

# Light Tower

## Operation and Maintenance Manual



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## 2. Safe operation

Careful operation is your best assurance against an accident. Read and understand this section carefully before operating the lighting tower. All operators, no matter how much experience they may have, should read this and other related manuals before operating the lighting tower. It is the owner's obligation to provide all operators with this information and instruct them on safe operation.

### Safety instructions

Be sure to observe the following safety operations.

Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE LIGHTING TOWER" before operating the lighting tower.

Learn how to operate and work safely. Know your machine and its limitations. Always keep the machine in good working order.

DO NOT modify the machine. UNAUTHORIZED MODIFICATIONS to the machine may impair the function and life span of this machine. If the machine does not perform properly, consult your local Lighting Tower Distributor first.

Carefully read the safety symbols attached to the lighting tower and obey all messages that follow the symbols to avoid possible injury or death.



#### **DANGER**

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



#### **WARNING**

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



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## **CAUTION**

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



## **NOTE**

Indicates potential personal injury hazards.

Gives helpful information.

## **Precautions against electrical shock**



- This lighting tower produces high voltages (up to 230 volts) that can produce a fatal shock to a person who accidentally places himself in the electrical circuit.
- Beware of a cut or damaged power cord and replace immediately.
- Shut down the machine when performing repairs and maintenance.
- When troubleshooting indicates a malfunction in the high voltage AC system, then pass the troubleshooting task on to a qualified and trained electrician.
- Disconnect electrical power and turn off engine before removing protective electrical covers on high voltage enclosures.
- Only use a multi-meter (or voltage meter) with two well-insulated probes rated for 750 volts.
- Before checking any electrical paths be sure to use common safe electrical practices to prevent any possible shocks.
- Inspect the ground cable between the generator set and the frame. If damaged, replace immediately.
- Use tools with insulated handles when working within the reach of live conductors, and remove any metal jewelry such as watchbands or bracelets that might make an inadvertent electrical contact.
- Concentrate on the task until the danger from high voltage is removed.

## Wear personal protective equipment (PPE)



- DO NOT wear loose, torn or bulky clothing around the machine that may catch on canopy doors, stabilizer legs, and drawbar causing injury.
- Use additional safety items-PPE, e.g. hardhat, safety protection, safety goggles, gloves, etc., as appropriate or required.
- DO NOT operate the machine under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating the machine.

## Safe handling of fuel and lubricants



- Fuel and lubricants are flammable materials, keep them away from fire.
- To ensure your safety, please stop the engine before refueling and/or lubricating.
- **DO NOT** smoke or allow flames or sparks in your working area. Fuel is extremely flammable and explosive under certain conditions.
- Refuel in a well-ventilated and open place after the engine cools down.
- **DO NOT** mix gasoline or alcohol with diesel fuel. The mixture can cause fire or severe engine damage.
- **DO NOT** start the machine when lack of fuel or lubricants is known.
- **DO NOT** use poor or unclean fuel and lubricants.
- **DO NOT** use unapproved containers, such as, buckets, bottles, jars. Use only approved storage containers.

## Cautions against burns & battery explosion



- Be cautious of hot components, e.g. muffler, muffler cover, radiator, hoses, engine body etc. During operation and after the engine has been shut off **DO NOT** touch the engine components within one hour after the engine has been turned off.
- **DO NOT** remove the radiator cap while the engine is running or immediately after



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stopping, otherwise hot water will spout out from the radiator. Wait until the radiator is completely cooled before removing the cap. Wear safety goggles.

