

# Towable Generators and Light Tower

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(Diesel Liquid Cooled)

TG8LT TG10T, 15T, 20T and 25T

**Installation & Operating Manual** 

Any trademarks used in this manual are the property of their respective owners.

## WARNING: CALIFORNIA PROPOSITION 65 WARNING:

Engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

## WARNING:

## **CALIFORNIA PROPOSITION 65 WARNING:**

Battery posts, terminals and related accessories are known to the state of California to cause cancer, birth defects and other reproductive harm.

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# Safety Notice Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury. Always disconnect all electrical loads before starting the equipment.

Installation and repair procedures require specialized skills with electrical generating equipment and liquid cooled engine systems. Any person that installs or repairs this equipment must have these specialized skills to ensure that this generating unit is safe to operate. Seek expert advise for repairs or any questions you may have about the safe installation and operation. The precaution statements are general guidelines for the safe use and operation of this equipment. It is not practical to list all unsafe conditions. Therefore, if you use a procedure that is not recommended in this manual you must determine if it is safe for the operator and all personnel in the proximity to the equipment and connected loads. If there is any question of the safety of a procedure please seek expert advise before starting or stopping the equipment. This equipment contains high voltages. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment. This equipment may be connected to other machines that have rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.

- System documentation must be available to anyone that operates this equipment at all times.
- Keep non-qualified personnel at a safe distance from this equipment.
- Only qualified personnel familiar with the safe installation, operation and maintenance of this device should attempt start-up or operating procedures.
- Always stop engine before making or removing any connections.
- Always stop engine and allow it to cool before refueling.
- **Responsibility** When your equipment is delivered, it becomes the responsibility of the owner/operator to prevent unsafe conditions and operation of the equipment. Some responsibilities include (but are not limited to) the following:
  - 1. It is the responsibility of the owner/operator to ensure that this equipment is correctly and safely installed.
  - 2. It is the responsibility of the owner/operator to ensure that this equipment, when installed fully complies with all federal, state and local codes.
  - 3. It is the responsibility of the owner/operator to ensure that any person operating this equipment has been properly trained.
  - 4. It is the responsibility of the owner/operator to ensure that any person operating this equipment has access to all manuals and information required for the safe use and operation of this equipment.
  - 5. It is the responsibility of the owner/operator to ensure that it is properly maintained and safety inspected at regular scheduled intervals.
  - 6. It is the responsibility of the owner/operator to ensure that any person who has not been trained on the safe use of this equipment does not have access to this equipment.

#### **Read This Manual Thoroughly**

If you do not understand any concept, any procedure, any safety warning statement, any safety caution statement or any portion of this manual, seek expert advise. Make sure you understand the information in this manual so that you can safely enjoy the full use of this equipment.

#### Symbols

This symbol is shown throughout the manual to indicate a connection to ground reference point.

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

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

#### Precaution Statements Used In This Manual

There are three classifications of precautionary statements used in this manual. The most critical is a **WARNING** statement, then the **Caution** statement and the least critical is the Note statement. The usage of each statement is as follows:

- WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.
- Caution: Indicates a potentially hazardous situation which, if not avoided, could result in damage to property.
- Note: Additional information that is not critical to the installation or operation.

#### **IMPORTANT SAFETY INSTRUCTIONS**

**SAVE THESE INSTRUCTIONS** – This manual contains important instructions for the equipment that should be followed during installation, operation and maintenance of this equipment. For ease of reading, the Warning statements are divided into four categories: Operation, Burn, Installation, and Maintenance.

#### **Operation Statements**

- WARNING: If the trailer is not properly secured to the tow vehicles tow hitch, the trailer may separate from the tow vehicle and cause severe injury or property damage. Always ensure that the tow hitch and trailer tongue are properly connected, in good working condition and that safety chains are properly connected from the trailer to the tow vehicle.
- WARNING: Never allow a person to ride in or on a trailer that is being towed. All states prohibit passengers in towed vehicles. A person can fall off and be struck by another vehicle or run over by the towed trailer. Failure to observe this warning can result in death.
- WARNING: Before using a tow vehicle, verify that the vehicle is designed for the load. Using a vehicle that is too small is very dangerous. Be certain that it can handle the M.G.V.W. (Maximum Gross Vehicle Weight) and the tongue weight for safe towing and braking.
- WARNING: For a new trailer, the wheel lug nuts should be tightened to the proper torque specification before use, after 50 miles of operation and every 100 miles of operation thereafter. Failure to check the lug nuts for proper tightness can result in an accident due to a wheel falling from the trailer.
- WARNING: Never operate a trailer or tow vehicle that has a loose, missing or broken lug nut. The trailer is designed for safe operation with all lug nuts installed and all at the proper torque rating. Operating the trailer with one or more broken or missing lug nuts greatly increases the load on the remaining nuts and can cause failure of the remaining nuts that can result in an accident due to a wheel falling from the trailer.
- WARNING: Never operate this equipment in a manner other than as described in this manual. Operation in any manner not described in this manual should be considered unsafe and should not be attempted. Never start the engine unless you have first verified that the installation and operation of the equipment are as described in this manual.
- WARNING: Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury.
- WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.
- WARNING: When operating this equipment remain alert at all times. Never operate machinery when physically or mentally fatigued, or while under the influence of alcohol, drugs or medication.

**Operation Statements** Continued

- WARNING: Gasoline and diesel fuel are flammable and can cause fire, explosions, injury or death. For storage or refueling handle fuel with care and only in clean, approved, properly marked safety fuel containers.
- WARNING: Do not overfill the fuel tank. Only fill the tank to within 1/2'' of the top of the tank to allow space for fuel expansion. Overfilling of tank may cause fuel to spill out onto engine and cause fire or explosion.
- WARNING: Clean up fuel spills by wiping completely dry before starting engine. Gasoline and diesel fuel are flammable and can cause fire, explosions, injury or death.
- WARNING: Make sure the fuel cap is completely and securely closed after refueling to prevent spillage. Gasoline and diesel fuel are flammable and can cause fire, explosions, injury or death.
- WARNING: Over crank indication can mean a loss of crank disconnect signal during the previous run period. Attempting to restart the engine with no crank disconnect signal can destroy the starter motor, which can cause serious personal injury.
- WARNING: Hot exhaust gasses must never be directed toward anything that may catch fire or explode.
- WARNING: Never operate this equipment indoors or in a poorly ventilated area such as a tunnel or cave. Exhaust fumes are extremely dangerous to all personnel that are in or in contact with that area.
- WARNING: Keep equipment at least three feet away from buildings and other structures.
- WARNING: Keep equipment away from flammable or hazardous materials (trash, rags, lubricants, explosives, paints etc.) and grass or leaf build up.
- WARNING: Some parts of this equipment rotate during operation. Rotating parts can present extreme danger if clothing or body extremities are caught by the rotating part and can cause serious or fatal injury. Never touch a part of the equipment until the engine has been stopped and all rotating parts are completely stopped. Also, disconnect the battery terminals to prevent accidental engine rotation during servicing.
- WARNING: Never move equipment set that is running. Loads should be connected and position secure before starting the engine. Hazards are caused by moving equipment that is running.
- WARNING: Never connect or disconnect loads during operation. Always connect load circuits before starting the engine and use external branch disconnects etc. to switch loads On/Off.
- WARNING: High voltage is present whenever engine is running. Electrical shock can cause serious or fatal injury. Never operate electrical equipment while standing in water, on wet ground or with wet hands, feet or shoes or while barefoot.
- WARNING: High voltage is present whenever the engine is running. Electrical shock can cause serious or fatal injury. Always stop engine before connecting or disconnecting power cords or external devices.
- WARNING: Be sure that you understand how to stop the engine quickly in case of an emergency situation. Become familiar with the controls and safety systems provided with this equipment.
- WARNING: Always wear safety glasses with side shields and hearing protection when working near the equipment.
- WARNING: Improper operation may cause violent motion of connected equipment. Be certain that unexpected movement will not cause injury to personnel or damage to equipment.
- WARNING: Never permit anyone to operate the equipment without proper instructions. Be sure to keep a copy of this manual with the equipment so that all users can be properly informed of its safe operation.
- WARNING: Never allow children or pets to be in the area where the equipment is running. The equipment and the equipment being powered may cause injury or death.
- WARNING: Never operate the equipment unless all guards, covers, shields and other safety items are properly installed.
- WARNING: Do not put hands, feet, tools clothing or other objects near rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.
- WARNING: Never operate the engine when the air cleaner is removed. An engine backfire can cause serious burns.

