Portable Solar Trailer - 7.5' Trailer
(4) Panels, Batteries/BC - Backup Generator
Instruction Manual



WARNING:

USER SHOULD BE TRAINED IN THE PROPER USE AND MAINTENANCE OF THIS DEVICE. IMPROPER USE OF THIS DEVICE CAN LEAD TO SERIOUS INJURIES OR DEATH TO PERSONNEL. READ THIS ENTIRE MANUAL AND RETAIN IT AS A REFERENCE FOR FUTURE USE.

INSTALLING MAST

Note: *Not all trailers are equipped with masts, and not all that have masts are shipped with masts removed.*



When the mast is removed from the trailer for shipping, it is located on a separate pallet. Follow the steps below to install mast to trailer.

Place the trailer on a flat level surface and deploy outriggers to limit movement and tilt during installation. (**FIGURE 1**)


FIGURE 1

The mast is located on a pallet. Place mast near the trailer with enough room around to maneuver a lift.

Cut the bands securing the mast to the pallet.




FIGURE 2

Place a lifting sling around the top mid-section of the mast. **Sling MUST be placed below the top stages and under the winch cable! Do NOT lift from any top stage section or cause pressure to winch cable. Doing so can damage the mast and cause the mast to extend while lifting.**

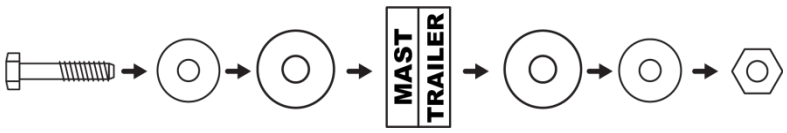
With assistance, slowly lift the mast and position it upright on the pallet. (**FIGURE 2**)


FIGURE 3

Once upright, apply a second sling to maneuver mast towards trailer. Lift mast so the winch will be facing the rear of the trailer when installed. **FIGURE 3**


FIGURE 4

With assistance, slowly transport and position the mast on the trailer. (**FIGURE 4**) There are six (6) mounting holes. Align the holes on the trailer to the holes on the mast. (**FIGURE 5**)



Secure the mast with the included mounting hardware. Mounting hardware for each mast is located in a box attached to the top of the green job box. There will be 6 bolts, 6 nuts, 12 small washers, and 12 large washers per mast. Ensure each bolt is tight and secure.



FIGURE 5

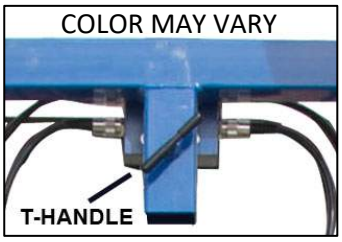
The Larson Electronics SPLT-1.2K-400AL-ISDG-BC-R1 Portable Solar Trailer provides a safe and effective way for operators to power equipment in remote, outdoor locations. This solar unit features four 300-watt solar panels, 400 aH capacity battery bank, battery charger and 5 kW backup generator. The entire assembly is mounted onto a 7.5` trailer, allowing operators to transport this solar system from location to location.

Light Head Installation (if applicable)

- Locate the light head and unpack it.



- The light head is equipped with a T-handle screw that holds it in place. Be sure this is loose before installing to ensure it will slip over the top stage of the mast.



- Using two slings, wrap each sling around the light head in between the lights on both sides.



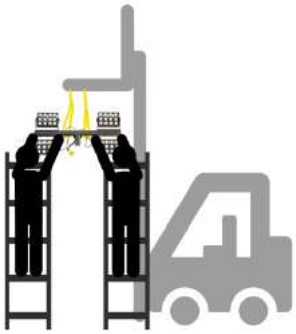
- Attach the slings to a forklift or other heavy lifting device.



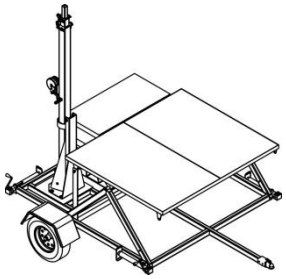
- With a person on each side of the light head holding it steady, slowly lift the light head above the mast.



- Place a ladder on either side of the mast to allow the 2 people to guide the light head onto the top of the mast. Once the head is in place, tighten the T-handle to secure the light head to the top of the mast. Complete electrical connection to lights by connecting the cord from the side of the trailer job box to the receptacle on bottom of the junction box on the light head.



Deploying Mast



- Choose a location that is as flat as possible and park the trailer in the desired position. Drop the trailer from the tow vehicle using the forward most jack on the tongue of the trailer. Ensure safety chains and cable have been disconnected from the tow vehicle.



- Once the trailer has been disconnected from the hitch of the tow vehicle, extend the remaining jacks. There are (2) leveling jacks located on the back and (2) jacks located on the front of the trailer. Pull the pin on the side of the jack to rotate it 90° toward the ground and hand crank the jack clockwise to extend it. Use a bubble level to level the trailer front to back, and side to side.



- Unlatch the solar panel and reposition it 45°. There is a hand screw (or spring loaded pin) located on each side of the solar panel, and a pin on either side at the bottom where the panel will tilt. With help, remove each bottom pin to allow the panel to reach maximum angle, then remove each hand screw to free the panels and pivot the solar panels down against the frame at a 45° angle. Insert the pin at the bottom on each side to hold the panel in place.

- Pull the pin on the edge of the solar panel to allow the other panel(s) (if applicable) to be pulled outward into position. This will expose the second (or 3rd/4th) panel and all will now be exposed to sunlight. Some solar units are not equipped with additional panel(s).



- Before raising the mast, check again with a bubble level to be sure the mast is level. Locate the hand winch on the mast. Turn the handle clockwise to raise the mast until it stops. Watch for snags during this process if there are any cords attached. The mast is now deployed. To rotate the mast, view **ROTATING THE MAST** on this manual.

The trailer is now deployed.

ROTATING THE MAST



The mast can be rotated while fully lowered or elevated.

1. Loosen the bolt located toward the center of the mast on the collar.



2. Once loose, rotate the mast to your desired position

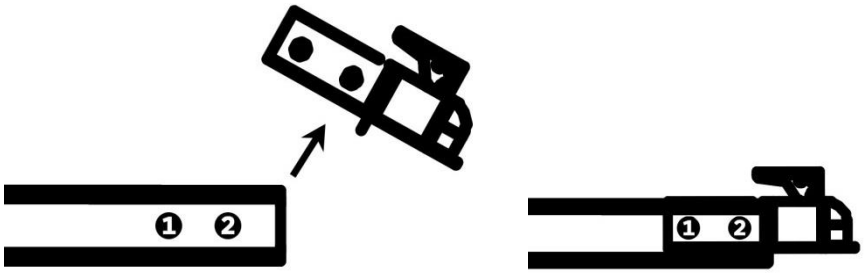


3. Tighten the bolt in order to hold the mast in place

Note: Pay attention to any attached cords while rotating the unit to prevent tangles or strain around the light mast.

REMOVING THE HITCH

The trailer hitch can be removed preventing the trailer from unauthorized towing. Remove the two bolts & from the graphic below holding it in place and lift the hitch off. This can be stored inside the job box when not in use. To install the hitch, place it back on the trailer tongue and replace the two bolts. Be sure both safety chains are attached.



PREPARING FOR TRANSPORT

Warning: Always remove light head before transporting!!



