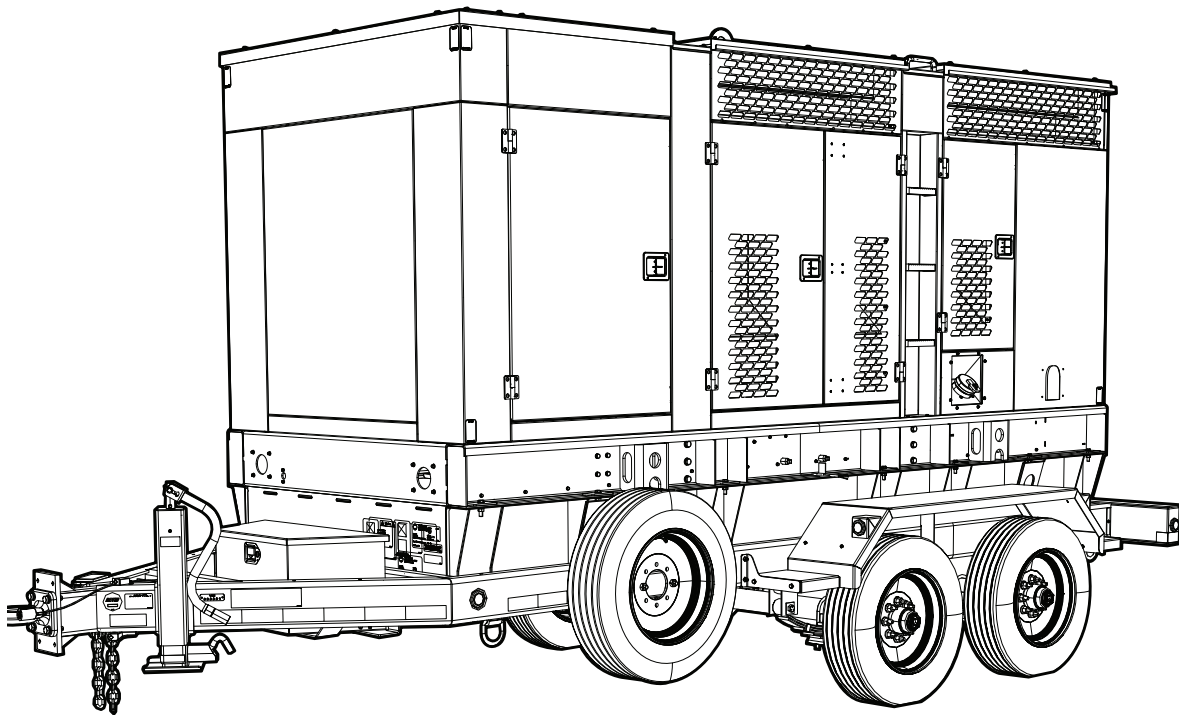


Owner's Manual

Diesel Generator

MDE330P



For technical assistance contact:

www.generacmobileproducts.com

Technical Support

1-800-926-9768

SAVE THIS MANUAL FOR FUTURE REFERENCE

Use this page to record important information about your unit.

Unit Model No.	
Unit Serial No.	
Engine Model No.	
Engine Serial No.	
Generator Model No.	
Generator Serial No.	

Record the information found on your unit data label on this page. See unit serial number location (***Unit Serial Number Locations***). The label plate is affixed to the inside partition, to the left of the control panel console.

Engine and generator serial numbers are located on separate data plates affixed to the engine and generator.

When contacting a Generac Mobile Authorized Service Dealer (GMASD) about parts and service, supply the complete model number and serial number of the unit.

Operation and Maintenance: Proper maintenance and care of the unit ensures a minimum number of problems and keeps operating expenses at a minimum. It is the operator's responsibility to perform all safety checks, to verify that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by a GMASD. Normal maintenance, service and replacement of parts are the responsibility of the owner or operator and, as such, are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage may contribute to the need for additional maintenance or service.

 **WARNING**

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to

www.P65Warnings.ca.gov/diesel. (000394)

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Section 1: Introduction and Safety

Introduction

Thank you for purchasing a Generac Mobile product. This unit has been designed to provide high performance, efficient operation, and years of use when maintained properly.

The information in this manual is accurate based on products produced at the time of publication. The manufacturer reserves the right to make technical updates, corrections, and product revisions at any time without notice.

Read This Manual Thoroughly



⚠️WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

If any section of this manual is not understood, contact your nearest GMASD, or contact Generac Mobile Technical Service at 1-800-926-9768 or www.generacmobile-products.com with any questions or concerns.

The owner is responsible for proper maintenance and safe use of the equipment. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established, or with equivalent standards. Also, verify that the unit is applied, used, and maintained in accordance with the manufacturer's instructions and recommendations. Do nothing that might alter safe application/usage and render the unit in noncompliance with the aforementioned codes, standards, laws, and regulations.

Save these instructions for future reference. This manual contains important instructions for the unit that should be followed during setup, operation and maintenance of the unit and battery. ALWAYS supply this manual to any individual that will use this machine.

How to Obtain Service

When the unit requires servicing or repairs, contact a GMASD for assistance. Service technicians are factory-trained and are capable of handling all service needs. For assistance locating a dealer, go to <https://www.generacmobileproducts.com/parts-service/find-service>.

When contacting a GMASD about parts and service, always supply the complete model and serial number of the unit as given on the data decal located on the unit. Record the model and serial numbers in the spaces provided on the front cover of this manual.

Safety Rules

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all inclusive. If using a procedure, work method or operating technique that the manufacturer does not specifically recommend, verify it is safe for others. Also make sure the procedure, work method, or operating technique utilized does not render the equipment unsafe.

Safety Symbols and Meanings

Throughout this publication, and on tags and decals affixed to the unit, DANGER, WARNING, CAUTION and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Their definitions are as follows:

⚠️DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

(000001)

⚠️WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

(000002)

⚠️CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(000003)

NOTE: Notes contain additional information important to a procedure and will be found within the regular text of this manual.

These safety alerts cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the action or service are essential to preventing accidents.

General Hazards

**⚠ DANGER**

Asphyxiation. Running engines produce carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide, if not avoided, will result in death or serious injury. (000103)

**⚠ DANGER**

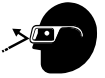
Asphyxiation. Do not operate unit without a properly functioning exhaust system. Doing so will result in death or serious injury. (000340)

**⚠ WARNING**

Loss of life. This product is not intended to be used in a critical life support application. Failure to adhere to this warning could result in death or serious injury. (000209b)

**⚠ WARNING**

Hearing Loss. Hearing protection is recommended when using this machine. Failure to wear hearing protection could result in permanent hearing loss. (000107)

**⚠ WARNING**

Vision Loss. Eye protection is required to avoid spray from spark plug hole when cranking engine. Failure to do so could result in vision loss. (000181)

**⚠ WARNING**

Moving Parts. Keep clothing, hair, and appendages away from moving parts. Failure to do so could result in death or serious injury. (000111)

**⚠ WARNING**

Hot Surfaces. When operating machine, do not touch hot surfaces. Keep machine away from combustibles during use. Hot surfaces could result in severe burns or fire. (000108)

⚠ WARNING

Equipment damage. Do not attempt to start or operate a unit in need of repair or scheduled maintenance. Doing so could result in serious injury, death, or equipment failure or damage. (000291)

⚠ WARNING

Risk of injury. Do not operate or service this machine if not fully alert. Fatigue can impair the ability to operate or service this equipment and could result in death or serious injury. (000215a)

⚠ WARNING

Equipment damage. Only qualified service personnel may install, operate, and maintain this equipment. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000182a)

⚠ CAUTION

Equipment or property damage. Do not block air intake or restrict proper air flow. Doing so could result in unsafe operation or damage to unit. (000229)

Trailer Hazards

⚠ WARNING

Personal injury. Trailer must be securely coupled to the hitch with the chains correctly attached. Uncoupled or unchained towing could result in death or serious injury. (000233a)

⚠ WARNING

Personal injury. Do not operate unit during transport. Doing so could result in death, serious injury, or property damage. (000231a)

⚠ WARNING

Crushing hazard. Verify unit is properly secured and on level ground. An unsecured unit can suddenly roll or move, causing death or serious injury. (000234a)

⚠ WARNING

Property or Equipment Damage. Tighten wheel lug nuts after first 50 miles to factory specifications. Failure to do so could result in death, serious injury, property or equipment damage. (000235)

Electrical Hazards



⚠ DANGER

Electrocution. In the event of electrical accident, immediately shut power OFF. Use non-conductive implements to free victim from live conductor. Apply first aid and get medical help. Failure to do so will result in death or serious injury. (000145)



⚠ DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury. (000104)



⚠ DANGER

Electrocution. Contact with bare wires, terminals, and connections while generator is running will result in death or serious injury. (000144)



⚠ DANGER

Electrocution. Verify electrical system is properly grounded before applying power. Failure to do so will result in death or serious injury. (000152)



⚠ DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury. (000123)



⚠ DANGER

Electrocution. Never connect this unit to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. Failure to do so will result in death or serious injury. (000150)



⚠ WARNING

Electrical shock. Disconnect battery ground terminal before working on battery or battery wires. Failure to do so could result in death or serious injury. (000164)

Lifting Hazards



⚠ WARNING

Personal injury. Failure to properly connect lifting cables, chains, or straps could result in death, serious injury, or property damage. (000346)

⚠ WARNING

Personal Injury. Do not use lifting hook if there are signs of damage or corrosion. Doing so could result in death, serious injury, or property damage. (000349)

⚠ WARNING

Personal Injury. Do not use lifting hook other than as directed. Failure to do so could result in death, serious injury, or property damage. (000350)

⚠ WARNING

Personal Injury. Verify all fasteners are properly tightened prior to lifting unit. Failure to do so could result in death, serious injury, or property damage. (000351)

Explosion and Fire Hazards



⚠ DANGER

Explosion and Fire. Fuel and vapors are extremely flammable and explosive. Add fuel in a well ventilated area. Keep fire and spark away. Failure to do so will result in death or serious injury. (000105)



⚠ WARNING

Fire risk. Fuel and vapors are extremely flammable. Do not operate indoors. Doing so could result in death, serious injury, or property or equipment damage. (000281)



⚠ WARNING

Risk of Fire. Unit must be positioned in a manner that prevents combustible material accumulation underneath. Failure to do so could result in death or serious injury. (000147)

Battery Hazards



⚠ DANGER

Electrocution. Do not wear jewelry while working on this equipment. Doing so will result in death or serious injury.

(000188)



⚠ WARNING

Explosion. Batteries emit explosive gases while charging. Keep fire and spark away. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000137a)



⚠ WARNING

Risk of burns. Batteries contain sulfuric acid and can cause severe chemical burns. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000138a)



⚠ WARNING

Explosion. Do not dispose of batteries in a fire. Batteries are explosive. Electrolyte solution can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000162)



⚠ WARNING

Risk of burn. Do not open or mutilate batteries. Batteries contain electrolyte solution which can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000163a)

Always recycle batteries in accordance with local laws and regulations. Contact your local solid waste collection site or recycling facility to obtain information on local recycling processes. For more information on battery recycling, visit the Battery Council International website at: <http://batteryCouncil.org>.

Fuel Hazards



⚠ DANGER

Explosion and fire. Fuel and vapors are extremely flammable and explosive. No leakage of fuel is permitted. Keep fire and spark away. Failure to do so will result in death or serious injury.

(000192)



⚠ DANGER

Risk of fire. Allow fuel spills to completely dry before starting engine. Failure to do so will result in death or serious injury.

(000174)

- **DO NOT** fill fuel tank near an open flame, while smoking, or while engine is running. **DO NOT** fill tank in an enclosed area with poor ventilation.
- **DO NOT** operate with the fuel tank cap loose or missing.

Engine Safety

Internal combustion engines present special hazards during operation and fueling. Failure to follow the safety guidelines described below could result in severe injury or death. Read and follow all safety alerts described in the engine operator's manual. A copy of this manual was supplied with the unit when it was shipped from the factory.

- **DO NOT** run engine indoors or in an area with poor ventilation. Verify engine exhaust cannot seep into closed rooms or ventilation equipment.
- **DO NOT** clean air filter with gasoline or other types of low flash point solvents.
- **DO NOT** operate the unit without a functional exhaust system.
- Shut the engine down if any of the following conditions exist during operation:
 - Abnormal change in engine speed.
 - Loss of electrical output.
 - Equipment connected to the unit overheats.
 - Sparking occurs.
 - Engine misfires or there is excessive engine/generator vibration.
 - Protective covers are loose or missing.

Operating Safety

Positioning the Unit

⚠ WARNING

Crushing hazard. Verify unit is properly secured and on level ground. An unsecured unit can suddenly roll or move, causing death or serious injury.

(000234a)

- The area immediately surrounding the unit should be dry, clean, and free of debris.
- If the unit is equipped with a frame grounding stud, follow any local, state, and National Electrical Code (NEC) guidelines when connecting.

Starting the Unit



⚠ DANGER

Electrocution. DO NOT use the unit if electrical cord is cut or worn through. Doing so will result in death or serious injury.

(000263a)

- **DO NOT** start a unit in need of repair.

Towing Safety

Towing a trailer requires care. Both the trailer and vehicle must be in good condition and securely fastened to each other to reduce the possibility of an accident. Some states require that large trailers be registered and licensed. Contact your local Department of Transportation office to check on license requirements for your particular unit.

Safe Towing Techniques

- Practice turning, stopping, and backing up in an area away from heavy traffic before transporting the unit.
- Maximum recommended speed for highway towing is 65 mph (105 km/h). Recommended off-road towing speed is 10 mph (16 km/h) or less, depending on terrain.
- When towing, maintain extra space between vehicles and avoid soft shoulders, curbs, and sudden lane changes.

Safety and Operating Decals

IMPORTANT NOTE: Replace missing and hard-to-read decals. Use care when washing or cleaning the unit. See the parts manual at www.generacmobileproducts.com for decal part numbers.

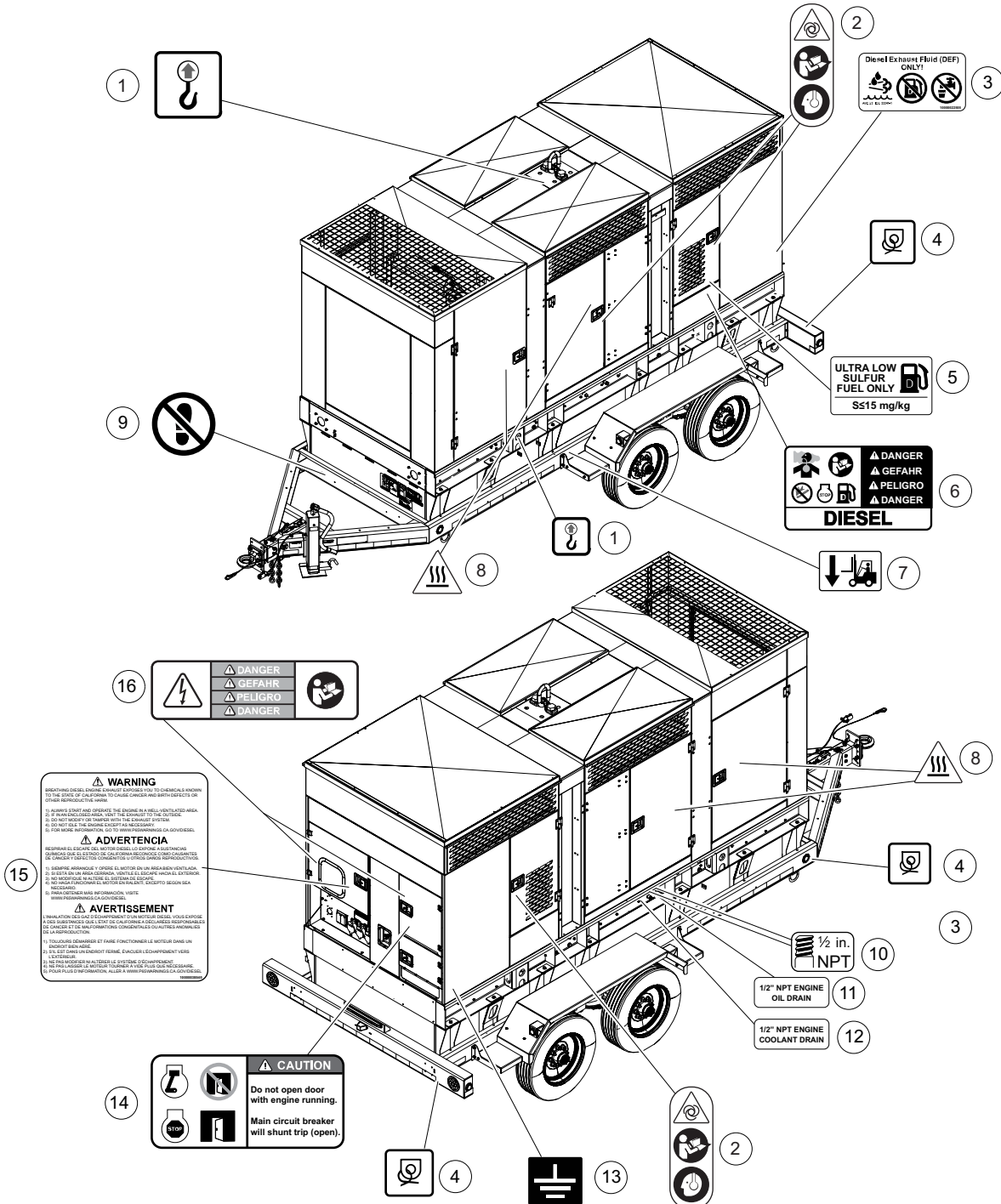
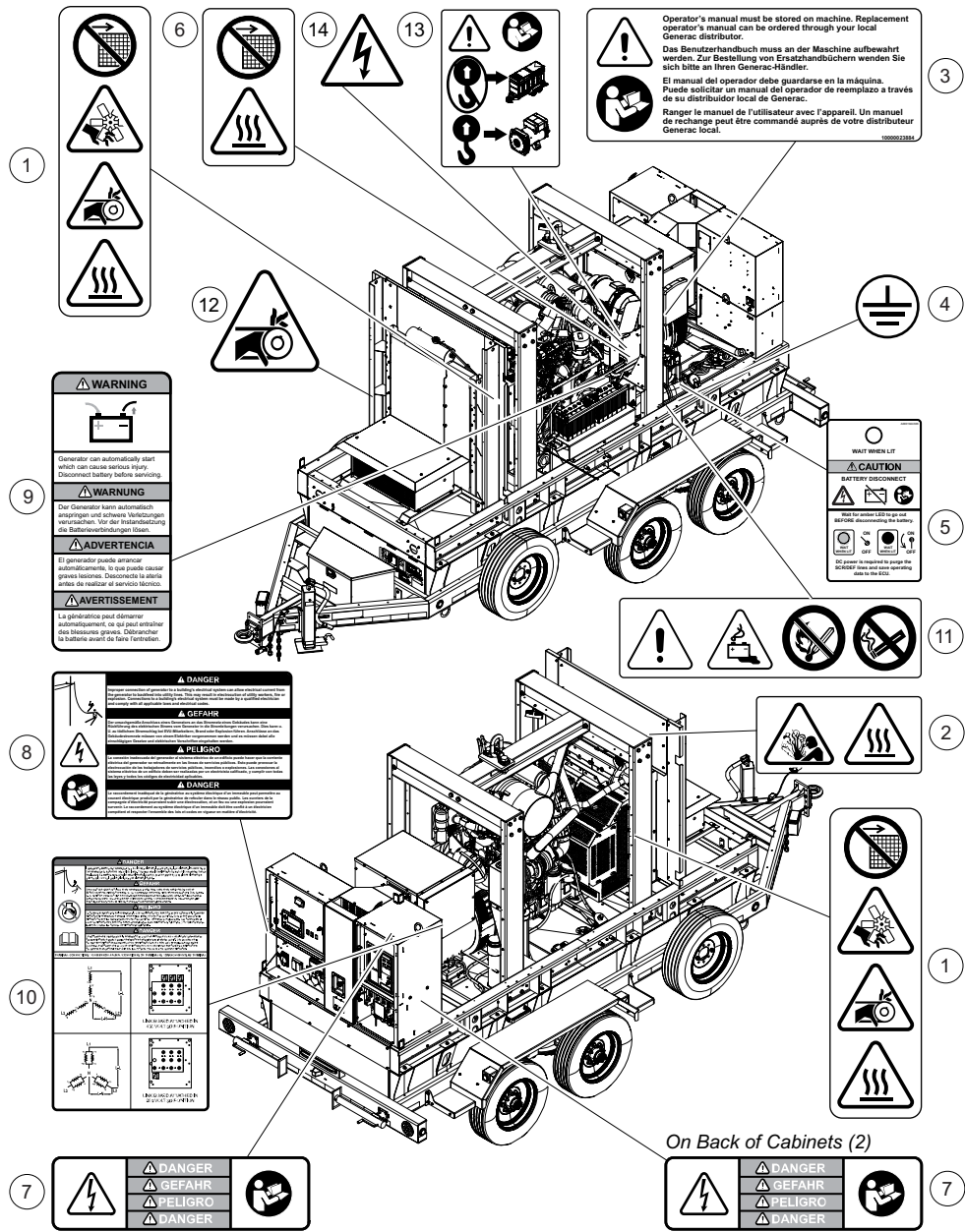


Figure 1-1. Exterior Decals

- | | | | |
|---|--|----|---|
| 1 | Overhead lift point | 9 | Do not step |
| 2 | Noise and auto-start hazards—read manual | 10 | ISO thread ½ NPT |
| 3 | DEF fluid only | 11 | Engine oil drain |
| 4 | Tie-down point | 12 | Engine coolant drain |
| 5 | Ultra low sulfur fuel only | 13 | Connection lug ground |
| 6 | Danger: Diesel fuel hazards | 14 | Do not open door with engine running—shunt trip |
| 7 | Forklift pocket below | 15 | CA Proposition 65 warning |
| 8 | High temperature hazard | 16 | Electrical danger—read manual |

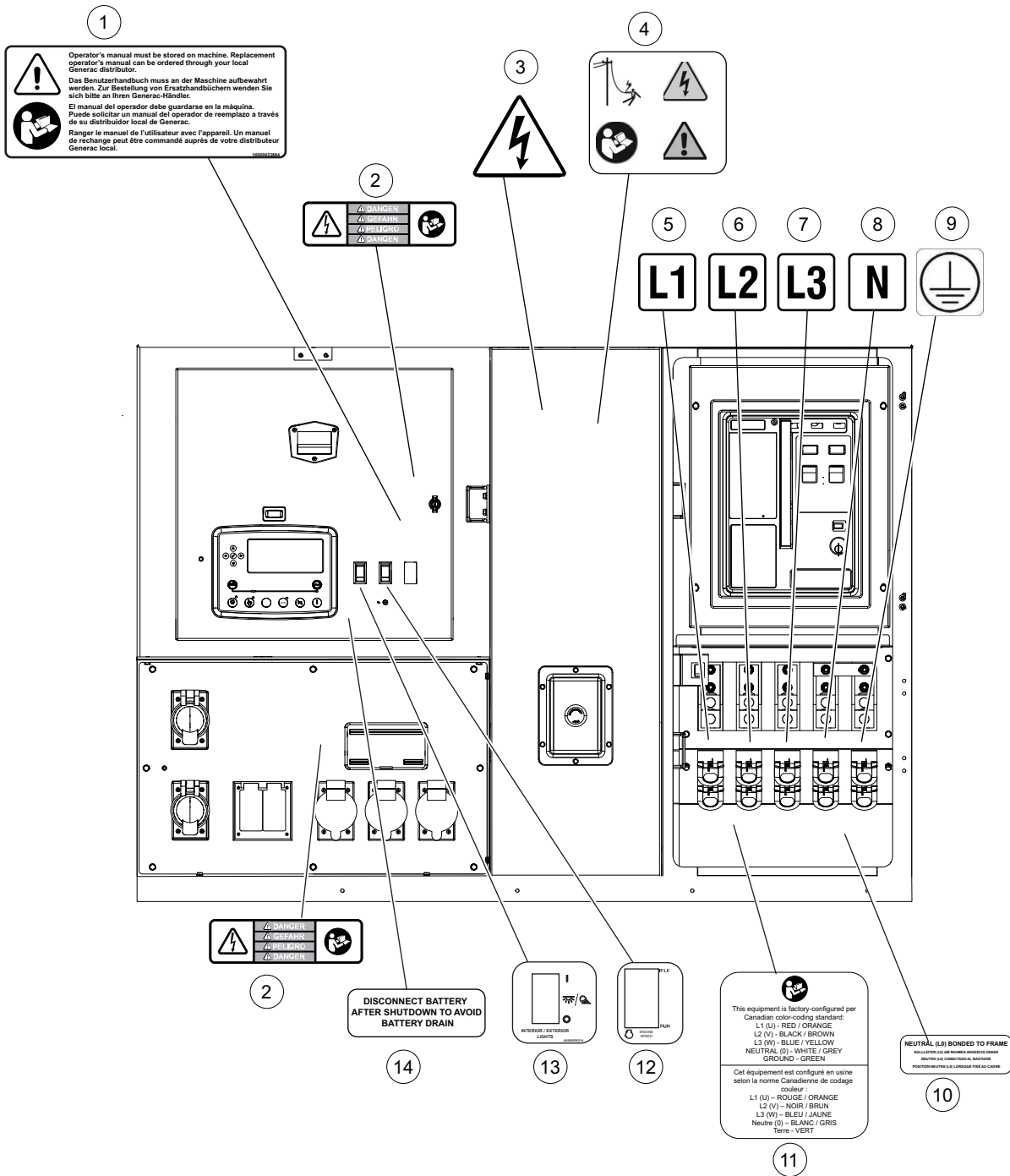
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Figure 1-2. Interior Decals

- | | |
|--|--|
| <ul style="list-style-type: none"> 1 Fan belt blade temp guard 2 Radiator fill hazard 3 Operator Manual Storage 4 Connection lug ground 5 Battery disconnect 6 Gen guard temp warning 7 Electrical danger—read manual | <ul style="list-style-type: none"> 8 Danger: Only qualified personnel may install equipment 9 Warning: Auto-start—Disconnect battery before service 10 Reconnect box 4 Lang 11 Battery explosion 12 Pinch point 13 Alternator lift 14 Electrical danger—read manual |
|--|--|



015075

Figure 1-3. Panel Decals

- | | |
|---|--|
| <p>1 Operator manual storage</p> <p>2 Electrical danger—read manual</p> <p>3 Electrical hazard</p> <p>4 ISO generator backfeed</p> <p>5 Connection lug L1 32 mm</p> <p>6 Connection lug L2 32 mm</p> <p>7 Connection lug L3 32 mm</p> | <p>8 Connection lug NEU 32 mm</p> <p>9 Connection lug GND 32 mm</p> <p>10 Neutral bonded to frame</p> <p>11 US cam lock—single pin</p> <p>12 Engine speed switch</p> <p>13 Interior-exterior light switch</p> <p>14 Disconnect battery</p> |
|---|--|

Section 2: General Information

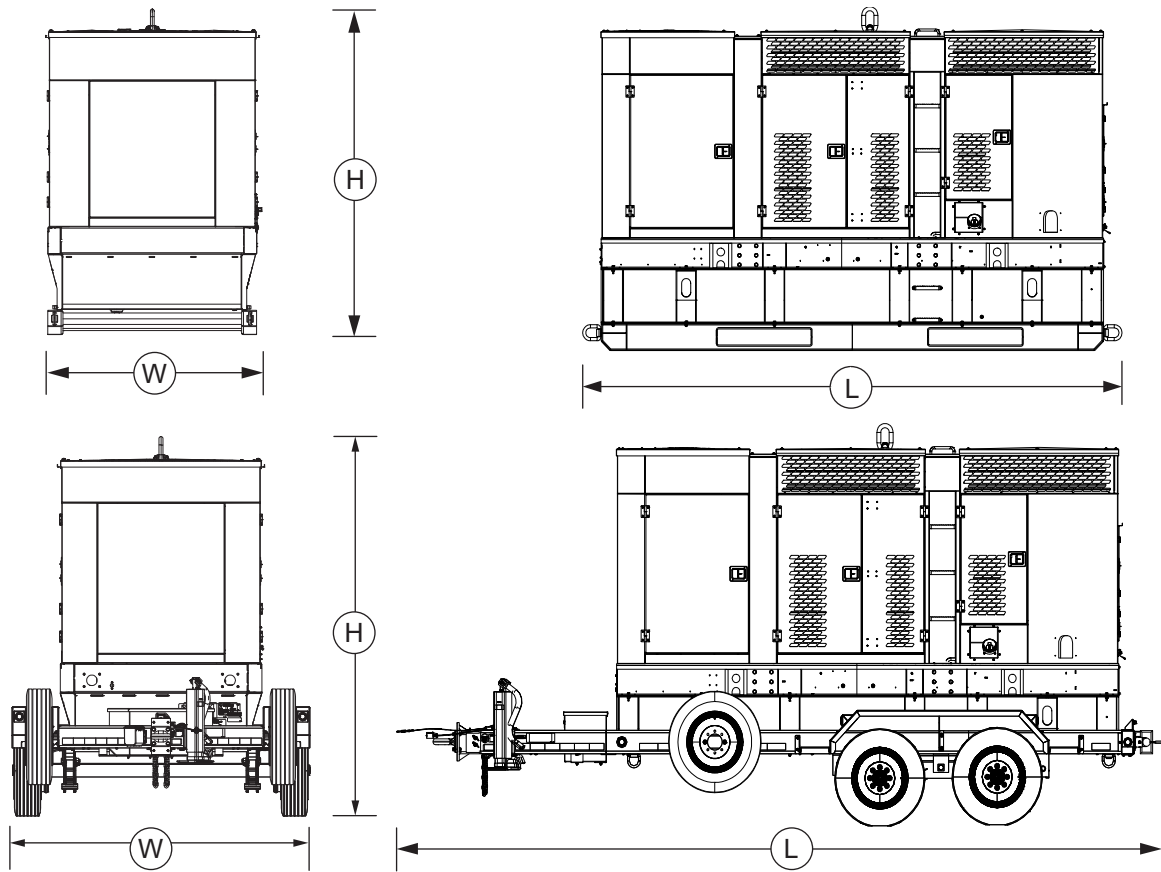
Specifications

Description	Unit Of Measure	MDE330P
Engine		
Make (Model)	—	Perkins® (1706J-E93TAG2)
Rated Power Output—Prime	hp (kW)	411 (307)
Operating Speed	rpm	1,800
Fuel Consumption—100% Prime	gph (L/hr)	19.7 (74.6)
Fuel Consumption—75% Prime	gph (L/hr)	14.5 (54.9)
Fuel Consumption—50% Prime	gph (L/hr)	10.1 (38.2)
DEF Consumption—100% Prime	gph (L/hr)	1.6 (6.0)
EPA—Emissions Certification	Tier	4 Final
Battery—Group Number	—	31
Battery—Voltage (Quantity Of Batteries)	VDC (qty)	24 (2)
Battery—Rating	CCA	950
Alternator System		
Standard Alternator		
Make (Model)	—	Leroy Somer™ (LSA 46.3 L10)
Frequency	Hz	60
Excitation Method	—	PMG
Power Output:		
3Ø Standby:		
208/120 VAC	kW/kVA (A)	288/360 (1,000)
240/120 VAC	kW/kVA (A)	290/363(873)
480/277 VAC	kW/kVA (A)	290/363 (437)
3Ø Prime:		
208/120 VAC	kW/kVA (A)	264/330 (917)
240/120 VAC	kW/kVA (A)	264/330 (795)
480/277 VAC	kW/kVA (A)	264/330 (397)
Optional SUPERSTART® Alternator		
Make (Model)	—	Leroy Somer (LSA 46.3 L11)
Frequency	Hz	60
Excitation Method	—	PMG
Power Output:		
3Ø Standby:		
208/120 VAC	kW/kVA (A)	288/360 (1,000)
240/120VAC	kW/kVA (A)	290/363(873)
480/277 VAC	kW/kVA (A)	290/363 (437)
3Ø Prime:		
208/120 VAC	kW/kVA (A)	264/330 (917)
240/139 VAC	kW/kVA (A)	264/330 (795)
480/277 VAC	kW/kVA (A)	264/330 (397)
Optional VFLEX Alternator		
Make (Model)	—	Leroy Somer (LSA 46.3 L11)
Frequency	Hz	60
Excitation Method	—	PMG
Power Output:		
3Ø Standby:		
208/120 VAC	kW/kVA (A)	288/360 (1,000)
240/120 VAC	kW/kVA (A)	290/363(873)

Description	Unit Of Measure	MDE330P
480/277 VAC	kW/kVA (A)	290/363 (437)
600/346 VAC	kW/kVA (A)	290/363 (349)
3Ø Prime:		
208/120 VAC	kW/kVA (A)	264/330 (917)
240/139 VAC	kW/kVA (A)	264/330 (795)
480/277 VAC	kW/kVA (A)	264/330 (397)
600/346 VAC	kW/kVA (A)	264/330 (318)
Weights		
Skid Mounted		
Dry	lb (kg)	12,132 (5,502)
Operating (Maximum)	lb (kg)	15,324 (6,949)
Trailer Mounted		
Dry	lb (kg)	13,778 (6,248)
Operating (Maximum)	lb (kg)	16,970 (7,696)
Capacities		
Standard Single Wall Fuel Tank—Total	gal (L)	421 (1,593)
Standard Single Wall Fuel Tank—Usable	gal (L)	381 (1,442)
Optional Double Wall Fuel Tank—Total	gal (L)	421 (1,593)
Optional Double Wall Fuel Tank—Usable	gal (L)	381 (1,442)
DEF Tank—Total	gal (L)	56.6 (214)
DEF Tank—Usable	gal (L)	49.4 (186)
Coolant—Including Engine	gal (L)	10 (37.8)
Oil—Including Filter	gal (L)	7.9 (30)
Maximum Run Time		
Fuel Tank—75% Load	hr	26.2
AC Distribution		
Circuit Breaker Size	A	1,000
Trailer		
Hitch—Standard	Size, Type	3 in (76.2 mm), Ring
Maximum Tire Pressure	psi (kPa)	125 (862)

Specifications are subject to change without notice.

