B.R.33003/249
April 1968

DIESEL MULTIPLE UNIT TRAINS WITH 'BLUE SQUARE' COUPLING CODES AND MECHANICAL OR TORQUE CONVERTER TRANSMISSION

PART 3
FAULT FINDING DATA AND CHARTS

THIS INSTRUCTION IS ISSUED IN CONJUNCTION WITH,

B.R.33003/247
PART 1 TRAINS WITH MECHANICAL TRANSMISSION

B.R.33003/248
PART 2 TRAINS WITH MECHANICAL TRANSMISSION

B.R.33003/250
PART 1 TRAINS WITH TORQUE CONVERTER TRANSMISSION

B.R.33003/251
PART 2 TRAINS WITH TORQUE CONVERTER TRANSMISSION

NOTES FOR THE GUIDANCE OF DRIVERS WHEN A FAULT OCCURS

1. If a D.M.U. train shows only a slight reduction in power no immediate action is necessary. A check on the equipment should be made at the next stopping point. If no obvious defects can be seen the journey may be completed.

2. If a severe reduction in power occurs an investigation should be made within five minutes, at the most convenient stopping point. An immediate stop must be made if there is excessive noise or smoke emitted from any equipment or if the fire alarm bells ring. (See the chart applicable to fire protection.)

3. A shortage of power may be accompanied by an engine indicator light becoming extinguished or low engine crankshaft speed indicated by the driving tachometer if the defect is in the leading power car. Alternatively a shortage of power may be indicated by the engine crankshaft speed increasing very rapidly after a particular gear has been selected.

   GREAT CARE MUST BE TAKEN TO ENSURE THAT NO SIGNAL ASPECTS OR LINESIDE WARNING BOARDS ETC. ARE MISSED WHENEVER INSTRUMENTS OR DRIVING COMPARTMENT INDICATORS ARE BEING CHECKED.

4. If a complete loss of power occurs an attempt must be made to coast and bring the train to a stand under the protection of the next fixed stop signal.

   When a train has been brought to a stand as a result of an equipment defect and the necessary Rules have been carried out, refer to the chart with a heading applicable to the indication or defect.

   This will show the various possible causes of the trouble and indicate the action to be taken. In some instances the possibilities may be numerous and the simpler defects should be checked before the more difficult ones. When a cause for a defect can be definitely established and it is known that it can be corrected, inform the nearest signalman, station official or the Traffic Control, stating how long it will be before the trouble may be overcome. When the defect has had attention, start the engines and make a test to ensure that traction power may be obtained and that all systems function.

   The train may then be worked forward.

   If any doubt exists as to the possibility of overcoming the fault, assistance must be requested immediately. If the train can only work forward on reduced power, the nearest signalman, station official or the Traffic Control must be advised of the circumstances.

5. At the end of the turn of duty, or before this time when applicable, the defects must be reported and all necessary repairs must be entered in the Repair Book of the defective vehicle. This will greatly assist the maintenance staff at the depot in which the repairs are carried out.

6. The following chart indicates the readings given by all instruments and indicates the action to be taken if incorrect readings are given when the engines are running.

Instrument	Reading with engines running at least 10 minutes		Action to be taken
	Train standing	Trafn moving	
Main reservoir air pressure gauge	85-100 p.s.i.	85-100 p.s.i.	Report any variations below the minimum or above the maximum
Vacuum brake pipe gauge	0-21" Hg	21" Hg	Report any variation from 21" Hg with the brakes released
Vacuum release pipe gauge	0-30" Hg	28-30" Hg	Report any instances where less than 27" Hg is obtained when running. Report all instances where vacuum is seriously reduced when releasing the brakes
Speedometer	0	0-70 m.p.h.	Report any defects
Engine tachometer	400 r.p.m.	400-1800 r.p.m.	Report any readings outside these limits with the engines running

EFFECT OF FUSES RUPTURING IN A D.M.U. POWER CAR

Various fuses are fitted in the electrical circuits of D.M.U. trains. Unless information is given separately in respect of any particular cars, D.M.U. train fuses cannot be changed by a Driver.

Two fuses are fitted which can bring a train to a stand in the event of rupture. These are:-

1. Control circuit fuse—No. 6.
2. Local control fuse—No. 7.

Effect of a No. 6 fuse rupturing:-

(a) The control circuit light and the air and axle lights will be extinguished.

(b) The brakes will be applied by the Driver's Safety Device.

(c) The engines will return to idling speed.

(d) The engines will not stop when the stop button is pressed in the driving compartment.

(e) The gearboxes or torque converters will revert to neutral.

