
OPERATING MANUAL

CLYDE

MODEL G6B

DIESEL ELECTRIC

LOCOMOTIVE





**CLYDE
DIESEL ELECTRIC
LOCOMOTIVE
Model G6B**

**DESIGNED and POWERED
By GENERAL MOTORS**

THE CLYDE ENGINEERING COMPANY PTY. LTD.

CLYDE WORKS
CLYDE, N.S.W., AUSTRALIA

in association with

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION

LA GRANGE, ILLINOIS, U.S.A.

First Edition

AUGUST, 1963

MANUAL No. 216

PRINTED BY NEW CITY PRESS, FITZWILLIAM AND WENTWORTH STREETS, PARRAMATTA

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INTRODUCTION

This manual is written specifically for locomotive operating crews and no attempt has been made to include instruction on the repair and adjustment of equipment.

Repair information is issued to the Railways and is kept in Locomotive Depots in the form of Maintenance Instructions.

The General Arrangement Diagram at the end of this book may be unfolded to show the location of the major component parts mentioned in the text. These major items are depicted in sketches throughout the text to show their component parts in greater detail.

PART 1

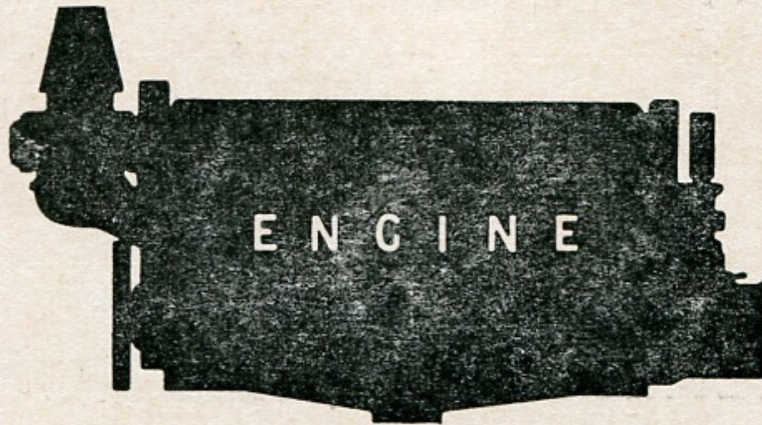
GENERAL DESCRIPTION

**THE CLYDE ENGINEERING COMPANY PTY. LTD.
AUSTRALIA**

"Home of the Diesel Locomotive"

GENERAL DESCRIPTION

POWER GENERATION



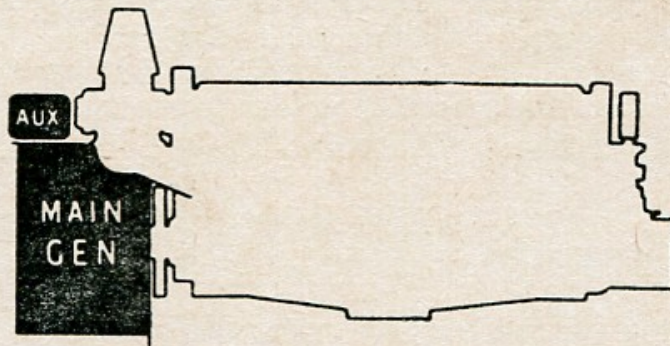
All the power for the operation of the locomotive is developed from the fuel oil burned by a Model 6-567C two-stroke cycle General Motors Diesel Engine. The engine has solid fuel injection, blower scavenging and operates at speeds from 275 r.p.m. to 800 r.p.m.

GENERAL DESCRIPTION

CONVERSION TO ELECTRICITY

The mechanical power developed by the engine is converted to electricity.

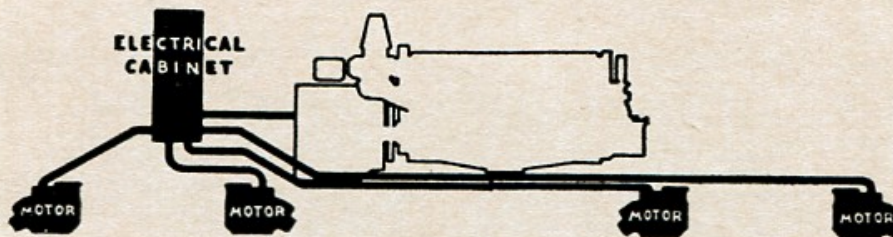
The Main Generator converts engine horsepower output to high voltage direct current for use in propelling the locomotive.



The Auxiliary Generator converts a small amount of the engine power to low voltage direct current at approximately 74 volts for use in charging the engine starting battery, exciting the main generator, operating the controls and providing current for all locomotive lights and accessories.

GENERAL DESCRIPTION

CONVERSION TO MECHANICAL POWER



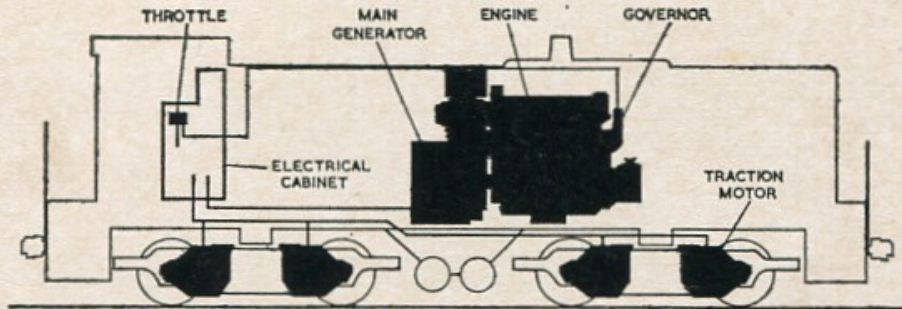
The electrical power developed by the main generator is distributed through the Electrical Cabinet to the four Traction Motors which are geared to the wheels. The motors convert the electrical power to mechanical power for propelling the locomotive.

Current from the auxiliary generator is also distributed through the electrical cabinet.

"Shunting" of the traction motor field windings is used to obtain full power from the equipment within the range of its voltage and current limits. "Shunting" of the traction motor field windings is referred to as "transition."

GENERAL DESCRIPTION

CONTROL OF POWER



The driver's throttle controls the power in two ways.

The Throttle, when opened to the first notch, acts on the Electrical Cabinet to bring the main generator to life. This causes current to flow to the traction motors.

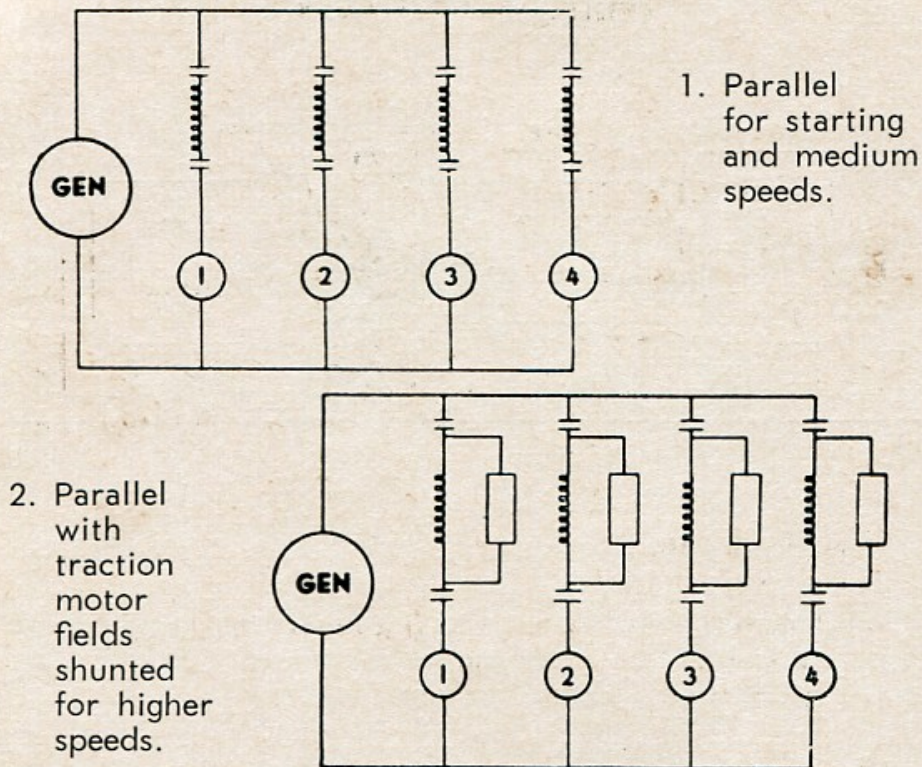
All succeeding notches on the throttle act on the Governor and cause the engine speed to increase by 75 r.p.m. for each notch. This increases the pulling power of the locomotive.

In multiple unit operation these controls go through the jumper cable between units, so that engines and generators in all units can be controlled from one throttle.

TRANSITION

Two types of traction motor electrical circuit connections are used so that full power may be obtained at all times from the main generator within its current and voltage limits.

GENERAL DESCRIPTION



The change from one type of connection to the other is called Transition and is effected automatically.

AUXILIARY EQUIPMENT

The radiator cooling fan, located at the front of the long hood, is directly driven by a shaft from the engine accessory gear train.

The cooling blower for the traction motors at the cab end is driven by a shaft from the auxiliary generator. The D-25C main generator is self-ventilated and coupled direct to the engine. The traction motors at the long hood end are cooled by a blower directly driven by a shaft coupled to the engine accessory gear train.

The locomotive is equipped with a Gardner-Denver 3-cylinder, two-stage air compressor, directly driven from the engine through a flexible coupling and capable of delivering 178 CFM at 800 RPM. The air is delivered to the Westinghouse brake and air system.

PART 2

STARTING AND STOPPING ENGINES

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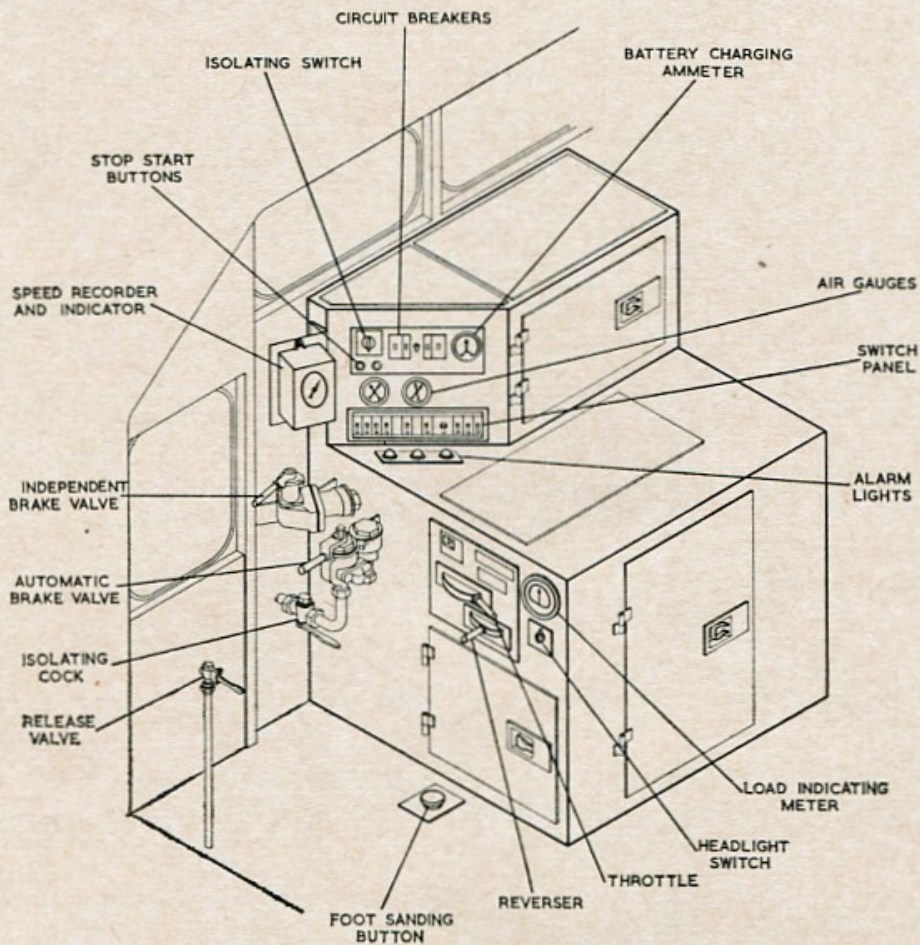
"Home of the Diesel Locomotive"

STARTING AND STOPPING ENGINES

PREPARATION FOR STARTING ENGINE

In the Cab:

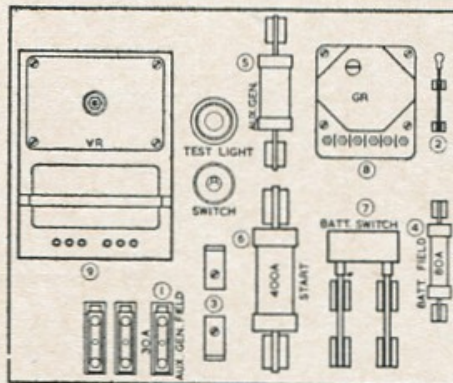
1. Independent air brake handle should be in the full application position.
2. Reverser handle should be removed.



