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**DRIVING INSTRUCTIONS FOR  
DIESEL MULTIPLE UNIT TRAINS  
POWER CARS**

**(Hydro-Mechanical Transmission)**

**"ORANGE STAR" COUPLING SYMBOLS**

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**DRIVING INSTRUCTIONS FOR  
DIESEL MULTIPLE UNIT TRAINS  
"ORANGE STAR" COUPLING SYMBOLS**

**GENERAL DESCRIPTION**

Each power car is provided with two engines. Driving controls are provided at one end only of each power car; driving controls are not provided in trailer cars. When the trains are marshalled a driving compartment must be at each end.

**TECHNICAL DATA**

|   |       |                |                 |       |  |    |    |
|---|-------|----------------|-----------------|-------|--|----|----|
| Type  | ..... | .....          | .....           | ..... | 2-2-2-2 (1A-A1).   |    |    |
| Weight in running order                               | ..... | Three Car Set: | Tons cwt. qrs.  |       |  |    |    |
|   |       |                | Motor 2nd Brake | 107   | 6  | 2  |    |
|   |       |                | Motor 2nd       | 39    | 7  | 0  |    |
|   |       |                | Trailer         | 39    | 8  | 1  |    |
|   |       |                |                 |       | 28   | 11 | 1. |
| Wheel base (coach)                                    | ..... | .....          | .....           | ..... | 55ft. 0ins.  |    |    |
| Wheel base (bogie)                                    | ..... | .....          | .....           | ..... | 8ft. 6ins.   |    |    |
| Bogie centre distance                                 | ..... | .....          | .....           | ..... | 46ft. 6ins.  |    |    |
| Wheel diameter  | ..... | .....          | .....           | ..... | 3ft. 0ins.   |    |    |
| Width overall   | ..... | .....          | .....           | ..... | 9ft. 3ins.   |    |    |
| Length overall  | ..... | .....          | .....           | ..... | 201ft. 6 $\frac{3}{4}$ ins. (Three car unit).                    |    |    |
| Height overall  | ..... | .....          | .....           | ..... | 12ft. 8 $\frac{1}{8}$ ins.                                       |    |    |
| Minimum curve negotiable                              | ..... | .....          | .....           | ..... | 3 $\frac{1}{2}$ chains.  |    |    |
| Maximum speed at maximum engines revs. (Direct drive) | ..... | .....          | .....           | ..... | 70 m.p.h.  |    |    |
| Torque Converter in, up to 47 m.p.h.                  | ..... | .....          | .....           | ..... | —nominal 37 m.p.h.   |    |    |
| Fuel capacity, Power Cars                             | ..... | .....          | .....           | ..... | 100 gallons per engine, including one heater; total 200 gallons. |    |    |
| Lubricating oil sump capacity                         | ..... | .....          | .....           | ..... | 12 $\frac{1}{2}$ gallons per engine.                             |    |    |
| Cooling water capacity                                | ..... | .....          | .....           | ..... | 17 $\frac{1}{2}$ gallons per engine.                             |    |    |
| Control system  | ..... | .....          | .....           | ..... | Electro-pneumatic.   |    |    |
| Brake system  | ..... | .....          | .....           | ..... | Vacuum.  |    |    |
| Warning horn  | ..... | .....          | .....           | ..... | Compressed air operated.   |    |    |
| <b>Engines</b>  |       |                |                 |       |  |    |    |
| Two 8-cylinder 16.2 litre horizontal oil engines      | ..... | .....          | .....           | ..... | R.R. Series 823 Type C8-NFLH<br>238 h.p. at 1,880 r.p.m.         |    |    |
| Compression ratio                                     | ..... | .....          | .....           | ..... | 16 to 1.   |    |    |
| Bore  | ..... | .....          | .....           | ..... | 130.175 mm. = 5.125 ins.   |    |    |
| Stroke  | ..... | .....          | .....           | ..... | 152.4 mm. = 6 ins.   |    |    |
| Firing order  | ..... | .....          | .....           | ..... | 1, 6, 2, 5, 8, 3, 7, 4.  |    |    |
| Rotation from free end                                | ..... | .....          | .....           | ..... | Clockwise.   |    |    |

|                                |       |       |   |
|--------------------------------|-------|-------|---|
| Fuel injector type             | ..... | ..... | C.A.V.  |
| Fuel injector lifting pressure | ..... | ..... | 175 atmospheres (2,570 lbs./sq. in.).           |
| Fuel pump type                 | ..... | ..... | C.A.V. Monobloc type N with hydraulic governor. |

