

The information in this booklet must not be given to the public

# WLA Driver's Manual

## Class 52 Locomotives



Driver's Duties for Class 52 'Western' Locomotives  
fitted with dual brakes

Issue 2  
Supersedes issue 1

Western  
Locomotive  
Association



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## Contents

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1.	Introduction	Page 4
2.	The Locomotive	Page 6
3.	Locomotive Preparation: Pre-heating	Page 8
4.	Locomotive Preparation: Internal Checks	Page 11
5.	Locomotive Preparation: External Checks	Page 13
6.	Locomotive Preparation: Engine Start Up	Page 14
7.	Locomotive Preparation: Brake Test	Page 18
8.	Locomotive Preparation: Power Test	Page 19
9.	Locomotive Disposal	Page 20
10.	Locomotive Operations	Page 21
11.	Locomotive Handling Notes	Page 23
12.	Locomotive Faults & Failures	Page 25
13.	Appendices	Page 28



1.1 A glossary of terms used within this manual is provided as follows:

Item	Description
Air Pass:	Air Passenger Brake mode
AVR:	Automatic Voltage Regulator
AWS:	Automatic Warning System
AV2:	Air Vacuum Relay Valve
BIS:	Battery Isolation Switch
CCB:	Control Circuit Braker
DSD:	Driver's/Deadman's Safety Device
EO:	Engine Only
ESIS:	Engine Start Isolation Switch
Fill:	Notch one on the power controller with transmission in 'fill'
FTP:	Fuel Transfer Pump
M8A:	Proportional Brake Valve or Auto Brake
OTMR:	On-Train Monitoring Recorder
SSF:	Slow Speed or Speed Sensitive Feature
TTS:	Transmission Test Switch
TPWS:	Train Protection Warning System
Vac Pass:	Vacuum Passenger Brake Mode

1.2 The Class 52 weighs 108 tonnes and has two 65 litre Maybach MD655 V12 engines each developing 1,350bhp at 1,500 rpm, a total of 2,700 bhp and 72,000lbs of tractive effort.

1.3 Before starting or operating the locomotive, the engines must be pre-heated to at least 43 degrees C and the engines decompressed and barred over beforehand, if they have not been used for more than 1 to 2 weeks or if the locomotive has been stabled outside during periods of heavy rain.

1.4 Each engine powers a Voith L630rV torque converter, which in turn powers each bogie independently of each other. If one engine is shut down, then it's respective bogie will be unpowered.

1.5 During wet or slippery rail conditions, great care must be taken to avoid slipping, especially if being driven on one engine, and especially when hauling heavy loads with the leading engine working only or when being driven from 'A' end cab with the loco not showing wheel spin from 'B' end.

1.6 The locomotive has a three-speed automatic gear box where (slightly audible) changes of gear would normally occur at 37mph and 66 mph but may change up sooner if the engine rpm is reduced below 1,500 rpm power, assuming mainline operation. Maximum speed is 90 mph. Changing down gears is also automatic.

1.7 WLA Class 52 locomotives are fitted with DSD and AWS but not TPWS, OTMR or SSF.

1.8 The DSD must be tested and operational, especially if Single Manned.

1.9 The locomotive consumes approximately one gallon of fuel per mile on both engines, although there is minimal saving when operating on one engine with a loaded train. Fuel capacity is approx. 750 gallons.

1.10 It is important to ensure that there is sufficient fuel for each operational day and under no circumstances should fuel fall below 100 gallons due to fuel filters becoming blocked or injectors becoming damaged. Please be aware of the fuel gauge over-reading (Fig. 1); refuel if the gauge reads below 300 gallons to be safe. (NB to read the gauge, BIS and CCB must be 'On').

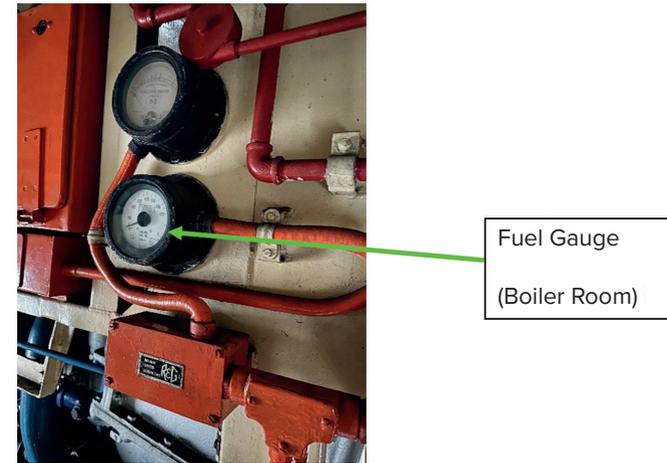


Figure 1

1.11 The Class 52 is suitable for all types of traffic and the maximum SVR passenger engine loadings for Class 52/Type 4 locomotives is 350 tonnes (10 coaches), unless authorised otherwise.

1.12 To prepare and operate the Class 52 locomotive you will need the following basic equipment:

- Locomotive door key(s)
- Carriage key
- Locomotive master key
- Bardic lamp or other similar light source
- Some clean rags

1.13 In addition to the above, it would be useful to have a WLA Class 52 Driver's Prep Sheet which can be downloaded from the WLA web site, at:  
<https://westernlocomotives.com/wla-class-52-drivers-prep-sheet/>

1.14 For any faults and failures, these should be reported to the WLA using Repairs Arising Sheet which can be downloaded from the WLA Web Site at:  
<https://westernlocomotives.com/wla-repairs-arising-sheet/>

## 2: The Locomotive

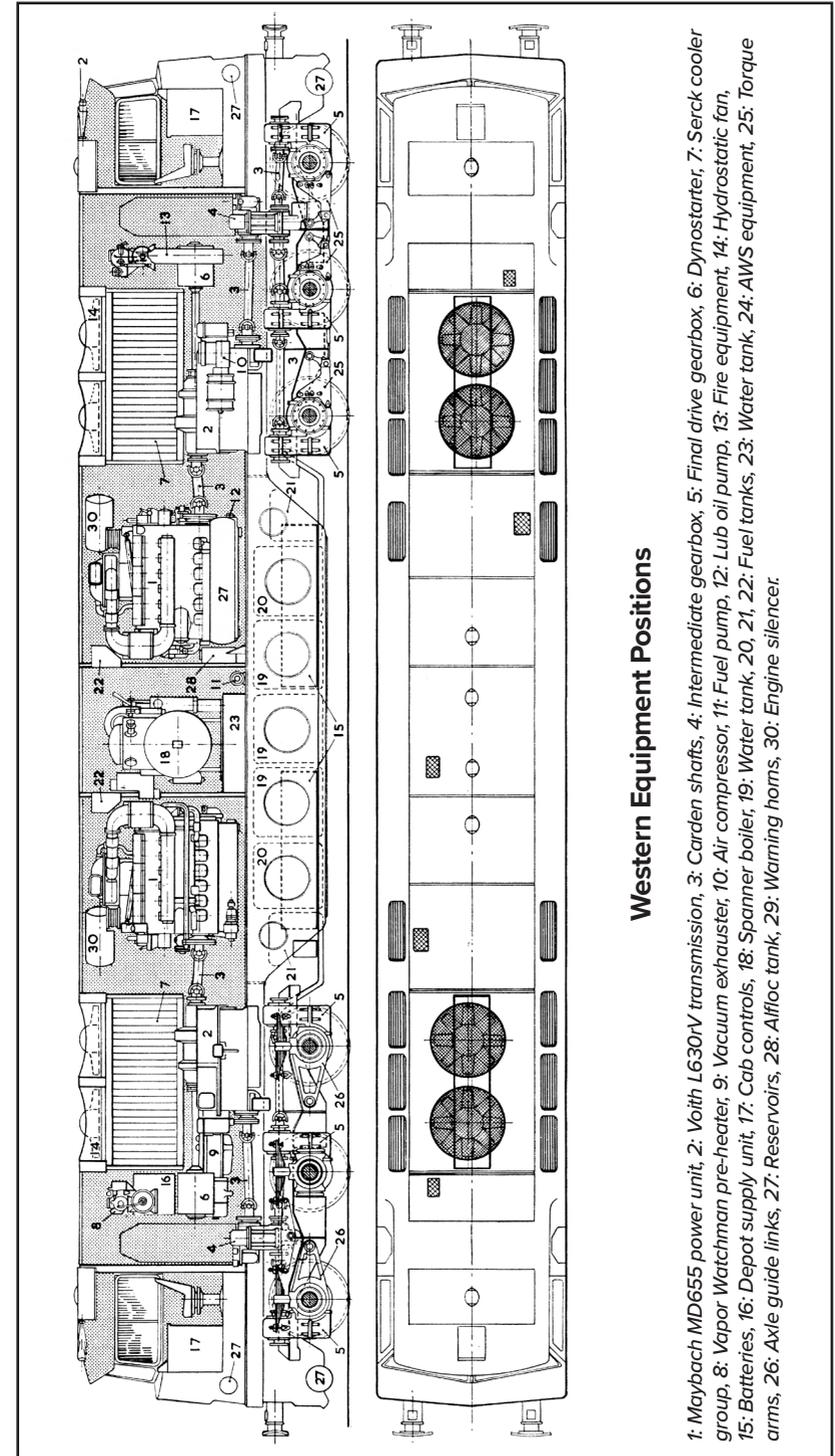
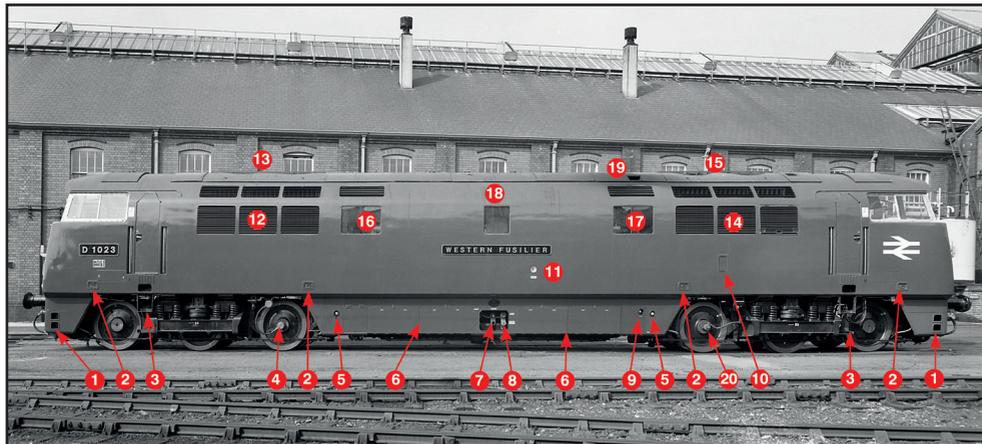
### Technical details