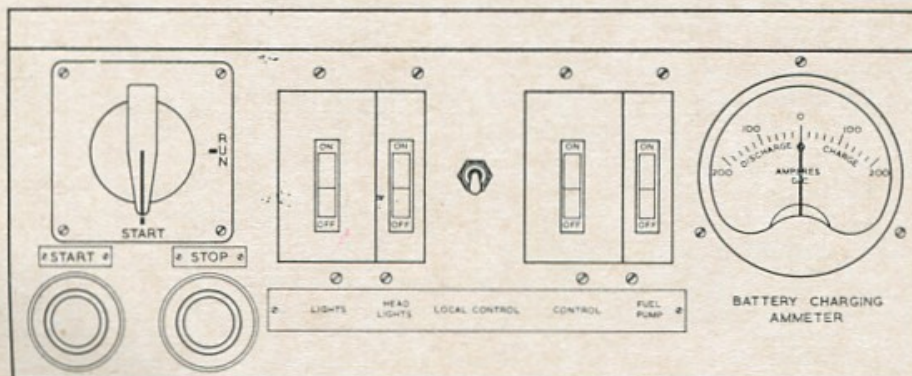
STARTING AND STOPPING ENGINES

Preparations for Starting Engine—(Cont'd.)

3. In the console top electrical cabinet—
 - (a) Close all knife switches.
 - (b) All fuses must be in place.



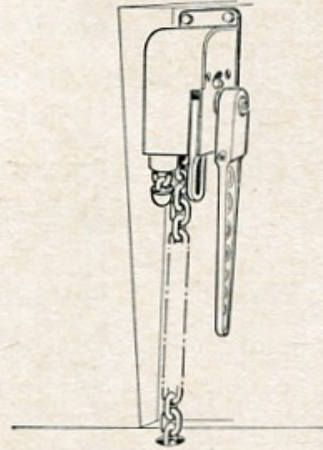
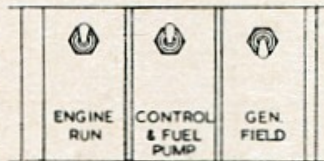
4. At the isolation switch panel—
 - (a) Switch all circuit breakers ON.
 - (b) Place local control switch ON.
 - (c) Isolation switch should be in START position.



STARTING AND STOPPING ENGINES

Preparations for Starting Engine—(Cont'd.)

5. At the driver's control panel on console:—
 - (a) Place Control switch ON.
 - (b) Place Engine Run Switch ON.



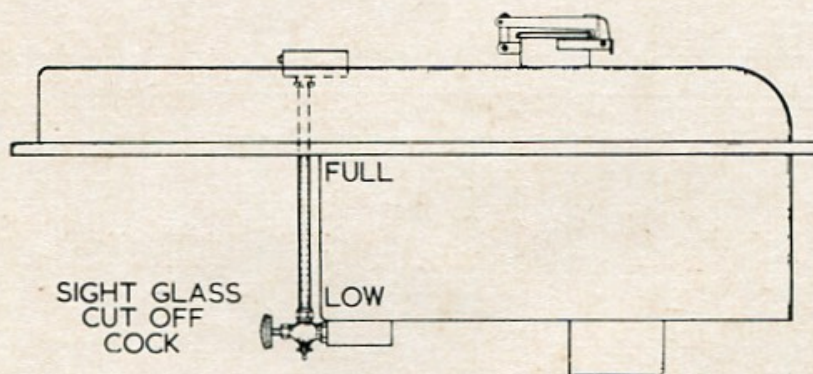
On Walkway

1. Hand Brake should be ON.

In the Engine Room—

1. Check the engine water level.

Open water level sight glass cut-off valve. Water should be evident in sight glass before attempting to start the engine. If water is not showing in the sight glass—do not start engine until maintenance staff has checked for internal and external water leaks. Water level should again be checked shortly after starting engine and if necessary water added to return level to FULL mark.



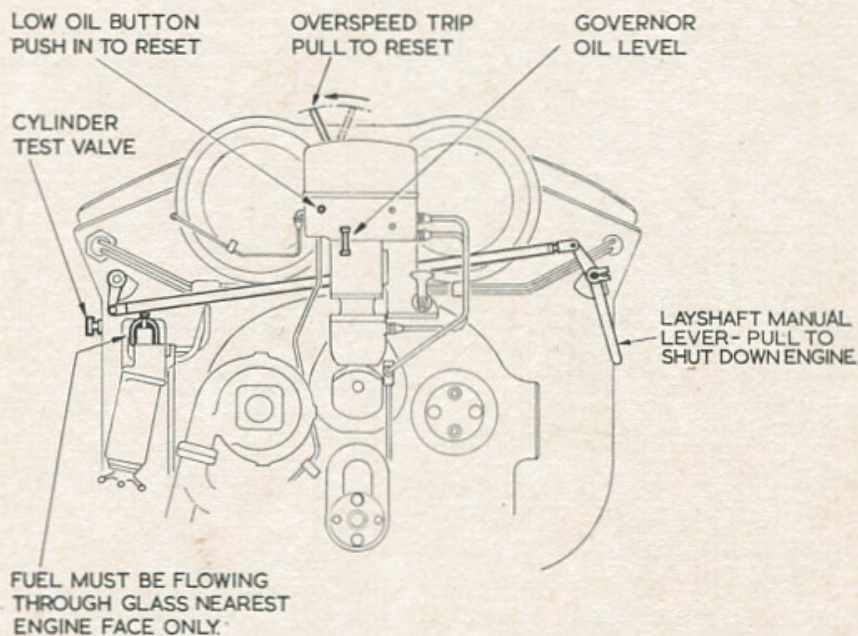
2. Check the governor oil level. — Should be between the marks on the glass.—Too much or too little oil should be reported.

STARTING AND STOPPING ENGINES

Preparations for Starting Engine—(Cont'd.)

3. Check low oil shut down button on the governor.
 - Test signal alarm system by pulling out button. Alarm bell should ring.
 - Push in to reset.

Accessory End of Engine:



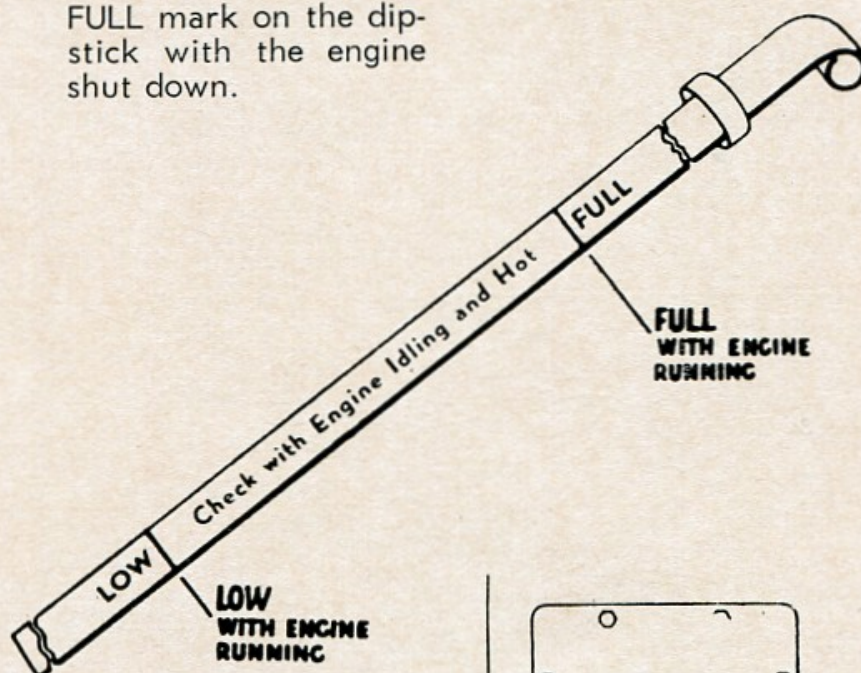
4. Check the overspeed trip.
 - Pull as indicated to reset.
5. Check for fuel flow through return sight glass.
 - The glass next to the engine must be full and clear. If there is any flow of fuel through the adjacent (right hand) glass, the maintenance staff must be notified.

STARTING AND STOPPING ENGINES

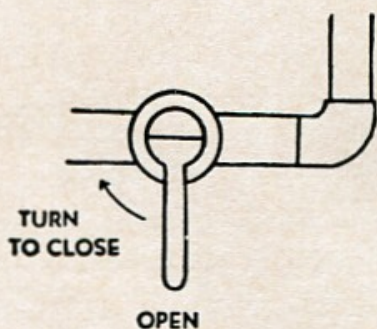
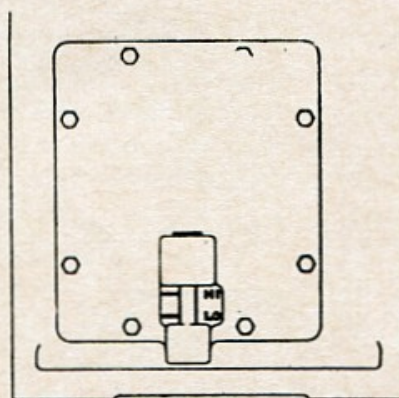
Preparations for Starting Engine—(Cont'd.)

6. Check the engine lubricating oil level.

—Should be above the FULL mark on the dipstick with the engine shut down.



7. Check the air compressor oil level. Oil should show in sight glass with locomotive on level track.

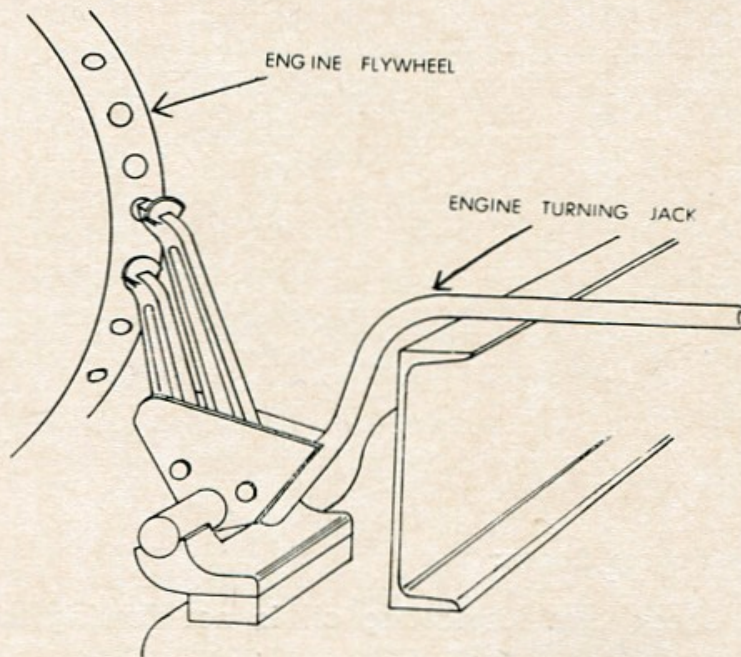


8. Check air box drain cocks—should be open. The engine air box accumulation settles in the two drain tanks, one on each side of the engine at the generator end of the oil pan.

STARTING AND STOPPING ENGINES

Preparations for Starting Engine — (Cont'd)

9. Test for water accumulation in engine cylinders:
- (a) Remove 400 ampere starting fuse.
 - (b) Open engine cylinder test valves about three turns.
 - (c) Rotate engine at least one complete revolution with the use of the engine turning jack.



NOTE: The start button **MUST NOT** be used when testing for water accumulation.

- (d) Watch the cylinder test valve openings for discharge of liquid.
 - If there is a discharge of liquid, do not attempt to start the engine until the maintenance staff has corrected the leaking condition.
 - If there is no discharge:
- (e) Close cylinder test valves.
- (f) Replace 400 ampere starting fuse.

NOTE: If the engine has been shut down for a period of time less than the minimum time specified by the mechanical officials, the above test (No. 9) may be omitted.

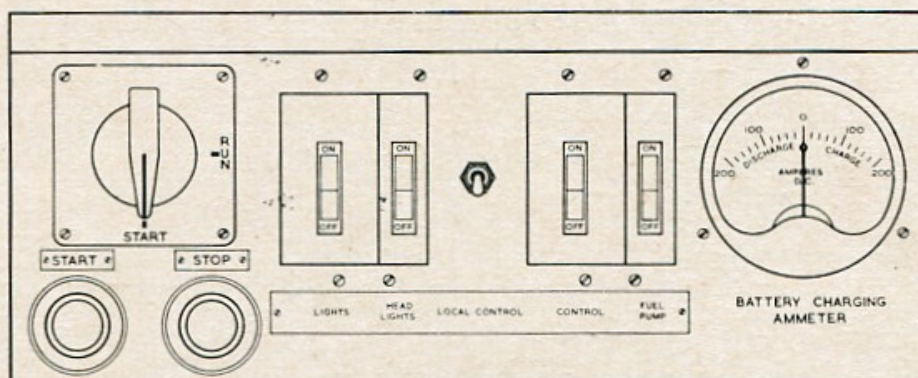
STARTING AND STOPPING ENGINES

STARTING ENGINE

In the Cab

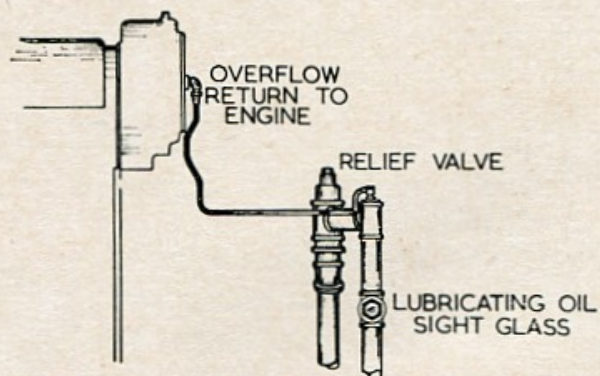
Press the START button and hold until the engine starts (not more than 15 seconds).