**Operation Statements** Continued

- WARNING: Never "jump start" equipment to start the engine. If the battery charge is insufficient to start the engine, charge or replace the battery and try to restart. Jump starting a battery can cause the battery to explode and cause severe injury or death to anyone in the area.
- WARNING: Do not smoke near equipment during operation or when close to fuel source. Gasoline and diesel fuel are flammable and can cause fire, explosions, injury or death.
- WARNING: Keep a fire extinguisher near the equipment while in use. An extinguisher rated "ABC" by the National Fire Protection Association is appropriate.

#### **Operation Statements – Light Tower**

- WARNING: Never stand under or close to an object that is being hoisted or lift into position. Accidents happen and if the object falls or tips over you or someone else could be crushed by the weight of the object causing severe injury or death to yourself or others. Always remain a safe distance from the object and always wear protective head gear (hard hat).
- WARNING: When erecting or stowing the mast assembly, be aware of the pinch points such as where the tower structures join or where the cable and winch are located. Careless operation can result in injury. Keep extremities away from moving parts to avoid injury.
- WARNING: Before erecting the mast assembly, be certain that the outriggers are properly set to stabilize the light tower and that they are secure and are not damaged. Erecting the mast without setting the outriggers can cause the light tower to tip over when raising the mast.
- WARNING: Before erecting the mast assembly, be certain that there are no overhead wires. Contact with overhead wiring presents an electrical shock hazard that may cause severe injury or death.
- WARNING: Before erecting the mast assembly, be certain that there are no overhead obstructions that the mast will hit when raising it. Hitting an object (tree limb etc.) may damage the mast or cause the light tower to tip over and may result in injury or property damage.
- WARNING: The mast assembly must remain in the stowed position until the outriggers are properly set to stabilize the trailer . Erecting the mast without setting the outriggers can cause the light tower set to tip over when raising the mast.
- WARNING: Never attempt to move the light tower when the mast is in the vertical position. All Outrigger and trailer jacks must remain in position and the trailer level until the mast is in its' stowed position. Failure to follow this warning may result in severe injury and property damage if the trailer tips over.
- WARNING: Never move or reposition a light tower when the mast is extended or in the vertical position. Unless the mast is in its stowed position, it may contact overhead wires or cause the light tower to be unbalanced or tip over.

#### Burn Statements

- WARNING: Parts of this equipment are extremely hot during and after operation. To prevent severe burns, do not touch any part of the equipment until you have first determined if the part is hot. Wear protective clothing and after use allow sufficient time for parts to cool before touching any part of the equipment.
- WARNING: Do not touch the hot exhaust parts. In addition to a severe burn, the sudden involuntary jerk of the hand or body part caused by contact with high voltage or a hot surface can result in injury to yourself or others.
- WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

#### Burn Statements – Light Tower

WARNING: Light fixtures become extremely hot during use. To prevent severe burns, do not touch light fixtures, bulbs or other components until they have cooled and no longer present a burn hazard. Wear protective clothing when placing the tower in the stowed position after use and do not allow any person to touch the light fixtures.

#### Installation Statements

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Installation Statements Continued

- WARNING: Installation and repair procedures requires specialized skills with electrical generating equipment and small engine systems. Any person that installs or performs repairs must have these specialized skills to ensure that the equipment set is safe to operate. Seek expert advise for installation or repairs.
- WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of equipment systems.
- Warning: Do not connect the equipment output neutral to the frame or local ground. The equipment output is isolated from ground. NEC and local codes require that the equipment output remain isolated from local ground reference.
- WARNING: Place protective covers over all rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.
- WARNING: Unauthorized modification of equipment may make the unit unsafe for operation or may impair the operation of the unit. Never start equipment that has been modified or tampered with. Be sure that all covers and guards are properly installed and that the unit is safe before starting the engine. If you are unsure, seek expert advise before starting the engine.
- WARNING: When moving this equipment, use reasonable caution. Be careful where you place fingers and toes to prevent injury "Pinch Points". Never try to lift the equipment without a hoist or lift means because they are heavy and bodily injury may result.
- Warning: Never connect this equipment to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a equipment to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the equipment is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.
- WARNING: Circuit overload protection must be provided in accordance with the National Electrical Code and local regulations.
- WARNING: Check Ground Fault Circuit Interrupt (GFCI) receptacles monthly by using the "Test" and "Reset" buttons.
- WARNING: Have electrical circuits and wiring installed and checked by licensed electrician or qualified technician. Electrical shock can cause serious or fatal injury.

Maintenance Statements

- WARNING: Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.
- WARNING: Before servicing the equipment, be sure to disconnect the battery terminals to prevent accidental engine rotation or starting.
- WARNING: Before cleaning, inspecting, repairing or performing any maintenance to the equipment, always be sure the engine has stopped and that all rotating parts have also stopped. After stopping, certain components are still extremely hot so be careful not to get burned.
- WARNING: Before servicing the equipment, be sure to disconnect the glow plugs or spark plug wires and the battery terminals to prevent accidental engine rotation or starting.
- WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.
- WARNING: Inspect all wiring frequently and replace any damaged, broken or frayed wiring or wires with damaged insulation immediately. Electrical shock can cause serious or fatal injury.
- WARNING: Disconnect all electrical wires and load devices from equipment power outlets before servicing the equipment. Electrical shock can cause serious or fatal injury. Always treat electrical circuits as if they are energized.

#### Maintenance Statements Continued

- WARNING: A battery presents a risk of fire and explosion because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery.
- WARNING: Do not mutilate the battery or dispose of a battery in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.
- WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. If electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water. If electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.
- WARNING: A battery presents a risk of electrical shock hazard and high short circuit current. Electrical shock can cause serious or fatal injury. Never wear jewelry, watch or any metal objects when in the area around the battery.
- WARNING: Check fuel tank, fuel line, and connections monthly for fuel leaks. Diesel is flammable and can cause fire, explosions, injury or death. If a leak is found, replace only with approved pipe or components.

#### **Caution Statements**

- Caution: Avoid installing the equipment beside heat generating equipment, or directly below water or steam pipes or in the vicinity of corrosive substances or vapors, metal particles and dust. Heat can cause engine problems to develop and unwanted substances can cause rust or equipment failure over time.
- Caution: Do not apply high voltage to windings (do not start the equipment) in a moisture-saturated condition. Moisture can cause insulation breakdown, making it necessary to repair the equipment and consequent expense and loss of time.
- Caution: Use only original equipment or authorized replacement parts. Using the correct parts will assure continued safe operation as designed.
- Caution: Do not support the equipment from the top of the frame or enclosure.
- Caution: Do not tamper with or change the engine speed. Engine speed is factory set to produce the correct voltage and output frequency.
- Caution: Never operate the engine without a muffler. The engine is designed to have the correct exhaust components installed and operating without these components can present a fire hazard, cause excessive exhaust gases and cause damage to engine. Inspect muffler periodically and replace if necessary.
- Caution: The Programmable Output Contacts selection must agree with the external control wiring prior to energizing the controller. Failure to do so may cause severe equipment damage.
- Caution: If a dead battery is suspected, remove the controller fuse, charge battery (or replace), and then attempt starting. Damage to engine control may result from jump starting.
- Caution: This equipment must have a battery installed for operation. The battery is used during starting and during operation. If engine operation is attempted while the battery is removed, damage to the engine's electrical components may result.

#### Caution Statements - Light Tower

- Caution: Never start the engine with any of the lights on, or with any electrical load connected, as damage to the light tower may result.
- Caution: Careless handling or storage of the light fixtures can damage the fixtures, lenses, and/or bulbs.
- Caution: Do not operate preheat for more than 30 seconds or the heating element may be damaged.
- Caution: Do not engage the starter motor for more than 60 seconds at a time or damage may result.
- Caution: Before towing, be sure that the mast, jack and outriggers are properly and securely stowed for travel to prevent trailer damage. Also be sure that all enclosure doors are closed and locked.
- Caution: Operate the light tower only on a level surface. Operation of the light tower on an incline or slope may degrade engine lubrication and result in engine failure.

Thank you for purchasing your Baldor Generator Set/Light Tower. This manual contains information you need to safely and efficiently install and operate your equipment. During the preparation of this manual every effort was made to ensure the accuracy of its contents. This manual describes only very basic engine information. A separate owner's manual for the engine is supplied with this unit for your use. Please refer to the engine manual for information relative to engine operation, maintenance, recommendations and additional safety warnings.