1957 BR number range:	D1000-D1073
Former class codes:	D27/1, later 27/1
Built by:	BR Swindon & Crewe
Introduced:	1961-1964
Wheel arrangement:	C-C
Weight (operational):	108 tonnes
Height:	12ft 11¾in (3.96m)
Width:	9ft (2.74m)
Length:	68ft (20.73m)
Min curve negotiable:	4½ chains (90.49m)
Maximum speed:	90mph (145km/h)
Wheelbase:	54ft 8in (16.66m)
Bogie wheelbase:	12ft 2in (3.71m)
Bogie pivot centres:	42ft 6in (12.95m)
Wheel diameter:	3ft 7in (1.09m)
Brake type:	Originally - Vacuum, most later fitted with Dual
Sanding equipment:	Pneumatic
Route availability:	6
Heating type:	Steam - Spanner Mk 111
Multiple coupling restriction:	Not multiple fitted
Brake force:	82 tonnes
Engine type:	2 x Maybach MD655
Engine horsepower:	Total - 2,700hp (2,013kW)
Power at rail:	2,350hp (1,752hp)
Tractive effort:	72,600lb (322.9kN), later reduced to 70,000lb (311.3kN)
Cylinder bore:	7¼in (184.1mm)
Cylinder stroke:	8¼in (209.5mm)
Transmission type:	Voith L630rV
Fuel tank capacity:	850gal (3,867lit)
Lub oil capacity:	100gal (455lit)
Boiler water capacity:	980gal (4,449lit) reduced to 800gal (3,640lit)
Boiler fuel supply:	From main supply

**Below:** Class 52 'Western' equipment positions.

1: Foot wells for climbing onto front end, 2: Sandbox filler port, 3: Cab footsteps, 4: Speedometer cable to axle head, 5: Engine lub oil filler, 6: Battery boxes, 7: Engine coolant and Boiler water filler ports, 8: Fuel gauge and Fuel filler port, 9: Electric shore supply input socket, 10: Access flap for compressor brushes, 11: Fire pull handle, 12: 'A' end cooler group roof fans, 13: 'A' end cooler group roof fans, 14: 'B' end cooler group, 15: 'B' end cooler group roof fans, 16: 'A' engine, 17: 'B' engine, 18: train heating boiler, 19: Exhaust Port, 20: Odometer cable.

Colin J. Marsden



### Western Equipment Positions

1: Maybach MD655 power unit, 2: Voith L630rV transmission, 3: Carden shafts, 4: Intermediate gearbox, 5: Final drive gearbox, 6: Dynostarter, 7: Serck cooler group, 8: Vapor Watchman pre-heater, 9: Vacuum exhaustor, 10: Air compressor, 11: Fuel pump, 12: Lub oil pump, 13: Fire equipment, 14: Hydrostatic fan, 15: Batteries, 16: Depot supply unit, 17: Cab controls, 18: Spanner boiler, 19: Water tank, 20, 21, 22: Fuel tanks, 23: Water tank, 24: AWS equipment, 25: Torque arms, 26: Axle guide links, 27: Reservoirs, 28: Alfloc tank, 29: Warming horns, 30: Engine silencer.

### 3: Locomotive Preparation: Pre-heating

- 3.1 Upon entering the Driver's door side at 'A' end, switch the BIS to 'On' and check that the cab desk voltage gauge reads around 90 volts (Fig. 9). (Note that the loco Voltmeter is at 'A' end only, but loco Amp meters are at both desk ends).
- 3.2 Check that the handbrake is 'On' or that the locomotive is scotched.
- 3.3 Place a 'Not to be moved' board on the locomotive.
- 3.4 Unlock the remaining external doors from the inside or from the outside with a key.
- 3.5 Assuming the engines are cold and in need of pre-heating find the blue 240-volt shore supply cable and connectors, usually stored in the boiler room - connectors are usually by the Davenset (Fig.2). Connect to shore supply (Fig. 6) and switch on mains supply. NB for the first start of the day, always use Shore Supply - only use Battery Supply if Shore Supply is not available.
- 3.6 Back at 'A' end, turn the Mains Shore Supply Switch from OFF to correspond to left or right from where the mains shore supply is coming from either left or right (i.e. SUPPLY A or SUPPLY B) and press the Charging Switch to 'ON', (Fig. 2) checking that charging amps are approx. 2 to 5 amps and voltage is approx. 100 volts (gauges next to Charging Switch) whilst charging the batteries.



Figure 2

Battery Charging Switch (with volts & Amps adjacent)

Mains Shore Supply Selector  
Left / OFF / Right

- 3.7 With the BIS switch remaining 'ON', switch on the Control Circuit Breaker (CCB) in 'A' cab (Fig. 4).
- 3.8 In each cab, select a Direction, Forward/Reverse and check fault lights on Secondman's side:
  - Coolant Low Level: Blue = safe to preheat  
Red = **DO NOT** preheat
  - Engine Temperature: Blue = at engine starting temperature  
Red = requires preheating
  - D1062: check water level in header tank sight glass.
- 3.9 If you are in **ANY DOUBT** as to the fault light indication, or the cooling water level, you **MUST** make arrangements to fill the respective cooling system before pre-heating.
- 3.10 Visually inspect pre-heater for water and fuel leaks. Wipe off any fuel. Ensure pre-heater jacket drain cock is closed.
- 3.11 Rotate coupling between motor/water pump by hand. Rotation should feel free without any tight spots.
- 3.12 Ensure damper flap moves up/down freely. Leave it in the closed position.
- 3.13 Check stack switch. Ensure trip button is pushed in.

#### DO NOT REMOVE GLASS AND FIDDLE WITH CAM

- 3.14 Rotate fuel filter two complete turns.
- 3.15 Ensure all radiator shutters are closed.
- 3.16 Turn pre-heater isolating switch to:

**BATTERY:** run from loco battery supply  
**SHORE SUPPLY:** run from external electric supply

Motor should start to run, circulating cooling water, but pre-heater will not fire up.

- 3.17 Press the pre-heater **START BUTTON**, and release immediately. There is no need to keep the start button depressed. The pre-heater should fire up within 30 seconds. If the pre-heater appears to fire intermittently, hold the damper flap down until you hear it fire up. If the preheater **DOES NOT** fire up after 3 attempts, start investigating cause of fault. Repeated attempts at firing without combustion will flood the pre-heater with fuel.