### Transmission

|                         |       |       |   |
|-------------------------|-------|-------|---|
| Type                    | ..... | ..... | R.R. 3 stage torque converter.  |
| Final drive             | ..... | ..... | Walker type.  |
| Reversing arrangement   | ..... | ..... | Axially sliding dog clutch between bevel gears incorporated in final drive gearbox. |
| Final drive: gear ratio | ..... | ..... | 2.88:1.   |

### AUXILIARIES

|  |       |       |   |
|--|-------|-------|---|
| Battery—                                     |       |       |   |
| Power Car (Motor and Motor 2nd)              | 2nd   | Brake | Lead acid BRA2 type, 12 cells: 24 volts, 440 amp./hr.       |
| Trailer                                      | ..... | ..... | Lead acid BRA2 type, 12 cells: 24 volts, 440 amp./hr.       |
| Alternators (2)                              |       |       |   |
| Power Car                                    | ..... | ..... | C.A.V. type AC8 Alternator.                                 |
| Trailer                                      | ..... | ..... | Belt-driven from the nose of each auxiliary drive gearbox.  |
| Trailer                                      | ..... | ..... | Stones, type XR.30.LC., Belt driven from axle (reversible). |
| Starter motors                               | ..... | ..... | Simms or C.A.V. axial type.                                 |
| Compressors                                  | ..... | ..... | Westinghouse E.10 gear-driven.                              |
| Exhausters                                   | ..... | ..... | Clayton-Dewandre. Type C.725. Belt driven.                  |
| Car heating equipment                        | ..... | ..... | Smith's combustion air heaters, Mark IIB.                   |
| Fuel tanks for Trailer car heating equipment | ..... | ..... | 30 gallons.   |
| Windscreen wipers                            | ..... | ..... | Compressed air operated.                                    |
| Speedometer                                  | ..... | ..... | Smith's (electrical drive).                                 |

### DRIVER'S CONTROLS

1. Control switch (with Yale type removable key) and indicator light.
2. Throttle handle (engine speed) incorporating the Deadman's device and selector switch for automatic engagement of direct drive at alternative road speeds. Marked OFF, IDLING and FULL.
3. Drive selector handle.
4. Isolating valve switch (detachable handle).
5. Reversing lever.
6. Engine Start buttons.
7. Engine Stop button.

8. Engine Indicator lights (12)—bright on fault.
9. Final drive direction indicator lights (3)—bright on fault.
10. Engine Tachometer.
11. Dual horn control.
12. Speedometer.
13. Air pressure gauge.
14. Vacuum gauge (Duplex).
15. Driver's brake valve (handle detachable).
16. Emergency vacuum brake valve.
17. Marker light and indicator light switches.
18. Route indicator light switch.
19. Instrument panel light switches and dimmer.
20. Windscreen wiper valve (2).
21. Change-over switch, engine speed.
22. Destination Indicator light switch.
23. Buzzer and buzzer button.
24. Handbrake.
25. Deadman's Isolating valve (in power cars only).
26. Car Heater switches (not for the use of the driver).
27. Deadman's hold-over button.
28. Car and train light control.
29. Fire alarm bell.
30. Demister control lever.
31. Demister and cab heating switch.
32. Loudaphone.
33. A.W.S. Key.
34. A.W.S. isolating cock.
35. A.W.S. indicator.
36. A.W.S. reset button.