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Baldor Generators have earned the reputation of being high quality and dependable. We take pride in this fact and continue to keep our quality standards high on our list of priorities. We are also constantly researching new technological ideas to determine if they could be used to make our Generator Sets/Light Towers even better.

Baldor makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of fitness for any particular purpose. The information in this document is subject to change without notice. Baldor assumes no responsibility for any errors that may appear in this document.

#### Limited Warranty

www.baldor.com/support/warranty\_generators.asp

**<u>Receiving & Inspection</u>** When you receive your equipment, there are several things you should do immediately.

- 1. Observe the condition of the equipment and report any damage immediately to the carrier that delivered your system.
- 2. Verify that the part number of the system you received is the same as the part number listed on your purchase order.
- 3. If the system is to be stored for several weeks before use, be sure that it is stored in a location that conforms to published storage temperature and humidity specifications.
- Lifting the Equipment When lift or hoist equipment is used to lift the equipment and move it to position, be careful not to contact overhead wires or other obstacles. Be sure lift or hoist equipment has appropriate tires for the terrain to avoid becoming stuck or tipping over. The lift slots are designed for use with a fork lift. A spreader bar and chains (see Figure 3-1) can also be used.

Light Tower Installation The light tower is delivered completely assembled, tested and ready for use. No assembly is required. However, before putting the light tower to use the system should be completely checked to ensure it is ready for operation. See Figure 3-1.

The light tower has six major systems that will be checked individually before use, these are:

- 1. Trailer
- 2. Engine/Generator
- 3. Trailer Stabilization System
- 4. Light Mast
- 5. Light Fixtures
- 6. Electrical Systems



#### Table 3-1 Towable Dimensions

Light Tower	A Height (in)	B Length (in)	C Width (in)	Approx. Shipping Weight (lbs)
TG8LT	71	158	54	1350

#### Light Tower Checks

**Trailer Stabilization Checks** Consists of 2 rear mounted outrigger assemblies and the jack on the trailer tongue.

- 1. Verify that the jack rotates and locks into position.
- 2. Ensure that all bolts, nuts and other hardware are tight and not missing.
- 3. Verify that the rear outriggers extend and rotate into position.
- 4. Ensure that the lock mechanisms operate correctly.

Light Mast Checks A 4 section 30 foot mast can be rotated 360 degrees.

- 1. Ensure that all bolts, nuts and other hardware are tight and not missing.
- 2. Verify that the cables for Tilt and Lift winches are not frayed or damaged.
- 3. Verify that the Tilt and Lift winches are not damaged.
- 4. Verify that the Tilt Lock and Mast Lock hardware is present and not damaged.

#### **Light Fixtures Checks**

- 1. Ensure that all bolts, nuts and other hardware are tight and not missing.
- 2. Verify that the electrical cables are not frayed or damaged.
- 3. Verify that the light bulbs, covers and other hardware are not damaged.

#### **Electrical Systems Checks**

Verify that the wiring cables, switches etc. are not damaged.

<u>Generator Installation</u> The generator is delivered completely assembled, tested and ready for use. No assembly is required. See Figure 3-2.







Generator	A Height (in)	B Length (in)	C Width (in)	Approx. Shipping Weight (lbs)
TG10T	57	114	54	1200
TG15T	57	114	54	1400
TG20T	57	121	54	1550
TG25T	57	121	54	1650

#### Equipment Checks

These checks should be performed before first service, after 25 hours of operation and every 100 operating hours thereafter.

Trailer Checks Single axle trailer with leaf springs and two tires.

- 1. Verify that the hitch mechanism on the trailer opens and closes freely and is securely fastened to the trailer tongue.
- 2. Verify that the safety chains are securely fastened to the trailer tongue.
- 3. Verify that the trailer lighting connector and harness are present and are not damaged (see Figure 3-5).
- 4. Verify that trailer lights are not broken or damaged.
- 5. Verify that the trailer tires are properly inflated (32 psi).
- 6. Verify that the lug nuts for each wheel are properly torqued to 90 lb-ft.
- 7. Verify that the enclosure is securely fastened to the trailer frame.

Ensure that all bolts, nuts and other hardware are tight and not missing.

Engine/Generator Checks Liquid cooled diesel engine.

- 1. Refer to the engine manual for maintenance check procedures to ensure all fluid levels are correct before each use.
- 2. Verify that electrical receptacles, switches and circuit breakers are not damaged.
- 3. Ensure switches and breakers are in the Off position before engine starting.

**Electrical Connections** Class 1 wiring methods must be used for field wiring connections to terminals of a class 2 circuit. It is the responsibility of the owner/operator to arrange for these procedures to be performed by a licensed electrical contractor and ensure conformance to all applicable codes including local codes peculiar to your municipality/city/county and state. Wire size and insulation type should be as required by NEC (National Electrical Code) and local codes.

WARNING: Never connect this equipment to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a generator to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the unit is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.

**Electrical Outlets** All receptacles may be used at the same time provided the total electrical load does not exceed the generators rated output. GFCI (Ground Fault Circuit Interrupter) provides ground fault protection.

Table 3-3 Recentacies

Receptacle	TG8LT	TG10T	TG15T	TG20T	TG25T
120 Volt 20 Amp Duplex GFCI	1	2	2	2	2
120/240 Volt 30A NEMA L1430R Twist lock	1	2	2	2	2
120/240 Volt 50A CS6369 Twist lock	-	-	1	2	2

Breaker Rating	TG8LT	TG10T	TG15T	TG20T	TG25T
15A	1	1	1	1	1
20A	1	2	2	2	2
30A	2	2	1	2	2
50A	-	-	1	2	2

#### Table 3-4 Circuit Breakers

#### **Frame Ground Connection**

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of light tower systems.

#### **Single Phase Connections**

Single Phase connections are made at load receptacles located near the operator control panel side of the equipment, Figure 3-3.



#### Three Phase Connections (TG25T Only)

Refer to Figure 3-4. For power to be applied to these terminals, the output voltage selector switch must be in the 120/208V or 277/480V positions.



#### Battery Connections

- WARNING: Removal, installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.
- WARNING: Do not mutilate the battery or dispose of a battery in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

# WARNING: A battery presents a risk of electrical shock hazard and high short circuit current. The following precautions are to be followed when working on batteries:

- 1. Remove watches, rings, necklaces and all other metal objects.
- 2. Use tools with insulated handles.
- 3. Wear rubber gloves and boots.

#### WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following precautions are to be followed when working on batteries:

- 1. Wear full eye protection (safety glasses or goggles) and protective clothing.
- 2. Where electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water.
- 3. Where electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.
- 4. Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of one pound (500 grams) bicarbonate of soda to one gallon (four liters) of water. The bicarbonate solution is to be added until evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.

- WARNING: A battery presents a risk of fire because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery. The following precautions are to be followed when working on batteries:
  - 1. Do not smoke when near batteries.
  - 2. Do not cause flame or spark in battery area.
  - 3. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.
- WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidental touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.
- **Procedure:** The correct type battery must be installed in the battery compartment provided. Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions.

Keep unauthorized personnel away from batteries.

- 1. Open access doors and locate battery tray.
- 2. Remove the old battery.
- 3. Install the new battery.
- 4. Connect the positive lead to the positive (+) battery terminal.
- 5. Connect the negative lead to the negative (-) battery terminal.
- 6. Do not lay tools or metal parts on top of batteries.



#### Figure 3-5 Trailer Harness

#### Towing the Equipment

- WARNING: Never allow a person to ride in or on a trailer that is being towed. All states prohibit passengers in towed vehicles. A person can fall off and be struck be another vehicle or run over by the towed trailer. Failure to observe this warning can result in death.
- WARNING: Before using a tow vehicle, verify that the vehicle is designed for the load. Using a vehicle that is too small is very dangerous. Be certain that it can handle the M.G.V.W. (Maximum Gross Vehicle Weight) and the tongue weight for safe towing and braking.
- WARNING: For a new trailer, the wheel lug nuts should be tightened to the proper torque specification before use, after 50 miles of operation, after 100 miles of operation and periodically thereafter. Failure to check the lug nuts for proper tightness can result in an accident due to a wheel falling from the trailer.
- WARNING: Never operate a trailer or tow vehicle that has a loose, missing or broken lug nut. The trailer is designed for safe operation with all lug nuts installed and all at the proper torque rating. Operating the trailer with one or more broken or missing lug nuts greatly increases the load on the remaining nuts and can cause failure of the remaining nuts that can result in an accident due to a wheel falling from the trailer.