Action to be taken:-

(i) Apply the handbrake.

(ii) Remove the control circuit switch key and place the reversing handle in NEUTRAL.

(iii) Check the train for obvious defects such as overheated electrical equipment or smoke.

(iv) If no defects are visible from normal observation, insert the control circuit switch key in another driving position and close the switch, noting that the control circuit light becomes illuminated.

(v) Return to the leading driving compartment, select a direction by the reversing handle, release the handbrake and proceed normally after receiving the guard's signal.

IMPORTANT NOTE

It must be remembered that the No. 6 fuse, due to being in the control circuit, may become ruptured due to a fault in the control system of any power car on the train or even in the train lines through a trailer vehicle. If a serious defect of this nature exists, the No. 6 fuse of the car in which the control circuit key is inserted in accordance with the instruction in (iv) above) will rupture. A train with only two power cars would therefore become a complete failure.

If in carrying out the instruction in (iii) above, smoke is seen to be issuing from the leading power car of a three car (MC+T+MC) or four car (MC+T+T+MC) train the instruction in (iv) above should not be carried out and the following should be substituted:-

(iv) Deal with the fire as necessary and ascertain if it safe for the train to continue.

(v) Isolate the Driver's Safety Device in the defective car.

(vi) Disconnect the jumper cables between the trailer car and the rear power car of the train and secure them into their sockets.

(vii) Insert the control circuit switch key, reversing handle, brake handle and A.W.S. key (where necessary) into their positions in the rear driving compartment.

(viii) Check that the brakes are applied by D.S.D. action then release the handbrake in the leading car.

(ix) Drive the train to the next point where the passengers can be detrained, with the Guard in the leading driving compartment observing the signals and operating the brake valve and horn as necessary. THE BUZZER AND LOUDAPHONE WILL BE INOPERATIVE IN THESE CIRCUMSTANCES AND THE GUARD SHOULD BE CLEARLY INSTRUCTED THAT HAND SIGNALS WILL BE NECESSARY.

Effect of a No. 7 fuse rupturing

(a) The gearboxes or torque converters will return to NEUTRAL on the affected car.

(b) The brakes will be applied by the Driver's Safety Device.

(c) The engines of the affected car will return to idling with the exception of Rolls-Royce torque converter cars.

Action to be taken:-

(i) Apply the handbrake.

(ii) Press the driving compartment engine stop button and note the car in which the engines do NOT stop. Note also that the control circuit light remains illuminated.

(iii) Proceed to the affected car with the final drive isolating fork (where necessary).

(iv) Turn both the final drive isolating plungers ¼-turn to the ISOLATED position.

(v) Operate the Forward and Reverse E.P. valve test buttons alternately, pausing 5 seconds between each operation, until the final drives have locked into NEUTRAL as shown by the cardan shafts turning.

NOTE 1. Final drive units with manual isolating handles may be isolated without operating the E.P. valves. The isolation CANNOT be effected by moving a driving compartment reversing handle between the two directions when a No. 7 fuse ruptures.

(vi) Return to the leading driving compartment, release the handbrake and after receiving the Guard's hand signal, proceed under reduced power.

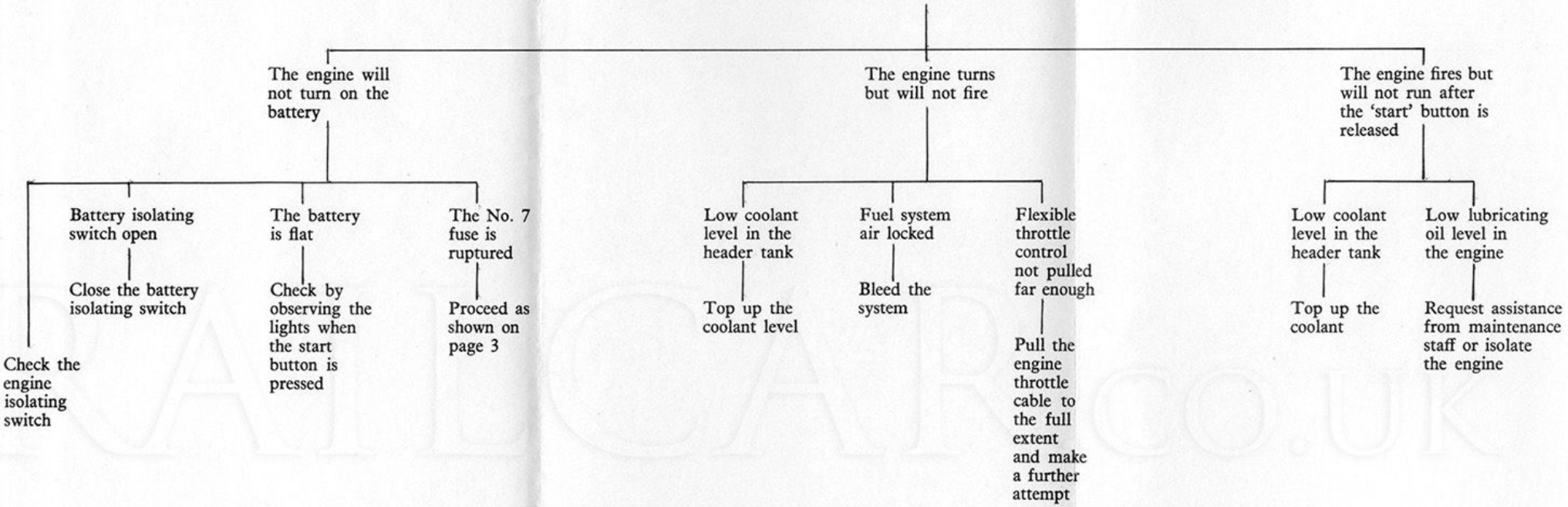
NOTE 2. If the defective fuse is in the leading power car, the control circuit key should be inserted in another power car driving position if the remaining running time is to exceed ½ hour or if any lighting is to be used. This is because the batteries of a car with a defective No. 7 fuse may not be charged.

