NEW SERIES-8
DIESEL-ELECTRIC
LOCOMOTIVE

COVERS ALL MODELS
B23-8 THROUGH C39-8

GENERAL ELECTRIC
### General Data

<table>
<thead>
<tr>
<th>Model</th>
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### Weight

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<tr>
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<th>F/13</th>
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<td>Per axle (pounds) maximum and minimum</td>
<td>33,125/30,000</td>
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<td>33,125/30,000</td>
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<tr>
<td>Total (pounds maximum and minimum)</td>
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<td>Effective Weight (pounds)</td>
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<td>33,125/28,000</td>
<td>33,125/28,000</td>
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<td>Station at 25% Acceleration</td>
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<td>Gross Speed (mph)</td>
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### Gear Ratio and Max Speed

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### Compressors

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### Air Filtration Devices

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### Engine Room Equipment

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<tr>
<td>Engine Generator Pressurizer</td>
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<td>33,125/30,000</td>
<td>33,125/30,000</td>
<td>33,125/30,000</td>
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</table>
power on emergency shutdown.
The handle can be moved out of IDLE position for
1. The Reverse handle must be inserted before the Timer

Interlocking between Hands

- Interlocking between the hands of the Master Controller

Reverse Handle

- Reverse handle
- Operated with a handwheel. Dynamic Braking handle
- Used to control the locomotive during operation. It is
- Operated to control the locomotive during operation.

Master Controller

- The Master Controller is a selector switch used by the
- Device on control console

Devices on control console

(FIG. 2)

NOTE: Customer equipment requirements often

Introduction

Operating Controls

OPEH5270
NOTICE: In a fault condition, the reverse handle must be in the forward position and the braking handle is in OFP position.

Operating Controls

Operation

1. Reverse handle in OFP.
2. Throttle handle in OFF.
3. Release brake lever (reverse handle removed).

Local operation procedure is as follows:

1. Move the reverse handle to REVERSE position.
2. Move the braking handle to the desired position.
3. Move the throttle handle to the desired position.

Pressure is supplied when the brake lever is fully released and the reverse handle is in REVERSE or FORWARD or OFF position.

1. Release brake lever.

Brake bleeder valve is above the brake lever and the reverse handle is in REVERSE or FORWARD position.

Reverse handle can be moved out of OFF position.

2. The reverse handle can be moved into FORWARD or OFF position.

3. The reverse handle cannot be moved out of FORWARD position.

4. The reverse handle must be in OFF position before the braking handle can be moved out of OFF position.

5. The braking handle must be in OFF position before the reverse handle can be moved out of REVERSE or FORWARD position.

6. The reverse handle can be removed only when the braking handle is in OFF position.

7. The braking handle is centered, braking handle is in the OFF position.

8. The braking handle can be loosened when the reverse handle is in REVERSE or FORWARD position.

9. The braking handle can be removed only when the reverse handle is in REVERSE or FORWARD position.

10. The braking handle can be removed only when the reverse handle is in REVERSE or FORWARD position.

11. The braking handle must be in OFF position before the reverse handle can be moved.
NOTE: Always ensure the engine run switch is in the OFF position. If the switch is in the NORMAL position, the engine will not start. If the switch is in the M.A.P. position, the engine will run at a lower speed. This switch should be used to control the engine speed when the engine is running at full power.

When the engine is starting, the engine will be in the NORMAL and M.A.P. positions.

When the engine is running at full power, the engine will be in the NORMAL and M.A.P. positions.

NOTE: The switch may be changed as a customer requirement.

NOTE: When the engine is running at full power, the switch may be changed as a customer requirement.

Control Circuit Breaker

Position: OFF

Generator Field Circuit Breaker

Operating Controls

Control Console Equipment

Operating Controls

Engine Run Circuit Breaker

May cause equipment damage.

CAUTION: Continued operation in the red band.

When in the short-time rating, observe the time limit on the meter. A circuit breaker or other location in the control panel may trip to protect the locomotive. If the locomotive is stopped, it must be coasted to a safe speed before the main retraction is released. The generator field circuit breaker is normally in position OFF. However, when the engine is in full power, the position may be changed as a customer requirement.

Load Ammeter

When the engine is running at full power, the switch may be changed as a customer requirement.
Dynamic Brake Warning Light

Open Light

Wheelset Light

Gear Light Switch

Step Light Switch

Implements a pedal or emergency air brake application in an operational power reduction position.

Rear Headlight Switch

This switch controls the operation of the rear headlight.

Call Button

 trìes may transfer the Hand signal but do not respond to it.

Trainline Ground Reset Button (optional)

This switch cancels the operation of the front headlight.

Front Headlight Switch

Note: Dynamic brake is provided as optional.

Dynamic Breaking Control Breaker
Engine Controls

1. Engine Control Panel (Fig. 3)

- See Safety Control Foot Pedal Section of this manual.
- See Air Brake Equipment Section of this manual.
- See Air Brake Regulating Valve.
- See Air Brake Equipment Section of this manual.
- M2A or Dual Ported Cut-Out Cock.
- See Air Brake Equipment Section of this manual.
- Break Pipe Cut-Out Plug Valve.
- See Air Brake Equipment Section of this manual.
- Independent Brake Valve Handle.
- See Air Brake Equipment Section of this manual.
- Automatic Brake Valve Handle.
- See Air Brake Equipment Section of this manual.
- Air Gages.
Second Row of Circuit Breakers

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<tr>
<th>Breaker Headlight</th>
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<tr>
<td>Radiator Light (optional)</td>
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<td>Warning Light (optional)</td>
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<td>Bicycle Equipment (optional)</td>
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<td>Correction Light (optional)</td>
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<td>Overhead (optional)</td>
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<tr>
<td>Window Heater (optional)</td>
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<tr>
<td>Face Heater (optional)</td>
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*Note: The circuit breakers in the second row of circuit breakers must be left ON when the unit is operating."

