BRITISH RAILWAYS

SOUTHERN REGION

INSTRUCTION No. 7a, 1949

INSTRUCTIONS TO MOTORMEN, GUARDS AND SHUNTERS RESPECTING THE ELECTRO-PNEUMATIC BRAKE APPARATUS ON DOUBLE DECK UNITS Nos. 4001 AND 4002

Four-coach Double Deck units Nos. 4001 and 4002 have been equipped with electro-pneumatic brake apparatus. This is additional to the normal Westinghouse automatic brake equipment which remains operative at all times whether or not the electro-pneumatic brake is in use.

If the electro-pneumatic brake is not in use the Driver's brake valve operates the normal Westinghouse automatic brake.

All the safety features (e.g. Deadman's Valve, Communication Cord, etc.) of the Westinghouse automatic brake remain fully operative whether or not the electro-pneumatic brake is used.

1. DESCRIPTION OF BRAKE APPARATUS.

a) The standard Westinghouse automatic brake system as fitted on other electric stock is used on the Double Deck units except that:

i. The additional fitting of the electro-pneumatic brake necessitates the replacement of the Driver's Brake Valve Isolating Cock by an Isolating Cock Switch which, however, operates in the same manner to cut in and out both brakes simultaneously.

ii. The normal Driver's Brake Valve is also replaced by an electro-pneumatic Driver's Brake Valve (see diagram) which, in addition to the positions required to operate the Westinghouse automatic brake in the usual manner, has application and holding positions for the operation of the electro-pneumatic brake.

iii. In the driving cab, above the route indicator, an electro-pneumatic brake indicator light (blue) is provided which, when alight, shows that an electrical supply is available from the battery to operate the electro-pneumatic brake.

iv. Two brake cylinders are provided on each coach.

v. Brake cylinder pressure gauges are also provided in the following positions:

a. **On each motor coach** – one gauge on the instrument panel in the driving cab and one in the guard's compartment above the train pipe gauge.

b. **On each trailer coach** – one gauge centrally on the solebar on one side of the coach.

These gauges show the air pressure in the brake cylinders ONLY on the coach in which they are mounted. If desired, therefore, the operation of the brake on any coach may be checked by reference to a brake cylinder pressure gauge on that coach.

With the brakes released the normal reading of these gauges is zero and as the brakes are applied the reading of the cages on the various coaches should not disagree widely.

The brake cylinder pressure gauges will always show the air pressure in the brake cylinders regardless of whether the brake application is electro-pneumatic or Westinghouse automatic.

vi. The train pipe pressure gauges, both in the driving cabs and guard's compartments, will not move from normal (i.e. not less than 65 lbs per square inch) during an electro-pneumatic application and will behave in the usual manner during a Westinghouse automatic application, whether made by the Motorman or Guard or Shunter.

NOTE – It will be seen from paragraphs (v) and (vi) that:

a) When the Motorman is making an electro-pneumatic brake application all brake cylinder pressure gauges will show an increase of pressure and all train pipe gauges will show no change of pressure.

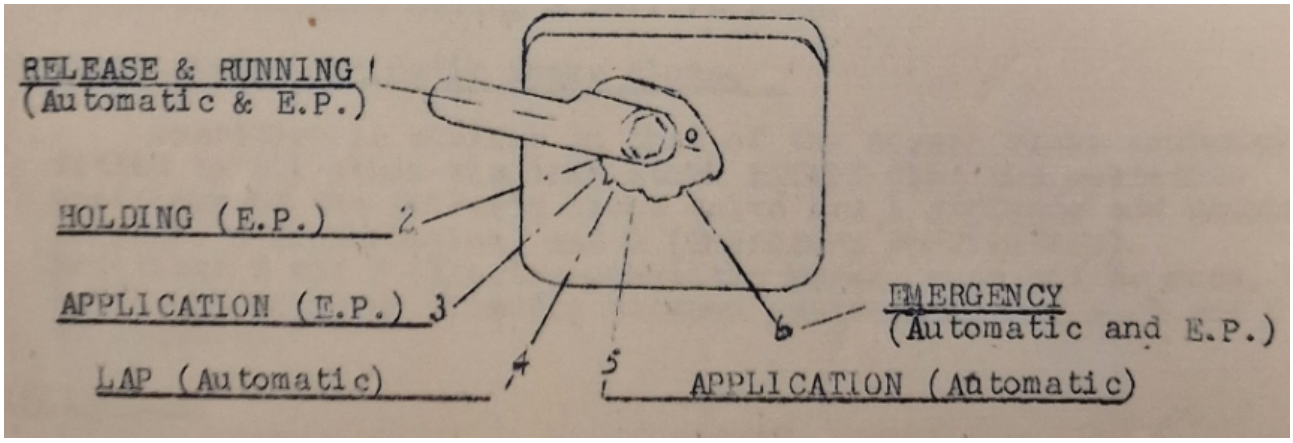
b) When a Westinghouse automatic brake application is made, whether by the Motorman or Guard or Shunter or by the operation of any of the safety features of this brake, all train pipe gauges will show a reduction of pressure and simultaneously all brake cylinder gauges will show an increase of pressure.

