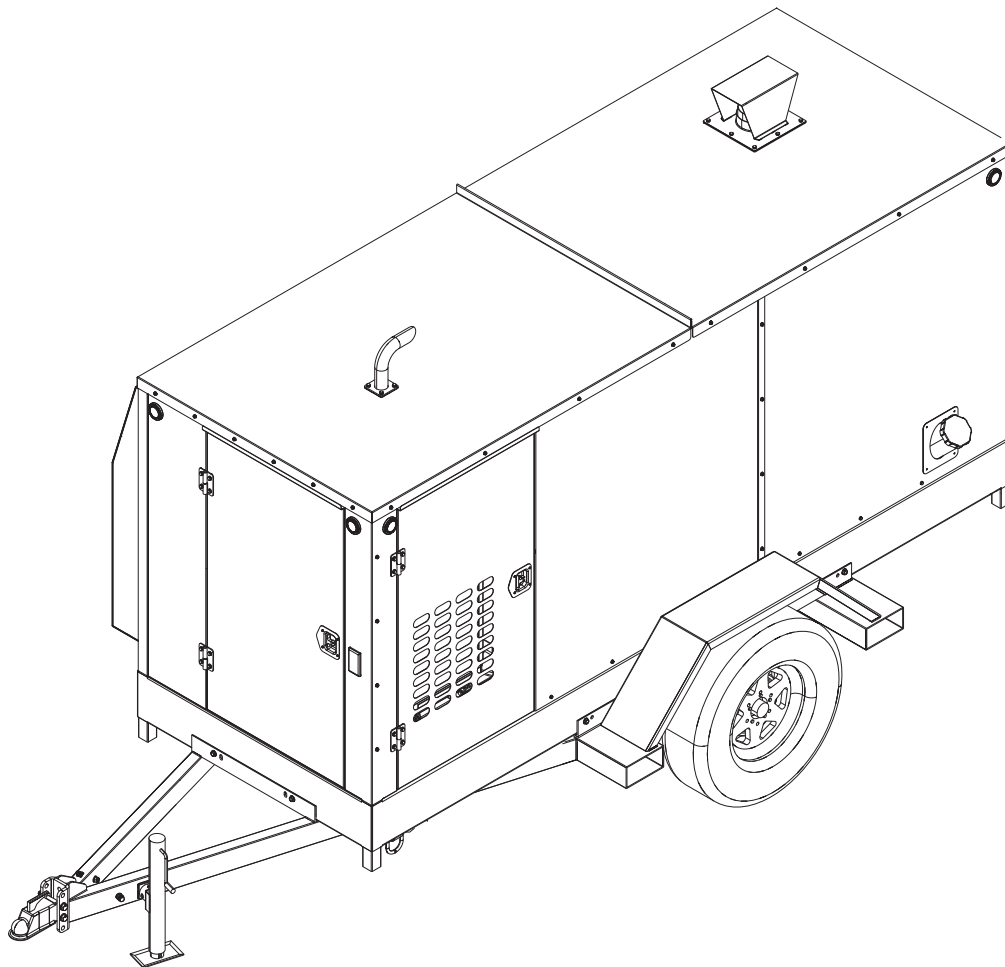


MIH800

Indirect Fired Heater

Owner's Manual



010409

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 mobile heater

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 Locations](#).

Engine and generator serial numbers are located on data plates affixed to the engine and generator, respectively. When contacting a Generac Mobile Authorized Service Dealer (GMASD) about parts and service, always provide the unit model and serial number.

Operation and Maintenance: Proper maintenance and care of the mobile heater 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/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

CANCER AND REPRODUCTIVE HARM

www.P65Warnings.ca.gov

(000393a)

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 quality use when maintained properly.

The MIH800 indirect fired heater is designed and built for sustained, reliable heat production in industrial operating conditions and environments. The MIH800 is built to withstand frequent handling under these conditions.

The unit is mounted on a trailer that has forklift access and chain attach points on both sides. The fully enclosed design protects the operating components, allowing all-weather storage and operations.

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 the manual is not understood, contact your nearest GMSD, or contact Generac Mobile Customer Service at 800-926-9768, or visit www.generac-mobileproducts.com with any questions or concerns.

The owner is responsible for proper maintenance and safe use of the equipment. The manufacturer strongly recommends that if the operator is also the owner, to read the owner's manual and thoroughly understand all instructions before using this equipment. The manufacturer also strongly recommends instructing other users to properly start and operate the unit. This prepares them if they need to operate the equipment in an emergency.

SAVE THESE INSTRUCTIONS for future reference. This manual contains important instructions for the machine that should be followed during installation, operation, and maintenance of the heater and batteries. Always supply this manual to any individual that will use this machine.

Intended Applications

The machine is designed for industrial use. Examples of intended applications include, but are not limited to:

- Gas and oil exploration
- Utilities and power plants
- Mining

- Construction
- Agricultural applications
- Employee locker areas and housing
- Emergency thawing
- Pre-warming of equipment and motors
- Offshore drilling rigs
- Painting and coating locations
- Airline hanger heat
- Dehumidification

Using this machine for applications other than its intended purpose may void the warranty. Examples of misuse include, but are not limited to, using the machine:

- To transport persons or equipment.
- As a tow vehicle.
- As a ladder or work surface.
- During extreme weather.
- Indoors.
- If it is incorrectly serviced or maintained.

Safety Rules

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

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. Alert 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.

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.

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)

WARNING

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

(000231a)



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

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

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

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

(000107)

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)

CAUTION

Unit damage. Do not stop engine before heating unit is cooled. Doing so could result in unit damage.

(000240a)

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)



DANGER

Explosion and Fire. Do not fill fuel tank past full line. Allow for fuel expansion. Overfilling may cause fuel to spill onto engine causing fire or explosion, which will result in death or serious injury.

(000214)



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)

**⚠️ 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**

Explosion and fire risk. Do not smoke near unit. Keep fire and spark away. Failure to do so could result in death, serious injury, or property or equipment damage. (000282)

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

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)

⚠️ WARNING

Rollover hazard. Unit must be placed on flat, level ground to prevent tipping or rollover. Failure to do so could result in death, serious injury, or property or equipment damage. (000283)

⚠️ WARNING

Property or equipment damage. Do not alter the trailer. Alterations can damage essential safety items. Doing so could result in death, serious injury, or property or equipment damage. (000285)

Battery Hazards

**⚠️ 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)

⚠️ WARNING

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)

⚠️ WARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death, or serious injury. (000228)

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>.

Service Safety

⚠️ CAUTION

Personal injury. Wear appropriate personal protective equipment at all times while operating and servicing unit. Failure to do so could result in personal injury. (000419)

- **DO NOT** perform even routine service (oil/filter changes, cleaning, etc.) unless all electrical components are shut down.
- Replace all missing and hard to read decals. Decals provide important operating instructions and warn of dangers and hazards.

Towing Safety

Towing a trailer requires care. 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 (DOT) office to verify license requirements for your particular unit.

Hitch and Coupling

- 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 the trailer using defective parts. Inspect the hitch and coupling for wear or damage before every tow.
- To eliminate squeaking, wipe the coupler clean and apply fresh grease each time the trailer is towed.
- Connect safety chains in a crossing pattern under the tongue.
- Before towing the trailer, verify that 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.
- Verify all access doors on the trailer are closed and locked.

Running Lights

- Verify directional and brake lights on trailer are connected and working properly.

Safe Towing Techniques

- Practice turning, stopping, and backing up in an area away from heavy traffic prior to transporting the unit.
- Maximum recommended speed for highway towing is 45 mph (72 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.
- Reduce speed before curves, and maintain speed throughout the curve.
- Reduce speed before going over bumps or holes. Keep your foot off the accelerator while going over bumps or holes.
- Do not tow unit with fuel in the fuel tank.

Reporting Trailer Safety Defects

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

If NHTSA receives similar complaints, it may open an investigation. 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 dealer, or Generac Mobile Products, LLC.

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
1200 New Jersey Avenue S.E.
Washington, DC 20590

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

Safety and Operating Decals

See [Figure 1-1](#). This unit features numerous safety and operating decals. These decals provide important operating instructions and warn of dangers and hazards. The following diagrams illustrate decal locations and descrip-

tions. Replace any missing or hard-to-read decals and use care when washing and cleaning the unit. Decal part numbers can be found in the unit parts manual at www.generacmobileproducts.com.