1. Lower the mast by rotating the hand winch counter-clockwise until the light mast is no longer supported by the winch cable. Do not leave slack in the cable to prevent potential issues this can cause.



2. If previously rotated, return the mast to its original position.



3. Power off all equipment. Open the job box and position the main disconnect switch to **OFF.** Position all other switches and breakers to **OFF** also. Disconnect equipment from outlets.



4. Lock the job box and take the keys to prevent unauthorized access.



5. Position the solar panels horizontal and secure them with the two hand screws (or spring loaded pins).

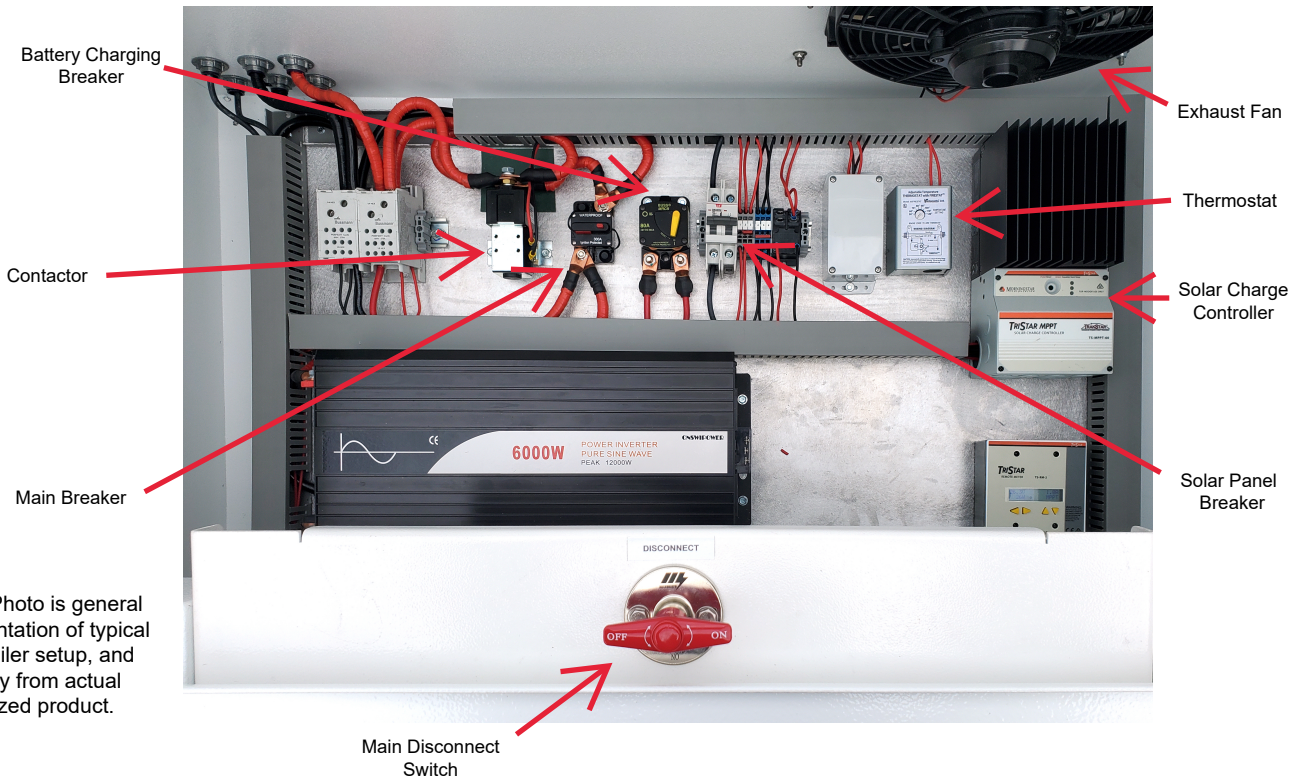


6. Lift the (4) jacks on each corner of the trailer by rotating the hand crank counter-clockwise. Pull the pin and rotate each jack 90° to horizontal position.

7. When the mast is fully lowered, powered off, light head removed, and the (4) main jacks are raised, you are ready to attach a tow vehicle. Once tied to a tow vehicle, raise the tow jack and ensure all other outriggers are raised. Ensure the trailer hookup and safety chains are connected. Test the trailer lights to ensure stop/tail/brake lights work before operating on public roadways.

Operation

The job box at the back of the trailer contains all of the electronics, including breakers, solar charger, and inverter with outlets. Take note of the location of all components and familiarize yourself with their layout for ease of operation. **NOTE:** Fan runs automatically based on thermostat setting. We recommend setting between 85° and 90°.



*Note: Photo is general representation of typical solar trailer setup, and may vary from actual customized product.

Once the trailer is in the desired position and mast has been raised and configured as outlined above, open the job box to access controls for solar charging, main power disconnect, and power outlets. Be sure main disconnect switch is the "ON" position. The battery charging breaker can then be switched on, as well as the solar panel breaker to allow the solar panels to begin charging the batteries. Thermostat will automatically operate the fan when ambient temperature inside the job box exceeds the current setting on the thermostat. Connect compatible equipment to the outlets available on the side of the power inverter. When turning things off, do so in reverse order to remove the load before turning off the main disconnect switch. If system powers off, remove the load and check the breakers and make sure they are still on, reset as needed. Restore load one piece of equipment at a time, and remove any excess equipment that is exceeding the load ratings.

WARNING: *Turn off all breakers before turning off main disconnect switch!*

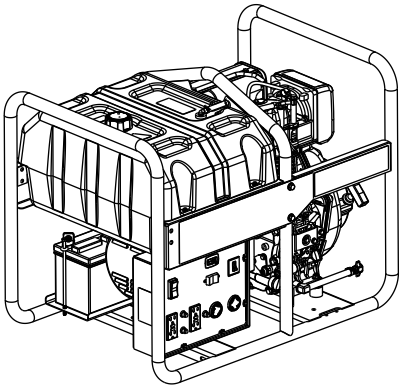
THESE INSTRUCTIONS MAY NOT COVER ALL DETAILS OR VARIATIONS OF THIS PRODUCT FOR YOUR EQUIPMENT OR INSTALLATION REQUIREMENTS. SHOULD FURTHER INFORMATION NOT COVERED BY THESE INSTRUCTIONS BE REQUIRED, PLEASE CONTACT LARSON ELECTRONICS BY EMAIL AT SALES@LARSONELECTRONICS.COM OR BY PHONE AT 1-877-348-9680 FOR FURTHER ASSISTANCE.

PLEASE VISIT LARSONELECTRONICS.COM FOR **WARRANTY** AND **RETURN** INFORMATION.

LARSON ELECTRONICS

Diesel Generator

Owner's Manual



MODEL:_____

SERIAL:_____

DATE PURCHASED:_____

SAVE THIS MANUAL FOR FUTURE REFERENCE

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⚠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)

Section 1 Introduction and Safety

Introduction

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

⚠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)

The owner is responsible for proper maintenance and safe use of the equipment. Before operating, servicing or storing this generator:

- Study all warnings in this manual and on the product carefully.
- Become familiar with this manual and the unit before use.
- Refer to the Assembly section of the manual for instructions on final assembly procedures. Follow the instructions completely.

Save these instructions for future reference. ALWAYS supply this manual to any individual that will use this machine.

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.