#### **Light Tower**

- **Intended Use** The intended purpose of this light tower is to provide portable lighting where main utility power supply is not available. It is not intended to connect to a building's wiring system.
- Protection Single Phase circuit protection is provided within the light tower.
- Light Tower Towing Instructions See Figure 3-1 for component identification.
- Caution: Before towing, be sure that the mast, jack and outriggers are properly and securely stowed for travel to prevent trailer damage. Also be sure that all enclosure doors are closed and locked.
  - 1. Mast must be stowed and locked (mast lock pin installed).
  - 2. If the light fixtures are mounted on the mast, reposition the light fixtures on the stowed mast so the four light glass fronts are tilted away from the objects that may be propelled from the tires during transportation.
  - 3. Ensure that all light fixtures are properly secured to the mast.
  - 4. If outrigger jacks are extended, retract the jacks and rotate rear jacks up 90 degrees and lock into position. Pull Outrigger Locks and slide outriggers in all the way until Outrigger Locks are locked.
  - 5. Shut all doors on the engine compartment housing and latch the locks.
  - 6. Back the tow vehicle to within a few inches of the trailer coupler.
  - 7. Be sure the Coupler Handle is in the "UP" (open) position.
  - 8. Adjust the trailer jack for the height of the ball hitch on the tow vehicle.
  - 9. Back the tow vehicle so the trailer coupler is directly over the tow vehicle ball hitch.
  - 10. Lower the trailer so the trailer coupler rests securely on the ball hitch of the tow vehicle.
  - 11. Move the Coupler Handle to the horizontal position and lock it in place to securely hold the ball hitch of the tow vehicle. If this is not done properly, the trailer may become unhitched when it is towed.
  - 12. Retract the front jack, pull the jack pin and rotate the jack 90 degrees from vertical to the horizontal position, making sure the self-locking pin reseats and the jack is secured to the tow bar (stowed position).
  - 13. Connect safety chains, making sure to cross them. If a safety chain is too long, simply twist it a few turns to shorten the chain before attaching to the tow vehicle.
  - 14. Connect the trailer light connector to the tow vehicle.
  - 15. Test the trailer lights to ensure they are operational.
  - 16. Check tires for proper inflation.
  - Check wheel lug nuts for correct tightness (see Figure 4-1). Wheel nuts/bolts should be torqued before the first road use and after each wheel removal. Check and re-torque after the first 50 miles and again at 100 miles. Check periodically thereafter.
  - 18. Verify that all jacks, outriggers, pins, cables, and light fixtures are in their proper place and/or are secured.
  - 19. Release the trailer wheel parking brake if equipped (optional equipment) and if set.

Light Tower Setup See Figure 3-1 for component identification.

- WARNING: When erecting or stowing the mast assembly, be aware of the pinch points such as where the tower structures join or where the cable and winch are located. Careless operation can result in injury. Keep extremities away from moving parts to avoid injury.
- WARNING: Before erecting the mast assembly, be certain that the outriggers are properly set to stabilize the unit and that they are secure and are not damaged. Erecting the mast without setting the outriggers can cause the unit to tip over when raising the mast.
- WARNING: Before erecting the mast assembly, be certain that there are no overhead wires. Contact with overhead wiring presents an electrical shock hazard that may cause severe injury or death.
- WARNING: Before erecting the mast assembly, be certain that there are no overhead obstructions that the mast will hit when raising it. Hitting an object (tree limb etc.) may damage the mast or cause the unit to tip over and may result in injury or property damage.
- WARNING: Never move or reposition a light tower when the mast is extended or in the vertical position. Unless the mast is in its stowed position, it may contact overhead wires or cause the light tower to be unbalanced or tip over.
  - 1. With the Light Mast in its' stowed position, install or reposition the four light fixtures to the desired placement when the tower is raised.
  - 2. Pull the Mast Lock pin so the mast is no longer secured in the stowed position.
  - 3. Pull the Tilt Lock pin so it is not in the way when the mast is raised.
  - 4. Use the Tilt Winch to raise the mast to the vertical position.
  - 5. Secure the mast in the vertical position by inserting and locking the the Tilt Lock pin. The Tilt Lock pin must be installed and the mast secured in the vertical position before the mast is raised.
  - 6. Use the Lift Winch to raise the mast to the desired height. The winch is self-braking and will lock in place automatically.
  - 7. To rotate the lights to the desired position, loosen the Mast Rotation Lock on the collar of the mast, rotate the mast to the desired position and tighten the Mast Rotation Lock.

The light tower is now setup for operation.

Light Tower Stow Procedure See Figure 3-1 for component identification.

- 1. Use the Lift Winch to lower the light tower to its' lowest vertical position. The mast should come down slowly and smoothly. If slack develops in the cable or the mast "hangs up", stop immediately. Crank the winch in the reverse direction to take up slack in the cable, and determine the cause of the problem if possible. Try to lower the mast again. If the problem persists do not continue, seek expert advise.
- 2. Loosen the Mast Rotation Lock and rotate the light mast so the lights face the rear of the trailer. Tighten the Mast Rotation Lock. (There is an indicator mark on the mast that will line up with the mast bracket indicator when the light fixtures are in the transport position. This allows the mast, when lowered to the horizontal transport mode, to rest on the brackets on the top of the engine compartment.)
- 3. Remove the Mast Lock pin so it will not interfere with the mast when it is tilted.
- 4. Make sure the Tilt Winch cable is tight.
- 5. Remove the Tilt Lock pin.
- 6. Use the Tilt Winch to lower the mast to the horizontal position being careful not to pinch the electrical light cables.
- 7. Install the Mast Lock pin.
- 8. Install the Tilt Lock pin.
- 9. Adjust the light fixtures as needed for transport so the four light glass fronts are tilted away from the objects that may be propelled from the tires during transportation.

The mast is now in the stowed position for transport.

#### Light Tower Setup for Towing

- 1. Adjust the two rear jacks to their shortest length.
- 2. Pull the Jack Lock Pin for the right jack and rotate the jack to the horizontal position. Lock the jack in this position using the Jack Lock Pin.
- 3. Pull the Outrigger Lock for the right jack and push the right outrigger fully in. Lock the outrigger using the Outrigger Lock.
- 4. Repeat steps 2 and 3 for the left outrigger and jack.
- 5. Shut all doors on the engine compartment housing and latch the locks.

The Trailer Outriggers are stowed and should appear as shown in Figure 3-1 left view. Refer to **Towing Instructions** at the beginning of this section to connect the POW'R LITE to the tow vehicle.

#### **Towable Generator**

**Intended Use** The intended purpose of the generator set is to provide electrical power when the main utility power supply is interrupted. Therefore, it is important that all the wiring that connects the generator set with your house, transfer switch, distribution box, battery charger, etc. be properly installed.

**Protection** Circuit protection is provided within the generator. The power output connections are rated and sized according to the kW of the generator. The circuit protection provided will not protect the genset or connected load in case of inadvertent connection to other power sources or power grid.

#### **Generator Towing Instructions**

- 1. Be sure the generator is off.
- 2. Shut all enclosure doors and latch the locks.
- 3. Back the tow vehicle to within a few inches of the trailer coupler (Pintle or Ball).
- 4. Be sure the Coupler Handle is in the "UP" (open) position or the Pintle Hook is Open.
- 5. Adjust the trailer jack for the height of the hitch on the tow vehicle.
- 6. Back the tow vehicle so the trailer coupler is directly over the tow vehicle ball hitch or the Pintle hook.
- Lower the trailer so the trailer coupler rests securely on the ball hitch of the tow vehicle. Move the Coupler Handle to the horizontal position and lock it in place to securely hold the ball hitch of the tow vehicle.
   OR
  - Latch the Pintle and lock the Pintle device securely.

Note: If this is not done properly, the trailer may become unhitched when it is towed.

- 8. Retract the front jack, pull the jack pin and rotate the jack 90 degrees from vertical to the horizontal position, making sure the self–locking pin reseats and the jack is secured to the tow bar (stowed position).
- 9. Connect safety chains, making sure to cross them. If a safety chain is too long, simply twist it a few turns to shorten the chain before attaching to the tow vehicle.
- 10. Connect the trailer light connector to the tow vehicle.
- 11. Test the trailer lights to ensure they are operational.
- 12. Check tires for proper inflation.
- Check wheel lug nuts for correct tightness (see Lug Nut Tightness). Wheel nuts/bolts should be torqued before the first road use and after each wheel removal. Check and re-torque after the first 50 miles and again at 100 miles. Check periodically thereafter.
- 14. Verify that all jacks, pins, cables, and doors are secured and trailer tongue is level.
- 15. Remove tire chocks (if used). These prevent the trailer from moving when parked.