- Lead acid batteries can be dangerous. The sulfuric acid in the battery can cause severe skin and eye burns. The hydrogen gas emitted during charging can explode if an arc or flame is present near the battery. Use precautions to prevent acid burns or explosive conditions.
- The battery presents an explosive hazard. When the battery is being charged, hydrogen and oxygen gases are extremely explosive. Keep sparks and open flames away from the battery, especially during charging.
- If acid does get on the skin or in the eyes, immediately flush under running water, and then obtain medical help as soon as possible

## Safety precautions against operation



- Please read the operators manual before operating the lighting tower.
- Only operate in accordance with the instructions to operate the lighting tower.
- **UNDER NO CIRCUMSTANCES** move the lighting tower before the mast is fully retracted, as it is extremely unsafe.
- Always ensure that only qualified people operate the lighting tower.
- Make sure the ground rod is installed properly and has a good connection to the provided lighting tower ground connection.
- Always dispose of any rags used to clean up fuel or oil in appropriate bins.
- Stay clear of any moving parts of the lighting tower.
- **DO NOT** remove or disconnect any of the safety devices.
- Only one operator at a time should operate the lighting tower for safety reasons.
- Always make sure that the stabilizer legs are secured, the jacks are extended to the ground, and the machine is level and stable before operation.
- Ensure that all appropriate measures are taken with the legs to avoid a trip hazard.
- **NEVER** start the lighting tower when it is short of fuel or lubricants.

## 4. Brief introduction of the Lighting Tower

Lighting towers are made with the components of gensets, lights, masts, trailers and canopy. It is designed for working outside in wind speeds up to designed specifications and is rainproof. The trailer allows it to be drawn by different kinds of vehicles. Its flexibility and reliability makes it ideal for the use of night construction, emergency handling, rescuing, special events, etc.

“T” series is the traditional and pioneering type of Grandwatt. It is competitive in price and practical. It includes tow types of “TL” and “TN”. There are two kinds of operation: manual and electrical type.

### **TN manual type features:**

1. The self-locking device can maintain the height of the mast, with little resistance making the operation very easy.
2. The winch makes the mast operation secure and reliable.

### **ETN electrical type features:**

1. Mast lifting and extension are Electrically operated; the safe and reliable “DC Electronic Actuator” can finish all the operation without running the generator and the self-locking ball screw can maintain the height of mast.
2. Electrically adjusting the lighting angle is optional: the light bar can be adjusted from horizontal to vertical by control panel operation.

### **The features of manual and electric types:**

1. The light bar can be manually adjusted. The illuminating angle of the light bar can be manually adjusted at the lowest position easily, each light can be rotated 360° and tilted 90° manually.
2. The mast can be rotated 360° manually.
3. The galvanized mast and the powder coated canopy are both weatherproof.
4. The AL-KO Hexagon rubber suspension system is suitable for rough roads and its

maintenance-free axis's service life will be at least 20 years.

5. The excellent quality and multi-fault protection generator with the low-emission diesel engine and brushless alternator can power all of the lights stably and continuously.

6. The simple and clear graphic indication on the control panel applies to any country.

7. Four 5000lb stabilizer legs with individual jacks offer stable and reliable support even on rough ground, so the lighting tower can continue to operate in designed winds.

8. All the outdoor electrical plugs and sockets reach at least IP44 protective class and all the lights even reach IP54 protective class.