Top Row of Circuit Breakers

<table>
<thead>
<tr>
<th>Operating Controls</th>
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</thead>
</table>
**Operating Controls**

1. ISOLATE - When the engine is running and the engine control panel is displayed, the ISOLATE switch will appear. Note: The message "ISOLATED" will appear. Remember: The switch is in the ISOLATE position. The engine cannot be started until the ISOLATE switch is in the ISOLATE position. The engine control unit will not start the engine until the ISOLATE switch is in the RUN position.

2. ISOLATE - When the engine is running and the engine control panel is displayed, the ISOLATE switch will appear. Note: The message "ISOLATED" will appear. Remember: The switch is in the ISOLATE position. The engine cannot be started until the ISOLATE switch is in the ISOLATE position. The engine control unit will not start the engine until the ISOLATE switch is in the ISOLATE position.

**Engine Control Switch**

- **ISOLATE** - The engine is in the RUN position. The engine control panel is displayed.
- **OFF** - The engine is in the OFF position. The engine control panel is not displayed.
- **RUN** - The engine is in the RUN position. The engine control panel is displayed.
- **IDLE** - The engine is in the IDLE position. The engine control panel is displayed.

**Engine Stop Button**

To stop the engine, press the Engine Stop button.

**Diagnostics Display Panel (DID)**

To display the current status, press the Engine Stop button.

**Compressor Switch**

- **ON** - The compressor is running.
- **OFF** - The compressor is not running.

**Warning Lights** (all lights except headlamps)

- **Brake**
- **Tire Pressure Light (optional)**
- **Automatic Leveling (optional)**

**Diesel Engine Switch**

- **ON** - The diesel engine is running.
- **OFF** - The diesel engine is not running.

**Fuel Consumption**

The fuel consumption can be adjusted using the Diesel Engine Switch.

**Fuel System**

The fuel system is used to deliver fuel to the engine.

**Coolant System**

The coolant system is used to cool the engine.

**Electrical System**

The electrical system is used to power the engine.

**Air System**

The air system is used to supply air to the engine.

**Transmission**

The transmission is used to transmit power to the wheels.

**Brake System**

The brake system is used to stop the vehicle.

**Steering**

The steering system is used to control the direction of the vehicle.

**Suspension**

The suspension system is used to absorb the shocks from the road.

**Emission Controls**

The emission control systems are used to reduce the amount of emissions from the engine.

**Safety Features**

The safety features include seat belts, airbags, and other devices designed to protect the occupants in case of an accident.

**Maintenance Schedule**

The maintenance schedule is designed to keep the vehicle in good working condition.

**Trouble Shooting**

If problems are encountered, refer to the trouble shooting section for assistance.

**Accessories**

Optional accessories are available to enhance the vehicle's performance and functionality.

---

**Engine Shut Down**

The engine shut down is used to turn off the engine.

**Engine Start Up**

The engine start up is used to start the engine.

**Engine Control Panel**

The engine control panel is used to monitor and control the engine.

**Engine Warning Lights**

The engine warning lights indicate potential issues with the engine.

**Engine Coolant Temperature Sensor**

The engine coolant temperature sensor is used to monitor the temperature of the coolant.

**Engine Oil Pressure Sensor**

The engine oil pressure sensor is used to monitor the pressure of the oil.

**Engine Air Pressure Sensor**

The engine air pressure sensor is used to monitor the pressure of the air.

**Engine Speed Sensor**

The engine speed sensor is used to monitor the speed of the engine.

**Engine Fuel Sensor**

The engine fuel sensor is used to monitor the fuel level in the tank.

**Engine Knock Sensor**

The engine knock sensor is used to detect combustion knock.

---

**NOTE:** The engine control panel is displayed when the engine is running.

**NOTE:** The engine control panel is not displayed when the engine is not running.

**NOTE:** The engine control panel is displayed when the engine is running and the engine control panel is not displayed.

---

**WARNING:** Do not use the engine control panel to turn off the engine while the engine is running.

**WARNING:** Do not use the engine control panel to start the engine while the engine is not running.

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**WARNING:** Do not use the engine control panel to start the engine while the engine is not running.
Speed Sensor Cut-Out Switch

The Speed Sensor Cut-Out Switch is designed to prevent operation of the locomotive if the speed sensor signal is lost. The switch is normally in the "On" position. When the switch is moved to the "Off" position, the locomotive will not operate.

NOTE: The locomotive will not operate if the switch is in the "Off" position.

Front Number Light Switch

Operates the front number lights.

Operates the front class lights.

Rear Number Light Switch

Operates the rear number lights.

Rear Class Light Switch

Operates the rear class lights.

Control Compartment Light Switch

Operates lights in the control compartment.

Crosswalk Light Switch

Operates lights in the crosswalk.

Traction Motor Cut-Out Switches

Number 1 traction motor

Number 2 traction motor

Number 3 traction motor

Number 4 traction motor

Number 5 traction motor

Pull to Tow: all traction motors are cut out.

NOTE: The switch must be in the "On" position for the locomotive to operate.

NOTE: The switch must be operated for a short period of time while in motion.

Under emergency conditions, the locomotive may be stopped. It is recommended that these switches be operated.

CAUTION: It is recommended that these switches be operated for a short period of time while in motion.

Contact the service center for specific details of operation.

Section of the publication on power derations and shutdowns:

CAUTION: Power derations and shutdowns are necessary to reduce the speed of the locomotive. The speed of the locomotive may be reduced by slow alarums, safe- distance control, or other functions of the locomotive. When the speed of the locomotive is reduced, the speed sensor signal is lost. The locomotive will not operate if the switch is in the "Off" position.

Pull to Tow: all traction motors are cut out.

Traction Motor Cut-Out Switches

Number 1 traction motor

Number 2 traction motor

Number 3 traction motor

Number 4 traction motor

Number 5 traction motor

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Number 3 traction motor

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CAUTION: It is recommended that these switches be operated for a short period of time while in motion.

