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B.C.W./E.C.W. RAILBUSES.  
Nos. SC 79958: SC 79959.

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**DRIVERS' INSTRUCTIONS FOR OPERATING BRISTOL  
COMMERCIAL VEHICLES LIMITED AND EASTERN  
COACH WORKS LIMITED**

**RAILBUSES NOS. SC. 79958—SC. 79959**

**GENERAL DESCRIPTION**

Single unit railbus with driving compartment at each end. Single engine only.

**TECHNICAL DATA**

Type ... ..	1A			
Weight in running order ...	13 tons 14 cwts.			
Wheel base ... ..	22ft. 0ins.			
Wheel diameter ... ..	2ft. 10½ins.			
Width overall ... ..	8ft. 10ins.			
Length overall ... ..	42ft. 7ins.			
Height overall ... ..	11ft. 11¼ins.			
Maximum speed at maximum governed engine revs.:				
1st speed	2nd speed	3rd speed	4th speed	5th speed
9	15	26	38	52
Gearbox ratios:				
1st gear	2nd gear	3rd gear	4th gear	5th gear
4.07 : 1	2.42 : 1	1.6 : 1	1 : 1	0.77 : 1
Fuel tank capacity ... ..	38 gallons.			
Lubricating oil sump capacity	4½ gallons. Frankman dispenser tank 1½ gallons. Total 6 gallons.			
Gearbox, oil capacity ... ..	2½ gallons.			
Clutch, oil capacity ... ..	4 gallons.			
Final drive oil capacity ... ..	3½ gallons.			
Cooling water capacity ... ..	10 gallons.			
Control system ... ..	Electro Pneumatic.			
Brake system ... ..	Dunlop monitor brake system, compressed air operated and hand brake lever.			
Warning horns ... ..	Compressed air operated (two-tone horns).			

**Engine**

One 6 cylinder 8.4 litre horizontal oil engine ...	Gardner type 6 H.L.W. 112 H.P. @ 1,700 r.p.m.
Compression ratio ... ..	13.5 : 1
Bore ... ..	4½ ins.
Stroke ... ..	6 ins.
Firing order ... ..	1, 5, 3, 6, 2, 4.
Rotation ... ..	Clockwise.
Fuel injector type ... ..	Gardner.
Fuel injector lifting pressure	131.5 atmospheres=1,933 lbs./sq. in.
Fuel pump type ... ..	C.A.V. Gardner.

**TRANSMISSION**

Clutch ... ..	Self Changing Gears Limited type 18in. Fluid Friction Clutch incorporating a centrifugal lock up clutch which operates at about 700 r.p.m.
Gearbox ... ..	Self Changing Gears Limited type R.11B fully automatic. 5 speed.

Final Drive ... ..	Bristol Commercial Vehicles type Spiral Bevel and Double reduction gearing.
Reversing arrangement ...	Axially sliding pinion between bevel gears incorporated in final drive gearbox.
Final drive gear ratio ...	4.37 : 1.

### AUXILIARIES

Battery ... ..	Exide type 3.BMF.17/2 296 amp. hr. 24 volts.
Alternator ... ..	C.A.V. type AC. 824/2. Belt driven from the front end of the gearbox.
Rectifier ... ..	C.A.V. Germanium type.
Lighting ... ..	24 volts.
Starter motor ... ..	C.A.V. 24 volt.
Compressor ... ..	Westinghouse type E.10.
Railbus heating equipment .	Smith's combustion air heater.
Radiator ... ..	Coventry flattened tube type.
Windscreen wipers ... ..	Compressed air operated.
Speedometer ... ..	Electrical type.
Seating capacity ... ..	56.

### DRIVER'S CONTROLS AND INSTRUMENTS

1. Main control lever (detachable).
2. Throttle handle (incorporating the deadman's device).
3. Battery isolating switch (No. 1 cab only).
4. Engine start button.
5. Hand brake lever.
6. Driver's air brake handle.
7. Deadman's hold-over button.
8. Radiator blinds (No. 2 cab only).
9. Dual horn control.
10. Demister control.
11. Door control switches, Left and Right hand side.
12. Door open and close button, Left and Right hand and "Door Open" indicator light—Red.
13. Engine temperature gauge.
14. Air pressure gauge.
15. Speedometer.
16. Windscreen wiper control.
17. Railbus heater controls (in No. 1 cab only).
18. Headlights code and interior lighting switches.
19. Air pressure low - warning buzzer.
20. Guard's buzzer.