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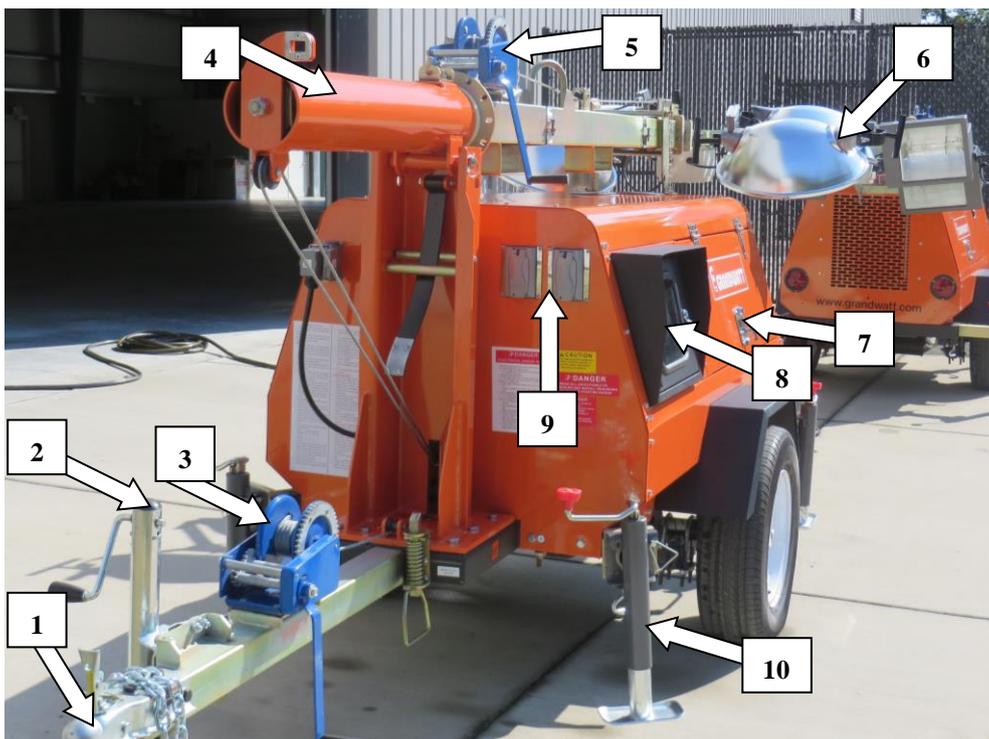
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## 5. Structure of the lighting tower

### 5.1 External construction



Items	Description	Items	Description
1	Coupler	2	Tongue wheel
3	Upright -Winch handle	4	Telescopic mast
5	Extend-winch handle	6	Floodlight (optional)
7	Door engine inspection x 2	8	Command panel
9	External electrical sockets	10	Stabilizer legs x 4



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## 5.3 Command panel (analog)