#### GENERAL INFORMATION

All control devices, e.g. drive selector, throttle handle (engine speed), reversing lever, etc., are operated by electro-pneumatic (E.P.) valves, therefore, **DO NOT USE FORCE WHEN MOVING THE CONTROL LEVER OR HANDLES.**

The electrical control system of each car is complete in itself but may be linked to that of another car of the same type by electrical jumper connections.

Any failure of the air pressure system resulting in a severe drop in pressure will shut down the engine to IDLING.

Loss of engine oil pressure will brighten the engine indicator light and stop the engine.

The throttle handle is also the Deadman's handle and if it is allowed to spring up the engines will drop down to IDLING speed

and after 5 to 7 seconds delay the vacuum brake will be applied. To re-set the Deadman's device the throttle handle must be moved back to the OFF position before the handle can be depressed.

### Special Note

DO NOT MOVE THE DRIVE SELECTOR HANDLE FROM THE NEUTRAL POSITION UNTIL READY TO START THE TRAIN.

## DRIVER'S DAILY DUTIES WHEN IN SERVICE

### At commencement of turn

1. Obtain the satchel containing the control switch key, isolating valve switch handle, vacuum brake handle, A.W.S. and carriage keys.
2. Check that:-
  - (a) the detonator cases are intact in all driving compartments;
  - (b) the Deadman's isolating valve covers **are intact** in all power cars. If a cover is not intact it must be reported;
  - (c) the handbrake is ON in the leading driving compartment;
  - (d) **THE HANDBRAKES ARE OFF IN ALL TRAILING COMPARTMENTS.**
3. **LOCK ALL DOORS OF TRAILING DRIVING COMPARTMENTS.**

### At a Convenient Time during Turn

1. Make a short inspection of the train and check that the apparatus is generally in good working condition. Check fuel tank levels.
2. **REPORT ALL KNOWN DEFECTS AT END OF TURN.**

## STARTING THE ENGINES

1. Turn the control switch key to the ON position. Place A.W.S. key into position and move to ON. Depress and release the A.W.S. reset button.
2. Move the drive selector handle to **NEUTRAL. The engines cannot be started with the selector in the position marked DRIVE.**
3. Insert the handle and close the isolating valve switch in the driving cab.
4. If at least 15 lbs./sq. in. air pressure is available in the system, and the engines are warm, they may be started from the driving compartment. The procedure is as follows:-
  - (a) Leave the throttle handle in the OFF position.
  - (b) Press the left and right "Start" buttons in turn and release each immediately the engine indicator lights go dim showing that all engines on that bank have been started. **DO NOT PRESS BOTH "START" BUTTONS TOGETHER.**
  - (c) Check that all the engine indicator lights have gone dim indicating that all engines have started.

**NOTE :** If an engine does not start, i.e. its indicator light does not go dim within approximately three seconds, release

"Start" button for not less than 10 seconds to allow engine to come to rest before pressing the button again. If an engine refuses to start, check that the engine isolating switch is in the ON position. Check fuel tank contents gauge for fuel content and ensure that the fuel cock is open. Then start engine locally.

5. If 15 lbs./sq. in. air pressure is not available in the system or the engines are cold, they must be started individually from the side of the car. The procedure is as follows:-

#### **In Driving Compartment**

- (a) Check that the Control switch and the A.W.S. keys are in the ON position.
- (b) Check that the isolating valve switch is closed.
- (c) Check that the drive selector handle is in NEUTRAL and that the hand brake is ON.

#### **At Side of Car**

- (d) Select excess fuel by depressing the button on the engine governor.
- (e) Pull the hand throttle control on the engine to the FULL OPEN position and hold it there.
- (f) Press the "Start" button which is located on a small panel adjacent to the engine and release it when the engine starts.
- (g) Release the fuel injection pump hand throttle control gradually until the engine runs at IDLING speed—do not race the engine.
- (h) Start the other engines in a similar manner, then return to the driving compartment.