**DANGER:** Start at "arm's length" and keep your face well away from the Sight Glass.

**NOTE:** Please preheat loco using Shore Supply whenever possible.

## Locomotive Preparation: Pre-Heating

3.18 With pre-heater now firing, rotate fuel filter two complete turns. Check fuel pressure gauge: should indicate approx. 100 psi. Also check fuel pump area, burner pot area and damper piston for fuel leaks.

3.19 Check temperature of **TELEPHONE PIPE**, and also **INLET** and **OUTLET** pipes. During preheating the temperature of the pipes should be:

**INLET: COOLEST**  
**TELEPHONE: WARM**  
**OUTLET: WARMEST**

3.20 The temperature of the telephone pipe should **NEVER EXCEED** the temperature of the outlet pipe during any stage of preheating. If the **TEMPERATURE OF THE TELEPHONE PIPE EXCEEDS THAT OF THE OUTLET PIPE, SHUT DOWN THE PREHEATER IMMEDIATELY**. Investigate cause of fault.

3.21 Check pre-heater exhaust. This will initially be a little smokey but should clear quickly to give a “clear heat haze”. If thick smoke is produced, **SHUT DOWN PRE-HEATER**. Investigate cause of fault.

3.22 During preheating, frequently check the temperature of the telephone pipe.

3.23 Once coolant temperature is up to Engine Starting Temperature, 43°C (Fig. 3), the pre-heater switch can be switched from **Shore Supply** to **BATTERY SUPPLY** to enable the remainder of the loco prep to be completed. In cool weather preheat to well above 43°C (figure 3) to ensure heat soaks into the engine block.

3.24 Open radiator shutters before departure.

3.25 Common faults:

- Damper flap not operating or opening quickly enough, with black smoke
- Stack Switch tripped
- Motor Overload Reset button on control panel tripped
- Over-fueling with smell of diesel

3.26 If you are unable to diagnose and cure a fault, please **SEEK ASSISTANCE**.

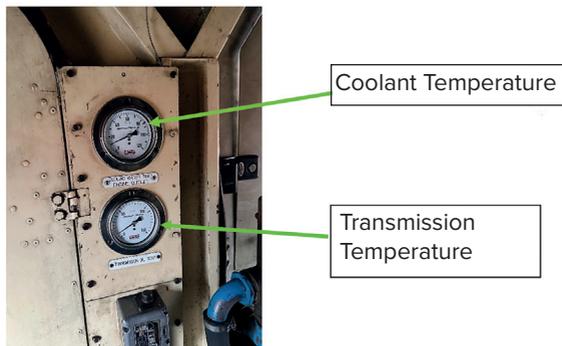


Figure 3

## 4: Locomotive Preparation: Internal Checks

4.1 With the locomotive pre-heating (if required), BIS switch 'On' and CCB 'On' at 'A' end (Fig. 4), test the Fire Alarm by pressing the Fire Alarm Test Button on the cab desk (both ends, Secondman's side).



Figure 4

Control Circuit Breaker (CCB) - 'A' end only

'A' end Circuit Breakers

4.2 Check that detonators, red flag, first aid kit and eye wash kit and spare tail lamp are on the locomotive.

4.3 Check that the handbrake is 'On' unless the locomotive is scotched and that a 'Not to be moved' board is displayed.

4.4 Check that the two hand-held fire extinguishers are located in the 'A' end vestibule area are in a useable condition with a pressure gauge if fitted or at least sealed.

4.5 Move to 'B' end and check the fuel gauge (figure 1) in the boiler room and check the brake selector switch (e.g. Vac Pass for Vacuum Passenger Train or Air Pass for Light Engine or Air Passenger) (figure 21).

4.6 Check the Compressor Change-Over Switch setting, normally position 1 (Fig. 21).

4.7 Move to 'B' end vestibule and unlock Driver's and Secondman's doors.

4.8 Pre-heat, if necessary, as described in Section 2.

4.9 Remove pin from fixed main fire extinguishers in 'B' end vestibule cabinet. Check that the two hand-held on-board fire extinguishers within the vestibule area are in a usable condition as per 4.4.

4.10 Move into 'B' end cab, check position of handbrake and test the Fire Alarm.

4.11 Check for first aid equipment etc within the cab.

## Locomotive Preparation: Internal Checks

- 4.12 Move to 'A' end cab, checking pre-heaters are operating correctly.
- 4.13 Check that the pre-heater roof latches are secure with the Bardic lamp or similar light source.
- 4.14 Switch off CCB at 'A' end cab (Fig. 4) whilst undertaking oil checks etc. unless on Shore Supply.
- 4.15 Move to 'A' end vestibule, open dyno-starter cabinet with the carriage key and check oil level with clean rag on Serck pump and check the oil system reservoir level.
- 4.16 Check the Intermediate Gear Box oil level making sure that no dirt is gets on the long dip stick. (This item is optional if short of time).
- 4.17 Move to 'A' end engine room and check the oil level in the two exhausters on the non-walkway side of the Cooler Group.
- 4.18 Check the engine oil level.
- 4.19 Open the Cooler Group doors and check the transmission oil level and check that the fans rotate freely.
- 4.20 Turn the Transmission Oil Filter handle two rotations on top of the Transmission (Fig. 5).



Transmission Oil Filter Handle

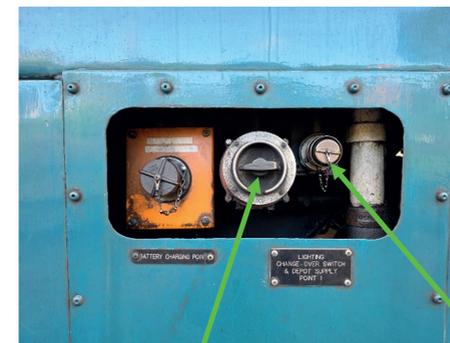
Figure 5

- 4.21 Check for leaks and make sure that everything seems in place, top up as necessary.
- 4.22 Check all engine room roof latches are secure.
- 4.23 Check engine temperature before moving to 'B' end engine room.
- 4.24 Repeat steps above in reverse, bearing in mind that the small compressor is on the 'B' end Cooler Group non-walkway side, rather than the two exhausters at 'A' end.
- 4.25 The large compressor is located underneath the locomotive and will not need checking with the WLA's Driver's Prep Examination.
- 4.26 Make sure that the cabs are clean, tidy and presentable.
- 4.27 Arrange for the windows to be cleaned, if necessary – there is no wash-wipe system.
- 4.28 Complete the internal check list on the WLA Driver's Prep Sheet.

**CAUTION: Internal & external cab doors are extremely heavy, and great care must be taken to avoid trapped fingers, especially when visitors are aboard!**

## 5: Locomotive Preparation: External Checks

- 5.1 Start at 'A' end and set the head-code if necessary, before checking that the head-code doors are securely locked shut.
- 5.2 Check all buffer beam brake pipes are in place and latched correctly.
- 5.3 Check that the Vacuum Bag is secure on the dummy, check rubber sealing ring.
- 5.4 Check the main air reservoir is secure underneath, behind the front valence.
- 5.5 Check tyre security/wheel markers are correctly aligned.
- 5.6 Check brake rigging is correctly aligned.
- 5.7 Check brake rigging locking nuts in place.
- 5.8 Use the Bardic or other light source to visually check for any obvious defects.
- 5.9 Check that the brake blocks have their Brake Block Keys correctly located.
- 5.10 Check for cracks and any excessive wear on brake blocks.
- 5.11 Check all visible springs for any obvious defects.
- 5.12 Use the carriage key to check that all the battery doors are locked and that the Talisman/Gravity latches are in place.
- 5.13 Check the Loco Lighting Switch, which should be switched from 'Depot' to 'Loco' (Fig. 6).



Loco Lighting Switch (No. 1 side only)

Figure 6

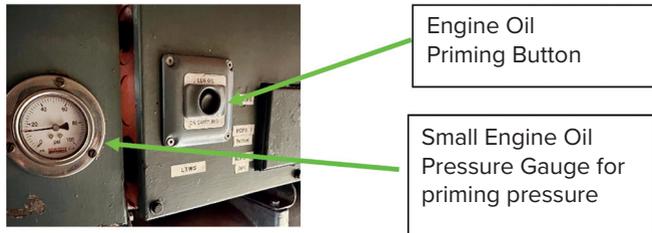
Shore Supply Point (both sides)

- 5.14 Check for leaks underneath the locomotive.
- 5.15 Repeat the above checks, from 'B' end, other side bearing in mind that the Loco Lighting Switch is one side only.