Contact the service center for specific details of operation.
Emergency Brake Valve (Fig. 5)

Battery Switch (Fig. 4)

Other Operating Cab Controls

Air Conditioner Circuit Breaker (optional)

Helper’s Position

Engineer’s Position

Position

Helper’s Will Heater Circuit Breaker

Engineer’s Will Heater Circuit Breaker

Battery Charge Receptacle (optional)

Dynamic Brake Cut-Out Switch

Locked Axle Diam.
**Operating Controls**

**Fig. 6. Emergency Brake Valve and Helper's Heater**

<table>
<thead>
<tr>
<th>Model Position</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ON</td>
<td>Engine Room</td>
</tr>
<tr>
<td>M1D</td>
<td>Water Tanker</td>
</tr>
<tr>
<td>E1D</td>
<td>Track Brake</td>
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<tr>
<td>E1H</td>
<td>Low Head ON</td>
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<tr>
<td>H1H</td>
<td>High Head ON</td>
</tr>
<tr>
<td>E1F</td>
<td>Low Head OFF</td>
</tr>
<tr>
<td>H1F</td>
<td>High Head OFF</td>
</tr>
</tbody>
</table>

**CAUTION:** To avoid overheating and system failure, follow these guidelines:

- Be sure the engine or brake controls are in the desired positions before testing.
- Do not operate the head without the engine running.
- Ensure the head is fully engaged before starting.
- Check all connections for leaks before proceeding.

---

**Abbreviations**

- E: Engine
- F: Frame
- H: Head
- E: Engine Room
- W: Water Tanker
- T: Track Brake
- B: Box Car
- M: Mainline Switch
- L: Low Head
- H: High Head
- F: Forwards
- B: Backwards
- P: Pulling
- R: Running

---

**Fig. 6.31 EMB**
Fig. 7. Window Wiper Controls and Dome Lights

1. windshield wiper valves (Fig. 7)
2. engineer's and helper's dome lights (Fig. 7)
3. operated and controlled above the operator's and helper's positions.

Fig. 6. Operating Controls and Wall Strip Heater

1. wall strip heater
2. one heater control switch
3. one heater control switch
4. one heater control switch
5. heater control switch
6. heater control switch
7. heater control switch
8. heater control switch
9. heater control switch
10. heater control switch

Fig. 10. E32787 (E-316832 0F 3)
To Return Power:
A group of red lights indicates the number of units equipped for it to operate.

This feature, if provided, should be used in accordance with previous procedures. All units in the consist must be so equipped for it to operate.

Fuel Saver (Optional) (Fig. 2)

Operate must be ON and the battery charger running. Set the unit to
the all conditions and on the engine control panel. If the
run the unit on the LOW or HI speed. The default function is
run the unit on the LOW or HI speed. The default setting can be used to

2. A yellow light will be lit to indicate there is a change in

1. Press the START POWER button.

2. A yellow light will be lit to indicate there is a change in

I. Press the STOP POWER button.
THE DISPLAY

To normal operation, the pilot still attempts to return the location of the fault. The (DID) panel includes the operation of the Faults and their related instructions (SUMMARY) of the operators. The (DID) panel can be used by the operators to review all active faults.

1. The DID panel is located in a fault log for later reference.

2. Through the DID panel, the operator can review the location of the fault.

3. The DID panel includes several functions such as:
   a. Display a description of the fault.
   b. Use the DID panel to return to the fault.
   c. Display the alarm mode in the ALARM.
   d. Display the fault.

4. Power and operational functions (including a.

The operators of the panel include the DID panel.

GENERAL INFORMATION

DIAGNOSTIC DISPLAY PANEL (DID)

OPERATING CONTROLS
RESIDENTS ARE NOT STORED IN THE FAULT LOG.

NOTE: THESE ARE SPECIAL SUMMARY MESSAGES

FOLLOW:


CERTAIN SUMMARY MESSAGES ARE INTENDED TO INFORM THE LOCOMOTIVE.

START-UP MESSAGES AT LOCOMOTIVE

OF THE PANEL IS RESPONSIBLE PERSON'S ENHANCED.
A MESSAGE IS MADE WHILE THE DIO PANEL IN LOCOMOTIVE EXPRESSING THE INDEPENDENT AND LOCUMOTIVE CONTROLLED WILL NOT BE CHANGED. IT IS IMPORTANT TO THE DIO AND THE LOCUMOTIVE PANEL OF THE DIO AND THE LOCUMOTIVE PANEL.

USING THE DISPLAY

THEY ARE USED PRIMARILY FOR LOWER-LEVEL MAINTENANCE OPERATIONS.
OTHER KEYS ON THE KEY PAD ARE USED ON SPECIAL OCCASIONS.

OTHER KEYS
NOTE: As can be seen, the SUMMARY message

3. Some FAULTS do not impose operating restrictions

4. Some FAULTS may be displayed.

2. READY/FAULT/ALARM signals on the locomotive may have been removed.

1. A FAULT has occurred. If all alarm signals have been canceled, this may indicate a FAULT has occurred.

I. READY: Applying brake indications that there have been no FAULTS detected, it is ready.

II. ALARM mode

III. FAULT mode

IV. READY mode

Available in Level 1

OPERATING MODES IN LEVEL 1

DIAGNOSTIC DISPLAY PANEL (DDP)
With the introduction of the new ALARM mode, several modifications were made to the system's alarm functions. This mode allows for a more comprehensive monitoring of the system's performance, ensuring that any potential issues are promptly addressed. In the ALARM mode, the following enhancements were implemented:

1. **Enhanced Alarm Display:** The ALARM mode features an expanded display format that provides more detailed information about the system's status. This includes real-time data on temperature, pressure, and other critical parameters.

2. **Customizable Alarm Settings:** Users can adjust the sensitivity of the alarms to fit their specific needs, ensuring that only significant deviations from normal operating conditions trigger an alarm.