vii. A 5-amp fuse is provided in the driving cab auxiliary cupboard to feed the electro-pneumatic brake system.

It should be noted that the electro-pneumatic brake can be fed only from the battery at the driving position in use and that should a feed from that battery not be available the blue indicator lamp will not be alight and the electro-pneumatic brake system will be inoperative.

viii. One electro-pneumatic brake unit is fitted under each coach and is the means by which the electrical impulses from the train line these are converted into brake applications on that coach making use of air from the main reservoir pipe.

b) **Diagram showing the various positions on the drivers brake valve.**



It will be noted from the diagram that in position 6 an emergency application is made both by electro-pneumatic and Westinghouse automatic means.

In positions 4 and 5 it should be remembered that, when the electro-pneumatic brake system is in operation, the holding magnets of the electro-pneumatic brake units are energised, which means that any electro-pneumatic brake application made on passing through No.3 position is not released in these positions.

2. OPERATION OF THE ELECTRO-PNEUMATIC AND AUTOMATIC BRAKES.

a) **electro-pneumatic brake**

To operate the Electro pneumatic brake:

i. Cut in the driving cab in normal manner.

ii. Open the isolating cock switch two the fullest extent and observe that the blue indicator lamp lights up.

iii. Before moving the train, carry out the special brake test as described in paragraph 3 below.

iv. Use position 1 (release and running), 2 (holding) and 3 (application) of the Driver's Brake Valve.
Note – when about to use the electro-pneumatic brake in service it is advisable to ensure that this brake is operative by observing that the blue indicator lamp is alight.

v. When changing ends or berthing the train, before leaving the driving cab make a full application of the Westinghouse automatic brake, close the isolating cock switch and return the Driver's brake valve handle to its No.1 (Release) position.

Note – the electro-pneumatic brake allows a graduated release of the brakes, obtained by moving the handle from the No.2 (Holding) position to the No.1 (Release) position for a short time depending upon the degree of release required, and then back to the Holding position. The correct method of operating the brake is to make a full electro-pneumatic application and then to ease off the brakes as necessary in order to make a smooth stop at the required point. The brakes can always be reapplied, if necessary, without making a full release.

b) **Westinghouse automatic brake alone.**

Operation is similar to that of the normal brake equipment fitted to all other electric stock EXCEPT that the operative positions of the Driver's Brake Valve are 1 (Release and Running), 4 (Lap), 5 (Application) and 6 (Emergency Application). Positions 2 and 3 (electro-pneumatic brake) must not be used, the handle being moved directly between positions 1 and 4, 5 and 6 as required.

3. BRAKE TESTS

When, for any reason, the electro-pneumatic brake is not operative, the full brake tests as laid down in Appendix A of the Book of Instructions applicable to the Electrified Lines must be carried out.