Safety Rules

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

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

⚠DANGER

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

(000001)

⚠WARNING

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

(000002)

⚠CAUTION

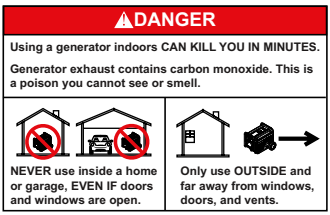
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(000003)

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

These safety warnings 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.

Safety Symbols and Meanings



000657



⚠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)

- If you start to feel sick, dizzy, or weak after the generator has been running, move to fresh air IMMEDIATELY. See a doctor, as you could have carbon monoxide poisoning.

⚠DANGER

Asphyxiation. The exhaust system must be properly maintained. Do not alter or modify the exhaust system as to render it unsafe or make it noncompliant with local codes and/or standards. Failure to do so will result in death or serious injury. (000179b)

⚠DANGER

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

⚠DANGER

Electrocution. Turn utility and emergency power supplies to OFF before connecting power source and load lines. Failure to do so will result in death or serious injury. (000116)

⚠WARNING

Equipment and property damage. Do not alter construction of, installation, or block ventilation for generator. Failure to do so could result in unsafe operation or damage to the generator. (000146)

⚠WARNING

Asphyxiation. Always use a battery operated carbon monoxide alarm indoors and installed according to the manufacturer's instructions. Failure to do so could result in death or serious injury. (000178a)

⚠WARNING

Equipment and property damage. Do not operate unit on uneven surfaces, or areas of excessive moisture, dirt, dust or corrosive vapors. Doing so could result in death, serious injury, property and equipment damage. (000250)

⚠WARNING

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

⚠WARNING

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

⚠WARNING

Personal injury. Do not insert any object through the air cooling slots. Generator can start at any time and could result in death, serious injury, and unit damage. (000142a)

⚠WARNING

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

⚠WARNING

Injury and equipment damage. Do not use generator as a step. Doing so could result in falling, damaged parts, unsafe equipment operation, and could result in death or serious injury. (000216)



- For safety reasons, it is recommended that the maintenance of this equipment be performed by an IASD. Inspect the generator regularly, and contact the nearest IASD for parts needing repair or replacement.

Exhaust and Location Hazards

⚠DANGER

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

⚠DANGER

Asphyxiation. The exhaust system must be properly maintained. Do not alter or modify the exhaust system as to render it unsafe or make it noncompliant with local codes and/or standards. Failure to do so will result in death or serious injury. (000179b)

⚠WARNING

Asphyxiation. Always use a battery operated carbon monoxide alarm indoors and installed according to the manufacturer's instructions. Failure to do so could result in death or serious injury. (000178a)

⚠WARNING

Equipment and property damage. Do not alter construction of, installation, or block ventilation for generator. Failure to do so could result in unsafe operation or damage to the generator. (000146)

- If you start to feel sick, dizzy, or weak after the generator has been running, move to fresh air IMMEDIATELY. See a doctor, as you could have carbon monoxide poisoning.
- NEVER run a generator indoors or in a partly enclosed area such as garages.
- ONLY use outdoors and far away from windows, doors, vents, crawl spaces and in an area where adequate ventilation is available and will not accumulate deadly exhaust gas.
- Using a fan or opening a door will not provide sufficient ventilation.

- Point muffler exhaust away from people and occupied buildings.

Electrical Hazards



⚠DANGER

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



⚠DANGER

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

- National Electric Code (NEC) requires the frame and external electrically conductive parts of the generator be properly connected to an approved earth ground. Local electrical codes may also require proper grounding of the generator. Consult with a local electrician for grounding requirements in the area.
- Use a ground fault circuit interrupter (GFCI) in any damp or highly conductive area (such as metal decking or steel work).



⚠DANGER

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

- Once generator has been started outside, connect electrical loads to extension cord(s) inside.

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 overfill fuel tank. Fill to 1/2 inch from top of tank to allow for fuel expansion. Overfilling may cause fuel to spill onto engine causing fire or explosion, which will result in death or serious injury. (000166b)



⚠DANGER

Risk of fire. Allow fuel spills to completely dry before starting engine. Failure to do so will result in death or serious injury. (000174)

⚠WARNING

Personal injury. Do not insert any object through the air cooling slots. Generator can start at any time and could result in death, serious injury, and unit damage. (000142a)

- Allow at least 5 feet of clearance on all sides of the generator when operating to prevent overheating and fire.
- Do not operate the generator if connected electrical devices overheat, if electrical output is lost, if engine or generator sparks, or if flames or smoke are observed while unit is running.
- Keep a fire extinguisher near the generator at all times.

Standards Index

1. National Fire Protection Association (NFPA) 70: The NATIONAL ELECTRIC CODE (NEC) available from www.nfpa.org
2. National Fire Protection Association (NFPA) 5000: BUILDING CONSTRUCTION AND SAFETY CODE available from www.nfpa.org
3. International Building Code available from www.iccsafe.org
4. Agricultural Wiring Handbook available from www.rerc.org, Rural Electricity Resource Council P.O. Box 309 Wilmington, OH 45177-0309
5. ASAE EP-364.2 Installation and Maintenance of Farm Standby Electric Power available from www.asabe.org, American Society of Agricultural & Biological Engineers 2950 Niles Road, St. Joseph, MI 49085
6. CSA C22.2 100-14 Electric motors and generators for installation and use, in accordance with the Rules of the Canadian Electrical Code
7. ANSI/PGMA G300 Safety and Performance of Portable Generators. Portable Generator Manufacturer's Association, www.pgmaonline.com

IMPORTANT NOTE: This list is not all inclusive. Check with the Authority Having Jurisdiction (AHJ) for any local codes or standards which may be applicable to your jurisdiction.

Section 2 General Information and Setup

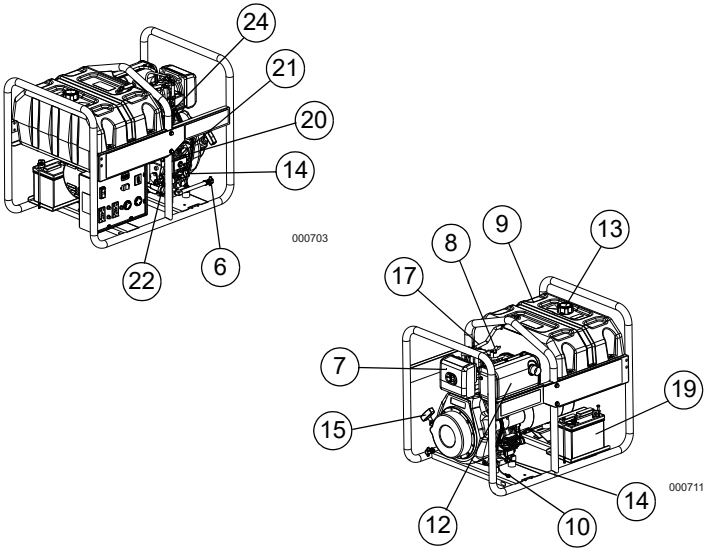


Figure 2-1. Features and Controls

Generator Components

1 120 Volt AC, 20 Amp, GFCI Duplex Receptacle
2 120/240 Volt AC, 30 Amp Locking Receptacle
3 120 Volt AC, 30 Amp Locking Receptacle
4 20 Amp Circuit Breakers
5 30 Amp Circuit Breaker
6 Oil Drain
7 Air Filter
8 Decompression Lever
9 Fuel Tank
10 Grounding Lug
11 Start/Run Switch
12 Muffler
13 Fuel Cap/Fuel Gauge
14 Oil Fill (2 locations)
15 Recoil Starter
16 Main 23 Amp Breaker Switch
17 Fuel Return Hose
18 Hour Meter
19 Battery (not included)
20 Fuel Filter
21 Engine On/Off Lever
22 Fuel On/Off
23 Voltage Selector Switch
24 Fuel Primer Bulb