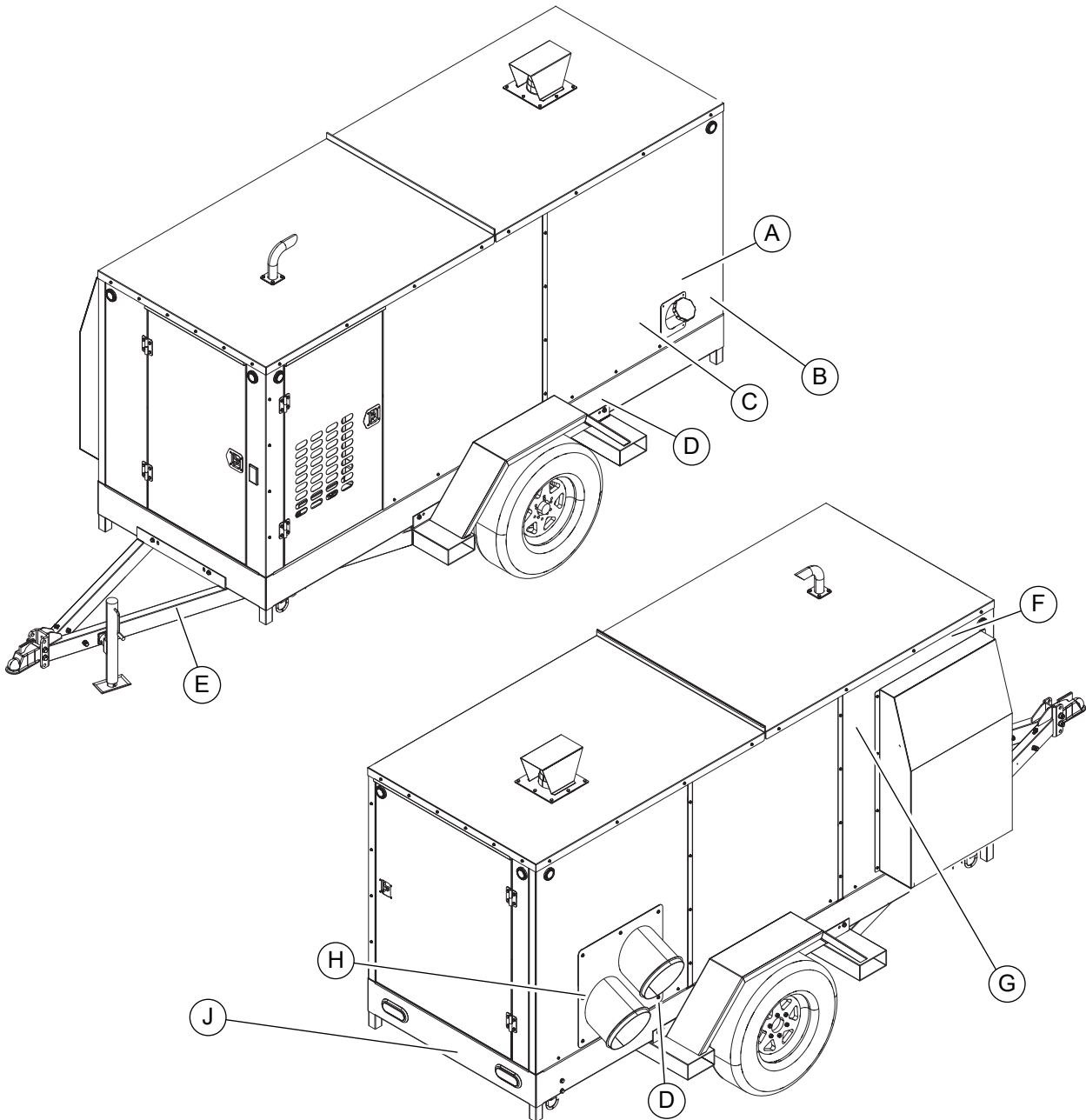


Figure 1-1. Safety and Operating Decal Locations

- | | |
|---|--|
| A No fuel additives. Low or ultra low sulfur diesel fuel only | F Caution: Rotating assembly |
| B No Gasoline in Fuel | G Danger: Moving parts can cut or crush |
| C Warning: Fire from flammable fuel can cause serious injury or death. No smoking, sparks, or open flame during fueling or wash-down | H Warning: Hot surfaces |
| D Warning: Wheel lugnuts may become loose | J TDGA Class 3 Diesel Label |
| E Trailer identification information | |

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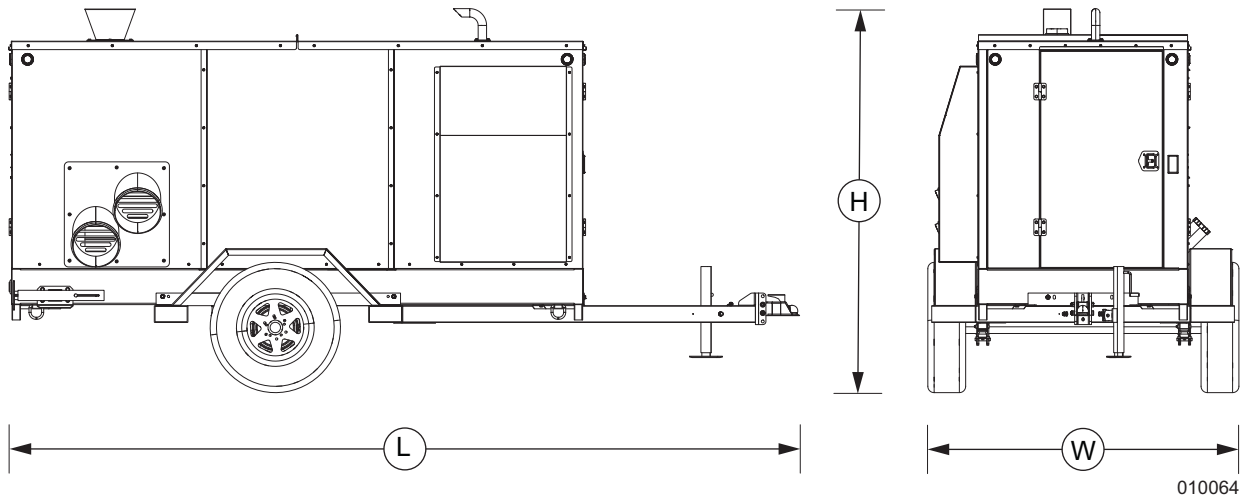
Section 2: General Information

Specifications

Description	Unit of Measure	MIH800
Engine		
Make (Model)	—	Isuzu® (3CE1)
EPA Certification	tier	4 Final
Type	—	Naturally aspirated
Horsepower At Operating Speed	hp (kW)	21.1 (15.7)
Operating Speed	rpm	1,800
Displacement	in ³ (L)	97.6 (1.6)
Cylinders	qty	3
Fuel Type	—	Diesel
Fuel Consumption	gph (Lph)	1.25 (4.73)
Capacities		
Minimum Run Time	hr	27.7
Fuel—Tank, Usable	gal (L)	189 (715.4), 171 (647)
Coolant—Engine Block	qt (L)	2.1 (2.0)
Oil, Including Filter	qt (L)	7.1 (6.7)
Fuel Consumption (Engine+Heater)	gph (Lph)	7.0 (24.5)
Heater		
Type	—	Indirect fired
Burner—Make (Model), type	—	Riello® (R40 F15), single stage
Burner—Fuel Consumption	gph (Lph)	5.75 (21.77)
Maximum Heat Produced	BTU/hr (kW/hr)	800,000 (234)
Air Output—Temperature Rise	°F (°C)	180 (82.2)
Air Output—Volume	ft ³ /min (m ³ /hr)	3,900 (6,626)
Static Pressure	WG (kPa)	5 (1.24)
Air Ducts	qty, diameter	2, 12 in (30.5 cm)
Estimated Efficiency	%	85
Trailer		
Brakes	type	Electric
Per-Axle Rating	lb (kg)	6,000 (2,721.6)
Axles	qty	1
Tire Size	in (cm)	16 (40.6)
Hitch	size, type	2-5/16 in, ball coupler
Maximum Tire Pressure	psi (kPa)	80 (551.58)
Electrical		
Generator—Make (Model), Output	—	Marathon Electric® (282CSL1504), 13.5 kW
System Voltage	VDC	24
Battery—Voltage (Quantity Per Unit)	VDC (qty)	12 (1)
Battery—Rating	CCA	720
Battery—Type	—	Wet cell
Battery—Group Number	—	24
Controller	—	LOFA™
Unit Weight		
Dry	lb (kg)	4,900 (2,223)
Operating	lb (kg)	6,080 (2,758)

Specifications are subject to change without notice.

Unit Dimensions



L	W	H
186 in (4.72 m)	72 in (1.83 m)	91.5 in (2.32 m)

Unit Serial Number Locations

See [Figure 2-2](#) for unit ID tag and Vehicle Identification Number (VIN) tag. Important information, such as the unit serial number, model number, VIN, and tire loading information are found on these tags. Record the

information from these tags so it is available if the tags are lost or damaged. When ordering parts or requesting assistance, you may be asked to provide this information.

