

OPERATION MANUAL

STOW

A DIVISION OF MULTIQUIP INC.

NIGHTHAWK SERIES MODELS LT-12D, LT-12P DEDICATED LIGHT TOWER (DEUTZ/LOMBARDINI DIESEL ENGINE) (PERKINS DIESEL ENGINE)

Revision #1 (08/15/08)



THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

P/N: 49103

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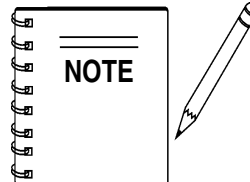
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**STOW NIGHTHAWK
LT-12 SERIES LIGHT TOWER**

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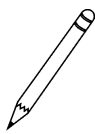
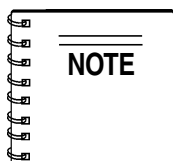


For Deutz/Lombardini Parts information, please see our LT-12 Deutz F3M1008F Diesel Engine Parts Manual.

LT-12 SERIES LIGHT TOWER — SAFETY MESSAGE ALERT SYMBOLS

FOR YOUR SAFETY AND THE SAFETY OF OTHERS!

Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the Safety Messages and Operating Instructions could result in injury to yourself and others.



This Owner's Manual has been developed to provide complete instructions for the safe and efficient operation of the **LT-12 Series Light Tower**.

Before using this Light Tower, ensure that the operating individual has read and understands all instructions in this manual.

SAFETY MESSAGE ALERT SYMBOLS

The three (3) Safety Messages shown below will inform you about potential hazards that could injure you or others. The Safety Messages specifically address the level of exposure to the operator, and are preceded by one of three words: **DANGER**, **WARNING**, or **CAUTION**.

DANGER

You **WILL** be **KILLED** or **SERIOUSLY** injured if you **DO NOT** follow directions.

WARNING

You **CAN** be **KILLED** or **SERIOUSLY** injured if you **DO NOT** follow directions.

CAUTION

You **CAN** be **INJURED** if you **DO NOT** follow directions.

Potential hazards associated with the **LT-12 Series Light Tower** operation will be referenced with Hazard Symbols which appear throughout this manual, and will be referenced in conjunction with Safety Message Alert Symbols.

HAZARD SYMBOLS

WARNING - Lethal Exhaust Gasses

Engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled. **NEVER** operate this equipment in a confined area or enclosed structure that does not provide ample free flow air.



WARNING - Explosive Fuel

Diesel fuel is extremely flammable, and its vapors can cause an explosion if ignited. **DO NOT** start the engine near spilled fuel or combustible fluids.



DO NOT fill the fuel tank while the engine is running or hot. **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system. Store fuel in approved containers, in well-ventilated areas and away from sparks and flames.

WARNING - Burn Hazards

Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operations. Never operate the engine with heat shields or heat guards removed.



CAUTION - Respiratory Hazard

ALWAYS wear approved **respiratory** protection when required.



LT-12 SERIES LIGHT TOWER — SAFETY MESSAGE ALERT SYMBOLS

CAUTION - Rotating Parts

NEVER operate equipment with covers, or guards removed. Keep fingers, hands, hair and clothing away from all moving parts to prevent injury.

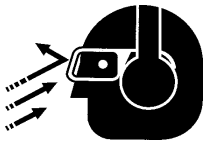


CAUTION - Accidental Starting

ALWAYS place the power source, circuit breakers or **ON/OFF** switch in the **OFF** position, when the generator is not in use, unless connected to transfer switch.



CAUTION - Sight and Hearing Hazards



ALWAYS wear approved eye and hearing protection.

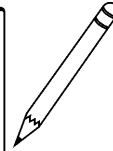
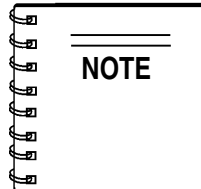
CAUTION - Over-Speed Conditions



NEVER tamper with the factory settings of the engine governor settings. Personal injury and damage to the engine or equipment can result if operating speed ranges above maximum allowable.

CAUTION - Equipment Damage Messages

Other important messages are provided throughout this manual to help prevent damage to your light tower, other property, or the surrounding environment.



This light tower, other property, or the surrounding environment could be damaged if you **do not** follow instructions.

LT-12 SERIES LIGHT TOWER — RULES FOR SAFE OPERATION

WARNING - READ THIS MANUAL

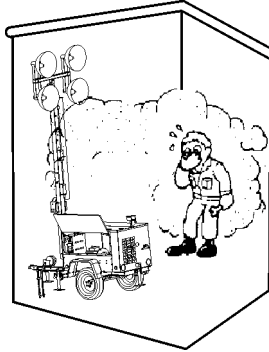
Failure to follow instructions in this manual may lead to **Serious Injury** or even **Death**. This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

The following safety guidelines should always be used when operating the LT-12 Lighttower.

Safety

- **DO NOT** operate or service this equipment before reading this entire manual.
 - This equipment should not be operated by persons under 18 years of age.
 - **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.
- 
- 
- **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.
 - **NEVER** operate the saw under the influence of drugs or alcohol.
 - **NEVER** use accessories or attachments, which are not recommended by Stow for this equipment. Damage to the equipment and/or injury to user may result.
 - Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
 - Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
 - **ALWAYS** check all the bolts on the light tower for tightness.
 - **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing engine or generator.
 - **High Temperatures** – Allow the engine to cool before adding fuel or performing service and maintenance functions. Contact with *hot* components can cause serious burns.
- 

- The engine of this light tower/generator requires an adequate free flow of cooling air. **NEVER** operate the generator in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause serious damage to the generator engine and may cause injury to people. Remember the engine of the light tower/generator gives off **DEADLY** carbon monoxide gas.



- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.
 - **ALWAYS** use extreme caution when working with **flammable** liquids. When refueling, **stop the engine** and allow it to cool. **DO NOT smoke** around or near the machine. Fire or explosion could result from fuel vapors, or if fuel is spilled on a hot engine.
 - **NEVER** operate the light tower/generator in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe *bodily harm or even death*.
 - Topping-off to filler port is dangerous, as it tends to spill fuel.
 - **ALWAYS** make sure that the light tower/generator is secure on level ground so that it cannot slide or shift around, endangering workers. Also keep the immediate area free of bystanders.
 - **ALWAYS** use a **trained technician** to install and remove a floodlight, or replace any damaged fixture wiring.
 - **NEVER** leave any grease or oil residue on glass surface when replacing or removing bulbs. This can create hot spots, reducing the service life of the bulb or causing outer jacket to burst.
 - **ALWAYS** make sure trailer is leveled with all outriggers extended before raising tower. Outriggers must remain extended while tower is up.
 - **ALWAYS** keep area behind trailer clear of people while raising and lowering mast.
 - **NEVER** remove safety pin or pull mast locking pin while tower is in a raised position!
 - **CHECK** the mast and winch cables for wear. If any problem occurs when lower or raising the tower **STOP** immediately! Contact a trained technician for assistance.
 - **NEVER** pivot or retract mast while unit is operating.
- 

LT-12 SERIES LIGHT TOWER — RULES FOR SAFE OPERATION

! DANGER - High Danger Areas

The **5 DANGER** items listed below are considered **High DANGER** areas and should be adhered to. Failing to understand these areas could result in **Bodily Harm, Electrical Shock, Electrocutation, and even Death!** Please pay close attention when operating the light tower.

! DANGER - Grounding the LT-12 for Operation

The LT-12 Light tower is equipped with a **ground terminal** for your protection. **ALWAYS** complete the **grounding path** from the light tower to an external grounding source.



ALWAYS make certain the light tower is well grounded and securely fastened to a good earth ground (ground rod). The possibility exists of **Electrical Shock, Electrocutation, and even Death** if the light tower is not grounded.

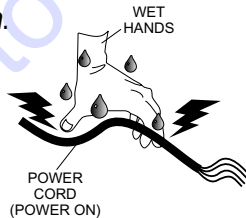
! DANGER - Electric Shock Hazards

NEVER operate the LT-12 Light tower or handle any electrical equipment while standing in water, while bare foot, while hands are wet, or in the rain. A dangerous **electrical shock** could occur causing **Severe Bodily Harm or even Death**.



ALWAYS keep electrical cords in good condition. Worn, bare or frayed wiring can cause electrical shock, thus causing **Bodily Harm or even Death**.

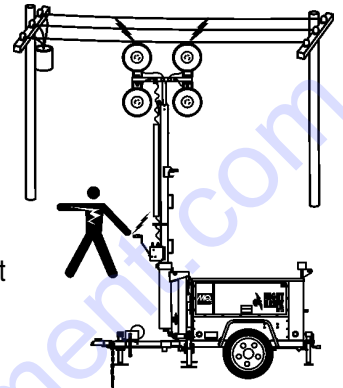
NEVER grab or touch a live power cord with wet hands, the possibility exists of **Electrical Shock, Electrocutation, and even Death!**



- **NEVER** use the light tower mast as a crane. **DO NOT** lift anything with the mast.
- **NEVER** attach anything to the light tower mast.
- **ALWAYS** keep the immediate area surrounding the light tower clean, neat, and free of debris.
- **ALWAYS** lower the tower when not in use, or if high winds or electrical storms are expected in the area.
- **NEVER** pivot or retract mast while unit is operating.

! DANGER - Overhead Obstruction Danger

ALWAYS make sure the area above Light tower is open and clear of overhead power lines and other obstructions. The tower extends in excess of 30 ft. (9 meters). Contact with overhead powerlines or other obstructions could result in equipment damage, **Serious Injury or Death!**



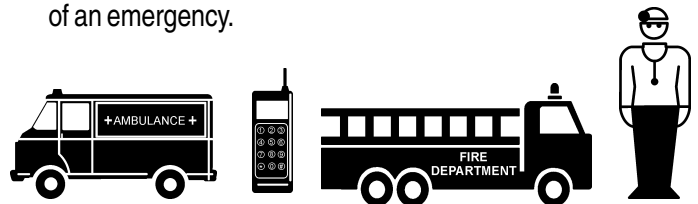
- **NEVER touch** bulbs while in use. Bulbs become extremely hot when in use! Allow bulbs and fixture to cool at least 10-15 minutes before handling.
- **ALWAYS** retract the mast before lowering the tower to transport position.

Maintenance Safety

- **NEVER** lubricate components or attempt service on a running light tower/generator.
- **ALWAYS** allow the light tower/generator a proper amount of time to cool before servicing.
- Keep the light tower/generator in proper running condition.
- Fix damage to the light tower/generator immediately and always replace broken parts.

Emergencies

- **ALWAYS** know the location of the nearest **fire extinguisher**.
- **ALWAYS** know the location of the nearest **first aid kit**.
- In emergencies **always** know the location of the nearest phone or **keep a phone on the job site**. Also know the phone numbers of the nearest **ambulance, doctor and fire department**. This information will be invaluable in the case of an emergency.



LT-12 SERIES LIGHT TOWER — OPERATION AND SAFETY DECALS

Machine Safety Decals

This dedicated light tower is equipped with a number of safety decals. These decals are provided for operator safety and maintenance information. The illustration below and on the next page shows these decals as they appear on the machine. Should any of these decals become unreadable, replacements can be obtained from your dealer.



P/N: 29126



P/N 29119



P/N 35137



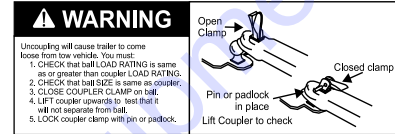
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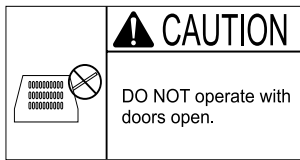
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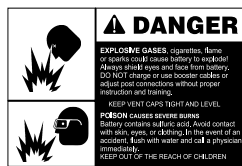
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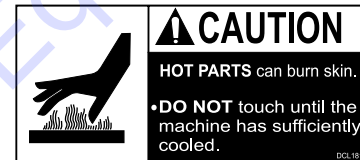
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P/N: DCL188



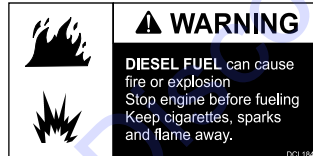
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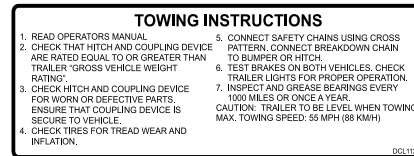
P/N: DCL181



P/N: DCL182



P/N: DCL184



P/N: 29127



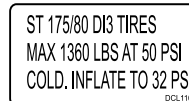
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P/N: DCL186



P/N: 29121



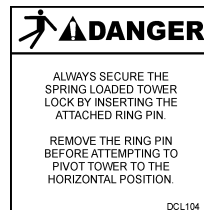
P/N: 29125



P/N: 29133



P/N: 29124



P/N 29120



P/N: DCL187



P/N: 29116

Figure 1. Operation and Safety Decals

LT-12 SERIES LIGHT TOWER — OPERATION AND SAFETY DECALS

WARNING

ATTACH HOOKS TO TOW VEHICLE FRAME

ALWAYS use safety chains. Chains hold trailer if connection fails. You must:

- CROSS chains underneath coupler.
- ALLOW slack for trailer to turn.
- ATTACH chain hooks securely to tow vehicle frame.

ENOUGH SLACK FOR TURNS

CROSS CHAINS

P/N: 29743

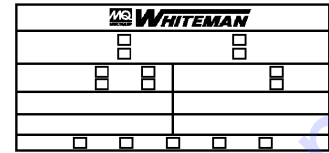
WARNING

DISCONNECTED CONNECTED

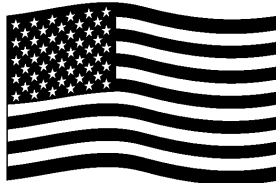
Lights can prevent trailer from being hit by other vehicles. You must:

- CONNECT trailer and tow vehicle electrical connectors.
- CHECK all lights, tail lights, turn signal, and brake lights.
- DO NOT TOW if lights are not working.

P/N: 29472



CONTACT PARTS DEPT.



P/N: 29730

240 VAC/30A MAIN BREAKER

P/N: DCL199

120 VAC/15A G.F.C.I. BREAKER

P/N: DCL189

LIGHT CONTROL/BREAKER

P/N: 29130

CAUTION

SHUT DOWN GENERATOR BEFORE CHANGING LAMPS

P/N: 29132

WARNING

FAILURE TO TURN OFF LIGHTS BEFORE STOPPING ENGINE MAY RESULT IN GENERATOR DAMAGE AND VOID WARRANTY

P/N: 29128

WARNING

ELECTRICAL SHOCK HAZARD

- Electrically ground trailer frame to earth before operating genset.
 - Screw all jacks firmly against ground.
 - For extra safety, also drive in ground rod and connect cable to stud welded to trailer frame.
- Keep light fixture receptacles dry.
 - Screw caps on hand light to seal receptacles when not in use.
 - Do not screw light fixture into receptacle if receptacle is wet.
- Beware of cut power cord.
 - When raising, lowering or rotating tower, be sure to watch power cord.
 - If power cord gets cut or crushed, replace before operating light tower.
- Turn off genset when performing electrical work.
 - Turn off genset before re-lamping fixture.
 - Turn off genset before replacing ballast.
- Take extra precautions when troubleshooting electrical problems.
 - Only use a voltmeter with two well insulated pin probes rated for 600 volts.
 - Ground trailer frame securely with all jacks and a backup ground cable.
 - Inspect ground cable between genset and trailer frame.
 - Treat all conductors as potentially hot.
 - Proceed through circuits systematically, operating only one section at a time.
 - Before disconnecting ballast, turn off circuit breaker and wait 30 seconds for capacitor to discharge.
 - If all the lights are out and the ballasts are receiving power, suspect burned out power cable. Shut down genset and fully inspect power cable and junction box.