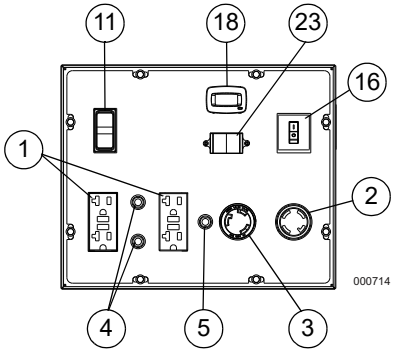


Figure 2-2. Control Panel

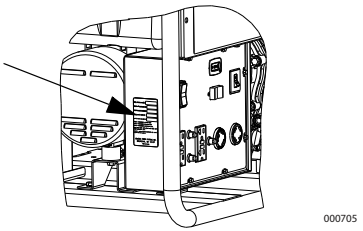


Figure 2-3. Identification Label

Know Your Generator

⚠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)

Emissions Information

The U.S. Environmental Protection Agency, EPA, (and California Air Resource Board, CARB, for equipment certified to CA standards) require the generator comply with exhaust emission standards. The generator is certified to meet applicable EPA and CARB emission levels using Ultra Low Sulfur fuel, Diesel No. 2. Any other use may be a violation of federal and/or local laws. To ensure the engine complies with applicable emission standards for the duration of the engine's life, it is important to follow the maintenance specifications in Maintenance Section. **Tampering with or altering the emission control system may increase emissions and may be a violation of Federal or California Law.**

Product Specifications

Generator Specifications	
Rated Power	Rated 5000 Watts**
Surge Power	Surge Rating 5500 Watts
Rated AC Voltage	120/240
Rated AC Load Current @ 240V Current @ 120V	 20.8 Amps** 41.7 Amps**
Rated Frequency	60 Hz @3600 RPM
Phase	Single Phase
** Operating Temperature Range : -18 deg. C (0 deg. F) to 40 Deg. C (104 Deg. F). When operated above 25 deg. C (77 deg. F) there may be a decrease in power. ** Maximum wattage and current are subject to, and limited by, such factors as fuel Btu content, ambient temperature, altitude, engine condition, etc.. Maximum power decreases about 3.5% for each 1,000 feet above sea level; and will also decrease about 1% for each 6° C (10° F) above 16° C (60° F) ambient temperature.	
5.5 / 6.5 Engine Specifications	
Displacement	435 cc (26.5 in^3)
Fuel Capacity	45.4 L (12 U.S. gallons)
Oil Type	See chart in the ***Add Engine Oil*** section.
Oil Capacity	1.6L (1.7 qt)
Run Time at 50% Load	32 Hours
Battery	Purchase Locally (not included)
Battery Type	12V 35Ah Battery, Group U1

Hour Meter

The Hour Meter tracks hours of operation for scheduled maintenance. See ***Figure 2-4***.

- The CHG OIL display will illuminate every 100 hours. The message will flash one hour before and one hour after each 100 hour interval, providing a two hour window to perform service.
- The SVC display will illuminate every 100 hours. The message will flash one hour before and one hour after each 200 hour interval providing a two hour window to perform service.

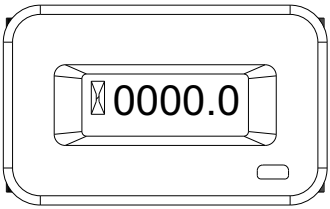


Figure 2-4. Hour Meter

When the hour meter is in flash alert mode, the maintenance message will alternate with elapsed time in hours and tenths. The hours will flash four times, then alternate with the maintenance message four times until the meter automatically resets.

- 100 hours - CHG OIL — Oil Change Interval (Every 100 hrs)
- 200 hours - SVC — Service Air Filter (Every 200 hrs)

NOTE: The hour glass icon will flash when the engine is running. This signifies the meter is recording hours of operation.

Connection Plugs

120 VAC, 20 Amp, GFCI Duplex Receptacle

The 120 Volt outlet is overload protected by a 20 Amp push-to-reset circuit breaker. See ***Figure 2-5***. Each receptacle will power 120 Volt AC, single phase, 60 Hz electrical loads requiring up to 2400 watts (2.4 kW) or 20 Amps of current. Use only high quality, well-insulated, 3-wire grounded cord sets rated for 125 Volts at 20 Amps (or greater).

NOTE: Limit length of extension cords to fifteen feet, or less, to prevent voltage drop and overheating of wires.

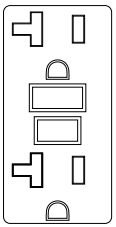


Figure 2-5. 120 VAC, 20 Amp, Duplex Receptacle

120/240 VAC, 30 Amp Receptacle

Use a NEMA L14-30 plug with this receptacle (rotate to lock/unlock). Connect a suitable 4-wire grounded cord set to plug and desired load. The cord set should be rated 250 Volts AC at 30 Amps (or greater). See ***Figure 2-6***.

Use this receptacle to operate 240 Volt AC, 60 Hz, single phase loads requiring up to 5000 watts (5.0 kW) of power at 20.8 Amps.

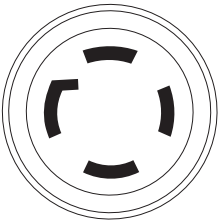


Figure 2-6. 120/240 VAC, 30 Amp Receptacle

120 VAC, 30 Amp Receptacle

Use a NEMA L5-30 plug with this receptacle (rotate to lock/unlock). Connect a suitable 3-wire cord set to the plug and to desired load. The cord set should be rated for 125 Volts AC at 30 Amps (or greater). See ***Figure 2-7***.

Use this receptacle to operate 120 Volt AC, 60Hz, single phase loads requiring up to 3600 watts (3.6kW) of power at 30 Amps. The outlet is protected by a 30 Amp push-to-reset circuit breaker.

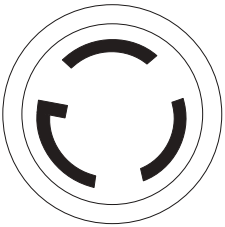


Figure 2-7. 120 VAC, 30 Amp Receptacle

Remove Contents from Carton

1. Open carton completely by cutting each corner from top to bottom.
2. Remove and verify carton contents prior to assembly. Carton contents should contain the following:

Contents

Item	Qty.
Main Unit	1
Owner's Manual	1
Liter Oil SAE 30	2
Product Registration Card	3
Muffler Extension	1
Battery Bracket Assembly	1

Portability Kit (optional)

Portability Kit (Model No. G0069100)	Qty.
10" Wheel (A)	2
Axle (B)	1
Axle Mount (C)	2
5/8" Flat Washer (D)	4
Cotter Pin (E)	2
Handle (F)	1
Handle Mount (G)	2
Handle Grip (H)	2
Frame Foot (J)	2
Rubber Feet (K)	2
M6-1x50mm Screw (L)	4
.344"x1.0" Flat Washer (M)	2
M8 Flat Washer (N)	10
M8-1.25 Locknut (P)	6
M8-1.25x30 Screw (Q)	2
M8-1.25x45 Screw (R)	2
M8-1.25x50 Screw (S)	2
M8-1.25x110 Screw (T)	2
5/16x1.25 Pin Release (U)	1
Lanyard	1

4. Record model, serial number, and date of purchase on front cover of this manual.

Assembly

⚠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)

The following tools are required to install the accessory kit.