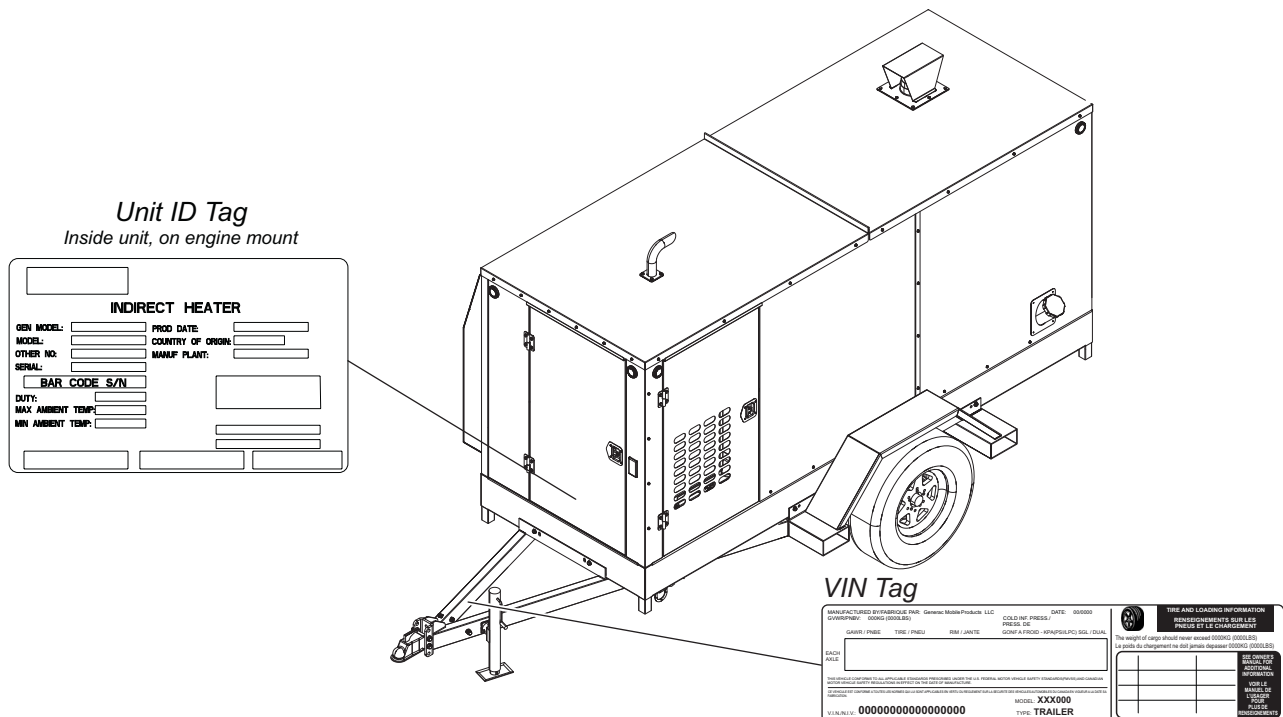
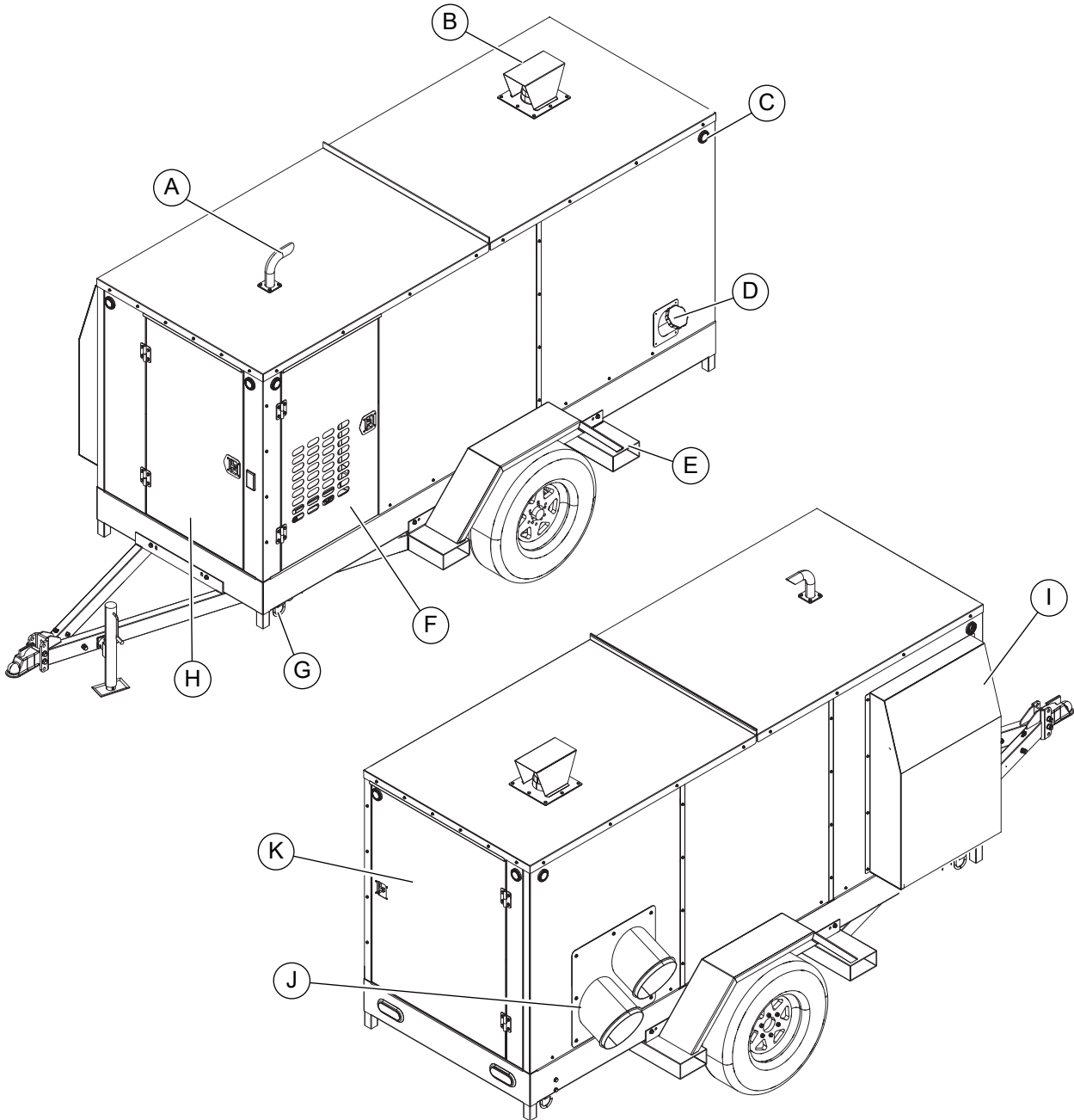


Figure 2-2. Serial Number Locations

Component Locations

Exterior



010410

Figure 2-3. Exterior Components

- | | |
|---|--|
| A Engine exhaust | G Tie-down (4 locations) |
| B Burner exhaust | H Control panel access door |
| C Reflector light (multiple locations) | I Inlet vent |
| D Fuel fill | J Hot air discharge ducts |
| E Forklift pocket (4 locations) | K Burner and thermostat access door |
| F Engine access door | |

Engine

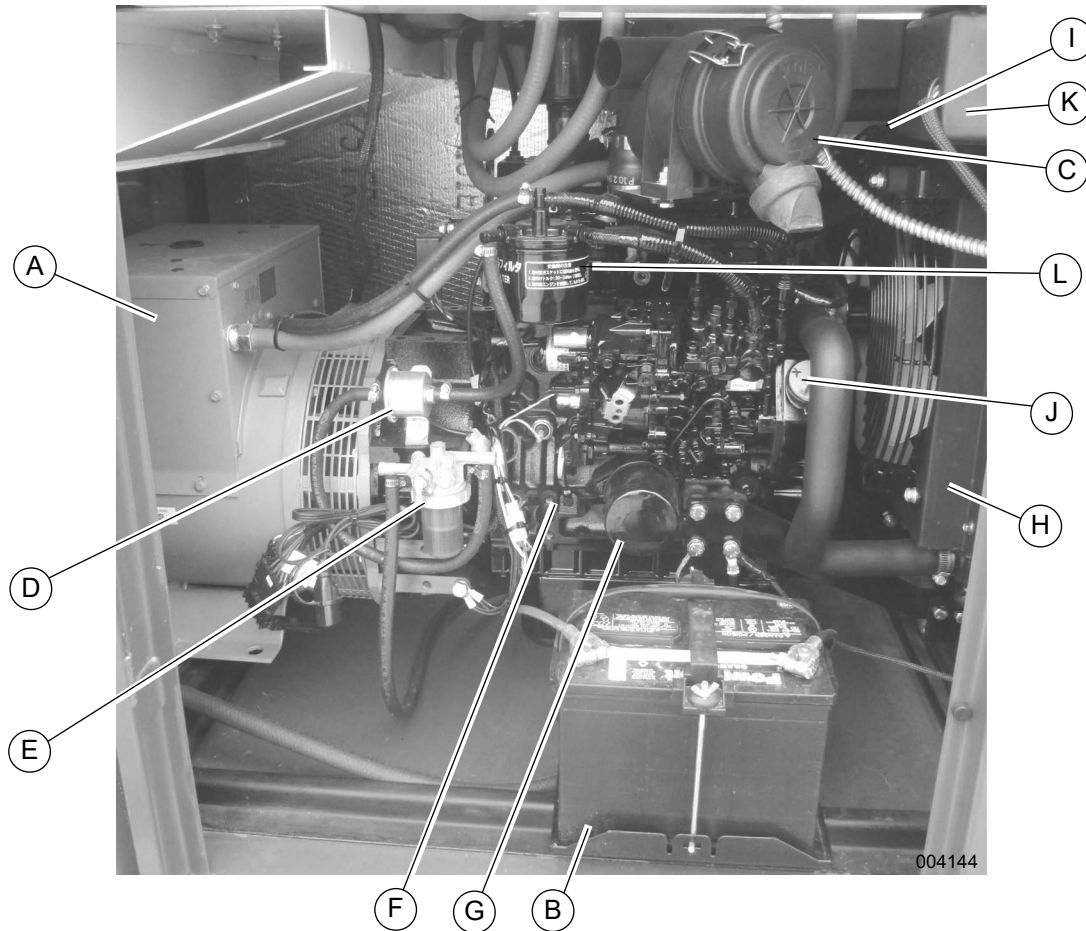
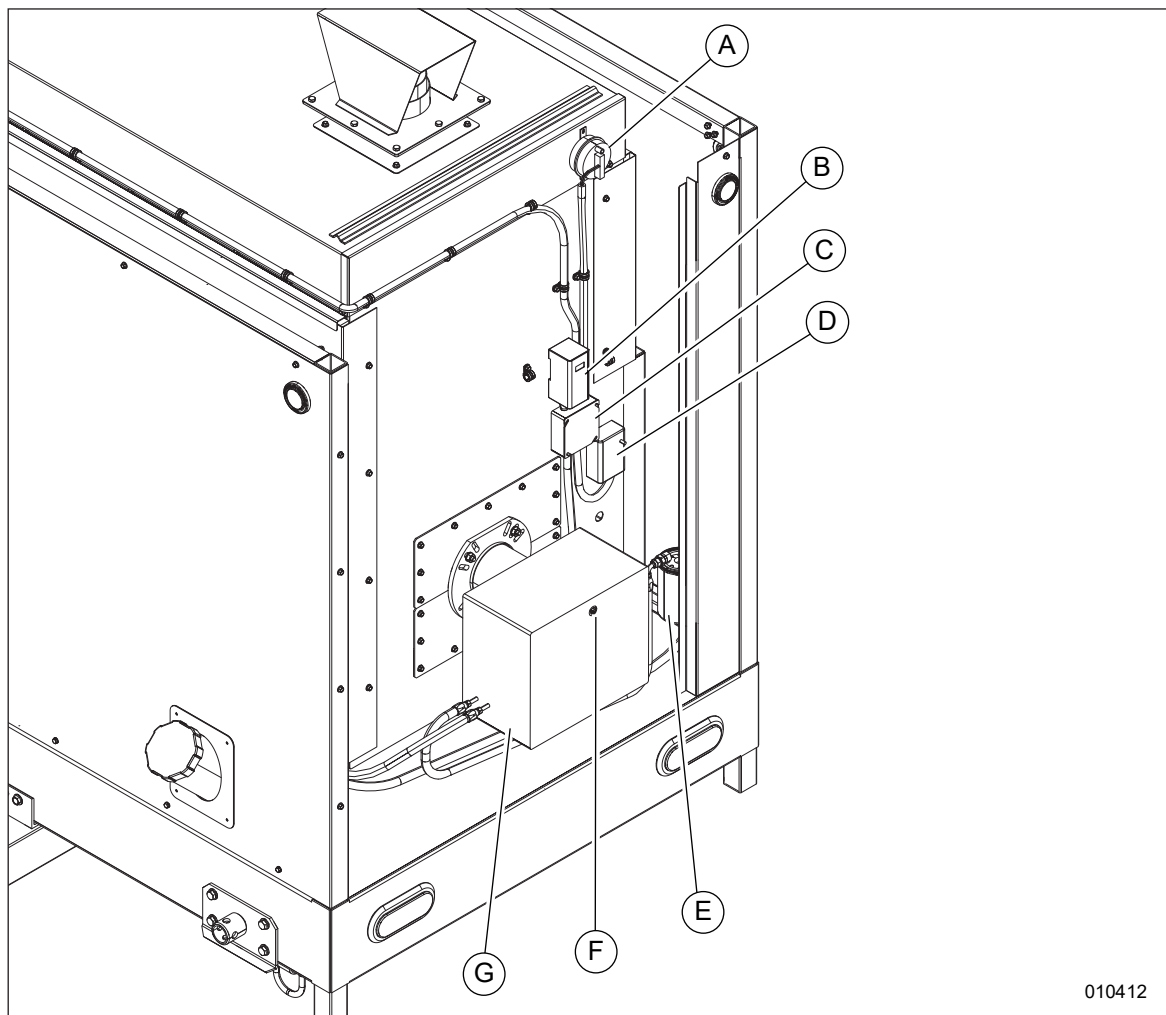