If engine will not start see page 58.



In The Engine Room:

1. Check that lubricating oil is not flowing through by-pass sight glass after engine has reached operating temperature.

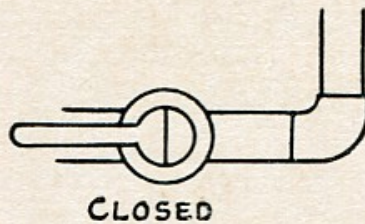


NOTE: If there is oil flow, the maintenance staff must be informed.

STARTING AND STOPPING ENGINES

Starting Engine—(Cont'd.)

2. Drain oil from air compressor intercooler and close cocks.
3. Close air box drain cocks.



On the Ground:

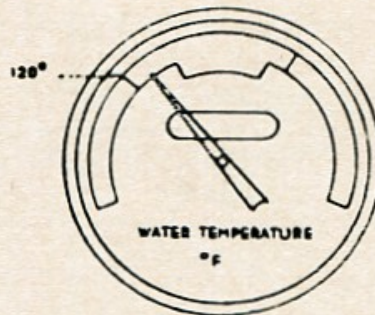
Check for flow of air at each traction motor outlet aperture to ensure that both blowers are operating.

STARTING AND STOPPING ENGINES

GIVING ENGINE CONTROL TO THE DRIVER

In the Engine Room:

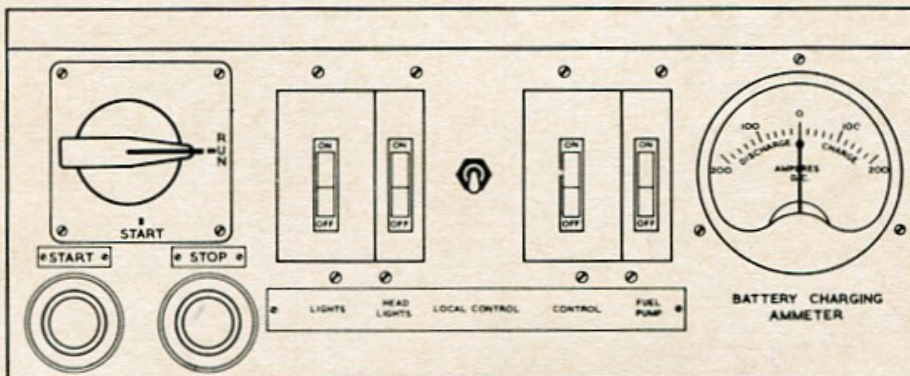
1. Check the engine cooling water temperature — should be 120 deg. F. before putting the engine on full load.



2. Release the handbrake.

In the Cab:

1. Turn the isolation switch to RUN — this is known as placing the engine "on the line."



STARTING AND STOPPING ENGINES

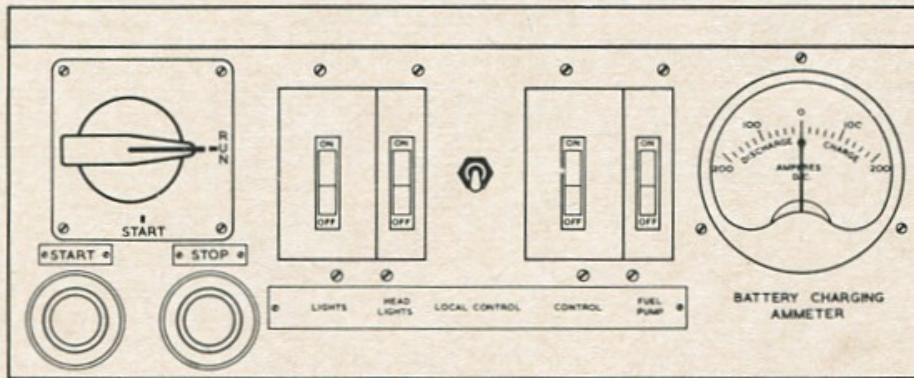
Giving Engine Control to the Driver—(Cont'd.)

2. Check the battery charging ammeter.

—Should read zero or show slight charge at all times with the engine running.

—Report if showing a discharge.

—Check periodically whilst running.



STARTING AND STOPPING ENGINES

STOPPING ENGINE

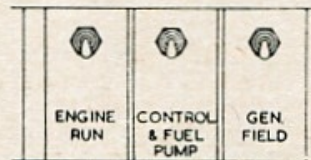
When stopping the Engine Normally:

In the Cab at Driver's Console:

1. Turn isolation switch to START. This is known as "isolating the engine" because it takes control away from the driver's controller.
2. Press the STOP button and hold until engine stops completely.
3. Place all switches on the driver's control panel in the OFF position.

In the Engine Room:

Open air box drain cocks.



On the Ground:

1. Drain condensate from main air reservoirs and air system drains.
2. Observe drainings from air box for presence of water.

NOTE: If a discharge as distinct from an air flow is observed at any time from the air box drain pipes with the drain cocks closed (discharge through overflow pipe) or if the presence of water is noted, the maintenance staff should be informed.

STARTING AND STOPPING ENGINES

Stopping Engine—(Cont'd.)

When Leaving the Locomotive:

After Shutting Down the engine.

1. Apply the hand brake.
2. Remove the reverser handle.
3. Check that all circuit breakers and switch on the isolation switch panel are OFF.
4. Open main battery switch.

Stopping and Starting Engines While Under Power in Multiple Unit Operation:

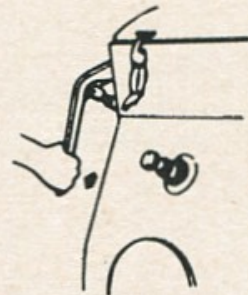
The power from any unit in a multiple consist may be isolated or taken "off the line" (engine stopped) or placed "on the line" (engine started) without stopping the train or reducing the throttle of other units.

Taking "Off the Line"

1. Manually operate the lay shaft lever to stop the engine.
2. Turn isolating switch to START position.

Placing "On the Line"

1. Start the engine in the normal manner.
2. Turn isolating switch to RUN position.

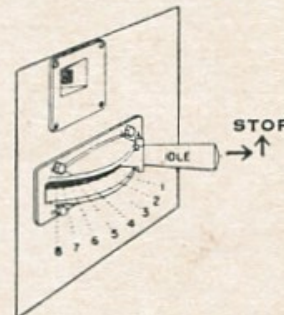


Emergency Stopping of Engines from Cab:

In the case of fire, collision or other emergency, all engines can be stopped from cab.

1. Pull the throttle lever out away from the controller and then move the throttle beyond IDLE to STOP.

NOTE: Do NOT move control switch to OFF until engine has stopped completely.



STARTING AND STOPPING ENGINES

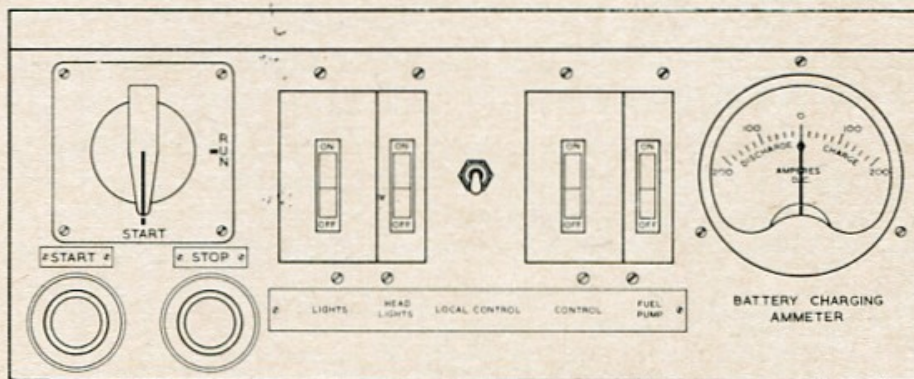
SAFETY PRECAUTIONS

To Kill High Voltage:

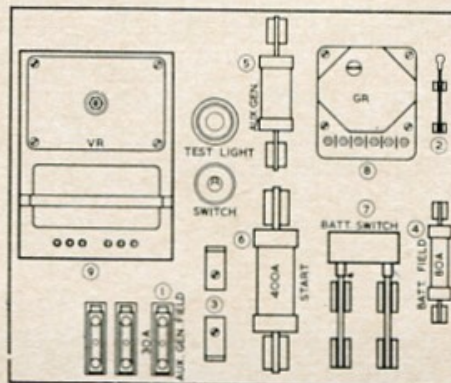
Turn the isolation switch to START.

To Kill Low Voltage:

1. Stop the Diesel engine.



2. Open battery knife switch in console top electrical cabinet.



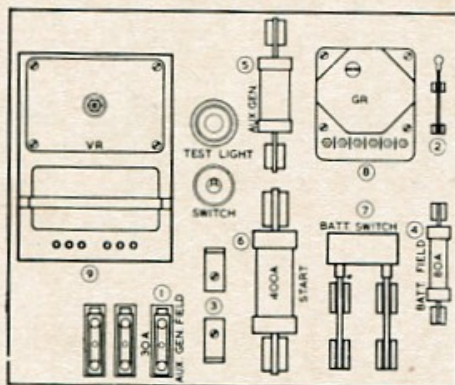
STARTING AND STOPPING ENGINES

Safety Precautions—(Cont'd.)

To Prevent the Engine Starting Accidentally:

To work safely without the danger of someone accidentally starting the engine—

1. Remove the 400 ampere starting fuse.

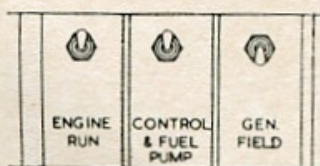
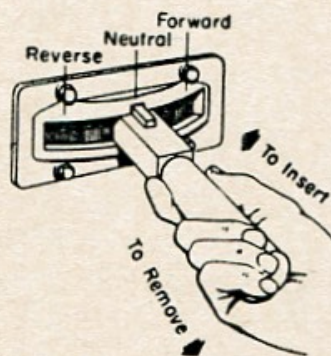


2. Place "DO NOT START" notice on isolation switch panel.

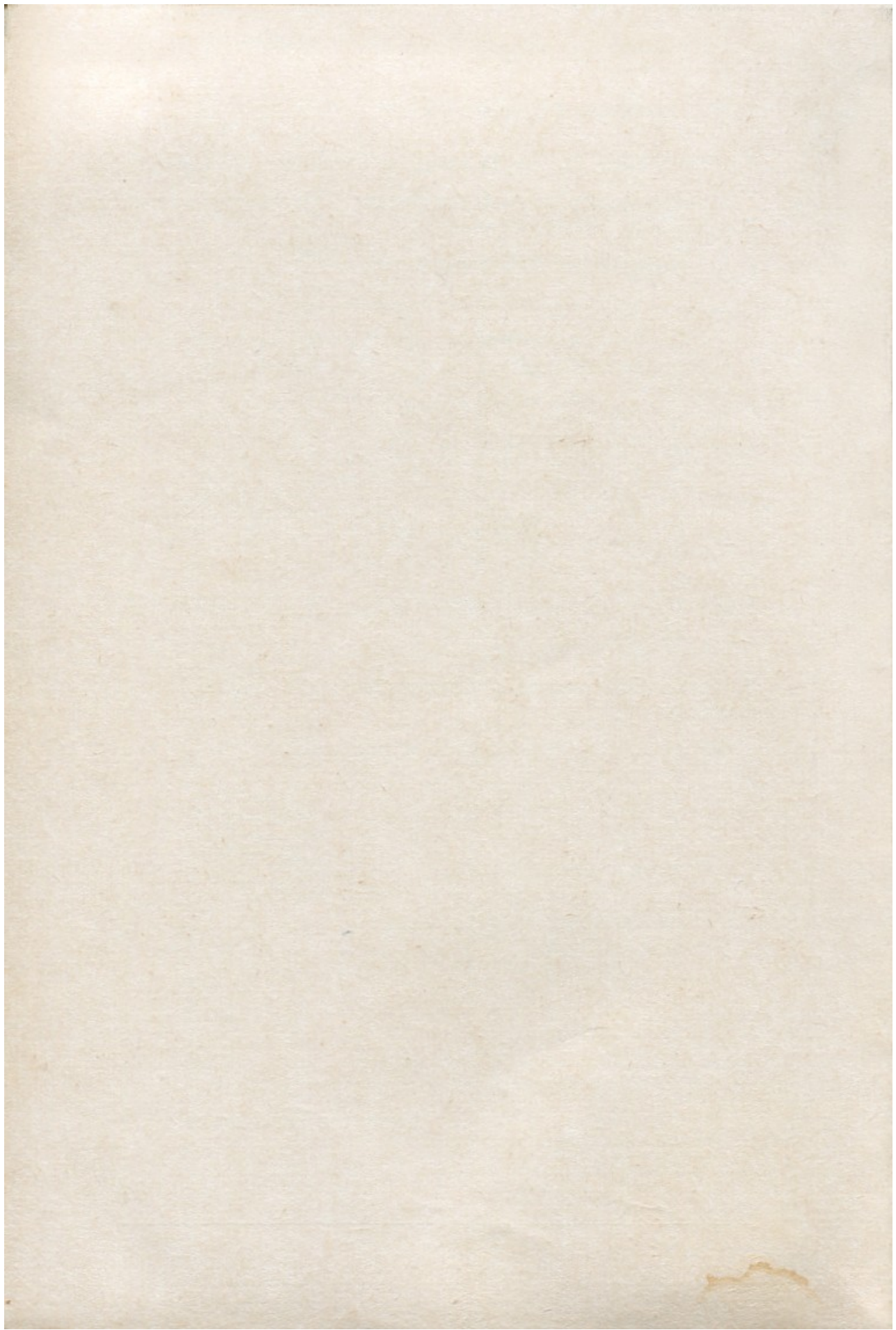
To Prevent Movement of Locomotive while Engine is Running:

Before leaving the locomotive unattended—

1. Remove reverser handle.
2. Place generator field switch in OFF position.



3. Apply the hand brake.



PART 3

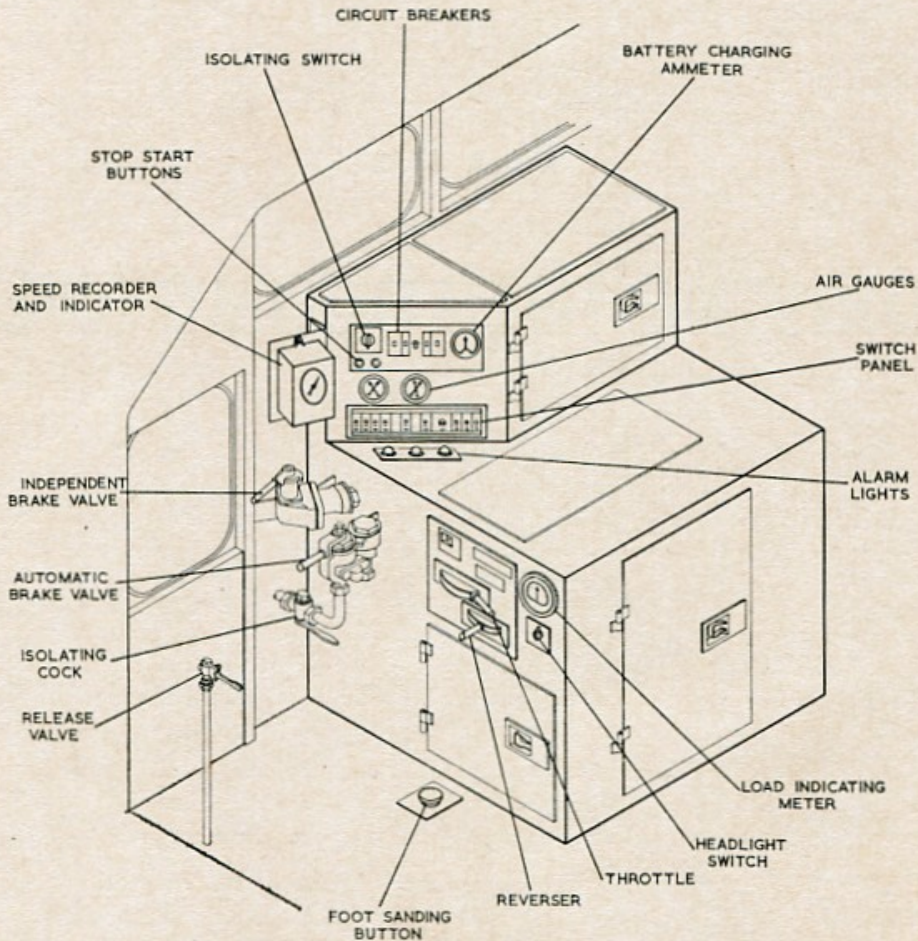
DRIVING THE LOCOMOTIVE

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DRIVING THE LOCOMOTIVE

HANDLING THE TRAIN



Starting Characteristics

Diesel locomotives have an extremely high starting tractive effort.

It is not necessary to bunch slack in making a start, but if slack is in the train, care must be taken to run the slack out gradually. Fast starts may jolt passengers and break trains.

DRIVING THE LOCOMOTIVE

Handling the Train—(Cont'd.)

To Start the Train

1. Release hand brake.
2. Insert the reverser handle.
3. Place generator field switch in ON position.
4. Move the reverser handle to FORWARD or REVERSE.
5. Release the train and locomotive brakes.
6. Open the throttle.

To Stop the Train

1. Close the throttle.
2. Apply the brakes.
3. If standing, move the reverse handle to NEUTRAL.

To Reverse the Train

1. Close the throttle.
2. Apply the brakes and wait until the locomotive STOPS.
3. Move the reverser handle to the opposite position.
4. Release the brakes.
5. Open the throttle.

NEVER MOVE THE REVERSER HANDLE WHEN THE LOCOMOTIVE IS MOVING.

To Pump Air

The diesel engine is mechanically connected to the air compressor.

To accelerate the pumping of air without applying power to the locomotive when train is STATIONARY.

1. Place the reverser handle in NEUTRAL.
2. Place the generator field switch in OFF position.
3. Open the throttle to not over NOTCH 4.

DRIVING THE LOCOMOTIVE

OPERATING PRECAUTIONS

Opening Throttle

The throttle should be opened one notch at a time with a pause between notches — If the throttle is opened too quickly, wheel slip may result.

Closing Throttle

It is possible to close the throttle to IDLE in one sweep, but this should not be done in normal handling. Close the throttle one notch at a time, allowing a pause between notches.

THE STOP FEATURE OF THE THROTTLE LEVER IS FOR EMERGENCY ONLY AND MUST NOT BE USED DURING NORMAL THROTTLE HANDLING.

The throttle should be closed before the brakes are applied.

Mechanical Interlocks between Throttle and Reverser

The levers on the controller are interlocked so that—

1. Throttle cannot be opened if Reverser handle is removed.
2. Reverser handle cannot be moved if Throttle is OPEN or in STOP.
3. Reverser handle cannot be removed or inserted unless Throttle is in IDLE.

Running through Water

If water is high enough to reach the wheel flanges, the locomotive speed should not exceed 3 m.p.h.

If water is above the rail level the locomotive must not proceed under any circumstances.

DRIVING THE LOCOMOTIVE

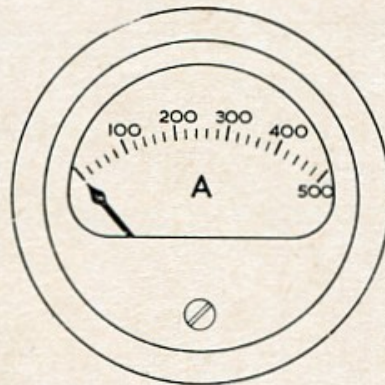
MISCELLANEOUS OPERATING INSTRUCTIONS

Load Indicating Meter

The amount of current showing on the meter is flowing to each traction motor.

Total main generator output in amperes is FOUR times the amount shown on the meter.

A high reading on the load indicating meter is permissible when starting a train, provided the pointer moves toward the continuous rating as the train accelerates and care is taken to avoid wheel slip.



Wheel Slip:

Flashing of the wheel slip light located on the control stand during power application indicates that wheels are slipping.



When Wheel Slip Occurs:

- Power to traction motors is automatically interrupted.
- Full power is reapplied when wheel slip stops.

If Wheel Slip Light Flashes Repeatedly:

1. Reduce throttle—one or two notches.
2. Apply sand.
3. Open throttle gradually.

Sand should be used to prevent slipping—not to stop it.

CAUTION:

If light persists, one set of wheels may be locked due to traction motor bearing failure.

DRIVING THE LOCOMOTIVE

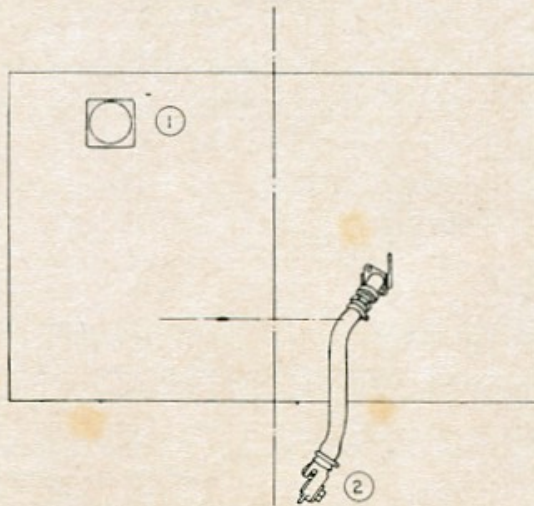
Miscellaneous Operating Instructions—(Cont'd.)

To Check:

Stop the train, then start slowly with someone on the ground to check if all wheels are rotating. If wheels are locked, notify the locomotive depot and do not attempt to move the locomotive.

MULTIPLE UNIT OPERATION

Two or more locomotives may be coupled together and operated from one cab.



The above sketch illustrates the connections for multiple unit operation as fitted to the locomotive.

1. Connect jumper cable between units.
2. Connect brake pipe and open cocks.

NOTE: Each engine must be started separately.

All isolation switches must be in RUN, all circuit breakers CLOSED and the local control switch must be ON in all cabs.

DRIVING THE LOCOMOTIVE

Multiple Unit Operation—(Cont'd.)

Changing Operating Cab

When the leaving cab —

1. Remove reverser handle.
2. Place the independent brake valve handle in the RELEASE position.
3. Make a FULL SERVICE application with the automatic brake valve and CLOSE brake valve isolating cock.
4. Place automatic brake valve handle in RELEASE position.
5. Place all switches on the driver's control panel in OFF position.
6. Proceed to cab at apposite end.

When Entering Cab:

1. Place switches on driver's control panel in ON position as for normal operation.
2. Insert reverser.
3. Place independent brake valve handle in FULL APPLICATION position.
4. Place automatic brake valve handle in RUN position.
5. Open brake valve isolating cock.
6. Proceed with normal locomotive operation.

NOTE: BRAKE VALVE ISOLATING COCK MUST BE OPEN IN OPERATING CAB AND CLOSED IN ALL TRAILING CABS.

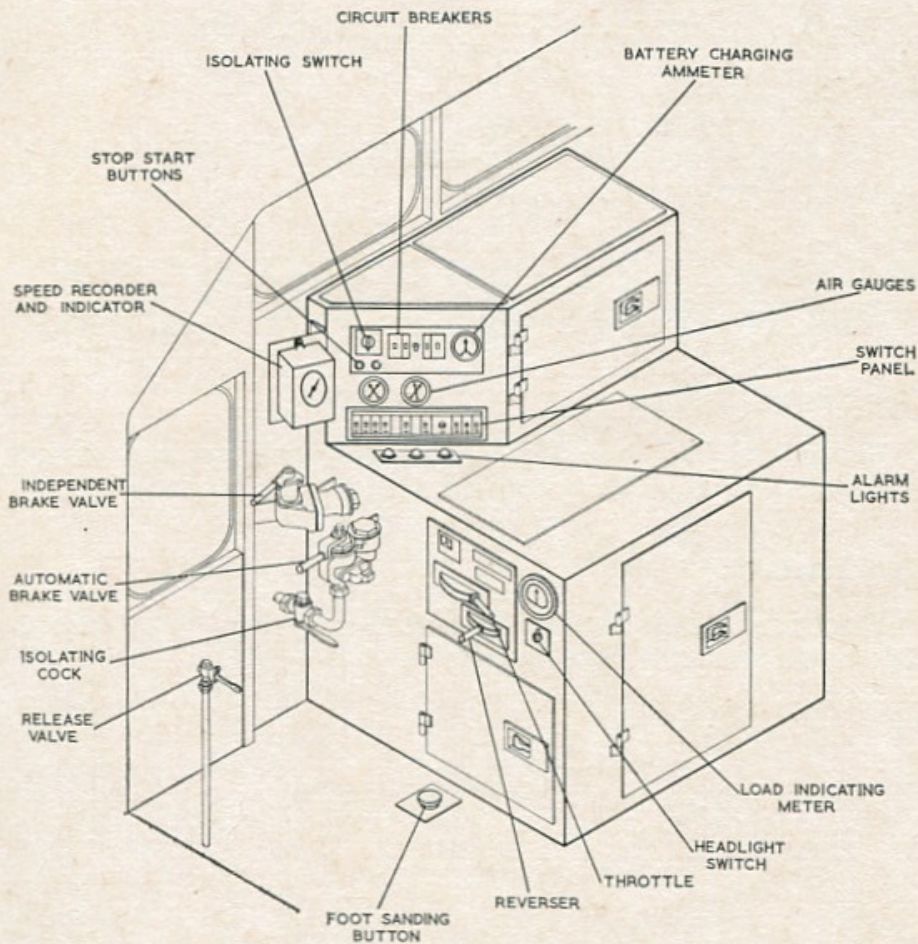
DRIVING THE LOCOMOTIVE

TOWING THE LOCOMOTIVE

1. Remove Jumper cable between units.
2. Remove the reverser handle from the controller.
3. Isolating switch should be in START position.
4. Local control switch must be OFF.
5. The brake valve isolating cocks should be closed.
6. Independent brake valve handle should be in RELEASE position.
7. Automatic brake valve handle should be in RELEASE position.
8. Examine all reverser contactors in the console side electrical cabinet to ensure that they are open.