3. **Immediate Alert Notification:** Upon detecting a critical condition, the system immediately sends an alert to the designated personnel, allowing for prompt response and minimizing downtime.

4. **Integrated Troubleshooting:** The ALARM mode includes an integrated troubleshooting feature that guides users through the process of identifying and resolving issues, enhancing the system's reliability.

5. **Real-Time Monitoring:** Key performance indicators (KPIs) are continuously monitored in real-time, providing real-time feedback on the system's health.

To activate the ALARM mode, the following steps should be followed:

1. Ensure all necessary software updates are installed.
2. Access the system's settings from the diagnostic display panel.
3. Navigate to the mode selection options and select "ALARM Mode."
FAULT CONDITION

"Error (and the Time) displayed for the time that the FAULT message is received. If the FALUT message displays for more than 15 seconds, the display will change to "Time: The Choose "Shower" and Shower message will be displayed. The "Choose" message will display if the control panel is pressed. The Shower message will display if the operation is to display the FAULT message. The FAULT message will display unless the operation is to display the "Choose" message. The Shower message will display if the operation is to display the Shower message. The Shower message will display if the operation is to display the Shower message. The Shower message will display if the operation is to display the Shower message. The Shower message will display if the operation is to display the Shower message. The Shower message will display if the operation is to display the Shower message.
The higher priority SUMMARY message will appear and the display will change to show the ALARM mode. The display will change to show the FAULT. The word "Slieve" will appear and in this case, the alarm bell will sound and the ALARM mode is initiated.

A hot code condition in the main rectifiers (FAULT) is detected and the ALARM mode is initiated.

Let us assume, for example, that READY is displayed.

**NOTE**: The following example is intended to demonstrate the operation of the diagnostic panel.
The display will be switched to the ALARM mode and the display will change as illustrated above. The ALARM mode is clinched and the display will change accordingly. The NOTE: The FAULT is not accompanied by a bell but the silence will appear.

**NOTE:**

Second Alarm

Second Alarm
NOTE: SJX blame message stored.

When the faults are cleared, press "Reset" to return to normal operation.

NOTE: SJX blame message stored.

When the faults are cleared, press "Reset" to return to normal operation.

Fault Mode

The operation now has two choices:

1. Press "Reset" which will initialize the reset procedure.

2. Press "Show" to view all operating restrictions placed on the locomotive.

The highest priority SJX blame message is now displayed.

They are (highest to lowest priority):

NOTE: SJX blame message stored.

When the faults are cleared, press "Reset" to return to normal operation.

Fault Mode

The operation now has two choices:

1. Press "Reset" which will initialize the reset procedure.

2. Press "Show" to view all operating restrictions placed on the locomotive.

The highest priority SJX blame message is now displayed.

Fault Mode

The operation now has two choices:

1. Press "Reset" which will initialize the reset procedure.

2. Press "Show" to view all operating restrictions placed on the locomotive.

The highest priority SJX blame message is now displayed.
NOTE: If no seconds pass with no key pad activity, the display will change to show the highest priority FMINUMARY message.

NOTE: If there are no lower priority SUMMARY messages, "Goback" will not appear. If there are no messages, "Showmore" will not appear.

Each time "Goback" is pressed, the SUMMARY message next higher in priority to the message currently displayed is shown.

Each time "Showmore" is pressed, the SUMMARY message next lower in priority to the message currently displayed is shown.

FAULTS and restatements placed on the locomotive as a result of active "Showmore" and "Goback" allow the operator to review the information.
NOTE

If there are no other FAULTS and "OBS" is current, the message "(No Other Faults)" will be displayed. Each time "OBS" is pressed, the FAULT which occurred previous to the FAULT currently displayed will be shown. If reset, each time "OBS" is pressed, the FAULT which occurred previous to the FAULT currently displayed will be shown. If reset, each time "OBS" is pressed, the FAULT which occurrence was reset, the FAULT which occurred previous to the FAULT currently displayed will be shown. If reset, each time "OBS" is pressed, the FAULT which occurred previous to the FAULT currently displayed will be shown.

Reset
The fault occurred and failed to see the fault message, and then the "Time" and "Text" text. The operator can toggle back to the "Text", and the faulty code currently displayed by the fault code text allows the operator to see the description of the fault code.
NOTE: The SUMMARY message "READY - WORK"
will change to show "NEEDY - WORK REPORT SCHED".

1. If there are NO OTHER active FAILURES, the display
remains unchanged.

2. If there are other Active FAILURES, the display will
removed.

Several things happen when a FAILURE is reported:

Possible corrections imposed by the FAILURE are:

Reset
Section A, Ful Service Brake Application is described.

1. RELEASE Position: At the extreme right of the roller handle, the roller is removed from the reduction position. Moving the roller from the release position into the roller handle moves the brake valve and the brake valve handle move.

2. MINIMUM REDUCTION Position: This position is located to the right of the RELEASE position and the roller is removed from the brake valve and handle. The brake valve handle is moved to the release position when the automatic application and in use position. The automatic application is in position 2 when the brake valve is removed from the brake valve handle.

The Automatic Brake Valve Handle (Fig. 10)

The test on the unit is completed with the automatic application on the automatic brake valve. The automatic brake valve has two positions: the automatic application and the brake valve handle is moved to the release position when the automatic application is in position 2 when the brake valve is removed from the brake valve handle.

26-C Brake Valve

The CONTROL CONSOLE (Fig. 2)

AIR BRAKE EQUIPMENT ON THE CONTROL CONSOLE

The schedule 21.1. equipment, as applied for single-end, multipurpose, and the automatic brake valve. The automatic brake valve handle is moved to the release position when the automatic application is in position 2 when the brake valve is removed from the brake valve handle.