Trailer Setup Carefully read all instructions before starting.

- Locate a suitable, level location with no overhead wires or obstructions. The trailer is balanced so the majority of the weight rests on the tow bar (Jack). If on a minor incline, the safest way to position the trailer is to have the tow bar facing down the incline (front of the trailer lower than the rear of the trailer).
- 2. Install tire chocks if used. These prevent the trailer from moving when parked.
- 3. Disconnect the safety chains and the trailer light connector from the tow vehicle.
- 4. Pull the pin on the front jack and rotate the jack 90 degrees to the vertical position. Lock the jack in the vertical position using the pin to secure it.

- 5. Move the Coupler Handle to the vertical position to release the ball hitch. OR
  - Release the Pintle hook.
- 6. Use the jack to raise the trailer coupler from the ball hitch of the tow vehicle.
- 7. The tow vehicle can now be moved away from the equipment.
- Use the jack to level the trailer for operation. 8.

Lug Nut Tightness Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60 or 90 degrees.) The proper procedure for attaching your wheel is as follows, see Figure 4-1:

- 1. If a wheel is removed and installed, start each nut by hand to prevent cross threading.
- 2. Tighten lug nuts in the following sequence.
  - Tighten each bolt in the sequence shown in Figure 4-1 and tighten to one half the a. torque specified until all lug nuts are tightened to one half the torque.
  - Tighten each bolt in the sequence shown in Figure 4-1 and tighten to three fourths b. the torque specified until all lug nuts are tightened to three fourths the torque.
  - Tighten each bolt in the sequence shown in Figure 4-1 and tighten each to the c. specified torque until all lug nuts are tightened to the correct torque.
    - Figure 4-1 Lug Nut Tightening Specifications

Tightening Sequence



Torque	Description	Application	Minimum Torque (ft-lbs.)	Maximum Torque (ft-lbs.)
Specification	1/2" Cone nut	12" – 13" Wheel	50	65
		14" – 16" Wheel	90	120
	5/8" Cone nut	Flat Disc Wheel	175	225
	5/8" Cone nut	Clamp Ring	190	210
	3/4" Hex nut	Demountable Ring Clamp	210	260

#### **Voltage Selection**

WARNING: High voltage is present whenever the engine is running. Electrical shock can cause serious or fatal injury. Always stop engine before connecting or disconnecting power cords or external devices.

WARNING: High voltage is present whenever engine is running. Electrical shock can cause serious or fatal injury. Never operate electrical equipment while standing in water, on wet ground or with wet hands, feet or shoes or while barefoot.

#### Hard Wire Load Terminal Block, (TG25T Only, Figure 3-4)

- Ensure the generator is off. 1.
- 2. Place voltage select switch in the correct position 208/120, 240/120 or 480/277VAC, Figure 4-3. To ensure the switch position is not accidentally changed, it should be padlocked as shown in Figure 4-2.

Figure 4-2



Insert padlock through the hole in the handle. This activates an internal mechanism that prevents handle rotation.

3. Carefully inspect all Individual load cables for broken insulation or other signs of damage. Never use a damaged cable. Replace it before usage.



Note: Refer to Table 3-4 for specific circuit breakers by model.

#### Voltage Reconnect and Adjustment

The digital engine controller runs software called voltage auto-detect. Every time the engine is started and after the timer in the Engine Params: Stabil Time (3 second factory setting) has elapsed, the nominal voltage will be detected and locked in. Various set points in the engine controller are then calculated as a percentage of this nominal voltage. For example: The over-voltage set point is set to 110%. This means that when the unit is providing 208V, the over-voltage set point will lock in at 229V. When the unit is operating in 480V the over-voltage set point will lock in at 528V.

Example: To change the voltage from 208V nominal to 240V nominal, the voltage adjustment must be made before the controller locks in the nominal voltage.

- 1. Set the Voltage Select Switch to 240/120V position.
- 2. Start the engine.
- 3. Immediately adjust the Voltage Adjust for 240VAC nominal before the 20 second timer expires.
- 4. The new 240V nominal voltage is now locked in.

This procedure must be performed whenever the nominal voltage is changed.



Note: For reference only. See Table 3-4 for appropriate breakers.

<u>Operating Procedures</u> The engine–generator controller is designed to start and stop an engine from either AUTO "Automatic" mode or Manual "NOT IN AUTO". Refer to Figure 4-5.

#### Manual Start Procedure

- 1. Press AUTO until the Green LED is not lit above the button.
- 2. Press "Start".
- 3. The controller will start the engine.

#### **Manual Stop Procedure**

- 1. Use disconnect at the load to turn OFF the load. Allow equipment cool down if needed.
- 2. Press "Stop".

#### AUTO Start Procedure

- 1. Press AUTO until the Green LED is lit above the button.
- In Auto mode, the equipment will start when the remote start input closes.
- 2. In Auto mode, the equipment will stop when the remote start input opens.

#### Flood Light Operation:

- 1. When the engine reaches operating speed and is operating smoothly, turn on one light and wait one second turn on another light and wait one second etc. until the flood lights are all on.
- 2. Observe the operation of each flood light and replace defective bulbs if required. To change a bulb, refer to Section 5 of this manual.

Note: Vaporous flood lights may require 5 to 15 minutes to warm up and produce full light output.

#### **Operating Checks:**

3. Check diesel fuel level and shut off the engine and add if necessary. Check engine oil each time fuel is added. Never allow the engine to run out of fuel or to run low of oil.

#### Receptacle Panel Load Connections, see Figure 3-3.

- 1. 120/240VAC voltage is present at the receptacle panel only when equipment is running.
- 2. Carefully inspect all Individual load cables for broken insulation or other signs of damage. Never use a damaged cable. Replace it before usage.
- 3. Individual load cables may be routed to the receptacle compartment.
- 4. Individual load cables may be connected or disconnected while equipment is running. Use extreme care not to touch any electrical wire or terminal to avoid shock hazard.
- 5. Keep Engine Compartment doors closed at all times. This prevents rain or other harmful elements from entering the compartment.
- AC Breaker (on panel) that when tripped turns off all AC power to Mast Lights and AC Receptacles. Manually trip the breaker "Off" to immediately interrupt all AC power. If breaker trips due to overload, first clear the overload condition. To reset the breaker, place it first in the off position then to the ON position.

#### Engine Stop Procedure: (see Figure 4-5)

# Caution: Never stop the engine with any of the lights on, or with any electrical load connected, as damage may result.

- 1. Turn OFF all floodlight switches and unplug all loads from receptacle panel.
- Note: After turning OFF a light, do not attempt to turn the light ON until after a 10–25 minute cool down period. Turning a light OFF then ON may damage the light bulb.
  - 2. If the engine has been operating for several hours under load, allow it to operate unloaded for at least five minutes to reduce coolant temperature.
  - 3. Press the STOP Position to shut down engine.
- WARNING: Light fixtures become extremely hot during use. To prevent severe burns, do not touch light fixtures, bulbs or other components until they have cooled and no longer present a burn hazard. Wear protective clothing when placing the tower in the stowed position after use and do not allow any person to touch the light fixtures.
- WARNING: When erecting or stowing the mast assembly, be aware of the pinch points such as where the tower structures join or where the cable and winch are located. Careless operation can result in injury. Keep extremities away from moving parts to avoid injury.
- WARNING: The mast should come down slowly and smoothly. If slack develops in the cable or the mast "hangs up", stop immediately. Crank the winch in the reverse direction to take up slack in the cable, and determine the cause of the problem if possible. Try to lower the mast again. If the problem persists do not continue, seek expert advise. Cable slack can allow the light tower to fall unexpectedly which may result in injury or damage.

#### Digital Engine Controller Description EM0046A68 (MRS)



Figure 4-5 Operator Control Panel

Note: The operator control panel LCD display operating temperature range is -20°C to 70°C (not the entire equipment, see generator specifications).

**LED Indicators** 

Start

Alarm (red) – The LED will blink when there is one or more active warnings or shutdowns. LED is on when active shutdown is confirmed and engine cannot be started.

Running (green) – LED blinks if engine is starting, cooling or stopping.

LED is on when engine is running, loaded or ready to load.

Warning (red) – Warning condition has occurred. LED above Stop is blinking. Auto (green) – Control is in Auto mode. LED above AUTO is on.