## 6: Locomotive Preparation: Engine Start-up

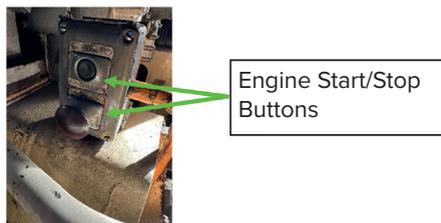
- 6.1 With the locomotive pre-heated to over 43 degrees C, internal and external checks complete, the locomotive is ready for the start-up procedure.
- 6.2 Pre-heaters may continue operating on 'Shore Supply' or 'Battery Supply' within the pre-heater cabinets.
- 6.3 When no longer using 'Shore Supply, switch off the Shore Supply Charging Switch by the BIS at A end and turn the Mains Supply Selector Switch to OFF (Fig. 2). Disconnect the shore supply and replace the locking cap.
- 6.5 Ensure the cable is neatly coiled and that everything is returned to its usual place.
- 6.6 At 'A' end cab, switch on the CCB, FTP & ESIS switches (Fig. 4 and 9).
- 6.7 Insert Master Key and select Engine Only for first start of the day for Local Start OR insert Master Key and Select Forward or Reverse for Remote Start once a Local Start has been completed earlier.
- 6.8 Switch on engine room lights if necessary and move to engine room, check engine stop button position.
- 6.9 Press the Engine Oil Priming (Lub Oil On Sample) Button (Fig. 7) for several minutes watching for movement on the Small Oil Pressure Gauge (about 10 to 15 psi).

Figure 7



- 6.10 Once primed, press the Engine Start button (Fig. 8) with the Engine Stop button pressed "In" to turn the engine over approx. 5 seconds of engine running before any attempt to fire up.
- 6.11 Pull the Engine Stop button 'Out' and then press the Engine Start button (Fig.8) allowing the engine to turnover and fire up within about 5 to 10 seconds. Once fired, keep the Engine Start button pressed for ten seconds and then release. Should the engine not fire, wait a few seconds before trying again.

Figure 8



- 6.12 Watch the main oil pressure gauge during the start-up procedure and check that the oil pressure is between 80 to 100 psi.
- 6.13 Bear in mind that the engine overspeed switch may 'trip' on D1062 'B' end due to electronic rev counter, if the sensor thinks the engine has turned over too quickly during item
- 6.10. The reset button is located within the Smiths box on the engine walkway side.
- 6.14 The above procedure assumes that the engine does not need to be decompressed and barred over first.
- 6.15 Once the engine has started, move the two engine oil filter ratchet handles several times up and down for two complete turns of the filter, at the back of the engine.
- 6.16 Proceed to A end cab checking for any oil/water leaks and check batteries are charging at no more than 50 amps (Fig. 9). The locomotive voltage should be between 100 to 112 Volts.

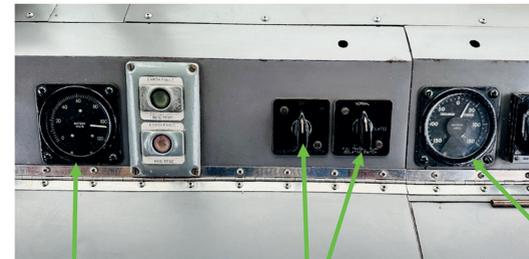
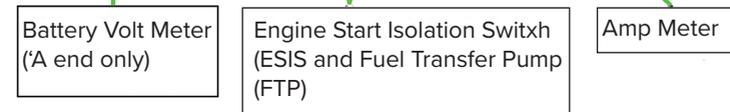
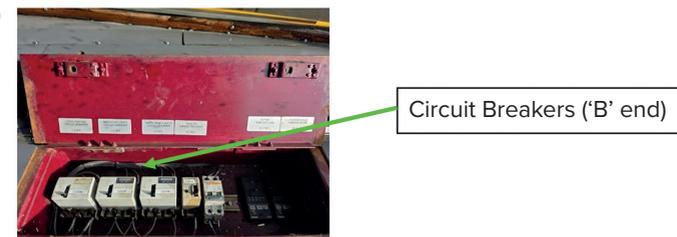


Figure 9



- 6.17 Repeat the process at 'B' end (or vice versa if necessary). Leave direction controller in Engine Only to run the compressors.
- 6.18 Double-check the positions of the Compressor Changeover and Brake Selector Switches in the Boiler Room.
- 6.19 Switch on circuit breakers in 'B' end cab (Fig. 10) then move to 'A' end vestibule and switch both Exhauster Switches to 'Normal' if Vacuum mode required (Fig. 20).

Figure 10



- 6.20 Switch on remaining circuit breaker switches adjacent to CCB in 'A' end cab (Fig. 4).
- 6.21 Leave the Master Controller in 'Engine Only' whilst creating air on the Main Reservoir to around 90psi. The M8A (auto-brake) valve should remain in Shut Down.
- 6.22 NOTE: If the Master Controller is 'Off' the air compressors will not be working and therefore, no air will be created.
- 6.23 Once the Main Air Reservoir has been created above 90 psi, the M8A valve can be moved from 'Shut Down' to 'Run' and observe Train Pipe rising to 72.5psi. Assuming in Vacuum mode, the vacuum will start to be created.
- 6.24 Note that if in Air Brake Mode, in Run, with 72.5 psi on the Train Air Pipe, it will take 3 to 5 minutes for the Brake Control Reservoir to be charged – until that time, the M8A brake will only work in 'Emergency'.
- 6.25 Once the Main Air Reservoir has been created and Vacuum created, the brake test can commence.
- 6.26 Once the engines have been running for 10 to 15 minutes or so, check the Turbo Charger sight glass (Fig.11) with a light source for the oil drip feed – one drop every 10 to 15 seconds. If no oil, stop engine.

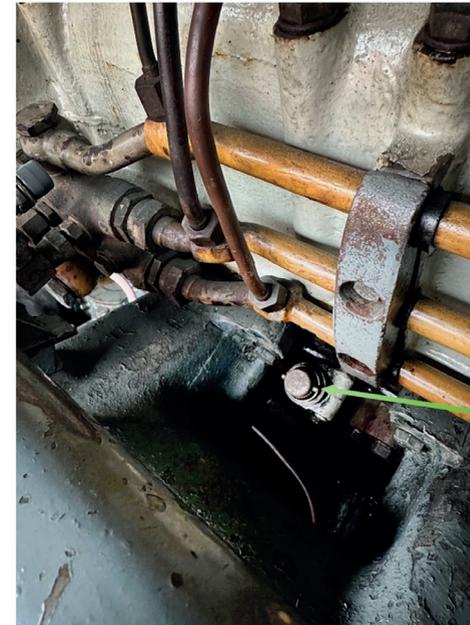


Turbo Oil Drip Sight Glass

Figure 11

- 5.27 Pre-heater switches should be switched to 'OFF' before departure.

**5.28 IMPORTANT!** When the engine(s) have not been operated for more than 1 to 2 weeks or after being stored outside for any time after heavy rain, the engine(s) must be decompressed and barred over before starting. The 12 decompression valves (figure 1) will need to be opened using the decompression tool (figure 1) and the engine can then be turned over manually using the barring over tool and chain, or run for approx. 10 seconds with the engine STOP button pushed IN (Fig. 8). **If in doubt, decompress first, before starting.**



Engine Decompression Valve (12 on each engine)

Figure 12



Engine Decompression Tool

Figure 13

## 7: Locomotive Preparation: Brake Test

7.1 Test the Straight Air Brake first from 'Off' to fully 'On' where both bogie brake pressures should increase from 0 to 57 psi and then move back to 'Off', making sure both brakes release completely.

7.2 The M8A valve can then be tested with the brake in Initial, Full Service and Emergency.

7.3 The readings at both ends should normally be as follows:

M8 Valve Test	Brake pipe	Vacuum pipe	Brake Cylinder	"A" end	"B" end
Release	77.5 - 79 psi	21 inches Hg	Zero		
Running	71.5 - 73.5 psi	21 inches Hg	Zero		
Test 1	62.5 psi	13 - 15 inches Hg	N/a		
Test 2	N/a	12 inches Hg	21 – 27 psi		
Full Service	46.5 - 50.5 psi	0 – 3 inches Hg	54 – 60 psi		
Emergency	Zero	Zero	54 – 60 psi		
<b>Straight Air</b>	N/A	N/A	0 to 57 psi		

### Brake Test 1

Move the brake valve handle just beyond INITIAL position so that the air brake pipe pressure falls to 62.5 psi. The vacuum train pipe should read 13" - 15" Hg

### Brake Test 2

Move the brake valve slightly so that the vacuum train pipe is maintained at 12" Hg. The brake cylinder pressure should be 21 - 27 psi. Full Service Application - Brake Cylinder Pressure should be 54 – 60 psi.