DRIVING THE LOCOMOTIVE

MISCELLANEOUS CAB EQUIPMENT



Switches on the driver's control panel are not circuit breakers.

Circuit breakers are on the isolation switch panel.

When circuit is overloaded, circuit breakers move toward OFF position.

To reset, move to OFF position, then to ON.

DRIVING THE LOCOMOTIVE

Miscellaneous Cab Equipment—(Cont'd)

Air Gauges:

Standard gauges, clearly labelled as to function.

Speedometer:

The speedometer is located so that it is clearly visible to the driver.

Horn Valve:

Horns are operated by pull cords in the cab ceiling.

Windscreen Wipers:

There are four windscreen wipers, one on each front and rear window. They can be operated independently.

Cab Heaters:

Electrical strip heaters are provided for cab heating. Operating switches are located at the heaters.

PART 4

LOCOMOTIVE SYSTEMS

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"Home of the Diesel Locomotive"

LOCOMOTIVE SYSTEMS

COLOUR CODING

All piping in the locomotive car body is colour coded at connections, elbows, tee pieces, etc., so that each of the four locomotive systems may be readily identified.

Cooling system (Water) — BLUE

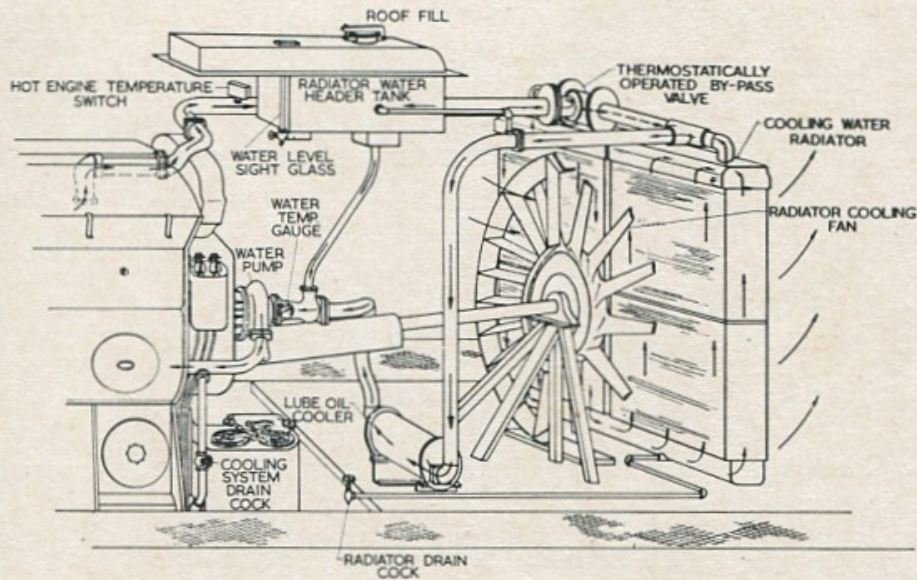
Lubricating system (Oil) — YELLOW

Fuel system — RED

Air system — GREEN

LOCOMOTIVE SYSTEMS

COOLING SYSTEM



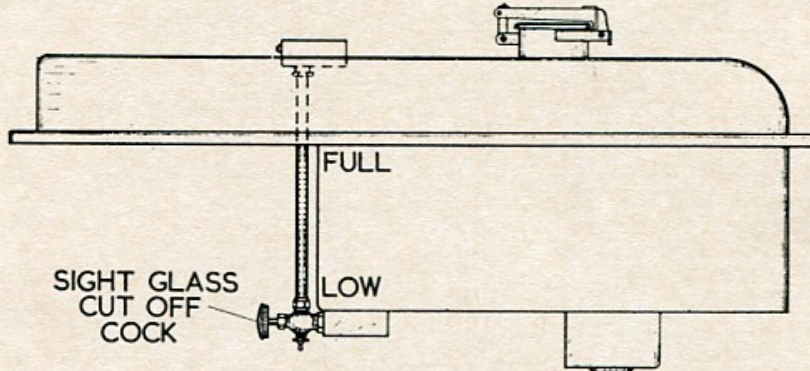
Path of the Water

1. The PUMP forces water through the engine.
2. Heated discharge water from the engine flows to the RADIATORS.
3. A COOLING FAN directly driven from the engine causes air circulation through the radiators to cool the water.
4. Water from the radiators passes through the LUBRICATING OIL COOLER before returning to the engine pump.
5. A thermostatically operated BY-PASS VALVE at the radiator cooling water inlet controls water flow through the radiator to maintain a constant engine water temperature.
6. A WATER HEADER TANK provides a reserve of cooling water to make up for losses and maintains a positive head on the water system.

LOCOMOTIVE SYSTEMS

Cooling System—(Cont'd)

Checking the Water Level:



Open the water level sight glass cut off valve to check water level.

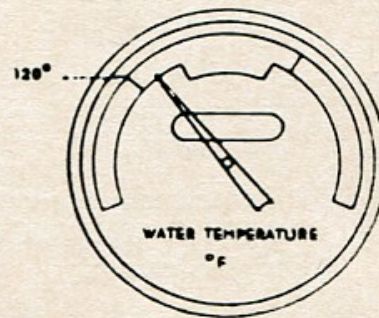
If water is not evident in the sight glass do not start the engine until maintenance staff have checked for internal or external water leaks.

Water level should be maintained so that water is between FULL and LOW marks in the sight glass.

Water Temperature:

This should be at least 120 deg. F. before putting the engine on full load.

- Alarm bell rings at 210 deg. F.
- Engine should not be operated with water boiling.



Water Treatment:

The water used in the Diesel locomotive cooling system is treated with a special compound to reduce mineral deposits and resist corrosion. This treatment is different from that used for steam locomotives. For this reason, the system should be filled ONLY where this special water is available.

LOCOMOTIVE SYSTEMS

Cooling System—(Cont'd)

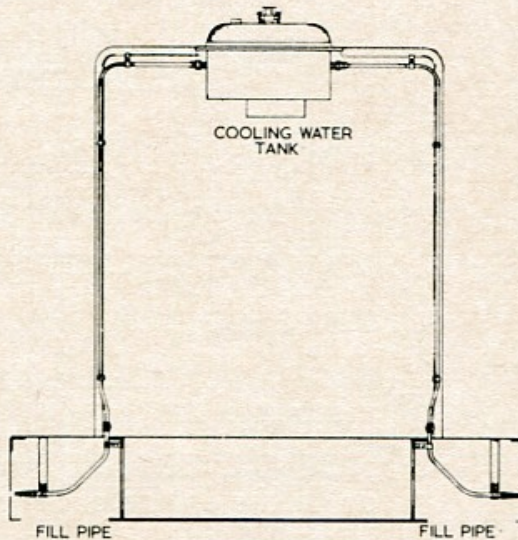
Only in an emergency should ordinary water be used and should such an occasion arise, the maintenance staff should be informed as soon as possible.

Treated water must not be used for drinking or washing.

Filling the System:

The system is filled either through the filler cap located on the roof of the locomotive above the water tank or through the filler pipes on either side of the unit. To fill the system proceed as follows (steps 1 to 3 are necessary only when filling a dry or nearly dry engine):

1. Stop Engine.
2. Fill slowly until water runs out the filler pipe on the side of the locomotive or shows FULL on the sight glass.
3. Start engine and run for several minutes. This will eliminate any air pockets in the system.



4. With engine at idle add further water if required until water runs out the filler pipe on the side of the locomotive or shows FULL on the sight glass.

If the cooling system of a hot engine has been drained, do not refill immediately with cold water. If this is done, the sudden change in temperature might crack or warp the cylinder liners and heads.

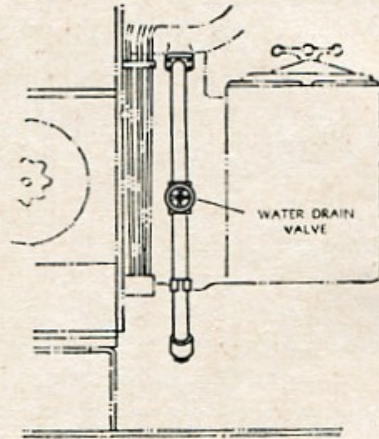
DO NOT FILL HOT ENGINES WITH COLD WATER

LOCOMOTIVE SYSTEMS

Cooling System—(Cont'd)

Draining the System:

Remove plugs from engine room floor drain and open engine water drain valve adjacent to lubricating oil strainer box.

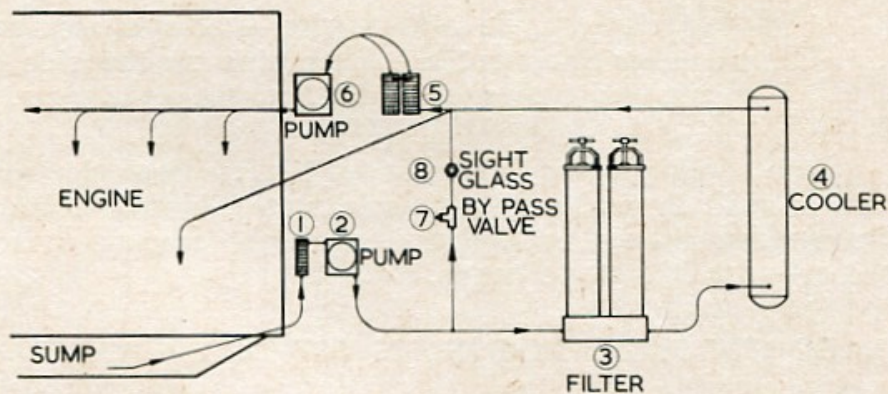


LUBRICATION SYSTEM

Path of the Oil:

Oil from the engine sump is drawn through the:

1. SCAVENGE OIL STRAINER by the
2. SCAVENGE PUMP which delivers oil to the
3. MICHIANA FILTER where the oil is cleaned before passing to the
4. LUBE OIL COOLER where heat in the oil is given up to the engine cooling water. The Pressure pump.



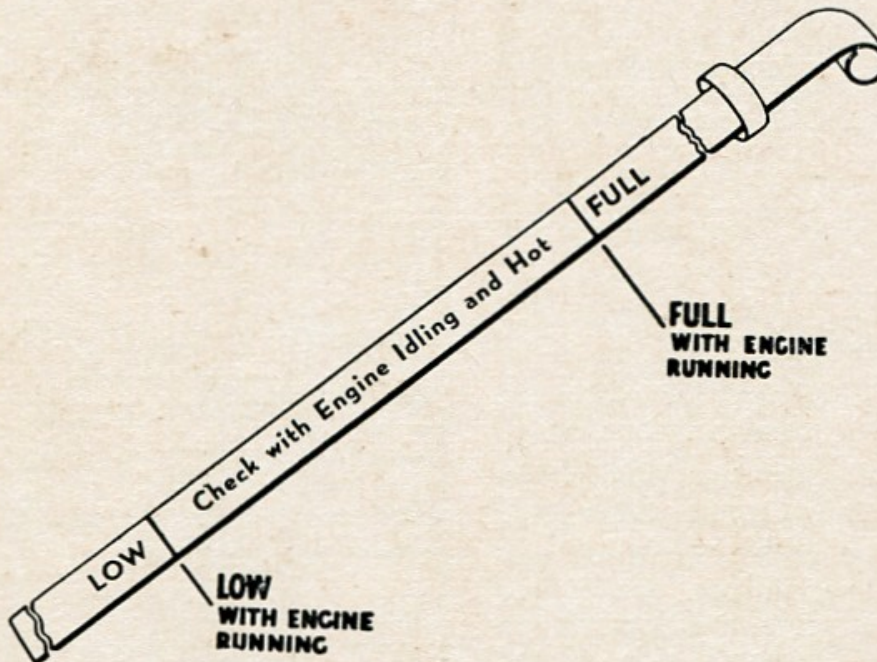
LOCOMOTIVE SYSTEMS

Lubrication System—(Cont'd.)

5. SUCTION STRAINERS prevent particles from damaging the
6. PRESSURE PUMP which delivers oil to the engine where it lubricates and cools the engine parts — Surplus oil overflows to the engine sump. A by-pass fitted with a
7. BY-PASS valve and
8. SIGHT GLASS is connected between the inlet to the lube oil filter and the discharge side of the lube oil cooler and permits circulation of cold oil or oil volume in excess of filter capacity.

Checking the Oil Level:

Check with engine idling and at operating temperature.



Oil Pressure:

If pressure falls dangerously low or suction is too high, engine will shut down.