Unit Dimensions



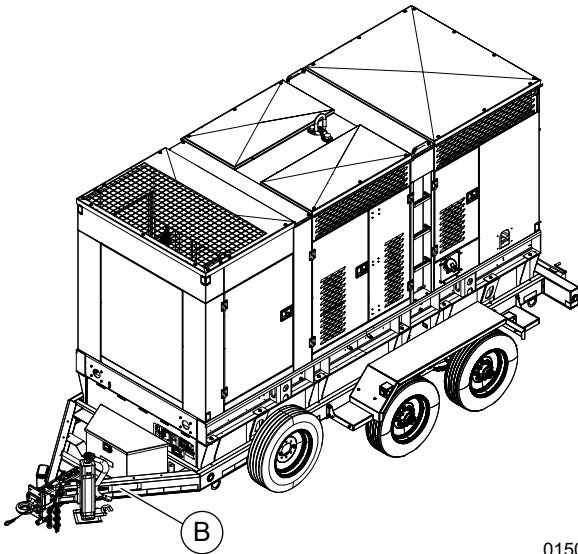
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Figure 2-1. Unit Dimensions

	L	W	H
Skid Mounted	168.0 in (4.26 m)	64.0 in (1.62 m)	101.0 in (2.56 m)
Trailer Mounted	232.0 in (5.89 m)	94.5 in (2.4 m)	115.0 in (2.92 m)

Unit ID and VIN Tag Locations

See **Figure 2-2** The unit ID tag is located on the control panel face. The vehicle identification number (VIN) tag (B) is located on the drivers side of the trailer tongue. Important information such as the unit model number, serial number, VIN, and tire loading information are listed on the tags. Record the information from the tags in the event the tags are lost or damaged. This information may be required when ordering parts or requesting assistance.



015072

Figure 2-2. Unit ID and VIN Tag Locations

Altitude and Temperature Limitations

All units are subject to derating for altitude and temperature. Derating reduces the power available for operating tools and accessories connected to the outlets.

- **Altitude:** This unit can provide full prime power up to 1,640 ft (500 m) above sea level. Above that, power output is reduced by 2% for every additional 820 ft (250 m) of elevation.
- **Temperature:** This unit can provide full prime power up to 109 °F (43 °C) ambient air temperature. Above that, a power derate of 3.5% per 41 °F (5 °C) above the maximum would apply.

Wet Stacking

This unit is powered by a diesel engine. Wet stacking is a condition in diesel engines in which not all fuel is burned. Unburned diesel fuel passes into the exhaust system, where it accumulates. Wet stacking is often caused by operating the engine below about 30% of its rated capacity. Damaging effects fuel injector fouling, oily buildup on engine valves, and deposits on aftertreatment components. Always operate the engine between 30% and 100% of its rated capacity. Appropriate generator sizing is determined by the anticipated load. It is not recom-

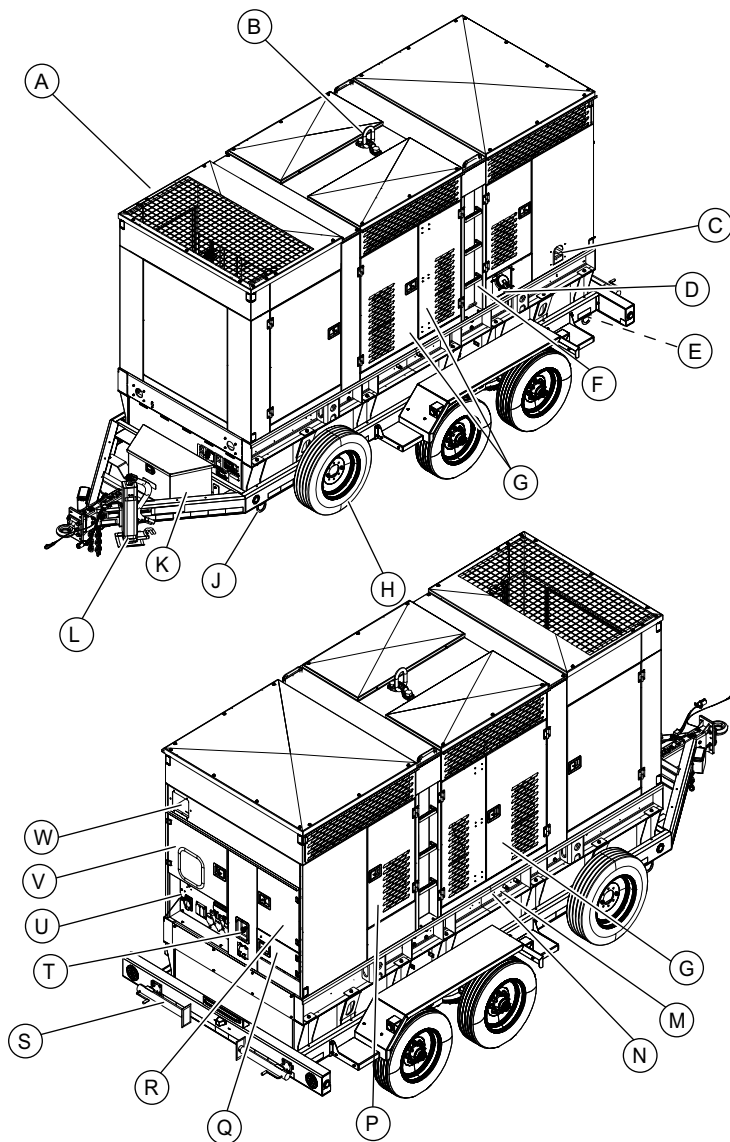
mended to run the engine in idle (1100 RPM) conditions for more than 10 minutes. This prevents the engine controller from activating the load management system and can lead to engine and after treatment problems

Load Management System

This engine is equipped with a standard exhaust temperature management (ETM) load management system.

When a low-load condition exists, ETM activates a regeneration cycle, introducing heat into the exhaust system. This process helps to maintain proper operating temperatures in the exhaust, and helps to clean catalysts of deposits due to low loading.

Component Locations—Unit Exterior

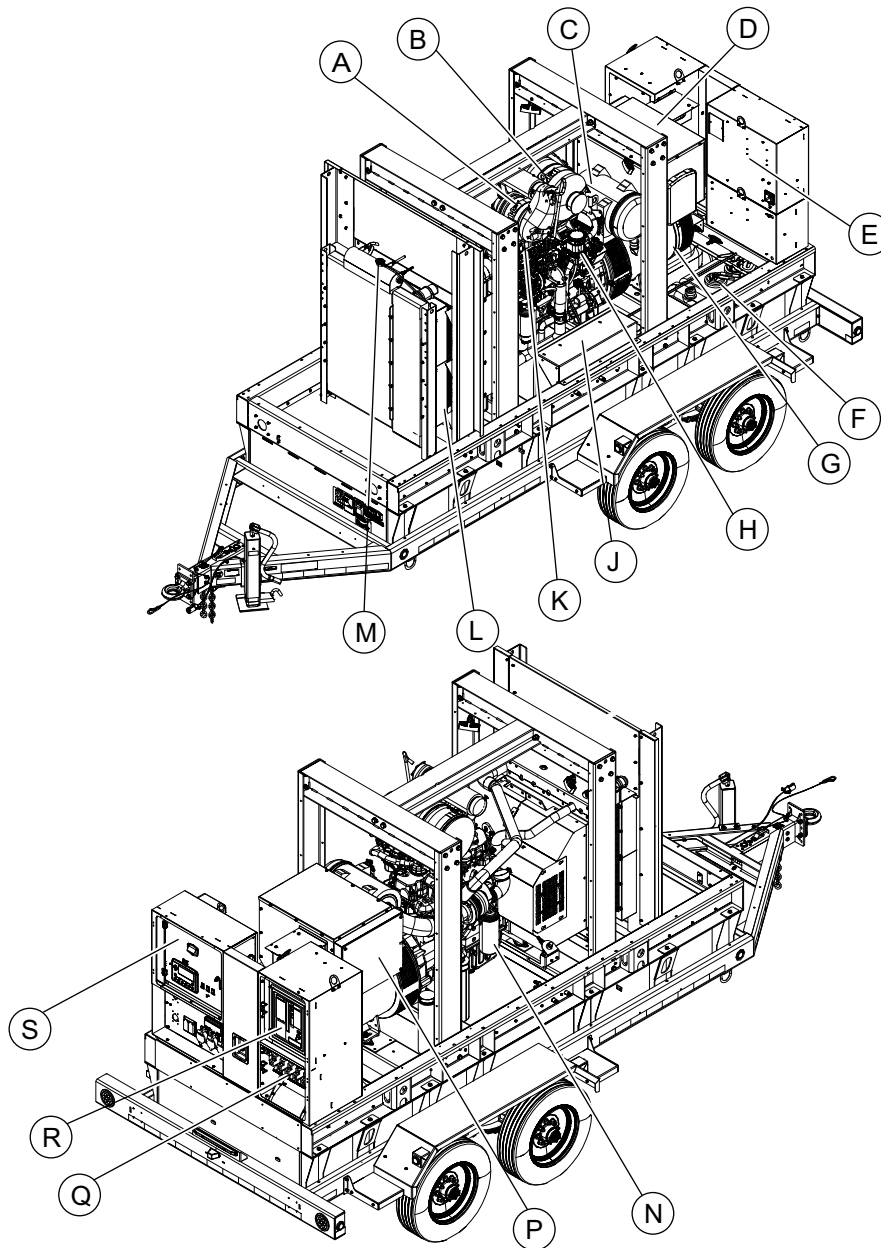


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Figure 2-3. Exterior Components

- | | |
|--|--|
| A Hot air/exhaust duct | M Coolant drain |
| B Central lift point | N Engine oil drain |
| C Diesel exhaust fluid (DEF) fill port | P Generator and link board access door |
| D Fuel fill | Q 3-phase AC power distribution access door |
| E DEF drain (not shown—unit underside) | R Breaker panel access panel |
| F Ladder | S Stabilizer jack (2 locations) (if equipped) |
| G Engine and generator (genset) access door | T Emergency stop switch |
| H Spare tire (2 locations) (if equipped) | U Receptacle panel |
| J Tie-down point (4 locations) | V Control panel access door |
| K Toolbox (if equipped) | W Telemetry (if equipped) |
| L Tongue jack | |

Component Locations—Unit Interior

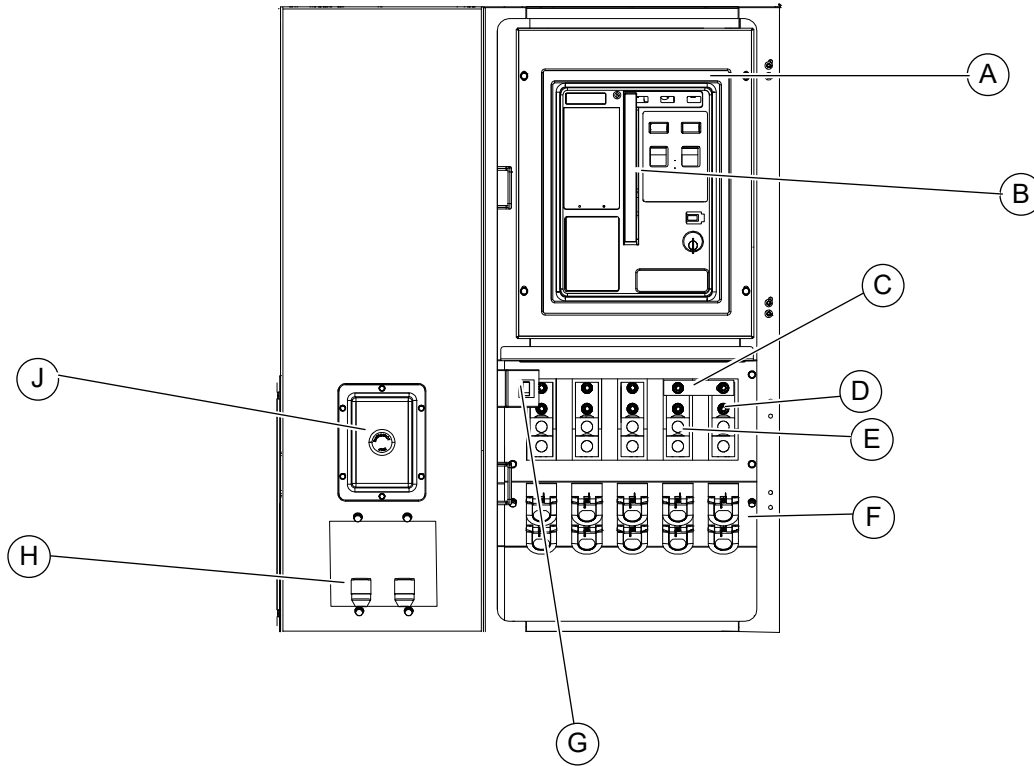


015078

Figure 2-4. Interior Components

- | | |
|--|---|
| A Diesel oxidation catalyst (DOC) and Diesel particulate filter (DPF) | K Engine charge alternator (behind engine fan) |
| B Selective catalytic reduction (SCR) module | L Radiator/charged air cooler |
| C Air filter | M Radiator fill |
| D Generator box | N Engine oil filters |
| E Battery charger (if equipped) | P Link board panel |
| F DEF tanks | Q 3-phase AC power connection panel |
| G Generator | R Breaker panel |
| H Crankcase ventilation (CCV) filter | S Control panel |
| J Batteries | |

Component Locations—AC Distribution Panel

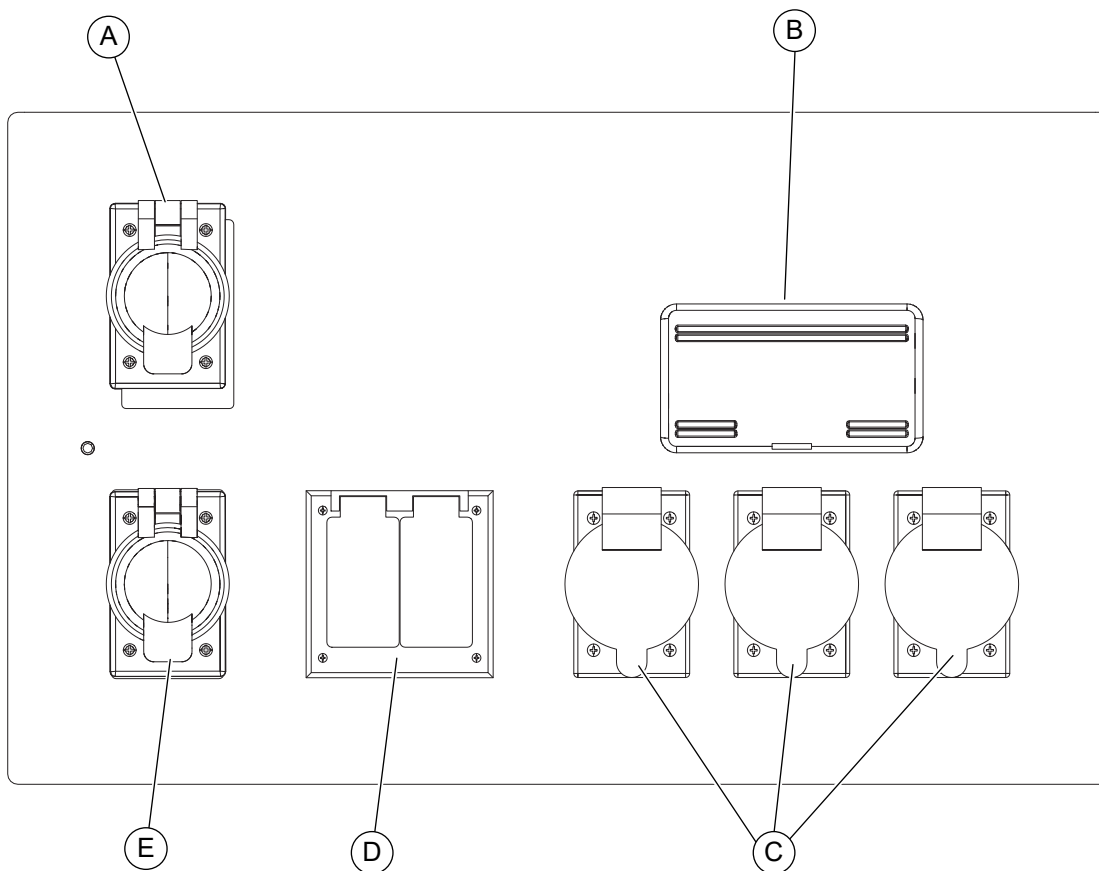


015079

Figure 2-5. AC Distribution Panel Components

- | | |
|---|---|
| A Main Line Circuit Breaker (MLCB) | F Cam lock receptacle (10 locations) (if equipped) |
| B Charging lever | G Lug door safety switch |
| C Neutral bonding bar | H Parallel ports |
| D Ground terminal | J Emergency stop switch |
| E Terminal lug (4 locations) | |

Component Locations—Receptacle Panel

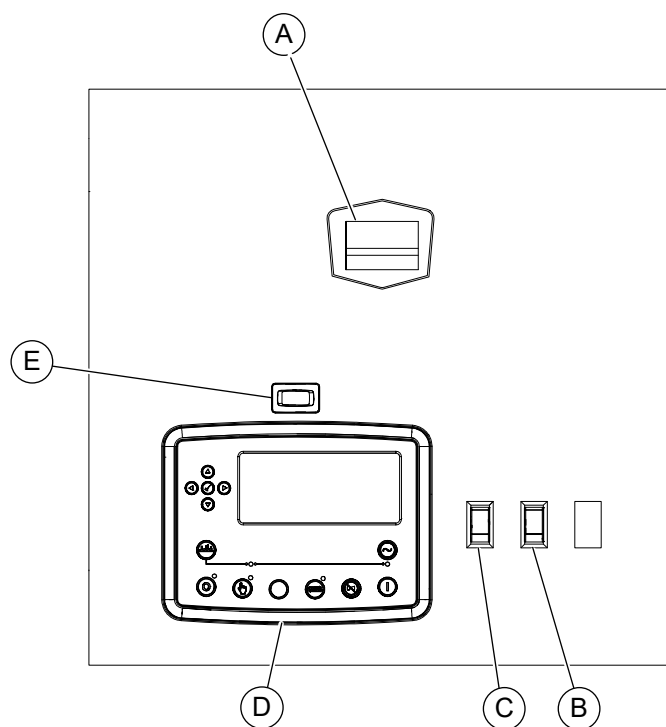


014007

Figure 2-6. Receptacle Panel Components

- | | |
|--|--|
| A 125 V, 15 A battery charger shore power plug (NEMA 5-15P) (If equipped) | D 120 V, 20 A, GFCI, duplex outlets (NEMA 5-20R) |
| B Receptacle panel circuit breakers | E 125 V, 30 A, winter heater shore power plug (NEMA L5-30P) (If equipped) |
| C 240 V, 50 A, 3 pole, twist-lock outlet (CS6369) | |

Component Locations—Control Panel



014008

Figure 2-7. Control Panel Components

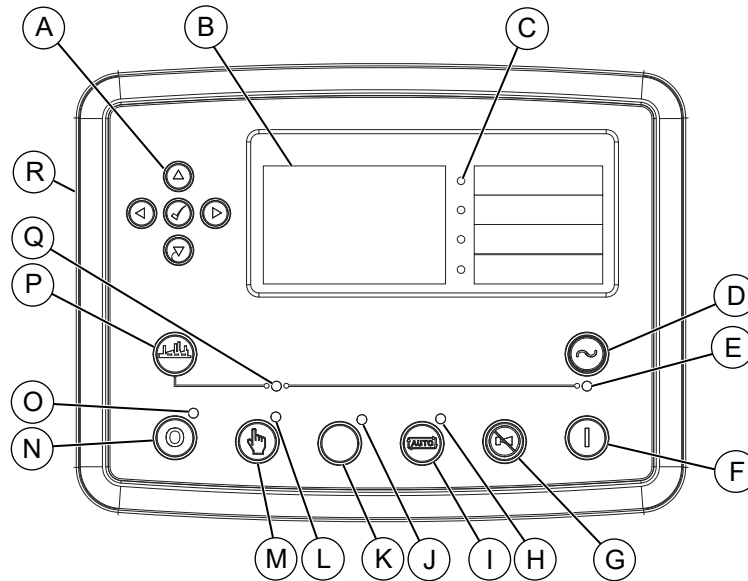
- | | |
|---|----------------------------|
| A Panel light | D Genset controller |
| B RUN-IDLE switch | E Hour meter |
| C Switch for control panel lights and optional interior lights | |

Genset Controller

See [Figure 2-8](#). The genset controller displays real-time operational data, monitors functions of the generator and engine, shuts down the unit for certain fault conditions, displays fault data, and retains up to 250 unit performance events.

The controller is programmable. It can automatically start and stop the genset according to schedule, fault condition, or load demand.

IMPORTANT NOTE: All units are equipped with the illustrated controller. Controller programming varies in accordance with unit equipment.



010417

Figure 2-8. Genset Controller—Deep Sea® Model DSE8610 MKII

- | | |
|--|---|
| A Navigation buttons | J Positive air shutoff (PAS) valve test switch LED (if equipped) |
| B Screen | K PAS valve test switch (if equipped) |
| C Indicator LED (4 locations) | L MANUAL Mode LED |
| D Transfer to Generator button | M MANUAL Mode button |
| E Generator Available LED | N Engine STOP/RESET Mode button |
| F Engine START button | O Engine STOP/RESET Mode LED |
| G Alarm Mute and Lamp Test button | P Open Generator button |
| H AUTO Mode LED | Q Open Generator LED |
| I AUTO Mode button | R RS232 serial port (not shown—controller backside) |

Genset Controller With Paralleling (If Equipped)

If the unit is equipped to run in parallel with other units, the controller is specifically programmed with paralleling functions.

Observe the following guidelines when operating units in parallel configuration:

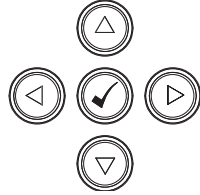
- Paralleling-equipped units can be connected **ONLY** to other paralleling-equipped units.
- Before operating units in parallel configuration, verify each unit is operating correctly, in accordance with this manual.

- To verify the units intended for paralleling are appropriate for the load, contact Generac Mobile at 1-800-926-9768.

See [Operation](#) for unit paralleling setup and operation.

(A) Navigation Buttons

See [Figure 2-9](#). Used to navigate the operator pages.



010418

Figure 2-9. Navigation Buttons

Navigate the operator pages as follows.

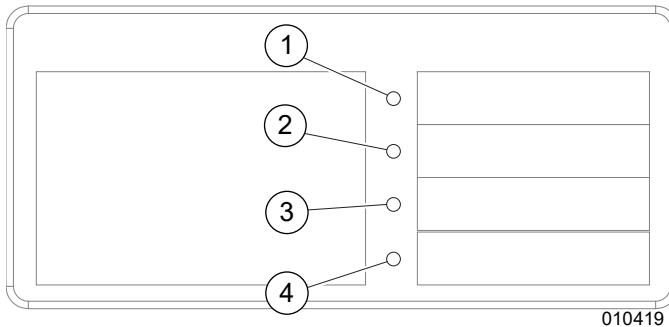
- ▶ View next
- ◀ View previous
- ▲ Scroll up current
- ▼ Scroll down current
- ✓ Select highlighted item

(B) Controller Screen

The controller screen displays various operational data for unit monitoring, diagnosing, and troubleshooting. See [Operator Pages](#) for more information.

(C) Indicator LEDs

See [Figure 2-10](#). Each LED indicates a condition that impedes normal unit function.



010419

Figure 2-10. Indicator LEDs

If an indicator LED is illuminated, resolve the condition to restore normal unit function, as described in table below.

NOTE: When a condition is resolved, the corresponding indicator LED switches off.

(1) Low Load indicator LED.

- Indicates genset has operated at less than 30% capacity for more than 15 minutes.
- Resolve by increasing electrical load. If unable to operate genset at more than 30% load, use a smaller generator.

(2) Lug Door Open indicator LED.

- Indicates lug-box door is open.
- Resolve by closing lug-box door. If condition remains unresolved, inspect lug-box door safety switch for proper operation.

(3) Emergency Stop indicator LED.

- Indicates Emergency Stop switch is active (pushed in).
- Resolve by deactivating (pulling out) Emergency Stop switch.

(4) Shutdown indicator LED.

- Indicates a shutdown alarm is present.
- Resolve by resolving shutdown condition.

NOTE: If unable to resolve a condition as recommended, contact a GMASD.

(D) Transfer to Generator Button

Only applies to MANUAL mode.

Controls operation of generator load switch, when the generator is available.

NOTE: In units equipped with a manual breaker, this function is not available.

Status is indicated by the Close Generator LED.

(E) Close Generator LED

- When illuminated, the main circuit breaker is closed, and cam locks and lugs are enabled.
- When not illuminated, the main circuit breaker is open, and cam locks and lugs are disabled.

(F) Engine Start Button

When STOP/RESET mode is active, the Engine Start button switches on the engine ECU but does not start the engine. Uses in this context are to check status of the CAN communication and to prime the engine.

When MANUAL mode is active, the Engine Start button starts the generator.

NOTE: In AUTO or STOP mode, the Engine Start button activates the ECU.

(G) Alarm Mute and Lamp Test Button

Stops the audible alarm and illuminates functional controller LEDs.

To test the LEDs, press and hold button. All LEDs illuminate. When button is released, the LEDs switch off.

NOTE: If an LED does not illuminate when button is pushed, the LED is not functioning.

(H) AUTO Mode LED

- When illuminated, AUTO mode is active.
- When not illuminated, AUTO mode is not active.

(I) AUTO Mode Button

Switches the mode to AUTO. See [Controller Modes](#) for important guidelines.

Status is indicated by the AUTO Mode LED.

(J) PAS valve test switch LED (if equipped)

When illuminated, PAS test is in progress.

(K) PAS valve test switch (if equipped)

When PAS test is active, the PAS is cycled once for 15 seconds to verify function. Press and hold test button until message is displayed on screen. Release button and allow PAS to cycle.

(L) MANUAL Mode LED

- When illuminated, MANUAL mode is active.
- When not illuminated, MANUAL mode is not active.

(M) MANUAL Mode Button

Switches the mode to MANUAL. See [Controller Modes](#) for important guidelines.

Status is indicated by the MANUAL Mode LED.

(N) Engine STOP/RESET Mode Button

Switches the mode to STOP. See [Controller Modes](#) for important guidelines.

Status is indicated by the STOP/RESET Mode LED.

(O) Engine STOP/RESET Mode LED

- When illuminated, STOP mode is active.
- When not illuminated, STOP mode is not active.

(P) Open Generator Button

The Open Generator button is only active in the Manual Mode and allows the operator to open the generator load switch when a motorized breaker is used. Pressing the Open Generator button when the Generator is on load, the generator main circuit breaker switch is open.

NOTE: In units equipped with a manual breaker, either limited or no function is available.

Status is indicated by the Open Generator LED.

(Q) Open Generator LED

- When illuminated, cam locks and lugs are disabled.
- When not illuminated, cam locks and lugs are enabled.

Controller Modes

NOTE: See [Operation](#) for instructions on changing controller mode.

MANUAL Mode

MANUAL mode is distinguished by full operator control of unit start-up and shut-down functions, and by full operator control of generator load and unload functions.

AUTO Mode

AUTO mode is distinguished by automation of unit start-up and shut-down functions, and by automation of generator load and unload functions.

AUTO mode utilizes the remote start connections. For remote starting procedures, see [Operation](#).

AUTO mode utilizes a programmed schedule, which can be modified.

NOTE: To modify the AUTO mode programmed schedule, use the Deep Sea Configuration Suite software.

STOP/RESET Mode

STOP/RESET mode is distinguished by the following:

- Unloads the generator.
- Clears active alarms—if alarm conditions have been resolved.
- Shuts down the unit.
- Deactivates the Engine Start button.
- Stops all AUTO mode automation (if applicable).
- Controller power remains ON.

Operator Pages

Operator pages display various data for unit monitoring, diagnosing, and troubleshooting. The pages are:

- Home page
- Status page
- Engine page
- Generator page
- Alarm page
- ECU DTC page
- Event Log page
- Serial Port page
- Program File Information page
- About page

NOTE: Operator pages are available after normal unit start-up.