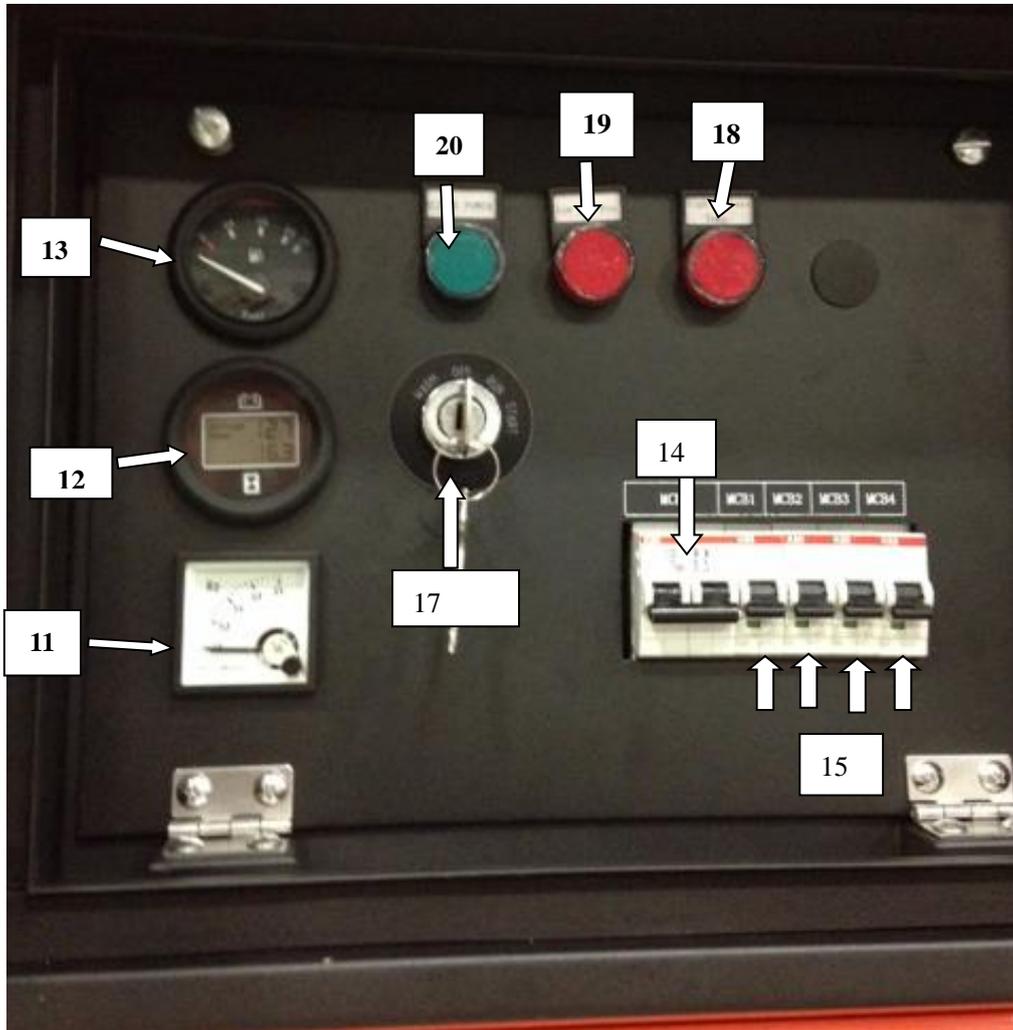


Figure 1

Items	Description	Items	Description
11	Frequency Meter (Hz)	12	Hour Meter/Battery gauge
13	Fuel Gauge	14	Main circuit
15	Floodlight Circuit Breakers		
17	Ignition switch	18	Low Oil Pressure
19	High Coolant Temp	20	Voltage Indicator

- The main input or other generators can power the lighting tower through the input socket, in order to benefit on the fuel consumption and noise pollution.



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## 5.3 Command panel (Digital)