P/N: 29118

OPERATING INSTRUCTIONS

START ENGINE GENERATOR

- Check the levels of the engine oil, fuel and coolant.
- Make sure all circuit breakers and auxiliary switches are in the OFF position before starting engine. CAUTION: Starting generator under load can cause damage.
- If the engine is fitted with a glow plug, turn the key to the preheat position and hold for 3-5 sec.
- Turn the key to the "START" position and hold until the engine starts, then release.

CAUTION: If the engine does not start in 20 seconds, release key and repeat steps 3 & 4.

NOTE: If unit is equipped with Auto-Stop/Start, the system will automatically shut off the fuel supply if oil pressure is not obtained within 30 seconds after key is turned to "ON" position. You must return the key to the "OFF" position to restart the 30 second timer if engine does not start.

TURN ON THE FLOODLIGHTS

- Once engine achieves operating speed and is running smoothly, turn on each floodlight control breaker to the "ON" position.

NOTE: Floodlights require a warm-up of 5-15 minutes before they reach full output. If start/stop, a 10 minute cool down is required before restarting.

P/N: 29134

WARNING

DANGEROUS GAS FUMES

- Only operate machine in well ventilated areas.
- DO NOT inhale exhaust gases.
- Only qualified personnel should install, use or service this equipment.

P/N: DCL187

WARNING

CALIFORNIA — Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

P/N: DCL197

OIL LEVEL DIPSTICK

CAUTION

Before starting the engine, check that the oil level is within the indicated operating range. If the level is above the H mark or below the L mark, it is important to correct before operating to avoid damage to the engine.

P/N: DCL193

CHECK DAILY

- Maintain water/coolant level at top of reservoir caps.
- Maintain reserve tank water/coolant level between H and L marks. Use a mixture of 50/50 Ant-Freeze/Water.
- Add coolant when reserve tank is low (L). Fill to the H mark with Ant-Freeze/Water.

CAUTION

WATER COOLANT LEVEL

RESERVE TANK

P/N: DCL194

DANGER HIGH VOLTAGE

P/N: 29047

WARNING

STAY CLEAR OF BOOM

P/N: 29123

DANGER!

TO PREVENT SERIOUS INJURY OR DEATH

ALWAYS MAKE SURE AREA ABOVE TOWER MAST IS OPEN AND CLEAR OF OVERHEAD POWER LINES. THE TOWER MAST EXTENDS IN EXCESS OF 30 FT. (9 METERS).

P/N: 29651

WARNING

OVER-HEAD HAZARD TO PREVENT SERIOUS INJURY OR DEATH

- Level trailer before use.
- Do not raise, lower or use light tower unless all outriggers and jacks are positioned on firm ground.
- Watch out for overhead obstructions, such as trees and high voltage power lines.

P/N: 29135

WARNING

ALL JACKS MUST BE SWIVELED TO HORIZONTAL BEFORE MOVING TRAILER

P/N: DCL106

WARNING

HOT COOLANT can cause severe burns

- DO NOT remove cap if radiator is hot

P/N: DCL183

Figure 1. Operation and Safety Decals (Continued)

LT-12 SERIES LIGHT TOWER — SPECIFICATIONS (LIGHT TOWER)

Light Tower Model	LT-12D	LT-12P
Engine Model	Deutz F3m1008F/ Lombardini LDW 1003 Diesel Engine	Perkins 103-10 Diesel Engine
Weight (Dry)	1,550 lbs. (700 kg.)	
Dimensions	See Table 3	
Support Points	5	
Wind Stability with Genset.	65 mph (80.46 kph)	
Floodlights	4-1,000 Watt Metal Halide	
Lumens	440,000	
Light Coverage	5 to 7 acres	
Light Termination	4 x 3-pin QD plug	
Generator Specifications		
GFCI Receptacle Output	120 VAC @ 15 A (US only)	
Twist-Lock Receptacle Output	240 VAC @ 25 A (US only)	
GFCI Circuit Breaker (Amps)	15 A	
Twist-Lock Circuit Breaker (Amps)	25 A	
Continuous Output (Watts)	6,000 W	
Noise Level @ 23 ft. (7 m)	73 db.	
Trailer Specification		
Jackstand Capacity	2,000 lbs. (907 kg.)	
Hitch Type	2 in. Ball (Optional Pintle Kit available)	
Tire Size	13 in. (330 mm.)	
Tire Rim Size	13 x 4.5 in. (330 x 114 mm)	
Axle Capacity	2,000 lbs. (907 kg.)	
Hub Type	5-Lug	
Suspension Type	3-Leaf	
Electrical Tail-light Connector	4-Wire	
Winch Capacity	1,500 lbs. (680 kg.)	
Winch Rope Wire	3/16 in.	

LT-12 SERIES LIGHT TOWER — SPECIFICATIONS (ENGINES)

Perkins Model 103-10 Diesel Engine	Engine Type	Aspirated 4-stroke, 3-cylinder, 1 liter Diesel Engine
	Bore X Stroke	2.95 in. X 2.83 in. (75 mm x 72 mm)
	Displacement	58.21 cu. in. (954 cc)
	Max Output Standby	12 H.P. at 1,800 R.P.M.
	Max Output Prime	10.5 H.P. at 1,800 R.P.M.
	Fuel Tank Capacity	Approx. 30 U.S. Gallons (113 Liters)
	Run Time With 4 Lights	64 Hours
	Standard Idle Speed	1,800 R.P.M.
	Fuel Type	N0. 2 Diesel Fuel
	Lube Oil Capacity	7.4 U.S. Pints (3.5 Liters)
	Cooling System	Water-cooled
	Coolant Capacity	8.0 U.S. Pints (3.8 Liters)
	Starting Method	Electric Start
	Battery Type	Group 12
	Total Weight (Dry)	280 lbs. (127 Kg.)
Total Weight (Wet)	287 lbs. (130 Kg.)	
Lombardini Model LDW 1003/Diesel Engine or Deutz Model F3M008F Diesel Engine	Engine Type	3-cylinder, Diesel Engine
	Displacement	62.73 cu. in. (1028 cc)
	Max Output Standby	12 H.P. at 1,800 R.P.M.
	Fuel Tank Capacity	Approx. 30 U.S. Gallons (113 Liters)
	Run Time With 4 Lights	64 Hours
	Standard Idle Speed	1,800 R.P.M.
	Fuel Type	N0. 2 Diesel Fuel
	Oil Sump Capacity	2.5 U.S. Quarts (2.36 Liters)
	Cooling System	Liquid-cooled
	Starting Method	Electric Start
	Battery Type	Group 24
Total Weight (Dry)	187.3 lbs. (85 Kg.)	

LT-12 SERIES LIGHT TOWER — DIMENSIONS

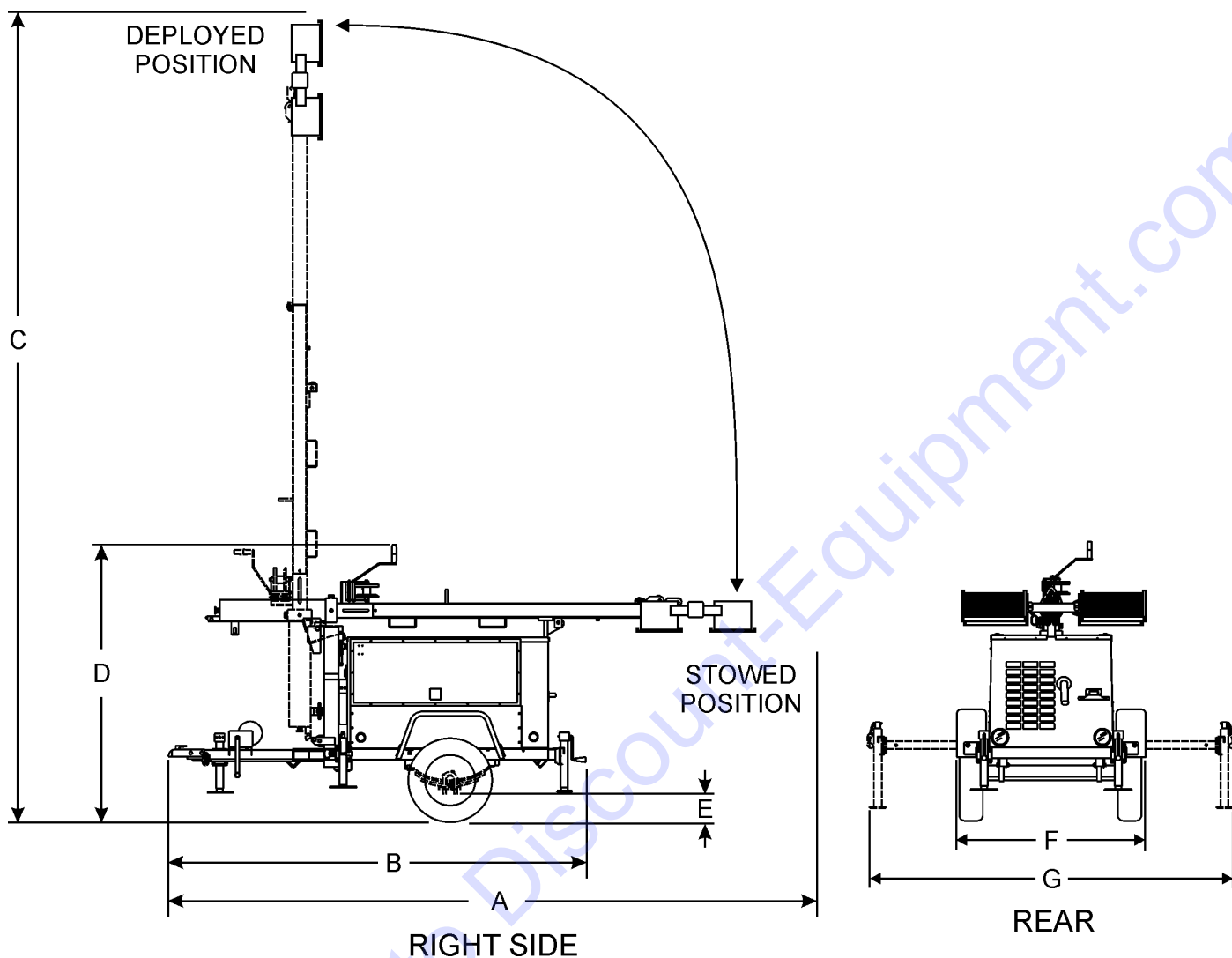


Figure 2. Dimensions

Reference Letter	Description	Dimension in. (mm.)
A	Length (Mast Stowed Position)	170 in. (431 cm.)
B	Length (Mast Deployed Position)	101 in. (256 cm.)
C	Max. Height (Mast Deployed Position)	31.5 ft. (9.6 m)
D	Height (Mast Stowed Position)	74 in. (187 cm.)
E	Ground Clearance (From Axle)	8 in. (20 cm.)
F	Width (Tow Ready)	51 in. (129 cm.)
G	Width (Outriggers Deployed)	109 in. (276 cm.)

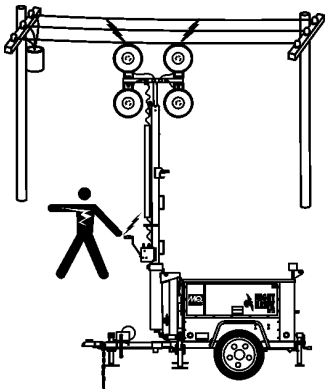
LT-12 SERIES LIGHT TOWER — GENERAL INFORMATION

The Stow LT-12 Series Light Tower is a dedicated general purpose floodlight tower intended for emergency and remote lighting conditions.

The light tower can be raised vertically in excess of 31.5 feet (9.6 meters) by means of a manual winch. The tower tensioning system is designed to provide the necessary tension to safely control the pivot of the tower. Outriggers and rear support stand must be deployed prior to raising the mast.

! **DANGER - Overhead Obstruction Danger**

ALWAYS make sure the area above Light tower is open and clear of overhead power lines and other obstructions. The tower extends in excess of 30 ft. (9 meters). Contact with overhead powerlines or other obstructions could result in equipment damage, ***Serious Injury or Death!***

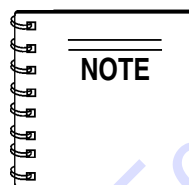


The lighting system of Stow's LT-12 Series Light Tower is comprised of 4 "Metal Halide" 1000 watt lamps. Each lamp has an output of 110,000 lumens yielding a total of 440,000 lumens for all four floodlights. Typical lighting coverage is between 5 to 7 acres.

Each floodlight requires a ballast for starting. Located on the control panel of the generator is a weather resistant ballast box that contains the ballast for each floodlight. The control panel contains four ON/OFF circuit breakers for each floodlight.

For ease of service or transport, each floodlight is equipped with a quick-disconnect connector that allows the lamp fixture to be removed quickly. This feature is extremely useful during transport of the light tower over rough terrain. It is always best to remove the floodlights and pack them safely so they will not get damaged.

As an added feature, the LT-12 is available with two auxiliary output receptacles. The upper most receptacle (twist-lock), located at the front of the light tower, can provide 240 VAC at 25 amps. The bottom receptacle is a GFCI receptacle which can supply 120 VAC at 15 amps. These receptacles that can be used for light power tools or other similar applications.



Some LT-12 Light towers are equipped with a Lombardini Diesel Engine. All procedures & references to Deutz engines in this manual may be applied to Lombardini engines unless specifically noted otherwise.