### Indicators Fitted

1. Forward gear indicator light—Green. Illuminated when gear engaged.
2. Reverse gear engaged—Amber. Illuminated when gear engaged.
3. Generator indicator light—Red. Illuminated momentarily when starting railbus from rest.
4. Air indicator light—Red.
5. Oil indicator light—Red.
6. Water indicator light—Red.
7. Gearbox indicator light—Red.
8. Indicator lights test button.
9. Door open warning light—Red.

## General Information

The reversing control, excess fuel device, starter circuit, local hydraulic throttle control (Engine only), and Engine Stop, are all operated by one detachable lever which operates in both the starting throttle control gate and in the Forward and Reverse directional gate.

The throttle handle is coupled to the engine fuel pump throttle control by Electro-Pneumatic valves.

The throttle and electrical control system operates from either end of the railbus, but on this type **cannot** be linked to another car as no jumper connections or couplings are provided.

Any failure of the control air pressure resulting in a severe drop in pressure will return the gears to NEUTRAL and the engine will run at IDLING speed.

The throttle handle is also the deadman's device and if allowed to spring up the brakes are **instantaneously** applied, the gearbox is automatically placed into NEUTRAL position and the engine shut down to IDLING speed, a deadman's hold button is provided in each driving compartment which, on depressing the button, isolates the deadman's device for 20 seconds to allow time for tablet exchange, etc.

There are four positions in the Forward and Reverse directional gate:—

1. Handle on.
2. Forward—normal forward position—all five gears, automatically operated.
3. F.2—Hold position—an intermediate gear held in until lever again placed in Forward position.
4. Reverse—Low gear only engaged in this position. See instructions under "With the Engine Running" for operating the reversing control. (Main Control Lever).

## Indicator Lights

With the exception of the "Forward" and "Reverse" gear indicator lights which remain illuminated the whole time that "Forward" or "Reverse" is engaged, the indicator lights are normally out—illuminated on fault.

**NOTE.**—The Generator indicator light is illuminated momentarily when starting the railbus from rest.

## DRIVER'S DAILY DUTIES

1. Obtain the Main Control Lever.
2. To obtain initial access to the vehicle, one of the door emergency cocks should be opened; the door can then be opened by hand.
3. (a) Check that the detonator cases are intact.  
(b) Check that the handbrake is ON in the leading driving compartment.  
(c) Check that the handbrake lever is in the down position in the trailing driving compartment and the safety lock is turned to hold the lever in that position.

**NOTE.**—Operation of handbrake lever:

**To apply the handbrake** pull the handbrake lever upwards and when the brake is applied allow the handle to drop forward towards the OFF position; the brake is now held on by the pawl and quadrant.

**To release the handbrake.** Check that the safety lock is released, then push the handbrake lever sharply forward to the full extent of its travel; this releases the brake on all four wheels irrespective of the position of the handbrake lever in the trailing compartment.

**The handbrake safety lock.** To avoid misuse of the handbrake on leaving the driving compartment and to protect the handbrake in the trailing compartment, the following procedure must be carried out—

- (1) Apply the handbrake.
- (2) Allow the handbrake lever to drop forward into the down position.
- (3) Turn and drop down the safety lock at the base of the handbrake lever and check that the lever is then locked in the down position.

#### **At a Convenient Time during Turn of Duty**

Make a short inspection of the railbus and check that the apparatus is generally in good working condition.

Check fuel tank level recorded on gauge, also that the oil level is showing in sight glass of Frankman sump oil tank (visible through cut-out in body skirt panel).

**Report all known defects at end of turn.**

#### **STARTING THE ENGINE**

1. Check that the handbrake is "ON" in the driving compartment from which starting is to be initiated.
2. Check that the battery isolating switch is ON (below No. 1 end control desk).
3. Place the main control lever into the STARTING GATE; this automatically switches on the starter circuit. Leave main control lever in the UPRIGHT position; press "Start" button, and then pull main control lever BACK to open throttle when engine starts. (In cold conditions, excess fuel is obtained by moving the main control lever "forward").
4. Run the engine until the air pressure gauge shows at least 75 lbs./sq. inch (maximum air pressure is 100 lbs./sq. inch).
5. Press indicator light TEST button and check that all warning lights show and that the low air pressure buzzer sounds.