NOTE: Operator pages are view-only. No settings can be added, modified, or deleted.

Home page

When no other page has been selected, or after a period of controller inactivity, the Status page automatically displays. This is the Home page.

NOTE: The Home page varies, according to the state of the unit.

- See [Figure 2-11](#) for Home page when engine is stopped.

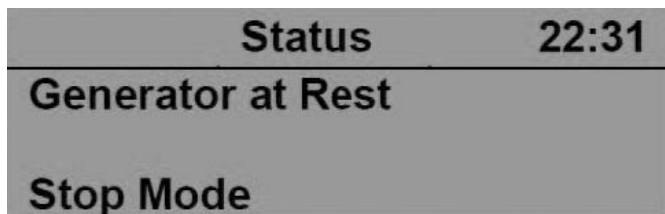


Figure 2-11. Home Page—Engine Stopped

- See [Figure 2-12](#) for home page when engine is running.

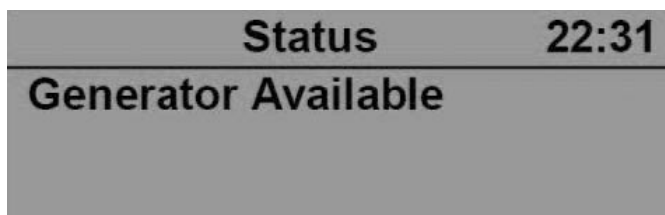


Figure 2-12. Home Page—Engine Running

Generator Page

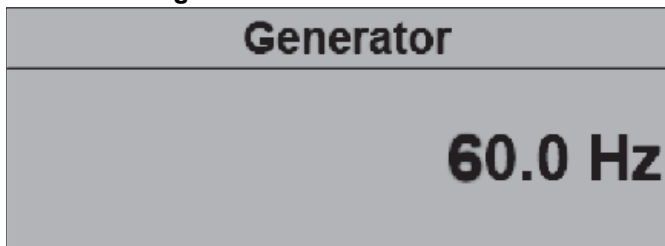


Figure 2-13. Generator Page

The Generator page displays the following generator data, in real time (press ▲ or ▼ to scroll).

- Voltage (ph-N)
- Voltage (ph-ph)
- Frequency
- Current (A)
- Load ph-N (kW)
- Total load (kW)
- Load ph-N (kVA)
- Total load (kVA)
- Single phase power factors
- Power factor average
- Load ph-N (kvar)
- Total load (kvar)
- Accumulated load (kWh, kVAh, kvarh)
- Loading scheme
- Phase rotation
- Nominal
- Active configuration

NOTE: The list in the previous column varies according to generator make, model, and features.

NOTE: As possible, distribute electrical loads equally among generator lines. Minor load imbalances (10% or less) usually do not cause problems. When loading generator, observe the load (amperage) on each line.

Alarms Page

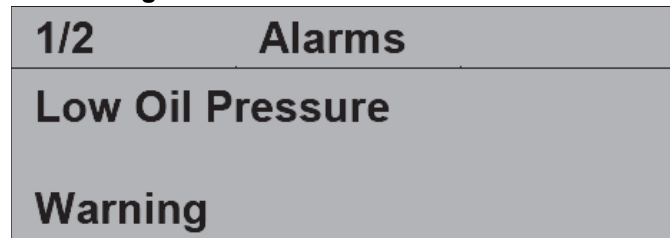


Figure 2-14. Alarm Page

The Alarms page displays active warnings and active alarms, including engine DTCs.

ECU DTC Page

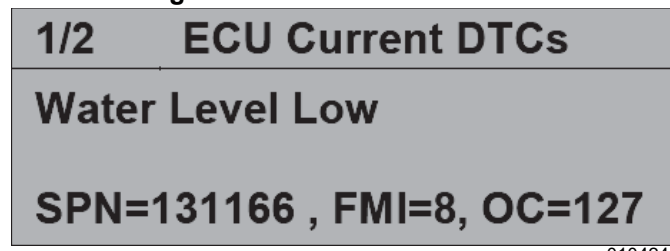


Figure 2-15. ECU DTC Page—Current DTCs

The ECU Current DTC page displays active ECU DTCs. Press ► to view previous ECU DTCs.

NOTE: See engine manual for information on ECU DTCs.

NOTE: All DTCs display on the ECU DTC page. Some DTCs also display in the Event Log, with similar descriptions.

Event Log Page

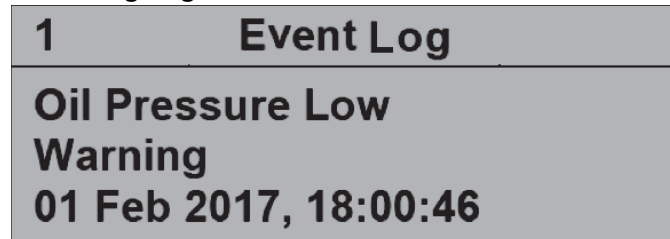


Figure 2-16. Event Log Page

The Event Log page displays current and previous alarms.

- Event Log capacity is 250 alarm events. After 250 events are logged, each new event overwrites the oldest.
- Only alarms are logged.

- Newest event displays at top of log; oldest at bottom.

Serial Port Page

The Serial Port page displays information about the RS232 serial port, which enables data transfers. If an external modem is connected to the serial port, modem information also displays.

NOTE: The Serial Port page display may vary, in accordance with controller configuration.


See [Figure 2-17](#). If a modem is connected to the controller, *Modem* displays, as illustrated.

Serial Port	
Baud	9600
SlaveID	10
Modem	

010426

Figure 2-17. Serial Port Page. If modem is not connected, RS232 displays in place of Modem.

See [Figure 2-18](#). When the controller can accept a data transfer, *Modem Ready* displays, as illustrated.

Serial Port	
	
Modem Ready	

010427

Figure 2-18. Serial Port Page—Modem Ready

Program File Information Page

PROGRAM FILE INFORMATION

014037

Figure 2-19. Program File Information Page

The Program File Information page displays the following controller information.

- Controller model unit
- Program file name
- Program PN
- Program version

About Page

About	
Variant	7310
Application	V5.0.23
USB ID	6B248D0576

About	
Bootloader	V3.2.1
Analogue	V1.2.0

About	
Engine Type	
Version	

010429

Figure 2-20. About Page

The About page displays various general information about the unit and controller, as illustrated.

Maintenance Alarms

Maintenance alarms indicate a regular-maintenance service interval is expired. To resolve the condition, perform the indicated service, then re-set the corresponding service interval.

To re-set a service interval:

1. Display the Engine page.
2. Scroll (▲ or ▼) until the appropriate service interval is highlighted.

NOTE: The expired interval displays on the Alarm page.

3. Press and hold the Engine STOP/RESET Mode button until **###* hr service** changes to **0 hr service**.

**A number displays. The value varies according to what service interval is highlighted.*

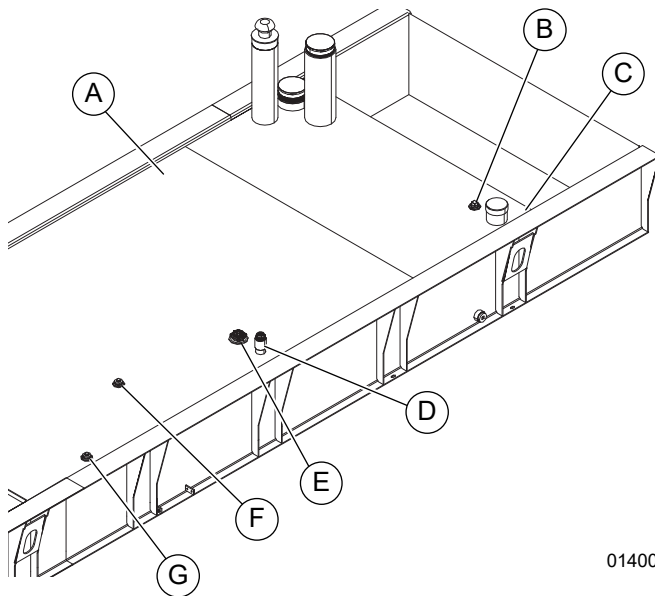
Fuel System

Standard units are equipped with the following fuel system components:

- Single wall fuel tank
- Engine fluid containment
- Engine fluid containment sensor

Fuel Tank

See [Figure 2-21](#) for fuel tank components.



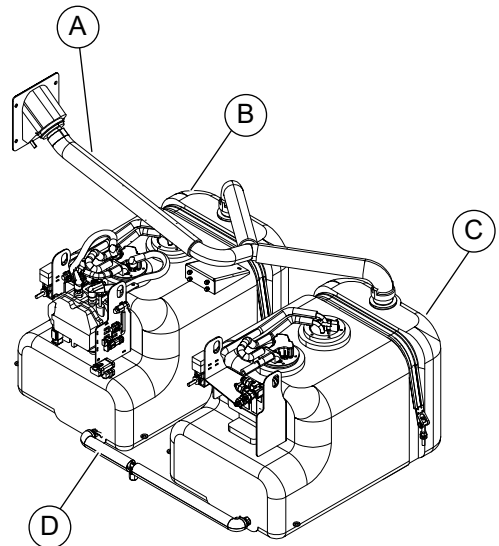
014009

Figure 2-21. Fuel Tank

- A** Single-wall or double-wall fuel tank
- B** Auxiliary fuel tank connection
- C** Engine fluids (oil, coolant, and DEF) leak detection sensor
- D** Fuel leak detection sensor (Rupture basin alarm) (if equipped)
- E** Fuel level sender
- F** Fuel supply
- G** Fuel return

Dual Diesel Exhaust Fluid (DEF) Tank System

See [Figure 2-22](#) for DEF tank components.

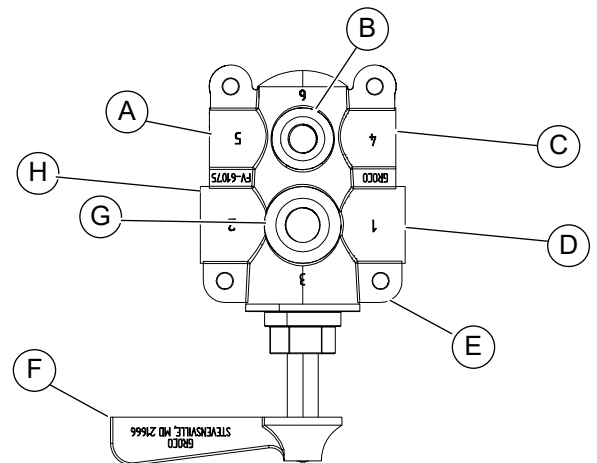


015091

Figure 2-22. Dual DEF Tank System

- A** Fill neck
- B** Primary tank
- C** Secondary tank
- D** Heated line/drain hose

3-Way Fuel Valve (If Equipped)



015092

Figure 2-23. 3-Way Fuel Valve

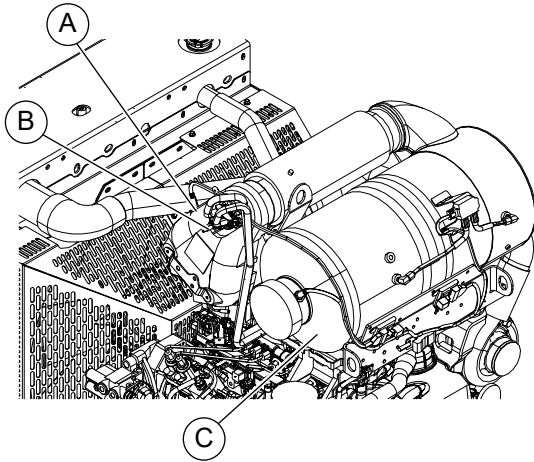
- A** Fuel return to main tank
- B** Fuel return from engine
- C** Fuel return to AUX tank
- D** Fuel supply from AUX tank
- E** Valve body
- F** Handle
- G** Fuel supply to engine
- H** Fuel supply from main tank

rates to show the status of the ECU function, refer to the engine manufacturer for more information about this.

Engine After Treatment Monitoring

This section describes the indicators that display on the After Treatment Status page of the Engine tab.

Figure 2-24. This unit is equipped with a diesel oxidation catalyst (DOC), diesel particulate filter (DPF), and selective catalyst reduction system (SCR), to meet Tier 4 Final EPA emissions standards.



015088

Figure 2-24. Aftertreatment System

- A** DOC and DPF
- B** DEF Injector
- C** SCR module

To access the After Treatment Status status page:

1. Press an arrow button (▲, ►, ▼, or ◀) to access the Maintenance pages.
2. When on the Engine tab, press ▼ to scroll through the pages until the After Treatment Status page appears.

Four areas of the After Treatment Status page communicate information to the operator. The areas and the indicators that appear in those areas are explained here:

- **HEST Lamp (High Exhaust System Temperature):** This area displays the regeneration underway indicator above the words HEST LAMP - SOLID when the unit is in the process of the exhaust catalyst. During the regeneration process, the exhaust temperature will be very high.
- **DPF Regeneration Lamps:** Depending upon the Engine Type selected in the module's configuration, the Engine section may include the DPF Regeneration Lamps page. This page contains icons to show the status of various ECU functions, some of which are applicable to Tier 4 engine requirements. The icons flash at different

Icon	Fault	Description
	ECU Amber Alarm	The module received an Amber fault condition from the engine ECU..
	ECU Red Alarm	The module received a Red fault condition from the engine ECU.
	DPF Active	The module received a fault indication from the engine ECU informing that the Diesel Particulate Filter is active.
	DPF Inhibited	The module received a fault indication from the engine ECU informing that the Diesel Particulate Filter has been inhibited.
	DPF Stop	The module received a fault indication from the engine ECU informing that the Diesel Particulate Filter has been stopped.
	DPF Warning	The module received a fault condition from the engine ECU informing that the Diesel Particulate Filter has a fault condition.
	HEST Active	The module received a fault indication from the engine ECU informing that the High Exhaust System Temperature is active.
	DEF Low Level	The module received a fault condition from the engine ECU informing that the Diesel Exhaust Fluid Low Level is active.
	SCR Inducement	The module received a fault indication from the engine ECU informing that the Selective Catalytic Reduction Inducement is active.

See [Figure 2-25](#) for examples.

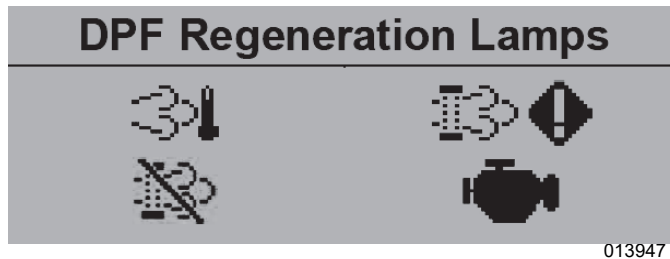


Figure 2-25. Icons—On-Screen Examples

- **Diagnostic Codes & Events:** This area will display the engine alarm indicator above the words ALARM - SOLID when an alarm condition occurs. This area displays different text depending upon which alarm condition occurs.

See [DOC, SCR, and DPF Cleaning Operations](#) for more information on the operation of auto exhaust filter regeneration and service regeneration.

Alternator

Standard Alternator

- Excitation: Permanent magnet generator (PMG)
- Voltage regulation: DSE A109 automatic voltage regulator (AVR). See [Voltage Regulator](#).
- Voltage fine tuning: See [Fine Tuning the Voltage](#).

Optional Alternators (If Equipped)

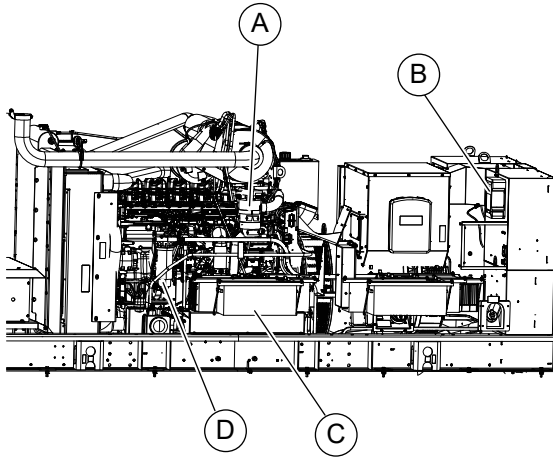
- SuperStart alternator: This unit may be equipped with a SuperStart alternator.
- VFLEX (600 V) alternator: This unit may be equipped with a VFLEX alternator.

Cold Weather Starting Aids and Operation (If Equipped)

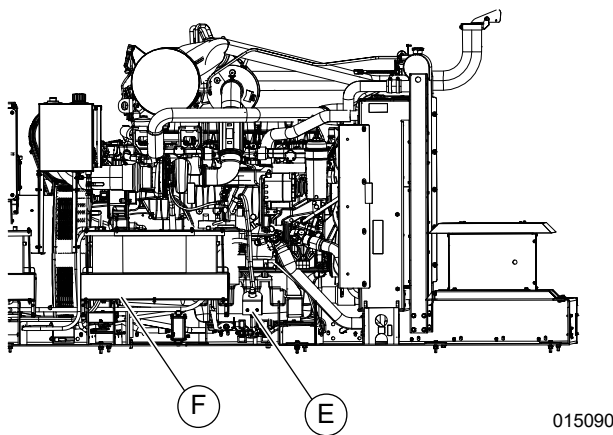
Component Locations

See [Figure 2-26](#). This unit may be equipped with one or more starting aids for cold weather operation.

Left Side



Right Side



015090

Figure 2-26. Parts Removed for Clarity

(A) Crankcase Ventilation Heater

54 W, 24 VDC.

(B) 30 A Battery Charger

Requires optional shore power inlet (see receptacle panel). See [Operation](#) for more information.

(C) 1,100 CCA Batteries

More cranking power for extreme cold.

(D) Fuel Filter Heaters (x2)

50 W, 24 VDC.

(E) Oil Pan Heater

1,000 W, 120 VAC. Requires optional shore power inlet (see receptacle panel).

(F) Block Heater

2,250 W, 120 VAC. Requires optional shore power inlet (see receptacle panel).

(Not Shown) 60/40 Coolant

60% ethylene glycol mixture lowers freezing point of coolant.

Recommendations



⚠ DANGER

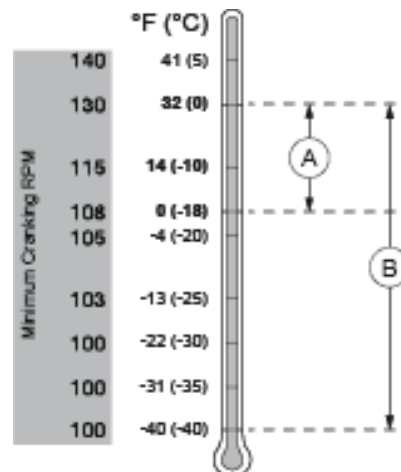
Explosion. Do not use ether when starting an engine equipped with glow plugs or an air intake heater. Doing so could cause an explosion, which will result in death or serious injury. (000583)

IMPORTANT NOTE: The use of correct grade oil is critical to achieving adequate cold weather cranking speed. Synthetic oils have improved flow at low temperatures. see [Engine Oil Recommendations](#).

Starting aids may be required under the following conditions:

- Cold weather.
- When starting equipment with high parasitic loads during cranking and start acceleration to idle.
- When using unit above 5,000 ft (1,500 m) altitude.

See [Figure 2-27](#). Recommended cold-weather packages vary in accordance with expected temperatures.



014040

Figure 2-27. Recommended Packages

(A) From 32 to 0 °F (0 to -18 °C)

Standard Cold Weather Package is recommended.

(B) From 32 to -40 °F (0 to -40 °C)

Extreme Cold Weather Package is recommended.

NOTE: See [Table 2-1](#) for components in each package.

Table 2-1. Packaged Components

Component	Standard Package	Extreme Package
Block heater	◆	◆
CCV heater	◆	◆
Battery charger	◆	◆
Fuel filter heater	◆	◆
Oil heater	◆	◆
Dual 4D batteries		◆
60/40 coolant		◆

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Section 3: Operation

Overview

The engine can be started in low-idle or at normal operating speed (1,800 rpm). In cold weather, it is recommended to start the engine in low-idle condition, and idle for up to one minute. That allows the engine oil to heat up before increasing engine speed and applying load. If the engine is in an idle condition for an extended period, the ETM may drive a higher engine speed to generate more heat and activate a regeneration.

IMPORTANT NOTE: The breaker cannot be closed while engine is in low-idle condition, as such load cannot be applied.

Low idle speed is 1,100 rpm.

Prestart Checklist

All items in the prestart checklist must be completed before starting the unit. This checklist applies to both manual and remote starting of the unit.



⚠️ WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

⚠️ WARNING

Equipment damage. Do not attempt to start or operate a unit in need of repair or scheduled maintenance. Doing so could result in serious injury, death, or equipment failure or damage. (000291)

- Read and understand all safety guidelines. See [Introduction and Safety](#).
- Perform daily maintenance and other periodic maintenance. See [Maintenance](#).
- Verify the unit is level.
- Verify no water is inside, on, or near the unit. Dry if needed.
- Ground the unit in accordance with all applicable local, state, and National Electrical Code (NEC) guidelines.
- Verify all circuit breakers are OFF.
- Inspect all electrical cords. Repair or replace any that are cut, worn, or bare.
- Verify oil, coolant, DEF, and fuel levels are correct, in accordance with the OEM engine manual.
- Verify battery connections are secure.
- Check engine fan belt tension and condition.

- Check engine fan belt guard.
- Check engine exhaust system for loose or rusted components.
- Verify all covers are in place and secure.
- Verify all electrical connections at the connection lugs, if equipped, are tight and wired correctly.
- Verify the link board is set to the desired voltage and locked.
- Verify the emergency stop switch is pulled out.
- Verify the radiator and surrounding shroud are clear of debris.
- Turn the battery disconnect switch ON.
- Open the fuel shutoff valve.

Cold Weather Operation

In cold environments, units equipped with starting aids are recommended. See [Cold Weather Starting Aids and Operation \(If Equipped\)](#).

When starting a unit equipped with starting aids, observe these guidelines:

- Follow supplier instructions for starting aids provided on engine.
- An optional 24 VDC, 30 A battery charger can be configured with the machine if needed and is recommended if machine is equipped with fuel filter heater or CCV heater. The shore power inlet receptacle (120 V, 15 A [5-15P]) can be located on the convenience receptacle panel. Shore power will be required to utilize on-board battery charger. When engine has started, the inlet receptacle can be disconnected as charger will no longer be needed if engine continues to run.

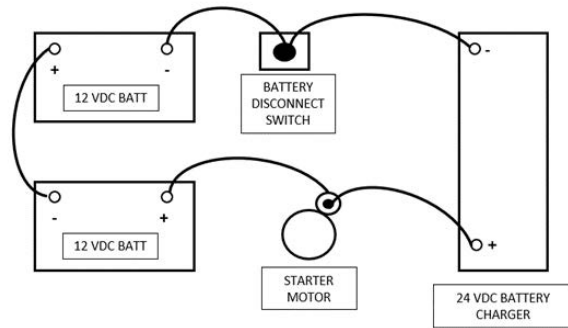
IMPORTANT NOTE: In cold temperatures, with the engine off, the DC-powered heaters for cold starting and cold-operation will deplete the engine-starting batteries if the batteries are not being charged by the optional onboard battery charger.

NOTE: If alternate battery charger is being used please see [Using An External Battery Charger](#) for correct charger connection.

- An optional coolant heater and oil pan heater can be configured to aide cold weather starting. The shore power inlet receptacle (125 V, 30 A) can be located on the convenience receptacle panel. Shore power will be required to utilize on-board coolant and oil pan heater. If machine has been stored at -40F (-40C) temperatures for 8 hours more, preheat times up to 6 hours might be required to provide adequate heating to coolant

and oil. Preheat time is reduced to 2 hours if ambient temperatures have not been colder than -4F (-20C). These heaters will cycle on and off as needed during preheat cycle. When engine has started, the inlet receptacle can be disconnected as heater will no longer be needed if engine continues to run.

- Optional fuel filter heaters (x2) can be configured with the machine to aid in cold weather starting and cold weather operation. These heaters are powered via the battery circuit (24 VDC). These heaters are equipped with a thermo-switch for automatic heater activation when ambient temperatures drop below the switch threshold. The battery disconnect switch must be switched to the ON position for these heaters to work. The machine must also be configured with a 24 VDC, 30 A battery charger to ensure maximum battery performance and heater operation.
- Optional crankcase ventilation heater can be configured with the machine to aide in cold weather operation. This heater is powered via the battery circuit (24 VDC). This heater is equipped with a thermo-switch for automatic heater activation when ambient temperatures drop below the switch threshold. The battery disconnect switch must be switched to the ON position for these heaters to work. The machine must also be configured with a 24 VDC, 30 A battery charger to ensure maximum battery performance and heater operation.
- Standard 50/50 coolant can be used down to 0 °F (-18 °C). If continued operation below 0 °F (-18 °C) is likely, it is recommended to use 60/40 coolant blend for optimal machine performance during cold weather operation.
- For more information on cold weather operation, see your local GMASD.



014011

Figure 3-1. Connecting Battery Charger

1. Connect battery charger to a power source.
2. Switch the battery disconnect switch to ON, completing the circuit of the batteries connected in series. This will allow charging of both batteries on the generator.
3. Connect the POSITIVE (+) cable of the battery charger to the positive post of the battery that is connected directly to the (+) post of the starter.
4. Connect the NEGATIVE (-) cable of the battery charger to the grounding lug on the frame located directly below the BDS as seen in the image.
5. Turn the charger to the correct voltage setting and charging current.
6. Start the engine. Disconnect jumper cables immediately after engine starts.

NOTE: To avoid sparks, do not allow free ends of jumper cables to touch metallic conductive material.

Using Two-Position Link Board



WARNING

Electrocution. Potentially lethal voltages are generated by this equipment. Render the equipment safe before attempting repairs or maintenance. Failure to do so could result in death or serious injury.

(000187)

IMPORTANT NOTE: Never attempt to open link board panel when engine is running. There is a safety switch that will shunt trip breaker and shut down generator if panel is removed.

The two-position link board mechanically configures the generator main windings.

This unit is equipped with one of three multi-voltage alternators capable of achieving up to 600 VAC. In addition to the link board, a two-position toggle switch can be used to select other voltages. A large decal on the link board cover panel details the proper connections for selected voltages.

1. Shut down the unit. See [Shutting Down the Unit](#).
2. Remove fasteners from link board cover panel.

Using An External Battery Charger



CAUTION

Equipment damage. Do not make battery connections in reverse. Doing so will result in equipment damage.

(000167a)

See [Figure 3-1](#). A 24 VDC battery charger can be connected to the batteries, to aid in cold weather starting. ALWAYS use heavy-duty jumper cables.

3. Loosen nuts securing link board plate to panel.
4. Position link board according to the correct configuration, to obtain the desired output voltage.
5. Tighten nuts 40 ft-lb (54.2 Nm).
6. See **Figure 3-2** and **Table 3-2**. Verify toggle switch (A) is in correct position for the desired voltage.

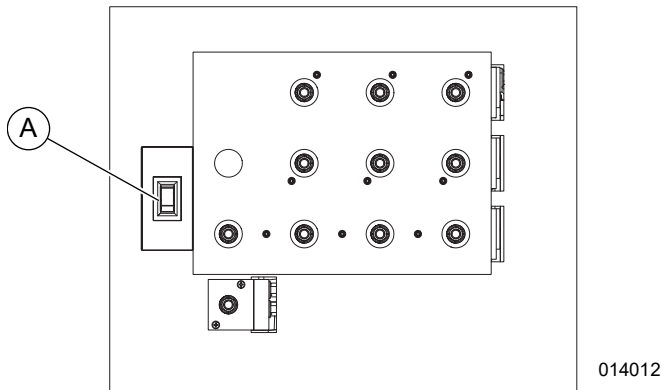


Figure 3-2. Link Board

Table 3-2. Link Board Positions, Voltage Settings

		Rocker Switch	
		Up	Down
Link Board	Up	240 VAC	208 VAC
	Down	600 VAC*	480 VAC

* If equipped. If unit does not have 600 VAC capability, it will default to 480 VAC.

7. Install link board cover panel. Tighten bolts to 10 ft-lb (13.6 Nm).

Lockout Function

The link board is equipped with a lockout mechanism. When engaged, the switch is locked in place, preventing configuration changes. If an attempt is made to access the link board, the controller will shunt trip the breaker and stop the engine.

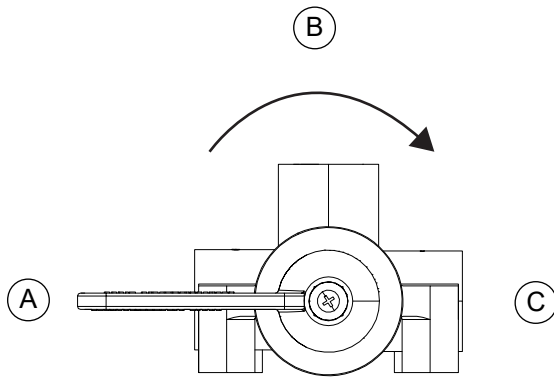
3-Way Fuel Valve (If Equipped)

The unit may come equipped with a 3-way fuel valve to provide longer autonomous running with the use of a larger auxiliary fuel tank. The placement of the auxiliary fuel tank should be directly adjacent to the generator. Avoid any dips or traps in the line between the generator and the auxiliary fuel tank. This will help to purge air from the circuit and improve the flow of fuel to the engine. The fuel tank should be on the same level ground/platform that the generator sits on. The maximum pumping height without an additional lift pump installed is 1.5m (60"). Fuel hoses longer than 15 feet coming out of the base frame rail can cause higher restrictions in the supply line resulting in performance issues, engine power derates

and/or fault codes due to high fuel pressure restrictions. A lift pump can be installed to push fuel from an external tank if a longer supply hose is required to connect the auxiliary tank, it shall have a maximum supply pressure of 100 kPa (14.7 PSI) and a flow capacity up to 127 GPH (480 LPH). The maximum pressure restriction at the filter head shall not be greater than -27 kPa. Pressure restrictions greater than this can cause permanent damage to the engine fuel system. The 3-way valve can then be rotated to the correct position to allow use of either the main tank or auxiliary tank. The third position will close the valve for both tanks. When using the auxiliary fuel tank, the main fuel tank must be maintained above a 15% fuel level. If the main tank fuel level is below 15%, a low fuel level warning will be displayed on the controller independent of the fuel level in the auxiliary fuel tank. If the fuel level in the main tank is below 5%, the engine will not start due to the low fuel level shut down alarm.

Fuel System Priming

When switching the 3-way valve to use the auxiliary fuel tank, the fuel system will need to be primed prior to starting the engine. This is to ensure there is adequate fuel in the lines and the air has been purged from the circuit. The priming function can be performed using the Perkins Service Tool or via the control panel. Please refer to the engine manual for instructions on how to use the Perkins Service Tool. Alternatively, the fuel system priming function can be performed by simultaneously pressing and holding for 3 seconds the "MANUAL MODE" and "ALARM MUTE" buttons on the controller. The fuel priming will start and run for 2 minutes. The engine must be off, the controller in STOP mode and the battery disconnect switch must be on. The engine cannot be started while the priming function is running.