LT-12 SERIES LIGHT TOWER — COMPONENTS

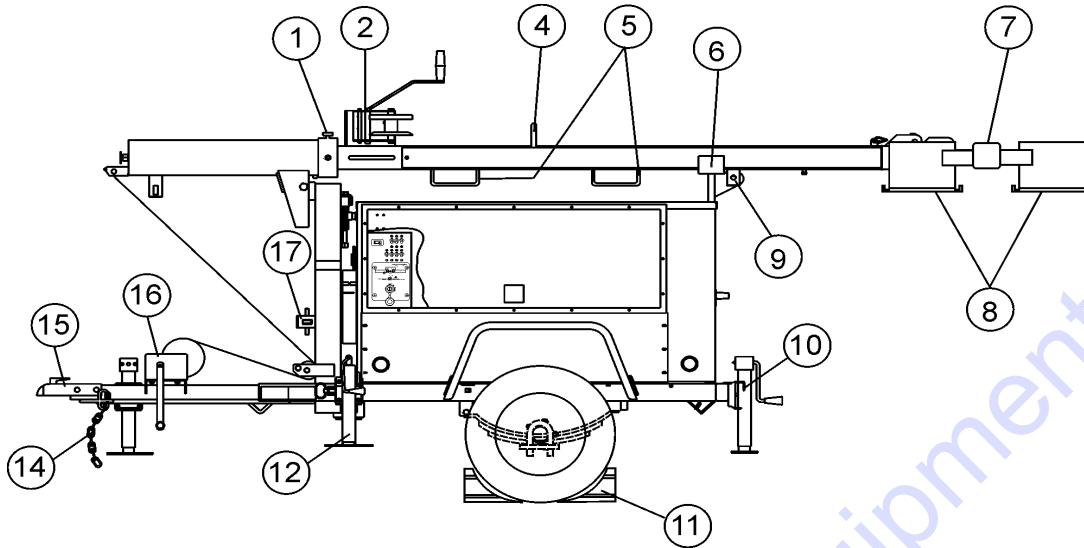


Figure 3. Major Components (Control Panel Side)

Figure 3 and 4 shows the location of the controls and components for the LT-12 Series Light Tower. The functions of each control is described below:

1. **Mast Rotation Locking Knob** – Unscrew this knob to release mast for rotation.
2. **Vertical Mast Extension Winch** – Use this winch to extend the mast to the desired height. Maximum height is approximately 31.5 feet (9.6 meters).
3. **Mast Rotation Handle** – Grip this handle to rotate mast to desired position. To lock mast tighten mast rotation locking knob.
4. **Lifting Bail** – When lifting of the light tower by crane is required, use this lifting bail. Note: this lifting bail is balanced for a **fully configured** light tower; removal of any light tower components will un-balance the lifting bail.
5. **Forklift Pockets** – When lifting of the light tower is required, use these fork lift pockets to lift the light tower. Remember to insert the forks of the fork lift a minimum of 24 inches into the mast fork lift pockets.
6. **Mast Cradle Support** – When towing of the light tower is required, place the tower mast into the cradle support. Make sure tower release pin has been inserted and mast is locked.
7. **T-Bar** – Allows the floodlights to be mounted vertically or horizontally.
8. **Flood Light** – 1000 watt "Metal Halide" type bulb with a 110,000 lumens capacity. Light coverage is typically between 5 to 7 acres.
9. **Tower Lock/Release Pin** – Pull this pin to release tower mast from cradle support.
10. **Jack Stands** – There are two trailer jack stands, which are located at the front and rear of the trailer. Use these 2 jack stands to level and support the light tower.
11. **Chock Blocks** – Place these blocks (not included as part of the light tower package) under each trailer wheel to prevent rolling.
12. **Outrigger Jacks** – Use these 2 outrigger jacks to level and support the light tower.
13. **Control Panel/ Ballast Compartment** – This panel contains the ON/OFF circuit breakers for each flood light. In addition, located behind the control panel are the ballasts and electrical components for each floodlight.
14. **Safety Chain** – Always attach safety chain to the towing vehicle. Never tow the light tower with the safety chain unattached.
15. **Ball Hitch Coupler** – Attach this coupler to the towing vehicle. Use only the specified ball diameter as indicated on your coupler. Use of any other ball diameter will create an extremely dangerous condition which can result in separation of the coupler and ball or ball failure.
16. **Vertical Mast Winch** – Use this winch to raise the mast to the vertical position. Once mast is in the full vertical position the locking pin engages automatically.
17. **Mast Locking/Release Pin** – Pull this pin to start placing the tower mast in the vertical position. Locking pin automatically engages when tower mast has reached full vertical position.

LT-12 SERIES LIGHT TOWER — COMPONENTS

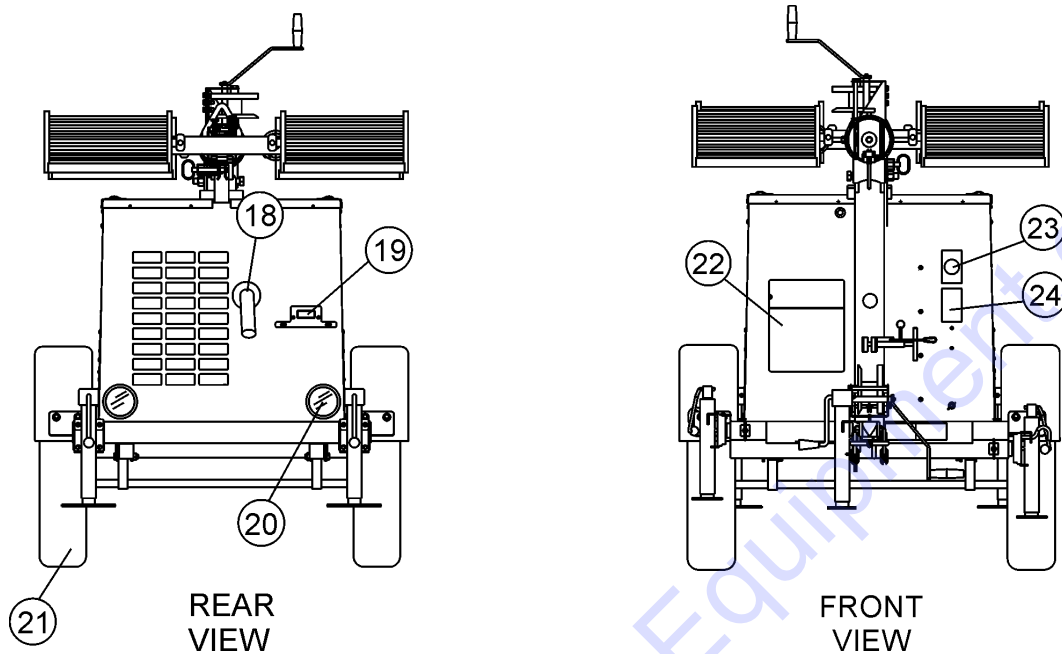


Figure 4. Major Components (Front/Rear)

18. **Engine Exhaust Pipe**— Directs engine exhaust to the rear of the light tower. **NEVER** block this exhaust pipe with obstructions. **ALWAYS** place the generator in an area free of obstructions.

21. **Tires**— This light tower uses a ST175-13C size tire. Replace with only recommended tire size. **NEVER** tow light tower with bad or worn tires.

22. **Documentation Box**— Contains information regarding the light tower.

23. **240 VAC Twist-Lock Receptacle**— This twist-lock receptacle provides 240 VAC, 25 amps.

24. **120VAC GFCI Receptacle**— This GFCI receptacle provides 120 VAC, 15 amps.

CAUTION - Burn Hazard

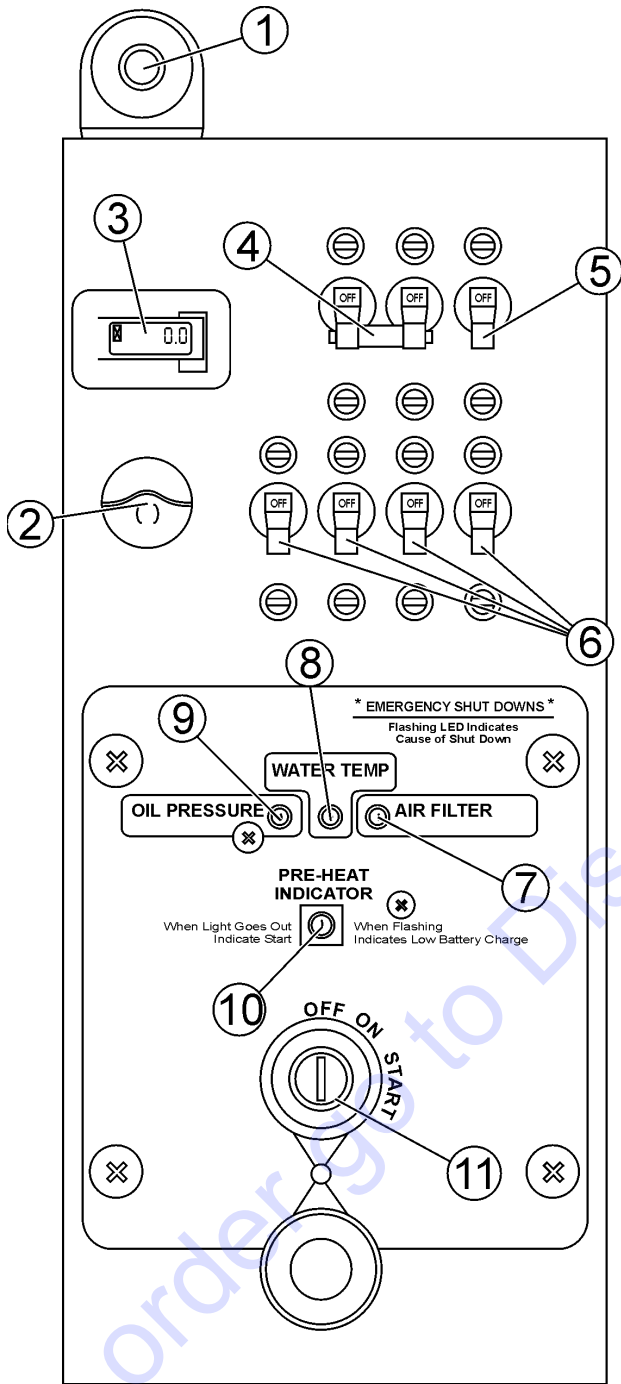
The exhaust pipe will become extremely hot when the engine is in use. **NEVER** touch the exhaust pipe when the engine is running. The possibility exists of severe burns to the skin. Allow the exhaust pipe to **cool** before touching.



19. **License Light**— This light illuminates the license plate. Whenever towing of the light tower is required, make sure this light is operational.

20. **Brake Lights**— Before towing the light tower, make sure that these lights are operational and are working correctly. **NEVER** tow the light tower if these lights are inoperative.

LT-12 SERIES LIGHT TOWER — CONTROL PANEL

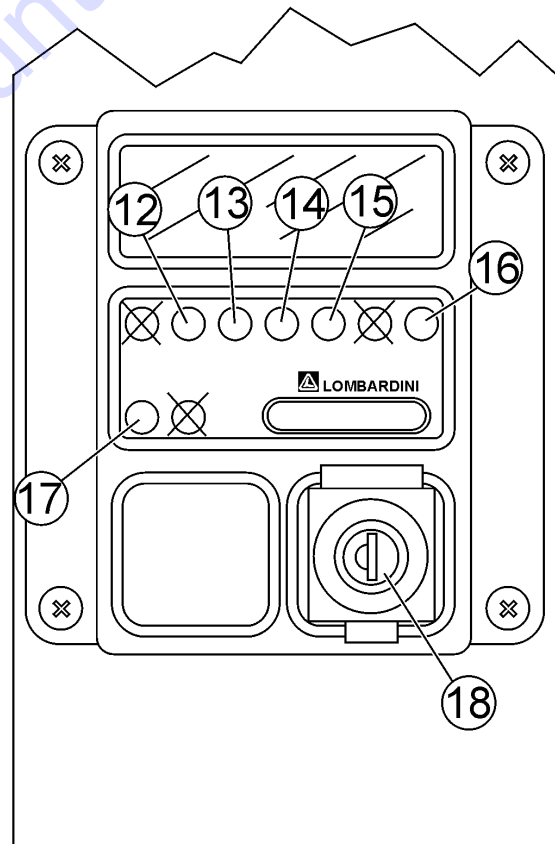


PERKINS ENGINE CONTROL PANEL

Figure 5. Control Panel Components and Indicators

DISPLAY = NOT USED

⊗ = NOT USED



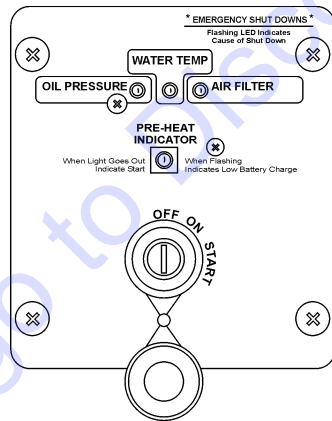
LOMBARDINI ENGINE CONTROL PANEL

LT-12 SERIES LIGHT TOWER — CONTROL PANEL

Figure 5 shows the location of the basic control panel components for the LT-12 Light Tower. Listed below is a brief explanation of each control or component.

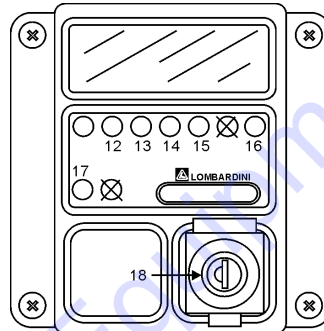
1. **Internal Cabinet Light Switch** – This switch controls the internal cabinet light for the light tower control panel. When the cabinet door is raised, the light will automatically come on. When the cabinet door closes, the switch is depressed and the light turns off.
2. **Internal Cabinet Light** – Provides illumination for the LT-12 control panel during nighttime operation. The light is activated when the cabinet door is raised.
3. **Hour Meter** – This digital hour meter indicates the number of hours machine has been in use.
4. **Main Circuit Breaker** – A double-pole 25 amp, ON/OFF circuit breaker which protects the 240 VAC twist-lock receptacle from overload. In addition it allows voltage to be supplied to the GFCI receptacle and 15 amp breakers (4).
5. **GFCI Receptacle Circuit Breaker** – A single-pole, 15 amp, ON/OFF circuit breaker which protects the GFCI receptacle from overload.
6. **Flood Light Circuit Breakers** – A single-pole, 15 amp, ON/OFF circuit breaker for each floodlight (4).

Items 7 - 11 refer to the Perkins Engine Control Panel only. See Figure 5.










7. **Air Filter Indicator Alarm Light** – This alarm light flashes when a problem with the air filter is detected. Service as required.
8. **Water Temperature Alarm Light** – This alarm light flashes when the water temperature becomes too hot for normal engine operation. Service as required.
9. **Oil Pressure Alarm Light** – This alarm light flashes when the oil pressure has fallen to low for normal engine operation. Service as needed.