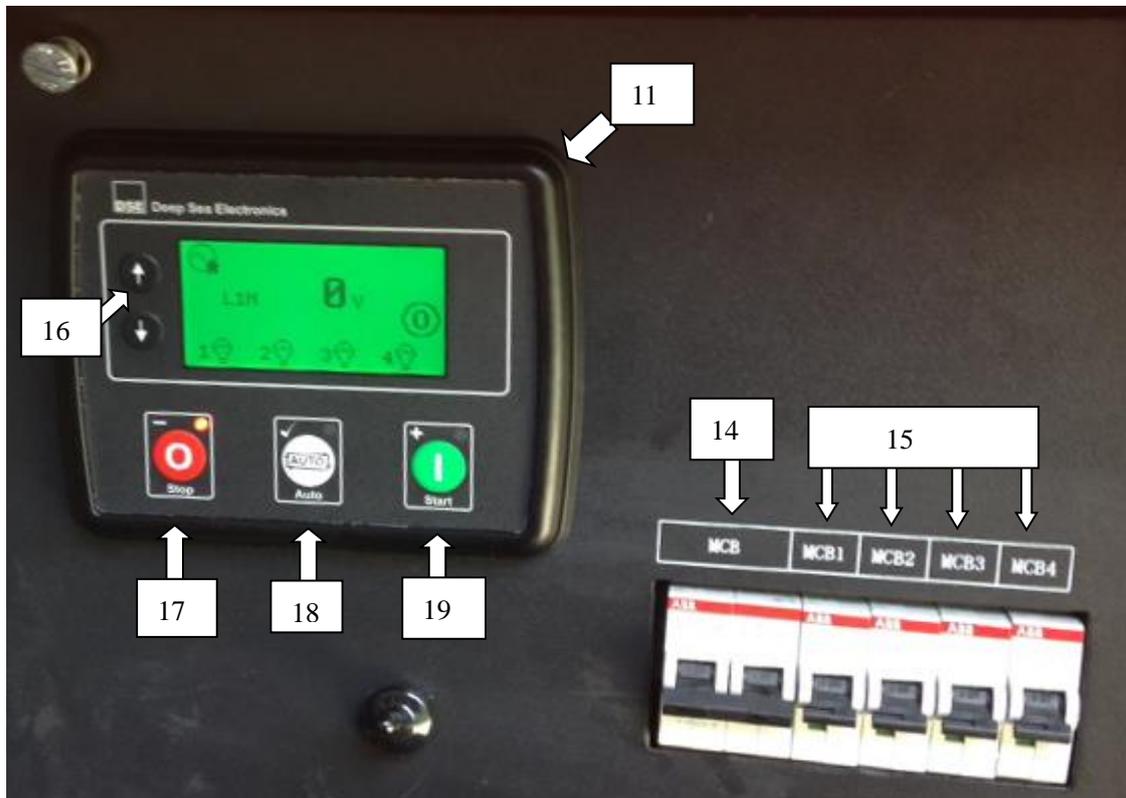


Figure 2

Items	Description	Items	Description
11	Deep Sea Controller	12	
13		14	Main circuit
15	Floodlight Circuit Breakers	16	Scroll Up/Down
17	Stop/-	18	Auto Start/Enter
19	Manual Start/+	20	

- The main input or other generators can power the lighting tower through the input socket, in order to benefit on the fuel consumption and noise pollution.

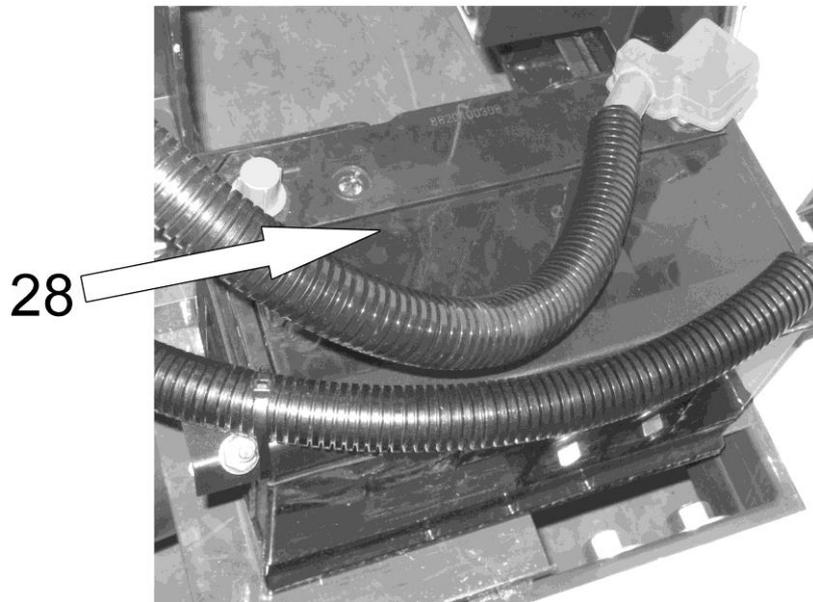
- Please choose suitable cables when inputting and outputting voltage.



**WARNING:**

Input and output currents are high-voltage, please be careful.

## 5.4 Battery



Items	Description
28	36AH 12V battery

- The machine is supplied with the battery not connected.
- Please pay attention to the correct polarity when connecting the battery with cables.
- If the machine has to be stopped for a long period, we suggest you disconnect the battery.