015113

Figure 3-3. 3-Way Fuel Valve

- A Main Tank Supply
- B Aux Tank Supply
- C Valve Closed

Manually Starting the Unit



⚠ DANGER

Asphyxiation. Running engines produce carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide, if not avoided, will result in death or serious injury. (000103)



⚠ WARNING

Hot Surfaces. When operating machine, do not touch hot surfaces. Keep machine away from combustibles during use. Hot surfaces could result in severe burns or fire. (000108)

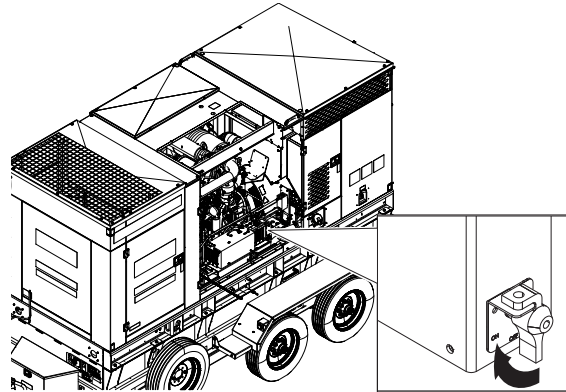


⚠ WARNING

Fire risk. Fuel and vapors are extremely flammable. Do not operate indoors. Doing so could result in death, serious injury, or property or equipment damage. (000281)

To start the generator in MANUAL mode:

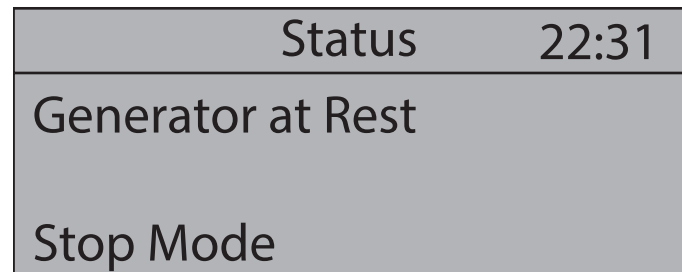
1. Switch the battery disconnect switch to the ON position.



015080

Figure 3-4. Battery Disconnect Switch

NOTE: See [Figure 3-5](#). The Home page displays when the controller is ON, and no other page has been selected. The controller is in STOP mode.



011608

Figure 3-5. Home Page

2. Press the AUTO/MANUAL mode button to start MANUAL mode.

NOTE: The controller can be started from any page when MANUAL mode is active.

3. Press the green Engine START (I) button on the controller to initiate the engine startup process. The unit starts if there are no engine faults preventing the unit from starting.

NOTE: It may take a few seconds for the engine to run smoothly and reach operating speed. During this time, a voltage displays, different from the voltage set on the voltage selector switch.

4. If the engine does not start after the first cranking attempt, the engine pauses for 15 seconds, allowing the starter to cool. The controller displays MANUAL MODE - CRANK REST. The engine will attempt to start twice more, for a total of three crank cycles.

5. If the engine does not start and run after three crank cycles, the controller displays the fail to start alarm. The starting sequence can be repeated after the starter has had a minimum of two minutes to cool. Press the ENTER button to clear the alarm and reset the controller.

NOTE: If the engine is equipped with glow plugs or air heater, the controller will allow time for preheating before cranking engine. Some engines may not have a preheating cycle and as such will skip preheat cycle.

6. When the engine starts, it behaves according to the position of the low-idle switch (LIS):
 - If the LIS is in the IDLE position, the engine continues to idle at 1,100 rpm.
 - If the LIS is in the RUN position, the engine idles for 10 seconds, then accelerates to operating speed (1,800 rpm).

NOTE: In cold weather, it is recommended to start the engine in low-idle condition, and idle for up to one minute. The engine may hunt or change speeds until operating speed is reached.

7. Before applying load, inspect the generator for excessive noise or vibration, and for coolant, oil, DEF, and fuel leaks.
8. Verify the AC output voltage is correct. See [Fine Tuning the Voltage](#).
9. Verify the frequency (Hz) is correct on the Generator page. The frequency should read approximately 60 Hz with no loads connected to the generator, depending on the type of engine governing used.
10. Switch the main circuit breaker to ON (I), then add any loads attached to the receptacles by switching the respective circuit breaker to the ON (I) position. A slight change in engine sound when a load is applied to the unit is normal.

NOTE: If the engine is idled for longer than 10 minutes, a warning will be displayed on the controller. It is not recommended to excessively idle the engine at 1100 RPM. Repeated and excessive idling can cause damage to the engine and after treatment components. It is recommended to accelerate engine to 1800 RPM and load the engine to greater than 30% or shut off the engine if it will not be in use.

AUTO (Remote) Starting the Unit

IMPORTANT NOTE: Before starting in AUTO mode, review [Prestart Checklist](#) and [Manually Starting the Unit](#). Follow all safety warnings and review all information on isolating the generator with a transfer switch, if the unit will be used as a standby power source. See [Changing Exercise Timers](#), then proceed in accordance with this section.

Use AUTO (remote start) mode to start from somewhere other than the control panel by using a transfer switch. AUTO mode is the normal setting when the unit is being used as a standby power source.

1. Start the unit in MANUAL mode at least once, to verify correct engine operation.
2. Check the remote start circuit:
 - Remove wires from the remote start terminal block.
 - Change controller mode to AUTO. See [Switching Controller Mode](#).
3. Attach a 16-gauge jumper wire (or thicker) across the two terminals on the remote start terminal block. (This applies a ground to the controller to close the starting circuit contacts.) The engine cranks, then starts, then runs.
4. Remove the jumper wire from the remote start terminal block. The engine stops. Reconnect any necessary wires from the remote start switch (transfer switch) to the remote start terminal block.
5. Verify the unit is in AUTO mode. See [Switching Controller Mode](#) if necessary.
6. Close and lock all access doors.

The unit is ready for remote starting.

Remote Start Terminal Block

The remote start terminal block provides a connection to install a remote start switch, which allows unit startup through a remote dry-contact closure switch.

IMPORTANT NOTE: Before starting in AUTO mode, verify the contacts of any remote switch linked to the unit are open. If the contacts of a remote switch are closed, the engine will crank and start, when AUTO mode is started. Attach the switch leads to the two unused terminals (A) on the remote start terminal block.

See [Figure 3-6](#). The remote start terminal block is inside the control box, on the rear panel. Access the remote start terminal block by opening the control panel box.

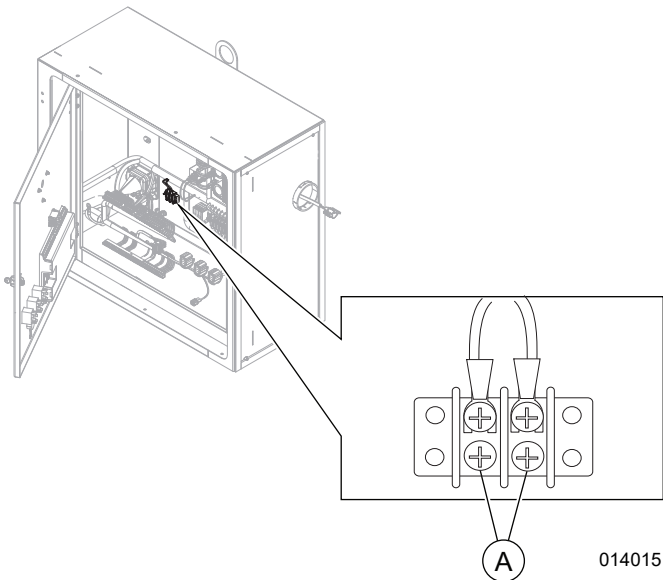


Figure 3-6. Remote Start Terminal Block

Parallel Setup and Operation (If Equipped)

This system is designed to work with generators that are connected on the mobile switching center (MSC) network only and not with the utility or any other independent power source. All other power sources must be isolated from the MSC network to prevent potential damage due to power sources closing out of phase.

See [Figure 3-7](#) and [Figure 3-8](#). One unit serves as the primary unit. The primary unit controls up to 31 secondary units.



Figure 3-7. Two Units in Parallel

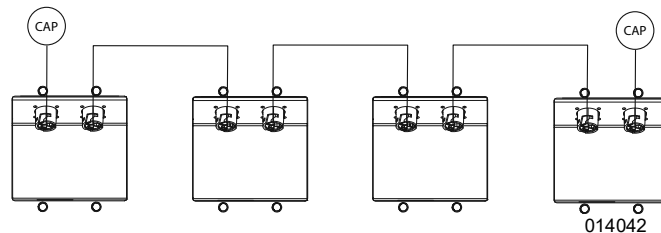


Figure 3-8. Three or More Units in Parallel

Secondary units synchronize with the primary unit.

Manual Paralleling

1. Verify the units to be paralleled are OFF.
2. Secure all electrical connections to each unit and a common bus. Before connecting, ensure all wiring is properly color coded or labeled.

IMPORTANT NOTE: Any crossed connection will prevent paralleling function.

3. Connect MSC cable(s) and terminating plugs (resistors) to the end units.
4. Switch the battery disconnect to ON.
5. Set controller mode to MANUAL. See [Switching Controller Mode](#).
6. Start each unit intended for paralleling. Allow all to warm up.
7. Press the Close Circuit Breaker button on each unit.

Automatic Paralleling

1. Verify the units to be paralleled are OFF.

- Secure all electrical connections to each unit and a common bus. Before connecting, ensure all wiring is properly color coded or labeled.

IMPORTANT NOTE: Any crossed connection will prevent paralleling function.

- Connect MSC cable(s) and terminating plugs (resistors) to the end units.
- Switch the battery disconnect to ON.
- Connect two wire start signal (dry contact closure) to all the generators on the MSC network. The contact closure will be in parallel.
- Set controller mode to AUTO. See [Switching Controller Mode](#).

Switching Controller Mode

NOTE: When switching controller mode, the engine can be running, but it is not required.

NOTE: See [General Information](#) for explanation of each mode.

- Switch controller ON.
- Stop drawing power from the unit: Stop using equipment plugged into receptacles, cam locks, and anything connected to the lugs.
- See [Figure 3-9](#). Press the desired Mode button. The controller mode immediately changes, and the corresponding LED illuminates.

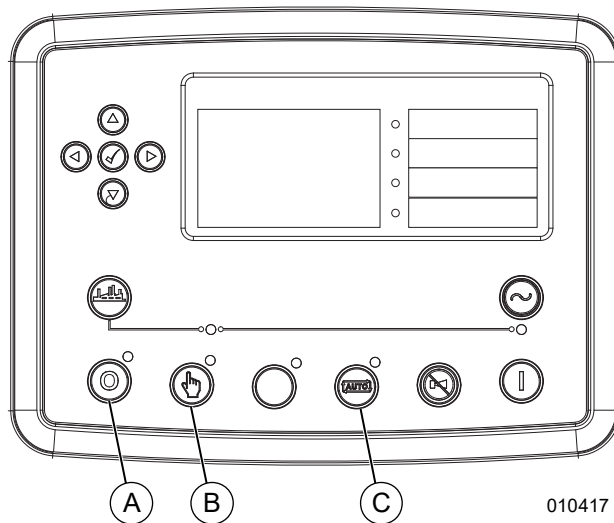


Figure 3-9. Mode Buttons

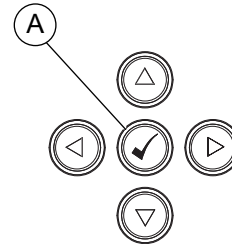
- A STOP Mode button
- B MANUAL Mode button
- C AUTO Mode button

Fine Tuning the Voltage

Voltage adjustment range is $\pm 10\%$. This can be done when engine is running and breaker is closed to fine tune voltage output at load connection.

IMPORTANT NOTE: This procedure is only permitted on non-parallel capable machines. Machines set up with parallel controls will not respond to voltage adjustments when the breaker is closed.

See [Figure 3-10](#). Use the controller navigation buttons to fine-tune generator output voltage.



010418

Figure 3-10. Navigation Buttons

- From the Home page, press and hold the CHECKMARK button (A) to access the Running configuration editor - display.
- Press the UP or DOWN button to scroll to the Editor - Generator Voltage Adjust L-N page.
- Press and release the CHECKMARK button so the voltage starts to flash.
- Press the UP or DOWN button to change voltage.
- Press and release the CHECKMARK button to set and save the voltage setting. The value stops flashing.

NOTES:

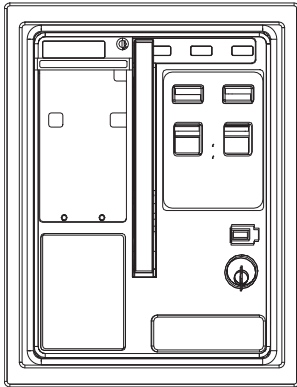
- The new voltage setting is retained through ON-OFF cycles of the generator.
 - When battery power is cycled through the battery disconnect switch, the voltage setting returns to the target voltage for which the link board is configured.
- Press and hold the CHECKMARK button to exit the Running configuration editor.

Voltage Regulator

The voltage regulator controls the output of the generator by regulating current into the exciter field. The voltage regulator is adjusted before shipment from the factory and typically does not require adjustment.

Main Circuit Breaker

See [Figure 3-11](#). The main circuit breaker is on the unit backside, between the control panel and AC distribution panel.



014017

Figure 3-11. Main Circuit Breaker

When the main line circuit breaker (MLCB) is OFF, power is interrupted to the connection lugs and the optional cam lock receptacles. The breaker may be switched ON after connections have been made to the connection lugs or the optional cam lock receptacles, and the unit has been started and allowed to reach normal operating speed and temperature.

The convenience receptacles have separate circuit breakers protecting those circuits and operate independent from the MLCB. If the MLCB is switched off, the convenience receptacles may still provide power. Verify the 20/50 A circuit breakers for their respective circuits.

Any of the following conditions can trip the main circuit breaker:

- Overload of the generator circuits to the connection lugs or the optional cam lock receptacles.
- The door covering the connection lugs is open.
- The door covering the cam lock receptacles (if equipped) is open.
- The link board cover panel is removed.
- The Emergency Stop switch is active.

Before switching the breaker ON (I), verify ALL problems causing breaker-trip are resolved.

NOTE: The MLCB controls power ONLY to the connection lugs and cam lock receptacles (if equipped). It does NOT control power to the convenience receptacles. When the main circuit breaker is OFF, convenience receptacles remain powered. Each convenience receptacle is controlled by an individual circuit breaker, located near the receptacle. Verify the 20/50 A fuses for the respective circuits.

Motorized Breaker (If Equipped)

Units with paralleling function are equipped with a motorized main circuit breaker. The motorized breaker can be closed electronically, through the controller.

Connection Lugs

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage. (000237)



⚠ DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury. (000157)



⚠ DANGER

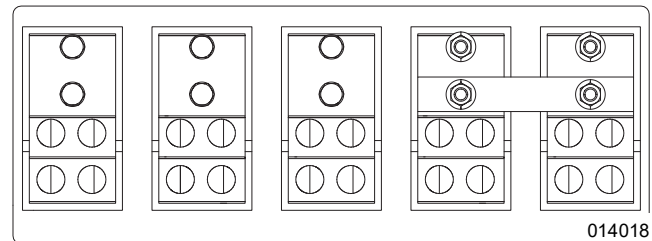
Electrocution. Before connections are made to the unit, verify the main circuit breaker and battery disconnect switch are OFF. Failure to do so will result in death or serious injury. (000156)

⚠ WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000155a)

The installation should be in compliance with the national electrical code (NEC), state, and local regulations.

See [Figure 3-12](#). Generator connection lugs are on the unit backside, behind the lug box door. The lugs provide connection points to attach external loads to the generator.



014018

Figure 3-12. Connection Lugs

Decals above the connection lugs identify the lugs.

Decal
L1
L2
L3
N (Neutral)
G (Ground)

Connecting to Lugs

Connect to the lugs by routing power cables through the opening in the bottom of the door. The tightening torque for the set screws on the connection lug is 30 ft-lb (41 Nm).

IMPORTANT NOTE: Do not make any connections directly to the lugs without routing the cables through the opening. Use a hex-wrench to tighten the cable connections.

IMPORTANT NOTE: There is permanent conductor between the generator (stator winding) and the frame.

The connection lug door is equipped with safety interlock switches. If the door is opened when the unit is operating, the interlock switches trip the main circuit breaker, disable the voltage regulator, and shut down the unit.

See [Figure 3-13](#). A ground connection (A) is located on the curbside rear exterior of the generator. The unit must be connected to ground for proper operating safety. The generator neutral is bonded to ground when it is shipped from the factory. The bonding plate must be removed when the generator is used as a standby power source. Installation should be in compliance with the National Electrical Code (NEC), state, and local regulations.

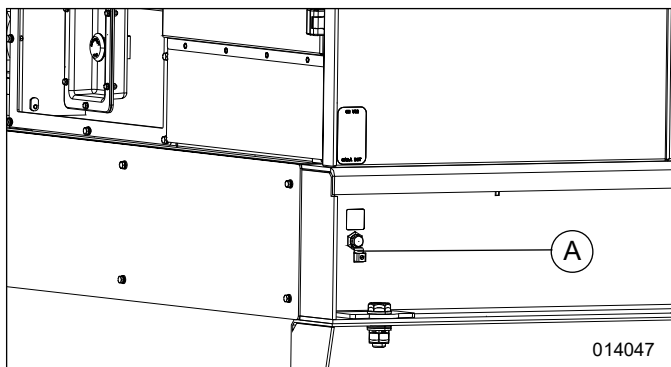


Figure 3-13. Grounding Lug

Cam Lock Connections (If Equipped)



⚠ DANGER

Electrocution. Before connections are made to the unit, verify the main circuit breaker and battery disconnect switch are OFF. Failure to do so will result in death or serious injury.

(000156)

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)



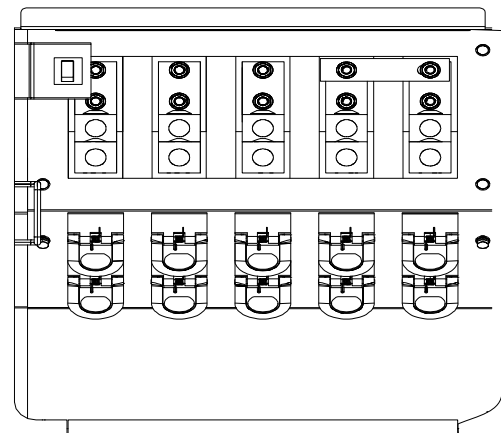
⚠ WARNING

Electric Shock. Verify all connections to the cam lock receptacles are made to one side only. Failure to do so could result in death, serious injury and property damage. (000308)

⚠ WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000155a)

See [Figure 3-14](#). The unit may be equipped with cam lock connections. If equipped, they are on the unit backside, below the connection lugs.



015081

Figure 3-14. Cam Lock Panel

Cam locks provide connection points to attach external loads to the generator.

Above the connection lugs, decals describe the cam locks. Also, cam locks are color-coded, according to country of destination.

Decal	Color—USA	Color—Canada
L1	Black	Red
L2	Red	Black
L3	Blue	Blue
N (Neutral)	White	White
G (Ground)	Green	Green

IMPORTANT NOTE: The nation for which the unit is configured determines cam lock colors, and decals indicate which color convention is being followed.

Connections should be made by plugging power cables equipped with series 16 taper nose 400 A, 600 V cam lock plugs into the cam lock receptacles. Secure connection by rotating plug one-half turn to the right.



DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury.

(000157)

Convenience Receptacles

CAUTION

Equipment Damage. Verify voltage application before making changes to factory settings. Incorrect voltage applied to a load could result in equipment damage.

(000303)

See **Figure 3-15**. The unit is equipped with various receptacles.

- The 240/120 VAC twist-lock receptacles are rated at 50 A each.
- The 120VAC duplex receptacles are rated at 20 A each, with ground fault circuit interrupt (GFCI) protection.
- Convenience receptacles are NOT routed through the main line circuit breaker. Each receptacle has its own circuit breaker, located directly above or next to the receptacle. Each breaker is sized to the maximum rating of the corresponding receptacle.

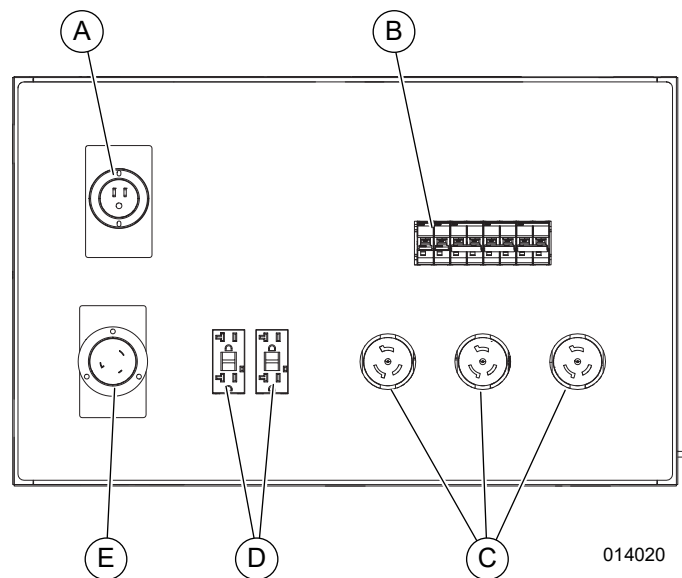


Figure 3-15. Receptacles, Breakers—Covers Removed

A	125 V, 15 A battery charger shore power plug (5-15P) (If equipped)
B	Receptacle circuit breaker panel
C	240 V, 50 A, 3 Pole, twist-lock receptacles (CS6369)
D	120 V, 20 A, GFCI, duplex receptacle (NEMA 5-20R)
E	125 V, 30 A winter heater shore power plug (L5-30P) (If equipped)

IMPORTANT NOTE: All receptacles are powered when the generator is running, even when the main circuit breaker is OFF.

Correct Receptacle Use

Before switching breakers to ON positions, ensure equipment connected to receptacles is switched OFF. This machine is equipped with a buck transformer which will step down the voltage at the receptacles to ensure proper voltage output in each of the link board positions.

NOTE: Generac Mobile does not recommend using the receptacles in the 600 V position.

- When the link board is set to 480/277 VAC, 3-phase, each GFCI receptacle delivers 120 VAC and each twist lock receptacle delivers 240/139 V.
- When the link board is set to 240/120 VAC, 3-phase, each GFCI receptacle delivers 120 VAC and each twist lock receptacle delivers 240/139 V.
- When the link board set to 208/120 VAC, 3-phase, each GFCI receptacle delivers 120 VAC and each twist lock receptacle delivers 208/120 V.
- When the link board set to 600/346 VAC, 3-phase, the buck transformer is not capable of stepping

down voltage to an acceptable range. Generac Mobile does not recommend using the receptacles in the 600 V position.

Transfer Switch

⚠ DANGER

Loss of life. Property damage. Installation must always comply with applicable codes, standards, laws and regulations. Failure to do so will result in death or serious injury. (000190)

⚠ DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage. (000237)

⚠ WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage. (000155a)



⚠ WARNING

Electric shock. Phase rotation must be compatible. Incompatible phase rotation could result in death, serious injury, or equipment damage.

(000226b)

The installation should be in compliance with the National Electrical Code (NEC), and state and local regulations.

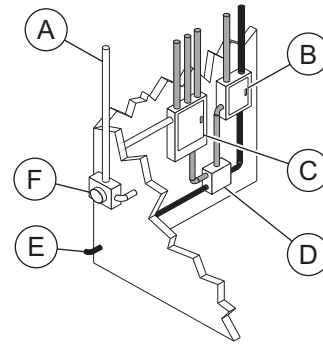
IMPORTANT NOTE: This must be performed by a certified electrician.

Before attempting any connections, verify the main circuit breaker and the control power switch are in the OFF position and that the negative (-) battery cable has been disconnected from the battery.

Installation of such devices must be performed by following all directions supplied by the manufacturer of the switch. If attaching the unit to a power supply normally serviced by a utility company, notify the utility company and check state and local regulations. Familiarize yourself with all instructions and warning labels supplied with the switch.

When the unit is used as a standby power supply, it must be equipped with a transfer switch that isolates it from the utility's distribution system. A transfer switch is designed to transfer electrical loads from the normal power source (utility) to the emergency power source (generator) when normal voltage falls below a prescribed level. The trans-

fer switch automatically returns the load back to the normal source when power is restored back to operating levels.



002807

Figure 3-16. Transfer Switch Operation

A	Incoming utility power
B	Emergency distribution panel (generator power)
C	Main distribution panel (utility power)
D	Transfer switch
E	Power from generator
F	Utility meter
WHITE	Incoming utility power
GRAY	Normal utility power circuit
BLACK	Emergency generator power circuit

Changing Exercise Timers

If exercise timers or scheduled runs are needed, contact a GMASD for assistance.

PAS, Installation, Operation & Testing (if equipped)

See [Figure 3-17](#). The PAS is installed on the intake pipe in between the charged air cooler and the engine intake manifold. The valve body has an internal butterfly valve to close off air flow. There is also a visual indicator on the external part of the valve body to know if the valve is closed or open.

See [Figure 3-18](#). To perform a functional test of the Positive Air Shutoff (PAS), the engine must be off, and the battery disconnect switch (BDS) ON to provide power to the controller and generator accessories. The E-Stop must also be activated (pressed) to prevent engine start up during the test cycle. To activate the test cycle, the TEST button on the control panel must be pressed and held for 5 seconds. The LED adjacent to the TEST button will illuminate when the test cycle is active. The following message "POSITIVE AIR SHUTDOWN" will be displayed

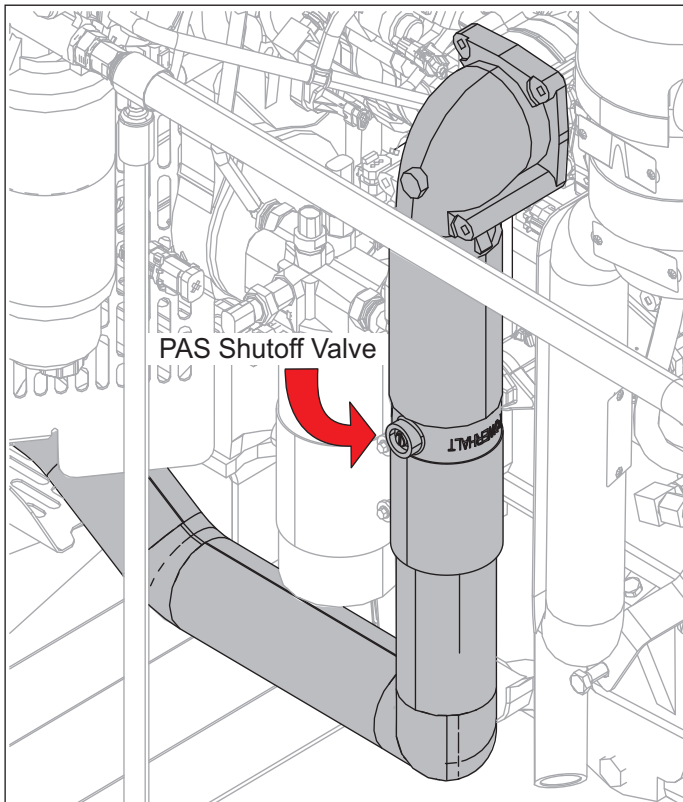


Figure 3-17. PAS Location

on the control panel screen when the test cycle is active. The PAS will cycle once and close for 15 seconds. During this period, the engine will be locked out and cannot be started. Once the test cycle has been completed, the PAS will open and the lock out feature will be disabled allowing the engine to be started. The E-Stop must be manually deactivated. To visually observe the closure of the valve, the shaft of the valve can be observed rotating 90°. The slotted cutaway is the visual indicator, located on the body of the valve (see Figure 3-17). If the slot is parallel to the direction of air flow the valve is open. If it is perpendicular, then the valve is closed.

During normal operation, the PAS can be activated automatically without operator intervention if certain variables are satisfied that would indicate an engine over speed condition has occurred. If the engine speed or generator frequency exceeds 2200 RPM (73 Hz), the PAS will close immediately to prevent further speed elevation and potential permanent damage to the engine and/or alternator. In this condition, the PAS will cycle closed and remain closed for 15 seconds cutting off air flow to the engine and bringing it to a stop. A warning will be displayed on the screen and an event will be logged into the controller history.

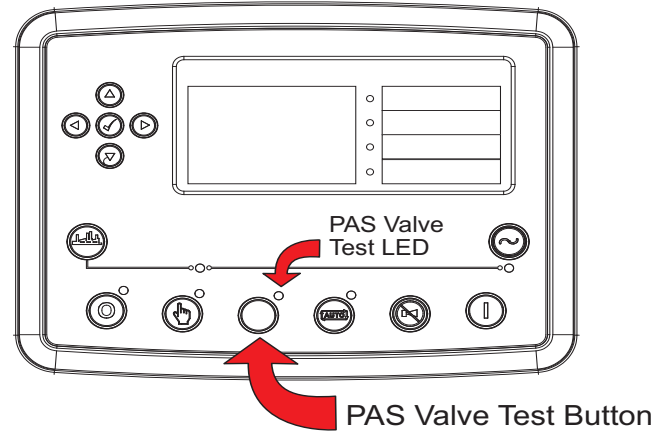


Figure 3-18. PAS Test Button

NOTE: The PAS cannot and should not be used to stop engine during normal operation. This can and will cause permanent engine damage.

Shutting Down the Unit

Before shutting down the unit, check with personnel using power supplied by the generator and let them know the power is being switched off. Verify the power shut-down will not create any hazards by accidentally turning off equipment that must continue operating (such as pumps, compressors, lights).

1. Remove all loads from the generator by opening all circuit breakers (turn to the OFF position).
2. Allow engine to run for approximately five minutes to allow it to cool down.
3. Press the red engine STOP/RESET (O) button on the controller.
4. After pressing the red engine STOP/RESET (O) button, the unit may continue to run for an additional cool down period. This is being driven by the engine controller to ensure engine temperatures have cooled sufficiently.
5. After the unit shuts down, wait for the battery disconnect LED to turn off. When the LED shuts off, it is safe to switch the disconnect switch to off.

NOTE: The ECU must run for 90 seconds after shut-down to purge the DEF.

NOTE: Switching off the control panel before the controller finishes updating could cause a loss of data.

NOTE: For extended storage time, disconnect the battery. See the OEM engine manual for extended storage requirements.

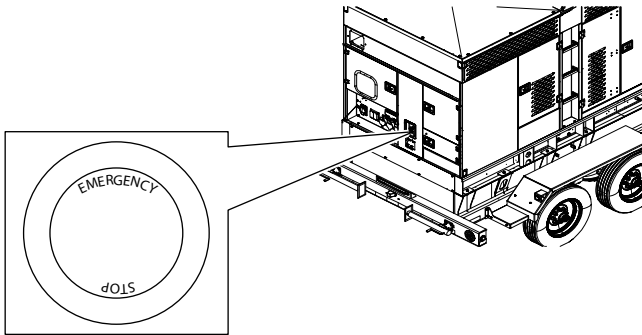
NOTE: If any units are in parallel, do not disconnect the MSC cable.