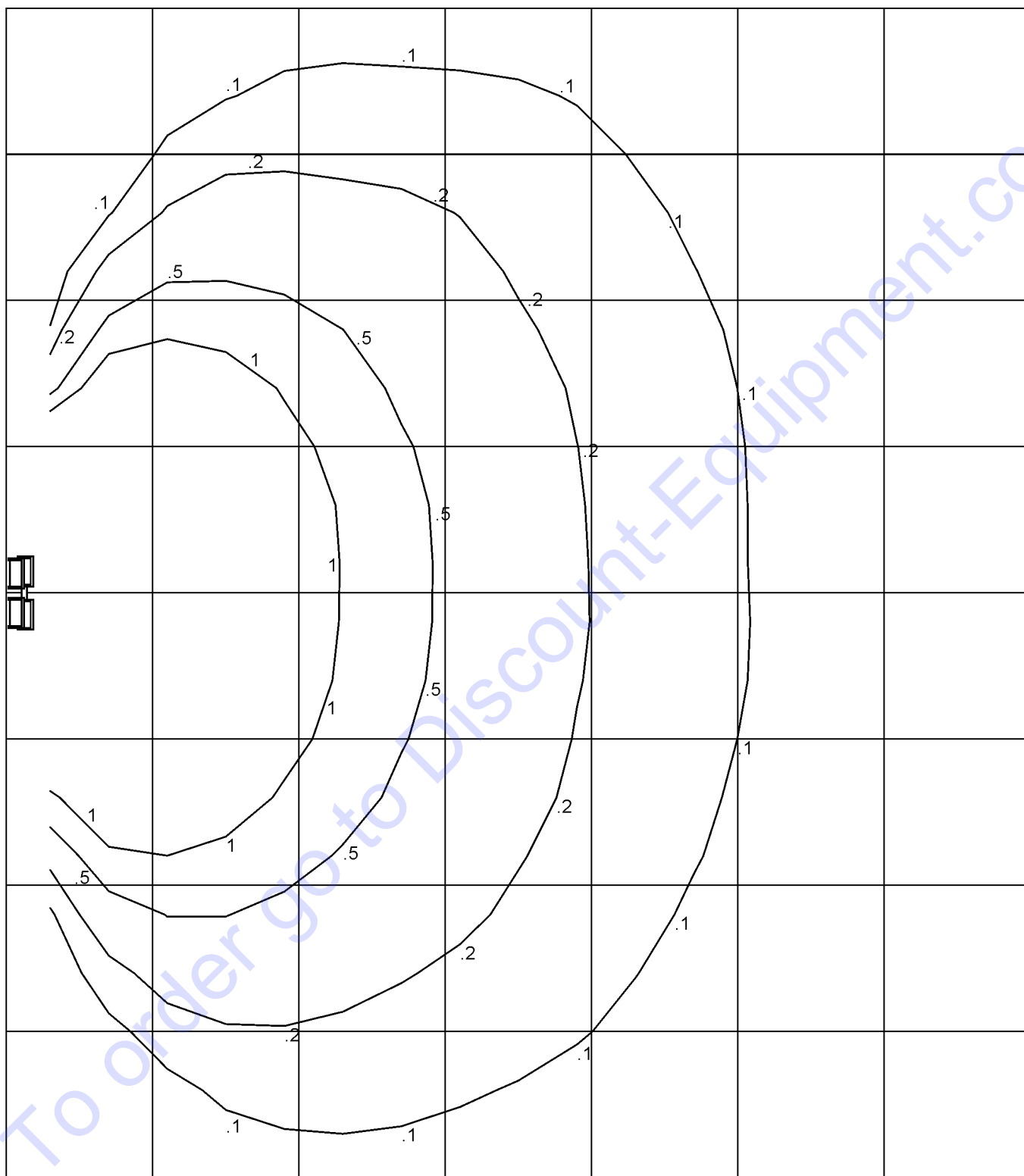
10. **Pre-Heat Indicator Light/Battery Charge Light** – Indicates when the glow plugs have been heated up for starting the engine. If the light is flashing, a low battery charge is detected.
11. **Ignition Key Switch** – Insert key into ignition switch and turn clockwise to the **ON** position to warm the glow plugs. When glow plug indicator light goes **OFF**, turn the key to the **START** position. Release key when engine starts.



Items 12 - 18 refer to the Lombardini Engine Control Panel only. See Figure 5.

12. **Normal Operation Indicator Light** – This indicator light is illuminated when the engine is functioning normally. 
13. **Low Oil Shutdown Indicator Light** – This indicator light is illuminated when the engine has shut down due to low oil pressure. Service as needed. 
14. **High Temperature Indicator Light** – This indicator light is illuminated when the engine has shut down due to high water temperature. Service as needed. 
15. **Alternator Indicator Light** – This indicator light is illuminated when the engine has shut down due to high water temperature. Service as needed. 
16. **Glow Plug Indicator Light** – This indicator light is illuminated when the glow plugs have been heated for starting the engine. 
17. **Air Filter Restriction Indicator Light** – This indicator light is illuminated when the engine has shut down due to blockage in the air filter. Service as needed. 
18. **Ignition Key Switch** – Insert key into ignition switch and turn clockwise to the **ON** position to warm the glow plugs. When glow plug indicator light goes **OFF**, turn the key to the **START** position. Release key when engine starts. 

LT-12 SERIES LIGHT TOWER — FLOOD LIGHT FOOTCANDLE PLOT



Light Plot represents a mast extended to 30'
with 4 lights illuminated, tilted down 20°

Scale: 1 in. = 50 ft.

Figure 6. Floodlight Footcandle Plot (Area Coverage)

LT-12 SERIES LIGHT TOWER — TOWING GUIDELINES

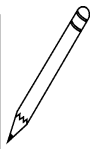
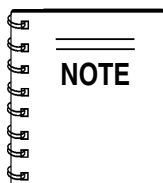
Towing Safety Precautions

CAUTION - Local Towing Regulations

Check with your county or state safety towing regulations department before towing your *light tower*.

To reduce the possibility of an accident while transporting the light tower on public roads, always make sure that the trailer and the towing vehicle are in good operating condition and both units are mechanically sound.

The following list of suggestions should be used when towing the light tower:



Remember, when transporting of the light tower is required, **always remove the floodlights** and pack them safely so they will not get damaged.

- Make sure that the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating" (GVWR). See Table 1 for light tower weight.
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow the light tower's trailer with defective hitches, couplings, chains etc.
- **CHECK** the tire air pressure on both the towing vehicle and the trailer. Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer section of the light tower is equipped with a "**Safety Chain**".
- **ALWAYS** attach trailer's safety chain to frame of towing vehicle.
- **ALWAYS** make sure that the vehicle and trailer directional, backup, brake, and trailer lights are connected properly and are working properly.
- Remember in most cases the maximum speed unless otherwise posted for highway towing is 55 MPH, however before towing your light tower, check your local state, and county vehicle towing requirements. Recommended off-road towing is not to exceed **15 MPH** or less depending on type of terrain.
- Place *chocked blocks* underneath wheel to prevent **rolling**, while parked.
- Depending on soil conditions and location it may be necessary to place *support blocks* underneath the trailer's bumper to prevent **tipping**, while parked.

- Inflate tires to correct pressure, inspect tires for cuts, and excessive wear. See Table 3 (Tire Wear Troubleshooting).
- Check wheel mounting lug nuts with a **torque wrench**. Torque wheel lug nuts as described in the "**Lug Nut Torque Requirements**", Table 5.
- Check tightness of hanger bolt, shackle bolt, and U-bolts nuts, torque suspension hardware per Table 4.
- Avoid sudden stops and starts. This can cause skidding, or jackknifing. Smooth, gradual starts and stops will improve gas mileage.
- Avoid sharp turns to prevent rolling.
- Swivel all jackstands parallel to the ground before transporting.
- **DO NOT** transport light tower with fuel in the generator fuel tank.

CAUTION - Defective/Damaged Trailer Couplings

If the trailer coupler is deformed replace entire coupler. **NEVER** tow the light tower with a defective trailer coupler. There exist the possibility of the trailer separating from the towing vehicle.

Light Tower Trailer Vehicle Connection

1. Check the vehicle hitch ball, and trailer coupler for signs of wear or damage. Replace any parts that are worn or damaged before towing.
2. Use only the 2-inch ball diameter as indicated on the trailer's coupler. Use of any other ball diameter will create an extremely dangerous condition which can result in separation of the coupler and ball or ball failure.
3. Be sure the coupler is secured to the hitch ball and the lock lever is down (locked).
4. Attach safety chains as shown in Figure 7. Remember to **cross** the safety chains.
5. After towing for about 50 miles recheck the entire towing system for tightness.

Recommended Maintenance

1. Smear ball socket and clamp face with chassis grease. Periodically oil pivot points and wear surfaces of the coupler with SAE 30 W motor oil.
2. When parking or storing the light tower, keep the coupler off the ground so dirt and other debris will not build up in the ball socket.

LT-12 SERIES LIGHT TOWER — TOWING GUIDELINES

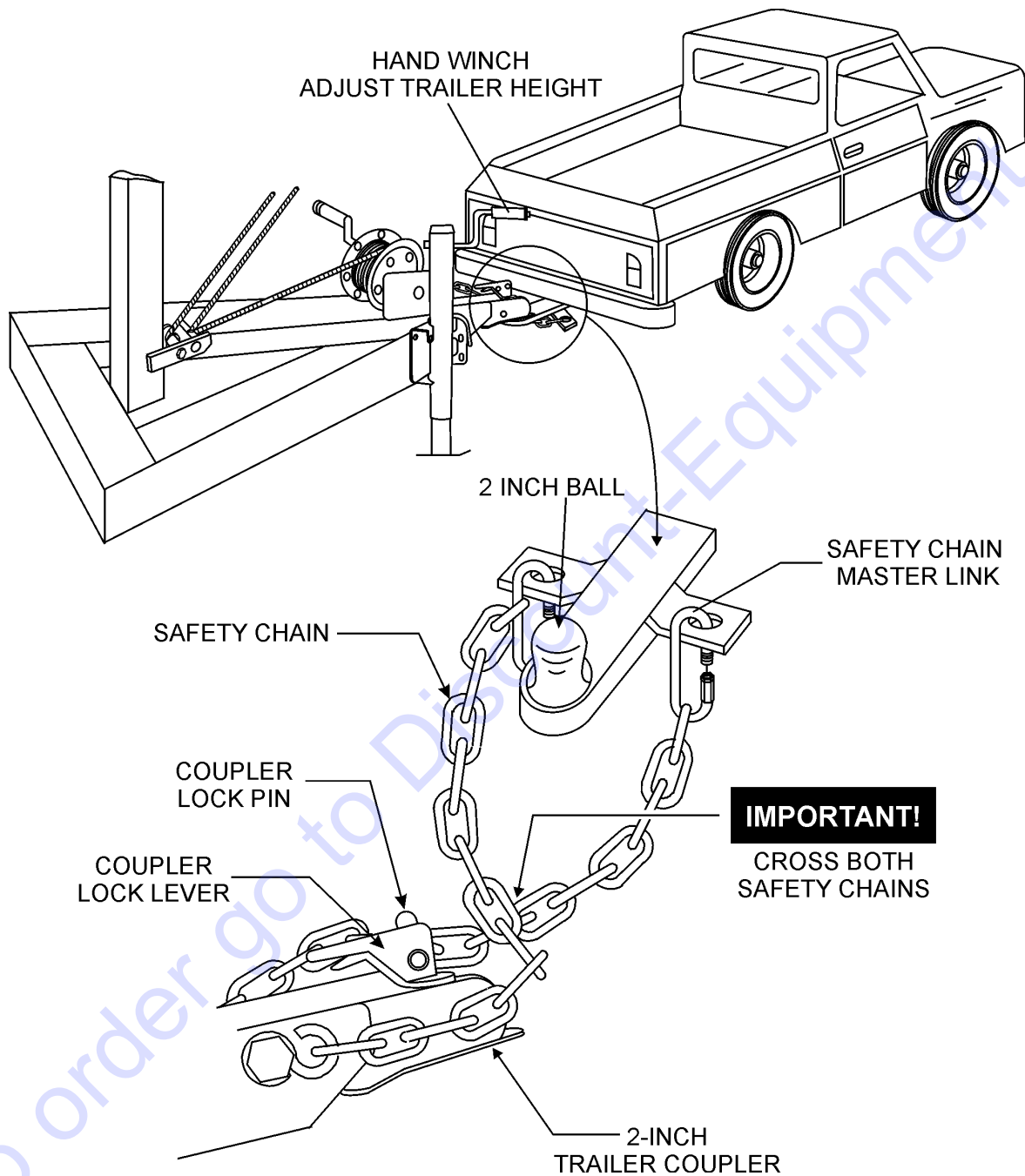


Figure 7. Safety Chains/Trailer Coupler Hook-up


LT-12 SERIES LIGHT TOWER — TRAILER SAFETY GUIDELINES

Tires/Wheels/Lug Nuts

Tires and wheels are a very important and critical components of the trailer. When specifying or replacing the trailer wheels it is important the wheels, tires, and axle are properly matched.

! WARNING - Wheel Repair/Modification

DO NOT attempt to repair or modify a wheel. **DO NOT** install an inter-tube to correct a leak through the rim. If the rim is cracked, the air pressure in the inter-tube may cause pieces of the rim to explode (break-off) with great force and can cause serious eye or bodily injury.



Tires Wear/Inflation

Tire inflation pressure is the most important factor in tire life. Pressure should be checked cold before operation. **DO NOT** bleed air from tires when they are hot. Check inflation pressure weekly during use to insure the maximum tire life and tread wear.

Table 3 (Tire Wear Troubleshooting) will help pinpoint the causes and solutions of tire wear problems.

! WARNING - Safety Glasses Required

ALWAYS wear safety glasses when removing or installing force fitted parts. Failure to comply may result in serious injury.










TABLE 3 TIRE WEAR TROUBLESHOOTING			
WEAR PATTERN		CAUSE	SOLUTION
	Center Wear	Over Inflation	Adjust pressure to particular load per tire manufacturer.
	Edge Wear	Under Inflation	Adjust pressure to particular load per tire manufacturer.
	Side Wear	Loss of chamber or overloading.	Make sure load does not exceed axle rating. Align wheels.
	Toe Wear	Incorrect toe-in	Align wheels.
	Cupping	Out-of balance	Check bearing adjustment and balance tires.
	Flat Spots	Wheel lockup & tire skidding.	Avoid sudden stops when possible and adjust brakes.

Suspension

The leaf suspension springs and associated components (Figure 8) should be visually inspected every 6,000 miles for signs of excessive wear, elongation of bolt holes, and loosening of fasteners. Replace all damaged parts (suspension) immediately. Torqued suspension components as detailed in Table 4.