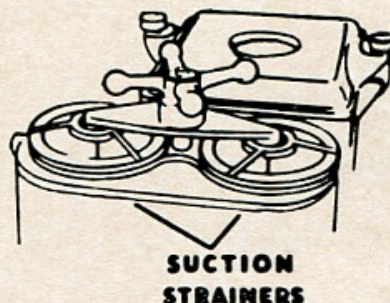
LOCOMOTIVE SYSTEMS

Lubrication System—(Cont'd.)

Low oil pressure may indicate a low oil level.

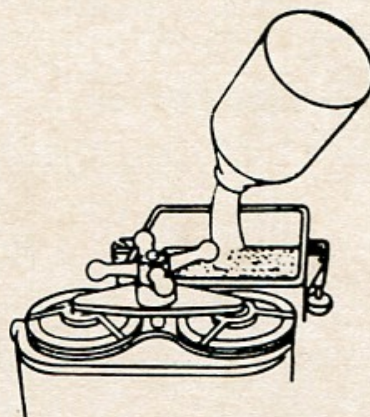
High suction usually indicates dirty suction strainers.

Strainers cannot be removed unless engine is shut down.



Filling the System:

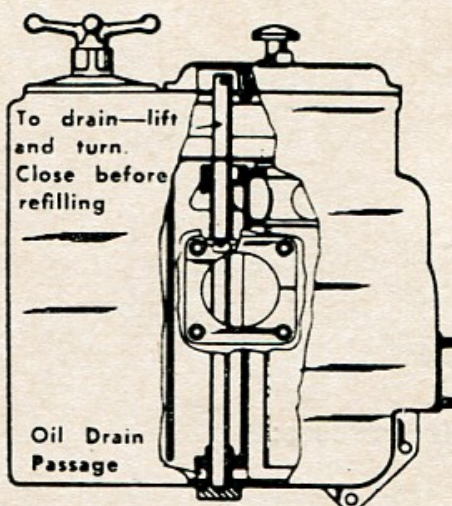
1. Remove the square cover on the oil strainer box.
2. Pour in oil until it reaches the correct level.



Draining the Oil:

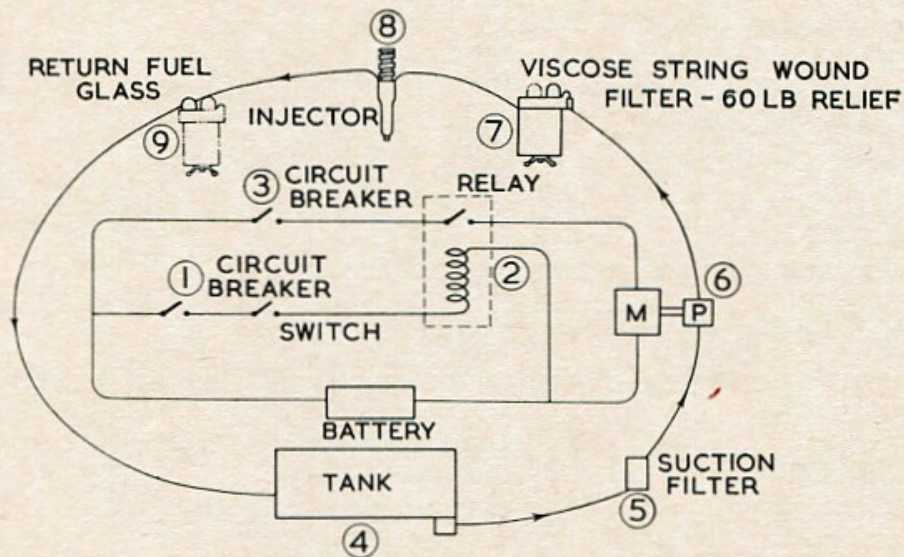
1. Open the valve in strainer housing.
2. Remove plug from oil pan drain and open valve.

The oil pan drain plug and valve are located on the fireman's side of the locomotive towards the rear of the fuel tank and behind the side apron.



LOCOMOTIVE SYSTEMS

FUEL SYSTEM



Path of the Fuel:

1. The CONTROL circuit breaker and CONTROL and FUEL PUMP switch in the cab close the circuit to
2. the FUEL PUMP RELAY.
3. When the FUEL PUMP CIRCUIT BREAKER is ON, the fuel pump will run.
4. The TANK where the fuel is stored supplies fuel through
5. the SUCTION FILTER to protect
6. the PUMP, which delivers fuel through
7. VISCOSE STRING WOUND filters where all remaining foreign matter is removed before fuel goes to
8. the INJECTORS. The injectors measure, time and atomise the fuel while injecting it into the cylinders.
9. The SIGHT GLASS shows surplus fuel returning to the tank. This provides a visual indication of fuel flow.

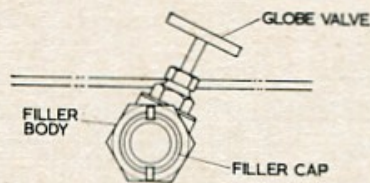
LOCOMOTIVE SYSTEMS

Fuel System—(Cont'd)

The glass next to the engine must be full and clear. If there is any flow of fuel through the adjacent (right hand) glass, the maintenance staff must be notified.

To Fill the Tank:

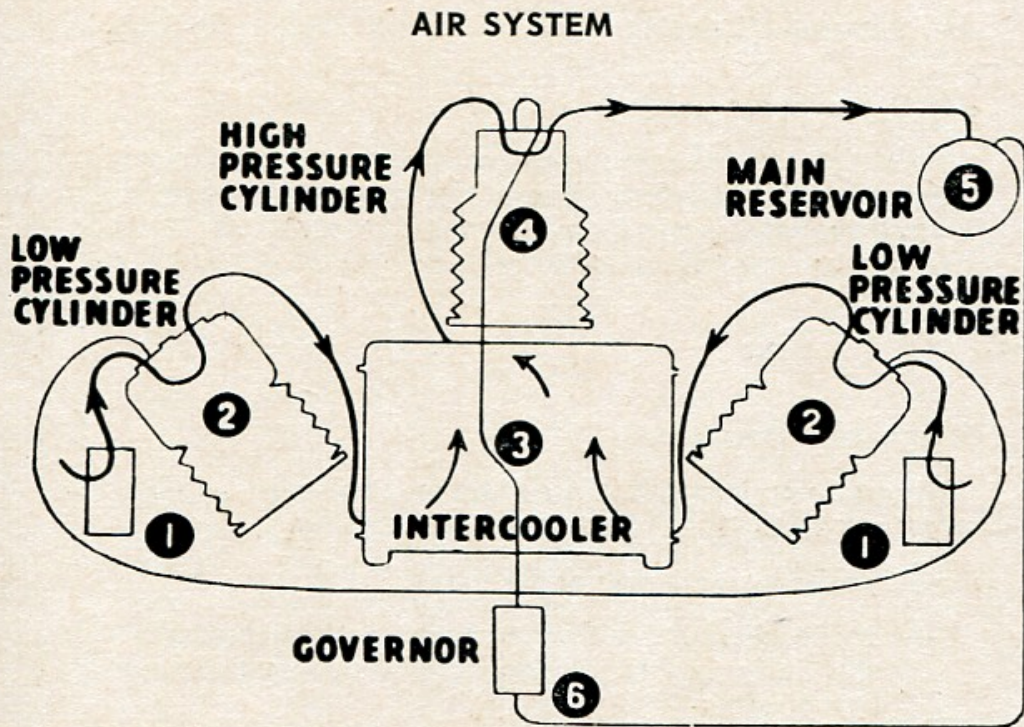
1. Remove filler cap on either side of the locomotive.
2. Attach fuelling hose to tank filler.
3. Open valve behind filler.
4. Fill until fuel shows in tank sight glass at the desired level.
5. CLOSE valve behind filler.
6. Detach fuelling hose and replace filler cap.



KEEP OPEN FLAMES AWAY WHEN FILLING.

In case of fire, switch the fuel pump circuit breaker OFF.

LOCOMOTIVE SYSTEMS



Path of the Air:

1. The AIR FILTER cleans the air before passing it to
2. the LOW PRESSURE CYLINDERS. Air is pumped up to about 30 lbs. pressure and discharged into
3. the INTERCOOLER. Here the air is cooled and discharged to
4. the HIGH PRESSURE CYLINDER, whence it is discharged at about 120 lbs. pressure into the MAIN RESERVOIR.
5. When the MAIN RESERVOIR reaches its maximum pressure, it unseats a piston in
6. the AIR COMPRESSOR GOVERNOR.
7. The UNLOADER LINES carry air pressure to the unloader pistons — the pressure in the unloader lines holds the suction valves off their seats. Thus no air is compressed as the compressor rotates. The air goes in and out through the breathers.

LOCOMOTIVE SYSTEMS

Air System—(Cont'd)

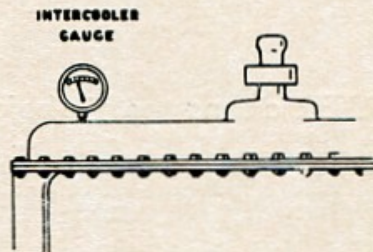
Air Compressor Loaded:

When the pressure in the main reservoir is reduced, a spring in the governor forces the governor piston down and closes off the air from the main reservoir. This causes the suction valves to seat and the compressor to start pumping.

Intercooler Pressure:

Intercooler gauge should register approximately 30 lbs. pressure when the compressor is pumping.

- Relief Valve is set at 50 lbs.
- If the pressure with the compressor pumping is substantially higher or lower than 30 lbs., it should be reported.



Main Reservoir Pressure:

Pressure should be 110 to 120 lbs.

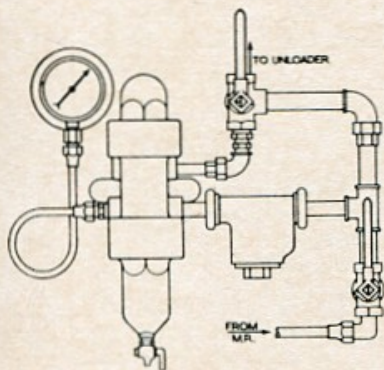
- Control is automatic, but can be controlled manually.

Manual Control of Air Pumping:

In emergencies it may be necessary to control the loading and unloading of the compressor manually.

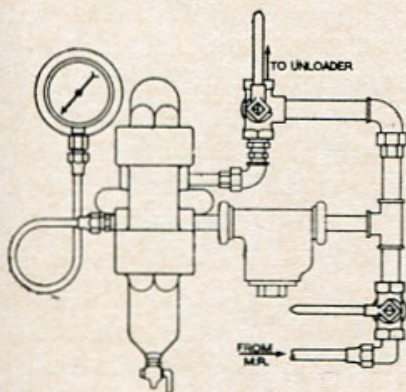
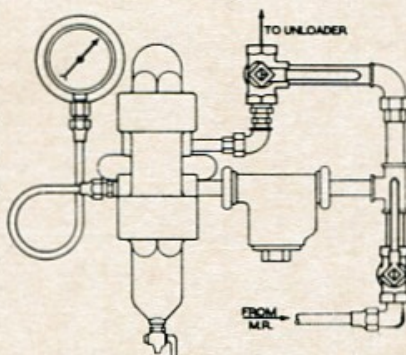
LOCOMOTIVE SYSTEMS

Air System—(Cont'd.)



1. Normal Operation — The governor controls the compressor — Valves should be as indicated in the diagram.

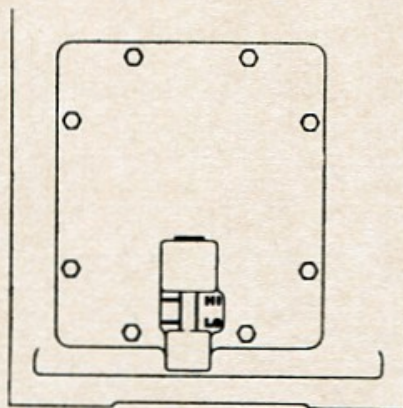
2. Permanently Unloaded — by turning the by-pass valve handle horizontal, air from the main reservoir goes direct into the unloader line, this prevents the compressor from pumping.



3. Permanently Loaded — By turning the governor cut-off valve horizontal, air from the main reservoir is cut off from the governor and unloader lines. The compressor will pump continuously. Pressure will go up to the safety valve limit of 150 lbs.

Lubricating Oil System:

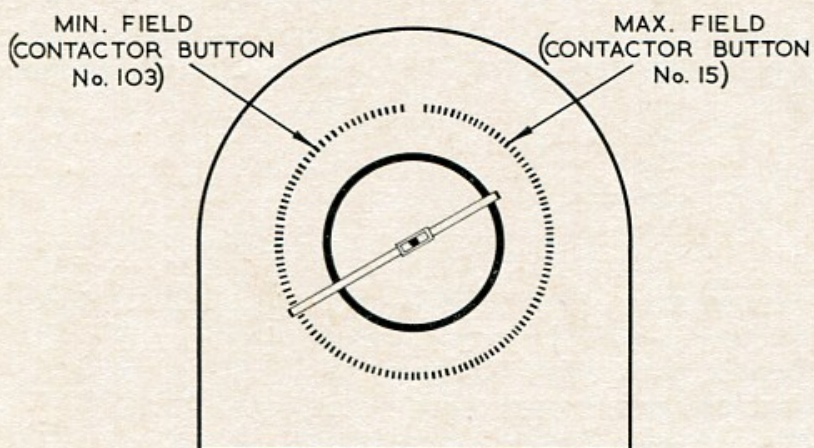
Oil level should be visible with locomotive on level track.