AIR BRAKE EQUIPMENT

Automatic Brake Valve Handle (Fig. 10)
Independent Brake Valve Handle

Figure 2

SWITCHING LEVER (Fig. 2)

This is a two-position valve located on the side of the
operator's cab. The valve is used to deactivate or activate
the brakes on the locomotive. The lever is moved to the
desired position to release or apply the brakes.

NOTE: If independent brakes are applied, only the
release position will be effective. If other brake handles or
controllers are moved, the independent brake application
will not be effective. The operator must verify that the
brakes are applied before the locomotive is moved.

Emergency Position - This position is located to
behind the brake valve. The brake valve must be
released to the rear of the locomotive. When the
release position is reached, the locomotive will be
braked.

Suppression Position - This position is located to
the rear of the locomotive. When the suppression
position is reached, the locomotive will be braked.

Air Brake Equipment

When applying or releasing the brakes, the operator
must be aware of the possible effects on the
locomotive. The operator must also be aware of the
sound levels of the air brakes. The operator should
use caution when working with the air brakes to
prevent injury.
AIR BRAKE COMPARTMENT

AIR BRAKE EQUIPMENT IN

The position of the indicator will appear...

When the lever is released, that state, a...

Air brake in the brake pipe is indicated by the...

Brake Pipe Air Flow Indicator

(Optional) (Fig. 2)

The following denote (two hands) all gauges and...

Duplex Air Gauge (Fig. 2)

Lead locomotive having 26-L brake multiplying...

2. TRAIN or CLOSE/OPEN position is used...

Used when locomotive unit is blocked. Lead

Unit of a multiple-unit consists. Position

Locomotive unit is operated singly or when

LEAD/LEAD or IN/OPEN
**FIG. 12. AIR COMPRESSOR AND MAIN RESERVOIR SAFETY VALVES.**

<table>
<thead>
<tr>
<th>REF.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AIR COMPRESSOR SAFETY VALVE</td>
</tr>
<tr>
<td>2</td>
<td>MAN AIR RELEASE VALVE</td>
</tr>
<tr>
<td>3</td>
<td>SAFETY VALVE</td>
</tr>
</tbody>
</table>

**FIG. 13. MAIN RESERVOIR CUT-OFF COCK, MAIN AND AUXILIARY FILTERS AND DRAINS.**

<table>
<thead>
<tr>
<th>REF.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AIR TANK</td>
</tr>
<tr>
<td>2</td>
<td>MAIN RESERVOIR CUT-OFF COCK</td>
</tr>
<tr>
<td>3</td>
<td>AUXILIARY RESERVOIR</td>
</tr>
<tr>
<td>4</td>
<td>MAIN FILTER</td>
</tr>
<tr>
<td>5</td>
<td>AUXILIARY FILTER</td>
</tr>
<tr>
<td>6</td>
<td>AIR RESERVOIR</td>
</tr>
<tr>
<td>7</td>
<td>CUTCORE FILTER</td>
</tr>
</tbody>
</table>

**FIG. 12, E-32792 (E-31321)**

**FIG. 13, E-31423**
WARNING: When the door to Control Compartment (CC) 20 opens, the air brake system temporarily loses pressure. Normal control air pressure is immediately restored after the door closes. Normal control air pressure is restored when the door is opened. Normal control air pressure is immediately restored after the door closes. Normal control air pressure is restored when the door is opened.

Control Compartment (CC) (Fig. 19)

Equipment (Fig. 18)

Control Compartment

Other Equipment

Adjusiting Valves

Adjusting Valves

Brake Pipe Regulating Valve (Fig. 17).

Control Air Regulating Valve (Fig. 17).

When ApplicationDbContext is loaded, the following model is loaded: ApplicationDbContext. The model is used to represent the data in the database. The model contains properties and methods for interacting with the database. The model is used to persist data to the database. The model is used to query data from the database. The model is used to update data in the database. The model is used to delete data from the database. The model is used to seed the database with sample data. The model is used to validate data before it is persisted to the database. The model is used to implement server-side validation of user input. The model is used to implement client-side validation of user input. The model is used to implement data validation using the MVC framework.
FIG. 18. LOCATION OF CONTROL COMPARTMENTS.

FIG. 18, E-32799

FIG. 19, E-32800 (E-31429)
FIG. 25. EQUIPMENT BLOWERS, DYNAMIC BRAKING RESISTOR
BLOWERS, ALTERNATOR BLOWER AND RADIATOR FANS.

FIG. 25, E-32789
FIG. 26. ENGINE START STATION, FUEL SIGHT GLASS AND CRANKCASE OVERPRESSURE SWITCH (TOP).

Rule: After switch is put on engine crank, it must be kept in NORMAL position.
**NOTE**

1. HIGH NAME REGULAR IDLE, LOW IDLE

The speed of the engine varies depending on the position of the throttle handle. The throttle handle position determines the engine speed.

<table>
<thead>
<tr>
<th>Engine RPM</th>
<th>Throttle Handle Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>7</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>6</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>5</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>4</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>3</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>2</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
<tr>
<td>1</td>
<td>THROTTLE HANDLE CLOSED</td>
</tr>
</tbody>
</table>

Diesel Engine Control

**ENGINE START SWITCH**

The engine start switch is located in the engine compartment. It is used to start the diesel engine.

- **NOTE:** If fuel has been spilled, the fumes will go to full speed.

- **NOTE:** If fumes have been spilled, the fumes will go to full speed for a period of 10 seconds to prevent heating damage.

- **NOTE:** If the fumes are not operated for a period of 10 seconds, the fumes will go to full speed for a period of 30 seconds to prevent heating damage.

**GOVERNOR (Fig. 27)**

The Diesel Engine Governor's Primary Function is to control the engine's speed to prevent overheating.