**CAUTION: Whilst conducting the above tests, the locomotive should be scotched and/or the handbrake applied.**

**NOTE: Whilst the use of one or both handbrakes are normally effective, they may be less so if new brake blocks have been fitted and may require an additional turn or two on the handbrake handle.**

## 8: Locomotive Preparation: Power Test

- 8.1 The following assumes engine(s) are running.
- 8.2 Switch external Loco Lighting Switch to 'Loco' (Fig. 6) if not already done (4.13).
- 8.3 Test marker lamps, head-code lights are working and select accordingly.
- 8.4 Place the Straight Air Brake to fully 'On'.
- 8.5 Insert Master Key and select Engine Only.
- 8.6 Ensure the handbrakes at both ends are 'Off'.
- 8.7 NOTE: If the handbrakes are on, the Fire Alarm will sound if in 'Fill' (notch 1 on Power Controller),
- 8.8 Keep the DSD pedal depressed.
- 8.9 Move the AWS handle up from 'Off' to 'On' and cancel the horn.
- 8.10 Select Forward and place the Power Controller into notch 1, (Fill).
- 8.11 Check the engine revs for 'Fill' (650 down to 600 rpm) before reversing and check for 'Fill' again, press the Tooth-on-Tooth button if the Reverser General light is showing Red for 5 seconds or so, until the light goes out. Check that the loco goes into 'Fill' in both directions.
- 8.12 DSD test: move the Master Controller to Forward, release the DSD pedal and ensure that Train Air Pipe commences to drop to zero within 5 to 7 seconds. Depress the DSD pedal and ensure that the Train Air Pipe returns to 72.5psi within approx. 30 seconds.
- 8.13 Move the M8A to Emergency, ensure Train Air Brake Pipe is destroyed to zero, bogie brakes fully applied, then move to Shut Down, Power Controller to Off, Straight Air Brake to Off, AWS Off & remove the Master Key and repeat at opposite cab end.
- 8.14 NOTE: Before shutting down the M8A valve, select direction of travel for the transmissions.
- 8.15 Set up cab end to be used, apply Straight Air Brake and/or Handbrake as required.
- 8.16 Complete WLA Daily Prep Sheet and SVR Locomotive Logbook paperwork and sign off.
- 8.17 Double check that scotches removed before setting off, shore supply removed and locomotive clear of obstructions, correct marker lights set at both ends.
- 8.18 Open Cooler Group louvres before departure.
- 8.19 Switch Pre-heaters from 'Battery Supply' to 'Off' before departure.
- 8.20 Check all interior doors and cab doors are closed before departure.
- 8.21 Remove 'Not to be moved' board.

## 9: Locomotive Disposal

- 9.1 Once the locomotive is in a safe position to be shut down, apply handbrake or scotch the wheels. If using the handbrake - leave the handle extended as a visible sign that the handbrake has been applied.
- 9.2 Place the direction Controller to 'Off'.
- 9.3 Exhaust Train Pipe and put M8A to Shutdown.
- 9.4 Place Straight Air Brake to the 'Off position.
- 9.5 Switch AWS control handle to 'Off'.
- 9.6 Stop engines and switch off ESIS & FTP switches (Fig. 9).
- 9.7 Switch off all circuit breakers under desk (Fig. 4 and Fig. 10).
- 9.8 Switch off all marker & indicator lights.
- 9.9 Switch off exhausters.
- 9.10 Switch off Pre-heaters.
- 9.11 Close Cooler Group Louvres.
- 9.12 Replace fire extinguishers safety pin at 'B' end.
- 9.13 Close all internal doors and windows, except internal cab doors, which should be left open.
- 9.14 If in Air Brake Mode, destroy remaining air brake control reservoir pressure on brake frame using the dagger handle in the Boiler Room.
- 9.15 NOTE: To destroy the Vacuum Reservoir, at 'A' end, Switch on CCB (Fig 2), insert Master Key, select Direction on the Master Controller and press the 'Loco Release' button on the Secondman's side. Once vacuum fully destroyed with Bogie Brakes Off, move Direction Controller to 'Off' and remove Master Key.
- 9.16 Switch off CCB, Circuit Breakers (Fig. 4 and 10), BIS and Exhausters, close and secure or lock all external doors.
- 9.17 Switch external Loco Lighting Switch to "Depot" (Fig. 6).
- 9.18 File SVR Loco Log Book sheet and report any faults and failures to WLA using Repairs Arising Sheet which can be downloaded from the WLA Web Site at:  
<https://westernlocomotives.com/wla-repairs-arising-sheet/>

## 10: Locomotive Operations

10.1

### Locomotive Towed Dead

- When a locomotive is towed dead using the air supplied from a towing locomotive, ensure the DSD is isolated by closing the valve located under 'A' end cab floor.
- On a vacuum braked train, where vacuum is piped through a dead locomotive being towed, isolate the Air Vacuum Relay Valve (AV2) (two-inch cock) in the engine room (adjacent to 'A' engine flywheel, non-walkway side, Fig. 14).

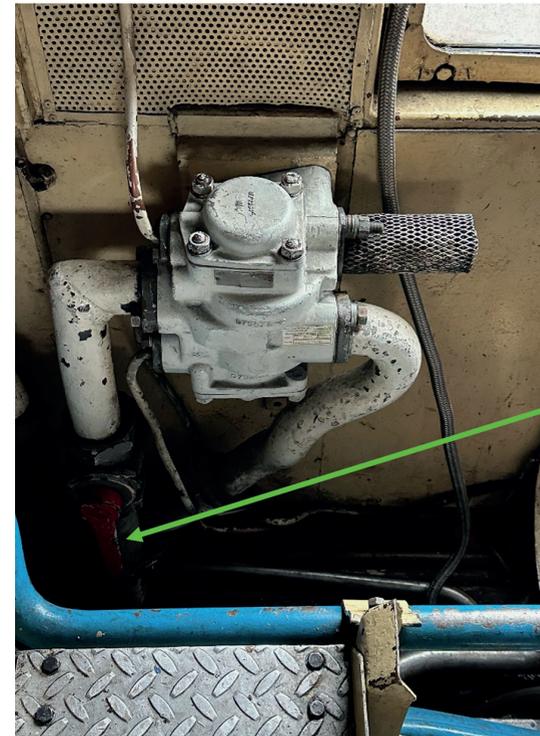


Figure 14

10.2

### Double Heading as a Second Locomotive

- Ensure Air/Vacuum bags are connected as appropriate. Only one Main Res bag to be connected.
- Switch off both exhausters.
- If leading loco is supplying air to train air pipe, place controls in Shutdown position. If leading locomotive is not supplying air on vacuum braked train, eg steam loco, the M8A must be in the 'Run' position to seat the valve in the AV2 and thus allow vacuum to be created.
- Depress DSD and place Direction Controller to desired direction.
- Note Train Air Pipe and vacuum readings from leading locomotive. To ensure loco brakes fully released, briefly press 'Loco Brake Release' button.
- Apply power as and when required.

10.3

### Rear Locomotive when Topping & Trailing

- Connect air/vacuum bags to train.
- Switch off both exhausters.
- Place M8A valve in 'Run' position, except where air braked stock forms train.
- Standard SVR procedure when Topping and Tailing is for the rear loco to have the M8A Brake Valve in Running to seat the AV2 and thus allow vacuum to be created. Thus, there is no requirement to isolate the AV2. The Proportional Brake Valve only needs to be in Shut Down when trailing on an air braked train.
- Place Master Controller in desired Direction with DSD depressed.
- Note vacuum gauge reading from leading locomotive via train. To ensure brakes fully released, briefly press 'Loco Brake Release' button.
- Apply power as and when required.
- Ensure tail lamp at rear.

10.4

### Changing Brake Modes – Air to Vacuum

- Stop locomotive, apply Straight Air Brake
- Place M8A to 'Emergency'.
- Proceed to Boiler Room and switch to 'Vac Pass' (Fig. 21).
- Proceed to "A" end vestibule and switch both exhauster switches to 'Normal' (Fig. 20).
- Return to driving cab and put Master Controller to 'Engine Only' position, put M8A to 'Run' position.
- Observe Train Air Pipe rise to 72.5 psi and Vacuum train pipe and reservoir to 21 inches hg. Locomotive is now in Vacuum Mode.
- Check brake application with M8A, watch bogie brake pressure rising with corresponding fall in vacuum.