Figure 2-4. Engine Components

- | | |
|--------------------------------------|---------------------------------------|
| A Generator | G Engine oil filter |
| B Battery | H Radiator |
| C Engine air cleaner assembly | I Coolant sub-tank (not shown) |
| D Engine fuel pump | J Engine oil fill |
| E Water separator assembly | K Breakaway brake system |
| F Engine oil dipstick | L Engine fuel filter |

Heater



010412

Figure 2-5. Heater Components

- | | |
|--------------------------------------|------------------------------|
| A Differential pressure meter | E Burner fuel filter |
| B Thermostat | F Burner reset |
| C Electrical junction box | G Diesel fired burner |
| D Fan limit controller | |

Control Panel

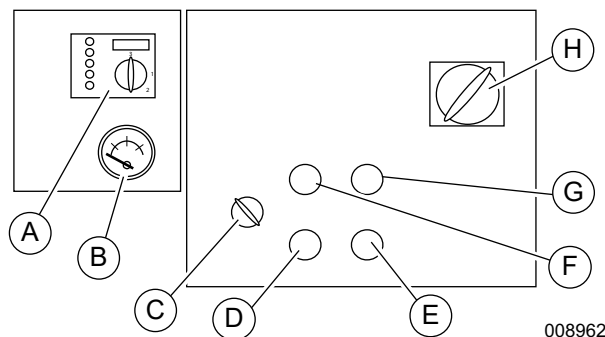


Figure 2-6. Control Panel

- | | |
|--|---|
| A Engine control box and ignition | E Blower STOP button |
| B Fuel gauge | F Blower ON indicator lamp |
| C Burner ON-OFF switch | G Blower OFF indicator lamp |
| D Blower START button | H Control panel main disconnect switch |

Emissions

The United States Environmental Protection Agency (US EPA) (and California Air Resources Board (CARB), for engines/equipment certified to California standards) requires this engine/equipment to comply with exhaust and evaporative emissions standards. Locate the emissions compliance decal on the engine to determine applicable standards. See the included emissions warranty for emissions warranty information. Follow the maintenance specifications in this manual to ensure the engine complies with applicable emissions standards for the duration of the product's life.

Engine Oil Recommendations

Change oil and oil filter at least once every 12 months, even if the hours of operation are fewer than the otherwise recommended service interval. See the applicable engine manual for recommended oil types. Use only approved oil types.

For more information, see the engine manual.

Coolant Recommendation



⚠ DANGER

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

(000149)

⚠ CAUTION

Engine damage. Use approved coolant only. Failure to do so could result in equipment damage.

(000323)

Use demineralized or distilled water for best results. Hard water causes scale deposits, which reduces cooling efficiency and raises internal temperatures, possibly leading to engine damage.

See the engine manual for recommended coolants.

Use a Long Life Coolant Antifreeze or Extended Life Coolant that meets or exceeds these specifications:

- Isuzu Part Number 8-12346-290-0
- ASTM D4985

See the engine manual for recommended coolants.

Test coolant yearly, or every 1,000 hours, whichever comes first.

For more information, see the engine manual.

Fuel System



⚠ 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)

The heater is designed to operate with diesel fuel.

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

Follow these guidelines:

- Use only ultra-low-sulfur diesel fuel.
- When temperatures are at or below freezing, use No. 1D diesel fuel.
- When temperatures are above freezing, use No. 2D 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 engine manual.

Trailer Towing Guidelines

⚠ 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

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)

⚠ WARNING

Property or equipment damage. Do not alter the trailer. Alterations can damage essential safety items. Doing so could result in death, serious injury, or property or equipment damage. (000285)

⚠ WARNING

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

Driving a vehicle with a trailer in tow is different than driving the same vehicle without a trailer in tow. Consider the following:

- It takes longer to get up to speed.

- More room is needed to turn and pass.
- More distance is needed to stop.
- The driver is responsible for keeping the vehicle and trailer under control.

When towing, make regular stops to verify the following:

- Coupler is secured to the hitch and locked.
- Electrical connections are made.
- Appropriate slack in the safety chains and the breakaway switch pull-pin cable.
- Tires are inflated to proper air pressure with no damage or unusual wear to tread or sidewalls.
- Trailer doors are secured and latched.
- Fuel tank is empty.

Other towing guidelines:

- Use the tow vehicle mirrors to verify there is enough room for lane changes or entering/exiting traffic.
- Allow plenty of stopping distance for the trailer and tow vehicle.
- Do not drive faster than the conditions allow.
- A rule of thumb for passing distance is the distance with a trailer is four times the passing distance without a trailer.
- Use lower gears for climbing and descending grades.
- Do not ride the brakes while descending grades; this can cause overheating and potential brake failure.
- Do not apply the tow vehicle brakes to correct extreme trailer swaying. Continued pulling of the trailer, and even slight acceleration, or carefully applying the trailer brakes (using the electronic brake controller) will provide a stabilizing force.

Wheel Chock Guidelines

⚠ 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)

- Select wheel chock according to equipment type and size.
- Always use in pairs and on firm surfaces.
- Chock in direction of grade.
- Chock both sides of wheel if direction of grade is unknown.
- Use wheel chock only after parking brake is applied and tested.

- Center chocks squarely against tread of each wheel.
- Do not drive over wheel chocks.

Section 3: Operation

Before Starting Engine

Pre-start Checklist



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)

- Remove all flammable materials and fire hazards within 5 ft (1.5 m) of unit.
- The unit shall be located outdoors:
 - not less than 3 m (10 ft) from a gasoline, natural gas, or propane dispenser
 - not less than 6 m (20 ft) from natural gas or propane storage equipment
 - not less than 1 m (40 in) from adjacent flammable or combustible liquid above-ground tanks
 - not less than 3 m (10 ft) from any adjacent building openings
 - not less than 3 m (10 ft) from any adjacent buildings, except as permitted by B138.2-17 Clause 4.2.1.2
 - not less than 5 ft (1.5 m) from structures or barricades
 - not less than 150 ft (45.72 m) from open oil head
- Portable oil-burning equipment located within 3 m (10 ft) of an adjacent building shall be provided with fire-extinguishing measures in accordance with the National Fire Code of Canada.
- Verify the unit is not leaking fluids: inspect inside and outside the unit for leaking fuel, engine oil, HTF/hydraulic oil, and engine coolant.
- Verify the following are clear of debris and obstructions:
 - Engine air intake
 - Engine exhaust stack
 - Outlets and fan intakes
- Verify air duct hose is securely fastened to outlet duct assembly.
- Check fuel, engine oil, and engine coolant levels.
- Verify unit is properly secure with jacks deployed (if applicable), wheels chocked, and level.
- Inspect the alternator drive belt for tension and abnormalities.
- Verify that the burner cover is securely installed.
- Inspect the generator. See the generator manual.

- Verify battery cables are not loose or corroded.
- Inspect ducting for damage or unusual wear.
- The unit must be located at least 16 feet (5 m) away from where the ground is subject to large, rapid amount of erosion.

Engine Oil Level Check

CAUTION

Engine damage. Verify proper type and quantity of engine oil prior to starting engine. Failure to do so could result in engine damage. (000135)

NOTE: If engine was running, wait at least 10 minutes before proceeding.

1. Remove oil dipstick from crankcase and wipe it clean with a clean, lint free cloth.
2. Slowly insert the clean oil dipstick into the oil dipstick tube. Verify the oil dipstick is fully seated.
3. After 10 seconds, remove the oil dipstick and look at the oil level on both sides. The lower of the two readings will be the correct oil level measurement.
4. Add oil (if necessary) to adjust the level. After adding or changing the oil, run the engine for one minute before checking the oil level. Wait 10 minutes to allow the engine to cool and oil to fully drain into the oil pan.

Typical causes of inaccurate oil level readings:

- Reading the high level of the oil dipstick.
- Reading the oil dipstick before the oil fully drains into the oil pan.
- Inserting and removing the oil dipstick too quickly.
- The oil dipstick is not fully seated in the oil dipstick tube.

Engine Coolant Check



WARNING

Risk of burns. Do not open coolant system until engine has completely cooled. Doing so could result in serious injury. (000154)

Inspect the coolant sub-tank to check the coolant level. Check the coolant level when the engine is cold, as coolant flows to the sub-tank when the radiator is still hot, which provides an inaccurate reading. Replace the coolant according to the [Maintenance Schedule](#), or if it is

contaminated or dirty. See [Adding Coolant](#).

Ducting Guidelines



⚠ 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

Burn hazard. Do not remove ducting until all air pressure has been emptied from hose duct. Failure to do so could result in severe injury. (000288)

- Place ducting in desired configuration before operating the unit.
- Tightly secure ducting end to the unit. Verify any additional ducting is also tightly secured.
- Avoid sharp bends or 90° turns in the ducting.
- Use only the necessary length of ducting required; do not exceed maximum length.
- Verify that ducting is not in a high traffic area, and will not impede workers or other machinery. Care should be taken to prohibit the need to step or climb over ducting.
- **DO NOT** place ducting over combustible materials.
- **DO NOT** place ducting over surfaces that may cause damage or reduce performance, such as water, sharp rocks or glass, electrical wiring, piping, etc.
- **DO NOT** place or drape anything over ducting, such as covers, insulation (insulated ducting is available), blankets or cloth, or electrical wires.
- Inspect ducting for damage or unusual wear before each use.