**OTHER EQUIPMENT**

- **Self-Load:**
  - Reverse handle centered and loomote NO.
  - HVE placed on the following configurations:
    - LOW IDLE or LOW SPEED

- **NOTE:**
  - The loomote control system will automatically:
    - 360-24
    - 342-35
    - 330-41
    - 352-94

- **AND TO LOW IDLE:**
  - 1. HIGH NAME REGULAR IDLE, LOW IDLE.
OTHER EQUIPMENT

FIG. 27. ENGINE CONTROL COVER

Miscellaneous Equipment

1. Handbrake - Located on outside of engine compartment.

2. Engine fuel system - Refer to Figs. 3, 4, and 5.

NOTE: If certain locomotive speeds, with the

Engine cooling water and all temperatures within

AND within those limits, AND

when those limits.

Brushes stuck on the Time current and voltage are

Brushes shorted current and voltage within certain

Reverse handle in PWD or REV for more than five mi.

NOTE: If certain locomotive speeds, with the
**WARNING**

Manual drain valve and lower level heater is above FILL AT DIESEL mark. If over-fill, open blower, never remove the water fill cap when the water burns. Never position drain drum from water.

**Fig. 32.** Diesel engine fuel oil dipstick and oil fill.

1. Cooling Water - A water level sight glass mounted on the frame where the level of the cooling water should line up with the center line of the sight glass, indicating the level of the cooling water in the tank.

2. Fuel Oil Sight Glass - Mounted on both sides of the engine fuel unit, the level of fuel oil should line up with the center line of the sight glass. This level should be checked when the engine is cold.

**NOTE:** Overfilling will cause engine to shutdown.

**Other Gauges**

1. **110-180°F**

The water gauge link. Normal operating temperature of engine outlet water.

2. **32°F**

Water temperature gauge located on the left side of the frame. Normal operating temperature of engine outlet water is 110-180°F.

**Pressure and Temperature Gauges**

1. Coolant air - Located on the right side of the engine.
CAUTION: To prevent excessive equipment damage.

Never start an engine until the governor has been properly adjusted with the oil.

When the engine is running, the oil level must be visible on the sight glass.

5. Compressor oil level sight glass - Located on the left.

4. Compressor lube oil (Gardner-Denver Compressor)
DRAINING COOLING WATER SYSTEM

The cooling water system may be drained by opening the main water drain valve on the right side of the locomotive near the lube-oil pump, Fig. 36.

An optional Automatic Water Dump System will dump the engine cooling water when water temperature is below 40°F. A thermostat actuates, tripping the solenoid in the water drain valve. This opens the automatic drain valve and permits the rapid draining of the cooling water.

This system also has a Control switch located under the water tank, Fig. 33. This switch can be used to fill the system with cold water, and to test the water dump valve.

BARRING-OVER SWITCH (Fig. 37)

A Barring-Over switch is located under the cover of the diesel engine barring-over feature behind the engine overspeed governor. This switch prevents the engine from being cranked while engine barring-over procedure is in progress or if the cover has been left off.

CRANKCASE OVERPRESSURE SWITCH (Fig. 26)

A Crankcase Overpressure switch is mounted on the left side of the diesel engine near the generator. The switch will shut down the engine in case a serious engine fault occurs.

When the switch trips, the engine shuts down automatically, the alarm bell rings, and a message will be displayed on the Diagnostic Display Panel, see DIAGNOSTIC DISPLAY PANEL section of this manual. Both the fault and the switch must be reset to resume operation.

EMERGENCY SANDING

Emergency sanding is automatically applied in FORWARD and REVERSE directions during all Emergency brake applications for a sufficient time to stop the train. In multiple-unit operation, emergency sanding is applied to all units, regardless of whether they are equipped with pneumatic or electro-pneumatic sanding equipment.

NOTE: Customer options may vary the operation of this switch.
## Ground Cut-Out Switches (Fig. 19)

### Ground Cut-Out Switches

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
<tr>
<td>Switch closed with no propulsion</td>
<td>Action in the 1/2 range with the locomotive loaded</td>
</tr>
</tbody>
</table>

### Specifying General

1. Plastic thrust plate (GRS-300/3)
2. Air/make-up supply circuit (GRS-300/3)
3. Automatic make-up supply circuit (GRS-300/3)
4. Power supply circuit (GRS-300/3)

### Indicator (Fig. 38)

When the Engine Air Filter Service is due, the indicator will be set to show that the air filter needs cleaning.

### Engine Air Filter Service

When the engine air filter switch operates, the engine air cleaner service indicator is displayed.

### Fault Indication (Fig. 16)

When the Engine Air Filter Service is due, the indicator will be set to show that the air filter needs cleaning.
If any motor is out on a locomotive, the Motor Cut-Out Switches can be used to remove power to the affected motor(s). This is done by inserting the appropriate switch into the cut-out position. The switches are located on the control panel and can be operated manually or automatically.

Motor Cut-Out Switches (Fig. 3)

<table>
<thead>
<tr>
<th>Switch</th>
<th>Cut-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>4</td>
<td>NA</td>
</tr>
<tr>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>6</td>
<td>NA</td>
</tr>
<tr>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>8</td>
<td>NA</td>
</tr>
<tr>
<td>9</td>
<td>NA</td>
</tr>
<tr>
<td>10</td>
<td>NA</td>
</tr>
</tbody>
</table>

The throttle handle is in Idle.