10.5

### Changing Brake Modes – Vacuum to Air

- Stop locomotive, apply Straight Air Brake, Proceed to Boiler Room and switch to 'Air Pass' (Fig.21).
- Proceed to 'A' end vestibule and switch both exhauster switches to 'Off'. Do not select 'TEST'. Return to driving cab and put Master Controller to 'Engine Only' position.
- Press 'Loco Brake Release' button until vacuum reservoir reads zero, place M8A into "Run". Locomotive is now in Air Brake Mode.
- Place M8A to Run with 72.5psi on the Brake Pipe Gauge for 3 to 4 minutes to charge up the Control Side of the Distributor and thus allow the bogie brakes to apply as brake pressure is reduced.
- Observe Train Air Pipe rise to 72.5 psi. Check brake application with M8A, watch bogie brake pressure rising with corresponding fall in Train Air Pipe pressure, reduced to 50 psi with M8A brake in full service application.

## 11: Locomotive Handling Notes

11.1 Once selecting notch 1 (Fill) on the Power Controller and releasing the brakes, the locomotive will normally begin to move, whether light engine or on a passenger train, subject to gradient and loading.

11.2 Once in 'Fill' the power is being transferred directly to the rails and great care must be used when applying power especially beyond notch 6 or 7 especially in wet conditions, or when passing over pointwork to avoid wheel spin.

11.3 When awaiting the RA, the locomotive would normally be held on the Straight Air Brake with full vacuum. Upon the RA, the recommended procedure is from right to left placing the Power Controller into notch 1, 'Fill', sounding the horn and then releasing the straight air brake.

11.4 When applying power, it is good practice to allow the turbo chargers to spool up to avoid 'turbo lag' and black exhaust smoke. If full power is required, rather opening up to notch 9 straight away, open up to notch 7, let the engines settle and then open up to notch 9, if necessary.

11.5 Most of the maximum power is reached at the higher end revs.

11.6 Do not place Power Controller to 'Off' until the engine revs have returned to idle (approx. 600 rpm).

11.7 When driving the locomotive 'light engine', the M8A valve should be left in 'Run' and the straight air brake applied, as and when required and always used when running to the blocks or running round, light. Of course, the M8A valve can be used whether in Vac Pass or Air Pass mode to check its operation or to be used as an alternative but it is normal practice to just use the Straight Air Brake.

11.8 The Laycock Straight Air Brake is not proportional, and a great deal of care and skill is needed to master the brake correctly, mainly by 'balancing the air in the system' by moving the brake handle towards on and off, to a greater or lesser extent, as required, with the locomotive remaining in 'Fill', especially at slow speed, so braking against a constant force.

**CAUTION: Under no circumstances should anyone drive the locomotive light engine or buffer up without proper training.**

11.9 When dead slow, and when having to stop at a precise point (eg moving on to a turntable) the locomotive Straight Air Brake is best used when on one engine, rather than two.

11.10 When coupling up to stock, again great care and judgment is needed with the Straight Air Brake. Inexperienced Drivers are prone to 'kangaroo hopping', so you have been warned!

## Locomotive Handling Notes

11.11 When running Light Engine, the Straight Air Brake can be applied in one movement to a greater or lesser extent to check the speed. Once the speed is down to 10 mph or less and when still under power, then the brake will need to be applied in small on/off movements to avoid coming to a premature stop or increasing speed.

11.12 When running light engine, the locomotive can be braked with the Straight Air Brake without braking against power in Fill, on depending on the gradients but ultimately, Driver discretion is needed to decide what works best for them.

11.13 When applying the Stright Air Brake, stop on falling air pressure to avoid any risk of skidding.

11.14 When working on one engine with a train, please be aware that when running with just the leading engine working, the locomotive may be prone to slipping, especially in wet conditions.

11.15 To obtain a quick release of the brakes but only if really necessary, the M8A can be moved to 'Release' if held against the spring until a rise in Vacuum has been obtained – the Train Pipe will rise to 77.5 – 79.5psi.

11.16 Either engine may be isolated from the Engine Speed Isolation Cock (Fig. 15 located in the Engine Room (walkway side). Although the engine will idle, power will still be applied as if in notch 1 (Fill).



Engine Speed Isolating Cock (shown in normal operating position)

Figure 15

10.17 When coupling up, apply Straight Air Brake when move complete, move Power Controller to 'Off' and destroy Train Pipe air/vacuum. When uncoupling, the Secondman may require you to ease up once the Vacuum bags have been split and the Vacuum Bag has been placed on the locomotive dummy. If so, recreate air/vacuum with the M8A, ease up in direction, using the Straight Air Brake to stop, and then use the M8A to destroy, move controller to 'Off' signalling that the Secondman is safe to go in between, until the Secondman is safely out and signals accordingly, before recreating.

## 12: Locomotive Faults and Failures

	FAULT	CAUSE	REMEDY
A	(1) No electrical power	BIS out	1
	(2) No Lights or markers	Loco lighting switch on "Depot"	2
		Circuit breaker tripped	2
B	(3) No indicator lights	Circuit breaker tripped	2
	Pre-heater will not run	BIS out	1
		Stack switch tripped	2
C	Pre-heater will not fire	Water temp above maximum	0
		Solenoid valve stuck	9
		No fuel pressure	3
D	Engine oil pump not running	CCB out	1
		Direction controller not in correct position	14
		ESIS out	1
E	Engine will not turn	Engine water level low	4
		Low water temperature	6
		Engine overspeed tripped	2
F	Engine turn but will not fire	Insufficient oil pressure	9
		Battery volts low	5
		Local Stop button in Stop	2
G	Engine starts but will not run	Low water temperature	6
		Batter volts low	5
		Air in fuel system	3/N
H	Transmission will not fill	Fuel pump not running	1/N
		Start button released too early	9
		Low oil pressure	9
I	No Train Air Pipe pressure	Air in fuel system	3/M
		FTP not running	1/Q
		Fuel shut off valve closed	10
J		Low air pressure	11
		No Train Air Pipe pressure	9/H
		No Vacuum in Vac Brake Mode	9/J
K		Reverser General	9/13/L
		AWS not switched On	1
		Vacuum Governor tripped in Vac Mode	8
L		AVR fault	8
		Direction Controller in EO or Off	14
		Transmission high temp. tripped	2
M		Low main reservoir	11
		M8A in wrong position	2
		M8A not shutdown at remote end	2
N		Air bag blowing through	12

	FAULT	CAUSE	REMEDY
I	No vacuum reading	No or low Train Air Pipe pressure Loco in Air Brake Mode Exhausters not running Direction controller in Off Vacuum bad off dummy	9/11 14 11 14 12
J	Engine will not power up (1) Will only idle  (2) Engine will not make full power  (3) Engine shuts down	Transmission not in Fill Speed control valve closed Low cooling water High transmission temperature High cooling water temperature  Remote control <u>stand</u> unlocked Low fuel pressure  Low cooling water level Low oil pressure Overspeed protection CCB tripped Low fuel pressure	9G 10 8/4 2 9  2 3/N/Q  9/4 9 2 1 3/N/Q
K	Noisy M8A Valve	Remote M8A Valve not shut down	2
L	Bogie Brakes remain on, despite Straight Air Brake "Off"	Straight Air Brake "On" at remote end No Train Air Pipe Pressure DSD activated No Vacuum in Vacuum mode	2 9/11 2 9/11

**REMEDIES**

0	Ignore
1	Switch On
2	Reset
3	Bleed (See M below)
4	Refill
5	Arrange for charge
6	Pre-heat
7	Connect supply
8	Release override pin
9	Check and try again
10	Open valve
11	Run compressors and/or exhausters
12	Check outside locomotive
13	Operate Tooth on Tooth button (see L below)
14	Select correct setting

M

Total Failure to Reverse

If one or both transmissions fail to reverse:

1. With engine running, press Tooth on Tooth button.
2. If that fails and there is room, run loco a short distance in previous direction and try reversing again, using Tooth on Tooth button, if necessary.
3. Completely shut down remote end or vice versa and try again.
4. If that fails:
  - a) Stop engine.
  - b) Enter Cooler Group and lift far right-hand floor panel.
  - c) Fit handle to square end of reversing mechanism.
  - d) For trailing transmission, pull handle up, leading – pull handle down.
  - e) Close floor and close door to Cooler Group.
  - f) Start engine and proceed.