**NOTE :** If an engine does not start within approximately three seconds, release "Start" button for not less than 10 seconds to allow the engine to come to rest before pressing the button again.

#### **WITH THE ENGINES RUNNING**

- (a) Place the brake handle into position, depress and hold down the throttle handle to obtain control of the deadman's device, then move the brake handle to the RELEASE position. The A.W.S. apparatus must be reset by depressing and releasing the reset button. Check that 21 ins. of vacuum can be obtained in the train pipe and remains steady at not less than 19 in. by returning the brake valve handle to LAP position. There should be at least 26 in. on the high vacuum reservoir side gauge.

This is to ensure that there is sufficient vacuum in the top side of the brake cylinders for the efficient operation of the brake.

**NOTE :** The time required to obtain 21 in. of vacuum in the top side of the brake cylinders after the strings have been pulled on a vehicle or vehicles should not be less than 1½ minutes.

- (b) Return the vacuum brake handle to RELEASE position then

let go the throttle handle. Check that it springs up to the deadman's position and that after 5 to 7 seconds delay the brakes are applied.

- (c) Check that the air pressure has built up to approximately 95 lbs./sq. in.
- (d) Apply the vacuum brake and **RELEASE THE HAND-BRAKE** in the driving compartment.

**NOTE :** In future **single unit** diesel railcars will be fitted with an additional Duplex vacuum gauge which will indicate the top side vacuum in each brake cylinder on that car only; at least 19 in. must be registered on this gauge before moving off.

### **STARTING THE TRAIN**

- (a) Ensure that there is adequate vacuum on the reservoir side.
- (b) Obtain control of the deadman's device and hold the throttle handle in the **IDLING** position.
- (c) Release the vacuum brake to about 15 ins. of vacuum then "lap" the brake valve.
- (d) **WITH THE ENGINES IDLING** lift the handle of the reverse lever and move it to the direction required. Check that the final drive indicator lights are dim indicating that the final drives have properly engaged.

**NOTE :** In each power car driving compartment there are three final drive indicator lights, the centre marked No. 1 for the leading axle, the right-hand marked No. 2 for the trailing axle in that particular power car, and the left-hand light marked "T" indicating any axle in the rest of the train.

- (e) **MOVE THE DRIVE SELECTOR HANDLE TO DRIVE.** Depress the throttle handle to engage the deadman's device and hold in the **OFF** position. Release the vacuum brake fully by placing the brake handle into the **OFF** position. The train should not be moved with the brakes dragging.
- (f) Move the throttle handle just past the idling position and hold it there until the train moves and then open the throttle as required. The throttle is continuously variable and does not have to be opened by notches. Over the first portion of its movement, that is between **OFF** and **IDLING**, the throttle controller brings the engine actuators into readiness, but does not raise the engine speed. Beyond this, between the dedents at **Idling** and **Full Throttle**, movements of the throttle controller progressively increase engine fuel. A movement past the dedent at **Full Throttle** gives maximum acceleration with converter drive engaged.

Direct drive will automatically be engaged at 37 m.p.h. if the throttle handle is in a position up to and including being in the **Full Throttle** dedent. However, if the throttle handle is moved past the full throttle dedent position, maximum acceleration is obtained and direct drive is not engaged until 47 m.p.h. is reached.

During the transition from converter to direct drive the



engines are automatically returned to idling and then opened up again to a value appropriate to direct drive at that road speed.

When the train is retarded, converter drive is automatically re-engaged at approximately 30 m.p.h., unless the controller is moved beyond the full throttle dedent, when converter drive is re-engaged at approximately 40 m.p.h. The engine speed is not reduced to idling during the transition from direct drive to converter drive.

### **COASTING**

A free wheel is fitted within the torque converter to allow the propeller shaft to overrun. When the maximum running speed required is obtained, to allow the train to coast:-

1. Return the throttle handle to IDLING position.
2. Leave the drive selector handle in the DRIVE position.
3. Re-opening the throttle as required to maintain running speed.