Emergency Stop Switch



Equipment Damage. The emergency stop switch is not to be used to power down the unit under normal operating circumstances. Doing so could result in equipment damage. (000246b)

See [Figure 3-19](#). The unit is equipped with one emergency stop switch. The red button is clearly labeled EMERGENCY STOP. The switch can be accessed and activated with all doors closed and locked.



015083

Figure 3-19. Emergency Stop Switch

Using the emergency stop switch overrides normal shutdown sequence and bypasses the engine cool down period.

IMPORTANT NOTE: Using the emergency stop switch for regular shutdown can result in equipment damage.

Activate the emergency stop switch by pushing the button in until it locks down. This trips the main circuit breaker which then opens the contact, disconnecting the load to the connection and ultimately shuts down the engine. The emergency stop fault will be displayed on the control panel. The switch will remain closed until it is pulled out. The emergency stop should only be used in emergency situations and not be used to shutdown the generator during normal operation. Using the emergency stop switch overrides normal shutdown sequence.

Towing the Unit

NOTE: Before towing the unit, see [Trailer Hazards](#) and [Towing Safety](#).

Hitch and Coupling Guidelines

- Verify the hitch and coupling on the towing vehicle are rated equal to, or greater than, the trailer's Gross Vehicle Weight Rating (GVWR).

- Verify the trailer hitch and the coupling are compatible. Verify the coupling is securely fastened to the vehicle.
- **DO NOT** tow trailer using defective parts. Inspect the hitch and coupling for wear or damage.
- Connect safety chains in a crossing pattern under the tongue.
- Before towing the trailer, verify the weight of the trailer is equal across all tires. On trailers with adjustable height hitches, adjust the angle of the trailer tongue to keep the trailer as level as possible.

Preparing Unit for Towing

1. Verify engine is OFF.
2. Use the tongue jack to raise or lower the trailer onto the hitch of the towing vehicle. Lock the hitch coupling and attach the safety chains or cables to the vehicle. Raise the tongue jack to the highest positions providing the maximum clearance between the ground and the jack.

NOTE: Maintain a film of grease on the coupler to extend coupler life and eliminate squeaking. Before towing, wipe the coupler clean and apply fresh grease.

3. Lubricate grease fittings on leveling jacks to ensure proper operation of the jacks. See [Jack Maintenance](#). For maintenance interval information, see [Basic Maintenance Schedule](#).
4. Connect trailer wiring harness to tow vehicle. Verify proper operation of directional and brake lights.
5. Verify all doors and hoods are properly latched.
6. Verify all tires are inflated to the correct pressure. See [Specifications](#).
7. Check all wheel lugs. Tighten or replace any loose or missing lugs. If a tire was removed for axle service or replaced, tighten lugs in the order shown in [Figure 3-20](#) to the following specifications:
 - a. Start all lug nuts by hand.
 - b. First pass tighten to 50–60 ft-lb (67–81 Nm).
 - c. Second pass tighten to 150–200 ft-lb (203–271 Nm).
 - d. Third pass tighten to 275–325 ft-lb (373–441 Nm).

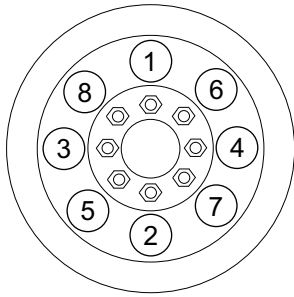


Figure 3-20. Lug Sequence

001441

WARNING

Property or Equipment Damage. Tighten wheel lug nuts after first 50 miles to factory specifications. Failure to do so could result in death, serious injury, property or equipment damage. (000235)

8. Verify all axle oil baths have adequate levels for towing.

Recommended Towing Speed

- Maximum highway speed: 65 mph (104 km/h), or in accordance with local traffic laws and ordinances.
- Maximum off-road speed: 10 mph (16 km/h), depending on terrain.

Lifting the Unit

Trailer and Skid-Mounted Units

NOTE: Before lifting the unit, see [Lifting Hazards](#).

NOTE: Always be aware of people and objects around the work site when moving or lifting the unit.

1. Verify the machine used to lift the unit is in good condition and has sufficient lifting capacity. See [Specifications](#) for approximate unit weights.
2. Close and lock all hoods and doors.
3. Choose lifting chains, slings, and hooks, according to unit dimensions. See [Unit Dimensions](#).
4. See [Figure 3-21](#). For a single lift point, attach hook to lift eye (A). For multi-lift point, use spreader bars and lift chains that are appropriately rated for this machine. Attach chain to 4 point lift eyes (B). See unit dimensions.

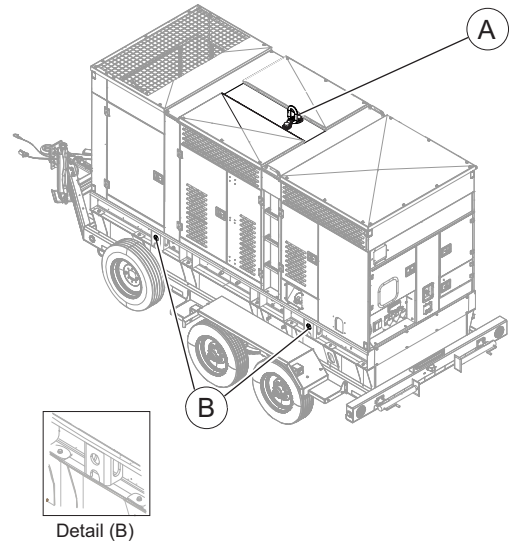


Figure 3-21. Trailer-Mounted Unit

015082

NOTE: See [Figure 3-22](#). Do NOT connect lifting equipment to indicated holes (A).

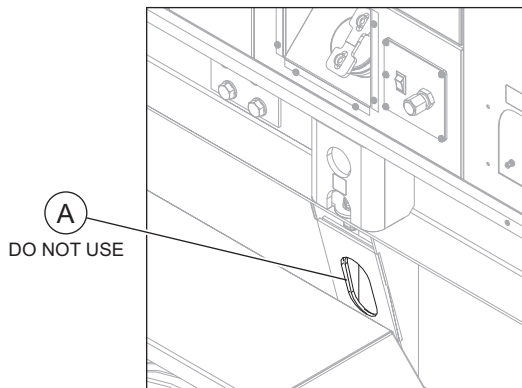


Figure 3-22. NOT Lifting Points (Four Locations)

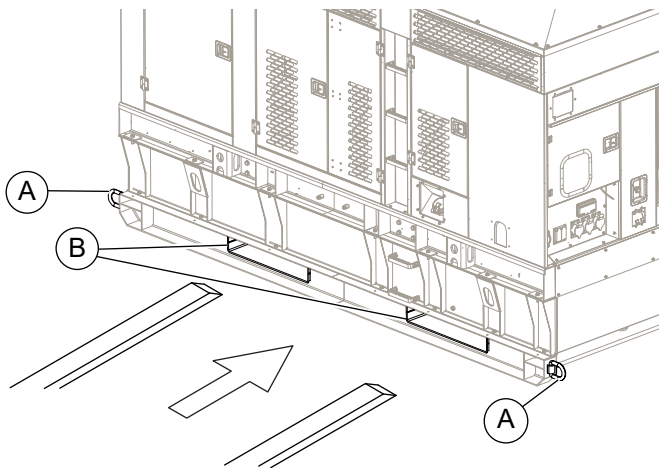
014023

See [Figure 3-21](#) (item B) for the correct lifting points

Skid-Mounted Units ONLY

Skid mounted units can be lifted multiple ways:

- See [Figure 3-23](#). Skid mounted units can also be lifted using the fork pockets (B).
- Before lifting, verify all obstructions are clear of forks, pockets, and other parts of the unit.
- Approach unit squarely, as illustrated.



015084

Figure 3-23. Skid-Mounted Unit

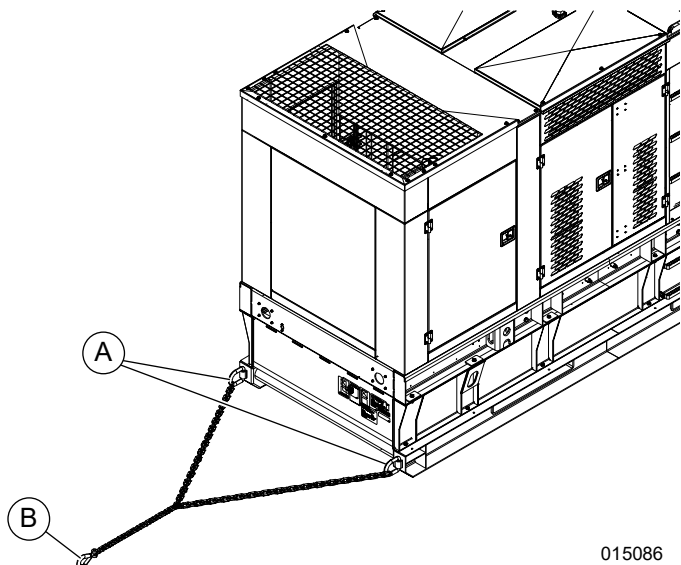
NOTE: The forklift must be capable of a 60.1 in (1.35 m) blade spread, or greater.

NOTE: The forklift must have sufficient lifting capacity. See **Specifications** for approximate unit weights.

NOTE: Use forklift pockets with care. Failure to approach the unit squarely can result in permanent damage to the unit.

Dragging the Unit (Skid Mounted Units Only)

IMPORTANT NOTE: This procedure **ONLY** applies to skid-mounted units. Do **NOT** attempt this procedure on trailer-mounted units.



015086

Figure 3-24. Dragging the Unit

1. See **Figure 3-24**. Attach a suitable chain to each D-Ring (A). D-Rings are located on the front and rear of the machine.

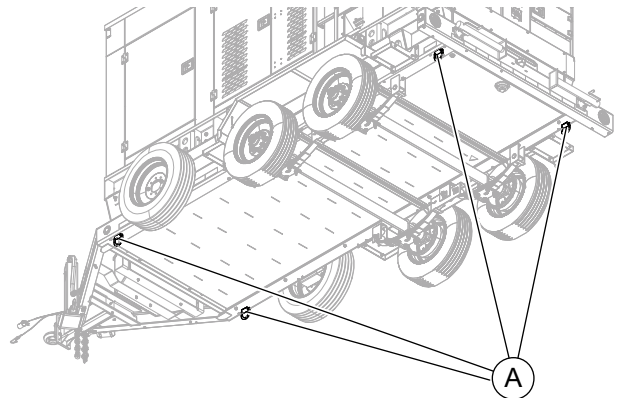
2. Attach the chains to a suitable tow vehicle (B).

NOTE: The D-Rings are not to be used for lift the entire generator. D-Rings are designed for dragging generator on skid frame.

Tying Down the Unit

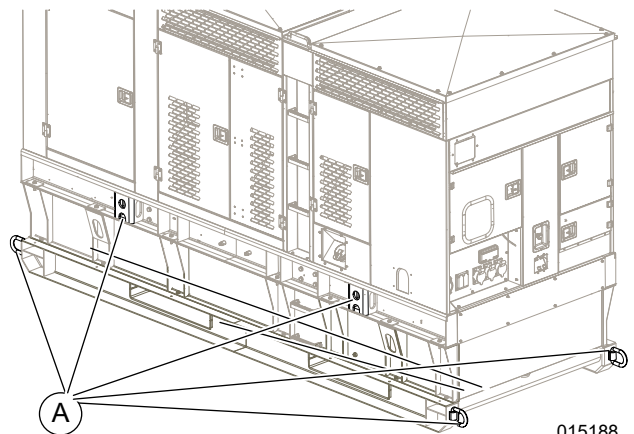
When securing the unit for transportation, verify the equipment being used to fasten the unit is in good condition and has sufficient strength to hold the unit in place during transport.

See **Figure 3-25** or **Figure 3-26**. Use the tie-down points (A) as shown.



015085

Figure 3-25. Tie-Down Points (Trailer Mounted)



015188

Figure 3-26. Tie-Down Points (Skid Mounted)

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Section 4: Maintenance

Emissions Information

For emissions information, see the OEM diesel engine manual.

Maintenance

Regular maintenance ensures correct machine performance and extends engine/equipment life. Generac Mobile recommends that all maintenance work be performed by a GMASD. Regular maintenance, replacement, or repair of the emissions control devices and systems may be performed by any repair shop or person of the owner's choosing. To obtain emissions control warranty service free of charge, the work must be performed by a GMASD. See the emissions warranty.

Daily Walk Around Inspection



Equipment Damage. Failure to perform a daily inspection could result in damage to the unit.

(000306)

- Inspect for conditions that could hinder performance or safety, such as (but not limited to) proper oil, coolant, DEF and fuel levels, blocked vents, loose or missing hardware, and improper electrical connections. When engine is stopped and completely cool, coolant may be added directly to the radiator.
- Oil may also be added directly to the fill tube. See the OEM engine manual for the proper viscosity grade of oil, including special operating conditions such as a change in season or climate. DO NOT start the unit if the engine oil level is below the add mark on the dipstick. Normal operating level is in the cross-hatch pattern between the FULL and ADD markings on the dipstick. Add oil only if the oil level is below the ADD mark on the bottom of the cross-hatch pattern on the dipstick. DO NOT OVERFILL the crankcase.
- Inspect the fan belt for signs of cracking, fraying, and stretching, and verify the belt is properly seated in the pulley grooves. Replace the belt according to the manufacturer's recommendations.
- Inspect containment basin and properly dispose of any fluid in containment basin.
- Verify the condition of the air filter by viewing the level of the vacuum draw on the filter minder gauge. Replace the air filter when the yellow center

bar reaches the red section on the gauge (20 in. H₂O).

- Inspect condition of electrical cords. DO NOT use the unit if insulation is cut or worn through.
- Check tire pressure, lug nut torque, and axle oil bath levels according to manufacturers recommendations. If unit is going to be stationary for extended period daily checks of the wheels and axles are not required. If unit has been stationary for an extended period and will be transported, a thorough inspection is necessary to ensure wheels and axles are in proper working order. Inspect the wheel bearings for unusual wear. See [Trailer Wheel Bearings](#).

NOTE: If the engine was run out of fuel, or the fuel tank was drained, it may be necessary to purge the fuel lines.

See the OEM engine manual supplied with the unit for more information.

General Maintenance

Poorly maintained equipment can become a safety hazard. Periodic maintenance and occasional repairs are necessary in order for the equipment to operate safely and properly over a long period of time. Never perform any routine service (such as oil and oil filter changes, cleaning) unless all electrical components are shut off. Before servicing the unit, always follow the instructions listed below.

- Verify the controller power switch is OFF.
- Verify the battery disconnect switch is OFF.
- Verify the circuit breakers are OFF.
- Activate (push in) the E-Stop switch.
- Disconnect battery negative (-) cable.
- Attach a DO NOT USE sign to the control panel. This signifies that the unit is being serviced and reduces the chance of someone inadvertently trying to start the unit.
- If the unit is connected to a remote start or transfer switch, verify the remote switch is OFF and tagged with a DO NOT USE sign.
- ONLY power wash the unit exterior. Do NOT power wash any part of the unit interior.
- Do not wash the engine block or fuel tank with a power washer or steam cleaner. Water may enter the cabinet and collect in the generator windings or other electrical parts, causing damage.
- Inspect coolant system for leaks.

- Inspect coolant level. Coolant should be visible in the sight-glass, located on the top tank of the radiator. Fill as needed.

Fuel Recommendations

IMPORTANT NOTE: DO NOT use home heating oil or bio-diesel fuel.

IMPORTANT NOTE: Comply with all laws regulating the storage and handling of fuels.

This unit is designed to operate with diesel fuel. Follow these guidelines:

- Use only ultra-low-sulfur (15 ppm) diesel fuel.
- When temperatures are at or below freezing, use No. 1 diesel fuel.
- When temperatures are above freezing, use No. 2 diesel fuel.
- In some areas of the country, climatized fuel—a mixture of 1D and 2D, may also be used.

For more information, see the OEM engine manual (Generac publication PN A0001715041, *Maintenance* section).

Adding Fuel



⚠ DANGER

Explosion and Fire. Fuel and vapors are extremely flammable and explosive. Keep fire and spark away. Failure to do so will result in death or serious injury. (000168)



⚠ DANGER

Explosion and Fire. Do not overfill fuel tank. Overfilling may cause fuel to leak and ignite or explode, resulting in death or serious injury. (000204)

NOTE: Never allow dust, foreign matter, or water to enter fuel tank.

NOTE: See [Specifications](#) for fuel tank capacity.

1. Place unit on a firm, level surface in a well ventilated area.
2. Verify unit is OFF.
3. Remove fuel fill cap.
4. Fill tank with diesel fuel to 0.25 in (6.4 mm) from the bottom of fill neck to allow for fuel expansion. See [Resetting Maintenance Alarms](#). Install fuel fill cap.

NOTE: Properly contain, clean, and dispose of spilled fuel.

The fuel tank can be filled via the externally mounted fill neck located on the rear corner roadside panel of the

machine. The fuel tank level can be monitored on the control panel display or the analog gauge located on top of the fuel tank near the battery tray on roadside of the machine. The fill neck can accept nozzles up to 1.5" (38mm) but flow rate should be limited to less than 65 GPM (246 LPM) to prevent blow back of fuel. When filling the tank, never top off the tank such that the fill neck is filled with diesel fuel. This will prevent fuel spills and allow proper tank ventilation.

The standard fuel tank does not come equipped with fuel containment or fuel tank drain. If fuel ever needs to be drained from tank, it should be pumped out of the tank and into a proper container.

The optional fuel tank does come equipped with fuel containment and a rupture basin alarm. This alarm will display a warning message on the controller display. The fuel can be drained from the containment basin using the drain plug located on the bottom of the tank.

Engine Oil Recommendations

To maintain the product warranty, the engine oil should be serviced in accordance with the recommendations of this manual. The engine has been filled with factory engine oil of a grade recommended by the engine supplier.

Use a high quality detergent oil with an appropriate classification and viscosity for the engine type and ambient temperature conditions. Contact a GMASD or refer to the applicable engine service manual for more information.

Commercial Oils

Perkins recommends use of Perkins Diesel Engine Oil for all Perkins engines. Perkins unique oil formulations have been developed to provide full performance and maximum service life of your engine, and in tests have been shown to provide superior protection. Available in suitable API classifications to meet the emissions requirements and performance of your engine, see [Table 4-3](#) for the correct oil specification for your engine. Consult your Perkins distributor for more information on these multi-grade oils.

IMPORTANT NOTE: Perkins requires the use of the following specification of engine oil. Failure to use the appropriate specification of engine oil will reduce the life of your engine. Failure to use the appropriate specification of engine oil will also reduce the life of your aftertreatment system.

Table 4-3. Oil Specifications

API CK-4
ACEA E9
ECF-3

API CK-4 and ACEA E9 oil categories have the following chemical limits:

- 0.1% maximum sulfated ash
- 0.12% maximum phosphorous
- 0.4% maximum sulfur

The chemical limits were developed to maintain the expected life of the engine aftertreatment system. The performance of the engine aftertreatment system can be adversely affected if oil that is not specified in [Table 4-3](#) is used.

The life of your aftertreatment system is defined by the accumulation of ash on the surface of the filter. Ash is the inert part of the particulate matter. The system is designed to collect this particulate matter. There is a small percentage of particulate matter that is left behind as the soot is burnt. This matter will eventually block the filter, causing loss of performance and increased fuel consumption. Most of the ash comes from the engine oil which is gradually consumed during normal operation. This ash passes through the exhaust. To meet the designed life of the product, the use of the appropriate engine oil is essential. The oil specification that is listed in [Table 4-3](#) has low ash content.

Maintenance intervals for engines that use bio-diesel: The oil change interval can be adversely affected by the use of bio-diesel. Use oil analysis to monitor the con-

dition of the engine oil. Use oil analysis also to determine the oil change interval that is optimum.

IMPORTANT NOTE: DO NOT use API FA-4 oil in Perkins engines. API FA-4 oil is designed for use in selected on-highway applications and is NOT designed to support off-road applications, including Perkins engines.

IMPORTANT NOTE: The following engine oils are NOT approved by Perkins and these engine oils must not be used: CC, CD, CD-2, CF-4, CG-4, CH-4, and CI-4.

Lubricant Viscosity Recommendations for Direct Injection (DI) Diesel Engines

The correct SAE viscosity grade of oil is determined by the minimum ambient temperature during cold engine start-up, and the maximum ambient temperature during engine operation.

See [Figure 4-1](#) (minimum temperature) to determine the required oil viscosity for starting a cold engine.

See [Figure 4-1](#) (maximum temperature) to select the oil viscosity for engine operation at the highest ambient temperature that is anticipated.

Generally, use the highest oil viscosity that is available to meet the requirement for the temperature at start-up.

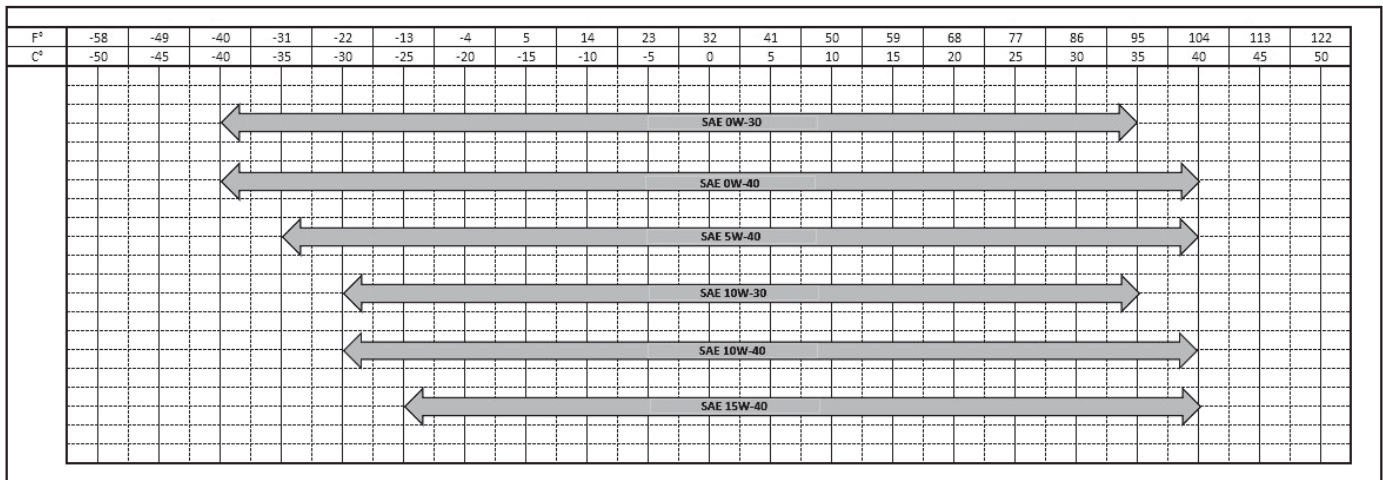


Figure 4-1. Lubricant Viscosities

NOTE: Supplemental heat is recommended for cold soaked starts below 32 °F (0 °C). Cold soaked starts occur when the engine has not been operated for a period of time. This interval allows the oil to become more viscous due to cooler ambient temperatures.

Aftermarket Oil Additives

Perkins does not recommend the use of aftermarket additives in oil. Aftermarket additives are not necessary to achieve the engines maximum service life or rated performance. Fully formulated, finished oils consist of base

oils and of commercial additive packages. These additive packages are blended into the base oils at precise percentages to help provide finished oils with performance characteristics that meet industry standards.

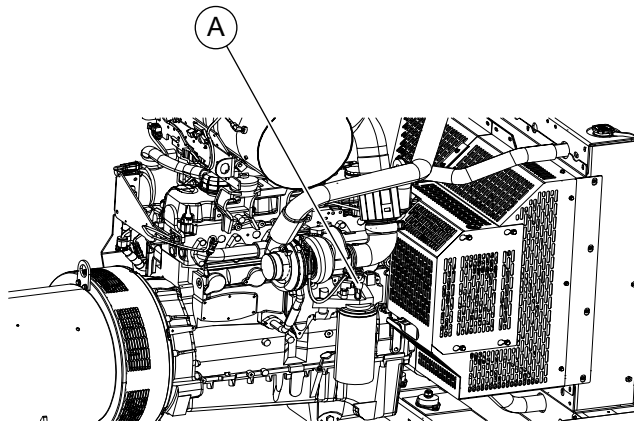
There are no industry standard tests that evaluate the performance or the compatibility of aftermarket additives in finished oil. Aftermarket additives may not be compatible with the finished oils additive package, which could lower the performance of the finished oil. The aftermarket additive could fail to mix with the finished oil. This failure could produce sludge in the crankcase. Perkins discourages the use of aftermarket additives in finished oils.

To achieve the best performance from a Perkins engine, conform to the following guidelines:

- See **Figure 4-1** to find the correct oil viscosity grade for your engine.
- At the specified interval, service the engine. Use new oil and install a new oil filter.
- Perform maintenance at the intervals that are specified in **Basic Maintenance Schedule**.

Oil analysis

See **Figure 4-2**. This engine is equipped with an oil sampling valve (A).



015087

Figure 4-2. Oil Sampling Valve

If oil analysis is required, the oil sampling valve is used to obtain samples of the engine oil. The oil analysis will complement the preventive maintenance program.

The oil analysis is a diagnostic tool that is used to determine oil performance and component wear rates. Contamination can be identified and measured by using oil analysis. The oil analysis includes the following tests:

- The Wear Rate Analysis monitors the wear of the engines metals. The amount of wear metal and type of wear metal that is in the oil is analyzed. The increase in the rate of engine wear metal in the oil is as important as the quantity of engine wear metal in the oil.
- Tests are conducted to detect contamination of the oil by water, glycol, or fuel.
- The Oil Condition Analysis determines the loss of the oils lubricating properties. An infrared analysis is used to compare the properties of new oil to the properties of the used oil sample. This analysis allows technicians to determine the amount of deterioration of the oil during use. This analysis also allows technicians to verify the performance of

the oil according to the specification during the entire oil change interval.

Coolant Recommendation



▲ DANGER

Risk of poisoning. Do not use mouth to siphon coolant. Doing so will result in death or serious injury.

(000149)



▲ WARNING

Risk of burns. Do not open coolant system until engine has completely cooled. Doing so could result in serious injury.

(000154)

▲ CAUTION

Risk of overheating. Do not use any chromate base rust inhibitor with propylene glycol base antifreeze, boosters, or additives. Doing so will cause overheating and possible equipment damage.

(000165a)

Acceptable Coolant Types

Coolant Type	Service Life*
Perkins ELC	6,000 service hours or 3 years
Commercial heavy-duty anti-freeze that meets ASTM D6210	3,000 service hours or 2 years
Commercial SCA inhibitor and water	3,000 service hours or 1 year

*Use the interval that occurs first. The cooling system must also be flushed at this time.

Coolant Mixtures and Freezing Points

	Freezing Point °F (°C)			
	-12 (-24)	-34 (-36)	-54 (-48)	-90 (-67)
Water (% Volume)	50	40	40	40
Anitfreeze (% Volume)	50	60	60	60*

* Maximum freeze protection is 60%.

NOTE: For more information, see OEM engine manual.

DEF Recommendations



Equipment damage. Do not alter DEF. Use approved DEF only. Failure to do so could cause equipment damage.

(000337)

Diesel Exhaust Fluid (DEF) is a liquid that is injected into the aftertreatment system before Selective Catalytic Reduction (SCR). This system of injecting the DEF into the exhaust will cause a chemical reaction in the SCR system. The Nitrogen Oxide (NOx) molecules in the exhaust are converted to elemental nitrogen and water. This conversion will reduce the emission of the engine.

Specification

DEF used in Perkins engines must meet the ISO specification 22241-1 for quality. The ISO specification 22241-1 requirements are met by many brands of DEF, including the ones that carry the AdBlue or API certification.

The document series ISO standard 22241 will give information on quality requirements, test methods, handling, transportation, storage, and refilling interface.

Spillage

Care should be taken when dispensing DEF. Spills should be cleaned immediately. All surfaces should be wiped clean and rinsed with water.

DEF that has been spilled will crystallize when the water within the liquid evaporates. Spilled DEF will attack paint and metal. If DEF is spilled, wash the area with water.

Caution should be used when dispensing DEF near an engine that has recently been running. Spilling DEF onto hot components may cause the release of ammonia vapors. Do not breathe ammonia vapors. Do not clean up any spills with bleach.

Filling the DEF Tank

The fill cap on the DEF tank must be colored blue. The DEF level is important, allowing the DEF tank to run dry or operate at a low level can affect the engine operation. Because of the corrosive nature of DEF, the correct materials must be used when filling a DEF tank. It is important to not top off the DEF tank. This will allow the tank vent to function properly and prevent any blockage to occur in the fill neck of the tank.

This unit is equipped with two DEF tanks to accommodate the on board volume of fuel. The fill neck is connected to both tanks to provide simultaneous filling from the external fill port located on the enclosure. The tanks are also connected with a lower communication line to allow fluid level equalizing in the tanks. This line also

serves as a drain for the tanks in the event it needs to be drained due to contamination. This line is wrapped with insulation and an embedded heater to prevent the DEF in the line from freezing. This heater will be turned on automatically with the thermo-switch that is in the heater circuit.

DEF Quality

DEF quality can be measured with a refractometer. The DEF must comply with ISO standard 22241-1 with the urea solution of 32.5%.

Cleanliness

Contaminants can degrade the quality and life of DEF. Filtering DEF is recommended when dispensed into the DEF tank. Filters should be compatible with DEF and should be used exclusively with DEF. Check with the filter supplier to confirm compatibility with DEF before using. Mesh-type filters using compatible metals, such as stainless steel, are recommended. Paper (cellulose) media and some synthetic filter media are not recommended because of degradation during use.

Care should be taken when dispensing DEF. Spills should be cleaned immediately. Machine or engine surfaces should be wiped clean and rinsed with water. Caution should be used when dispensing DEF near an engine that has recently been running. Spilling DEF onto hot components will cause harmful vapors.

Storage

IMPORTANT NOTE: Do not store DEF in direct sunlight.

Table 4-4. Expected DEF Life @ Storage Temperature

Storage Temperature—°F (°C)	Expected DEF Life
Below 77 (25)	18 months
77 to 86 (25 to 30)	12 months
86 to 95 (30 to 35)	6 months
Above 95 (35)	Test quality before use

Perkins recommend that all DEF taken from storage should be checked to ensure the DEF meets ISO standard 22241-1.

Materials compatibility

DEF is corrosive. Due to the corrosion caused, DEF must be stored in tanks constructed of approved materials. Recommended storage materials:

Stainless steels:

- 304 (S30400)
- 304L (S30403)
- 316 (S31600)

- 316L (S31603)

Alloys and metals:

- Chromium Nickel (CrNi)
- Chromium Nickel Molybdenum (CrNiMo)
- Titanium

Non-metallic materials:

- Polyethylene
- Polypropylene
- Polyisobutylene
- Teflon (PFA)
- Polyfluoroethylene (PFE)
- Polyvinylidene fluoride (PVDF)
- Polytetrafluoroethylene (PTFE)

Materials NOT compatible with DEF solutions include Aluminum, Magnesium, Zinc, Nickel coatings, Silver and Carbon steel, and Solders containing any of the above. Unexpected reactions may occur if DEF solutions come in contact with any non-compatible material or unknown materials.