N

Bleeding Fuel System on Engine

1. Switch on Fuel Transfer Pump (FTP).
  2. Open bleed screw on each side of engine.
  3. Start engine and observe bubble flowing through plastic pipe.
  4. When clear, close bleed screw and tighten lock nuts
- NB. To avoid bleed screws coming out and spraying fuel into engine room, please ensure that bleed screws are nipped up and locked with locking nut. (Note bleed screws may have been replaced with small lever handle).

Q Running on One Fuel Pump

- 1) Stop engines.
  - 2) Switch off defective fuel pump.
  - 3) Open by-pass valve in boiler room.
  - 4) Ensure serviceable fuel pump is running.
  - 5) Start both engines & bleed fuel systems if necessary.
- Note: One fuel pump will not supply sufficient fuel pressure to run both engines on full power. Limit engine revs to 1,200 maximum.

### 13: Appendices

- Cab Controls (Driver's View)
- Cab Controls (Full View)
- Class 52 Schematic
- Loco Fuses: Cabs
- Loco Fuses: 'A' end Vestibule
- Loco Fuses: Boiler Room
- Lubricants
- WLA Repairs Arising
- WLA Daily Driver's FTR Exam

#### Cab Controls Driver's View



Figure 16

1	(Not Shown)	19	Straight Air Brake	29	Wheel Slip
2	Main Air Reservoir	20	M8A Auto Brake	30	Driver Switches (to left)
3	Train Air pipe	21	Windscreen Wiper	31	Horn
4	Bogie Brakes	22	Windscreen Wiper	32	Rear Horn
5	Vacuum	23	A engine stopped	33	AWS reset button
6	Speedo	24	B engine stopped	34	Power Controller
7	Engine Revs	25	Low Fuel Warning	35	Direction EO/OFF
8	Rev Changeover	26	General Alarm	36	Master Key
9	TTS Override (1)	27	Reverser General	38	Engine Start/Stop
10	TTS Override (2)	28	Tooth on Tooth	39	Engine Start/Stop

#### Cab Controls Full Width



Figure 17

1	AWS	14	Fault Light Panel	27	Reverser General
2	Main Air Reservoir	15	AVR Short	28	Tooth on Tooth
3	Train Air Pipe	16	Loco Brake Release	29	Wheel slip
4	Bogie Brakes	17	Horn	30	Driver Switches (to left)
5	Vacuum	18	Circuit breakers	31	Horn
6	Speedo	19	Straight Air Brake	32	Rear Horn
7	Engine Revs	20	M8A Auto Brake	33	AWS reset button
8	Rev Changeover	21	Windscreen Wiper	34	Power Controller
9	TTS Override (1)	22	Windscreen Wiper	35	Direction EO/OFF
10	TTS Override (2)	23	A engine stopped	36	Master key
11	ESIS	24	B engine stopped	37	Transmission reset
12	FTP	25	Low Fuel Warning	38	Engine Start/Stop
13	Amp Meter	26	General Alarm	39	Engine Start/Stop