### **STOPPING THE TRAIN**

1. Return the throttle handle to IDLING and hold it in that position.
2. Apply the vacuum brakes as required.
3. When almost at a stand return the drive selector handle to NEUTRAL.

**NOTE :** If the train speed has been reduced, e.g. due to a signal check, and the signal is placed into the clear position before the train is brought to a stand, release the vacuum brake and then re-open the throttle as required.

### **CHANGING ENDS**

1. Put the vacuum brake ON, then place the vacuum brake handle to LAP position and remove handle.
2. STOP the engines.
3. Remove the handle from the Isolating switch valve.
4. Place control switch in the OFF position and remove key.
5. Remove A.W.S. key.
6. Lock driving compartment doors and remove keys.
7. Proceed to the other end of the train and place handles into their appropriate positions. Place control switch in ON position.
8. Place A.W.S. key in position, depress and release the A.W.S. reset button.
9. Check that the drive selector handle is in NEUTRAL position, then place reversing lever in FORWARD OR REVERSE as required.
10. Proceed to re-start engines as shown under "Starting the Engine" item 4 (a-c).



## REVERSING THE TRAIN

If it is necessary to reverse the train without changing ends, when the train has been brought to a stand check that the DRIVE selector handle has been placed into the NEUTRAL position, then:

1. With the engines IDLING lift the handle of the reversing lever and move it to REVERSE. Check that the air indicator lights go dim indicating that the final drives have correctly engaged. If any final drive lamps shine brightly, the associated final drives are not correctly engaged. Move the neutral selector to Drive, which may effect engagement. If not, return the selector to Neutral, select the direction opposite to that required, re-select Drive, release the vacuum brake and inch the train back: then try again to engage the direction required.  
A final drive that cannot be engaged must be put into Neutral.
2. Proceed as in "Starting the Train," items (a) to (f).

**N.B.—DO NOT ATTEMPT TO REVERSE WHEN THE TRAIN IS MOVING.**

## STOPPING THE ENGINES

1. Return the throttle handle to IDLING position then release to deadman's position.
2. Check that the vacuum brake is ON, then return brake valve handle to LAP position.
3. Press the "Stop" button and hold in that position until all engines have stopped (engine lights are shining brightly).
4. Place the drive selector handle to DRIVE position, this ensures that the engines cannot be restarted.
5. Apply the handbrake.

## STABLING THE TRAIN

### Reversal of Final Drives

When diesel multiple unit trains are stabled and it is known (i.e. at terminal points) or anticipated that the next movement will be in the opposite direction, drivers before leaving the train should select the opposite direction on the reverser with a view to the final drives being engaged in the direction for the next movement, thus obviating any difficulty of correct engagement later when the equipment and lubricant may have become cold.

If reversing the train without changing ends—

1. Check that the DRIVE selector handle has been placed into the NEUTRAL position.
2. With the engines IDLING lift the handle of the reversing lever and move it to REVERSE. Check that the air indicator lights momentarily brighten and then go dim indicating that the final drives have correctly engaged. If any final drive lamps shine brightly, the associated final drives are not correctly engaged. Move the neutral selector to Drive, which may effect engagement. If not, return the selector to Neutral, select the direction opposite to that required, re-select Drive, release the vacuum brake and inch the train back: then try again to engage the direction required.
3. STOP the engines.

4. Place the drive selector handle to DRIVE position, this ensures that the engines cannot be restarted.
5. Apply the handbrake, place the vacuum brake handle to LAP position and remove the handle.
6. Remove isolating valve switch handle. Place control switch in OFF position and remove key.
7. Remove A.W.S. key.
8. Lock the driving compartment and partition doors.
9. Return the satchel containing the brake valve handle, isolating valve switch handle, control switch, A.W.S. and carriage keys to the responsible person on duty.

### **TRAIN HEATING**

Heating is by means of hot air suitably directed into the passenger compartments and driving compartment of each vehicle.

The operation of the heaters is automatic apart from switching on in the **Guard's** compartment.