Engine and Heater Startup



⚠ 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

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

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)

⚠ 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)

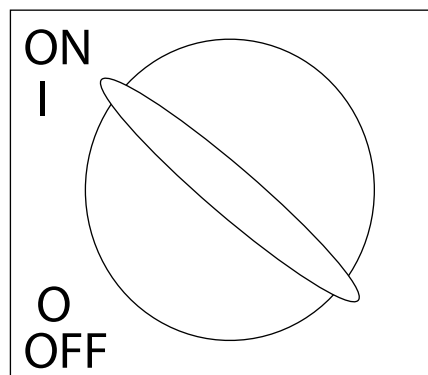
⚠ CAUTION

Equipment damage. Do not cover unit during operation. All ducting ports must remain open even if not being used. Failure to do so will result in equipment damage. (000290)

1. Turn ignition key to RUN and wait for the light to expire.
2. Turn ignition key to START.

NOTE: Do not hold the engine starter key in the start position for more than 15 seconds. Doing so will overheat the starter motor. Wait 30 seconds for the starter motor to cool before making a second attempt to start if the engine fails to start.

3. Warm up engine for 90 seconds.
4. See [Figure 3-1](#). Turn main disconnect switch to ON.



008974

Figure 3-1. Main Disconnect Switch

5. Press green START BLOWER button.
6. Turn burner to ON.
7. See [Ducting Guidelines](#). Place heating ducts as appropriate for the application.

IMPORTANT NOTE: A twisted or bent air duct will cause loss of air pressure and temperature.

NOTE: Do not use starting aids, such as gasoline. Doing so will damage the engine.

Adjusting Heater Output

See [Thermostat Control](#) to adjust the setpoint (SP) and differential (dIF). If SP is set to 180 °F (82 °C) and dIF is set to 10 degrees, the following will happen:

1. Temperature will rise to 180 °F (82 °C).
2. Burner shuts off until temperature cools down 10 degrees.
3. Burner turns back on.

Engine and Heater Shutdown

CAUTION

Equipment damage. Shut down the heater before turning off the generator. Failure to do so could result in equipment damage.

(000295)

1. Turn burner switch to OFF.
2. Allow outlet air temperature to cool for at least 90 seconds.

IMPORTANT NOTE: Do not detach ducting until all air pressure has been emptied from hose duct.

3. Press STOP BLOWER button.
4. Turn ignition key to OFF.

Thermostat

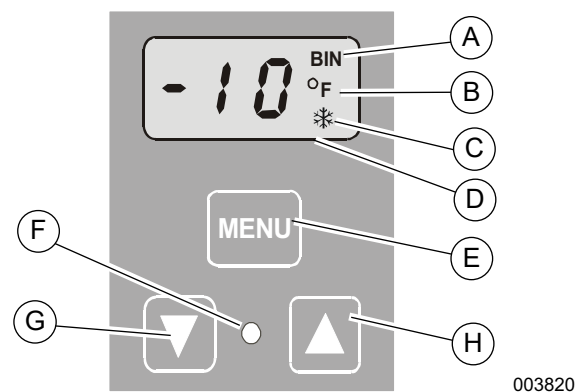


Figure 3-2. Thermostat with LCD Screen Showing Default Display

- A Temperature offset indicator
- B Temperature units indicator
- C Operating mode indicator
- D LCD screen
- E MENU button
- F output relay status indicator LED
- G Down arrow button
- H Up arrow button

Changing Temperature Units

The thermostat displays temperature in Fahrenheit units. See the OEM thermostat manual for instructions on changing temperature units to Celsius.

Thermostat Control

1. Press the MENU button. The LCD screen displays OFF.
2. Scroll through parameter codes by pressing the UP or DOWN arrow button.

NOTE: One parameter code displays at a time.

3. To view—or modify—the setting for the displayed parameter code, press the MENU button.
4. To change the setting, press the UP or DOWN arrow button.

NOTE: To exit without saving, press no buttons until default display shows ([Figure 3-2](#)).

5. To save, press the MENU button.
6. To return to the default display, simultaneously press and hold the UP and DOWN arrow buttons for five (5) seconds. Alternatively, exit by pressing no buttons for 30 seconds.

Parameter Code	Factory-Set Value	Programmable Values
OFF = Temperature burner switches off	180 °F (82.2 °C)	-40 to 212 °F (-40 to 100 °C)
ON = Temperature burner switches back on, after cooling	170 °F (76.7 °C)	-40 to 212 °F (-40 to 100 °C)
SF = Sensor Failure Action	0	0 = If temp. sensor fails, burner switches off 1 = If temp. sensor fails, burner remains on
ASd = Assigned delay (minutes) for OFF and ON functions*	0	0 to 12 minutes

**When ASd=0, temperature is the only factor determining when OFF and ON occur. When ASd is adjusted to >0, a timed delay is added.*

For example, using the factory-set values shown in the table above, if the burner is OFF and ASd=1, the burner remains off for 1 minute after burner cools to 170°.

IMPORTANT NOTE: At all times, OFF value must be greater than ON value. Unit may not function properly if ON is greater than OFF.

NOTE: When OFF value is greater than ON value, the operating mode indicator ([Figure 3-2](#)) displays a flame icon.

Section 4: Maintenance

Maintenance

Regular maintenance will improve performance and extend 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.

Maintenance Tasks

Daily checks must be performed when unit is operated continuously for extended periods of time. Daily checks and routine monthly checks can be performed by an authorized operator.

NOTE: Normal maintenance, service, and replacement of parts are the responsibility of the owner and are not considered defects in materials or workmanship within the terms of the warranty. It is strongly recommended that equipment be periodically checked by a GMASD.

Daily Walk Around Inspection

Inspect for conditions that could hinder performance or safety, such as (but not limited to) oil, coolant, and fuel leakage, blocked vents, loose or missing hardware, and improper electrical connections. Check for foreign matter blocking vents and on top of unit. Perform any necessary maintenance tasks. See [Trailer Maintenance](#) before towing.

- Inspect outer cover for significant damage beyond scuffs and small nicks.
- Inspect for electrical wire abrasion.
- Inspect the fan belt for cracking, fraying, and stretching. Verify the belt is properly seated in the pulley grooves. See [Maintenance Schedule](#).
- Check fluid levels.
- Inspect electrical connectors, battery, and ground points. Look for loose or missing hardware.
- Inspect all flexible rubber hoses for deterioration.
- Inspect hydraulic hoses for signs of wear.
- Verify hoses are not crushed, bent, or twisted.
- Verify there are no cracks or corrosion.
- Inspect tires for unusual wear.
- Inspect ducting for damage or unusual wear.

Draining and Refilling the Oil



⚠ WARNING

Risk of burns. Allow engine to cool before draining oil or coolant. Failure to do so could result in death or serious injury.

(000139)

⚠ WARNING

Potential of cancer. Prolonged or repeated contact with used motor oil has been shown to cause cancer in laboratory animals. Thoroughly wash exposed areas with soap and water.

(000127a)

1. See [Figure 4-1](#). Place container under drain port, or connect hose (A) or piping to drain port leading to container.

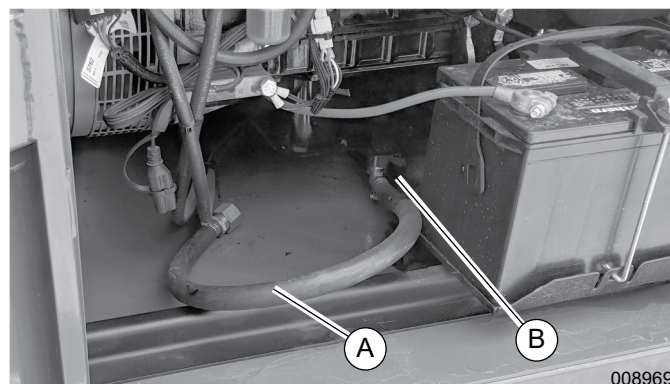


Figure 4-1. Oil Drain Hose Location

2. Remove plug from oil drain.
 3. Open drain valve (B). Drain oil.
 4. Close drain valve once draining is complete.
 5. Remove drain hose or piping, if applicable.
 6. See engine manual for oil filter information.
 7. See [Figure 2-4](#). Remove filler cap (yellow) (J) on the rocker arm cover.
 8. Fill oil pan to specified level.
 9. Replace filler cap.
- NOTE:** Do not overtighten filler cap. Overtightening may damage filler cap.
10. Start engine and let run for five minutes. Verify there are no leaks.
 11. Stop engine and let cool for approximately 10 minutes. Verify oil level is correct. (See [Engine Oil Level Check](#).) Repeat steps 7–9 until oil is properly filled.

IMPORTANT NOTE: Do not overfill oil pan. Overfilling may result in white exhaust smoke, sudden over engine speed, or engine damage.

Adding Coolant



⚠ 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. Contents under pressure. Do not remove the radiator pressure cap while engine is hot. Doing so could result in death or serious injury.

(000322a)



⚠ 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)

⚠ CAUTION

Personal injury. Wear appropriate personal protective equipment at all times while operating and servicing unit. Failure to do so could result in personal injury.

(000419)

Coolant must be changed every year or at 1,000 hours of operation. Check coolant level and degree of fouling according to the steps below. Correct coolant level is approximately 0.39 in (10 mm) below the radiator core top. Wear proper PPE when handling Long Life Coolant.

1. Verify engine is stopped and cooled.
2. See [Figure 4-2](#). Verify coolant drain plug (A) is closed.

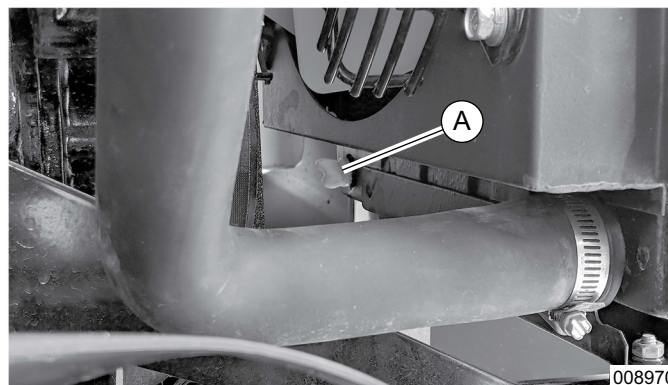


Figure 4-2. Coolant Drain Plug

3. See [Figure 4-3](#). Remove radiator cap (B).

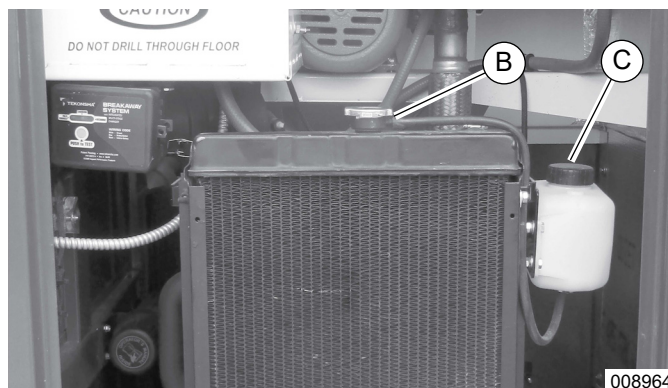


Figure 4-3. Radiator Location

4. Fill radiator slowly with coolant until it reaches the lip of the filler port.
5. Replace radiator cap.
6. Remove cap (C) from sub-tank.
7. Fill sub-tank with coolant until it reaches the FULL mark.
8. Replace sub-tank cap.
9. Operate engine approximately five minutes at a low idle speed to purge air in the coolant system.