Class 52 Schematic

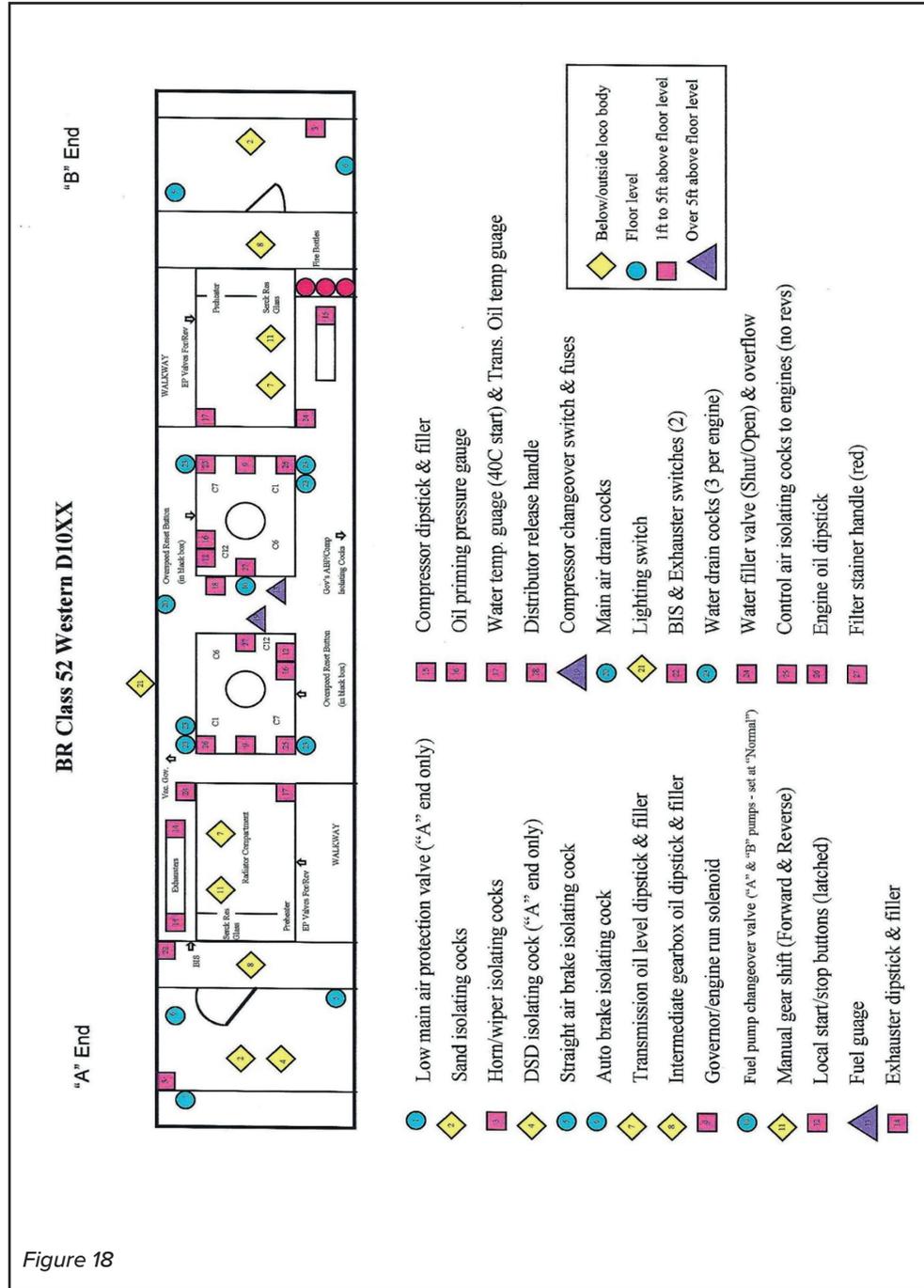


Figure 18

Loco Fuses - Cab

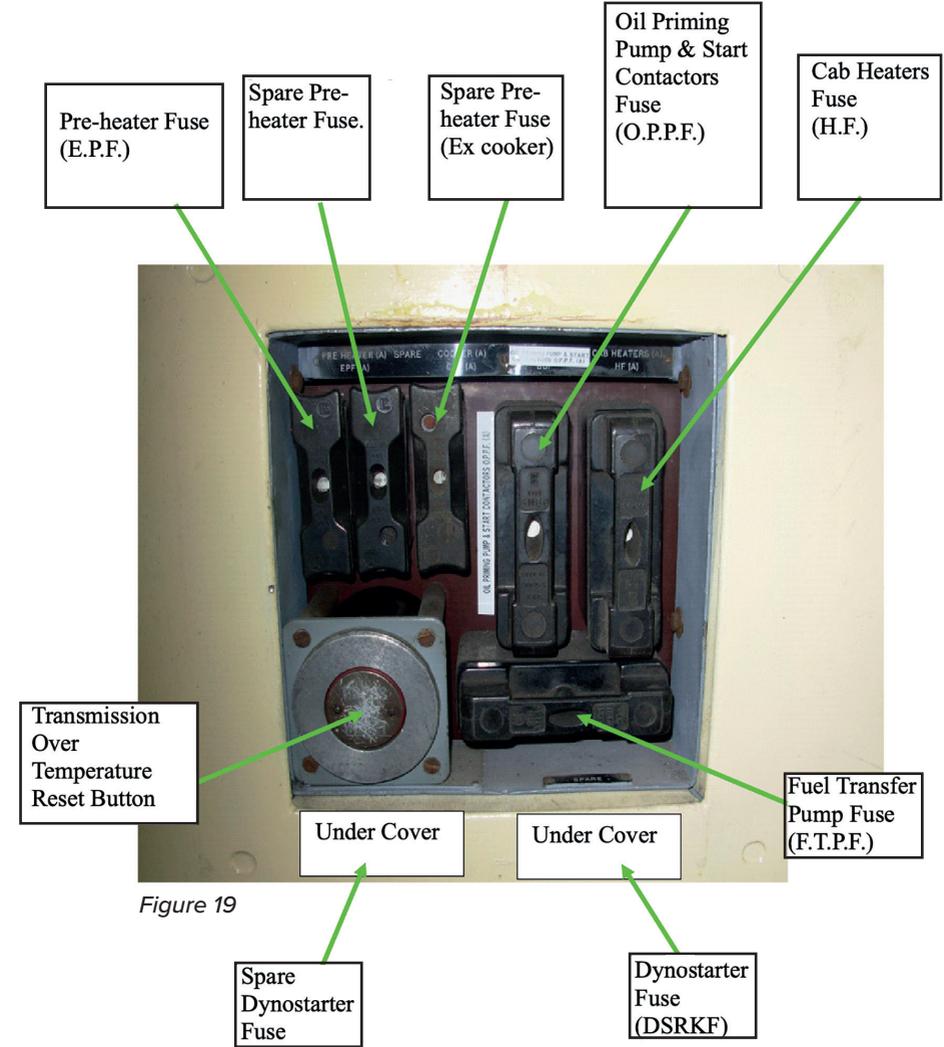


Figure 19

Loco Fuses - 'A' End Vestibule

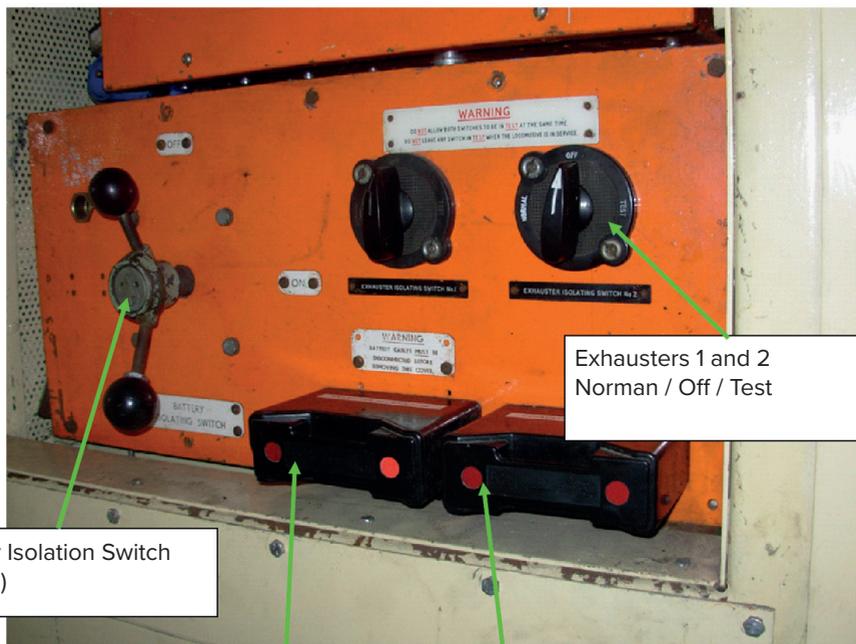


Figure 20

Exhauster No1 Fuse

Exhauster No2 Fuse

Loco Fuses - Boiler Room

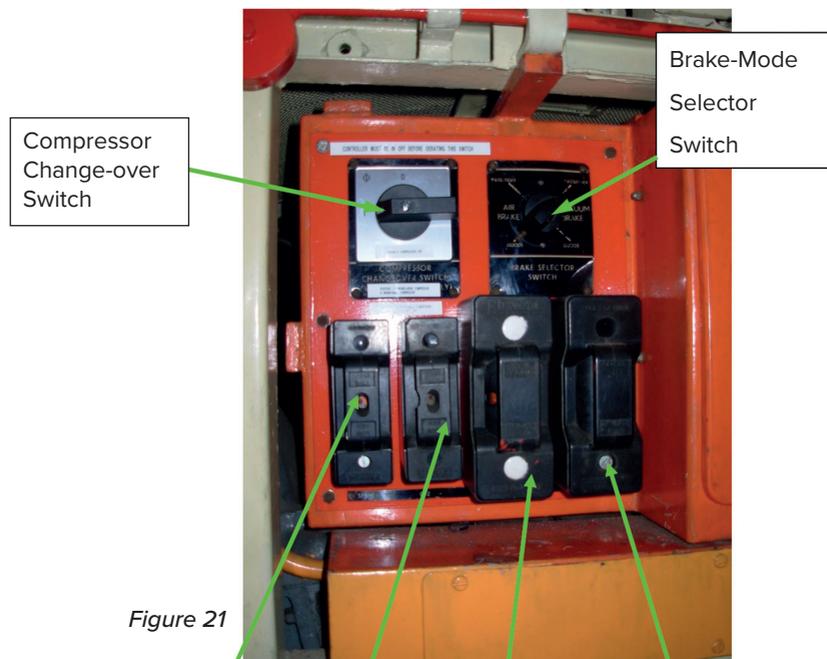


Figure 21

Small Compressor Fuse 'B' End (C.F.2)

Spare Small Compressor Fuse 'B' End

Large Compressor Fuse 'A' End (C.F.1),

Spare Large Compressor Fuse 'A' End

Notes

Each Compressor is driven direct (electrically) from each dyno-starter, thus 'A' engine will normally run 'A' end Large Compressor (underneath the loco) and 'B' end engine will normally run the Small Compressor ('B' end non-walkway side beside the Cooler Group), with the Compressor Changeover Switch in Position 1. Position 2 gives the option to switch 'A' end engine to run 'B' end Compressor and 'B' end engine to run 'A' end Compressor.

If 'Vac Pass' or 'Vac Goods' is selected, then only one compressor will run, depending on direction ie forward with 'A' end desk open, 'A' end compressor runs, forward with 'B' end desk open, 'B' end compressor runs.

When on one engine – the locomotive will automatically select the available compressor in either direction.



**Driver's Prep Sheet**

**WLA Class 52 Driver's Prep Sheet**

**LOCOMOTIVE: D1013/D1062**

**DRIVER:..... SECONDMAN:..... DATE:.....**

External Checks	"A" end Remarks	"B" end Remarks
Not To Be Moved Board & Scotches on/removed?		
Drawbar/hook/coupling/buffers		
Brake pipes intact/secure		
Front air reservoirs secure		
Wheels & Tyre Markers checked		
Brake rigging correctly aligned		
Battery box doors latched		
Coolant/Oil/fuel leaks underneath?		
Head-code doors secure		
Lighting Switch set to "Loco" before leaving		
Marker/Head-code lights working		
Shore Supply on/removed from loco		
Internal Checks	"A" end Remarks	"B" end Remarks
Fire alarm test		
Fire bottles armed ("B" end) + extinguishers		
12 Detonators + 1 Red Flag in each cab		
Spare Tail Lamp		
Roof latches secure		
Oil levels checked: Engines/transmissions/IM <u>gear-box</u> exhausters/compressors/Serck pump		
Coolant/Oil/Fuel leaks?		
Coolant levels topped up		
Cooler Group (slats set to "open" after pre-heating)		
Fuel filters		
Fuel level in fuel tank		GALLONS
Oil feed to Turbo Chargers		
Pre-heaters (set to "OFF" before leaving)		
Handbrakes operational		
Brake & Compressor setting in boiler room	VAC PASS - GOODS	AIR PASS - GOODS
Main air reservoir charged @ 118-140 psi		
Reverser/directional control		
Power control		
DSD test		
AWS test		

M8 Valve Test	Brake pipe	Vacuum pipe	Brake Cylinder	"A" end	"B" end
Release	77.5 – 79.5 psi	21 inches Hg	Zero		
Running	71.5 - 73.5 psi	21 inches Hg	Zero		
Test 1	62.5 psi	13 - 15 inches Hg	N/a		
Test 2	N/a	12 inches Hg	21 – 27 psi		
Full Service	46.5 - 50.5 psi	0 – 3 inches Hg	54 – 60 psi		
Emergency	Zero	Zero	54 – 60 psi		
<b>Straight Air</b>	N/A	N/A	0 to 57 psi		

Brake Test 1

Move the brake valve handle just beyond INITIAL position so that the air brake pipe pressure falls to 62.5 psi. The vacuum train pipe should read 13" - 15" Hg

Brake Test 2

Move the brake valve slightly so that the vacuum train pipe is maintained at 12" Hg. The brake cylinder pressure should be 21 - 27 psi. Full-Service Application: Brake Cylinder Pressure should be 54 – 60 psi

Signed for and on behalf of the W.L.A.....