Shutdown	Warning	3
	X	Maintenance
	Х	Low Battery
Х		Over/Underspeed
Х		Low Oil pressure
Х		High Coolant temperature
Х		Generator Over/Undervoltage
Х		Generator Over/Under frequency
Х		Start fail
Х		Stop fail
Х		Battery flat

Start equipment operation (MAN mode only). Confirms changes in setup mode.

#### Table 4-5 Shutdown & Warning Conditions

Stop	Stops the Engine and equipment (MAN mode only). Cancels changes in setup mode. Push for shutdown confirmation.
Auto	Selects AUTO or Manual operating modes.
▲ and ▼	Selects the menu choice, select the setpoint or select the menu or increase/decrease the setpoint value.
Setup Mode	Make sure engine is stopped; Controller is in Manual Mode (Green LED above AUTO is off). If controller (init) screen is not configured, press and hold STOP button, then press $\blacktriangle$ button and then press Auto. If you created your own (init) screen press and hold STOP button, then press $\blacktriangle$ button and the custom screen will appear. Continue to hold the STOP button then press $\bigtriangledown$ to change LCD default screen. Then press AUTO. To move up and down in setup menu, use $\bigstar \checkmark$ buttons. Press START to select or STOP button to exit.

#### **Operating Mode** Use the AUTO button to select AUTO or MANUAL mode.

- AUTO Green LED above AUTO will be on. Start and Stop buttons are ignored.
- MAN Green LED above AUTO will be off. Press Start to manually start the equipment immediately. Press STOP to stop the equipment immediately.

**Inputs and Outputs** Any Binary input or output can be configured to any controller terminal.

Inputs are T07,T11–T15; Outputs are T04–T06, T07. They can be changed to different functions by NanoEdit software. T07 is a shared input/output terminal.

There is fixed 1 sec delay when any binary input is configured as protection.

#### Table 4-6 Binary Inputs

High Coolant Temperature	Shutdown is activated. Red LED above STOP will blink. Coolant Temp symbol will be displayed in the event log.
Oil Pressure	Shutdown is activated. Red LED above Stop will blink. Oil Pressure Symbol will be displayed in the event log.

Table 4	-7 Binary outputs
Starter (relay output)	The closed relay energizes the starter motor. The relay opens if: • The firing speed is reached or • Maximum time of cranking is exceeded or • Request to stop occurs
Fuel solenoid (relay output)	Closed output opens the fuel solenoid and enables the engine start. The output opens if: Emergency stop occurs or Cooled gen-set is stopped or In pause between repeated starts
Prestart	Output is closed prior to the engine start (Prestart) and opens when START RPM speed is reached. During repeated crank attempts the output is closed too. The output could be used for pre-glow, pre-heat or prelubrication.

### Set points

#### Table 4-8 Basic Setpoints

	T G IS	
B01	Nominal Voltage Ph–N	Nominal system voltage (phase to neutral). Step: 1V; Range: 80 – 480V
B02	Nominal Voltage Ph-Ph	Nominal system voltage (phase to phase). Step: 1V; Range: 80 – 480V
B03	Nominal Frequency	Nominal system frequency. Range: 50 – 60Hz
B04	Connection Type	Generator winding connection Split phase or 3Phase4Wire or Voltage Autodetect
B05	Units Format	Setpoint format for pressure and temperature Range: Metric units or US units
B07	Zero Power Mode Delay	Controller goes into sleep mode after no user interaction Value 0 disables function. Step 1 minute; Range: 0–360 minutes
B08	Light Tower Mode	Special Operating Mode. Enabled: main screen shows battery voltage, run hours and engine status

#### Table 4-9 Engine Parameters and Protections

E01	Prestart Time	Time of closing the PRE-START output prior to engine start. Factory Setting: 2s; Step: 1s; Range: 0-600s. 0=PRE-START output is open.				
E02	Maximum Cranking Time	Maximum time starter motor is energized. Factory Setting: 5s; Step: 1s; Range: 0–60s.				
E03	Cooling Time	Runtime of the unloaded gen-set to cool engine. Factory Setting: 30s; Step: 1s; Range: 0-3600s.				
E06	Battery Undervoltage	Warning threshold for Low Battery Voltage. Factory Setting:11.5V; Step: 1V; Range: 8–40V.				
E07	Warning Maintenance	Service interval counts down only when unit is running. Factory Setting: 9999 Hr.; Step: 1Hr; Range: 0–1000Hr.				
E08	Oil Pressure Starter Disengage	Enabled: Starter will disengage when oil pressure reaches starting oil pressure. Disabled: RPM (frequency), generator voltage will be used. Factory Setting: Disabled.				
E09	Choking Time	Choke output timer. The timer is started when engine is started. Factory Setting: 0s; Step: 1s; Range: 0–3600s.				
E10	Minimal Stabilization Time	Minimum time after reaching defined RPM the GCB closes. Factory Setting: 3s; Step: 1s; Range: 0-300s				

#### Table 4-10 Generator Protect Setpoints

Gen Overvoltage Shutdown	Shutdown level for generator overvoltage. All phases are checked. Factory Setting: 110%; Step: 1% of nominal voltage; Range: Gen> V SD – 200%
Gen Undervoltage Shutdown	Shutdown level for generator undervoltage. All phases are checked. Factory Setting: 70%; Step: 1% of nominal voltage; Range: 0% – Gen> V SD
Gen Overfrequency Shutdown	Shutdown level for generator overfrequency. Factory Setting: 110%; Step: 0.1% of nominal frequency; Range: Gen> f SD – 130%
Gen Underfrequency Shutdown	Shutdown level for generator underfrequency. Factory Setting: 85%; Step: 0.1% of nominal frequency; Range: 0% – Gen> f SD



Figure 4-6 Wiring Diagram

WARNING: Never "jump start" a equipment to start the engine. If the battery charge is insufficient to start the engine, charge or replace the battery and try to restart. Jump starting a battery can cause the battery to explode and cause severe injury or death to anyone in the area.

# Caution: If a dead battery is suspected charge battery (or replace), and then attempt starting. Damage to engine control may result from jump starting.

# **Maintenance** This manual contains only very minimal engine maintenance instructions. Refer to the engine manufacturer's owner's manual for specific engine maintenance instructions for your equipment. Any maintenance instructions or recommendations in the engine owner's manual take precedence over any of the following general recommendations.

#### General:

- 1. Inspect the fuel system for leaks. Replace all defective components immediately.
- 2. Inspect and replace any fuel line that shows signs of deterioration.
- 3. Inspect all the fuel clamps to ensure they are tight.
- 4. Make sure the fuel cap fits snugly on the fuel tank and that the fuel tank contains no leaks.
- 5. Inspect and clean the battery posts and the associated battery cable terminals.
- 6. Inspect the external wire cables and connectors used with the equipment for cuts, fraying, or loose connections. Repair or replace any problems prior to using the unit.

#### Engine:

- 1. Clean and/or replace any fuel, oil, and/or air filters per the engine manufacturers' guidelines.
- 2. Check oil level regularly; at least every 5 to 8 operating hours. Maintain the proper oil level.
- 3. Change the oil as is recommended in the engine manufacturer's owner's manual.
- 4. Clean the cooling fins on the engine to keep the engine's heat dissipation potential at it's maximum.
- 5. Inspect and clean all governor and fuel supply linkages so they operate properly.

#### Alternator: (also called Generator End)

This equipment must be run at its proper speed to obtain the correct electrical power at its output. All engines have a tendency to slow down when a load is applied to it. The engine governor is designed to hold the operating speed as nearly constant as possible. When the electrical load is increased, the engine is more heavily loaded and engine speed drops slightly. This slight decrease in engine speed results in a slight decrease in equipment voltage and frequency output. This voltage and frequency variation has no appreciable effect in the operation of motors, lights, and most appliances and tools. However, timing devices and clocks may not keep perfect time.

- 1. Clean the equipment and remove any and all dust, dirt, or other foreign material.
- 2. Inspect and clean the cooling air intake and exhaust louvers of the equipment end. Make sure they are clean. Remove dirt or any buildup that may restrict the cooling air flow.
- 3. Clean the equipment and its components with a damp cloth or sponge. Never use a water hose or pressure washer as this may damage electrical components.
- 4. Inspect and replace any control panel components that are broken or not working properly (receptacles, circuit breakers, switches, etc.)

#### Flood Light Bulb Replacement

WARNING: Light fixtures become extremely hot during use. To prevent severe burns, do not touch light fixtures, bulbs or other components until they have cooled and no longer present a burn hazard. Wear protective clothing when placing the tower in the stowed position after use and do not allow any person to touch the light fixtures.