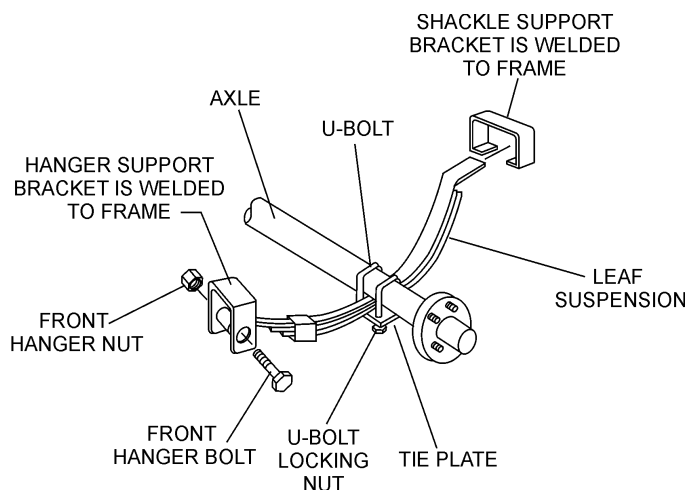


Figure 8. Major Suspension Components

LT-12 SERIES LIGHT TOWER — TRAILER SAFETY GUIDELINES

3/8" U-BOLT	MIN-30 MAX-35
7/16" U-BOLT	MIN-45 MAX-60
1/2" U-BOLT	MIN-45 MAX-50
SHACKLE BOLT SPRING EYE BOLT	SNUG FIT ONLY. PARTS MUST ROTATE FREELY. LOCKING NUTS OR COTTER PINS ARE PROVIDED TO RETAIN NUT-BOLT ASSEMBLY.
SHOULDER TYPE SHACKLE BOLT	MIN-30 MAX-50

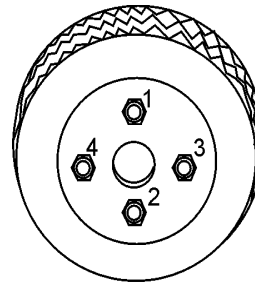
Lug Nut Torque Requirements

It is extremely important to apply and maintain proper wheel mounting torque on the trailer. Be sure to use only the fasteners matched to the cone angle of the wheel. Proper procedure for attachment of the wheels is as follows:

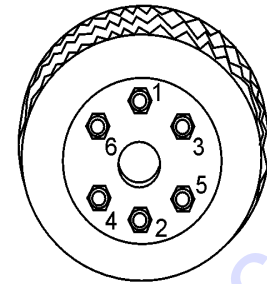
1. Start all wheel lug nuts by hand.
2. Torque all lug nuts in sequence. See Figure 9. **DO NOT** torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Table 5.

Wheel Size	First Pass FT-LBS	Second Pass FT-LBS	Third Pass FT-LBS
12"	20-25	35-40	50-65
13"	20-25	35-40	50-65
14"	20-25	50-60	90-120
15"	20-25	50-60	90-120
16"	20-25	50-60	90-120

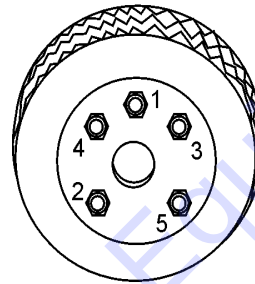
3. After first road use, retorque all lug nuts in sequence. Check all wheel lug nuts periodically.



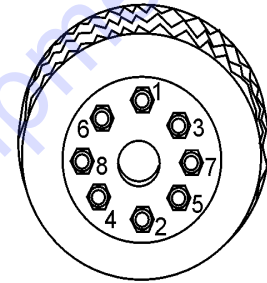
4-LUG NUTS



6-LUG NUTS



5-LUG NUTS



8-LUG NUTS

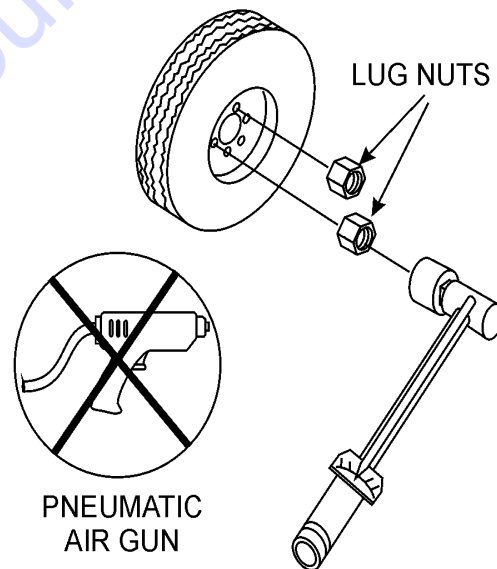
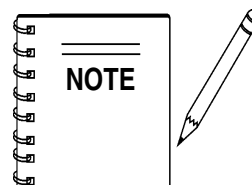


Figure 9. Wheel Lug Nuts Tightening Sequence



NEVER! use an pneumatic air gun to tighten wheel lug nuts.

LT-12 SERIES LIGHT TOWER — TRAILER WIRING DIAGRAM

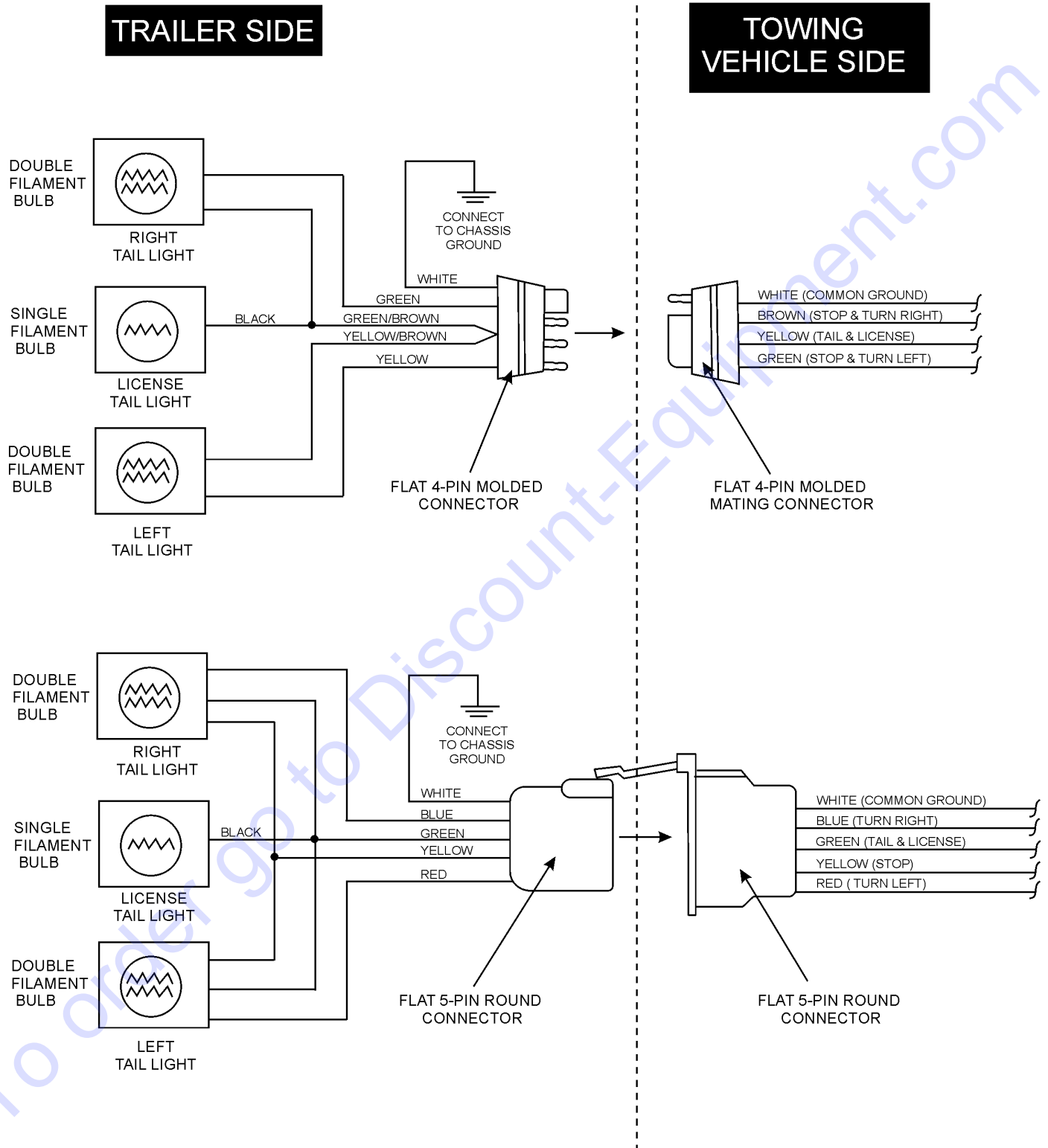


Figure 10. Typical Trailer Wiring Diagram

NOTE:
LIGHTS ARE ORIENTED FROM THE DRIVER'S SEAT

LT-12 SERIES LIGHT TOWER — INSPECTION

Before Starting

1. Read **all safety instructions** at the beginning of manual.
2. Clean the light tower, removing dirt and dust, particularly the engine cooling air inlet and air cleaner.
3. Check the air filter for dirt and dust. If air filter is dirty, replace air filter with a new one as required.
4. Check all fastening nuts and bolts for tightness.

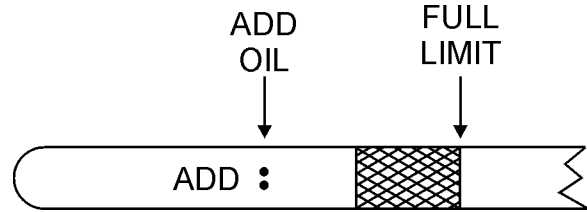


Figure 11. Dipstick

5. When checking the engine oil, be sure to check if the oil is clean. If the oil is not clean, drain the oil by removing the oil drain plug, and refill with the specified amount of oil as outlined in the **Perkins or Lombardini-Deutz Engine Owner's Manuals**. Oil should be warm before draining.

WARNING - Ventillation Requirements

Ensure adequate ventilation when operating the lighttower in enclosed areas. The engine exhaust contains noxious elements.



Indoor Installation

Exhaust gases from diesel engines are extremely poisonous. Whenever an engine is installed indoors the exhaust fumes must be vented to the outside. The engine should be installed at least two feet from any outside wall. Using an exhaust pipe which is too long or too small can cause excessive back pressure which will cause the engine to heat excessively and possibly burn the valves.

Eliminate the danger of deadly carbon monoxide gas. Remember that exhaust fumes from any gasoline or diesel engine are very poisonous if discharged in a closed area. If the light tower is installed indoors, you must make provisions for venting the engine exhaust to the outside of the building.

Engine Oil Check

1. To check the engine oil level, place the make sure the light tower is placed on secure level ground with the engine stopped.
2. Remove the **filler cap/dipstick** from its holder and wipe it clean.
3. Insert and remove the dipstick from its holder. Check the oil level shown on the dipstick.
4. If the oil level is low, add oil through the oil filler hole, **DO NOT** overfill. Fill to the normal operating level as shown on the dipstick (Figure 28). Verify that the oil level is maintained between the two notches as shown in Figure 11. Always fill with recommended type oil as listed in Table 6. Reference Table 2 for engine oil capacity.

TABLE 6. RECOMMENDED MOTOR OIL (DEUTZ ENGINES)

°C	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
°F	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122
SAE 10W																			
										SAE 20W									
															SAE 30				
																		SAE 40	
												SAE 10W-30							
															SAE 10W-40				
																		SAE 10W-60	

TABLE 6. RECOMMENDED MOTOR OIL (PERKINS ENGINES)

°C	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
°F	-40	-31	-22	-13	-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122
										SAE 5W-20									
															SAE 10W-30				
																		SAE 15W-40	
															SAE 20W-50				
												SAE 20							
															SAE 30				
																		SAE 40	

Other types of motor oils may be substituted if they meet the following requirements:

- API Service Classification CH-4
- API Service Classification CG-4
- API Service Classification CF-4
- ACEA Specification E3
- ACEA Specification E2

LT-12 SERIES LIGHT TOWER — INSPECTION

Fuel Check

! CAUTION - Diesel Fuel Safety

Diesel fuel and its vapors are dangerous to your health and the surrounding environment. Avoid skin contact and/or inhaling fumes. **DO NOT** smoke while refueling. **DO NOT** attempt to refuel the light tower if the engine is **hot!** or **running**.



1. To check the engine fuel level, make sure the light tower is placed on secure level ground with the engine stopped.
2. Lift the light tower access door (Figure 12) opposite the control panel. Set the door support latch in place to keep the door open (up).

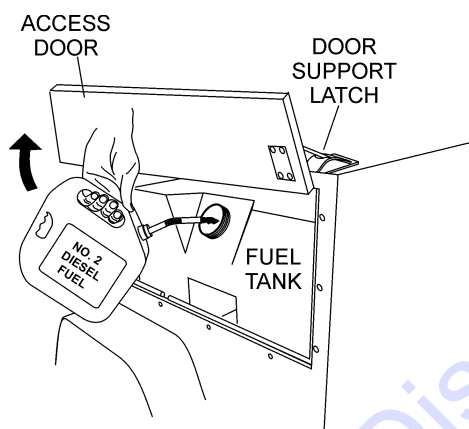


Figure 12. Adding Fuel

3. Remove the fuel cap from the fuel tank as shown in Figure 12.

! CAUTION - Diesel Fuel Safety

ALWAYS fill the fuel tank with clean, fresh #2 diesel fuel. **DO NOT** fill the fuel tank beyond its capacity. **DO NOT TOP-OFF.**

4. Pay attention to the fuel tank capacity when replenishing fuel. The fuel tank cap must be closed tightly after filling. Handle fuel in a safety container. If the container does not have a spout, use a funnel. Wipe up any spilled fuel immediately.
5. Wipe up any spilled fuel **immediately!**

Battery Check

! WARNING - Battery Safety

The operator **MUST** wear the appropriate protective equipment and clothing while handling the battery.

Failure to wear protective equipment or clothing could result in **SERIOUS INJURY**.



Battery - The 12-volt DC battery (Figure 13) is shipped **dry**, and will require a proper electrolyte level for operation.

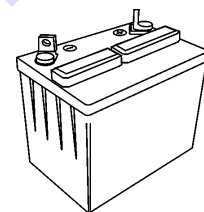


Figure 13. Battery

When servicing of the battery is required perform the following:

- A face shield and rubber gloves should be worn while handling and servicing battery's electrolyte.
- **Disconnect** battery terminal clamps, and remove the battery from the generator cabinet when servicing is required.
- **DO NOT** overfill the battery.

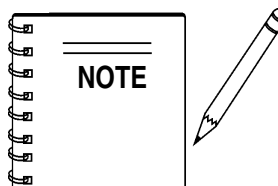
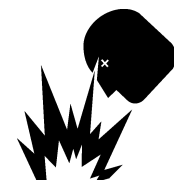
! WARNING - Battery Service Safety



Electrolyte is an acid and must be handled with caution. Servicing instructions from the electrolyte manufacturer must **ALWAYS** be followed to ensure safety. Serious injury can result from careless handling and noncompliance to safety handling instructions.

Overfilling the battery may cause the electrolyte to overflow resulting in corrosion to nearby components. Immediately wash off any spilled electrolyte (battery acid).

Additionally, when connecting the positive (+) cable to the battery's positive (+) terminal post, **DO NOT** allow contact of the wrench or any metallic part to come in contact with the battery's negative (-) terminal post. This may result in an electrical short circuit or an explosion.



Use only **distilled** water in the battery. Tap water can **reduce** the operating life of the battery.

LT-12 SERIES LIGHT TOWER — INSPECTION

Coolant (Ethylene Glycol [Green] / Water — 50/50 mix)

Use only drinkable tap water. If hard water or water with many impurities is used, the inside of the engine and radiator may become coated with deposits and cooling efficiency will be reduced.