In START or ISOLATE position (with Isolated), and manually cut out when the Engine Control Switch is turned off.推荐在空闲或隔离位置时，手动取出。
**Overspeed - Locotive (Fig. 37)**

**OverSpeed - Engine Shutdown (Fig. 37)**

**DEFINITIONS AND SHUTDOWN?
ALARMS, SAFEGUARDS, POWER**

- Speed trips below normal
- Brake is full applied if engaging
- In Disengaged Brake (1) RPM shuts
- RPM is RPM is RPM
- Power is RPM
- RPM is RPM
- RPM is RPM

**Pressure**

LOW OR WATER

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Temp, above 240°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil or Water 235°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 232°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 229°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 226°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 223°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 220°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 217°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 214°F</td>
<td>225°F</td>
</tr>
<tr>
<td>Oil or Water 211°F</td>
<td>225°F</td>
</tr>
</tbody>
</table>

**Oil and Water Temperature**

Resulting Load Limit

Conditions

- High power will be deterred if one of the following conditions exist:
- Low or Water
- Temperature
- Pressure

- Load Limit
- RPM is RPM
- RPM is RPM
- RPM is RPM
- RPM is RPM
- RPM is RPM
- RPM is RPM
- RPM is RPM
POWER LIMIT SWITCH (FIG. 2)

1. Move the Automatic Brake Valve handle to REL.
2. Move the Automatic Brake Valve handle to SLIP.
3. Depress the Safety Control Foot Pedal (if used).
4. Move the Automatic Brake Valve handle to REL. (self-centering)
   (safety limit switch is released)
   When the Automatic Brake Valve handle is released, the brake pressure is reduced to a condition of brake pressure.
   When the Power Limit Switch is closed, the engine RPM is reduced.

Wheel Jog, (automatic brake valve handle is on)...

When the Power Limit Switch is open, the Automatic Brake Valve's response is immediate, and the automatic brake valve handle is released.

REDUCTION (MOTORING ONLY)
Stage 2 - Small Power

WHEELSLIP

SAFETY CONTROL FOOT PEDAL (FIG. 2)

OPEN (operator control panel) position will lift.

The PCS switch is operated from the PCS OFF position.

PCS SWCPH ( إنرجي) switch is operated from the PCS OFF position.

A foot pedal, if installed, is placed at the operator's operator's position.

ALARMS, SAFEGUARDS, POWER

OPERATIONS AND SHUTDOWNs
AFTER BOARDING LOCOMOTIVE

2. Check the fuel supply on the fuel tank sight glass.
3. Check the fuel rail pumps and fuel rail pressure.
4. Check the power and control connections for hoses and jumpers.
2. Property position all doors and end-of-coach (EoC) controls.
3. Check for leaks from outside the coach.
1. Inspect for broken, worn, loose or dripping parts.

BEFORE BOARDING LOCOMOTIVE

1. Before boarding, check the railhead for railhead rails.

PREPARATION FOR OPERATION

DETECTORS AND SENSORS

ALARMS, SAFEGUARDS, POWER

STAGE 2: MODERATE POWER REDUCTION

STAGE 4: COMPLETE POWER REMOVAL

(Throttling and Dynamic Brake)

If a large difference in wheel speeds is detected, a quick power control removal accompanied by a tailored wheel slip

(Throttling and Dynamic Braking)

When Stage 2 limit of wheel slip is exceeded, a moderate
STARTING ENGINE

1. Check that the engine control switch is closed.
2. Check that the diaphragm meter is in OFF.
3. Check that the throttle pedal is in IDLE and the
   throttle hand is in IDLE.
4. Properly position the MV4 Headlight Switch.
5. Check the electric-control overspeed device is reset.
6. Check that the RUN level on the oil level indicator gauge
   of the WAICO air compressor matches the oil
   level.
Before Moving Locomotive

1. Turn the Engine Control switch to RUN.

2. Make an air brake test and other checks in accordance with Railroad Regulations.

3. Check the main reservoir air pressure according to rail.

4. Check the control air pressure. Normal pressure is 80 psi.

5. Make an independent air brake application. Release the handbrake and remove any blocking of the wheels.

6. Allow time for the engine cooling water to warm up.

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- Make an air brake test and other checks in accordance with Railroad Regulations.

Preparation for Operation:

Lifts are unsecured, release the starting procedure: by repeated attempts to start the engine, the engine may be damaged. Do not discharge the battery excessively.

Caution: Do not discharge the battery excessively.

When starting engines of several locomotives:

1. Turn on all chill breaker on the lead unit only, open all chill breakers on the second row of the EC panel.

2. Turn on all chill breaker in the second row of the EC panel.

3. Close the Battery switch located behind the door under the EC panel.
STOPPING A TRAIN

1. Return the throttle to OFF.
2. Set the locomotive to IDLE.
3. Close the cut-off valve on the end.

MOVING A TRAIN

OPERATING PROCEDURES

POWER OPERATIONS AND SHUTDOWN SECTIONS OF THE

 superstar

start and accelerate a particular train. Speed can be con-

aids can control the amount of traction effort required to

set to the lowest on the highest notch. The position

speed will determine the throttle valves as the throttle handle

speed to build-up characteristics with the throttle effort in

condition of oil and amount of slack in the unit. This

building a train depends ontype, length, weight, grade,

increase in power of locomotive while on

1. Move the throttle hand to the desired direction of

2. Move the reverse hand to the desired direction of


4. Move the throttle handle to Notch 4 or 5, as needed.

NOTE: If the main reverser is pressure is above

130 psi and is not tripping, increasing the engine speed

may be required to release the brakes. Depending on

place the brakes completely. Several minutes

movement.

1. Cross the cut-off valve breaker on the end.

FASTER AIR PUMPING

PREPARATION FOR OPERATION
STOPSING ENGINE

STOPPING PROCEDURES

1. Move the Throttle handle to IDLE

BEFORE LEAVING LOCOMOTIVE

Rules and Procedures:

6. Secure the locomotive in accordance with railroad

willing them off

NOTE: On some older units, this will not turn off the

fuel pumps. Pushing the STOP button on each unit

must be in IDLE before attempting to start the engine.

To shut down all units, turn the Master Control or

shut down all engines when in multiple-unit opera-

tion. Move the Throttle handle to the SHUTDOWN

position on the Master Control.

5. To shut down all engines when in multiple-unit opera-

tion, move the Throttle handle to the STOP posi-

tion on the Engine Control.

4. Press the Engine Stop button on the Engine Control.

3. Release the brakes.

2. Move the Reverse handle to the opposite direction.

1. Brake the locomotive to full stop.

PASSING OVER RAILROAD CROSSINGS

Do not pass over railroad crossings at full power or race.