LOCOMOTIVE SYSTEMS

GENERATOR LOAD CONTROL

Load Regulator:



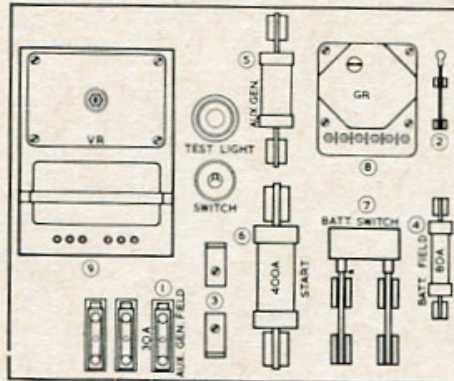
The load regulator is located on the right-hand side of the locomotive at the rear of the equipment rack. Its function is to control automatically the loading of the engine by the main generator, so that a predetermined power output is obtained for each position of the throttle. The load regulator is an automatically operated rheostat connected in series with the main generator battery field. (This is a low voltage externally excited field).

The load regulator is in minimum field when the contact arm is in the ten o'clock position. Maximum Field is obtained when the brush arm is in the two o'clock position.

LOCOMOTIVE SYSTEMS

ELECTRICAL CONTROLS

Console Top Electrical Cabinet (Auxiliary Distribution Panel)

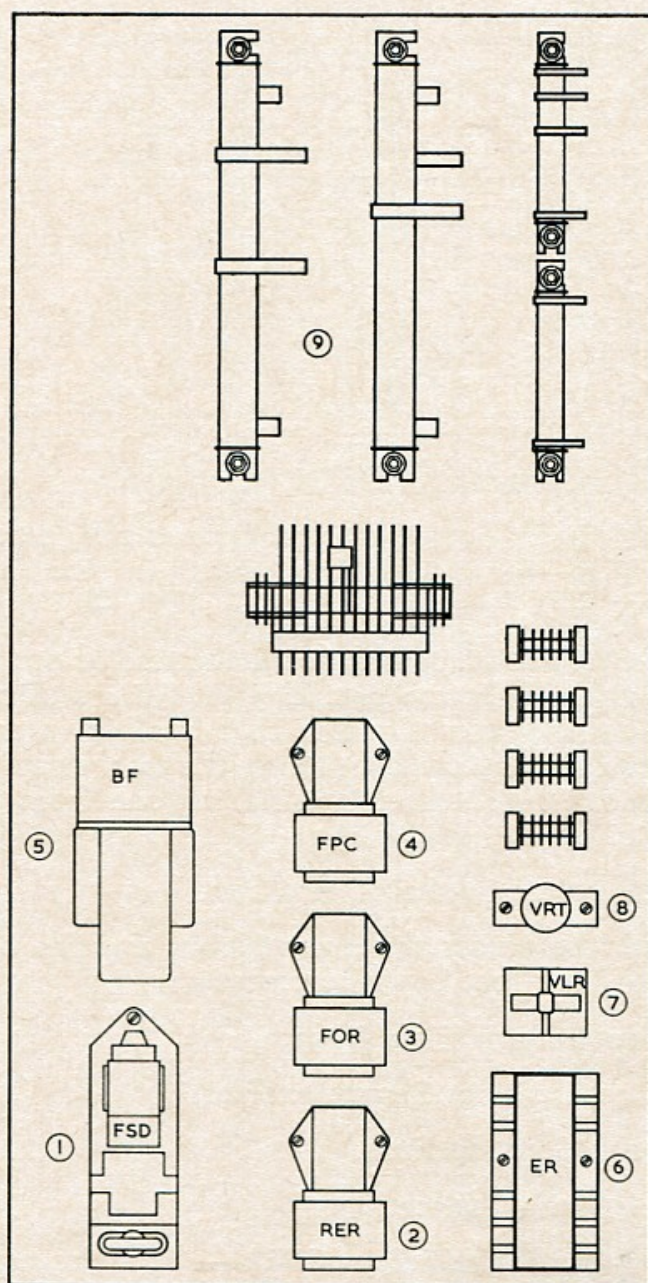


1. Auxiliary Generator Field 30 Amp Fuse.
2. Ground Relay Cutout—To be opened only as directed.
3. Fuse Test—Fuses may be tested in the following manner —
 - (a) Switch on small switch above the test points and fuse test light at the top should light. Failure of this bulb to light indicates that the bulb has blown and must be replaced before continuing the test, a replacement bulb can be obtained by utilising one from the step lights.
 - (b) Place switch in the off position.
 - (c) Place fuse across the brass blocks and the bulb will light if the fuse is satisfactory.
4. 80 Amp Battery Field Fuse.
5. 150 Amp Auxiliary Generator Fuse.
6. 400 Amp Starting Fuse.
7. Battery Knife Switch.
8. Ground Protective Relay (GPR) — Provides protection for equipment against earthing of high voltage.
9. Voltage Regulator (VR) — Maintains the auxiliary generator output at a fixed voltage.

LOCOMOTIVE SYSTEMS

Electrical Controls—(Cont'd.)

Console Bottom Electrical Cabinet (Distribution Panel)



LOCOMOTIVE SYSTEMS

Electrical Controls—(Cont'd.)

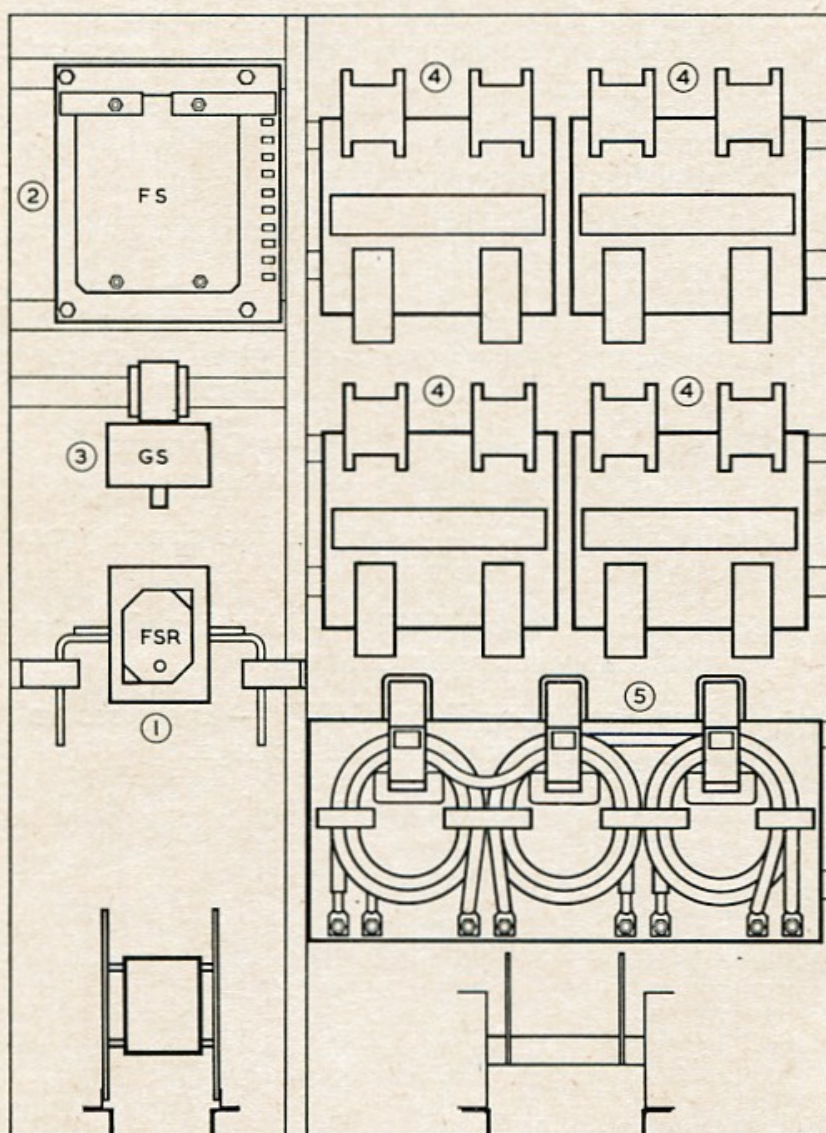
Console Bottom Electrical Cabinet (Distribution Panel)

1. Field Shunt Delay Relay (FSD) — Delays closing of Field Shunting contactors until main generator output is reduced.
2. Reverse Relay (RER) — Controls the low voltage circuits for reverse travel.
3. Forward Relay (FOR) — Controls the low voltage circuits for forward travel.
4. Fuel Pump Contactor (FPC) — Connects the fuel pump to the battery and is energised when the control and fuel pump switch is closed.
5. Battery Field Contactor (BF) — Connects the main generator battery field to low voltage.
6. Engine Relay (ER) — Controls the circuit from the throttle to the governor.
7. Voltage Limit Relay (VLR) — Limits main generator voltage to predetermined limits.
8. Voltage Regulating Tube (VRT) — Energises voltage limit relay at predetermined voltage.
9. Transition Setting Resistors.

LOCOMOTIVE SYSTEMS

Electrical Controls—(Cont'd.)

Console, Side Electrical Cabinet

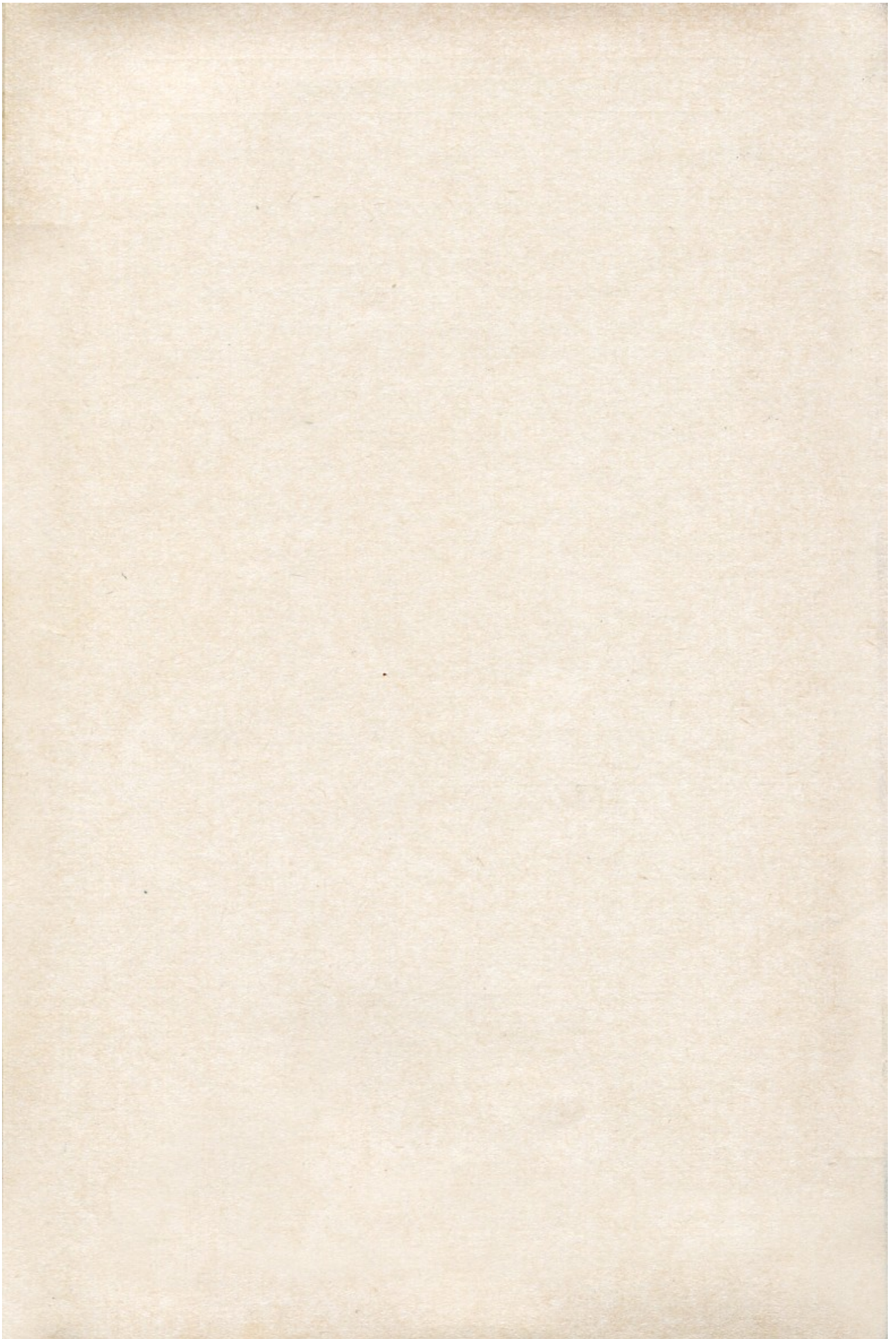


1. Field Shunting Relay (FSR) — Operates at pre-determined main generator and current and voltage conditions to cause traction motor fields to be shunted.