An anticorrosion additive added to the water will help prevent deposits and corrosion in the cooling system. See the engine manual for further details.

WARNING - Radiator Burn Hazard

If adding coolant/antifreeze mix to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. The possibility of hot! coolant exists which can cause severe burns.



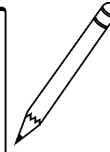
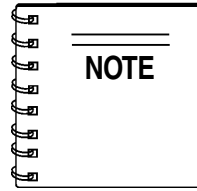
Day-to-day addition of coolant is done from the recovery tank. When adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 7 for engine and radiator, coolant capacities. Make sure the coolant level in the recovery tank is always between the "H" and the "L" markings.

Engine Type	Coolant Capacity
Perkins 103-10	5 qt. (4.7 Liters)
Lombardini LDW 1003	5.18 qt. (4.9 Liters)
DEUTZ F3M1008F	5.18 qt. (4.9 Liters)

Operation Freezing Weather

When operating in freezing weather, be certain the proper amount of antifreeze (Table 8) has been added.

Vol % Anti-Freeze	Freezing Point		Boiling Point	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226



When the antifreeze is mixed with water, the antifreeze mixing ratio **must be** less than 50%.

Cleaning the Radiator

The engine may overheat if the radiator fins become overloaded with dust or debris. Periodically clean the radiator fins with compressed air. Cleaning inside the machine is dangerous, so clean only with the engine turned off and the **negative** battery terminal disconnected.

Air Cleaner

Periodic cleaning/replacement is necessary. Inspect it in accordance with the **Perkins, Lombardini or Deutz Engine Owner's Manuals**.

Fan Belt Tension

A slack fan belt may contribute to overheating, or to insufficient charging of the battery. Inspect the fan belt for damage and wear and adjust it in accordance with the **Perkins, Lombardini or Deutz Engine Owner's Manuals**.

The fan belt tension is proper if the fan belt bends 10 to 15 mm (Figure 14) when depressed with the thumb as shown below.

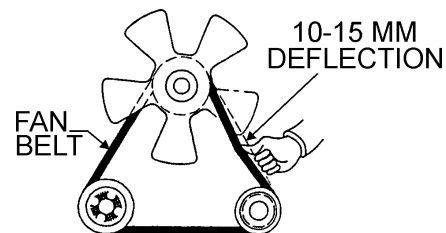


Figure 14. Fan Belt Tension

WARNING - Rotating Parts Hazard

NEVER place hands near the belts or fan while the engine is running.



LT-12 SERIES LIGHT TOWER — INSPECTION

WARNING - Respiratory Hazard

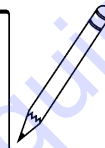
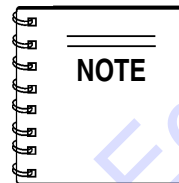
The engine's exhaust contains harmful emissions. ALWAYS ventilate the exhaust when operating inside tunnels, excavations or buildings. Direct exhaust away from nearby personnel.



Before starting the engine perform the following:

1. Be sure to **disconnect the electrical load** and switch the main circuit breaker and all lamp (4) circuit breakers to the **OFF** position prior to starting the engine.
2. **NEVER** start the engine with any circuit breakers in the **ON** position.
3. Make sure light tower is placed on **secure level ground** with chock blocks underneath each wheel to prevent the light tower from rolling.
4. Outriggers have been fully extended to prevent the trailer from tipping.
5. All tower mast sections have been raised to the desired height.

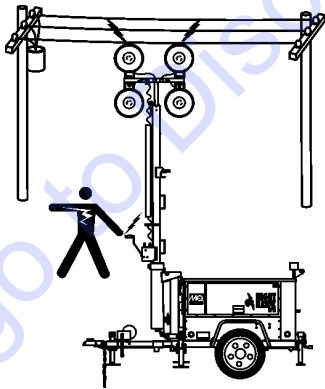
6. Bottom tower mast is locked in place.
7. Light tower trailer support stands have been positioned properly and the trailer is level.
8. Flood lights have been adjusted to desired position.
9. Chocked blocks have been positioned under each wheel to prevent trailer from rolling.
10. Flood lights **DO NOT** interfere with any overhead obstructions.
11. Flood light power cables have been plugged into the appropriate receptacles (J1-J4) on the T-Bar assembly.
12. Light tower trailer frame has been grounded correctly.



DO NOT attempt to start the engine until all the conditions referenced in steps 1 through 12 have been met.

DANGER - Overhead Obstruction Danger

ALWAYS make sure the area above Light tower is open and clear of overhead power lines and other obstructions. The tower extends in excess of 30 ft. (9 meters). Contact with overhead powerlines or other obstructions could result in equipment damage, **Serious Injury or Death!**



LT-12 SERIES LIGHT TOWER — STARTUP PROCEDURES

Starting the Engine

The Night-Hawk LT-12 Series Light Tower is available with two types of engines (Perkins or Lombardini/Deutz). The engine starting procedure contained within this manual will address both engines..

Starting the Engine (Perkins Engines)

1. **Open** the access panel door on the right-side of the light tower (opposite the fuel tank). Set the door latch in place to hold the door open (up)
2. Insert the ignition key into the ignition switch (Figure 15). Turn the ignition key clockwise to the **ON** position. The pre-heat indicator lamp will be lit, wait for this indicator lamp to go **OFF**. When the lamp goes **OFF** this indicates that the glow plugs have been pre-heated and the engine can now be started.

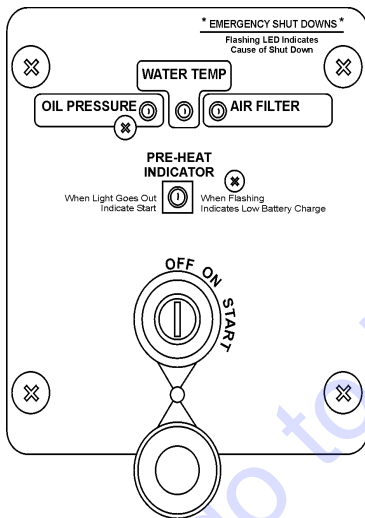


Figure 15. Perkins Ignition Switch

3. Continue turning the ignition key in a clockwise direction to the **START** position, when the engine has started, release the key.
4. Before placing the light tower into actual operation, let it run for 3-5 minutes. Listen of any abnormal sounds or smells that would be associated with a defective light tower. If any abnormal conditions occur, shut-down the light tower and correct the problem.

Starting the Engine (Lombardini/Deutz Engines)

1. **Open** the access panel door on the right-side of the light tower (opposite the fuel tank). Set the door latch in place to hold the door open (up)
2. Insert the ignition key into the ignition switch (Figure 16). Turn the ignition key clockwise one click to the **ON** position. The pre-heat indicator lamp will be lit, wait for this indicator lamp to go **OFF**. When the lamp goes **OFF** this indicates that the glow plugs have been pre-heated and the engine can now be started.

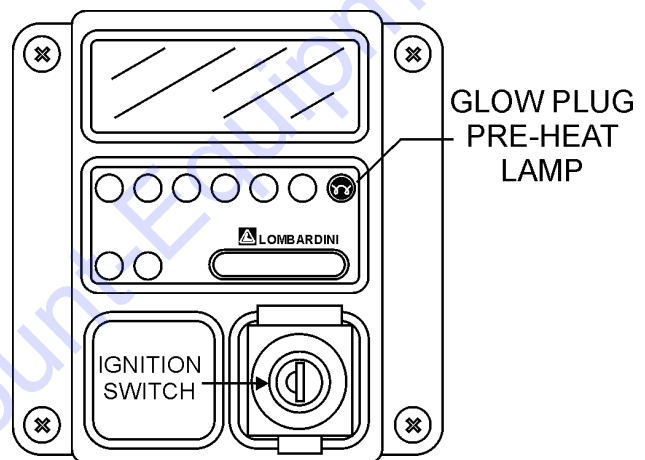


Figure 16. Lombardini/Deutz Ignition Switch

3. Continue turning the ignition key all the way clockwise, when the engine has started, release the key.
4. Before placing the light tower into actual operation, let the engine run for 3-5 minutes. Listen of any abnormal sounds or smells that would be associated with a defective light tower. If any abnormal conditions occur, shut-down the light tower and correct the problem.

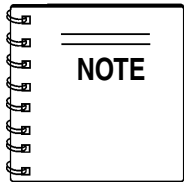
LT-12 SERIES LIGHT TOWER — SHUTDOWN PROCEDURES

Normal Shut-down

1. If a load is attached to the generating set of the light tower, **remove the load**.
2. Set CB-1 thru CB-4 on the control panel to the **OFF** position.
3. Place the **MAIN** circuit breaker (Figure 5, Item 4) on the control panel to the **OFF** position.
4. Wait a few seconds and observe that flood all floodlights are **OFF**.
5. Let the engine idle for a few minutes with no load.
6. Turn the ignition key to the **OFF** position. Store key in a safe location.
7. Lower light tower mast and place in stow position as outlined in the Pre-Setup section of this manual.
8. Place outriggers in tow position, and remove chock blocks.
9. Store light tower in a clean, dry location out of the reach of children and bystanders.

Emergency Shut-down

1. Turn the ignition key to the **OFF** position.



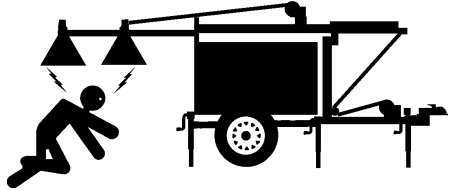
Allow flood lights to cool (15 minutes) if service or removal of bulb is required.

LT-12 SERIES LIGHT TOWER — MAST OPERATION

DANGER - Overhead Obstruction Danger

ALWAYS make sure the area above Light tower is open and clear of overhead power lines and other obstructions. The mast extends in excess of 30 ft. (9 meters). Contact with overhead powerlines or other obstructions could result in equipment damage, **Serious Injury or Death!**

DO NOT stand behind the trailer while the mast is being raised or lowered. Serious Injury could result if the mast falls down.



Outriggers and Support Stands

1. Make sure both outriggers are extended. To extend the outriggers, pull the locking pin on the outrigger and hold while sliding out the outrigger assembly.
2. As soon as the pin clears the travel position hole, release it and continue sliding out the outrigger. The pin must snap into the outrigger locking hole in the extended position.
3. After extending all outriggers, rotate all trailer **jack stands** into the foot down position, then turn the crank handle on the **jack stands** clockwise to lower it and level the light tower.
4. Check behind the light tower and make sure all personnel and objects are clear of the mast.

Raising Mast (Lower Mast Section)

Follow the steps below to raise the lower mast:

1. To release the mast from the support stand locking cradle, **PULL** the large cradle locking pin (see Figure 3, item 9). This will unlock the mast from the horizontal position.
2. Remove the bottom mast quick release locking pin (see Figure 3, Item 17) before raising tower to the vertical position.
3. To place the mast in the vertical position, **TURN** the vertical winch hand lever (Figure 3, item 16) clockwise until the mast is pointing upwards at 90 degrees.
4. Once the mast in the vertical position and the mast lock captures the swivel base tab, insert the quick release locking pin to prevent the mast from falling.

Raising Mast (Top and Center Tower Sections)

Once the tower mast has been locked into its vertical position, the top and center tower sections can now be raised. These two tower sections allow the flood lights to be extended upwards in excess of 30 ft. Perform the following steps when extending the floodlights:

1. Locate the "vertical mast extension hand winch", see Figure 3, Item 2.
2. Turn the vertical mast extension hand winch lever clockwise, and observe that the flood lights begin to climb upward.
3. Continue turning the hand winch lever in the clockwise direction until the desired height has been reached.
4. Release the hand winch lever, this winch is of the self-locking type. The tension on the cable will keep the mast sections in place.

Lowering Mast (Top and Center Tower Sections)

1. Turn the vertical mast extension hand winch lever counter-clockwise, and observe that the flood lights begin to drop downward.
2. Continue turning the hand winch lever counter-clockwise until the top and center mast sections have been fully retracted (slack in the cable).

Lowering Mast (Lower Lower Section)

1. Remove the quick release locking pin to allow the mast section to be lowered to the horizontal section. Hold the locking pin open until the swivel base tab clears the lock.
2. Turn the vertical mast hand winch lever counter-clockwise, and observe that bottom tower mast begins to approach the horizontal position.
3. Continue turning the vertical hand winch lever in the counter-clockwise direction. As the lower tower mast approaches the locking cradle, pull the tower release pin to allow the tower mast to rest in the cradle.
4. Once the lower mast is resting in the cradle of the tower support stand, align the hole on the mast with the hole on the cradle and insert locking pin.

LT-12 SERIES LIGHT TOWER — OPERATION

Turning On the Flood Lights

The **Main Circuit Breaker** (25 amps), and 4 **floodlight circuit breakers** (10 amps each) are located on the upper control panel (Figure 20). Please note that there is one 10 amp circuit breaker for each floodlight.

1. Place the **Main circuit breaker** (Figure 17) on the control panel to the **ON** position.
2. Set CB-1 on the control panel to the **ON** position.
3. Wait a few minutes for the ballast to activate. Observe that flood light #1 is **ON**.
5. Repeat steps 2 and 3 for flood lights 2 through 4 (CB-2 through 4).
6. If all the **flood light circuit breakers** are in the **ON** position (up), then all of the lights should be on.
7. If any of the flood lights are not **ON** refer to the troubleshooting section of this manual.
8. **CLOSE** all cabinet doors.

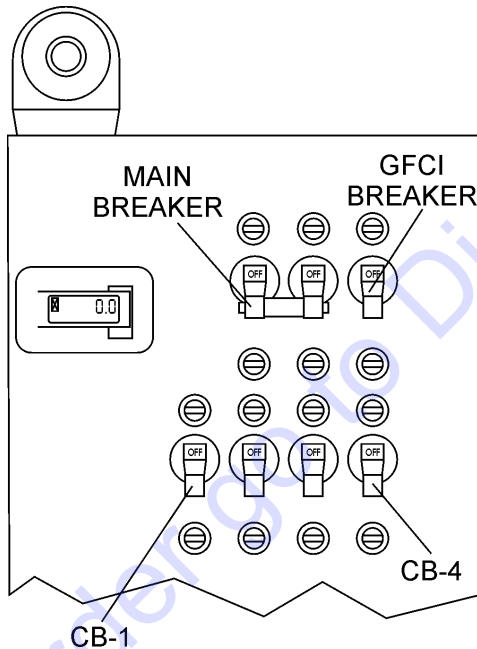
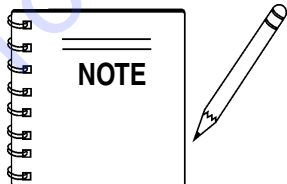


Figure 17. Control Panel Circuit Breakers



NEVER operate the light tower with the engine compartment doors open. Operation with the doors open may cause insufficient cooling to the unit, and damage may result.