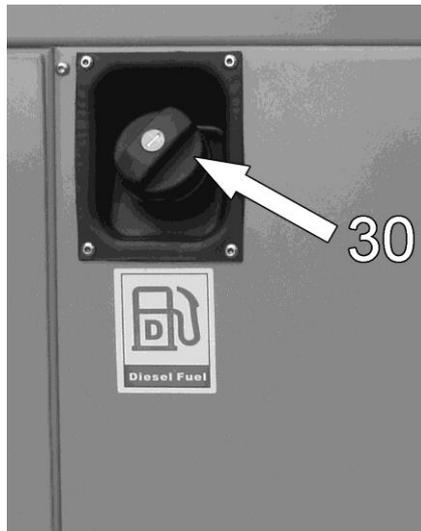
**WARNING:**

The battery fluid contains sulphuric acid which is extremely corrosive and harmful to the skin and eyes. Always wear protective gloves and eye protection.



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## 5.5 Fuel tank and battery switch



Items	Description
30	Lockable Fuel Cap

- The operation of refueling must be done according to the instruction of fuel contents gauge.
- Turn off the engine before any operation of refueling.
- **DO NOT** let fuel spill or leak.
- Please protect the environment and dispose of waste oil properly.



### **CAUTION:**

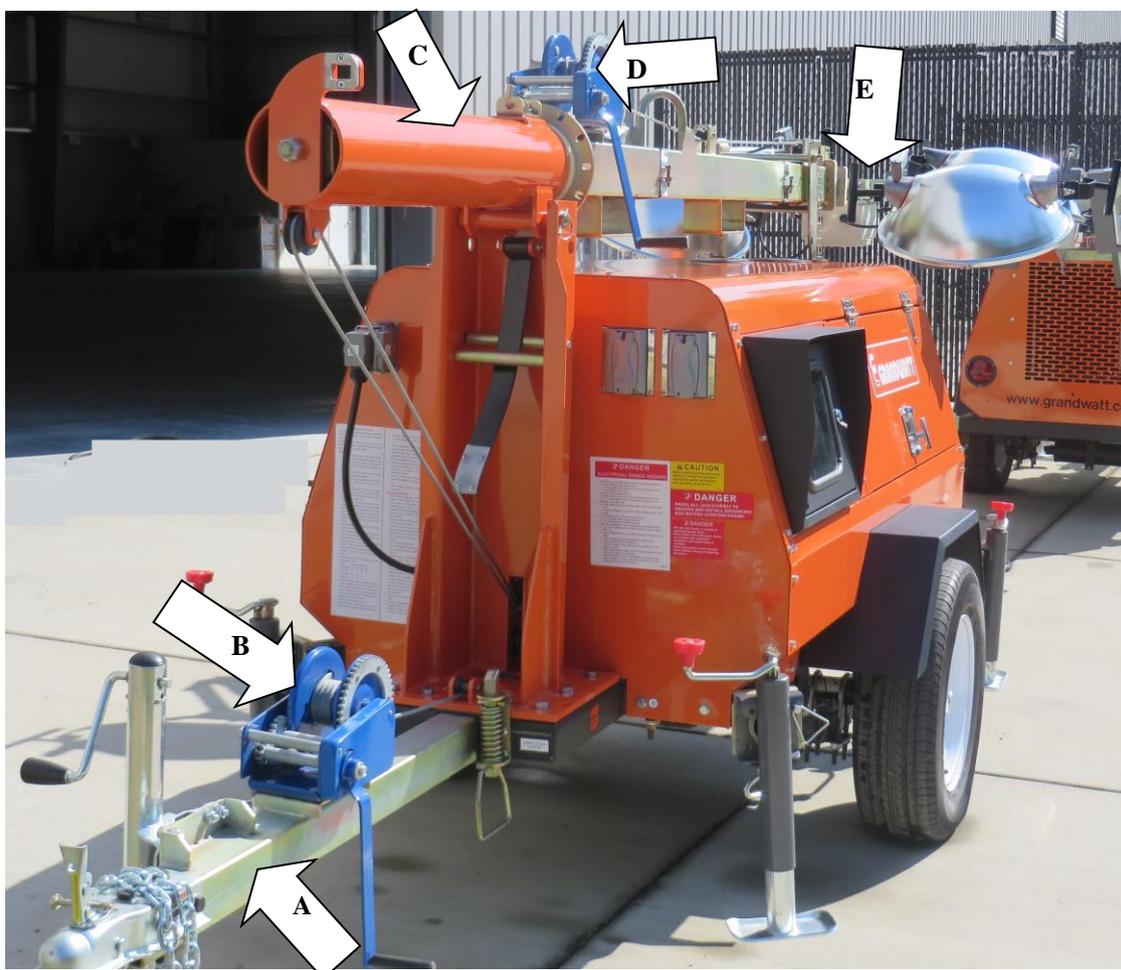
**Contact with engine oil can damage your skin, put on gloves when using engine oil.**