LOCOMOTIVE SYSTEMS

Electrical Controls—(Cont'd.)

2. Field Shunting Contactor (FS) — Connects shunts across the traction motor field windings.
3. Starting Contactor (GS) — Connects the battery to the main generator for turning the engine over.
4. Reverser Contactors — Change traction motor connections to reverse the direction of the locomotive.
5. Wheel Slip Relays (WSR) — Light the cab indicator and reduce power to the traction motors when wheels slip.



PART 5

TROUBLE SHOOTING

**THE CLYDE ENGINEERING COMPANY PTY. LTD.
AUSTRALIA**

"Home of the Diesel Locomotive"

TROUBLE SHOOTING

ENGINE WILL NOT START

Engine Will Not Turn Over

Check:

1. Isolation switch — must be in START.
2. Control circuit breaker on isolation switch panel — must be ON.
3. Control switch on driver's control panel — must be ON.
4. Main battery switch — must be CLOSED.
5. 400 amp. starting fuse. (Refer para. 3, page 53.)

Engine Rotates, but Will Not Fire

Check:

1. Fuel flow through sight glass.

NOTE: If there is no flow through the sight glass next to the engine the $\frac{1}{2}$ " globe valve in the supply line near the fuel tank may be closed — OPEN this valve and again check the sight glass for fuel flow.

2. Low oil pressure button on governor.
3. Overspeed trip.

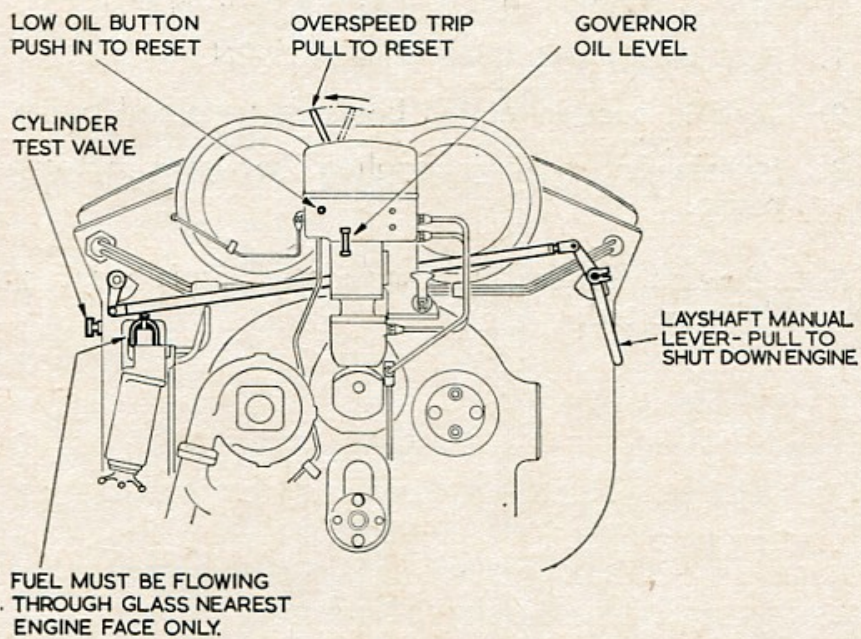
If the engine starts, but stops as soon as the Isolation Switch is turned to RUN, the throttle may be in the STOP position.

TROUBLE SHOOTING

OVERSPEED TRIP

Operates at Approximately 910 RPM.

- Fuel is stopped at injectors.
- Engine cannot be started until overspeed trip is reset.
- PULL LEVER ANTI-CLOCKWISE TO RESET.
- Start engine in usual manner.



TROUBLE SHOOTING

FUEL FLOW

Normally a good flow of fuel, clear and free from bubbles, should be indicated in the return sight glass.

If no fuel flow, check:

1. Fuel supply.
2. Control circuit breaker and switch — must be ON.
3. Fuel pump and motor.
4. $\frac{1}{2}$ " globe valve near fuel tank — must be OPEN.

If motor is running, but fuel is not flowing check:

1. Fuel supply and globe valve is OPEN
2. Leak in suction piping between tank and pump.
3. Broken or slipping coupling between motor and pump.

Fuel flowing through by-pass (right hand) sight glass should be reported.

TROUBLE SHOOTING

LOCOMOTIVE FAILS TO RESPOND

Engine Will Not Speed Up When Throttle Is Opened

Check:

1. Isolation switch — must be in RUN.
2. Control circuit breaker — must be ON.
3. Control and engine run switches — must be ON.
4. Ground protective relay — must be set.

Engine Speeds Up, but Locomotive Will Not Move When Throttle Is Opened

Check:

1. Reverser handle — must be in FORWARD or REVERSE.
2. Generator field switch on driver's control panel — must be ON.
3. Hand and air brakes must be released.
4. 80 amp. battery fuse.
5. Local control circuit breaker must be ON.

Engine Goes to Idle

Check:

1. Ground protective relay.
2. Control and fuel pump and engine run switches on driver's control panel — must be ON.
3. Isolation switch must be in RUN.
4. Control circuit breaker may be tripped.

Engine Stops

Check:

1. Throttle — may be in STOP position.
2. Fuel pump circuit breaker on isolation switch panel.
3. Control and engine run switches on driver's control panel.
4. Ground protective relay.
5. Overspeed trip.
6. Low oil pressure button.

TROUBLE SHOOTING

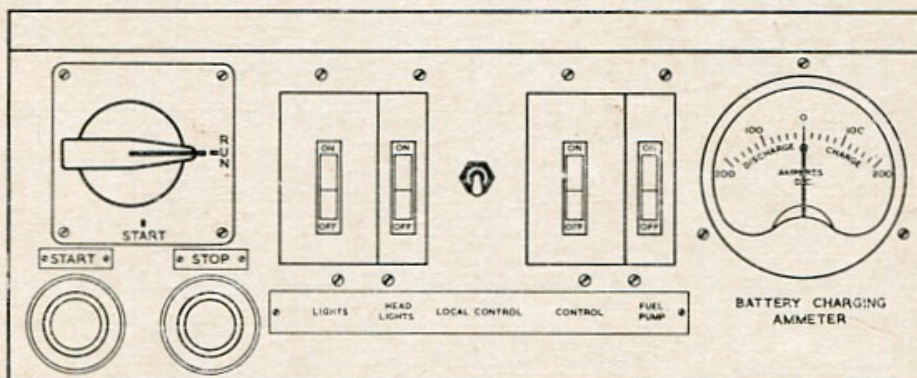
BATTERY CHARGING AMMETER

If Ammeter Shows a Continuous DISCHARGE with the Engine Running —

Check:

Caution:— Engine should be stopped before removing the 150 amp. Auxiliary Generator Fuse or the 30 amp. Auxiliary Generator Field Fuse.

1. Auxiliary generator field 30 amp. fuse.
2. Battery charging (Auxiliary generator) fuse — 150 amp.



ALARMS

The alarm bell is located in the cab on the partition between cab and engine room.

Alarm Lights

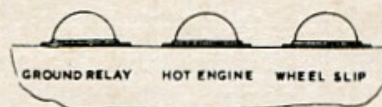
— Situated on the driver's control panel.

1. Ground relay (main generator earthed).
2. Hot engine.

In multiple unit operation —

— Alarm bell rings in all units.

— Light shines ONLY in unit having fault.



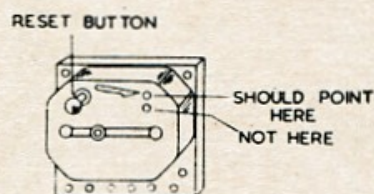
TROUBLE SHOOTING

Alarms (Cont'd.)

Ground Protective Relay

Engine will return to idle or will stop if throttle is in notches 5 or 6.

Main Generator output is reduced to zero. Alarm bell will ring and ground relay light will shine.



To Reset:

1. Isolate engine, reset by pushing button in to move pointer from red to yellow dot on cover.
2. Put engine on the line and if relay continues to trip (pointer moves to red dot) do not use the power in this unit.

Hot Engine

When engine water temperature is 210 deg. F. at outlet. Red light comes on and alarm bell will ring.

— Isolate engine and investigate cause.

Light goes out and bell stops ringing when engine water temperature drops to 200 deg. F.

Engine control is not interrupted in the case of a hot engine alarm.

Low Oil Pressure or High Suction (No Light)

Low oil pressure button on governor moves out and coloured band appears. Alarm bell will ring and engine will shut down.

1. Isolate engine and reset low oil pressure button.
 2. Check oil level and condition.
 3. Start engine.
- If fault still exists, engine will shut down after approximately 40 secs. running at idle speed.
- If an attempt is made to run the engine above idle speed during the delay period, engine will shut down immediately.

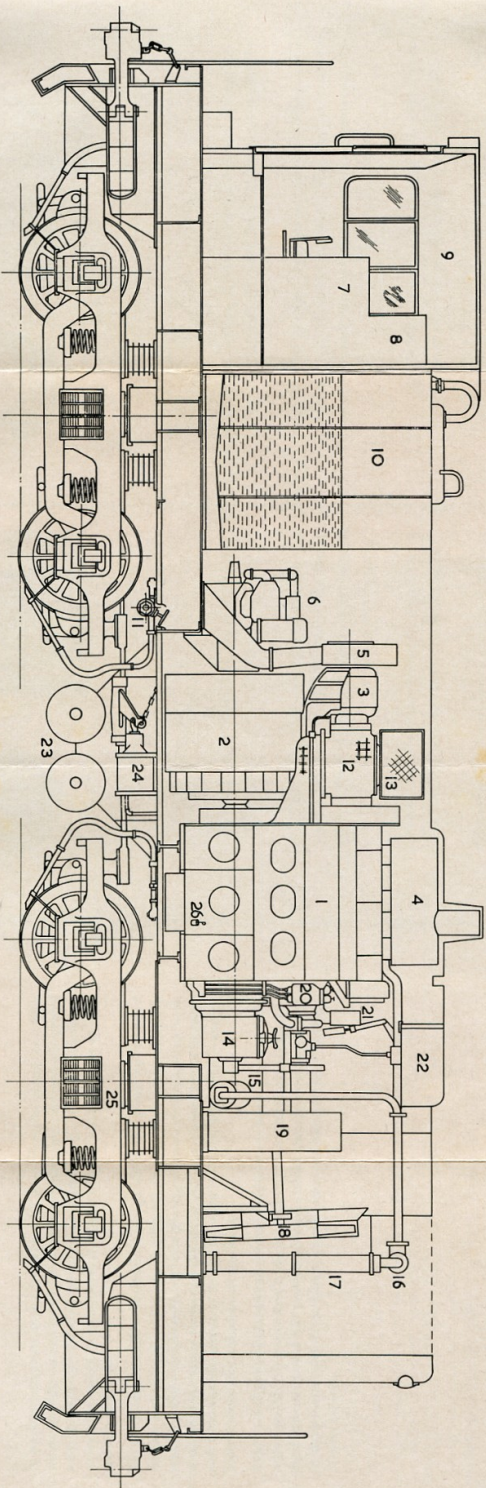
NOTE: DO NOT REPEATEDLY START ENGINE IF LOW OIL PRESSURE BUTTON KEEPS SHUTTING DOWN THE ENGINE.

GENERAL SPECIFICATIONS

G6B — 650/600 H.P. LOCOMOTIVE

Engine	6-567C
Main Generator	D25C
Approx. weight (fully loaded)	64 tons
Number of Drivers	8
Fuel Oil	1000 Imp Gal
Lubricating Oil	103 Imp. Gal
Cooling Water	130 Imp. Gal
Sand	16 cu. ft.
Bogie Centres	20'0"
Driving Wheel Diameter	42"
Bogie Rigid Wheel Base	8'6"
Minimum Curve Radius	3 ch.
Length over Headstocks	40'0"
Height over Rail Level	13'9"
Width over Handrails	9'7"
Gear Ratio	74/23
Max. Permissible Track Speed	45 m.p.h.

SECTIONAL ELEVATION



- | | | | | |
|-----------------------------|---------------------------|-----------------------------|------------------------|--------------------------------|
| 1 ENGINE - EMD MODEL 6-567C | 7 DRIVERS CONTROL CONSOLE | 13 ENGINE AIR FILTERS | 19 No. 2 T. M. BLOWER | 25 BOGIE - 4 WHEEL 2 MOTOR |
| 2 MAIN GENERATOR | 8 ELECTRICAL EQUIPMENT | 14 LUBE OIL STRAINER | 20 FUEL FILTER | 26 ENGINE DIP STICK (FAR SIDE) |
| 3 AUXILIARY GENERATOR | 9 CAB | 15 LUBE OIL COOLER | 21 ENGINE GOVERNOR | |
| 4 EXHAUST MANIFOLD | 10 FUEL TANK | 16 THERMOSTAT BY-PASS VALVE | 22 ENGINE WATER TANK | |
| 5 No. 1 T. M. BLOWER | 11 FUEL FILLER | 17 ENGINE COOLING RADIATORS | 23 MAIN AIR RESERVOIRS | |
| 6 AIR COMPRESSOR - WXE | 12 ENGINE BLOWER | 18 ENGINE COOLING FAN | 24 BRAKE CYLINDER | |