#### **WITH ENGINE RUNNING**

With the engine running at IDLING speed, remove the main control lever from the STARTING GATE and place it into the DIRECTIONAL GATE and select required direction of travel, i.e. Forward or Reverse. Check that the appropriate indicator light on the control panel is illuminated. (Green for Forward, Amber for Reverse).

If the air pressure is below 50 lbs./sq. inch, the low air pressure warning buzzer will sound continuously until 50 lbs./sq. inch air pressure is obtained. See instructions under Air Pressure.

**NOTE.**—In F.2 position 1st gear only will be engaged when moving away from rest and this position should only be used for slow speed movements. (See instructions for operating in F.2 position). 1st gear only is engaged when "Reverse" is selected).



## STARTING THE RAILBUS

1. Place both door control switches to ON position on the control panel then CLOSE DOORS. (NOTE.—Any door emergency cocks opened to obtain initial access to the vehicle **must** be closed before power operation of the doors is possible.
2. Lift handbrake safety lock and release handbrake by a sharp forward movement of the lever to full extent of its travel.
3. Check that the main control lever is in the FORWARD position, then depress the throttle handle fully to release the deadman's device. Holding the throttle handle down, move it to FULL THROTTLE position. The railbus will move away and accelerate to maximum speed, gears being selected and engaged completely automatically at appropriate speeds.

**NOTE.**—The brake cannot be released or the throttle operated until the doors are closed (Red warning light shows when doors are open). If the doors are opened while the railbus is moving, the throttle will be automatically closed and an emergency brake application made.

THE DEADMAN'S HANDLE (THROTTLE HANDLE) MUST BE HELD DOWN WHILE THE RAILBUS IS IN MOTION, except when the Deadman's hold over button is operated to allow time for tablet exchange, etc. See item under GENERAL INFORMATION.

## COASTING

A free wheel is fitted and when the required running speed is attained, the throttle lever may be returned to the IDLING position and the railbus allowed to coast.

## POSITION F.2 ON THE DIRECTIONAL GATE

F.2 is a holding position for the gears. On rising gradients "hunting" of the automatic gearbox may sometimes occur. This is characterised by repeated downward and upward gear changes taking place automatically between two consecutive gears, without the throttle lever being moved. If this occurs proceed as follows:

1. Hold the throttle handle in the OPEN position.
2. Move the main control lever back to the F.2 position, when the lower of the two gears will be "held" and upward gear change prevented.
3. Return the main control lever to the FORWARD position as soon as gradient permits.
4. F.2 position may also be used when moving away from rest to make a slow shunting movement, in this case 1st gear only will be engaged.
5. DO NOT UNDER ANY CIRCUMSTANCES MOVE THE MAIN CONTROL LEVER BACK BEYOND F.2 POSITION WHILST THE RAILBUS IS MOVING.

## STOPPING THE RAILBUS

1. Return throttle handle to IDLING and hold it down in that position.
2. Apply power brake as required.
3. When the vehicle is stationary, release the throttle handle to the "deadman's" position and return the air brake handle to the OFF position.

## **CHANGING ENDS**

When the railbus has been brought to a stand as shown under "Stopping the Railbus"—

1. Apply the handbrake, drop the safety lock into position, move handbrake lever forward and check that the lock engages.
2. Place both door control switches to OFF.
3. Move the main control lever in the DIRECTIONAL GATE to the central (vertical) position, then remove lever. The engine may be left running.
4. Proceed to the other driving compartment, place the main control lever into the DIRECTIONAL GATE, then move it into the FORWARD position and check that the Green indicator light is illuminated before attempting to move the railbus.

## **REVERSING THE RAILBUS**

If it is necessary to reverse the railbus without changing ends, when it has been brought to a stand—

- (a) with the engine idling move the main control handle to "Reverse" position and check that the indicator light (Amber) is illuminated.
- (b) Operate throttle handle as required to move the railbus in 1st gear only.

**DO NOT ATTEMPT TO REVERSE WHILST THE RAILBUS IS MOVING.**

## **STOPPING THE ENGINE**

1. Return the throttle handle to IDLING position.
2. Move the main control lever to the vertical position in the DIRECTIONAL GATE and remove.
3. Place the main control lever vertically into the STARTING GATE then press the lever to the LEFT to STOP position. Release lever when the engine has stopped.