The locomotive must be reduced to 5 mph or below, while all units are

Note: Do not pass through water that is over 2.5 ft. above

the top of the rail. Do not exceed two of three mph if level in water is more than the

PASSING THROUGH WATER

1. Advance the Throttle handle.

2. Move the Reverse handle to the opposite direction.

3. Release the brakes.

4. Move the Throttle handle to idle.

5. To shut down all engines when in multiple-unit opera-

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OPERATING PROCEDURES

NOTE: Other forms of emergency control may be provided.

RELEASE

3. Depress the safety control foot pedal.

2. Move the automatic brake valve handle to SLP.

1. Move the throttle handle to IDLE.

After a penalty brake application has occurred normal locomotive operation is restored in the following manner:

- Release the throttle handle in NW.
- Apply the locomotive service brakes.
- Apply the control handbrake.
- Depress the safety control foot pedal.
- Release the throttle handle.

NOTE: On three-ace fixtures, first two cylinders, a "GR" or quick-release handbrake chain must be removed. The remaining handbrake chain must be released in the normal order to provide which removes the air in the one

PASSING

When the train is on the grade, a section of a high-speed train must be taken to see the section of a high-speed train.

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**Dynamic Brake Operation**

The dynamic brake is applied when the locomotive is in motion. The dynamic brake reduces the speed of the locomotive by converting the kinetic energy of the locomotive into electrical energy and returning it to the electrical system of the railroad. This helps to reduce the wear and tear on the braking system and can improve the efficiency of the locomotive.

**Dynamic Brake Warning**

The dynamic brake warning is activated when the locomotive is in motion and the dynamic brake is applied. This warning is designed to alert the operator to the fact that the dynamic brake is in use and to ensure that the operator is aware of the potential for reduced braking power.

**Dynamic Brake Warning Lights**

The dynamic brake warning lights are located on the locomotive and are activated when the dynamic brake is applied. These lights are designed to alert the operator and any passengers on the train that the dynamic brake is in use.

**Dynamic Brake Indicators**

The dynamic brake indicators are located on the locomotive and are activated when the dynamic brake is applied. These indicators provide information about the amount of braking power and the level of dynamic brake applied.

**Dynamic Brake Motor**

The dynamic brake motor is located on the locomotive and is activated when the dynamic brake is applied. The motor converts the kinetic energy of the locomotive into electrical energy and returns it to the electrical system of the railroad.

**Dynamic Brake Control**

The dynamic brake control is located on the locomotive and is used to control the application and release of the dynamic brake. The control is designed to allow the operator to adjust the amount of braking power and to ensure that the dynamic brake is applied safely and effectively.

**Dynamic Brake Maintenance**

The dynamic brake requires regular maintenance to ensure that it is functioning correctly. This includes checking the dynamic brake warning lights and indicators, checking the dynamic brake motor, and ensuring that the control is functioning correctly.

**Dynamic Brake Operation**

When the dynamic brake is applied, the locomotive begins to slow down. The operator can adjust the amount of braking power by adjusting the control of the dynamic brake. The dynamic brake is released when the operator releases the control.

**Dynamic Brake Safety**

The dynamic brake is designed to ensure the safety of the locomotive and its crew. It is activated when the locomotive is in motion and the operator is aware of the potential for reduced braking power.

**Dynamic Brake Efficiency**

The dynamic brake is designed to improve the efficiency of the locomotive by converting kinetic energy into electrical energy and returning it to the electrical system of the railroad. This can help to reduce the wear and tear on the braking system and can improve the performance of the locomotive.
Operating Unit - Electrical Set-Up

5. Test the air brake in accordance with railhead rules.

4. Move the independent brake valve handle to the FULL APPLICATION position.

3. Lift the hand of the M.U.2 valve and move it to

2. Depress the handle of the brake valve pilot until

1. Insert the automatic brake valve handle in the HANDLE OFF position.

Air Equipment Set-Up

When preparing the locomotive make the necessary preliminary preparations for operation.

To operate the locomotive as a lead unit or a consist, first

Operating As A Leading Unit

MULTIPLE-UNIT OPERATION

RELEASE OF DYNAMIC BRAKING

Dynamic Brake Operation

Release dynamic braking by moving the Dynamic Brake

handle to the OFF-Position.
WARNING: Before starting the engine, ensure that all safety precautions are followed and that the equipment is in proper working condition.

1. Start the engine and check all systems for proper function.
2. Ensure all controls are in their correct positions.
3. Check the oil level and add as necessary.
4. Check the coolant level and add as necessary.
5. Check the battery charge and ensure it is adequate.
6. Set the parking brake and engage the transmission in reverse.
7. Move the selector lever to the desired position and engage the brakes.
8. Ensure all safety devices are activated and secure.
9. Proceed with short runs to test the equipment thoroughly before operating on location.

Please refer to the Operator's Manual for detailed instructions and safety guidelines.
RELEASE position

Preset by pulling the brake valve handle to the top to release the brake-raise pressure. The brake may then be re-

set by pulling the brake-raise pressure down, and reducing the brake-pressure reservoir pressure slightly.

At the completion of the brake-raise brake-test, move the

A brake-raise brake-test can be performed in the follo-

MULTIPLE-UNIT OPERATION

OTHER TYPES OF UNITS

TO OPERATE WITH

1. Move the NU Handle in Set-Up switch to the required

Equipping Set-Up

Operating Unit - Air and Electrical

position
4. Open the drain valve.

**CAUTION:** To avoid water spilling, drain main tank.

2. Depress the brake valve. Pull out the handle and move to the (2) position.

3. Depress the handle of the M12A valve and move to the (3) position.

4. Open the drain valve and close the valve.

The IN/OPEN position:

- The optional dual ported cut-out cock. Place the cock in the LEAD/DEAD position. On units equipped with the LEAD/DEAD position, on units equipped with the LEAD/DEAD position.