Refer to Section 4 of this manual for the procedures if you are not familiar with these steps.

- 1. Stop the generator.
- 2. Lower the mast.
- 3. Tilt the mast down to the stowed position.
- 4. Wait until the fixtures and bulbs have cooled sufficiently and replace the defective bulb.

#### <u>Cleaning</u>

Keeping your equipment clean is an important part of good operation. If dirt buildup is not removed, the equipment will run hotter than normal and it's life is reduced. The following are general guidelines for cleaning.

	Maintenance Interval						
Maintenance Operation	10 Hrs (Daily)	50 Hrs.	125 Hrs.	250 Hrs.	500 Hrs.	1000 Hrs.	2500 Hrs.
Safety Guard Inspection 1	•						
Fluid Leak Inspection – General 1	•						
Oil Level Check 1	•						
Coolant Level Check 1	•						
Fan/Alternator Belt Inspection 2	•						
Radiator Core Inspection 3	•						
Air Filter Element Check (Dry Type) ④	4						
Air Filter Check (Oil Bath Type) 5	•						
Oil Replacement – Initial only 6		•					
Oil Filter Replacement – Initial only 6		•					
Oil Replacement 6			•				
Check mast cables. Check lighting lead wires (TG8LT)			•				
Oil Filter Replacement				•			
Fuel Filter Replacement				•			
Coolant Hose Replacement				•			
Fan/Alternator Belt Tension Adjustment				•			
Valve Adjustment					•		
Fan/Alternator Belt Replacement					•		
Fuel Injection System Adjustments					•		
Grease the mast collar grease fitting (TG8LT)					•		
Clean Fuel Tank 3						•	
Grease trailer bearings						•	
Coolant Replacement 7							•
Replace Timing Belt							•

Maintenance Schedule

Add fluid(s) as needed.

2 After inspection, adjust, repair or replace as needed.

- 3 Clean as often as needed.
- A Replace air filter if air flow is restricted or one (1) year.
- Service oil bath filter element (upper and lower) as needed. Replace reservoir oil as needed.
   Note: In dusty conditions, service the oil bath air filter every four (4) hours of operation.
- 6 See engine manufactures recommendation.

Replace coolant every 2500 hours or 2 years.

# Equipment Troubleshooting Guide

Table 5-1 Light Mast Troubleshooting Guide					
Problem	Possible Cause	Remedy			
Mast will not raise to operating position.	Mast Lock Pin still in place. Defective winch or cable.	Remove pin. Have winch and cable examined by a qualified mechanic. Replace if required.			
Mast will not telescope to desired height.	Defective winch or broken cable.	Have winch and cable examined by a qualified mechanic. Replace if required.			
Mast will not rotate.	Bolt/nut on bottom of mast may be too tight.	Back off on nut setting slightly and try to rotate mast.			
	Mast rotation collar needs to be greased.	Apply grease to grease fitting.			
	Table 5-2 Generator Trouble				
Problem	Possible Cause	Remedy			
Engine will not turn over.	Loose battery cables or dead battery. Engine seized due to loss of oil.	Recharge or replace battery. Check battery cable at battery terminals and starter for tightness. Have unit inspected by qualified mechanic.			
Engine turns over but will not start.	Fuel tank empty. Clogged fuel filter. Fuel line connections leaking. Heater plug element burned out. Suspect contaminated fuel.	Fill tank and bleed fuel system. Replace filter, use winter grade fuel (weather cold). Bleed out air. Tighten all fuel fittings and bleed air from fuel system. Replace heater plug. The fuel tank has a drain valve on the bottom side of the trailer. Drain and replace the fuel.			
Engine difficult to start.	Battery charge low or cables loose. Motor oil too thick in cold winter. Clogged fuel filter or fuel cloudy in cold weather. Fuel line connections leaking.	Replace/recharge battery. Tighten cable connections. Use proper winter grade oil. Replace filter and bleed air from System. Use winter grade diesel in cold weather. Tighten all fuel fittings and bleed air from fuel system.			
Rough running engine with low power output.	Clogged fuel filter or leaking fuel line connections. Exhaust system clogged. Air filter clogged. Fuel injectors nozzles clogged or stuck. Valve clearance needs adjusting or valve springs broken. Governor or injector pump defective.	Tighten all fuel fittings and bleed air from fuel system. Check muffler and exhaust manifold, clear any obstructions. Replace air filter. Have unit checked by qualified mechanic. Have unit checked by qualified mechanic. Have unit checked by qualified mechanic.			
Engine runs but produces excessive thick smoke.	Crankcase oil level too high. Compression low.	Drain oil level to full mark on dipstick. Have qualified mechanic check unit for broken or seized rings or improper valve clearances.			
Engine runs but battery voltage low.	Battery charger or alternator failure.	Have qualified mechanic repair or replace.			
Engine runs but lights do not come on.	Circuit breakers tripped or light switches in "OFF" position. Loose connections in light wiring. Loose connection in ballast box wiring. Bulbs burned out. Defective AC generator. Engine speed too low. Defective ballast.	Check circuit breaker, press reset button if tripped, turn on light switches. Check junction box connections for security. Have a trained electrician inspect ballast box and wiring. Replace bulbs. Have a trained electrician inspect generator. Have a qualified mechanic check unit and, if necessary, reset engine speed to 1800 RPM or 60 HZ. Have a trained electrician inspect the ballast system.			
Unusual noises coming from the generator.	Generator bearing or cooling fan defective.	Have a qualified mechanic inspect the generator.			
An electric shock occurs when the light tower or housing is touched.	Short circuit in wiring system.	IMMEDIATELY stop using the light tower. IMMEDIATELY have the unit inspected by a qualified mechanic.			

	Table 5-2 Generator Troubleshooting Guide Continued				
Problem	Possible Cause	Remedy			
Genset will not pull load	Incorrect Engine Speed	Remove electrical load, output should be 61–62 Hertz adjust engine speed if necessary.			
	Load not connected properly	Verify voltage at the load and the connections to the proper receptacle or load terminal block.			
	Load too large for unit	Verify load amperage is less than the equipment rated. Note: For inductive loads, use the starting amperage rating of the load (not the running amperage rating). Starting amps may be as much as 5 times the running amps.			
Electrical shock when frame is touched	Static charge. Grounded armature or field coil.	Ground equipment frame at local reference ground (see Section 3). Contact service center.			
Mechanical noise (alternator)	Defective bearing	Replace bearing.			
	Rotor rubbing on stator	Bad bearing - replace.			
		Bent shaft – contact service center.			
		Loose drive Discs – tighten			
	Loose or misaligned coupling	Tighten; align coupling and alternator shaft to engine shaft.			
Trailer lights inoperable	Trailer to tow vehicle connection Trailer electrical connection not compatible	Connect trailer lighting connector to tow vehicle trailering connector Use adapter plug to convert from connector style found on trailer to connector style found on tow vehicle or replace connector with com- patible mate			
	Insufficient Ground connection	Verify there is a ground wire connection from the tow vehicle to the trailer. Do not rely on the trailer tow coupling for the battery ground connection. Repair as necessary.			
	Faulty light bulb	Replace as necessary			
Trailer sways during towing	Tow vehicle trailering ratings too small	Check tow vehicle ratings meet or exceed the Gross Vehicle Weight Rating (GVWR) of the trailer. Use larger tow vehicle as necessary. Seek expert advise.			
	Trailer tongue not level on tow vehicle	Adjust trailer or tow vehicle as necessary for trailer tong to be level or slightly higher than rear of tow vehicle when additional supports have been removed. View and make adjustments while vehicle and trailer are on level surface. Seek expert advise.			
	Towing at excessive speed	Reduce tow vehicle speed and use caution while braking. Obey all local laws and regulations, never exceed the posted speed limit, and use reasonable care when towing any type of trailer. Contact local authority having jurisdiction.			

Note: After the engine is stopped, there is a 15 second restart delay before engine cranking.