Effect of a lighting fuse rupturing

Failure of the lighting fuses will not normally extinguish all headcode and route indicator lights, but in the event of this happening the instructions in Rule 125 must be carried out.

SIDE STARTING NO AIR PRESSURE

THE ENGINE WILL NOT START



ALL DEFECTS MUST BE REPORTED

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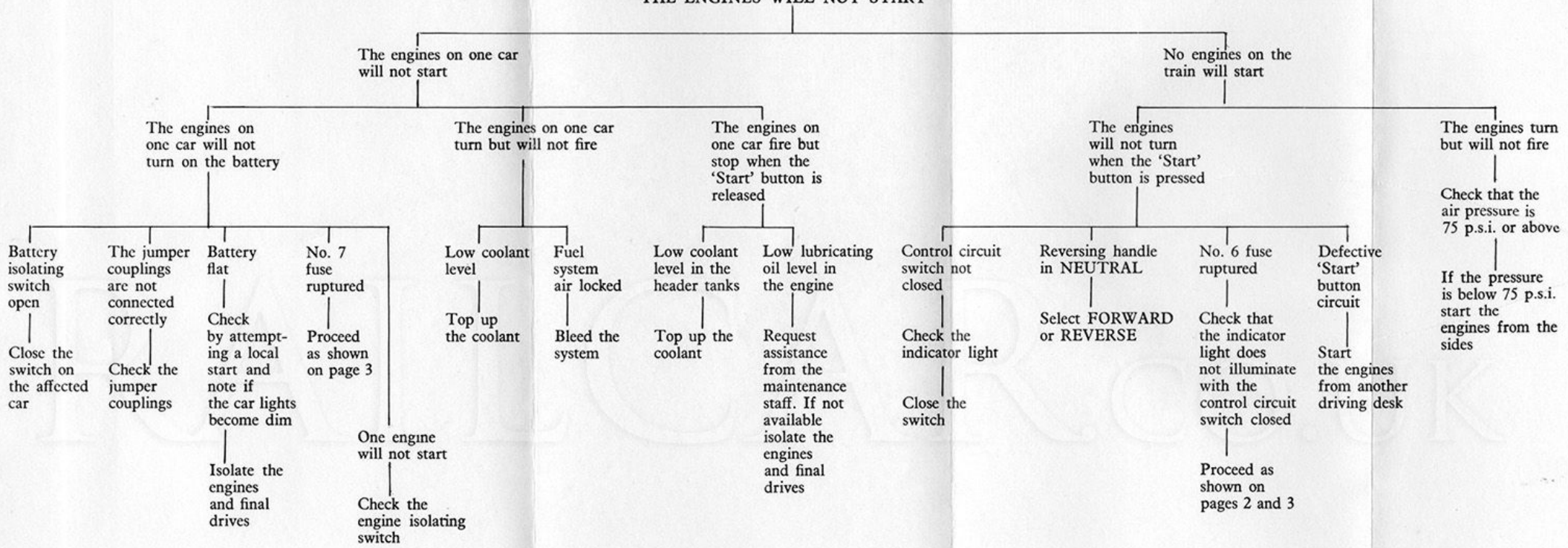
CAB STARTING, 75 P.S.I. AIR PRESSURE OR ABOVE