Basic Maintenance Schedule

See the original equipment manufacturer's operating manual for a complete list of maintenance requirements. Failure to comply with the procedures as described in the OEM engine manual will nullify the warranty, decrease performance, and cause equipment damage or premature equipment failure. Maintenance records may be required to complete a warranty request.

NOTE: See the OEM engine manual for more maintenance information.

Table 4-5. Basic Maintenance Schedule

Item	Daily	Every 250 Hr	Initial 500 Hr	Every 500 Hr	Every 500 Hr/3 Mo	Every 500 Hr/1 Year	Every 2,000 Hr	Every 2,500 Hr	Every 3,000 Hr	Every 4,000 Hr	Every 5,000 Hr	Every 6,000 Hr	Every 10,000 Hr	Every 200,000 Gal (760,000 L) of fuel or 10,000 Hr	Every 12,000 Hr or 6 Yr	As Required
Air Filter Housing Sediment - Drain	◆															
Cooling System Coolant Level - Check	◆															
Engine Air Cleaner Service Indicator - Inspect	◆															
Engine Oil Level - Check	◆															
Fuel System Primary Filter / Water Separator Drain	◆															
Walk-Around Inspection	◆															
Engine Oil Sample - Obtain		◆														
Grounding Stud - Inspect, Clean, and Tighten		◆														
Engine Valve Lash - check			◆													

Table 4-5. Basic Maintenance Schedule

Item	Daily	Every 250 Hr	Initial 500 Hr	Every 500 Hr	Every 500 Hr/3 Mo	Every 500 Hr/1 Year	Every 2,000 Hr	Every 2,500 Hr	Every 3,000 Hr	Every 4,000 Hr	Every 5,000 Hr	Every 6,000 Hr	Every 10,000 Hr	Every 200,000 Gal (760,000 L) of fuel or 10,000 Hr	Every 12,000 Hr or 6 Yr	As Required
Battery Electrolyte Level - Check				◆												
Engine Oil and Filter - Change				◆												
Belts - Inspect/ Adjust/ Replace					◆											
Fuel system Primary Filter (Water Separator) Element - Replace						◆										
Fuel System Secondary Filter - Replace						◆										
Engine Valve Lash - Check								◆								
Diesel Exhaust Fluid Filter (Emission Related Component) - Replace												◆				
Diesel Particulate Filter (Emission Related Component) - Clean													◆			
Diesel Exhaust Fluid Injector (Emission Related Component) - Replace													◆			
Cooling System Coolant Extender (ELC) - Add													◆			
DEF Manifold Filters (Emission Related Component) - Replace														◆		
Overhaul Considerations															◆	
Cooling System Coolant (ELC) - Change																◆

Table 4-5. Basic Maintenance Schedule

Item	Daily	Every 250 Hr	Initial 500 Hr	Every 500 Hr	Every 500 Hr/3 Mo	Every 500 Hr/1 Year	Every 2,000 Hr	Every 2,500 Hr	Every 3,000 Hr	Every 4,000 Hr	Every 5,000 Hr	Every 6,000 Hr	Every 10,000 Hr	Every 200,000 Gal (760,000 L) of fuel or 10,000 Hr	Every 12,000 Hr or 6 Yr	As Required
Diesel Exhaust Fluid (DEF) Filter Screen (Emission Related Component) - Clean																◆
Diesel Exhaust Fluid (Emission Related Component) - Fill																◆
Engine Air Cleaner Element - Replace																◆
Radiator - Clean																◆

Resetting Maintenance Alarms

The controller will display a warning message when the unit is due for maintenance or service. See [Table 4-5](#) for applicable service intervals. Once the unit has been serviced, the appropriate maintenance alarm reminder must be reset. Proceed as follows to reset the maintenance alarms:

1. With the unit shut down, rotate the battery disconnect switch to ON (I). The controller automatically displays to the Home page after initialization.
2. Press ▲, ►, ▼, or ◀ to display the maintenance pages.
3. Simultaneously press ✓ and O. The Configuration menu displays.
4. Press ▼ until the Maintenance group is highlighted.
5. Press ► to display the sections. Press ▼ to highlight the Maintenance section.
6. Press ► to display the parameters and highlight the maintenance alarm that requires reset.
7. Press ✓ to select the editable parameters. The cursor highlights NOT RESET under the selected maintenance alarm. Press ▲ to highlight RESET.
8. Press ✓ to reset the selected maintenance alarm.
9. To perform additional maintenance alarm resets, repeat steps 6–8.

NOTE: If the selected maintenance alarm does not require reset, press ▼ to highlight NOT RESET, then press ✓ to return to the parameters section.

10. Press and hold ✓ for five seconds to save changes. Press and hold O for five seconds to discard changes made.

DEF System Maintenance

DEF Testing

NOTE: Using DEF with the correct concentration is critical to engine and aftertreatment system performance. Extended storage and other conditions can adversely alter the DEF concentration.

If DEF quality is questionable, draw a sample out of the DEF tank or storage tank into a clear container. DEF must be crystal clear. If DEF appears cloudy or has a colored tint, it is likely not within specification. DEF in this condition should not be used. Drain the tank, flush with distilled water, and fill with new DEF. After filling the tank, check DEF concentration.

If the DEF passes the visual and smell tests, check the DEF concentration with a handheld refractometer calibrated to measure DEF.

DEF concentration should be checked when the engine has been stored for extended periods, or if there is suspicion the engine or packaged DEF has been contaminated with water.

Follow the instructions included with either tool to obtain the measurement.

The correct DEF concentration is 32.5% urea. If the DEF concentration is not within specification, drain the DEF tank, flush with distilled water, and fill with new or good DEF. If packaged DEF is not within specification, dispose of DEF packages and replace with new or good DEF.

NOTE: Do not create DEF by mixing agricultural grade urea with water. Agricultural grade urea does not meet the necessary specifications and can damage the after-treatment system.

DEF Tank Cleaning

Proceed as follows to clean the DEF tank:

1. Drain DEF tank into a suitable container. See [DEF Disposal](#).
2. Flush DEF tank with distilled water, and fill with new or good DEF.

DEF Disposal

Large amounts of DEF should be contained. If large spills occur, contact local environmental authorities for assistance with clean up.

If a substantial quantity of DEF is not within specification, contact the DEF supplier for assistance with disposal. Do not dump large quantities of DEF onto the ground or send DEF to wastewater treatment facilities.

DEF Tank Refilling

WARNING

Personal injury. Avoid prolonged contact with skin. Wash skin thoroughly with soap and water. Remove contaminated clothing and wash before reuse. Seek medical attention if skin becomes irritated. Failure to do so could result in personal injury. (000338a)

CAUTION

Equipment Damage. Immediately clean any surfaces with water that come in contact with diesel exhaust fluid. Failure to do so could result in equipment damage. (000365)

IMPORTANT NOTE: If DEF is filled into engine fuel tank or other fluid compartment, do not operate engine until system is properly purged of DEF. Contact a GMASD immediately to determine how to clean and purge the system.

NOTE: Use only distilled water to rinse components that are used to deliver DEF. Tap water can contaminate DEF. If distilled water is not available, rinse with clean tap water, then thoroughly rinse with ample amounts of DEF.

Reasonable care should be taken when refilling the DEF tank. Verify the DEF tank cap area is free of debris before removing the cap. Wipe clean with a lint free cloth to remove debris from tank cap. Seal DEF containers between use to prevent contamination and evaporation. Avoid splashing DEF, and do not allow DEF to come into contact with skin, eyes, or mouth.

NOTE: Keep anything used to store or dispense DEF clean of dirt and dust. Wash and rinse containers or funnels thoroughly with distilled water to remove contaminants.

If an unapproved fluid, such as diesel fluid or coolant is added to the DEF tank, flush DEF tank with distilled

water, and fill with new or good DEF, contact a GMASD, to determine how to clean and purge the system.

If water has been added to the DEF tank, a tank cleaning is necessary. After refilling the tank, check the DEF concentration. See [DEF Testing](#). The operator must maintain appropriate DEF levels at all times. Check the DEF level daily and refill the tank as needed. The filling port is identified by a blue colored cap embossed with the DEF symbol.

DEF Storage Guidelines

WARNING

Risk of poisoning. Do not ingest diesel exhaust fluid. Seek medical attention immediately if consumed. Failure to do so could result in serious injury.

(000334)

WARNING

Personal injury. Do not inhale diesel exhaust fluid fumes. If breathing becomes difficult, move to an area with fresh air and seek medical attention immediately. Failure to do so could result in serious injury.

(000335a)

WARNING

Personal injury. Avoid contact with eyes. Flush eyes thoroughly with water and seek medical attention immediately. Failure to do so could result in serious injury.

(000336)

NOTE: See the Materials Safety Data Sheet (MSDS) for additional information.

DEF freezes at temperatures below 11.5 °F (-11.3 °C). Do not use additives to reduce the freezing temperature. Additives currently available are more corrosive than DEF, and will cause component and system degradation and negatively impact reliability. For more information, see the operator manual, or contact a DEF supplier.

DEF quality degrades rapidly at temperatures above 140 °F (60 °C). To maintain emissions compliance, the urea concentration must remain between 31.8–33.2%.

Ideal conditions for storage of DEF are:

- Store at temperature range 23–86 °F (-5–30 °C)
- Store in sealed dedicated containers to avoid contamination and evaporation

Under these conditions, DEF is expected to remain usable for a minimum of 18 months. Storing DEF at higher temperatures can reduce its useful life by approximately six months for every 9 °F (5 °C) above 86 °F (30 °C). Long-term storage in the DEF tank (over 12 months) is not recommended. If long-term storage is necessary, test DEF before operating engine. See [DEF Testing](#).

DOC, SCR, and DPF Cleaning Operations



WARNING

Risk of Burn. Stay clear of the exhaust system during operation and exhaust filter cleaning. Exposure to hot exhaust gases and components could result in serious injury. (000304)

The exhaust aftertreatment system goes through an automatic cleaning process known as regeneration. Under normal circumstances, regeneration occurs without interrupting the unit operation.




NOTE: Always park the unit in a safe location for elevated exhaust temperatures and check for adequate fuel level before beginning the exhaust aftertreatment cleaning process. The cleaning cycle can take an extended period of time (approximately 45 minutes). Cleaning is complete when the regeneration indicator remains off.

Diesel Particulate Filter Regeneration

NOTE: See [Emissions Information](#) in this section for emissions statement.

Regeneration is to increase the exhaust temperature for a given time. The regeneration process is used to remove soot from the DPF, and warm up the Selective Catalyst Reduction (SCR) system. The DPF traps both soot and ash. The ash is removed through a manual cleaning process. See [Diesel Particulate Filter—Clean](#) for procedure on the service of the DPF.

Regeneration Indicators

	Regeneration Active. When illuminated, the system is active. This indicator shows that elevated emission temperatures are possible. This indicator will switch off when regeneration is complete.
	DPF. When illuminated, regeneration is required. This indicator will illuminate when "Time to Regen" is less than a predetermined amount of time.
	The module received a fault indication from the engine ECU informing that the Diesel Particulate Filter has been inhibited.

Modes of Regeneration

Automatic: The Electronic Control Module (ECM) uses multiple inputs from the engine and the machine to determine the best time to perform automatic regeneration. Automatic regenerations can take place throughout the operating cycle of the engine.

The regeneration active indicator will be illuminated when regeneration is being performed. Interruptions of the regeneration are acceptable.

NOTE: Automatic adjustments of engine speed may be noticed during regenerations. If regeneration is taking place and the engine is taken to low idle, the engine speed may remain elevated to maintain the regeneration.

NOTE: If the machine returns to work while automatic regeneration is active, the regeneration may be stopped. The ECM will continue to monitor inputs to determine the best time to restart the regeneration.

Regeneration Triggers

See [Table 4-6](#). Regeneration may be required for the following reasons.

Soot: The DPF will collect soot produced by the engine. Automatic regeneration activates to reduce soot level.

Start-Up Regeneration: Start-up regeneration is initiated by the ECM after a cold engine start. This regeneration is performed to heat the system to a required temperature for Diesel Exhaust Fluid (DEF) dosing to begin.

SCR Maintenance: Regeneration is performed to maintain the SCR system.

Regeneration System Warning Indicators

See [Figure 4-3](#). The DPF Indicator will illuminate solid when regeneration is required. Regeneration should be performed as soon as possible.



Figure 4-3. DPF Indicator

NOTE: In some situations, the DPF indicator may stay illuminated after regeneration ends. The illuminated DPF indicator indicates that complete regeneration has not been performed. Complete regeneration is when the soot has been depleted or all the criteria for one of the other regeneration types have been met. If the DPF indicator stays illuminated, perform regeneration without interruption. The DPF indicator will shut off when regeneration is complete.

If the soot load is above a threshold or sulfur is high, then regeneration is required. The DPF indicator will illuminate and flash slowly. Engine power will be slightly derated. If the machine continues to operate without regeneration, derate will eventually reach 100%. Stop the machine. With the engine at low idle, initiate manual regeneration.

See [Figure 4-4](#). Once the amount of soot collected in the DPF has reached a threshold or “Time to Regen” has been at 0 hours for a predetermined time, the DPF indicator will illuminate and flash at a fast rate. A red stop lamp will illuminate solid.

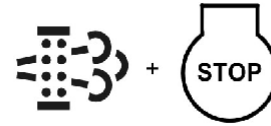


Figure 4-4. DPF Indicator and STOP Lamp

10 minutes after the illumination of the DPF indicator and red stop lamp the engine will stop. The engine can be restarted by cycling the engine start switch key. The engine will return to the previous derate state before shutdown.

Once the amount of soot collected reaches a threshold level or 6.4 hours of run time has passed since the red stop lamp was illuminated without successful regeneration, the engine will have a 100% derate.

Once the amount of soot collected reaches a critical threshold level, the regeneration will be locked out. Now, regeneration can only be performed by using electronic service tool (ET). The engine may be restarted, but will only run for 3 minutes before shutting down again.

A fault code will be active for any DPF system-related issue. Follow the troubleshooting guide to rectify the issue.

If the DPF loses function, or is tampered with in any way, the check engine lamp, and an amber action (if equipped) will illuminate. A fault code will also announce. The lamps and fault code will remain active until the problem is rectified.

NOTE: The engine and emissions control system shall be operated, used, and maintained in accordance with the instructions provided. Failure to follow the instructions could result in emissions performance that does not meet the requirements applicable to the category of the engine. No deliberated tampering with, or misuse of the engine emissions control system should take place. Prompt action is critical to rectify any incorrect operation, use, or maintenance of the emissions control system.

Table 4-6. Regeneration Triggers

Type	Reason For Trigger	Strategy	Regen Interval	Duration (Minutes)
Primary Triggers (LSR & HSR)	A/T maintenance	Upon cold startup (coolant temp. below 104 °F (40 °C), the A/T will be maintained. Coolant temp. must reach 104 F° (40 C°) before regeneration will occur. Shutoff after 17 min.	On cold startup. Frequency depends on how often application starts up cold.	17
Secondary SMART Triggers (LSR & HSR)	DPF soot level	LSR and HSR enabled at 80%.	10 hours to infinite	30–45 Max: 75
	CRS/Deposit maintenance	Fuel must be cycled through main CRS nozzle at least once every 25 hours.	25 hours to infinite.	10–20
	Sulfur*	30 minutes of 842 °F (450 °C) SCR inlet temperature is required every 100 hours. Smart timer is incremented or decremented based on logic.	Infinite—other triggers will currently reduce sulfur adequately.	30
	HC evap*	Model of HC collected in A/T. After prolonged cranking or long-duration idle at low temperature, trigger 932 °F (500 °C) for an ECU predetermined time interval.	Depending on ambient and operating conditions.	Min: 2> 797 °F (425 °C) Max: 30 (de-icing strategy)

*Does not impact Time to Regeneration (hours) timer.

Checking Generator Drive Plate Torque



Accidental Start-up. Disconnect the negative battery cable, then the positive battery cable when working on unit. Failure to do so could result in death or serious injury. (000130)

1. Disconnect battery.
2. Remove generator fan guard.
3. Tighten each drive plate bolt to 44 ft-lb (56.9 Nm).
4. Install generator fan guard.
5. Connect battery.

removing the jack cover, or, if equipped, use a needle-nose applicator or standard grease gun on the lubrication point on the side of the jack near the crank. Rotate the jack handle to evenly distribute grease.

- Lightweight oil must be applied to the handle, at both sides of the tube.
- If equipped, the axle bolt and nut assembly of the caster wheel must also be lubricated with the same lightweight oil.

Jack Maintenance

The following procedures should be performed annually.

Side-Wind Models

- The internal gearing and bushings of the jack must be kept lubricated. Apply a small amount of automotive grease to the internal gearing by

Top-Wind Models

- Apply a light weight oil to the screw stem.

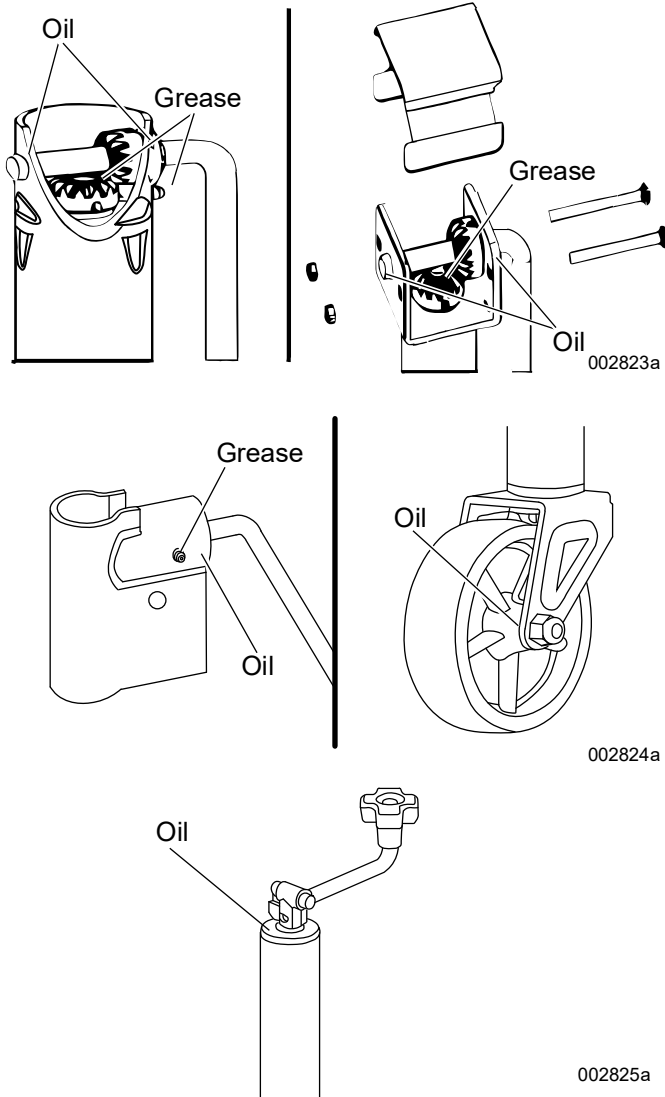


Figure 4-5. Lubrication Points

Trailer Wheel Bearings

The trailer axles are equipped with oil bath bearings. the clear plastic cap serves as a site glass to verify oil level in the axles. The cap should be tightened to 25 ft-lb. Over tightening can damage the sealing o-ring and cause an oil leak. The oil can be refilled through the clear cap by removing the rubber plug in the center of the cap. Please use one of the recommended oils to lubricate the bearings:

- SAE 90
- SAE 80W-90
- SAE 75W-90

In order to remove the hub/rotor assembly a gear puller may be required. The oil seal is a 2-part seal where the inside diameter of the seal presses onto the spindle journal and the outside diameter of the seal presses into the hub bore. A gear puller is the most efficient way to

remove the hub from the spindle. A new oil seal must be installed before reassembly or the old seal will leak upon re-installation and use. When re-installing a new oil seal, be sure to correctly orient the seal. Most are marked AIR SIDE. This side must not be placed towards the oil and bearing or it will fail in service. Install new seal using a block of wood and hammer to drive in the seal bore square until the outer face is flush with the seal bore face. Do not use Permatex on rubber-encased oil seals.

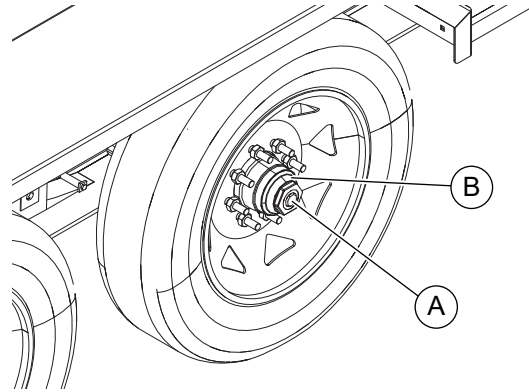


Figure 4-6. Hub Assembly

- A Rubber cap
- B Clear plastic cap

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Section 5: Troubleshooting

General Troubleshooting

This information is intended to be a check or verification for simple causes that can be located and fixed. It does not cover all types of problems. See the OEM engine manual for additional troubleshooting information. Procedures that require in-depth knowledge or skills should be performed by a GMASD.

Problem	Possible Causes	Solution
Low fuel level shutdown	Low fuel level	Check fuel level on controller.
	Unit not level	Verify unit is sitting level to ensure an accurate reading.
	Leaking fuel tank	Check tank for leaks.
	Damaged fuel sender or wiring	Check for continuity between sender and engine controller.
Low oil pressure shutdown	Low oil level	Check oil level on dipstick. Add oil if necessary.
	Leaking oil from engine	Visually inspect the engine for leaks. Restart unit and verify loss of pressure. Immediately stop engine if pressure does not reach 5 psi (34.5 kPa) within five seconds.
	Oil pressure sender	See the OEM engine manual to identify corrective action.
Low coolant level shutdown	Low coolant level	Allow engine to cool, then check coolant level in radiator. Add coolant if necessary.
	Leaking coolant hoses	Inspect hoses for leaks. Repair or replace as necessary.
	Leaking engine block or water pump	Visually inspect for leaks. Verify no coolant has mixed with the engine oil (oil will appear milky). See the OEM engine manual for additional information.
High coolant temperature shutdown	Low coolant level	Add coolant if necessary. Allow engine to cool, then check coolant level in radiator. Restart engine and check coolant temperature (on controller). Immediately stop engine if coolant temperature is 210 °F (99 °C) or higher.
	Blockage in radiator	Check radiator shroud and ducting for blockage and remove any foreign matter.
	Leakage in coolant hoses, engine block, or water pump	<ul style="list-style-type: none"> Inspect for visible leaks. Check tension of water pump serpentine drive belt. Remove load on generator and restart engine. Check coolant temperature and immediately stop engine if it starts to overheat. See the OEM engine manual for additional information on engine overheating.
Overcrank shutdown	Fuel level low	<ul style="list-style-type: none"> Check fuel level in tank. Check fuel pump operation. Check air filter for blockage. See the OEM engine manual for additional information.

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Section 6: Wiring Diagrams

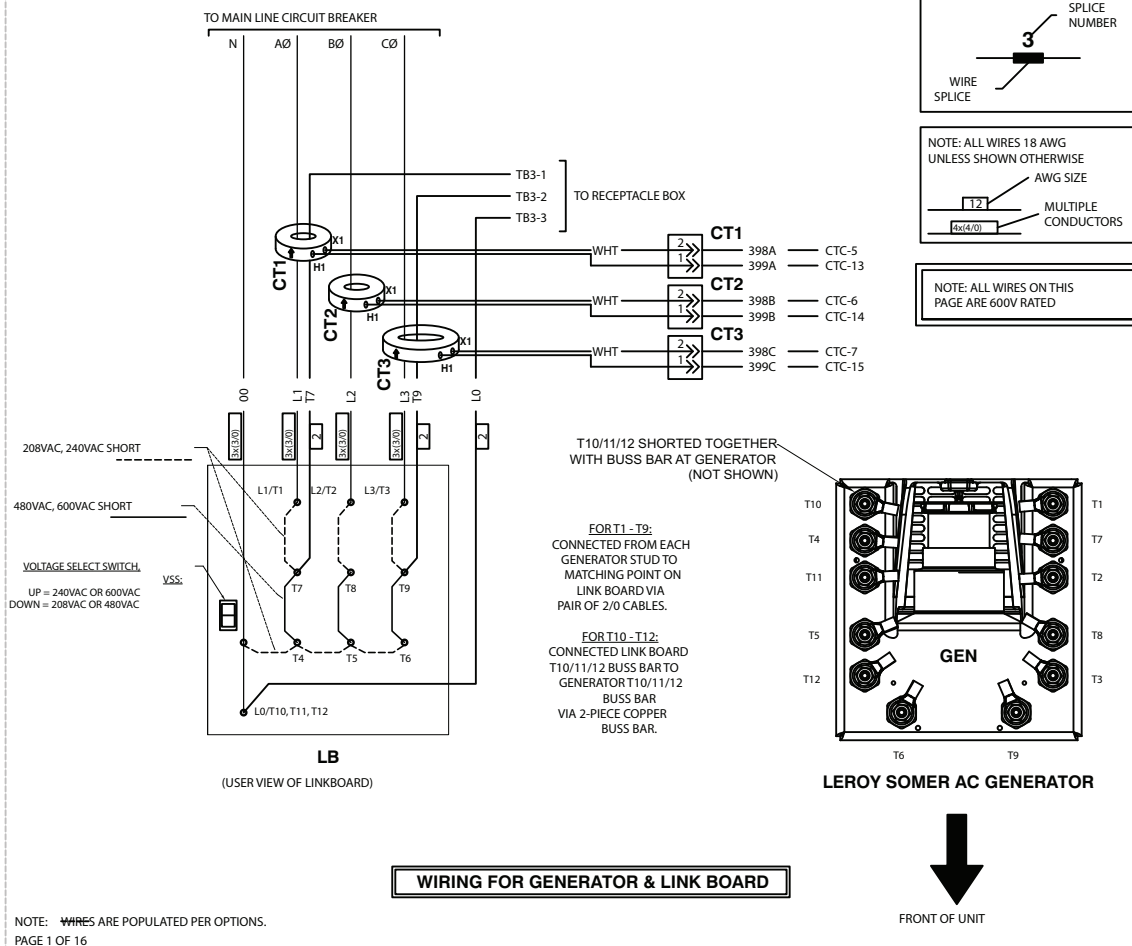
DIAGRAM

GROUP G

LEGEND

AFS - AUX FUEL SWITCH (NOT USED ON MDE330)	DSW1 - CUSTOMER LUG DOOR SAFETY SWITCH	PL - CONTROL PANEL LIGHT
ALT - DC CHARGE ALTERNATOR	DSW2 - LINK BOARD DOOR SAFETY SWITCH	PR - POWER RELAY
ATB - LSA GENERATOR TERMINAL BLOCK	ES_ - EMERGENCY STOP SWITCH	PWR - POWER ZONE POWER CONNECTOR
AVR - AUTOMATIC VOLTAGE REGULATOR	FB - DC FUSE BOX IN ENGINE BAY	PZC - MAIN POWER ZONE CONNECTOR
AVRC - AVR CONNECTOR	FB_ - FUSE BLOCK	RBS - RUPTURE BASIN LEAK DETECT SWITCH
BCH - BATTERY CHARGER	FLS - FUEL LEVEL SENDER	SC - START CONTACTOR
BCR - BATT CHARGER SHORE POWER RECEPT	GEN - GENERATOR	SM - STARTER MOTOR
BD - BATTERY DISCONNECT	GFCI - GROUND FAULT CURRENT INTERRUPT	SMS - STARTER MAGSWITCH
BH - ENGINE BLOCK HEATER	GND1 - GROUND BAR CONNECTION	TB_ - TERMINAL BLOCK
BTR - BUCK TRANSFORMER RELAY	H1 - SECONDARY DEF TANK PIPE HEATER	TCR - TELEMTRY CONNECTOR
BWDL - BATTERY WAIT TO DISCONNECT LAMP	HDB - HEATER DISTRIBUTION BOX	VSC_ - VOLTAGE SENSING CONNECTOR
CB_ - RECEPTACLE CIRCUIT BREAKERS	HM - HOUR METER	VSS_ - VOLTAGE SELECTOR SWITCH
CBC - (MLCB) CIRCUIT BREAKER CONNECTOR	HSP - AC HEATER SHORE POWER RECEPTACLE	WLS - COOLANT LEVEL SENDER
CC_ - CUSTOMER CONNECTION LUGS	IL - INTERIOR LED LIGHTING	XMFR1 - TRANSFORMER
CDV - SECONDARY COOLANT DIVERTER VALVE	LB - LINK BOARD (OUTPUT VOLTAGE SELECT)	Y_ - COMMS CONNECTION #
CT_ - CURRENT TRANSFORMER	LIS - LOW IDLE SWITCH	
CTC - CURRENT TRANSFORMER CONNECTOR	MLCB - MAIN LINE CIRCUIT BREAKER	
CVH - CRANKCASE VENT HEATER	MLS - MASTER LIGHT SWITCH	
DCS - DEF CONTAINMENT SWITCH	OLS - OIL LEVEL SWITCH	
DS_ - DEEP SEA 8610 CONTROLLER CONNECTOR	PAS - POSITIVE AIR SHUTDOWN	
DSE - DEEP SEA 8610 ETHERNET PORT	PASP - PAS POSITION RELAY	