NOTE: Coolant level will drop.

10. Stop engine and, once cooled, replenish with coolant until the sub-tank reaches the FULL mark.

Maintenance Schedule

Periodic inspection, service, and maintenance of this unit is critical to ensuring reliable operation. The following is the manufacturer's recommended maintenance schedule. The maintenance items need to be performed more frequently if the unit is used in severe applications (such as very high or very low ambient conditions or extremely dirty or dusty environments). Use the unit hour meter or calendar time, whichever occurs first, from the previous maintenance interval to determine next required maintenance interval.

NOTE: Some checks are based on hours of operation.

Follow all applicable safety alerts in this manual or the engine service manual before performing any maintenance checks or service.

This maintenance schedule reflects the minimum tasks needed to verify the unit remains operational. Some of the tasks can be performed by an authorized operator, and others must be performed by a GMASD.

NOTE: An authorized operator is one who has been trained by a GMASD in correct operation and inspection of this unit.

Engine Maintenance Schedule

Daily	<ul style="list-style-type: none"> • Check engine oil level. • Check fuel level. • Check engine coolant level. • Drain water from fuel filters. • Inspect air cleaner, dust unloader valve, and indicator. • Perform visual walk around inspection. • Inspect generator windings for dirt or grime.
50 Hour Break-In	<ul style="list-style-type: none"> • Replace engine oil and engine oil filter. • Inspect and adjust cooling fan V-belt.
Every 500 Hours	<ul style="list-style-type: none"> • Drain water from fuel tank. • Drain oil/water separator. • Service battery. • Change engine oil and replace oil filter. ^{1 2} • Inspect coolant pump. • Inspect open crankcase vent (OCV) system. • Remove and replace fuel filter elements. • Inspect belt wear. • Inspect belt tensioner. • Inspect cooling system. • Pressure test cooling system. • Check and adjust engine speeds. • Inspect engine mounts. • Inspect engine ground connection.
Every 1,000 Hours	<ul style="list-style-type: none"> • Inspect generator ball bearings. • Flush and refill cooling system.
Every 2,000 Hours	<ul style="list-style-type: none"> • Check the DC no load excitation voltage. See generator manual.
Every 3,000 Hours	<ul style="list-style-type: none"> • Inspect crankshaft vibration damper. • Adjust valve clearance. • Test glow plugs for continuity.
Every 6,000 Hours	<ul style="list-style-type: none"> • Test thermostat opening temperature.

<p>As Required</p>	<ul style="list-style-type: none">• Drain water from fuel filters.• Add coolant.• Replace air filter element.• Inspect primary air filter element.• Replace fan belt.• Inspect fuses.• Inspect electrical wiring and connections.• Purge fuel system.
<p>¹ During the initial operation of a new or rebuilt engine with Break-In Plus, change the oil and filter between a minimum of 100 hours and a maximum of up to 500 hours.</p> <p>² Service intervals depend on sulfur content of the diesel fuel, oil pan capacity, and the oil and filter used.</p> <p>NOTE: For more information, see engine manual.</p>	

Battery Inspection



⚠ 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

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)

⚠ WARNING

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)

⚠ WARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death, or serious injury.

(000228)

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>.

NOTE: Remove the 5 amp controller fuse from control panel.

An authorized operator should inspect the engine battery monthly. At this time, the battery fluid level should be checked using a load tester and distilled water added if needed. Battery cables and connections should also be inspected for cleanliness and corrosion.

A GMASD should inspect the battery system once every six months. At this time, the battery condition and state of charge should be checked using a load test battery. Recharge or replace the battery as required.

Battery service is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away.

Observe the following precautions when working on batteries:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of battery.
- Disconnect charging source prior to connecting or disconnecting battery terminals.

NOTE: Wash spilled electrolyte down with an acid neutralizing agent. A common practice is to use a solution of 1 lb (454 g) bicarbonate of soda (baking soda) to 1 gal (3.8 L) of water. Add the bicarbonate of soda solution until the evidence of reaction (foaming) has ceased. Flush the resulting liquid with water.

NOTE: Discharge static electricity before touching the battery by first touching a grounded metal surface.

Battery Installation and Replacement



⚠ WARNING

Explosion hazard. Never add acid to a battery. Add distilled water only. Failure to do so could result in death, serious injury, or equipment damage.

(000316)



⚠ CAUTION

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

(000167a)

When required, the battery must be replaced with one of equivalent size, voltage, and CCA (cold crank amp capacity). Contact a GMASD for correct battery size. A new battery must be filled with the proper electrolyte and be fully charged before install.

Battery cables are connected to the unit at the factory.

Proceed as follows to connect cables to battery posts.

1. Connect battery cable from starter contactor to positive (POS or +) battery post.
2. Connect black battery cable to negative (NEG or -) battery post.
3. Refer to [Engine and Heater Startup](#).

Other Maintenance Checks

The following inspections should be performed by an authorized service technician, or a properly trained authorized operator. These maintenance items require a high level of experience and skill to evaluate and correct.

- Inspect engine accessory drive belts.
- Inspect hoses and connections.
- Inspect fuel supply system.
- Inspect exhaust system.
- Inspect exhaust pipe sleeve.

Trailer Maintenance

Perform daily inspections of the trailer before each use.

- Inspect trailer for damage, such as dents, cracks, gouges, or deep scratches.
- Inspect trailer for corrosion or abrasion.
- Inspect trailer tires for wear and deflation.
- Inspect all safety devices for damage or unusual wear.
- Inspect all electrical connections for any bare wires or other damage.
- Rectify any issues before using the trailer.

Short Term Storage

When the machine will not be in use for three or more months, follow the guidelines below to properly store the machine:

- Perform all necessary maintenance or repairs based on the **Maintenance Schedule**. Perform any upcoming necessary maintenance task before storing.
- Fill the fuel tank to FULL.
- Fill coolant to FULL. Do not drain.
- Remove all dirt and debris from inside and outside the enclosure.
- Lock the machine to prevent any unauthorized operation.
- Store in a safe location — do not position near or on top of any combustible materials; observe any local, state, or national codes or regulations. Store in a low moisture, low dust area.
- Disconnect the negative cable from the battery.
- Grease exposed components and joints of the engine accelerator system.

Return to Service

Follow the guidelines below for engines and machines that have not been operated for three to six months:

- Conduct a thorough inspection of the machine before starting the engine.
- Verify the maintenance schedule is up to date.
- Connect the negative battery cable.
- After starting the engine, let it warm up for more than 10 minutes at idle.

Section 5: Troubleshooting

General Troubleshooting Guide

Some of the more common problems are listed in the table below. This information is intended to be a check or verification that simple causes can be located and fixed. It does not cover all types of problems. Refer to the OEM engine operator's manual for additional troubleshooting information. Procedures that require in-depth knowledge or skills should be referred to a GMASD.



WARNING

Risk of burns. Allow engine to cool before draining oil or coolant. Failure to do so could result in death or serious injury.

(000139)

Problem	Cause	Solution
Engine will not crank	Low battery output voltage or discharged battery.	Charge or replace batteries. See Battery Inspection .
	Loose or corroded connections.	Clean and tighten connections.
	Faulty start circuit relay.	Contact a GMASD.
	Blown fuse.	Replace fuse.
	Faulty main switch or start safety switch.	Repair switch as required.
	Faulty starter solenoid.	Replace solenoid.
	Faulty starter.	Replace starter.
Starter cranks slowly	Low battery output voltage or discharged battery.	Charge or replace batteries. See Battery Inspection .
	Excessive crankcase oil viscosity.	Drain crankcase oil and replace with correct viscosity oil. See Draining and Refilling the Oil .
	Loose or corroded connections.	Clean and tighten connections.
Hard to start or will not start	Engine starting under load.	Disengage PTO.
	Incorrect starting procedure.	Review starting procedure. See Pre-start Checklist and Engine and Heater Startup .
	Restricted exhaust.	Inspect and correct exhaust restriction.
	No fuel.	Check fuel tank.
	Air in fuel line.	Purge fuel lines. See engine manual.
	Poor fuel quality.	Drain fuel and replace with proper grade and quality of fuel for operating condition.
	Water, dirt, or air in fuel system.	Drain, flush, fill, and purge fuel system.
	Fuel filter restricted or full of water.	Replace fuel filter or drain water from fuel filter.
	Dirty or faulty fuel injectors.	Contact a GMASD.
	Electronic fuel system failure.	
	Cold weather.	Use cold weather starting aids (see engine manual).
	Excessive crankcase oil viscosity.	Drain crankcase oil and replace with correct viscosity oil. See Draining and Refilling the Oil .
	Electronic control system problem or basic engine problem.	Contact a GMASD.