Applying an External Load

The Night-Hawk LT-12 Series Light Tower is available with two auxiliary output receptacles (Figure 18). The upper most receptacle (twist-lock) located at the front of the light tower can provide 240 VAC at 25 amps. The bottom receptacle is a GFCI receptacle which can supply 120 VAC at 15 amps.

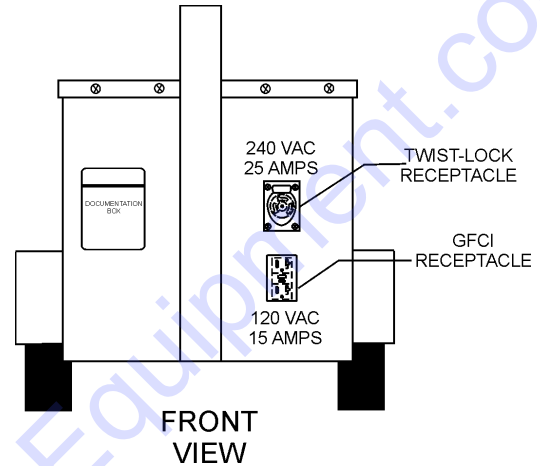


Figure 18. 120/240 VAC Output Receptacles

! DANGER - Electric Shock Hazards

NEVER grab or touch a live power cord with wet hands, the possibility exists of electrical shock, electrocution, and even death!

Testing the 120 VAC GFCI Receptacle

Pressing the **reset** button resets the GFCI receptacle after being tripped. Pressing the "**Test Button**" (See Figure 19) in the center of the receptacle will check the GFCI function. Both receptacles should be tested at least once a month.

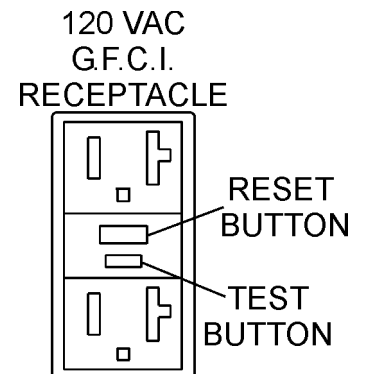


Figure 19. GFCI Test Button

LT-12 SERIES LIGHT TOWER — MAINTENANCE

Use Table 9 shown below as a general checklist to be performed on a daily basis. For more detailed maintenance refer to the Perkins or Lombardini/Deutz engine service manuals.



LT-12 SERIES LIGHT TOWER — MAINTENANCE

Check Cable Wear

The wire rope (cable) that raises and extends the mast is a very important part of the light tower. There is one cable/hand winch system, located on the tongue of the trailer, that raises and extends the light tower mast. There is a second cable/hand winch system located on the mast that serves to raise and lower the two extendable sections of the mast.

! DANGER - Light Tower Cable System Safety

Wire rope (cable) will fail if it is worn, frayed, misused, crushed, kinked or damaged in any way. **ALWAYS** check the cables and pulleys for any abnormalities before use.

DO NOT use it if there is even the slightest cause for concern and replace any damaged cables or pulleys **immediately**.

Servicing the Mast Raise/Lower Cable System:

To replace any components in the mast raise/lower cable system, use the following steps (Reference Figure 20):

1. Lower the mast to the horizontal resting position.
2. Inspect the cable clamps, pulleys, and other components for worn or damaged parts.
3. Disconnect the cable from the ball socket pin and remove from the mast pulley and cable sheave. Detach the cable from the hand winch as necessary.
4. Replace the pulley and the cable as needed.
5. Re-thread the cable through the pulley and reattach the cable to the ball socket pin.
6. Raise and lower the mast several times to verify correct operation.

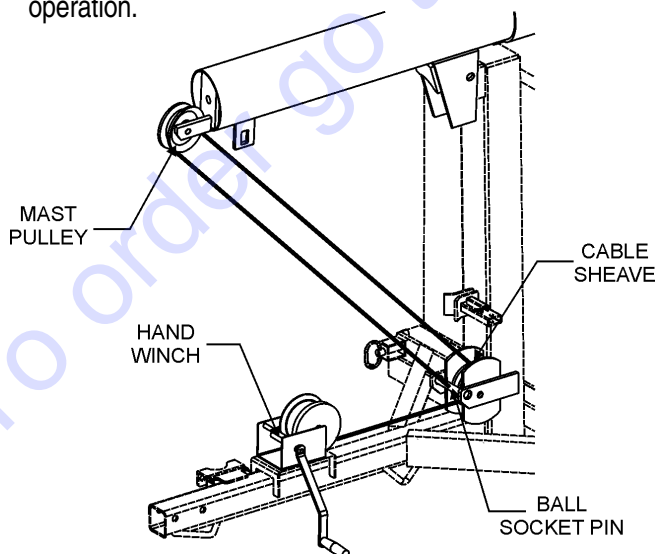


Figure 20. Mast Raise/Lower Cable System

Servicing the Mast Extension Cable System:

To replace the cable in the mast extension cable system, use the following steps (Reference Figure 21):

1. Lower the mast to the horizontal resting position.
2. Inspect the cable clamps, pulleys, and other components for worn or damaged parts. If either of the cables on the mast needs to be replaced, they should both be replaced at the same time.
3. Disassemble the mast by disconnecting the cables from the mast and sliding the sections apart. The lower cable can be disconnected from the winch.

! WARNING - Mast Service Safety

The mast sections are heavy and awkward to handle. Use proper lifting devices and procedures when servicing the mast and its components.

4. There are two pulleys in the mast raise/lower cable system. They should be removed, and replaced if worn or damaged, as they can cause premature cable failure if they are in poor condition.
5. Reassemble the mast extension cable system by connecting the cable to the bottom of the upper mast and sliding the upper mast into the opening of the center mast. Connect the second cable to the bottom of the center mast and slide the center mast into the opening of the lower mast, observing proper lifting techniques.
6. Route the upper mast cable through the center mast pulley and connect the free end of the cable to the lower mast ankle shackle. Route the center mast cable through the lower mast pulley and connect the free end of the cable to the hand winch at the bottom of the lower mast.
7. Raise, extend, retract and lower the mast several times to verify correct operation.

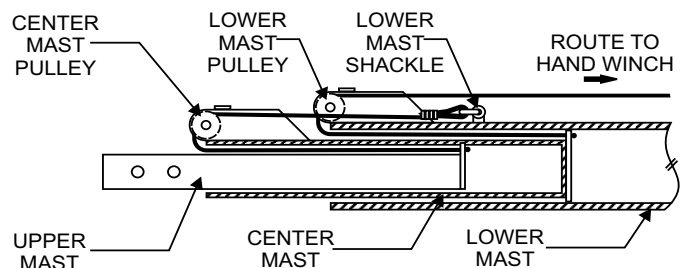


Figure 21 Mast Extension Cable System

General Inspection

Prior to each use, the generating set should be cleaned and inspected for deficiencies. Check for loose, missing or damaged nuts, bolts or other fasteners. Also check for fuel or oil leaks.

Air Cleaner

Every **50 hours**: Check dust indicators on control panel. If light is **ON**, clean the air cleaner element.

1. Un-latch the holding clips and take out the air cleaner element.
2. Clean the inside of the body and cover using a damp cloth.
3. Blow dry with compressed air (0.69Mpa {7kgf.cm², 99.4 PSI} maximum) against the side of the element along the pleats. Then blow dry against outside along the pleats, then against inside again.
4. Remove one seal each time the element is cleaned.
5. Replace the outer element after cleaning it 6 times or after one year. Replace the outer element if indicator is red even after cleaning it.
6. If seal washer is damaged or the threads of wing nut are damaged, replace.
7. Remove evacuator valve and clean it with compressed air. Reinstall.

Fuel Addition

Add diesel fuel (the grade may vary according to season and locations). Always pour through the mesh filter.

Removing Water from the Tank

After prolonged use, water and other impurities accumulate in the bottom of the tank. Occasionally remove the drain cock and drain the contents. During cold weather, the greater the empty volume inside the tank, the easier it is for water to condense. This can be reduced by always keeping the tank as full as possible.

Air Removal

If air enters the fuel injection system of a diesel engine, starting becomes impossible. After running out of fuel, or after disassembling the fuel system, bleed the system according to the following procedure.

To restart after running out of fuel, squeeze the fuel primer bulb to pump fuel into the engine. This unit is equipped with an automatic air bleeding system.

Service Daily

If engine is operating in very dusty and dry grass conditions, a clogged air cleaner will result in high fuel consumption, loss of power and excessive carbon buildup in the combustion chamber.

Cleaning the Fuel Strainer

Clean the fuel strainer if it contains dust or water. Remove dust or water in the strainer cap and wash it in diesel. Securely fasten the fuel strainer cap so that fuel will not leak. Check the fuel strainer every 200 hours of operation or once a month.

Check Oil Level

Check the crankcase oil level prior to each use, or when the fuel tank is filled. Insufficient oil may cause severe damage to the engine. Make sure the generator is level. The oil level must be between the two notches on the dipstick as shown in Figure 14.

WARNING - Radiator Burn Hazard

Allow engine to **cool** when flushing out radiator. Flushing the radiator while **hot!** will damage radiator. In addition the possibility of **hot!** coolant exists which can cause severe burns.



Flushing Out Radiator and Changing Coolant

1. Stop the engine and allow to cool. Tighten valve of the corrosion resistor (if equipped).
2. Turn water filler cap slowly and remove it.
3. Prepare a container to catch the coolant, then open drain plug of the radiator or heat exchanger and drain plug of the engine, and drain the coolant.
4. After draining the coolant, close drain plugs and fill with tap water.
5. When the water level is near the mouth of the water filler, open drain plugs and start the engine, and run at low idling. Keep the engine running at low idling and flush the radiator for about 10 minutes.
6. Adjust the flow of the water flowing in and draining out to ensure that the radiator is always full during the flushing operation. While flushing water through the system, watch carefully the water inlet hose does not come out of the radiator filler port.
7. After flushing, stop the engine, open drain plug and drain the water, then close drain plugs.
8. After draining the water, flush the system with a flushing agent. See instructions on flushing agent label.
9. After flushing, open drain plugs and drain out all the water, then close drain plugs and add tap water so the water level is near the mouth of the water filler.
10. When the water level is near the mouth of the water filler, open drain plugs and start the engine, run at low idling and continue to flush the system until clean water comes out. Adjust the flow of the water flowing in and draining out to ensure the radiator is always full during the flushing operation.
11. When clean water comes out, stop the engine, drain all the water, then close drain plugs.
12. Remove the corrosion resistor (if equipped) and open valve.
13. Supply water until it flows over the water filler.

14. Drain the water inside reserve tank, clean the inside of the reserve tank, then fill with coolant/water mixture to between the full and low lines.
15. Stop the engine, wait for 3 minutes, add tap water until the water level reaches near the water filler port, then tighten the radiator cap.

Changing Oil

1. Make sure the oil is cool before changing.
2. Set a container directly under the drain plug of the oil pan. Loosen the drain plug slowly.
3. Check the drained oil for excessive metal particles or foreign material. Contact the distributor if there is metal particles or foreign material.
4. Using a filter wrench, turn filter cartridge to the left to remove it. If the filter cartridge is filled with a large amount of oil, wait 10 minutes or so before removing. Make sure there is no old gasket stuck on the filter holder.
5. Tighten drain plug. Clean the filter holder, fill the new filter cartridge with clean engine oil, coat the packing and thread of the new filter cartridge with engine oil, then install it to the filter holder. Tighten until the gasket surface contacts the seal surface of the filter holder, then tighten it a further 3/4 to 1 turn.
6. Add engine oil through oil filler until the oil level is between the H and L marks on the dipstick.
7. Run the engine at idling for a short time, then stop the engine. Recheck the oil level and fill as necessary.

Replacing Fuel Filter

1. Set the container under the filter cartridge to catch fuel.
2. Using a filter wrench, turn the filter cartridge to the left to remove it.
3. Clean the filter holder, fill the new filter cartridge with fuel, coat the packing surface of the filter cartridge with engine oil, then install the cartridge to the filter holder.
4. When installing, tighten until the packing surface contacts the seal surface of the filter holder then tighten a further 2/3 of a turn. If the filter cartridge is tightened too much, the packing will be damaged and will cause fuel leakage. Fuel leakage will occur if the filter cartridge is not tightened enough. Always tighten to the correct angle.
5. Squeeze the fuel primer bulb to pump fuel back into the engine.
6. Replace Corrosion resistor cartridge (if equipped)
7. Screw in valves at the top of the corrosion resistor.
8. Using a filter wrench, turn the cartridge to the left to remove it.
9. Coat the seal surface of the new cartridge with engine oil and install it to the filter holder.
10. Tighten until the packing surface contacts the seal surface of the filter holder, then tighten a further 2/3 of a turn.
11. Open valves.

Light Tower Storage:

For storage of the generator for over 30 days, the following is required:

- Fill the fuel tank completely. Treat with fuel stabilizer if necessary.
- Completely drain oil from the crankcase and refill if necessary with fresh oil.
- Clean the entire light tower, internal and external.
- Disconnect the negative terminals of the battery and cover it, or remove it from the generator and store it separately.
- If the ambient temperature is expected to drop below 0°C, add antifreeze to the radiator.
- Cover the light tower and store in a clean, dry place away from children and non-qualified personnel.

Removal From Long Term Storage:

- Apply oil to the engine valve and rocker arms, and examine the operating condition of the valves.
- Change the oil in engine oil pan.
- Replace all the filters.
- Flush the inside of the cooling system.
- Drain the water from the fuel tank and bleed the air from the fuel system.
- If the engine has not been started for more than one year, contact Discount-equipment.

LT-12 SERIES LIGHT TOWER — TROUBLESHOOTING (GENERATOR)

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Generator Troubleshooting (Table 10) information shown below and on the following page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.



LT-12 SERIES LIGHT TOWER — TROUBLESHOOTING (ENGINE)

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Engine Troubleshooting (Table 11) information shown below and on the following page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.





LT-12 SERIES LIGHT TOWER — TROUBLESHOOTING (LAMPS)

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, use Table 12 shown below and the Troubleshooting Guide as a basic guideline for troubleshooting lamp malfunctions. If the problem cannot be remedied, consult our company's business office or service plant.





LT-12 SERIES LIGHT TOWER — TROUBLESHOOTING (LAMPS)

TROUBLESHOOTING GUIDE

Use the following procedure and wiring diagram on the opposite page to determine which of the four floodlights is not functioning:

Connections:

1. Make sure that floodlight #1 power cable is plugged into the J1 connector on the T-Bar assembly.
2. Make sure that floodlight #2 power cable is plugged into the J2 connector on the T-Bar assembly.
3. Make sure that floodlight #3 power cable is plugged into the J3 connector on the T-Bar assembly.
4. Make sure that floodlight #4 power cable is plugged into the J4 connector on the T-Bar assembly.
5. With the voltmeter set to the AC position, connect the negative lead of the AC voltmeter to any (neutral) white wire on the junction terminal block. This blocks connects all the neutral wires (white) in the system.
6. Connect the positive lead of the voltmeter to the output side of CB1, and observe that 120 VAC is present. Make sure circuit breaker is **ON**.
7. Repeat step 1-6 for CB2 thru CB4.
8. If the correct output voltages are present for CB1 thru CB4 then it can be assumed that the generator is working correctly and the correct voltage (120 VAC) are being supplied to the ballast.