**If you come in contact with engine oil, wash it off immediately.**

## 6. Transportation

### 6.1 Operations before loading the lighting tower

In order to make each standard container hold more lighting towers, we need to remove some parts before loading. Ensure the lighting tower is off and the telescopic mast is full retracted before removing its parts.



- (1) At the top of the boom is the lighting assembly which can be removed by unplugging the lights and unbolting them (e) . This should be done when the boom is the horizontal position.



**Floodlights are fragile goods and must be handled with great care.**



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- (2) Remove the telescopic mast (c), the support for the telescopic mast and the winch handle (b,d).
- (3) Remove all of the stabilizer legs and draw bar (a) of the lighting tower. And then take down the triangular metal bracket.

**NOTE: After taking down the triangular metal bracket and the handle, please keep these bolts for later use.**

Handled as the above, spare parts and components can be removed and loaded in a container, this innovative design feature allows more available space to be used, cutting down on transportation costs. The max load quantity in a 40' container is 16 sets.

## 6.2 Operations after unloading the lighting tower

Please follow the following steps to install the lighting tower:

- (1) Open the standard container; take out the lighting tower and its parts.
- (2) Install the draw bar (a).
- (3) Install the telescopic mast(c), the support of the telescopic mast and the winch handle (b, d).
- (4) Install the stabilizer legs and the triangular metal bracket.
- (5) Fix the floodlights onto the support(e).

As mentioned above, tow it after the parts have been installed. (The towing operation like described at the chapter **(7.1 Lighting Tower's Travel)**).

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## 7. Preparation before operating the lighting tower

### 7.1 Lighting Tower's Travel

#### Notes :

- **When the lighting tower is traveling, the genset must be off, all the stabilizer legs have to be retracted and the telescopic mast is in the horizontal position and fully retracted, all the parts that can move have to be fixed or locked.**
- **Please lock the stabilizer legs horizontally before travelling (Fig.2) in order to prevent the rear two stabilizer legs from touching the ground and affecting travel.**
- **The tires are to be inflated to the correct pressures.**