Problem	Cause	Solution
Engine misfiring or runs irregularly	Poor fuel quality; incorrect fuel/dirty fuel.	Test fuel, drain water from fuel bowl.
	Restricted fuel filter.	Replace fuel filter element.
	Water, dirt, or air in fuel system.	Drain, flush, fill, and purge fuel system.
	Low coolant temperature.	Remove and check thermostat.
	Dirty or faulty fuel injectors.	Contact a GMASD.
	Electronic fuel system problem.	
	Electronic control system problem or basic engine problem.	
Lack of engine power	Restricted air intake.	Service air cleaner.
	Restricted exhaust.	Check and correct exhaust restriction.
	Poor fuel quality.	Drain fuel and replace with proper grade and quality of fuel for operating condition.
	Restricted fuel filter.	Replace fuel filter elements.
	Engine overloaded.	Reduce engine load.
	Incorrect crankcase oil.	Drain crankcase oil and replace with correct viscosity oil. See <i>Draining and Refilling the Oil</i> .
	Low coolant temperature.	Remove and check thermostat.
	Incorrect valve clearance.	Adjust valve clearance or contact a GMASD.
	Dirty or faulty fuel injectors.	Contact a GMASD.
	Air leak in engine intake or exhaust manifold.	Check intake and exhaust manifold gaskets and manifolds; repair as required or contact a GMASD.
	Engine is in derate due to DTC.	Contact a GMASD.
	Electronic control system problem or basic engine problem.	
Engine idles poorly	Poor fuel quality.	Drain fuel and replace with proper grade and quality of fuel for operating condition.
	Electronic control system problem or basic engine problem.	Contact a GMASD.
Excessive fuel consumption	Engine overloaded.	Reduce engine load.
	Restricted or dirty air cleaner.	Replace air cleaner element as required.
	Insufficient compression.	Determine cause of low compression and repair as required.
	Leaks in fuel supply system.	Locate source of leak and repair as required.
	Poor fuel quality/improper type of fuel.	Drain fuel and replace with proper grade and quality of fuel for operating condition.
	Incorrect valve clearance.	Adjust valve clearance or contact a GMASD.
	Dirty or faulty fuel injectors.	Contact a GMASD.
	Electronic fuel system failure.	
	Electronic control system problem or basic engine problem.	
	Low engine temperature.	Remove and check thermostat(s).

Problem	Cause	Solution
Fuel in oil	Restricted fuel return line.	Check and fix fuel return lines.
	Engine load too light.	Increase engine load.
	Leaking fuel injectors.	Contact a GMASD.
Low-pressure fuel system — fuel pressure low	Restricted fuel filter.	Replace fuel filter.
	Restricted fuel line.	Locate restriction, repair as required.
	Faulty transfer pump.	Contact a GMASD.
	Faulty high-pressure fuel pump.	Remove fuel pump, repair/replace pump as required.
Abnormal engine noise	Worn main or connecting rod bearings.	Contact a GMASD.
	Excessive crankshaft end play.	
	Loose main bearing caps.	
	Worn connecting rod bushings and piston pins.	
	Scored pistons.	
	Worn timing gears or excess backlash.	
	Excessive valve clearance.	
	Worn camshaft lobes.	
	Worn rocker arm shaft(s).	
	Worn valve guides.	
	Damaged valve retainers.	
	Loose or worn rocker arms.	
	Bent pushrods.	
	Broken valve springs.	
	Bent connecting rods.	
	Worn flywheel.	
	Loose flywheel.	
Excessive piston to liner clearance.		
Excessive thrust bearing clearance.		
High oil viscosity.		
Engine emits white smoke	Insufficient engine compression.	Determine cause of low compression and repair as required, or contact a GMASD.
	Faulty thermostat(s) (does not close).	Test thermostats; replace thermostats as required.
	Coolant entering combustion chamber (failed cylinder head gasket or cracked cylinder head).	Repair or replace as required, or contact a GMASD.
	Electronic control system problem or basic engine problem.	Contact a GMASD.
	Poor fuel quality or incorrect type of fuel.	Drain fuel and replace with proper grade and quality of fuel for operating condition.
	Low engine temperature.	Warm up engine to normal operating temperature.
	Faulty fuel injectors.	Contact a GMASD.

Problem	Cause	Solution
Engine emits black, gray, or blue smoke	Restricted or dirty air cleaner.	Replace air cleaner element as required.
	Incorrect type of fuel.	Drain fuel and replace with proper grade, type, and quality of fuel for operating condition.
	Engine burning oil.	Contact a GMASD.
	Electronic control system problem or basic engine problem.	
	Cracked or damaged exhaust filter.	
Dirty fuel injectors.		
Engine overheats	Restricted or dirty air cleaner.	Replace air cleaner element as required.
	Insufficient coolant in cooling system.	Fill cooling system to proper level. Check radiator and hoses for loose connections or leaks. See Adding Coolant .
	Insufficient engine oil.	Check oil level. Add oil as required. See Draining and Refilling the Oil .
	Dirty radiator core.	Clean cooling system as required.
	Cooling system needs flushing.	Flush coolant system.
	Engine overloaded.	Reduce engine load.
	Loose or faulty fan belt.	Check automatic belt tensioner and belts. Replace as required.
	Faulty or wrong type of thermostat(s).	Test thermostat opening temperature, replace thermostats as required.
	Faulty radiator cap.	Replace radiator cap as required.
	Faulty temperature gauge or sender.	Check coolant temperature with thermometer and replace if necessary.
	Incorrect grade of fuel.	Drain fuel and replace with proper grade, and quality of fuel for operating condition.
	Damaged or leaking cylinder head gasket.	Contact a GMASD.
Faulty coolant pump.		
Coolant temperature below normal	Faulty thermostat(s).	Test and replace thermostats as required.
	Faulty temperature gauge or temperature sender.	Check gauge, sender, and connections.
Coolant in crankcase	Faulty cylinder head gasket.	Contact a GMASD.
	Cracked cylinder head or block.	
	Leaking cylinder liner seals.	
	Pitted cylinder liners.	
	Leaking oil cooler.	
	Faulty oil cooler O-rings.	
	Leaking EGR cooler system.	
Faulty coolant pump seal; weep hole plugged; coolant leaking through bearing.		

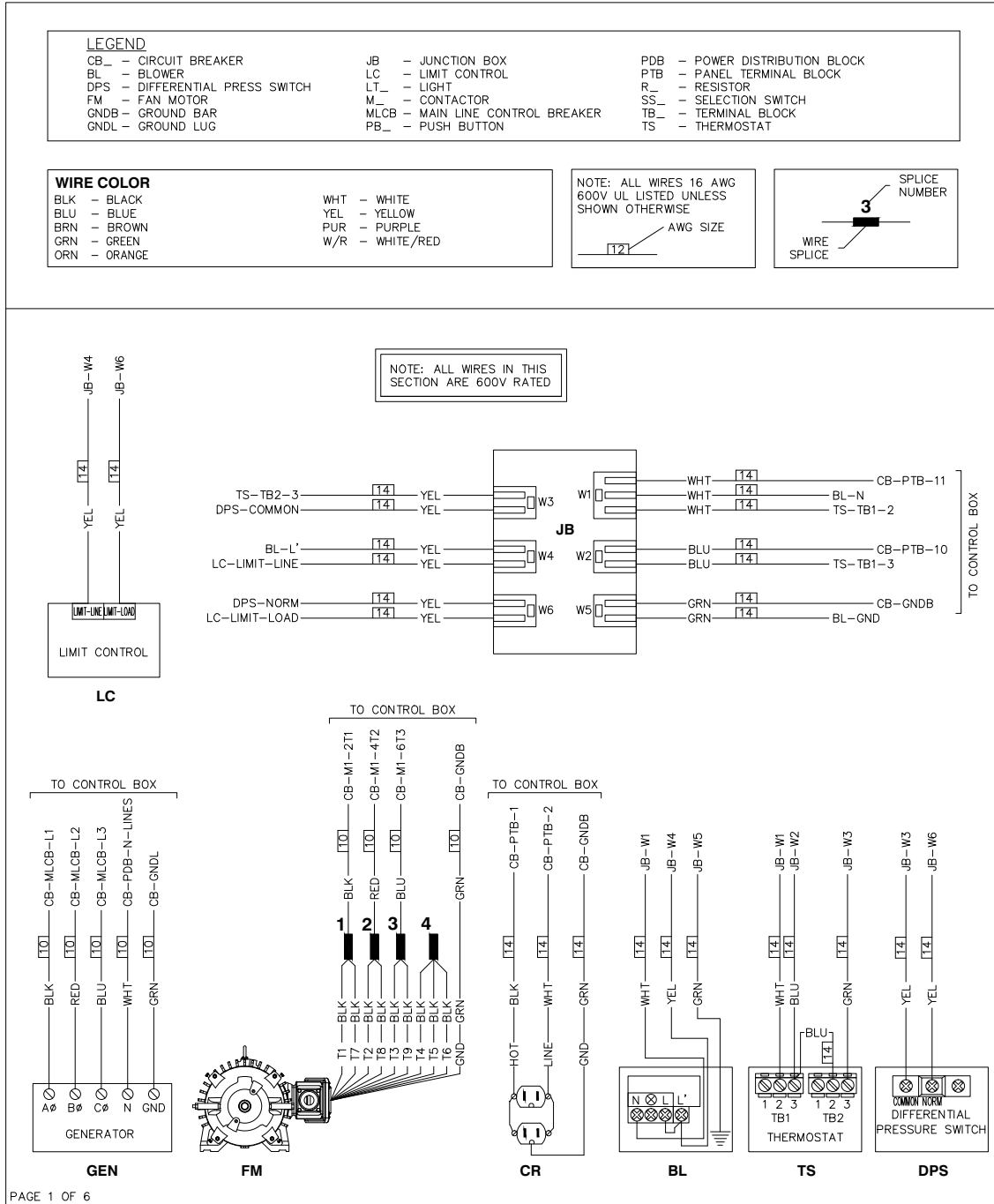
Problem	Cause	Solution
Excessive oil consumption	Insufficient crankcase oil viscosity.	Drain crankcase and refill with correct viscosity oil. See Draining and Refilling the Oil .
	Excessive crankcase oil.	Drain oil until oil level is correct. See Draining and Refilling the Oil .
	External oil leak(s).	Determine source of oil leak(s) and repair as required.
	Restricted crankcase vent tube.	Clean vent tube, verify that crankcase oil level is correct.
	Excessive oil pressure.	Contact a GMASD.
	Worn, broken, or unseated oil control rings.	
	Scored cylinder liners or pistons.	
	Worn valve guides or stems.	
	Faulty turbocharger.	
	Front and/or rear crankshaft oil seal faulty.	
	Piston ring gaps not staggered.	
	Insufficient piston ring tension.	
Piston rings sticking in ring grooves.		
Piston ring grooves excessively worn.		
Batteries will not charge	Loose or corroded connections.	Clean and tighten connections.
	Sulfated or worn-out batteries.	Replace batteries. See Battery Installation and Replacement .
	Stretched belt or faulty belt tensioner.	Adjust belt tension or replace belts.
Entire electrical system does not function	Faulty battery connection.	Clean and tighten connections.
	Sulfated or worn-out batteries.	Replace batteries. See Battery Installation and Replacement .
	Blown fuse.	Replace fuse.
Generator overheating	Overloaded generator.	Reduce load.
	Clogged ventilation screens.	Remove debris and clean air passages.
	High altitude.	Reduce load or improve ventilation. Contact a GMASD.
	Insufficient air circulation.	Contact a GMASD.
	Unbalanced load.	
Abnormal generator noises	Faulty bearing.	Contact a GMASD.
	Loose or misaligned coupling.	
	Belt slap or loose guards.	
Thermostat not functioning	Incorrect wiring.	Contact a GMASD.
	Insufficient supply voltage.	
	Incorrect sensor operation.	
	Display shows fault code.	See thermostat manual, or contact a GMASD.
No heat	Burner malfunction.	Contact a GMASD.