ALL CONNECTORS SHOWN FROM WIRE INSERTION VIEW UNLESS OTHERWISE NOTED



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WIRING - DIAGRAM
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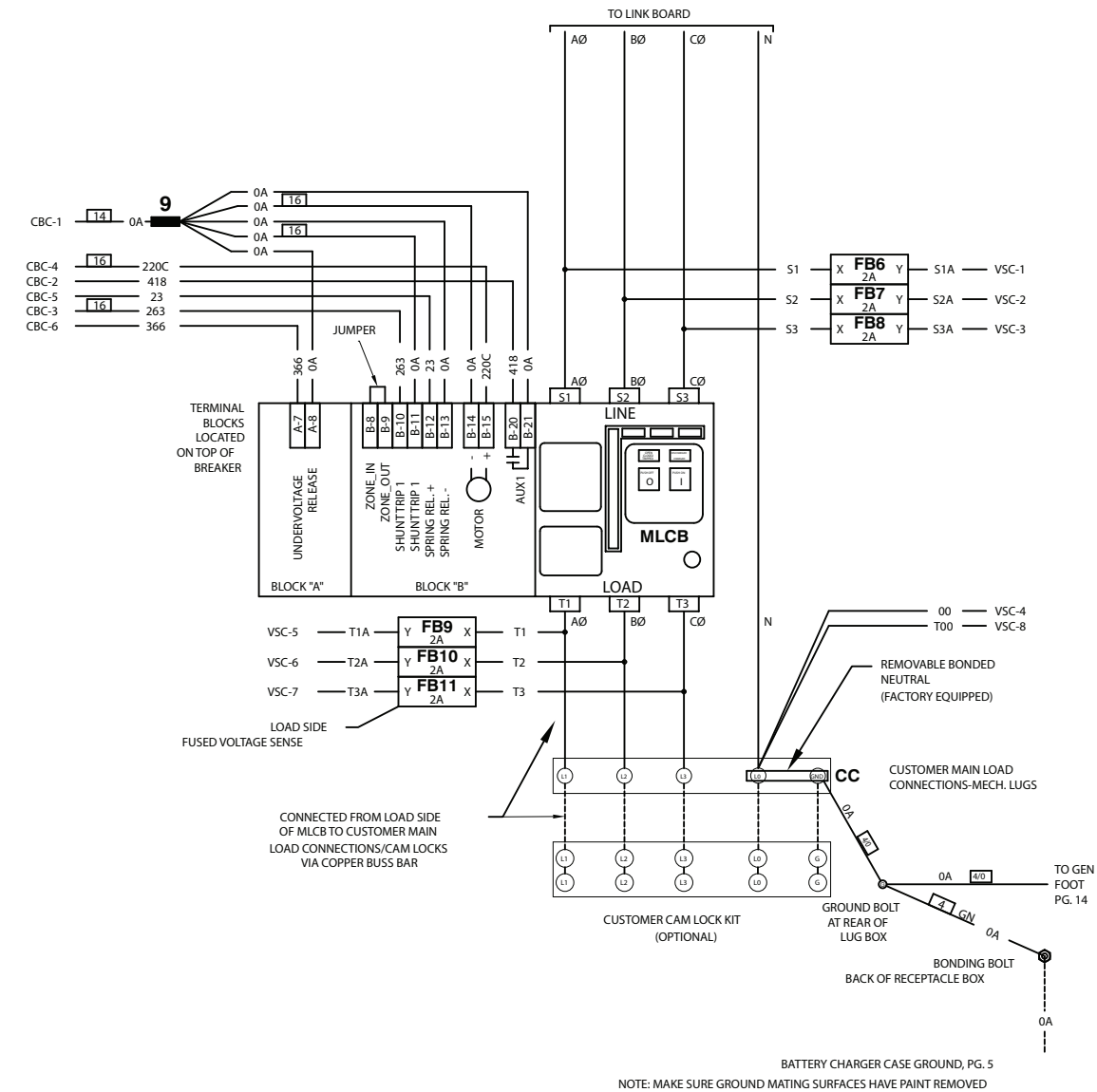
DIAGRAM

GROUP G

COMPONENTS LOCATED IN CIRCUIT BREAKER BOX

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED

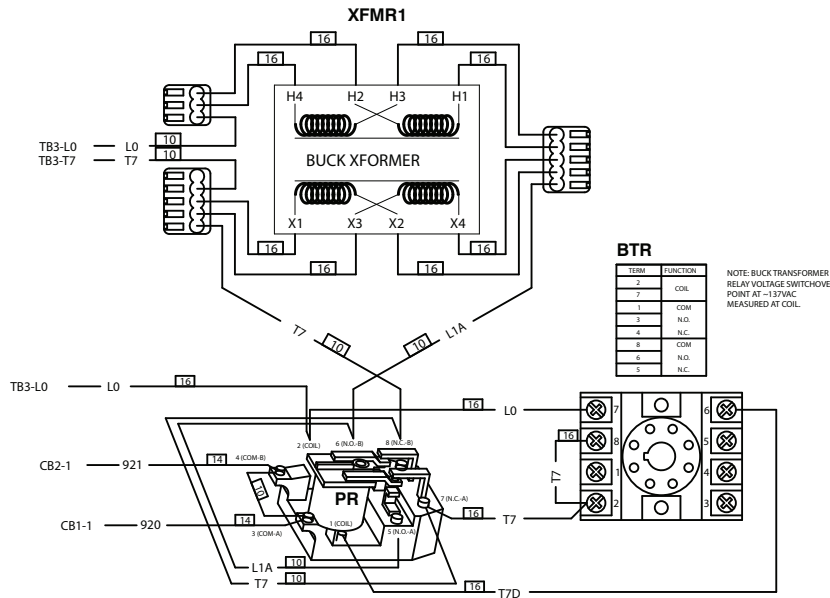
WIRING FOR MANUAL & MOTORIZED MLCB



DIAGRAM

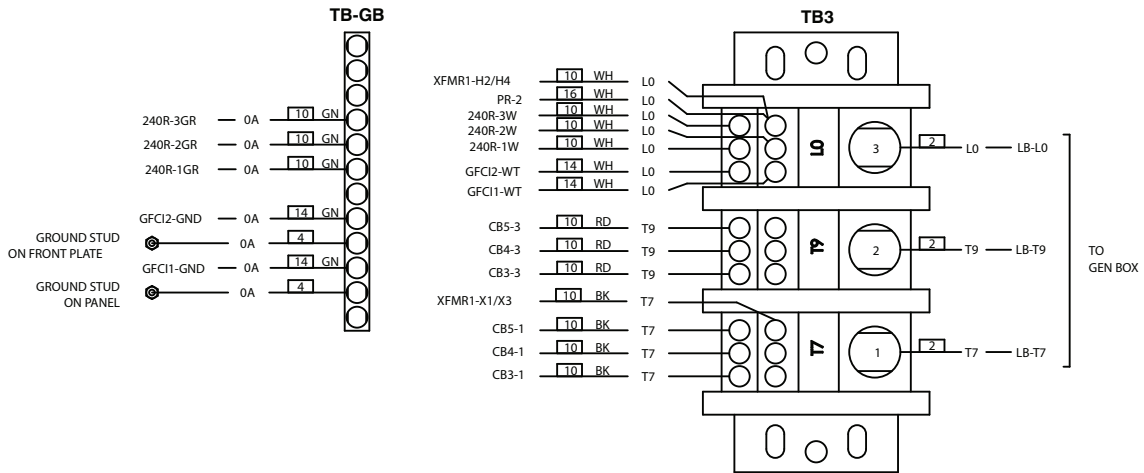
GROUP G

RECEPTACLE PANEL
(CONFIGURATION #1)



TERM	FUNCTION
2	COIL
3	COIL
1	COM
3	N.O.
4	N.C.
8	COM
6	N.O.
5	N.C.

NOTE: BUCK TRANSFORMER
RELAY VOLTAGE SWITCHOVER
POINT AT ~137VAC
MEASURED AT COIL



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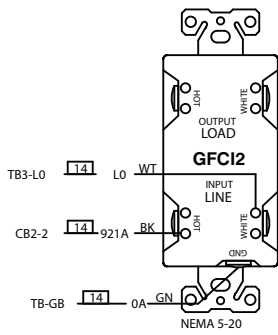
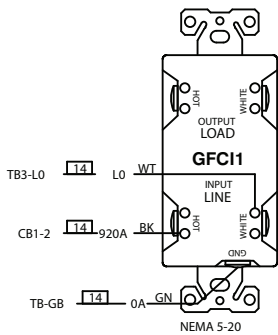
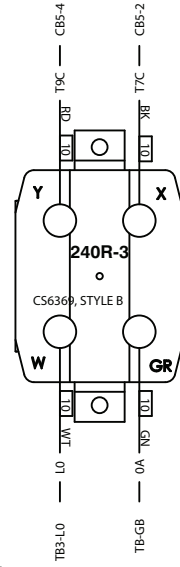
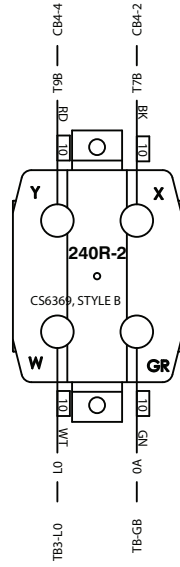
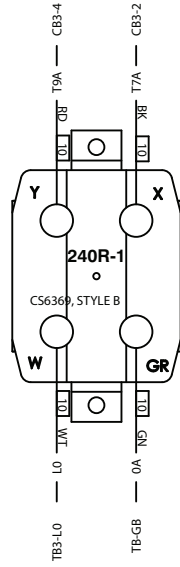
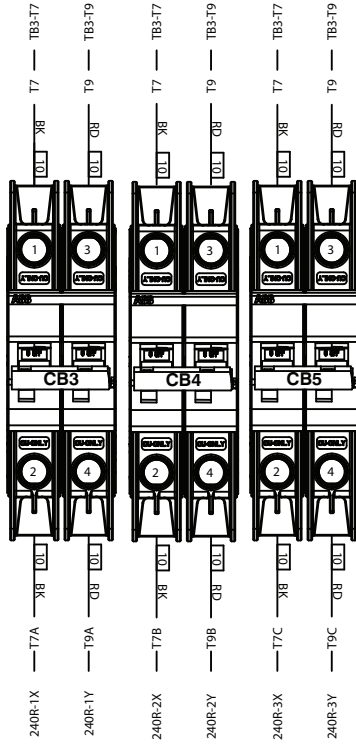
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WIRING - DIAGRAM
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DIAGRAM

GROUP G

RECEPTACLE PANEL
(CONFIGURATION #1)



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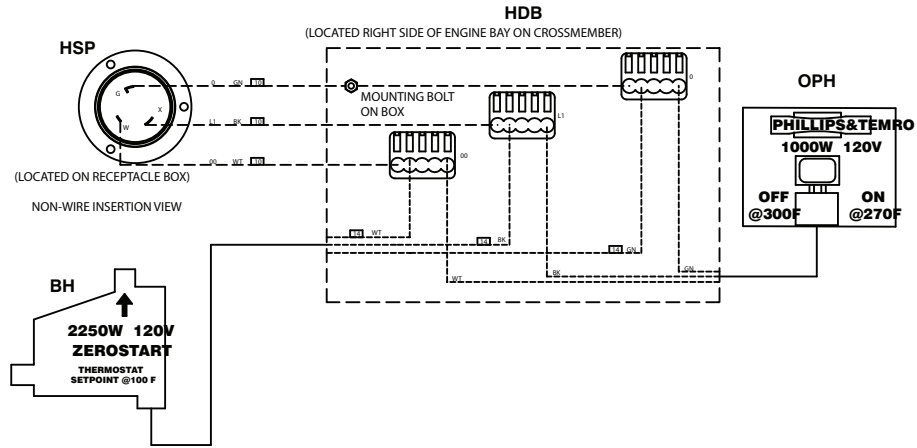
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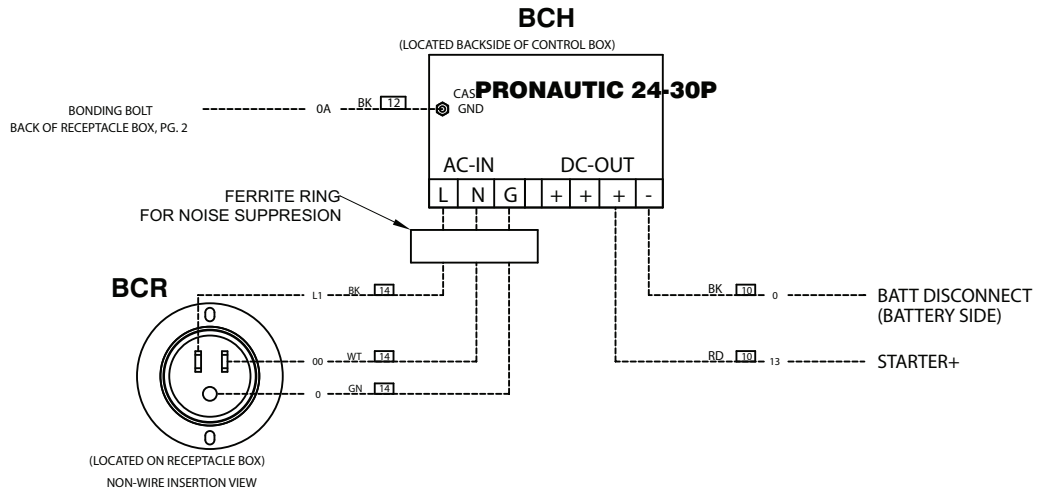
DIAGRAM

GROUP G

OPTIONAL HEATER SHORE POWER RECEPTACLE (NEMA L5-30)



OPTIONAL BATTERY CHARGER SHORE POWER RECEPTACLE - (NEMA 5-15)



NOTE: WIRES ARE POPULATED PER OPTIONS.

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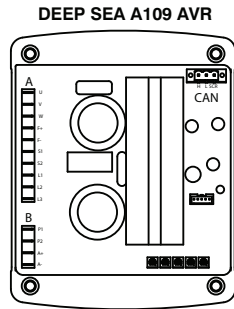
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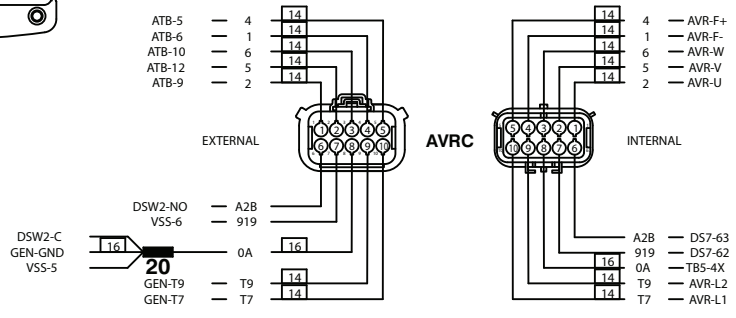
DIAGRAM

GROUP G

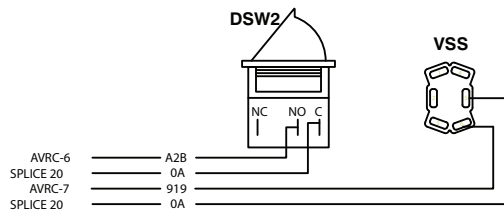
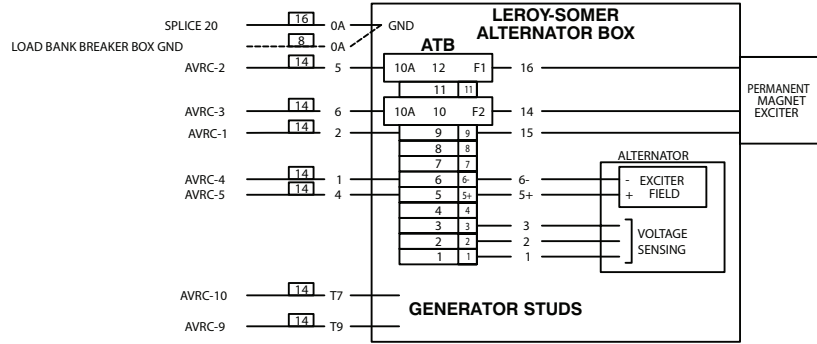
COMPONENTS LOCATED IN CONTROL PANEL



CONNECTOR A			CONNECTOR B			CAN		
PIN	WIRE	FROM	PIN	WIRE	FROM	PIN	WIRE	FROM
U	2	AVRC-1	P1	-	-	H	743A	DS3-26
V	5	AVRC-2	P2	-	-	L	744A	DS3-27
W	6	AVRC-3	A±	-	-	SCR	-	-
F±	4	AVRC-5	A-	-	-			
F-	1	AVRC-4	CUT	-	-			
S1	-	-						
S2	-	-						
L1	T7	AVRC-10						
L2	T9	AVRC-9						
L3	-	-						



COMPONENTS LOCATED IN ALTERNATOR



NOTE: WIRES ARE POPULATED PER OPTIONS.

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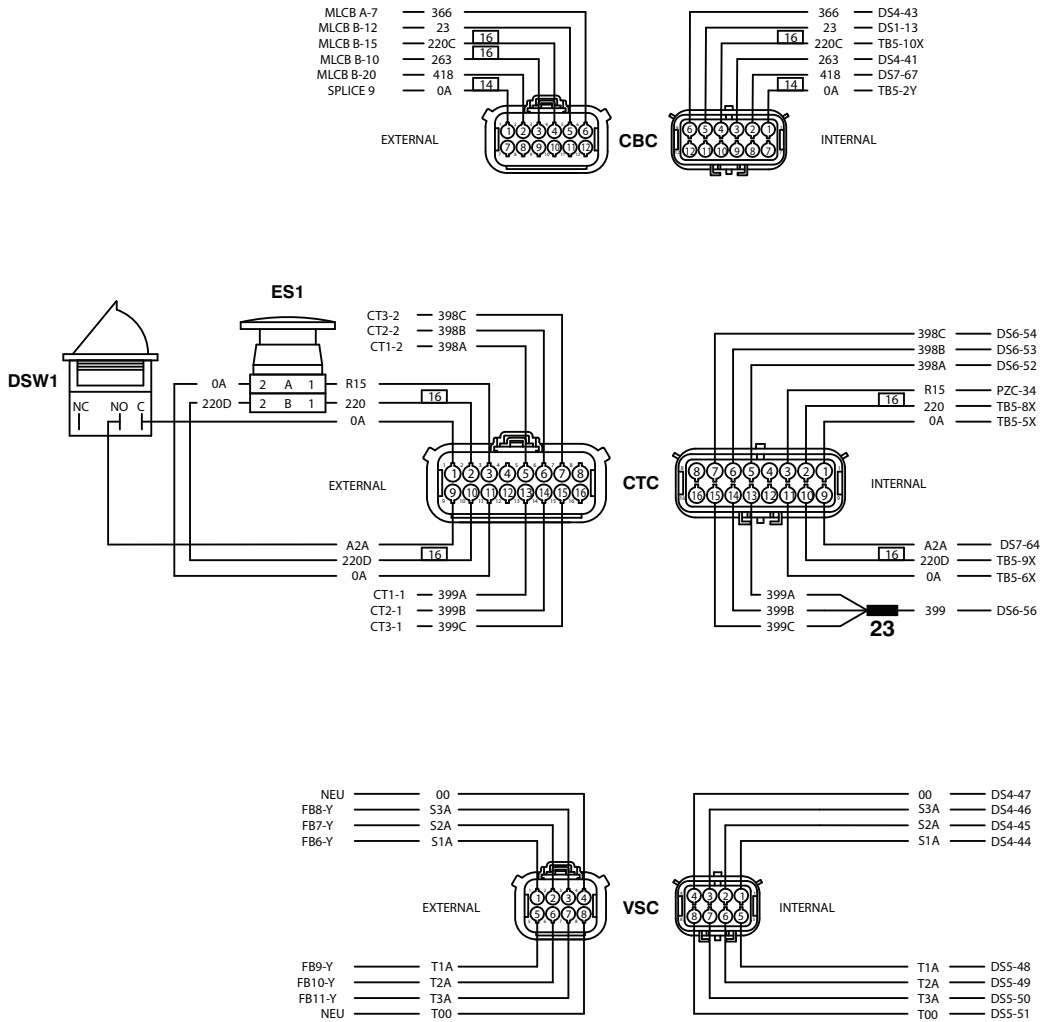
WIRING - DIAGRAM
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DIAGRAM

GROUP G

COMPONENTS LOCATED IN CONTROL PANEL

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED



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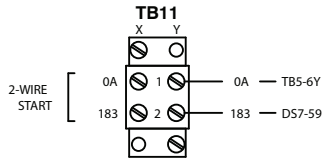
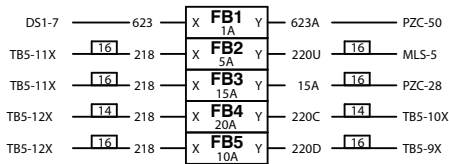
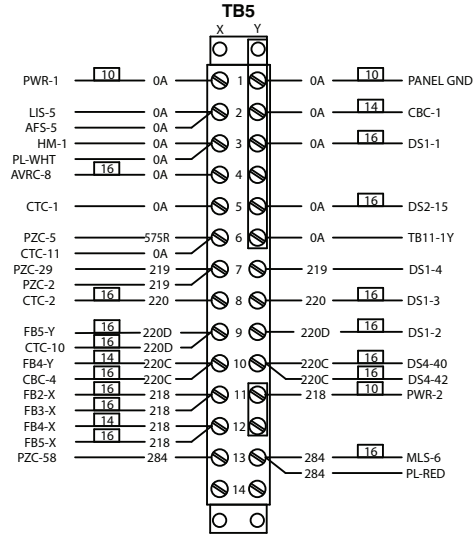
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WIRING - DIAGRAM
D9.3L G22 DSE8610 MDE
DRAWING #: A0002490373

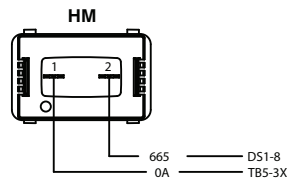
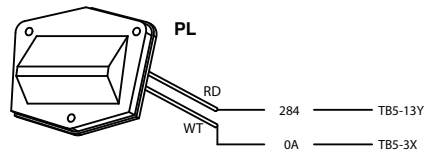
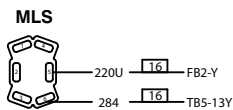
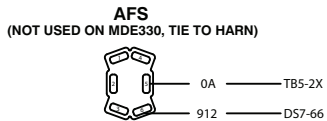
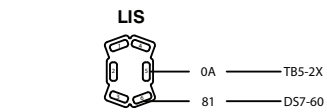
DIAGRAM

GROUP G

COMPONENTS LOCATED IN CONTROL PANEL



COMPONENTS LOCATED ON CONTROL PANEL INNER DOOR



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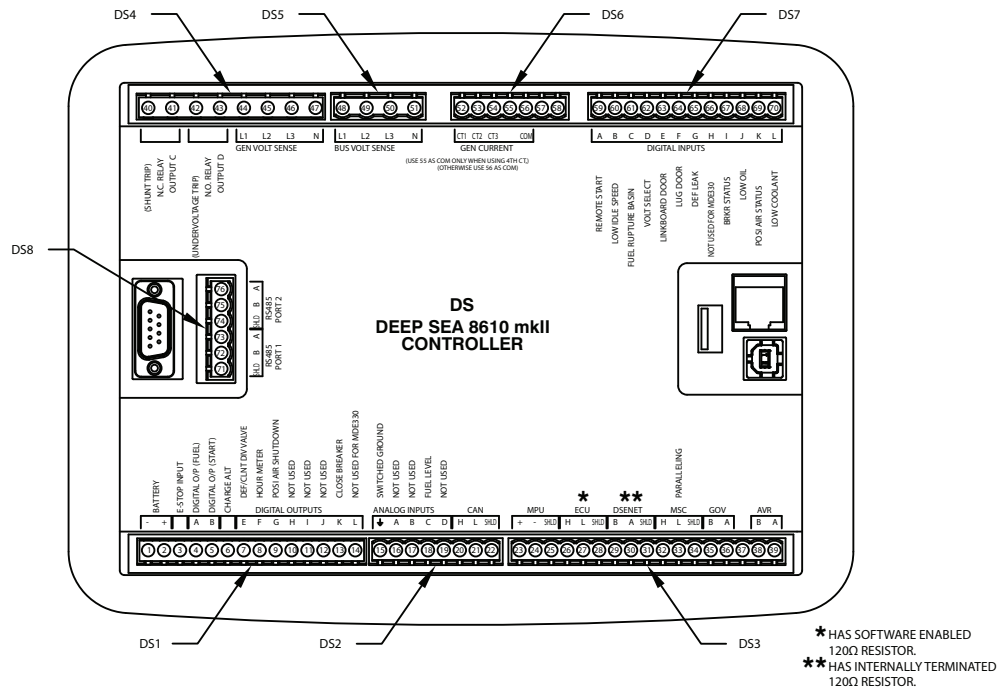
PAGE 8 OF 16

WIRING - DIAGRAM
D9.3L G22 DSE8610 MDE
DRAWING #: A0002490373

DIAGRAM

GROUP G

COMPONENTS LOCATED ON CONTROL PANEL INNER DOOR



DS1

PIN	WIRE	FROM
1	0A	TB5-3Y
2	220D	TB5-9Y
3	220	TB5-8Y
4	219	TB5-7Y
5	56	PZC-1
6	-	-
7	623	FB1-X
8	665	HM-2
9	285	PZC-56
10	-	-
11	-	-
12	-	-
13	23	CBC-5
14	910	PZC-59

DS2

PIN	WIRE	FROM
15	0A	TB5-5Y
16	-	-
17	-	-
18	5755	PZC-4
19	-	-
20	-	-
21	-	-
22	-	-

DS3

PIN	WIRE	FROM
23	-	-
24	-	-
25	-	-
26	743A	PZC-43
26	743A	AVR-CANH
27	744A	PZC-44
27	744A	AVR-CANL
28	SHLD	PZC-45
28	SHLD	CUT
29	-	-
30	-	-
31	-	-
32	743B	Y4-B
33	744B	Y4-C
34	SHLD	Y4-A
35	-	-
36	-	-
37	-	-
38	-	-
39	-	-

DS4

PIN	WIRE	FROM
40	220C	TB5-10Y
41	263	CBC-3
42	220C	TB5-10Y
43	366	CBC-6
44	S1A	VSC-1
45	S2A	VSC-2
46	S3A	VSC-3
47	00	VSC-4

DS5

PIN	WIRE	FROM
48	T1A	VSC-5
49	T2A	VSC-6
50	T3A	VSC-7
51	T00	VSC-8

DS6

PIN	WIRE	FROM
52	398A	CTC-5
53	398B	CTC-6
54	398C	CTC-7
55	-	-
56	399	SPLICE 23
57	-	-
58	-	-

DS7

PIN	WIRE	FROM
59	183	TB11-2Y
60	81	LIS-6
61	567	PZC-6
62	919	AVRC-7
63	A2B	AVRC-6
64	A2A	CTC-9
65	DI5	PZC-52
66	912	AFS-6
67	418	CBC-2
68	86	PZC-10
69	0B	PZC-57
70	573	PZC-7

DS8

PIN	WIRE	FROM
71	SHLD	PZC-48
72	391	PZC-47
73	390	PZC-46
74	-	-
75	-	-
76	-	-

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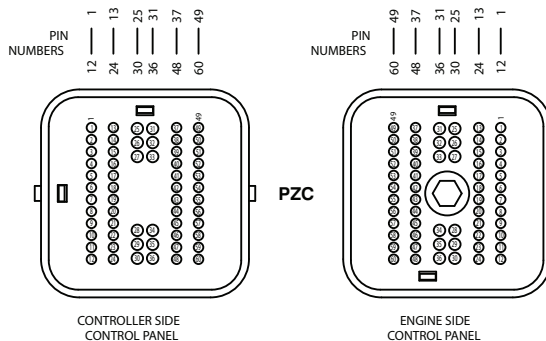
WIRING - DIAGRAM
D9.3L G22 DSE8610 MDE
DRAWING #: A0002490373

DIAGRAM

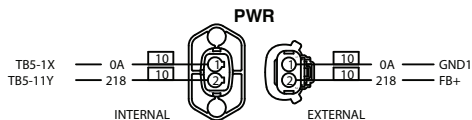
GROUP G

COMPONENTS LOCATED AT BACK OF CONTROL PANEL BOX

	PIN	WIRE	AWG	FROM	TO	PIN	WIRE	AWG	FROM	TO	PIN	WIRE	AWG	FROM	TO	
CRANK RUN SIGNAL (ACTIVE HI)	1	56	18	DS1-5	SC	13	-	-	-	-	25	-	25	-	-	
	2	219	18	TB5-7X	FB-D5	14	-	-	-	-	26	-	26	-	-	
	3	-	-	-	-	15	-	-	-	-	27	-	27	-	-	
FUEL LEVEL, 2WIRE FUEL LEVEL, 2WIRE FUEL CONTAINMENT LOW CLNT LVL	4	575S	18	DS2-18	FLS-1	16	-	-	-	-						
	5	575R	18	TB5-6X	FLS-2	17	-	-	-	-						
	6	567	18	DS7-61	RBS-1	18	-	-	-	-						
	7	573	18	DS7-70	WLS-C	19	-	-	-	-						
OIL MAKEUP LEVEL ALARM	8	-	-	-	-	20	-	-	-	-						
	9	-	-	-	-	21	-	-	-	-						
	10	86	18	DS7-68	OLS-1	22	-	-	-	-	28	15A	16	FB3-Y	SPLICE 6	DC HEATER
	11	-	-	-	-	23	-	-	-	-	29	219	18	TB5-7X	TCR-RUN	TELEMETRY RUN
	12	-	-	-	-	24	-	-	-	-	30	-	-	-	-	



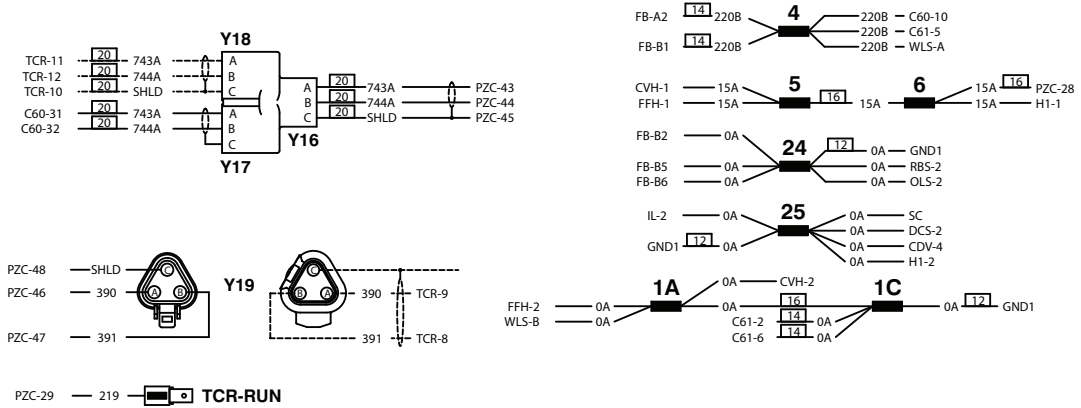
	PIN	WIRE	AWG	FROM	TO	PIN	WIRE	AWG	FROM	TO	PIN	WIRE	AWG	FROM	TO	
AUX SHUTDOWN	31	-	-	-	-	37	-	-	-	-	49	-	-	-	-	
	32	-	-	-	-	38	-	-	-	-	50	623A	18	FB1-Y	CDV-1	2ND CLNT DIV VALVE
	33	-	-	-	-	39	-	-	-	-	51	-	-	-	-	
AUX SHUTDOWN	34	R15	18	CTC-3	C60-30	40	-	-	-	-	52	DI5	18	DS7-65	DCS-1	DEF CONTAINMENT
	35	-	-	-	-	41	-	-	-	-	53	-	-	-	-	
	36	-	-	-	-	42	-	-	-	-	54	-	-	-	-	
						43	743A	20	DS3-26	Y16-A	55	-	-	-	-	
						44	744A	20	DS3-27	Y16-B	56	285	18	DS1-9	PAS-1	POSITIVE AIR SHUTDOWN TRIG
						45	SHLD	20	DS3-28	Y16-C	57	0B	18	DS7-69	FB-D8	LIGHTING
						46	390	20	DS8-73	Y19-A	58	284	18	TB5-13X	IL-1	
						47	391	20	DS8-72	Y19-B	59	910	18	DS1-14	-	
						48	SHLD	20	DS8-71	Y19-C	60	-	-	-	-	



DIAGRAM

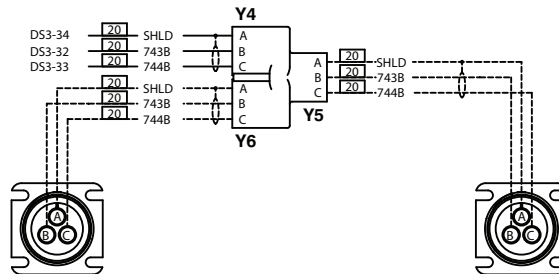
GROUP G

COMPONENTS LOCATED IN ENGINE BAY



OPTIONAL PARALLELING

(MSC PARALLELING CABLE REQUIRED BETWEEN UNITS WHEN PARALLELING)
 (WHEN UNIT IS LAST IN CHAIN, REQUIRES ONE 120OHM TERMINATING RESISTOR ASSEMBLY TO BE CONNECTED TO ONE PORT)
 (WHEN NOT PARALLELING, BOTH PORTS REQUIRE 120OHM TERMINATING RESISTOR ASSEMBLY TO BE CONNECTED)



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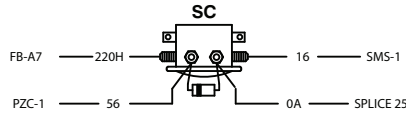
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WIRING - DIAGRAM
 D9.3L G22 DSE8610 MDE
 DRAWING #: A0002490373

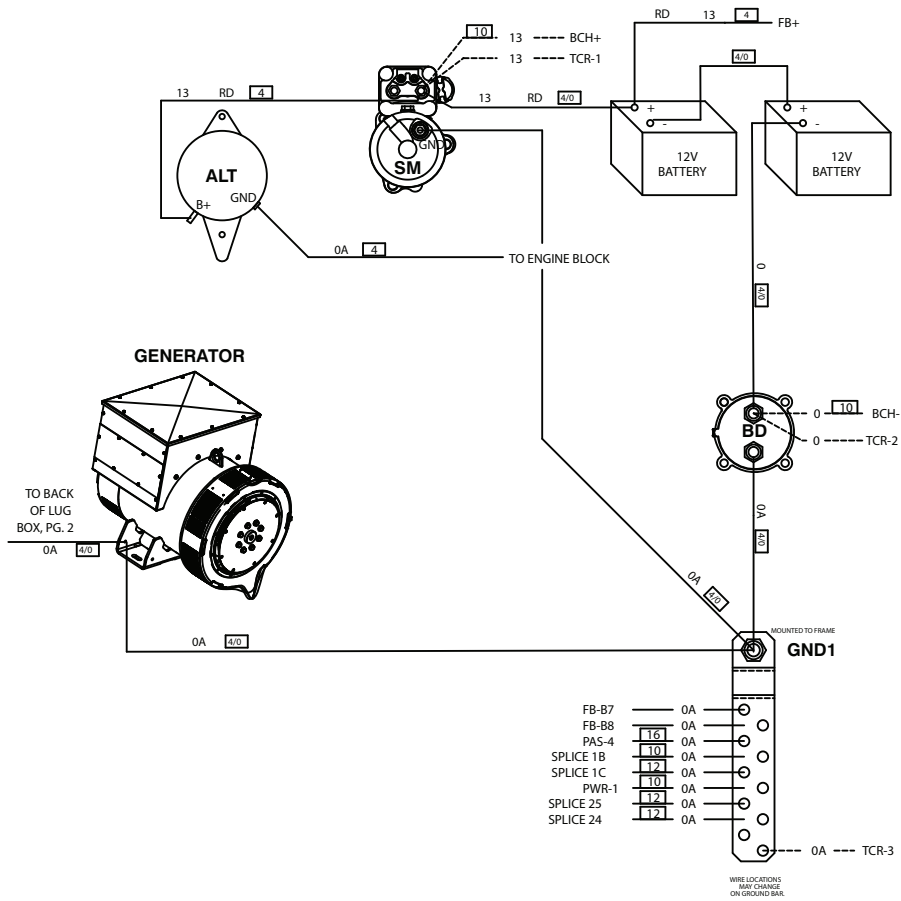
DIAGRAM

GROUP G

COMPONENTS LOCATED IN ENGINE BAY



NOTE: 3A, 600V DIODE LINE OF DIODE (CATHODE) MUST BE ORIENTATED THE SAME AS IN THE DRAWING.