- Ratchet with 10mm and 13mm sockets
- 13mm box wrenches

NOTE: The wheels are not intended for over-the-road use.

Install wheels as follows. See ***Figure 2-8***.

1. Insert cotter pin (E) to one end of axle (B).
2. In this order; slide washer (D), wheel (A), washer, (D), axle mount (2-C), washer (D), wheel (A), washer (D), and cotter pin (E) onto axle.
3. Place wheel assembly under frame so axle mounts align with holes in cradle frame.
4. Secure with M6 screws (L).

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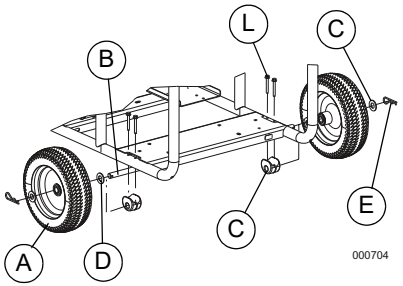

Figure 2-8. Wheel Assembly

Install frame foot and rubber bumpers as shown in ***Figure 2-9***.

1. Slide onto M8 screw (Q), flat washer (M), rubber foot (K).
2. Slide assembly through frame foot (J). Add M8 flat washer (N), and secure with M8-1.25 Locknut (P).
3. Place foot bracket assembly under cradle.
4. Slide M8 flat washers (N) onto M8-1.25x110 screws (T) and insert through foot bracket assembly and cradle.
5. Secure with M8 flat washer (N) and M8 locknut (P).

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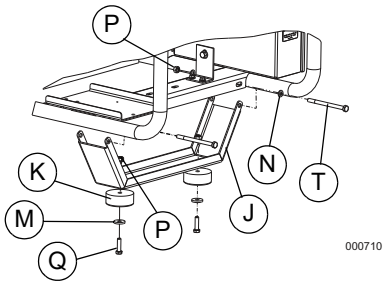

Figure 2-9. Frame Foot Assembly

Install handle as shown in ***Figure 2-10***.

1. Place a M8 flat washer (N) onto M8-1.25x45 screw (R) and through handle bracket and handle (A).
2. Secure with M8 flat washer (N) and M8 locknut (P).
3. Install handle grips (H).

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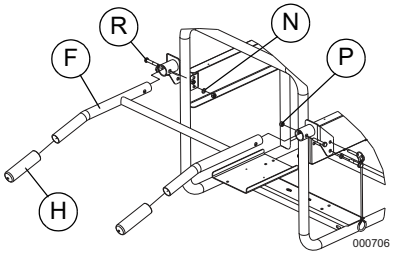


Figure 2-10. Handle Assembly

Battery Installation

The following tools are required to install the battery.

- 7/16” (11mm) ratchet, socket and wrench

Install the battery as follows. See ***Figure 2-11***.

1. Place battery onto battery tray with the positive terminal on the right.
2. Connect red battery wire to positive (+) terminal with a bolt, washer and nut.
3. Slide red battery terminal post cover over terminal and hardware.
4. Connect black battery wire to negative (-) terminal with a bolt, washer and nut.
5. Slide black battery terminal post cover over terminal and hardware.
6. Slide one spacer onto each screw.
7. Slide these assemblies through holes in top of bracket.
8. Place bracket assembly over top of battery. Do not to touch battery terminal hardware. The screws will pass through holes on battery tray.
9. Place washer, lock washer and wing nut onto screw.
10. Tighten wing nuts until the lock washers are compressed to being flat.

NOTE: The battery charges while the engine is running.

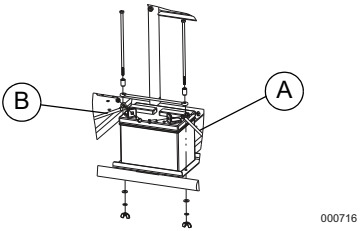


Figure 2-11. Battery Installation

Add Engine Oil

⚠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)

1. Place generator on a level surface.
2. Verify oil fill area is clean.
3. Remove oil fill cap and wipe dipstick clean. See ***Figure 2-12***.

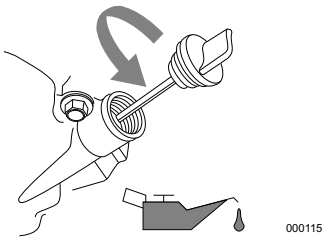
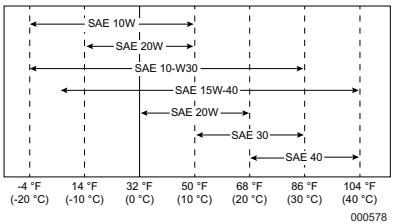


Figure 2-12. Remove Dipstick

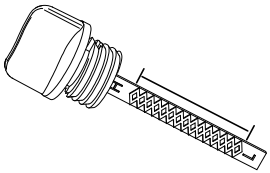
4. Add recommended engine oil as shown in the following chart.



NOTE: Some units have more than one oil fill location. It is only necessary to use one oil fill point.

5. Thread dipstick into oil filler neck. Oil level is checked with dipstick fully installed.

6. See ***Figure 2-13***. Remove dipstick and verify oil level is within safe operating range.
7. Install oil fill cap/dipstick and hand-tighten.



000116

Figure 2-13. Safe Operating Range

Fuel

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 overfill fuel tank. Fill to 1/2 inch from top of tank to allow for fuel expansion. Overfilling may cause fuel to spill onto engine causing fire or explosion, which will result in death or serious injury. (000166b)

IMPORTANT NOTE: DO NOT use Home Heating Oil or Bio-Diesel Fuel.

Use No. 2D diesel fuel when temperatures are above freezing. When temperatures are below freezing, blend No.1D diesel fuel and No. 2D diesel fuel together for a climate adjusted fuel ratio.

Diesel fuel must meet the following requirements:

- Sulfur content of 15 parts per million (ppm) maximum.
- Minimum Cetane index of 40.

NOTE: Low ambient temperatures as well as engine operation at high altitudes may require the use of fuels with higher Cetane ratings.

Fuel Maintenance

- Always treat diesel fuel for long term storage. Use the approved fuel additive and water abatement material. Test stored fuel every 90 days and provide additional treatment if required. Periodically check and dry abatement material as necessary.

Section 3 Operation

Operation

Before Starting Engine

1. Verify engine oil level is correct.
2. Verify fuel level is correct.
3. Verify battery is installed.

NOTE: The generator will not start without the battery installed.

4. Verify unit is secure on level ground, with proper clearance and is in a well ventilated area.

Prepare Generator for Use

⚠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

Asphyxiation. Always use a battery operated carbon monoxide alarm indoors and installed according to the manufacturer's instructions. Failure to do so could result in death or serious injury.

(000178a)

⚠DANGER

Asphyxiation. The exhaust system must be properly maintained. Do not alter or modify the exhaust system as to render it unsafe or make it noncompliant with local codes and/or standards. Failure to do so will result in death or serious injury.

(000179b)

⚠WARNING

Risk of fire. Do not use generator without spark arrestor installed. Failure to do so could result in death or serious injury.