## **STABLING THE RAILBUS**

After stopping the engine by the method shown above—

1. Check that the handbrake is ON and the safety lock applied.
2. Remove the main control lever from the STARTING GATE.
3. Shut off heater if in use.
4. Place the battery isolating switch into the OFF position.

## **TRAIN HEATING**

Heating is by means of hot air suitably directed into the passenger compartment of the vehicle. The operation of the heater is automatic apart from switching on and operating the heat control switch which is situated in No. 1 driving compartment.

To operate the heater, close master switch on the heater control panel, then turn heater switch in a clockwise direction to FULL HEAT position. This supplies current to the glow plug (an Element) and the glow plug light on the Indicator Panel should be illuminated. (If this fails, return switch to OFF position and do not attempt to re-start). After a period of 45 seconds the air fan light will be illuminated on the Indicator Panel denoting that the heater fan and fuel pump are working. In approximately 3½ minutes the glow plug indicator light will be automatically extinguished. If the oil fails to ignite in the above period, the fan and fuel pump are automatically switched off; it is then necessary to return the control

switch to OFF and re-start. Not more than three attempts should be made to start the apparatus.

If the switch is in the FULL HEAT position and the heater cuts out, the indicator light will be extinguished. Return the switch to OFF, then attempt to re-start the heater as described above.

To shut down the heater, return the switch to the OFF position.

To admit cold air to the train, turn the switch in an anti-clockwise direction past the OFF position to COLD.

### **AIR PRESSURE**

If through any cause the air pressure drops to 50 lbs./sq. inch or below, the warning buzzer will sound continuously if the main control lever is in the directional gate. Attempt to regain the normal air pressure by the following procedure:—

1. Remove main control lever from DIRECTIONAL GATE.
2. Place main control lever into the STARTING GATE and pull the lever backwards to open the throttle to speed up the engine under "Engine Only" conditions.
3. When normal air pressure is obtained (75-100 lbs./sq. inch), remove main control lever from the STARTING GATE, place it into the DIRECTIONAL GATE and move it to the direction of travel required.

### **FAULTS IN TRAFFIC**

**Engine stopped :** If the engine stops whilst the railbus is running, stop the railbus, then—

- (a) Release throttle handle to deadman's position.
- (b) Place power brake handle to OFF position.
- (c) Remove main control lever from DIRECTIONAL GATE and place it into the STARTING GATE.
- (d) Then attempt to re-start the engine by depressing the "Start" button not more than three times. If this fails to re-start the engine, if possible place the final drive in NEUTRAL before the railbus is towed to a suitable terminal point.

**Transmission Failure.** In the event of a transmission failure the engine should be stopped and if possible the final drive placed in NEUTRAL.

**NOTE.**—In the event of an engine or transmission failure—

- (a) The main control lever should be removed from the DIRECTIONAL GATE, placed into the STARTING GATE and moved to the engine STOP position to open the engine starting circuit. Then remove the main control lever from the control desk.
- (b) The handbrake is available and can be operated to give 70% of the full braking power on the railbus.
- (c) If the lights are not required, the battery isolating switch should be placed into the OFF position.

### **TO PLACE FINAL DRIVE IN NEUTRAL**

Two methods can be employed to place the final drive to NEUTRAL.

- (1) Withdraw the two half shafts from the final drive by first removing the axle caps and then withdrawing the shafts with the special tool provided.  
Care should be taken not to loose the spring-loaded buttons that are retained in position by the axle caps.



- (2) If it is not possible to remove the half shafts, the two set screws provided on the final drive housing opposite each other should be screwed in as far as they will go and then check that the propeller shaft is free to be moved by hand.

## **TOWING**

A special coupling and pin is provided to tow these vehicles, but due to no buffers being fitted, the railbus can only be towed at a maximum speed of 15 m.p.h. and when slowing down or stopping, extra care is necessary to avoid damage to the towed end of the railbus from impact with the towing vehicle or locomotive.

## **FIRE PRECAUTIONS**

Portable fire extinguishers are provided in each driving compartment and in the luggage compartment. In the event of an outbreak of fire, bring the railbus to a stand as laid down in Rule 188. Then use fire extinguisher as required.

## **WARNING HORNS**

When sounding the horn to comply with Rule 127 and the Appendix Instructions, operate the lever in such a manner to give the two-tone sound that these horns are designed to emit. This is of the utmost importance, and if the horn is defective it must be reported immediately.

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