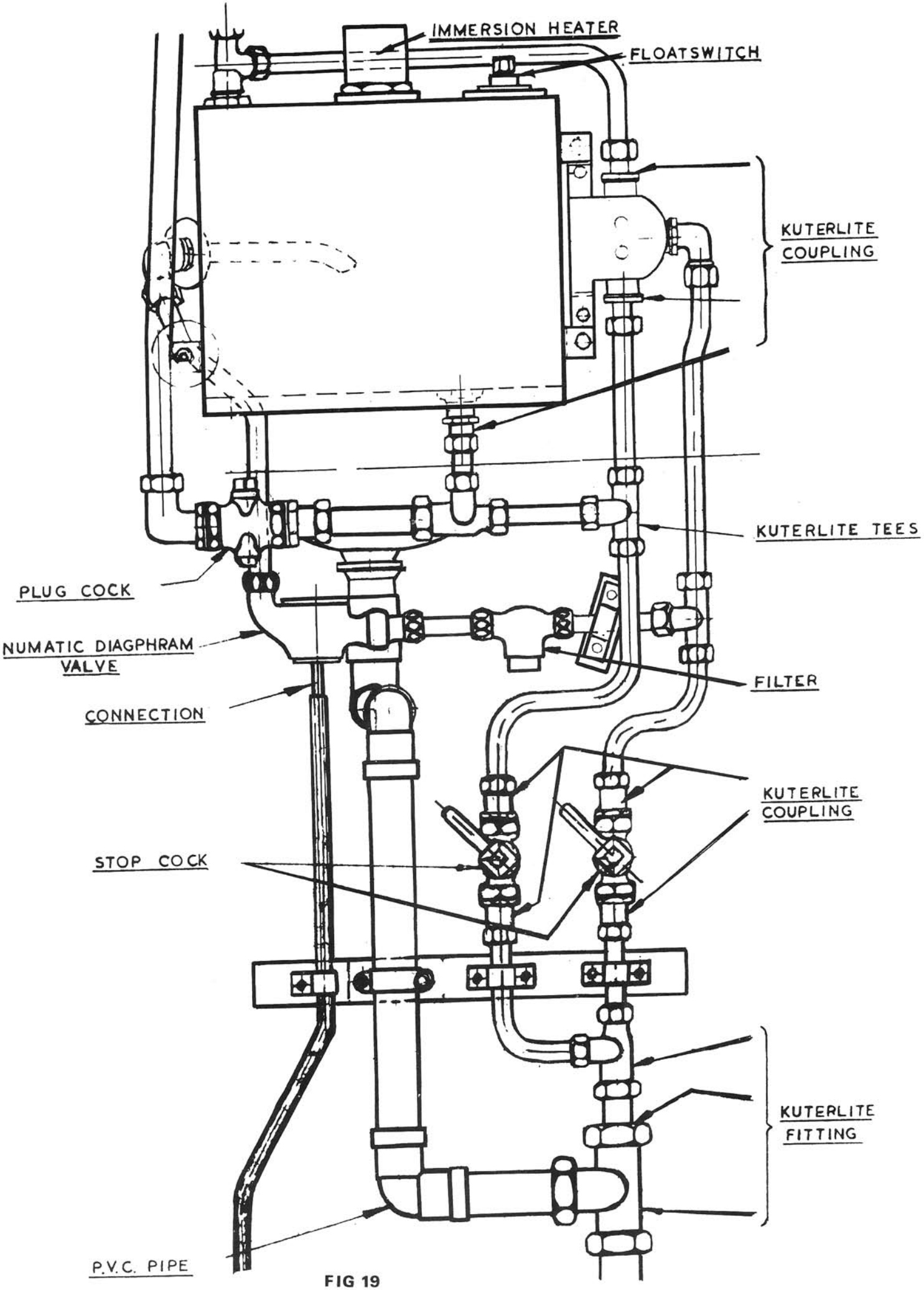


FIG 19

WASH BASIN PIPE LAYOUT

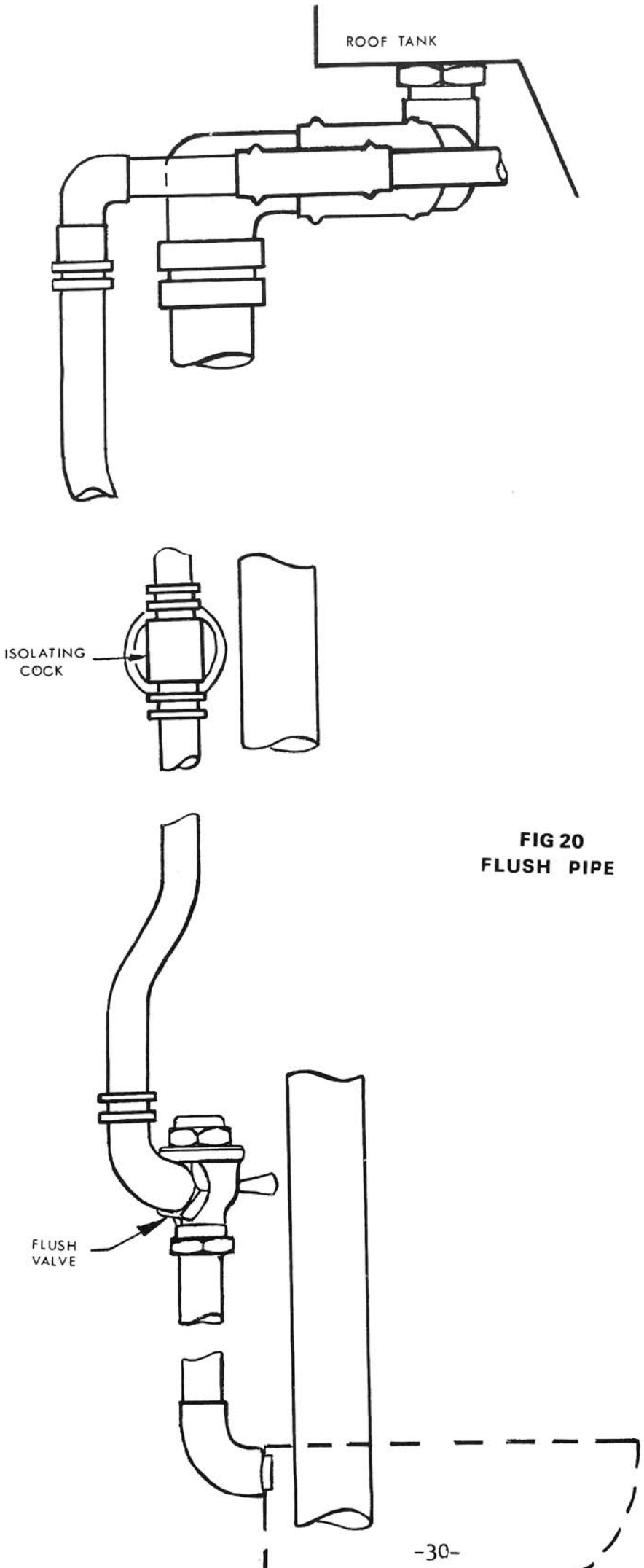


FIG 20
FLUSH PIPE

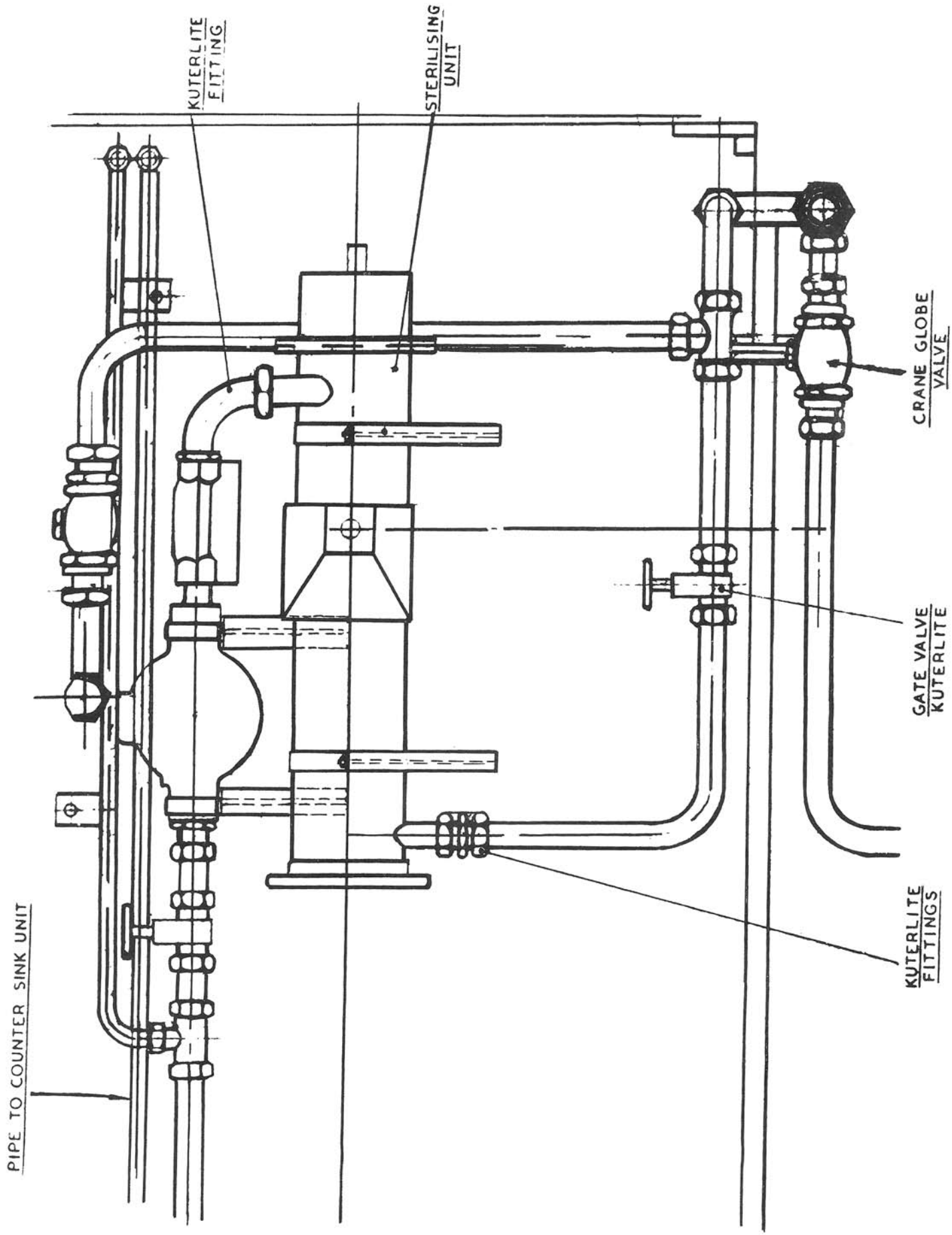


FIG 21

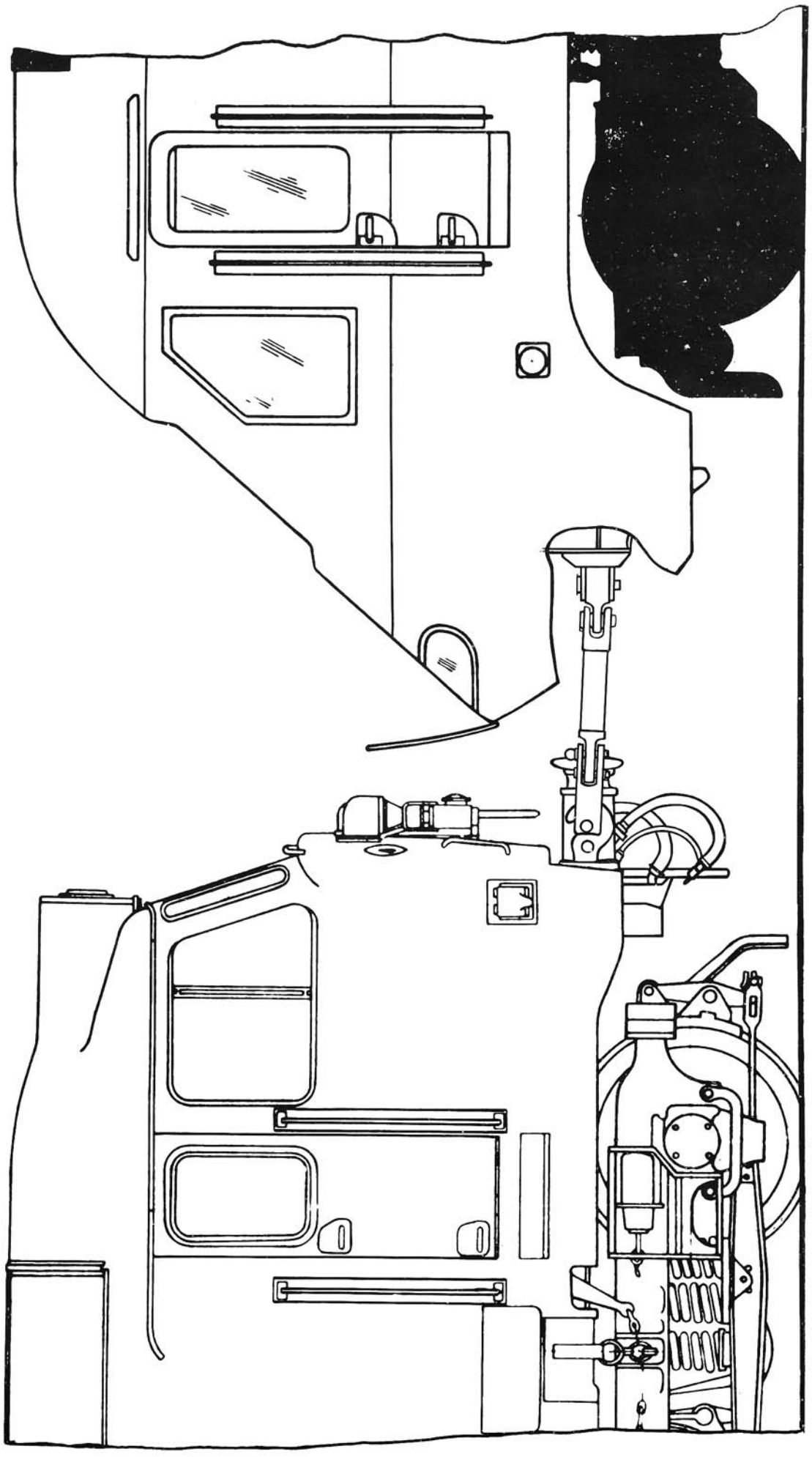


FIG 22 EMERGENCY COUPLING

EMERGENCY COUPLING.

Because of the absence of buffers on Class 253 trains, emergency draw gear is provided. Two draw bars are necessary. One is for coupling two Class 253 trains together and the other is for coupling a Class 253 train to a locomotive. The two draw bars are kept in a cupboard in the luggage van.

A telescopic element is incorporated in the draw gear, allowing a tolerance of one foot when coupling a locomotive and two feet when coupling two Class 253 trains together.

Two draw bars are necessary because one must fit to the coupling eyes of Class 253 trains, whereas the other has a special adaptor to fit a locomotive draw hook. A pinned joint is provided in the draw bar for attachment to locomotives. This joint is normally locked by a separate removable pin. If, however, the locomotive has a fixed draw hook, with no sideways movement, e.g. Class 08, the roundheaded pin must be removed and placed in the Class 253 cab. This will give the draw bar sideways flexibility.