(000118a)

⚠WARNING

Risk of Fire. Hot surfaces could ignite combustibles, resulting in fire. Fire could result in death or serious injury.

(000110)

⚠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)

⚠CAUTION

Equipment and property damage. Disconnect electrical loads prior to starting or stopping unit. Failure to do so could result in equipment and property damage.

(000136)

Grounding the Generator When Used as a Portable

The generator is equipped with an equipment ground connecting the generator frame and the ground terminals on the AC output receptacles (see NEC 250.34 (A). This allows the generator to be used as a portable without grounding the frame of the generator as specified in NEC 250.34. See ***Figure 3-1***.

- Neutrals bonded to frame.

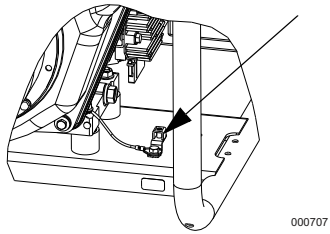


Figure 3-1.Grounding the Generator

Special Requirements

Review all Federal or State Occupational Safety and Health Administration (OSHA) regulations, local codes, or ordinances that apply to the intended use of the generator.

Consult a qualified electrician, electrical inspector, or the local agency having jurisdiction:

- In some areas, generators are required to be registered with local utility companies.
- If the generator is used at a construction site, there may be additional regulations which must be observed.

Connecting the Generator to a Building Electrical System

When connecting directly to a building electrical system, it is recommended that a manual transfer switch be used. Connections for a portable generator to a building electrical system must be made by a qualified electrician and in strict compliance with all national and local electrical codes and laws.

Know Generator Limits

Overloading a generator can result in damage to the generator and connected electrical devices. Observe the following to prevent overload:

- Add up the total wattage of all electrical devices to be connected at one time. This total should NOT be greater than the generator's wattage capacity.
- The rated wattage of lights can be taken from light bulbs. The rated wattage of tools, appliances, and motors can be found on a data label or decal affixed to the device.
- If the appliance, tool, or motor doesn't give wattage, multiply volts times ampere rating to determine watts (volts x amps = watts).
- Some electric motors, such as induction types, require about three times more watts of power for starting than for running. This surge of power lasts only a few seconds when starting such motors. Make sure to allow for high starting wattage when selecting electrical devices to connect to the generator:

1. Figure the watts needed to start the largest motor.
2. Add to that figure the running watts of all other connected loads.

The Wattage Reference Guide is provided to assist in determining how many items the generator can operate at one time.

NOTE: All figures are approximate. See data label on appliance for wattage requirements.

Table 3. Wattage Reference Guide

Device	Running Watts
*Air Conditioner (12,000 Btu)	1700
*Air Conditioner (24,000 Btu)	3800
*Air Conditioner (40,000 Btu)	6000
Battery Charger (20 Amp)	500
Belt Sander (3")	1000
Chain Saw	1200
Circular Saw (6-1/2")	800 to 1000
*Clothes Dryer (Electric)	5750
*Clothes Dryer (Gas)	700
*Clothes Washer	1150
Coffee Maker	1750
*Compressor (1 HP)	2000
*Compressor (3/4 HP)	1800
*Compressor (1/2 HP)	1400
Curling Iron	700
*Dehumidifier	650
Disc Sander (9")	1200
Edge Trimmer	500
Electric Blanket	400
Electric Nail Gun	1200
Electric Range (per element)	1500
Electric Skillet	1250
*Freezer	700
*Furnace Fan (3/5 HP)	875
*Garage Door Opener	500 to 750
Hair Dryer	1200
Hand Drill	250 to 1100
Hedge Trimmer	450
Impact Wrench	500
Iron	1200
*Jet Pump	800
Lawn Mower	1200
Light Bulb	100
Microwave Oven	700 to 1000
*Milk Cooler	1100
Oil Burner on Furnace	300
Oil Fired Space Heater (140,000 Btu)	400
Oil Fired Space Heater (85,000 Btu)	225
Oil Fired Space Heater (30,000 Btu)	150
*Paint Sprayer, Airless (1/3 HP)	600
Paint Sprayer, Airless (hand-held)	150
Radio	50 to 200
*Refrigerator	700
Slow Cooker	200
*Submersible Pump (1-1/2 HP)	2800
*Submersible Pump (1 HP)	2000
*Submersible Pump (1/2 HP)	1500
*Sump Pump	800 to 1050
*Table Saw (10")	1750 to 2000
Television	200 to 500
Toaster	1000 to 1650
Weed Trimmer	500
* Allow 3 times the listed watts for starting these devices.	

Transporting/Tipping of the Unit

Do not operate, store or transport the unit at an angle greater than 15 degrees.

Starting Pull Start Engines

⚠WARNING

Recoil Hazard. Recoil could retract unexpectedly. Kickback could result in death or serious injury.

(000183)

⚠CAUTION

Equipment and property damage. Disconnect electrical loads prior to starting or stopping unit. Failure to do so could result in equipment and property damage.

(000136)

1. Unplug all electrical loads from the unit's receptacles before starting engine.
2. Place generator on a level surface.
3. Turn main breaker switch Off (A). See ***Figure 3-2***.
4. Turn fuel valve On (B). See ***Figure 3-2***.

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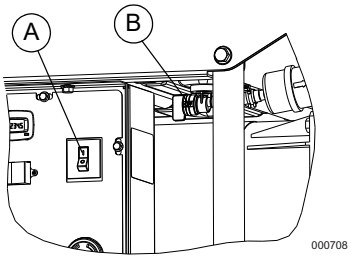

Figure 3-2.Main Breaker Switch and Fuel On/Off Valve

5. See ***Figure 3-3***. Switch engine control lever to Run (B).

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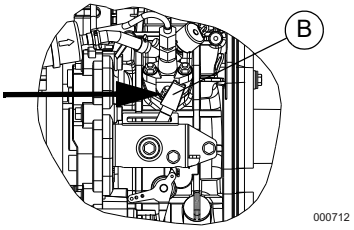

Figure 3-3.Engine Control Lever

6. See ***Figure 3-4***. Press control panel engine Run/Stop switch to Run (C).
7. Squeeze primer bulb 5-10 times until firm. The fuel filter should show fuel level at least half full.
8. Firmly grasp recoil handle and pull slowly until increased resistance is felt. Flip red decompression lever on top of engine. Pull rapidly up and away.
   – Repeat this procedure until the engine starts. If the engine does not start within 5 pulls, confirm steps 1-6 and perform step 7 again.

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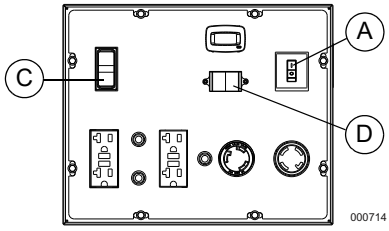


Figure 3-4.Engine Run/Stop Switch

1. Allow engine to run for at least 10 seconds, then turn main breaker On (A). See ***Figure 3-2*** or ***Figure 3-4***.
2. Select voltage rating with voltage selector (D). See ***Figure 3-4***.

IMPORTANT NOTE: Do not overload the generator. Also, do not overload individual panel receptacles. These outlets are protected against overload with push-to-reset type circuit breakers. If amperage rating of any circuit breaker is exceeded, that breaker opens and electrical output to that receptacle is lost. Read *Know Generator Limits* carefully.