The heater local control switches in the driving compartments **MUST NOT** be operated by either the driver or the guard; these switches are for maintenance check purposes only.

To operate the heater controls in the guard's compartment the following procedure should be followed:-

#### **Heat Cycling—Guard's Compartment**

1. Select heating position.
2. Switch Isolator ON: the Isolator and Failure indicators will light up.
3. Press Starter button.

The Failure indicator light will go out and the heater will operate automatically.

If the Failure indicator lights up, wait for one minute then press the starter button again.

If a Failure is still indicated after **THREE** such attempts to re-start the matter must be reported.

To stop the heater: Place isolator switch to OFF.

#### **Cold Ventilation**

1. Select ventilating position.
2. Switch isolator ON.

The isolator indicator will light up and the heater fan will run. To switch off: Place isolator switch to OFF.

### **FAULTS IN TRAFFIC**

1. If there is an indication that an engine has automatically shut down whilst the train is running, do not attempt to re-start before confirming at the next convenient stopping point that the engine is in fact not responding to the controls. Attempt to re-start by depressing the "local start" button no more than three times.
2. If the engine cannot be re-started, turn the engine isolating switch

to OFF and, if possible pin the lever on the associated final drive at NEUTRAL (as described below). Proceed to the terminal point on the remaining engines. At the terminal point the final drive lever MUST be pinned in NEUTRAL and the matter reported.

### 3. To Lock Final Drive in Neutral

STOP ALL ENGINES, then isolate the final drive concerned by reaching under the car and pulling the manual lever into the centre position and pinning it there. **Before moving the manual lever, close the two isolating cocks to interrupt the supply of air from the controls and keep them closed as long as the lever on the final drive is pinned in neutral.**

Check that the main transmission shaft to the final drive concerned can be rotated by hand.

Provided the final drives are all correctly engaged (or those not engaged are pinned in neutral) the vacuum brake may be released and the throttle opened to drive the train away on the remaining engine.

## ASSISTING DISABLED TRAIN

In an emergency, a disabled diesel train may be assisted by another diesel train or by a locomotive.

### 1. Assistance by a Train of Same Type:-

- (a) Provided the control and vacuum brake systems are working, the disabled train may be coupled in the normal way to another of the same type.

Follow the Appendix Instructions for the working of Multiple Unit Diesel Trains—Coupling and Uncoupling.

- (b) If the disabled and the assisting trains together exceed six power cars, the indicator lamp for the first engine will also be connected to the thirteenth engine of the combined train; the second lamp will be connected to the second and fourteenth engine, and so on.
- (c) An indicating lamp to which two engines are connected will not change from bright to dim unless both engines are running; if one only of the two engines is running, the other may be started either locally or from the common starter button in the driving cab.
- (d) The combined train may be driven from the leading cab in the normal way, provided the final drives of idle propulsion units in the disabled train are pinned in neutral.
- (e) Where a final drive cannot be disengaged, a speed of 25 m.p.h. in either direction must not be exceeded to the point where the disabled train can be taken out of traffic.

### 2. Assistance by a Locomotive or a Diesel Train of a Different Type:-

- (a) Stop all engines in the disabled train.
- (b) Pin the levers on all final drives at Neutral. If a final drive cannot be disengaged, a speed of 25 m.p.h. in either direction

must not be exceeded to the point where the disabled train can be taken out of traffic.

- (c) Remove the Control switch and A.W.S. keys and the handle from the isolating valve switch.
- (d) Connect only the vacuum brake hose to the assisting locomotive or train.
- (e) Put the vacuum brake in the disabled train at LAP and remove the handle.
- (f) Isolate the deadman's emergency device in the disabled train by closing the relevant cock in each of its cars.

## **FAILURES OF CONTROL EQUIPMENT**

### **Driving Controls**

#### **(a) Leading Driving Compartment**

Remove control switch key, isolating valve switch handle, brake handle and A.W.S. key (where fitted), then proceed to the next driving compartment and endeavour to regain control. Then act in accordance with the Appendix Instruction for the "Working of Diesel Mechanical Trains—Driving Apparatus Disabled."