THE ENGINES WILL NOT START



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POWER DEFECTS

The train is underpowered/poor acceleration

Engine(s) stopped

Check the indicator panel

If an engine is stopped see page 8

Low power below

41 m.p.h., gearbox cars

Gearbox brake bands slipping

In the suspected car: -
Check if the engine r.p.m. increases rapidly when accelerating in 1st, 2nd and 3rd gears
If brake band slipping is diagnosed.
At the next stop: -

(1) Apply the handbrake
(2) Obtain full air pressure
(3) Stop the engines
(4) Depress the power controller handle
(5) With the reversing handle in FORWARD select 1st, 2nd and 3rd gears in turn six times, pausing five seconds in each gear
(6) Release the handbrake, start the engines and proceed as necessary

46 m.p.h., torque converter cars

Fuel supply to torque converter(s) shut off

Check the isolating cocks. If any are closed, check the Repairs Book and condition of the piping. Open the cocks ONLY if it is safe to do so and no leakage occurs

Low power all speeds

Torque converter cars

Check the torque converter lubricating oil levels. If any are short of oil

Request assistance from maintenance staff

If no assistance is available isolate the engine(s) and final drive(s)

Check the engine(s) for air locks and bleed the system(s) as necessary

Gearbox cars

Low lubricating oil level in the fluid couplings

In the suspected car check if the engine r.p.m. increases rapidly when accelerating in ALL gears

If so, isolate the engine(s) and final drive(s)

Power cannot be obtained

A.W.S. switch open

Close the switch

Control circuit switch open

Close the switch

Gear selector in NEUTRAL

Select 1st gear or DRIVE (torque converter cars)

Insufficient air pressure

Wait until the air and axle lights become illuminated If the air pressure does not rise

Check the train for leakage

Isolate any defective inter-car flexible hoses

Check the compressor unloader valves and fit the blanking nut(s) to any which are defective

Power controller handle not depressed before moving to a power position

Return the handle to the IDLING position and depress it before moving

ALL DEFECTS MUST BE REPORTED

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AN ENGINE STOPS DURING SERVICE

PROBABLE CAUSE

Fire (Firebells ringing)

- Bring the train to a stand in accordance with Rule 188, and IMMEDIATELY open the control circuit switch
- Apply the handbrake
- Obtain a suitable hand extinguisher and proceed to the outbreak
- Stop the other engine of the affected vehicle
- Proceed as per the fire instructions in "DRIVERS' GENERAL INSTRUCTIONS FOR THE OPERATION OF DIESEL TRAIN LOCOMOTIVES, DIESEL SHUNTING LOCOMOTIVES AND DIESEL MULTIPLE UNIT TRAINS WITH ELECTRIC, HYDRAULIC AND MECHANICAL TRANSMISSIONS," B.R.33003/6 first issued April, 1968

Low engine coolant

- Top up the coolant level or isolate the engine(s) and final drive(s) if no water is available

Low engine lubricant level

- Check the dipstick
- Request assistance from maintenance staff or isolate the engine and final drive