The procedure for coupling two Class 253 trains together is as follows:-

With the two trains 6 - 12 feet apart and secured as necessary, convey the long draw bar to the end of one power car, open the draw gear access doors of both power cars and secure them with the shoot bolts.

Bring the assisting train to a position approximately 2ft 6in. from the other train.

Remove the main and oval pins from both trains.

Attach one end of the draw bar with the main pin to one train. Pull the draw bar towards the other train, to the full extent of the telescopic element. If necessary, pull out the coupling eye of the telescopic element of the other train, until the holes are in line. Insert the other main pin and then secure both of them with the detent pins.

Ensure that no person is standing between the trains, then gently move the assisting train closer, until the draw gear is closed up.

Insert both oval pins and secure them with the detent pins.

On the defective Class 253 train, the driver must isolate the E70 brake pipe pressure control unit in each power car, in accordance with the instructions in the Driver's Manual.

Couple the brake pipes and main reservoir pipes using the extension hoses and open their cocks.

Perform the brake continuity test before moving.

The procedure for coupling a Class 253 train to a locomotive is as follows:-

With the train and locomotive 6 - 12 feet apart and secured as necessary, convey the short draw bar to the end of the power car. Open the draw gear access door and secure it with the shoot bolts.

Bring the assisting locomotive to a position so that its buffers are approximately 18 in. from the nose of the Class 253 train.

Remove the main and oval pins from the Class 253 train.

Attach the end of the draw bar without the swivel end, to the coupling eye of the Class 253 train draw gear, by means of the main pin. Secure the main pin with the detent pin.

Remove the pin with the long handle from the swivel end of the draw bar. Fit the draw bar to the locomotive draw hook, pulling the draw bar towards the locomotive and extending the telescopic element as necessary. Insert the pin with the long handle through the eye of the draw bar and ensure that it also passes through the draw hook. Secure it with the detent pin.

Ensure that no person is standing between the locomotive and the train, then gently move the locomotive until the draw gear is closed up.

Insert the oval pin and secure it with the detent pin.

If the locomotive has a fixed hook, e.g. Class 08, remove the roundheaded pin from the draw bar and retain it in the Class 253 cab.

On the defective Class 253 train, the driver must isolate the E70 brake pipe pressure control unit in each power car in accordance with the instructions in the Driver's Manual.

Couple the brake pipe and main reservoir pipes and open their cocks.

Perform the brake continuity test as per the General Appendix instructions, before moving.

NOTE:- The emergency draw bar cannot be coupled to drop head Buckeye couplers.

A Class 253 train may be hauled at either the line speed limit or up to the maximum speed of any vehicle in the formation. The lowest speed according to the above, must always apply.

The speed must be limited to 40 m.p.h. when a Class 253 train is being propelled by a locomotive.

Difficulty may be experienced in coupling to assisting locomotives due to variations in draw-hook dimensions. If this situation is encountered the locomotive loose coupling must be removed to allow the long handled pin to be fitted.

BRAKE CONTINUITY TEST.

The procedure for carrying out the brake continuity test is as follows:-

The driver, who must be in the LEADING DRIVING COMPARTMENT, must communicate with the guard, apply the parking brake, and then move the automatic brake controller to 'RUNNING'.

The guard, who must be in the guard's compartment of the REAR POWER CAR, must check that the brake pipe pressure is approximately 5.0 bars and the main reservoir pipe pressure is approximately 7.0 bars.

The guard must open the emergency brake valve for ½ minute, observe that the brake pipe pressure falls and that the pressure rises in the brake cylinders. On closing the brake valve, he must check that the brake pipe pressure rises to approximately 5.0 bars and that the brake cylinder pressure reduces to zero.

The driver must observe the resulting drop in brake pipe pressure and subsequent rise to approximately 5.0 bars.

The guard must then communicate with the driver and both must confirm their satisfaction with the test.

The driver must, if driving from a different cab from that in which preparation was performed, or after changing ends, press and release the overcharge button and must take a holding brake application before releasing the parking brake.

The guard must not give the signal to start until he has carried out his duties in the above test.