Under normal conditions however, when the electro-pneumatic brake is to be used, the testing of the brakes must be carried out in all the circumstances provided for in Appendix A of the Book of Instructions applicable to Electrified Lines but the method of carrying out these tests by Motormen Guards and Shunters is amended as follows:

When the train pipe is charged with NOT LESS THAN 65 lbs of air,

i. The Motorman must make a full electro-pneumatic application from the leading cab by placing the brake valve handle in the No.3 position (Application electro-pneumatic) and observe that the brake cylinder pressure rises from zero to not less than 40 lbs per square inch and remains steady.

ii. They Guard or Shunter must observe, in the rearmost Guard's compartment or cab of the train, that the brake cylinder pressure rises from zero to not less than 40 lbs per square inch and remains steady. **NOTE** - when applying the brakes electro-pneumatically the train pipe pressure is NOT reduced from the normal reading of not less than 65 lbs per square inch.

iii. After a pause of a few seconds the Motorman must release the brakes and observe that the brake cylinder pressure falls to zero.

iv. The Guard or Shunter must see that the brakes have released i.e. that brake cylinder pressure has returned to zero.

After the foregoing electro-pneumatic brake test has been satisfactorily completed the Westinghouse automatic brake must be tested as follows:

i. the Motorman must close the isolating cock switch.

ii. When the electro-pneumatic brake test has been seen by the Guard or Shunter to be satisfactory, he must wait for a few seconds and then make the normal Westinghouse automatic brake test and, in addition to observing the reduction of 20 lbs in the train pipe pressure, must note that the brake cylinder pressure gauge rises to not less than 30 lbs per square inch.

Note – if the Guard or Shunter has not seen the electro-pneumatic brake test satisfactorily completed, he must on no account carry out the above test of the Westinghouse brake but must instead advise the Motorman. If there is a defect which cannot be remedied to enable the proper electro-pneumatic test to be carried out the train may be subsequently put into service using the Westinghouse automatic brake only, provided that the standard tests for that brake have first been carried out.

iii. After also observing the reduction in train pipe pressure and increase in brake cylinder pressure in his cab the Motorman must open the brake valve isolating cock switch and observe with that his gauges return to normal.

iv. After release of the brake by the Motorman, the Guard or Shunter must observe that the train pipe pressure returns to not less than 65 lbs per square inch and that the brake cylinder pressure falls to zero.

Note – if the Westinghouse automatic brake alone is to be used e.g. in the case of failure of the electro-pneumatic brake, the electro-pneumatic brake fuse must be isolated and withdrawn by the Motorman. This is the only means of isolating the electro-pneumatic brake whilst retaining the use of the automatic brake. Positions 2 and 3 of the Driver's brake valve handle will then be inoperative.

4. GENERAL INSTRUCTION

a) Motormen.

i) When using the Westinghouse automatic brake, Motormen must use the correct Lap position for the brake – that is Position 4.

Positions 2 and 3 are provided only for electro-pneumatic service braking.

ii) In order to satisfy himself that the Westinghouse automatic brake is functioning correctly, the Motorman must, at least once during each trip, test the brake either when making a booked stop or by checking the train. For the purposes of this test the brake valve handle

must be moved smartly over the electro-pneumatic positions Nos. 2 and 3 to No. 4 (Lap) position and then moved to No. 5 position, i.e. automatic application.

b) **Motormen, Guards and Shunters**.

i) For ordinary service purposes the Double Deck units must not be coupled to other multiple unit stock.

ii) In the event of it being necessary IN EMERGENCY for a Double Deck train to give assistance to or be assisted by another train or engine fitted with the Westinghouse automatic brake the Westinghouse brake pipes and the screw couplings only must be coupled. NO ATTEMPT MUST BE MADE TO COUPLE THE JUMPER CABLES BETWEEN DOUBLE DECK UNITS AND OTHER UNITS. In these circumstances it is necessary for the Motorman of the Double Deck train to isolate the electro-pneumatic brake. The working of the combined trains must then be carried out in accordance with the relevant instructions in the Book of Instructions applicable to the Electrified Lines (see Instructions Nos 51 and 60).

S. W. SMART
Superintendent of Operation.

T. E. CHRIMES.
Motive Power Superintendent

Waterloo Station.
19th October, 1949.

I hereby acknowledge receipt of Instruction No.7a, 1949, dated 19th October 1949 respecting Electro-Pneumatic Brake Apparatus on Double Deck units Nos. 4001 and 4002.

STATION OR DEPOT _____ NAME _____

DATE _____ GRADE _____