Starting Electric Start Engines

⚠CAUTION

Equipment and property damage. Disconnect electrical loads prior to starting or stopping unit. Failure to do so could result in equipment and property damage.

(000136)

1. Turn main breaker switch to Off (A). See ***Figure 3-2*** or ***Figure 3-4***.
2. Unplug all electrical loads from the unit's receptacles before starting engine.
3. Place generator on a level surface.
4. Turn fuel valve On (A). See ***Figure 3-2***.
5. See ***Figure 3-3***. Switch engine control lever to Run (B).
6. Squeeze primer bulb 5-10 times until firm. The fuel filter should show fuel level at least half full.
7. Press and hold the Engine Start switch (C) until engine starts. See ***Figure 3-4***. Release Engine Start switch if engine does not start within 5 seconds. If engine does not start within 5 seconds, review start-up procedure again before attempting start. If problems persist, refer to ***Troubleshooting***.
8. Turn Main Breaker to On.
9. Select voltage rating with Voltage Selector (D).

Generator Shut Down

⚠CAUTION

Equipment and property damage. Disconnect electrical loads prior to starting or stopping unit. Failure to do so could result in equipment and property damage.

(000136)

1. Turn main breaker switch Off.
2. Switch engine start switch to Off.
3. Turn fuel valve Off.

Emergency Shutdown Procedure

1. Press down on small red lever on lower engine controls (near recoil handle and dipstick) to the Stop position.
2. Turn main breaker switch Off.
3. Switch engine start switch to Off.
4. Turn fuel valve Off.

To re-start engine, the engine control lever must be moved to Run (B). See ***Figure 3-3***.

Low Oil Pressure Switch

The engine is equipped with a low oil pressure switch that shuts down the engine automatically when the oil level drops below a specified level. The engine will not run until the oil has been filled to the proper level.

If the engine shuts down and there is sufficient fuel, check engine oil level.

Maintenance

Regular maintenance will improve performance and extend engine/equipment life.

Maintenance Schedule

Follow maintenance schedule intervals, whichever occurs first according to use.

NOTE: Adverse conditions will require more frequent service.

NOTE: All required service and adjustments should be each season as detailed in the following chart.

At Each Use
Check engine oil level
Every Season
Check valve clearance***
Every 200 Hours or Every Season
Inspect/clean air cleaner filter**
Change oil and oil filter ‡*
Check engine speed control
Drain fuel tank & replace outlet fuel filter
Every 1000 Hours
Check compression
Every 1500 Hours
Inspect, clean & test fuel injection nozzle
Every 2000 Hours
Check & replace fuel hoses

‡ Change oil after first 50 hours of operation, then every season.
* Change oil and oil filter every month when operating under heavy load or in high temperatures.
** Clean more often under dirty or dusty operating conditions. Replace air filter parts if they cannot be adequately cleaned.
*** Check valve clearance and adjust if necessary after first 50 hours of operation and every 400 hours thereafter.

Preventive Maintenance

Dirt or debris can cause improper operation and equipment damage. Clean generator daily or before each use. Keep area around and behind muffler free from combustible debris. Inspect all cooling air openings on generator.

⚠WARNING

Personal injury. Do not insert any object through the air cooling slots. Generator can start at any time and could result in death, serious injury, and unit damage.

(000142a)

- Use a damp cloth to wipe exterior surfaces clean.
- Use a soft bristle brush to loosen caked on dirt, oil, etc.
- Use a vacuum to pick up loose dirt and debris.
- Low pressure air (not to exceed 25 psi [172 kPa]) may be used to blow away dirt. Inspect cooling air slots and openings on generator. These openings must be kept clean and unobstructed.

NOTE: DO NOT use a garden hose to clean generator. Water can enter engine fuel system and cause problems. If water enters generator through cooling air slots, some water will be retained in voids and crevices of rotor and stator winding insulation. Water and dirt buildup on generator internal windings will decrease insulation resistance of windings.

Engine Maintenance

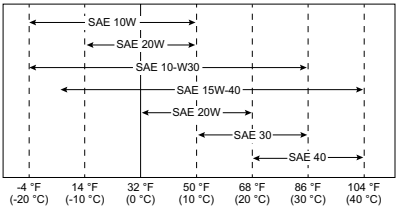
Engine Oil Recommendations

The engine oil should be serviced in accordance with the recommendations of this manual. For your convenience, maintenance kits designed and intended for use on this product are available from the manufacturer that include engine oil, oil filter, air filter, spark plug(s), a shop towel and funnel.

⚠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)



Inspect Engine Oil Level

⚠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)

Inspect engine oil level prior to each use, or every 8 hours of operation.

1. Place generator on a level surface.
2. Clean area around oil fill.
3. See ***Figure 4-1***. Remove oil fill cap and wipe dipstick clean.

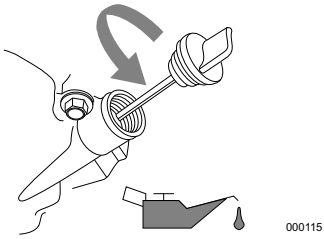


Figure 4-1. Engine Oil Fill

4. Screw dipstick into filler neck. Verify oil level is within safe operating range. See ***Figure 4-2***.

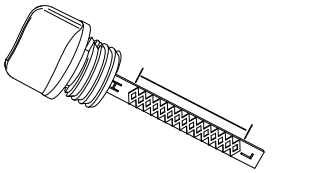


Figure 4-2. Safe Operating Range

5. Add recommended engine oil as necessary.
6. Replace oil fill cap and hand-tighten.

NOTE: Some units have more than one oil fill location. It is only necessary to use one oil fill point.

Change Engine Oil

⚠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)

When using generator under extreme, dirty, dusty conditions, or in extremely hot weather, change oil more frequently.

NOTE: Don't pollute. Conserve resources. Return used oil to collection centers.

Change oil while engine is still warm from running, as follows:

1. Place generator on a level surface.
2. Clean area around oil fill, and oil drain plug.
3. Remove oil fill cap.
4. Remove oil drain plug and drain oil completely into a suitable container.
5. Install oil drain plug and tighten securely.
6. Slowly pour oil into oil fill opening until oil level is between the crosshatch marks on dipstick. DO NOT overfill.
7. Install oil fill cap, and finger tighten.
8. Wipe up any spilled oil.
9. Properly dispose of oil in accordance with all applicable regulations.

Air Filter

Engine will not run properly and may be damaged if run with a dirty air filter. Service air filter more frequently in dirty or dusty conditions.

To service air filter:

1. See ***Figure 4-3***. Turn knob (A) and remove air filter cover.
2. Wash in soapy water. Squeeze filter dry in clean cloth (DO NOT TWIST).
3. Clean air filter cover before re-installing it.

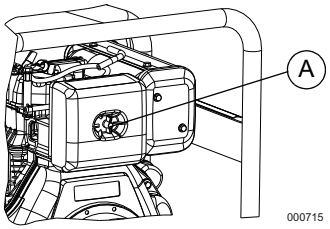


Figure 4-3. Air Filter Assembly

Battery Replacement (if applicable)

NOTE: A battery may lose some charge when not in use for prolonged periods of time.

⚠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)

The following tools are required to replace the battery.

- 7/16” (11mm) ratchet, socket and wrench

See ***Figure 4-4***.

1. Disconnect negative (-) battery terminal FIRST (A).
2. Disconnect positive (+) battery terminal SECOND (B).
3. Loosen wing nuts and remove battery bracket and hardware.
4. Replace battery by following instructions in the ***Battery Installation*** section.