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Section 6: Wiring Diagrams

Cabin Harness

GROUP G



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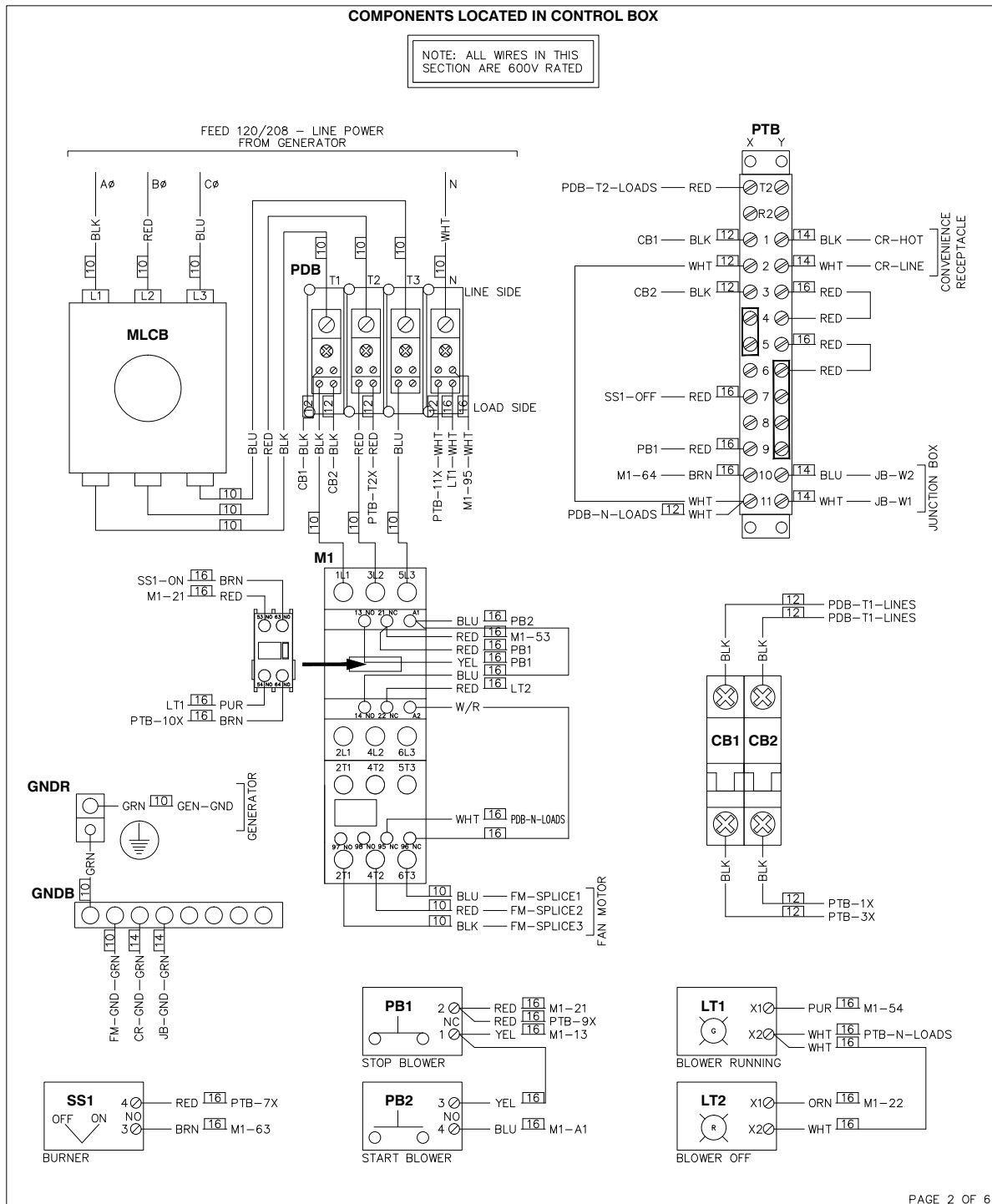
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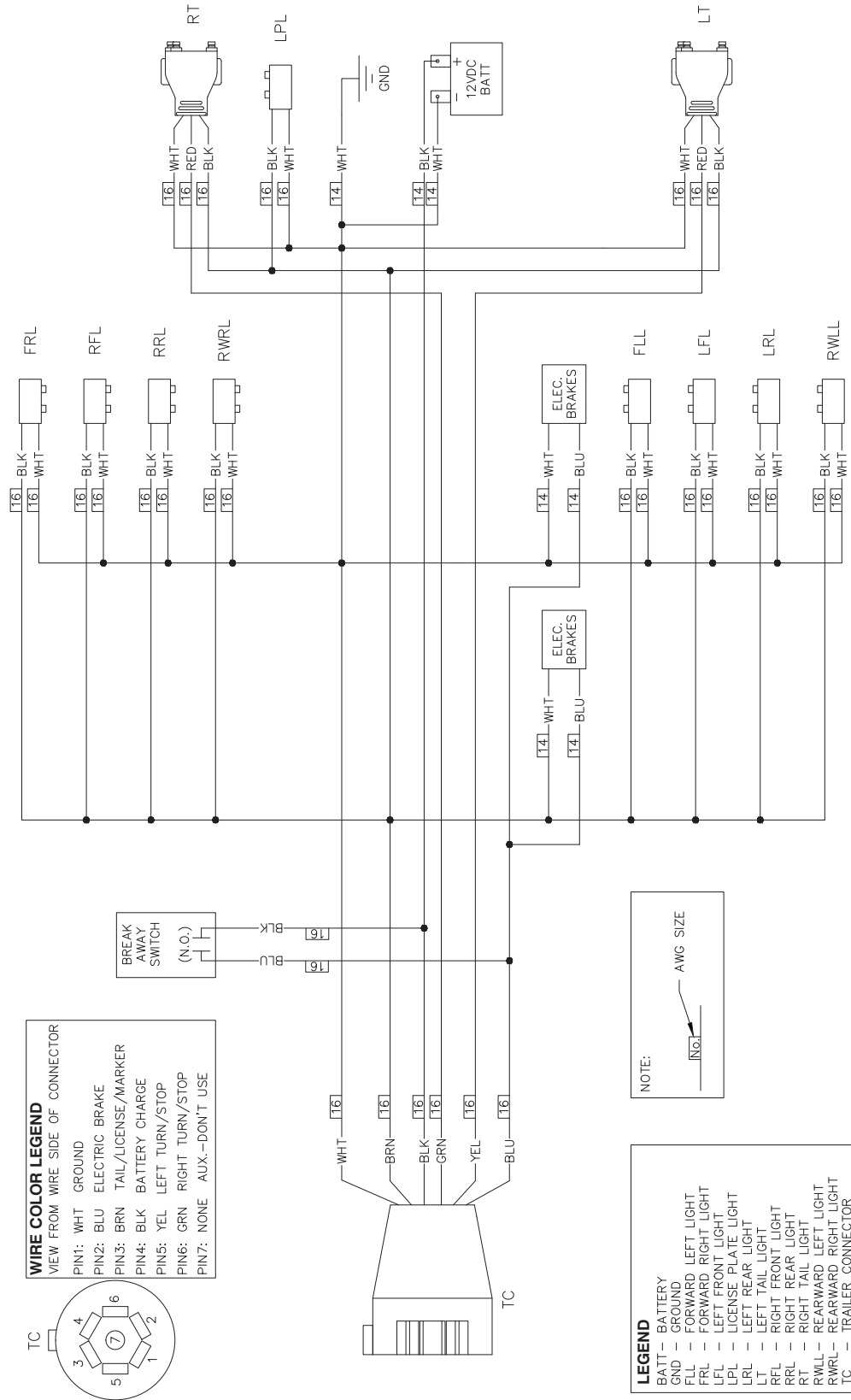
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WD SD-MIH800 CABIN
DRAWING #: A0000261121

Control Box Components

GROUP G



Trailer Wiring



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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 and 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.

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

Innerliner separation means the parting of the innerliner 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 gooseneck ball, by the trailer kingpin or gooseneck 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 or 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.

Treadwear 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 nonpneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the nonpneumatic rim and provides the connection between the nonpneumatic rim and the vehicle; or in the case of a nonpneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the nonpneumatic 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. Underinflated 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 underinflated 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 underinflated 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 treadwear 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

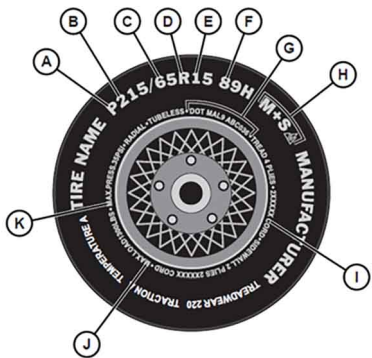
The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim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

Treadwear

The treadwear 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.

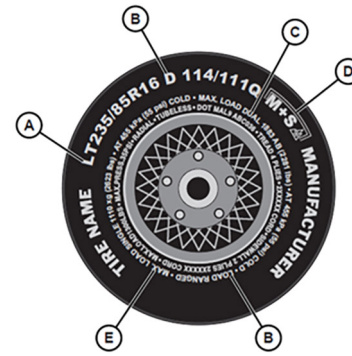
NOTE: The traction grade assigned to this tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

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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Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha WI 53189
[GeneracMobileProducts.com](https://www.generacmobileproducts.com) | 844-ASK-GNRC | 844-275-4672