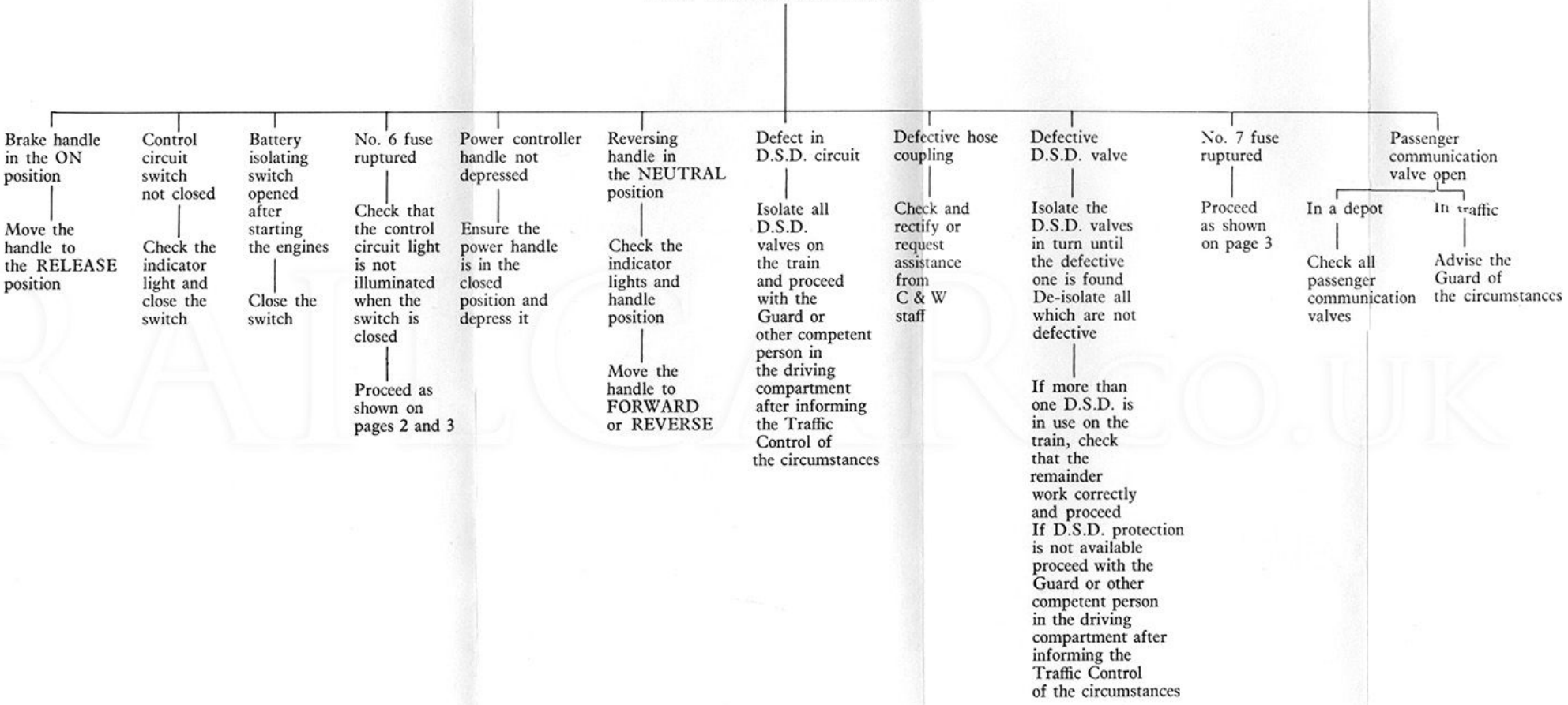
Low fuel level

- Check the gauges
- If no fuel is available isolate the engine(s) and final drive(s) of the affected car. Check the remaining fuel gauges on the train before continuing

NOTE: It is very important that the control circuit switch should be opened IMMEDIATELY a train is brought to a stand in the event of fire. This will reduce the risk of the No. 6 Fuse becoming ruptured due to wiring damage caused by the fire. It should then be possible to move the remainder of the train from the original driving position, if the leading car is not the affected one (see IMPORTANT NOTE page 3) after the damaged portion has been uncoupled (Rule 188). If a D.S.D. application occurs after the firebells ring the cause may be a ruptured No. 6 fuse on the leading car or a No. 7 fuse on the car which is on fire. This should be checked by the indicator light on the desk

ALL DEFECTS MUST BE REPORTED

THE BRAKES CANNOT BE RELEASED WITH THE ENGINES RUNNING



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THE BRAKES ARE APPLIED ON THE TRAIN WHEN RUNNING

Faults applicable to the leading car only

Pressure on power controller handle released

Return the handle to the IDLING position, apply downward pressure and re-apply power as necessary

No. 6 fuse ruptured

Proceed as shown on pages 2 and 3

Faults applicable to any car on the train

Defect in D.S.D. circuit

Isolate all D.S.D. valves on the train

Work forward with the Guard in the leading driving compartment and advise the Traffic Control

A.W.S. switch closed in a rear driving compartment. This will cause the brakes to be applied after cancellation

(1) When a DISTANT signal is passed at CAUTION or

(2) When a M.A.S. is passed at CAUTION or PRELIMINARY CAUTION or

(3) When a test inductor is passed

Check the train and open the switch

Defective D.S.D. valve

Isolate the D.S.D. valves in turn until the defective one is found. De-isolate all which are not defective

If more than one D.S.D. is in use on the train, check that the remainder work correctly and proceed. If D.S.D. protection is not available the Guard must ride in the leading driving compartment and the Traffic Control must be informed

No. 7 fuse ruptured

Proceed as shown on page 3

Passenger communication

If in section, stop the engines, remove the brake handle, reversing handle and control switch key, apply the handbrake, obtain the detonators and proceed in accordance with Rule 181(f) and (h)

Defective vacuum brake pipe hose

Check the train and rectify the fault or request assistance from C & W staff

ALL DEFECTS MUST BE REPORTED

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