#### **(b) Train of more than three cars including two or more Power Cars**

In a train composed of more than three cars including two or more power cars, the failure of the battery on any one power car does not necessitate the failure of the train, as the control switch key can be transferred to any other power car and control obtained of the train. It is not possible, however, to re-start the engines of the power car on which the battery has failed. The final drives on this power car must be locked in NEUTRAL.

#### **(c) Deadman's Device**

If there is a vacuum brake leakage caused by a defective deadman's device, tear off the cover on the deadman's isolating valve and move the handle to the ISOLATE position. IF A DEADMAN'S CONTROL IS ISOLATED THE MATTER MUST BE REPORTED as soon as possible.

The tear-off cover must not be replaced by an unauthorised person.

## **COMPRESSED AIR SYSTEM**

### **1. Unloader Valve**

Should an individual unloader valve be continuously blowing a  $\frac{1}{4}$  in. plug could be fitted into the exhaust port of the valve.

### **2. Compressor Governor**

A defective governor, which would cause all compressors to unload at less than 85 lbs./sq. in., can be isolated by means of the cock provided.

## **FIRE PRECAUTIONS**

In the event of a fire, which will be normally indicated by the fire warning bells ringing if fire is adjacent to an engine, bring the train to a stand as laid down in Rule No. 188. When the train has been brought to a stand take a hand-operated fire extinguisher from the driving compartment and inspect the engine that has been affected as shown by the indicator light in the driving compartment. An additional indication of the engine concerned will be given by the red warning light which will be illuminated on the appropriate fire alarm control box.

After ensuring that the fire has been extinguished, the small metal tab on the front of the fire alarm control box should be pulled off. This will uncover a switch which should be operated to stop the alarm bell, extinguish the warning light and render it impossible to re-start the affected engine. After this has been done, and before proceeding, turn the engine isolating switch to OFF and, if possible, set and lock the final drive gears of the defective engine in the NEUTRAL position. Where the final drive cannot be disengaged, a speed of 25 m.p.h. must not be exceeded to the point where the train can be taken out of traffic.

The alarm isolating switch referred to does not cut out the re-setting thermostat and should this operate through a recurrence of fire on the engine or torque converter, the alarm bells will ring and the warning light will be lit. In this event the fire will not be extinguished automatically. It is essential, therefore, for the remaining hand-operated fire-fighting equipment to be used as a matter of the utmost urgency after the train has been stopped.

If the automatic extinguishing apparatus has operated, avoid inhaling a concentration of the gas which has a faint smell, and avoid touching the liquid with the skin or clothes.

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

See General Instructions and Notices in Appendix to the Operating Instructions regarding First Aid treatment to a person contaminated by the fire extinguishing medium used in the automatic appliance.

## **GENERAL NOTES**

### **Coupling and Uncoupling**

1. Put the drive selector handle to NEUTRAL.
2. Stop the engines.
3. Remove the battery-isolating switch key and handle for the isolating valve switch.
4. Couple or uncouple.
5. Start the engines as described under Starting the Engines.
6. Check that all indicator lamps indicate correctly and that all controls are working before moving the train.

### **Warning Horns**

When sounding the horn, to comply with Rule 127 and the Appendix Instructions, operate the lever in such a manner as to give

the 2-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.

#### **Drivers in Course of Training**

Drivers in course of training are only allowed to operate the controls and brake on passenger trains under the direct supervision of the Instructor.

#### **MOVEMENT UNDER FLOOD WATER CONDITIONS**

1. **Normal** movement of rail cars should cease when the water level reaches 1 in. below the underside of the head of the running rail.
2. **Emergency** running at 3 m.p.h. is permissible, whether conductor rails are present or not, with the water level not exceeding 4 in. above the top of the running rail.
3. Movement should not be permitted when the water level exceeds 4 in. above the top of the running rail.

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