**Fault Shutdowns** Under certain operating conditions, onboard sensors determine that a condition may cause damage if operation continues. The onboard controller is programmed to sound an alarm or immediately stop (shutdown) the equipment. These conditions are as follows:

- 1. An alarm fault is indicated by an alarm light located on the operator panel:
  - a. Overspeed indicates the engine governor allowed speed to exceed safe limits.
  - b. Overcrank indicates engine failed to start within programmed time period.
  - c. Low Oil Pressure Safe engine operating oil pressure was not maintained.
  - d. Overtemperature indicates safe operating coolant temperature was exceeded.
- 2. Engine cannot be restarted until the alarm condition is corrected.
- Reset the alarm condition (after alarm condition is corrected) by pressing "STOP". Operation can be attempted, observe the operator panel when operation is resumed to ensure alarm condition is removed.
   When maximum current output exceeds the output breaker limit, the main breaker will trip. When

# **Overload** When maximum current output exceeds the output breaker limit, the main breaker will trip. When this occurs, the load must be reduced and the breaker reset before operation can be resumed.

Note: The Main Breaker cannot be reset if load connection box door is open. This door must be closed before the breaker can be reset to connect the electrical load. (TG25T)

### Service & Parts Service and parts for your equipment can be obtained from an authorized service center.

Please have the following information available prior to contacting the service center:

- The model number and serial number of the equipment.
- A complete and accurate description of the part (part number if known).
- Note: Engine parts can usually be obtained from a local distributor by using the information in the engine manufacturer's owner's manual.

**<u>Replacement Parts</u>** Engine parts are identified in the engine manual that was provided with your generator set.

IMPORTANT: Fuses are installed in the control box to protect the engine controller and associated control circuits. When replacing fuses, use the exact replacement fuse (manufacturer and part number).

#### **<u>Wiring Diagrams</u>** Wiring diagrams for these generators are contained on the following pages of this appendix.





Figure A-2 TG8LT





MN2423















#### **Baldor District Offices**

#### UNITED STATES

ARIZONA

PHOENIX 4211 S 43RD PLACE PHOENIX, AZ 85040 PHONE: 602-470-0407 FAX: 602-470-0464

ARKANSAS

CLARKSVILLE 706 WEST MAIN STREET CLARKSVILLE, AR 72830 PHONE: 479-754-9108 FAX: 479-754-9205

CALIFORNIA LOS ANGELES

6480 FLOTILLA STREET COMMERCE, CA 90040 PHONE: 323-724-6771 FAX: 323-721-5859

HAYWARD 21056 FORBES STREET HAYWARD, CA 94545 PHONE: 510-785-9900 FAX: 510-785-9910

COLORADO DENVER 3855 FOREST STREET DENVER, CO 80207 PHONE: 303-623-0127 FAX: 303-595-3772

CONNECTICUT WALLINGFORD 65 SOUTH TURNPIKE ROAD WALLINGFORD, CT 06492 PHONE: 203-269-1354 FAX: 203-269-5485

FLORIDA TAMPA/PUERTO RICO/ VIRGIN ISLANDS 3906 EAST 11TH AVENUE TAMPA, FL 33605 PHONE: 813-248-5078 FAX: 813-241-9514

GEORGIA ATLANTA 62 TECHNOLOGY DRIVE ALPHARETTA, GA 30005 PHONE: 770-772-7000 FAX: 770-772-7200

ILLINOIS Chicago

340 REMINGTON BLVD. BOLINGBROOK, IL 60440 PHONE: 630-296-1400 FAX: 630-226-9420

#### INDIANA

INDIANAPOLIS 5525 W. MINNESOTA STREET INDIANAPOLIS, IN 46241 PHONE: 317-246-5100 FAX: 317-246-5110

#### IOWA

DES MOINES 1943 HULL AVENUE DES MOINES, IA 50313 PHONE: 515-263-6929 FAX: 515-263-6515

MARYLAND BALTIMORE 6660 SANTA BARBARA RD. SUITES 22-24 ELKRIDGE, MD 21075 PHONE: 410-579-2135 FAX: 410-579-2677

MASSACHUSETTS BOSTON 6 PULLMAN STREET WORCESTER, MA 01606 PHONE: 508-854-0708 FAX: 508-854-0291

MICHIGAN DETROIT 5993 PROGRESS DRIVE STERLING HEIGHTS, MI 48312 PHONE: 586-978-9800 FAX: 586-978-9969

MINNESOTA MINNEAPOLIS 13098 GEORGE WEBER DR, SUITE 400 ROGERS, MN 55374 PHONE: 763-428-3633 FAX: 763-428-4551

MISSOURI ST LOUIS 13678 LAKEFRONT DRIVE EARTH CITY, MO 63045 PHONE: 314-373-3032 FAX: 314-373-3038

KANSAS CITY 1501 BEDFORD AVENUE NORTH KANSAS CITY, M0 64116 PHONE: 816-587-0272 FAX: 816-587-3735

NEW YORK AUBURN ONE ELLIS DRIVE AUBURN, NY 13021 PHONE: 315-255-3403 FAX: 315-253-9923

NORTH CAROLINA GREENSBORO 1220 ROTHERWOOD ROAD GREENSBORO, NC 27406 PHONE: 336-272-6104 FAX: 336-273-6628

OHIO CINCINNATI 2929 CRESCENTVILLE ROAD WEST CHESTER, OH 45069 PHONE: 513-771-2600 FAX: 513-772-2219

#### OHIO (Continued)

CLEVELAND 8929 FREEWAY DRIVE MACEDONIA, OH 44056 PHONE: 330-468-4777 FAX: 330-468-4778

OKLAHOMA

TULSA 5555 E. 71ST ST., SUITE 9100 TULSA, OK 74136 PHONE: 918-366-9320 FAX: 918-366-9338

OREGON PORTLAND 12651 SE CAPPS ROAD CLACKAMAS, OR 97015 PHONE: 503-691-9010 FAX: 503-691-9012

#### PENNSYLVANIA

PHILADELPHIA 1035 THOMAS BUSCH MEMORIAL HIGHWAY PENNSAUKEN, NJ 08110 PHONE: 856-661-1442 FAX: 856-663-6363

PITTSBURGH 159 PROMINENCE DRIVE NEW KENSINGTON, PA 15068 PHONE: 724-889-0092 FAX: 724-889-0094

#### TENNESSEE

MEMPHIS 4000 WINCHESTER ROAD MEMPHIS, TN 38118 PHONE: 901-365-2020 FAX: 901-365-3914

#### TEXAS

DALLAS 2920 114TH STREET SUITE 100 GRAND PRAIRIE, TX 75050 PHONE: 214-634-7271 FAX: 214-634-8874

HOUSTON

10355 W. LITTLE YORK ROAD SUITE 300 HOUSTON, TX 77041 PHONE: 281-977-6500 FAX: 281-977-6510

#### UTAH

**SALT LAKE CITY** 2230 SOUTH MAIN STREET SALT LAKE CITY, UT 84115 PHONE: 801-832-0127 FAX: 801-832-8911

#### WISCONSIN

MILWAUKEE 1960 SOUTH CALHOUN ROAD NEW BERLIN, WI 53151 PHONE: 262-784-5940 FAX: 262-784-1215 INTERNATIONAL SALES FORT SMITH, AR P.O. BOX 2400 FORT SMITH, AR 72902 PHONE: 479-646-4711 FAX: 479-648-5895

#### CANADA

EDMONTON, ALBERTA 4053-92 STREET EDMONTON, ALBERTA T6E 6R8 PHONE: 780-434-4900 FAX: 780-438-2600

TORONTO

OAKVILLE, ONTARIO 2750 COVENTRY ROAD OAKVILLE, ONTARIO L6H 6R1 PHONE: 905-829-3301 FAX: 905-829-3302

MONTREAL, QUEBEC 5155 J-ARMAND BOMBARDIER SAINT-HUBERT, QUÉBEC CANADA J3Z 1G4 PHONE: 514-933-2711

FAX: 514-933-8639

VANCOUVER, BRITISH COLUMBIA 1538 KEBET WAY PORT COQUITLAM, BRITISH COLUMBIA V3C 5M5 PHONE 604-421-2822 FAX: 604-421-3113

WINNIPEG, MANITOBA

54 PRINCESS STREET WINNIPEG, MANITOBA R3B 1K2 PHONE: 204-942-5205 FAX: 204-956-4251

#### MEXICO

LEON, GUANAJUATO KM. 2.0 BLVD. AEROPUERTO LEON, GUANAJUATO, CP37545 MEXICO FAX: +52 477 761 2010

## WARNING: CALIFORNIA PROPOSITION 65 WARNING:

Engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

### WARNING: CALIFORNIA PROPOSITION 65 WARNING:

Battery posts, terminals and related accessories are known to the state of California to cause cancer, birth defects and other reproductive harm.





P.O. Box 2400 Fort Smith, AR 72902-2400 USA Ph: (1) 479.646.4711, Fax: (1) 479.648.5792 www.baldor.com



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