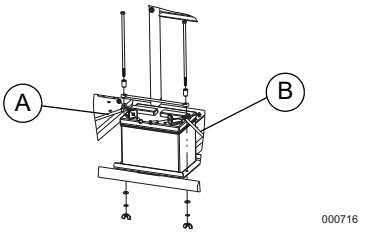


Figure 4-4. Battery Connection

Inspect Muffler and Spark Arrestor (if equipped)

NOTE: It is a violation of California Public Resource Code, Section 4442, to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the exhaust system is equipped with a spark arrestor, as defined in Section 4442, maintained in effective working order. Other states or federal jurisdictions may have similar laws.

Contact original equipment manufacturer, retailer, or dealer to obtain a spark arrestor designed for exhaust system installed on this engine.

NOTE: Use ONLY original equipment replacement parts.

Inspect muffler for cracks, corrosion, or other damage. Remove spark arrestor, if equipped, inspect for damage or carbon blockage. Replace parts as required.

Valve Clearance

Important: Please contact an Independent Authorized Service Dealer for service assistance. Proper valve clearance is essential for prolonging the life of the engine.

Storage

General

⚠DANGER

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

(000143)

⚠WARNING

Risk of Fire. Verify machine has properly cooled before installing cover and storing machine. Hot surfaces could result in fire.

(000109)

It is recommended to start and run the generator for 30 minutes, every 30 days. If this is not possible, refer to the following list to prepare unit for storage.

- DO NOT place a storage cover on a hot generator. Allow unit to cool to room temperature before storage.
- DO NOT store fuel from one season to another unless properly treated.
- Replace fuel container if rust is present. Rust in fuel will cause fuel system problems.
- Cover unit with a suitable protective, moisture resistant cover.
- Store unit in a clean and dry area.
- Always store generator and fuel away from heat and ignition sources.

Prepare Fuel System for Storage

⚠WARNING

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

(000181)

Recoil Start

1. Push and hold decompression down and slowly pull recoil starter 2 to 3 times. Do not start engine.
2. Pull decompression lever up. Pull recoil slowly until resistance is felt. This will close valves so moisture cannot enter engine cylinder. Gently release recoil.

Electric Start

1. Push and hold decompression lever down.
2. Push Start/Run/Stop switch to turn the engine for 2 to 3 seconds. Do not start engine.
3. Pull decompression lever up. Pull recoil slowly until resistance is felt. This will close valves so moisture cannot enter engine cylinder. Gently release recoil.
4. Completely drain fuel tank or completely fill fuel tank to proper level.

NOTE: Always treat diesel fuel for long term storage. Use the approved fuel additive and water abatement material. Test stored fuel every 90 days and provide additional treatment if required. Periodically check and dry abatement material as necessary.

Change Oil

Change engine oil before storage. See ***Change Engine Oil***

Return Engine to Service

1. Refer to the ***Before Starting Engine*** section.
2. Start engine and run at no load for 5 to 10 minutes while checking:
   - oil pressure
   - fuel, engine oil or coolant leaks
   - proper operation of indicators/gauges

NOTE: Avoid prolonged operation at minimum or maximum engine speeds and loads for the first hour of operation.

Troubleshooting

PROBLEM	CAUSE	CORRECTION
Engine is running, but AC output is not available.	1. Circuit breaker OPEN. 2. Poor connection or defective cord set. 3. Connected device is bad. 4. Fault in generator. 5. Main breaker switch is OFF. 6. Voltage selector switch is OFF. 7. Generator is overloaded. 8. GFCI outlet has tripped.	1. Reset circuit breaker. 2. Check and repair. 3. Connect another device that is in good condition. 4. Contact Authorized Service Dealer. 5. Switch main breaker ON. 6. Switch voltage selector switch to desired voltage output. 7. See ***Know Generator Limits*** 8. Correct ground fault in circuit and reset GFCI.
Engine runs well at no-load, but bogs when load is applied.	1. Short circuit in a connected load. 2. Generator is overloaded. 3. Engine speed is too slow. 4. Shorted generator circuit.	1. Disconnect shorted electrical load. 2. See ***Know Generator Limits*** 3. Contact Authorized Service Dealer. 4. Contact Authorized Service Dealer.

PROBLEM	CAUSE	CORRECTION
Engine will not start; or starts and runs rough.	1. Incorrect start sequence. 2. Fuel valve is OFF. 3. Dirty air filter. 4. Out of fuel. 5. Stale or contaminated fuel. 6. Low oil level. 7. Excessive rich fuel mixture. 8. Dirty fuel filter. 9. Air in fuel system. 10. Engine is under electrical load. 11. Battery not installed. 12. Battery weak or dead.	1. Review & follow starting procedure. 2. Turn fuel valve ON. 3. Clean or replace air filter. 4. Fill fuel tank. 5. Drain fuel tank and fill with fresh fuel. 6. Fill crankcase to correct level. 7. Contact Authorized Service Dealer. 8. Replace fuel filter. 9. Repeat priming procedure. If no start condition persists Contact Authorized Service Dealer. 10. Remove all equipment from receptacles. Make sure the main breaker switch is OFF. 11. Install battery. 12. Charge or replace battery.
Engine shuts down during operation.	1. Out of fuel. 2. Low oil level. 3. Fault in engine. 4. Ambient temp too high. 5. Battery weak or dead.	1. Fill fuel tank. Prime fuel system. See ***Starting Pull Start Engines*** or ***Starting Electric Start Engines*** 2. Fill crankcase to correct level. 3. Contact Authorized Service Dealer. 4. Move unit to cooler location and allow engine to cool before running again. 5. Charge or replace battery.
Engine lacks power.	1. Load is too high. 2. Dirty air filter. 3. Engine needs to be serviced. 4. Excessive valve lash. 5. Dirty fuel filter. 6. Fuel injector clogged.	1. Reduce load. See ***Know Generator Limits*** 2. Clean or replace air filter. 3. Contact Authorized Service Dealer. 4. Contact Authorized Service Dealer. 5. Replace fuel filter. 6. Contact Authorized Service Dealer.
Engine surges or stumbles.	1. Governor/throttle assembly is not adjusted properly. 2. Air in fuel system. 3. Battery weak or dead.	1. Contact Authorized Service Dealer. 2. Contact Authorized Service Dealer. 3. Charge or replace battery.

Notes

USE AND CARE

Unauthorized modification may impair the function and/or safety of this device and could affect the life of the equipment. Always check for damaged or worn out parts before using the device. Store it in a secure place out of the reach of children when not in use. Inspect for good working condition prior to storage and before re-use.

REPLACEMENT PARTS

The generator is designed to provide years of reliable performance. Should the need for replacement parts arise, please contact Larson Electronics.

THESE INSTRUCTIONS MAY NOT COVER ALL DETAILS OR VARIATIONS OF THIS PRODUCT FOR YOUR EQUIPMENT OR INSTALLATION REQUIREMENTS. SHOULD FURTHER INFORMATION NOT COVERED BY THESE INSTRUCTIONS BE REQUIRED, PLEASE CONTACT LARSON ELECTRONICS BY EMAIL AT SALES@LARSONELECTRONICS.COM OR BY PHONE AT 1-877-348-9680 FOR FURTHER ASSISTANCE.

PLEASE VISIT LARSONELECTRONICS.COM FOR **WARRANTY** AND **RETURN** INFORMATION.