Starting:

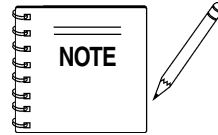
1. Start the generator and verify that there are no abnormal sounds.
2. Turn **CB1** thru **CB4** circuit breakers to the ON position.
3. Wait a few minutes and determine which flood light is not igniting.
4. If one of the floodlights is **OFF**, disconnect its power cable and plug it into a receptacle that is known to be working. **DO NOT** unplug a power cable from the T-Bar while power is being supplied by the generator. Always turn the circuit breaker **OFF** before un-plugging a power cable.
5. If the floodlight still does not ignite after plugging it into a working receptacle (120 VAC present), then it can be assumed that the ballast for that flood light is defective. Replace ballast.

Ballast Removal:

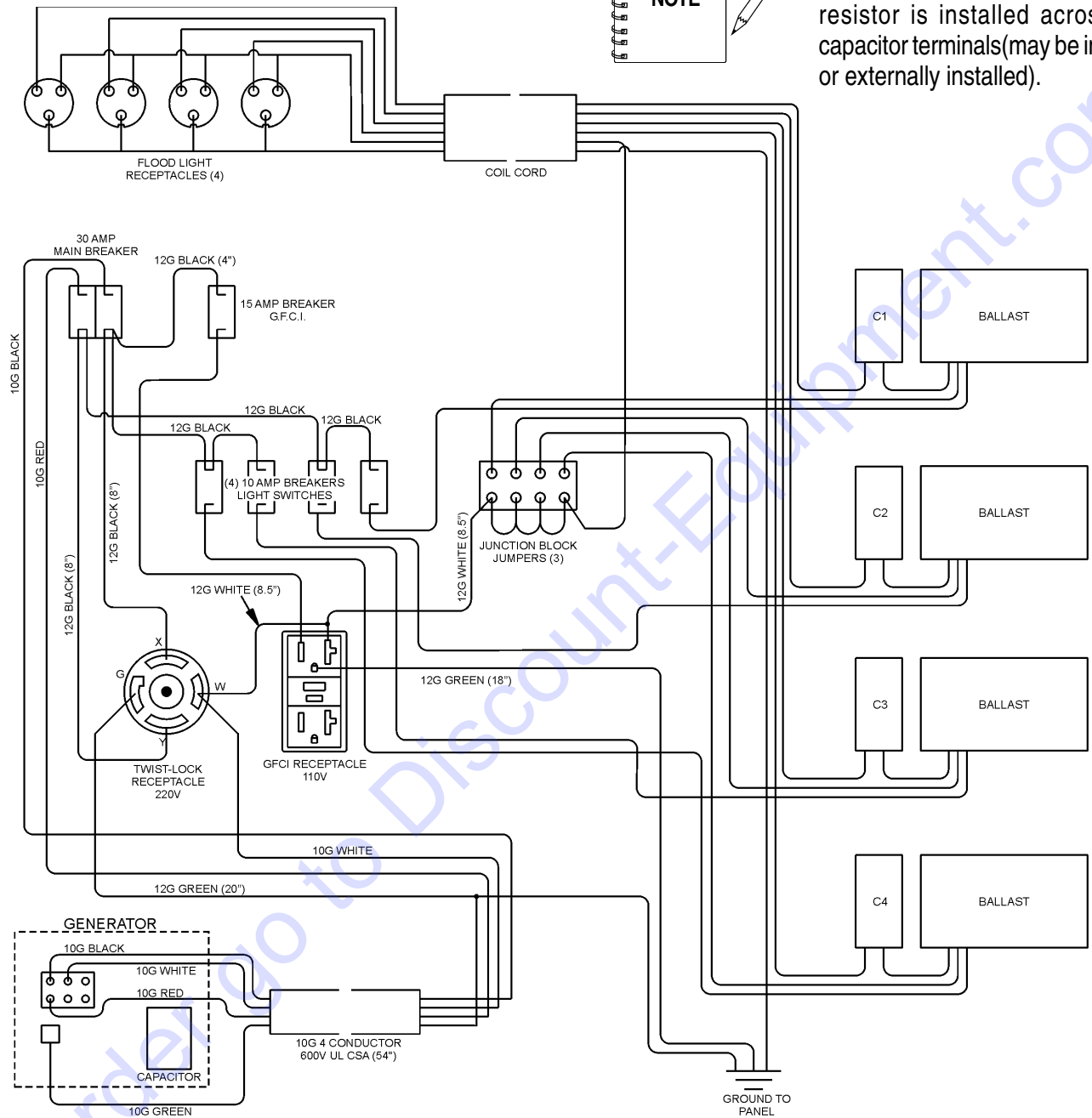
1. Remove the power cable from the generator or welder, and make sure that no voltage is being supplied to the ballast compartment.
2. Remove the four screws securing the ballast cover, and remove cover.
3. Make sure to discharge the ballast capacitor.
3. Remove the defective ballast, taking care to guard against electrical shock when coming in contact with the ballast and capacitor. The capacitor is known to store an electrical charge, that when discharged could result in a harmful shock. Make sure to discharge capacitor.

LT-12 SERIES LIGHT TOWER — SCHEMATIC DIAGRAM

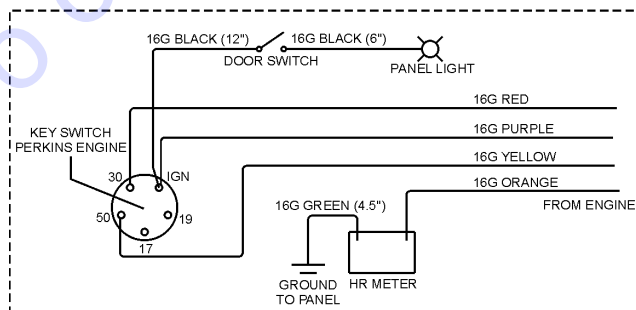
LIGHT TOWER SCHEMATIC DIAGRAM



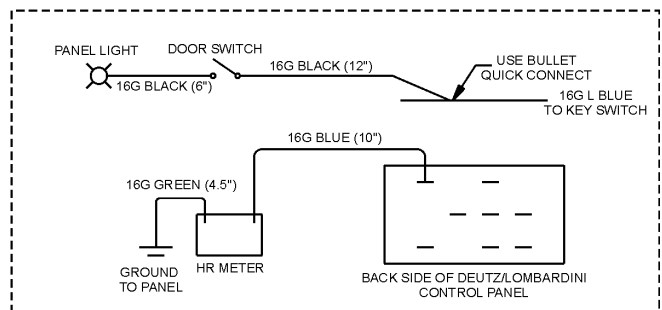
Capacitors C1 thru C4 are 480 VAC, 24 μ f. In addition a 47K Ω (1/2 watt) resistor is installed across the capacitor terminals (may be internal or externally installed).



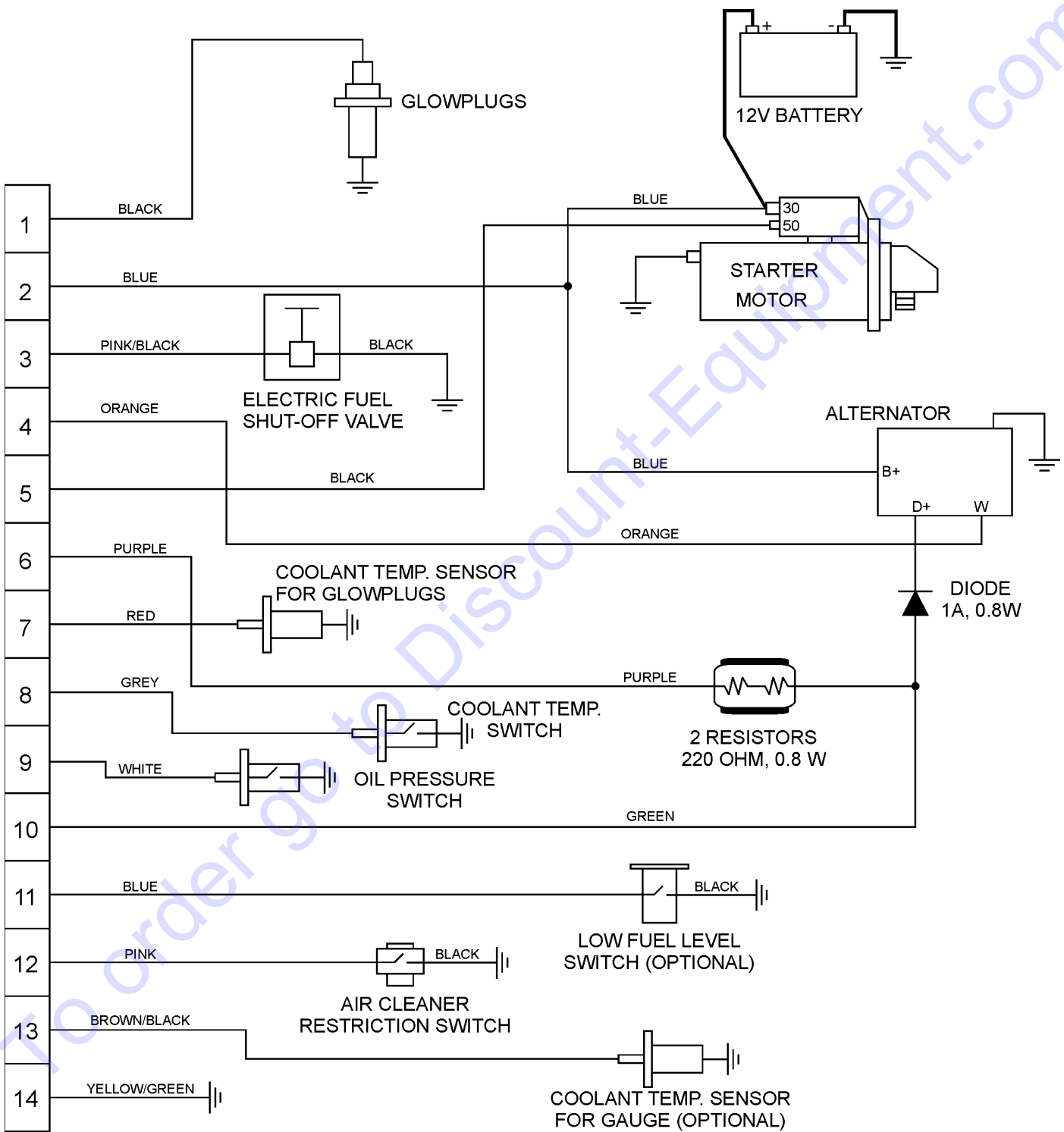
PERKINS SPECIFIC



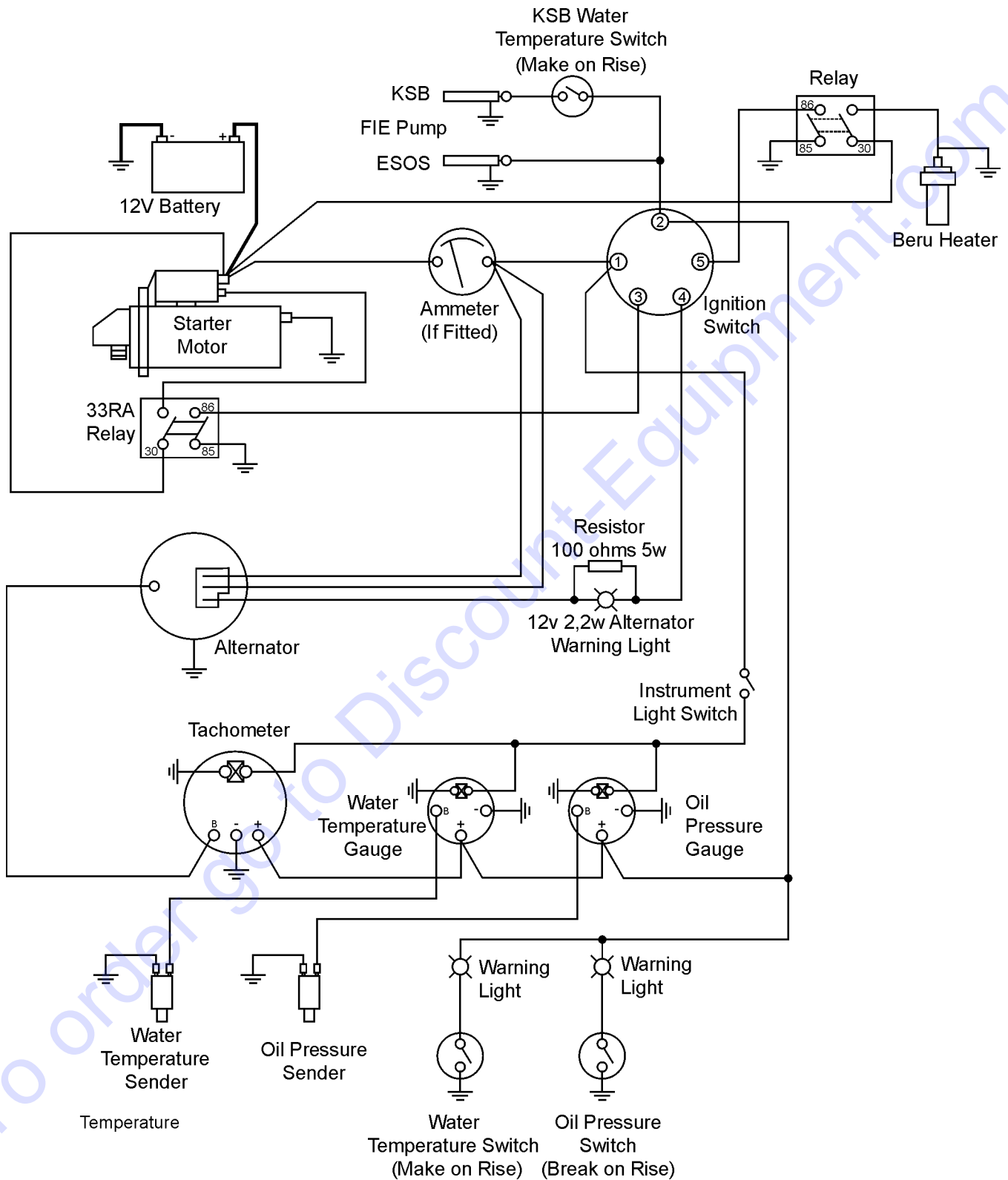
DEUTZ/LOMBARDINI SPECIFIC



LT-12 SERIES LIGHT TOWER — DEUTZ ENGINE WIRING



LT-12 SERIES LIGHTTOWER — PERKINS ENGINE WIRING



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