NOTE: WIRES ARE POPULATED PER OPTIONS.

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WIRING - DIAGRAM
D9.3L G22 DSE8610 MDE
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DIAGRAM

GROUP G

COMPONENTS LOCATED IN ENGINE BAY

PIN LIST			
FB			
PIN	WIRE	AWG	TO
A1	220J	14	C60-1
A2	220B	14	SPLICE 4
A3	220P	14	C60-15
A4	220Q	14	C60-33
A5	PLUG	-	-
A6	PLUG	-	-
A7	220H	18	SC
A8	220L	16	PAS-3
A9	PLUG	-	-
A10	PLUG	-	-

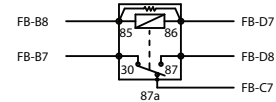
PIN LIST			
FB			
PIN	WIRE	AWG	TO
B1	220B	14	SPLICE 4
B2	0A	18	SPLICE 24
B3	PLUG	-	-
B4	PLUG	-	-
B5	0A	18	SPLICE 24
B6	0A	18	SPLICE 24
B7	0A	18	GND1
B8	0A	18	GND1
B9	PLUG	-	-
B10	PLUG	-	-

PIN LIST			
FB			
PIN	WIRE	AWG	TO
C1	PLUG	-	-
C2	PLUG	-	-
C3	PLUG	-	-
C4	PLUG	-	-
C5	PLUG	-	-
C6	PLUG	-	-
C7	PLUG	-	-
C8	PLUG	-	-
C9	PLUG	-	-
C10	PLUG	-	-

PIN LIST			
FB			
PIN	WIRE	AWG	TO
D1	286	18	C61-8
D2	220G	14	C61-7
D3	PLUG	-	-
D4	PLUG	-	-
D5	219	18	PZC-2
D6	256	18	C60-34
D7	285P	16	PAS-2
D8	0B	18	PZC-57
D9	PLUG	-	-
D10	PLUG	-	-

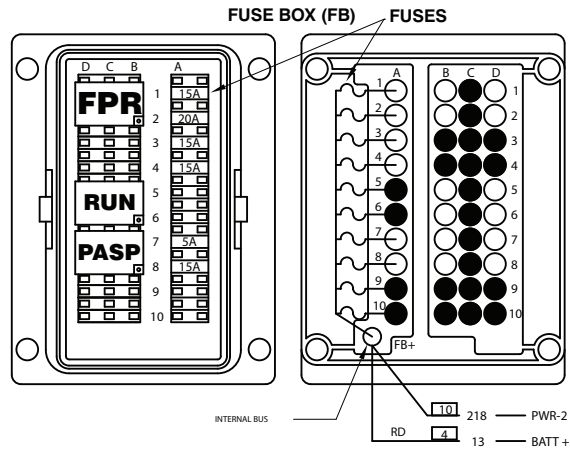
- FPR - PERKINS FUEL PUMP RELAY
- PASP - PAS POSITION RELAY (COMES WITH PAS OPTION)
- RUN - RUN RELAY

EXAMPLE FB RELAY WIRING



NOTE: TORQUE SPEC FOR FB+
40 +/- 5 IN-LB

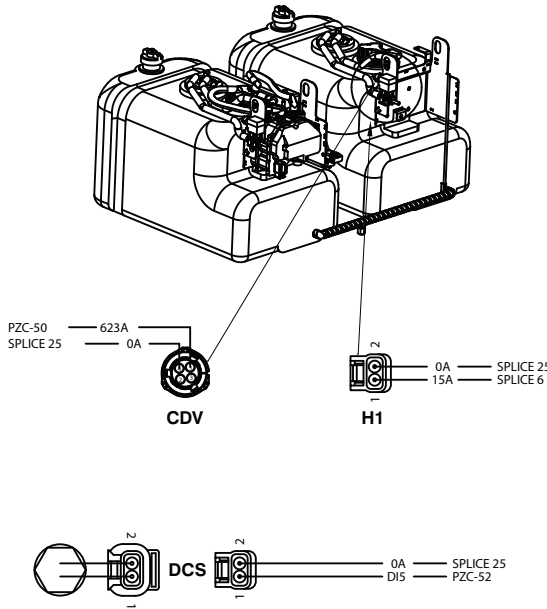
- A1 - ECU (15A)
- A2 - FUEL PUMP & ECU (20A)
- A3 - ECU (15A)
- A4 - ECU (15A)
- A5 - NOT USED
- A6 - NOT USED
- A7 - STARTER (5A)
- A8 - PAS (15A, COMES WITH PAS OPTION)
- A9 - NOT USED
- A10 - NOT USED



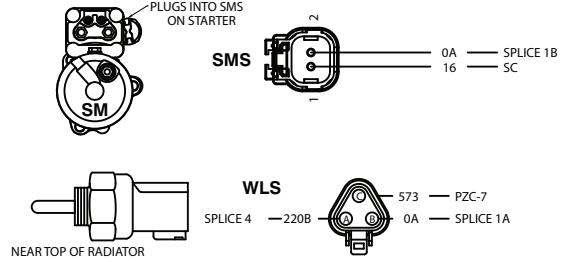
DIAGRAM

GROUP G

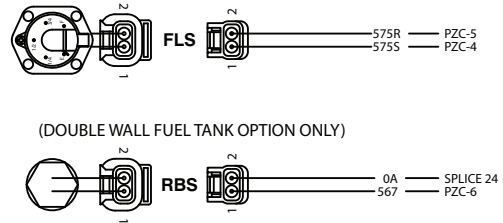
COMPONENTS LOCATED NEAR DUAL DEF TANKS



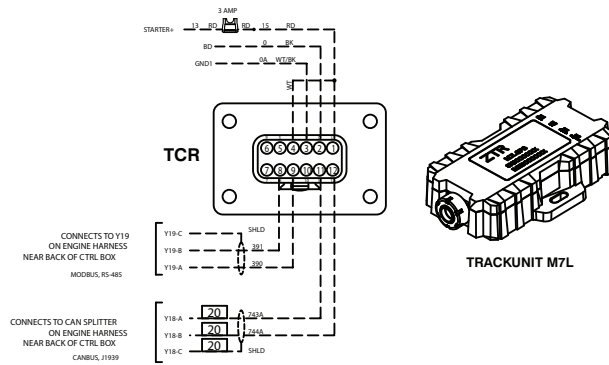
COMPONENTS LOCATED ON ENGINE/RADIATOR



COMPONENTS LOCATED ON FUEL TANK



OPTIONAL TELEMETRY (MODULE MOUNTED OUTSIDE UNIT ABOVE CONTROL BOX)



NOTE: WIRES ARE POPULATED PER OPTIONS.

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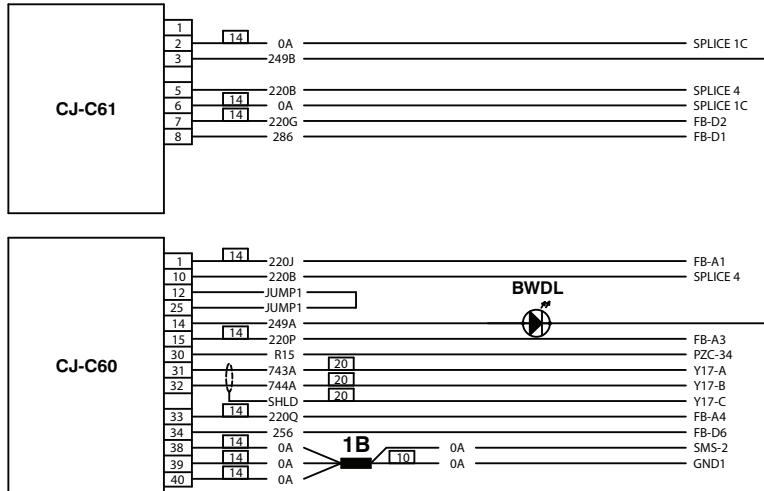
WIRING - DIAGRAM
D9.3L G22 DSE8610 MDE
DRAWING #: A0002490373

DIAGRAM

GROUP G

PERKINS ENGINE CONTROLS INTERFACE

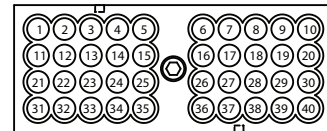
(LOCATED BETWEEN ENGINE AND AIR FILTER, ON VERTICAL MOUNTING BRACKET)



CJ-C61 CONNECTOR



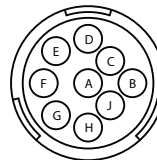
CJ-C60 CONNECTOR



PERKINS SERVICE TOOL CONNECTOR

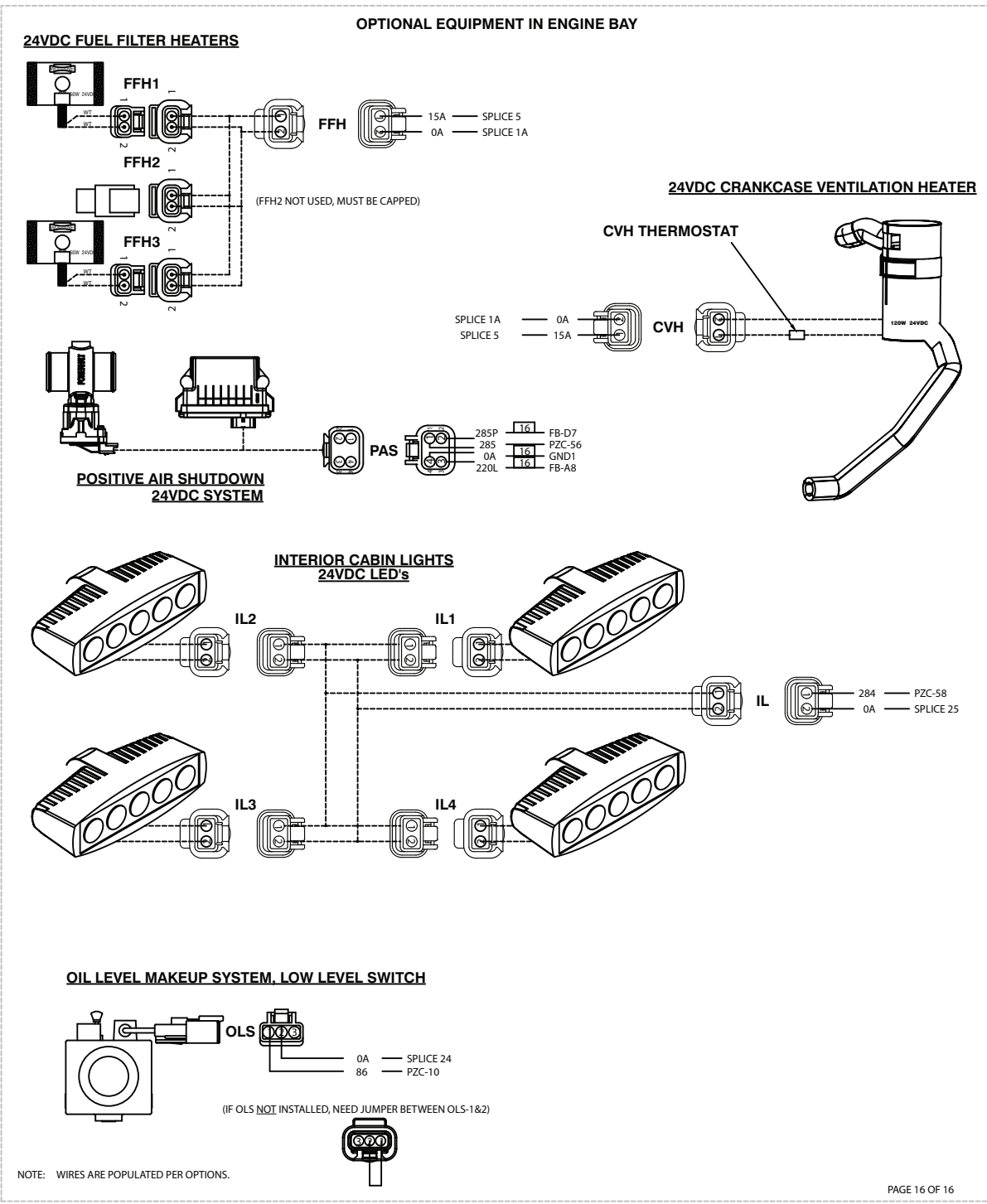
(LOCATED BEHIND PERKINS ENGINE CONTROLS INTERFACE BRACKET)

- BATTERY (+) — A
- BATTERY (-) — B
- CAN/J1939 SHIELD — C
- PDL (+) — D
- PDL (-) — E
- CAN/J1939 (-) — F
- CAN/J1939 (+) — G
- (NOT CONNECTED) J1587 (-) — H
- (NOT CONNECTED) J1587 (+) — J



DIAGRAM

GROUP G



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WIRING - DIAGRAM
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DRAWING #: A0002490373

Section 7: NHTSA Trailer Equipment Requirements

Reporting Safety Defects to the United States Government

If you believe your trailer has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Generac Mobile.

If NHTSA receives similar complaints, it may open an investigation; and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in an individual problem between you, your GMASD, or Generac Mobile.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153), go to <http://www.safercar.gov>, or write to:

Administrator
NHTSA
400 Seventh Street, SW.
Washington, DC 20590

You can also obtain other information about motor vehicle safety from <http://www.safercar.gov>.

Tire Safety Information

The following section contains tire safety information as required by 49 CFR 575.6. It will cover the following:

- Tire labeling, including a description and explanation of each marking on tires provided with the vehicle, and information about the location of the Tire Identification Number (TIN);
- Recommended tire inflation pressure, including a description and explanation of:
 - Recommended cold tire inflation pressure,
 - The vehicle placard and tire inflation pressure label and their location in the vehicle
 - Adverse safety consequences of underinflations (including tire failure), and
 - Measuring and adjusting air pressure to achieve proper inflation;
- Glossary of tire terminology, including “cold tire pressure”, “maximum inflation pressure,” and “recommended inflation pressure,” and other non-technical terms;
- Tire care, including maintenance and safety practices;
- Vehicle load limits, including a description and explanation of:
 - Locating and understanding load limit information, total load capacity, seating capacity, towing capacity, and cargo capacity,

- Calculating total and cargo load capacities with varying seating configurations including quantitative examples showing/illustrating how the vehicle’s cargo and luggage capacity decreases as the combined number and size of occupants increases,
- Determining compatibility of tire and vehicle load capabilities,
- Adverse safety consequences of overloading on handling and stopping on tires.

Steps for Determining Correct Load Limit – Trailer

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification / VIN label that is located on the forward half of the left (road) side of the unit. This certification / VIN label will indicate the trailer’s Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

If your trailer has a GVWR of 10,000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer cannot exceed the stated GVWR.

For trailers with living quarters installed, the weight of water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the trailer before it is loaded with cargo, and is not considered part of the disposable cargo load. Water, however, is a disposable cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle. Understanding this flexibility will allow you, the owner, to make choices that fit your travel needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk

to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or underinflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the certification / VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

Trailers 10,000 lbs (4,536 kg) GVWR or Less

1. Locate the statement "The weight of cargo should never exceed XXX kg or XXX lbs." on your vehicle's placard.
2. This figure equals the available amount of cargo and luggage load capacity.
3. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

Trailers over 10,000 lbs (4,536 kg) GVWR

NOTE: These trailers are not required to have a tire information placard on the vehicle.

4. Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.
5. Locate the GVWR of the trailer on your trailer's VIN (Certification) label.
6. Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight is the maximum available cargo capacity of the trailer and may not be safely exceeded.

Steps for Determining Correct Load Limit – Tow Vehicle

1. Locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs." on your vehicle's placard.
2. Determine the combined weight of the driver and passengers that will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kg or XXX lbs.
4. The resulting figure equals the available amount of cargo and luggage load capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb passengers in your vehicle, the amount of available cargo and luggage load capacity is 650 lbs. (1400-750 (5x150) = 650 lbs.)

5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity calculated in Step 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle's manual to determine how this reduces the available cargo and luggage load capacity of your vehicle.

Glossary of Tire Terminology

Accessory weight means the combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio, and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

Bead means the part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

Bead separation means a breakdown of the bond between components in the bead.

Bias ply tire means a pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

Carcass means the tire structure, except tread and sidewall rubber which, when inflated, bears the load.

Chunking means the breaking away of pieces of the tread or sidewall.

Cord means the strands forming the plies in the tire.

Cord separation means the parting of cords from adjacent rubber compounds.

Cracking means any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

Curb weight means the weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

Cold inflation pressure means the tire pressure when the vehicle hasn't been driven for at least three hours.

Extra load tire means a tire designed to operate at higher loads and higher inflation pressure than the corresponding standard tire.

Groove means the space between two adjacent tread ribs.

Gross Axle Weight Rating or GAWR means the value specified by the vehicle manufacturer as the load-carrying capacity of a single axle system, as measure at the tire-ground interfaces.

Gross Vehicle Weight Rating or GVWR means the value specified by the manufacturer as the loaded weight of a single vehicle.

Hitch weight means the downward force exerted on the hitch ball by the trailer coupler.

Inner liner means the layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

Inner liner separation means the parting of the inner liner cord material in the carcass.

Light truck (LT) tire means a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

Load rating means the maximum load that a tire is rated to carry for a given inflation pressure.

Maximum load rating means the load rating for a tire at the maximum permissible inflation pressure for that tire.

Maximum permissible inflation pressure means the maximum cold inflation pressure to which a tire may be inflated.

Maximum loaded vehicle weight means the sum of (a) Curb weight; (b) Accessory weight; (c) Vehicle capacity weight; and (d) Production options weight.

Measuring rim means the rim on which a tire is fitted for physical dimension requirements.

Non-pneumatic rim means a mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.

Non-pneumatic spare tire assembly means a non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

Non-pneumatic tire means a mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

Non-pneumatic tire assembly means a non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

Normal occupant weight means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

Occupant distribution means distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

Open splice means any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

Outer diameter means the overall diameter of an inflated new tire.

Overall width means the linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

Passenger car tire means a tire intended for use on passenger cars, multipurpose passenger vehicles, and trucks, that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less.

Pin weight means the downward force applied to the 5th wheel or goose neck ball, by the trailer kingpin or goose neck coupler.

Ply means a layer of rubber-coated parallel cords.

Ply separation means a parting of rubber compound between adjacent plies.

Pneumatic tire means a mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

Production options weight means the combined weight of those installed regular production options weighing over 2.3 kilograms in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

Radial ply tire means a pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

Recommended inflation pressure means the proper Cold Inflation Pressure as shown on the Tire Information label.

Reinforced tire means a tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Rim means a metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Rim diameter means nominal diameter of the bead seat.

Rim size designation means rim diameter and width.

Rim type designation means the industry of manufacturer's designation for a rim by style or code.

Rim width means nominal distance between rim flanges.

Section width means the linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

Sidewall means that portion of a tire between the tread and bead.

Sidewall separation means the parting of the rubber compound from the cord material in the sidewall.

ST tire means a tire designed for use only on trailers drawn on a road.

Test rim means the rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

Tread means that portion of a tire that comes into contact with the road.

Tread rib means a tread section running circumferentially around a tire.

Tread separation means pulling away of the tread from the tire carcass.

Tread wear indicators (TWI) means the projections within the principal grooves designed to give a visual indication of the degrees of wear on the tread.

Vehicle capacity weight means the rated cargo and luggage load plus 68 kilograms times the vehicle's designated seating capacity.

Vehicle maximum load on the tire means that load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

Vehicle normal load on the tire means that load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of 49 CFR 571.110) and dividing by two.

Wheel center member means, in the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between the tire and the vehicle.

Wheel-holding fixture means the fixture used to hold the wheel and tire assembly securely during testing.

Tire Safety

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by 49 CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following website:

http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling
- Help protect you and others from avoidable breakdowns and accidents

- Improve fuel economy
- Increase the life of your tires

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- Basic tire maintenance
- Uniform Tire Quality Grading System
- Fundamental characteristics of tires
- Tire safety tips

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

Basic Tire Maintenance

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Under-inflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

Finding Your Vehicle's Recommended Tire Pressure And Load Limits

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- Recommended tire size
- Recommended tire inflation pressure
- Vehicle capacity weight (VCW – the maximum occupant and cargo weight a vehicle is designed to carry)
- Front and rear gross axle weight ratings (GAWR – the maximum weight the axle systems are designed to carry)

Both placards and certification labels are permanently attached to the trailer near the left front.

Understanding Tire Pressure And Load Limits

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure – measured in pounds per square inch (psi) – a tire requires to be properly inflated. (You will also find this number on the vehicle information placard expressed in kilopascals (kpa), which is the metric measure used internationally.)

Manufacturers of passenger vehicles and light trucks determine this number based on the vehicle's design load limit, that is, the greatest amount of weight a vehicle can safely carry and the vehicle's tire size. The proper

tire pressure for your vehicle is referred to as the “recommended cold inflation pressure.” (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the “maximum permissible inflation pressure” on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Checking Tire Pressure

It is important to check your vehicle’s tire pressure at least once a month for the following reasons:

- Most tires may naturally lose air over time.
- Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
- With radial tires, it is usually not possible to determine underinflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours.

When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

Steps For Maintaining Proper Tire Pressure

1. Locate the recommended tire pressure on the vehicle’s tire information placard, certification label, or in the owner’s manual.
2. Record the tire pressure of all tires.
3. If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
4. If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These “missing” pounds of pressure are what you will need to add.
5. At a service station, add the missing pounds of air pressure to each tire that is underinflated.
6. Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been driving your vehicle and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your vehicle’s tire information

placard or certification label. While your tire may still be slightly under inflated due to the extra pounds of pressure in the warm tire, it is after to drive with air pressure that is slightly lower than the vehicle manufacturer’s recommended cold inflation pressure than to drive with a significantly under inflated tire. Since this is a temporary fix, don’t forget to recheck and adjust the tire’s pressure when you can obtain a cold reading.

Tire Size

To maintain tire safety, purchase new tires that are the same size as the vehicle’s original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner’s manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with the tire dealer.

Tire Tread

The tire tread provides the gripping action and traction that prevent your vehicle from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in tread wear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear “even” with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln’s head upside down and facing you. If you can see the top of Lincoln’s head, you are ready for new tires.

Tire Balance And Wheel Alignment

To avoid vibration or shaking of the vehicle when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle’s frame. These adjustments require special equipment and should be performed by a qualified technician.

Tire Repair

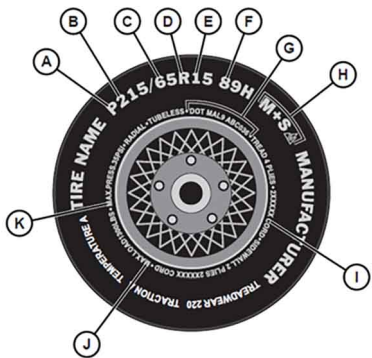
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

Tire Fundamentals

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental

characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

Information on Passenger Vehicle Tires



014608

Figure 7-1. Passenger Vehicle Tires

A	"P" indicates the tire is for passenger vehicles.
B	This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.
C	This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.
D	"R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.
E	This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.
F	(Number) This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. NOTE: You may not find this information on all tires because it is not required by law. (Letter) The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed below. NOTE: You may not find this information on all tires because it is not required by law. NOTE: See Figure 7-1 for complete list of letter and speed ratings.

G	U.S. DOT Tire Identification Number. This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.
H	The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.
I	Tire Ply Composition and Materials Used. The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.
J	Maximum Load Rating. This number indicates the maximum load in kilograms and pounds that can be carried by the tire.
K	Maximum Permissible Inflation Pressure. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Table 7-1. Tire Letter and Speed Rating

Letter Rating	Speed Rating
Q	99 MPH
R	106 MPH
S	112 MPH
T	118 MPH
U	124 MPH
H	130 MPH
V	168 MPH
Y	186 MPH

NOTE: For tires with a maximum speed capability over 149 mph, tire manufacturers sometimes use the letters ZR. For those with a maximum speed capability over 186 mph, tire manufacturers always use the letters ZR.

Uniform Tire Quality Grading (UTQGS)

Quality grades can be found where applicable on the tire sidewall between tread shoulder and maximum section width. For example: TREADWEAR 200 TRACTION AA.

Temperature A

All passenger car tires must conform to federal safety requirements in addition to these grades.

Tread Wear

The tread wear grade is a comparative rating based on the wear rate of the tire when tested under controlled conditions on a specified government test course. For example, a tire graded 150 would wear one and one-half (1.5) times as well on the government course as a tire graded 100. The relative performance of tires depends upon the actual conditions of their use, however, and may depart significantly from the norm due to variations in driving habits, service practices and differences in road characteristics and climate.

Traction

The traction grades, from highest to lowest, are AA, A, B, and C. Those grades represent the tire's ability to stop on wet pavement as measured under controlled conditions on specified government test surfaces of asphalt and concrete. A tire marked C may have poor traction performance.

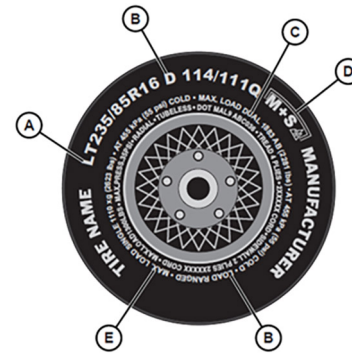
NOTE: The traction grade assigned to this tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

Temperature

The temperature grades are A (the highest), B, and C, representing the tire's resistance to the generation of heat and its ability to dissipate heat when tested under controlled conditions on a specified indoor laboratory test wheel. Sustained high temperature can cause the material of the tire to degenerate and reduce tire life, and excessive temperature can lead to sudden tire failure. The grade C corresponds to a level of performance which all passenger car tires must meet under the Federal Motor Safety Standard No. 109. Grades B and A represent higher levels of performance on the laboratory test wheel than the minimum required by law.

NOTE: The temperature grade for this tire is established for a tire that is properly inflated and not overloaded. Excessive speed, under-inflation, or excessive loading, either separately or in combination, can cause heat buildup and possible tire failure.

Additional Information on Light Truck Tires



014609

Figure 7-2. Light Truck Tires

A	The "LT" indicates the tire is for light trucks. An "ST" is an indication the tire is for trailer use only.
B	Load Range. This information identifies the tire's load-carrying capabilities and its inflation limits.
C	Maximum Load Dual. This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).*
D	The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.
E	This information indicates the maximum load and tire pressure when the tire is used as a single.*

* Maximum load is presented in kilograms and pounds (kg/lbs). Maximum tire pressure is presented in kilopascals and pounds per square inch (kPa/psi) for when the tire is cold.

Preventing Tire Damage

- Slow down if you have to go over a pothole or other object in the road.
- Do not run over curbs of foreign objects in the roadway, and try not to strike the curb when parking.

Tire Safety Checklist

- Check tire pressure regularly (at least once a month), including the spare.

- Inspect tires for cracks, foreign objects, uneven wear patterns on the tread, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Verify your tire valves have valve caps.
- Check tire pressure before going on a long trip.
- Do not overload your vehicle. Check the tire information placard or owner's manual for the maximum recommended load for the vehicle.

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