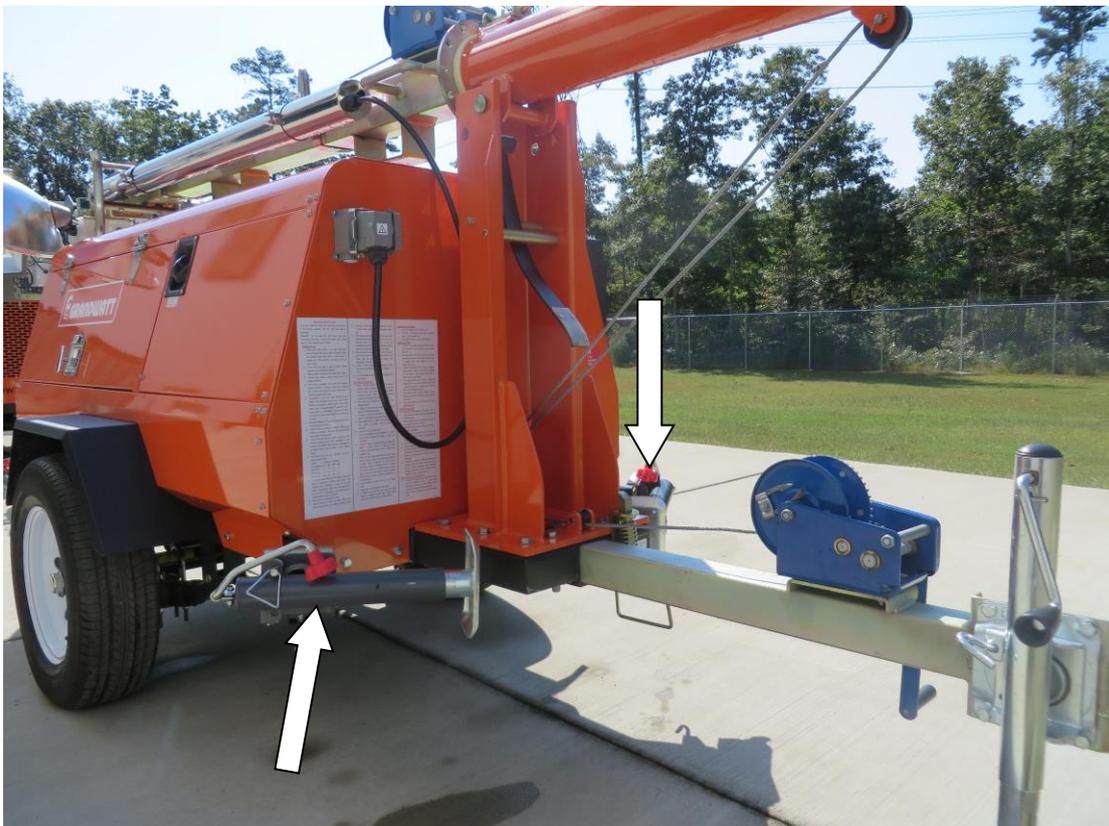
- (1) Travel to the work site and then extend all stabilizer legs to where they are just touching the ground.
- (2) Adjust all of the stabilizer legs, and make sure the trailer is in level operating position.
- (3) Carbon monoxide can cause severe nausea, fainting or death. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.



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(Fig. 1)



(Fig. 2)



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## 7.2 Connecting of the battery

The machine is supplied with the battery not connected.

Pay attention to the correct polarity when connecting the battery cables.

## 7.3 Pre-Start Checklist

- Read the manual carefully before operating the lighting tower.
- Ensure the lighting tower is in a horizontal position.
- Check the fuel, coolant, and engine oil levels are filled properly to their correct levels.

**Note: No fuel and lubrication in the engine of the lighting tower as purchased.**

- Walk around the machine and look for any obvious damage to the body itself, the lights, the tires and the tie down points.
- Check the wire ropes and ensure they are intact and not kinked.
- Check that all appropriate stickers are legible.
- Check the grounding.
- Check all of the switches on the Command Panel and ensure that they are all intact.
- Check that the circuit breakers placed on the front board are in the “OFF” position.



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## 8. Operating instructions



**WARNING:** Do not raise the lighting tower in the vicinity of overhead power lines.

**Note:** please perform the preparatory work carefully before starting the engine.

### 8.1 Engine Alarms

#### **Battery charge and hours (13)**

This meter will show the battery voltage, check the voltage before starting. Also, it shows the engine hours which can be used for tracking maintenance and repair.

#### **High water temperature (14)**

This table will show the coolant temperature, convenient to check the water tank.

#### **Low oil pressure (15)**

If the module detects that the engine oil pressure has fallen below the low oil pressure switch after the safety on time has expired, the low oil pressure light will be lit. Check oil level of the lighting tower when this occurs.

#### **Frequency meter (17)**

The meter will show the generator frequency.

### 8.2 Remarks

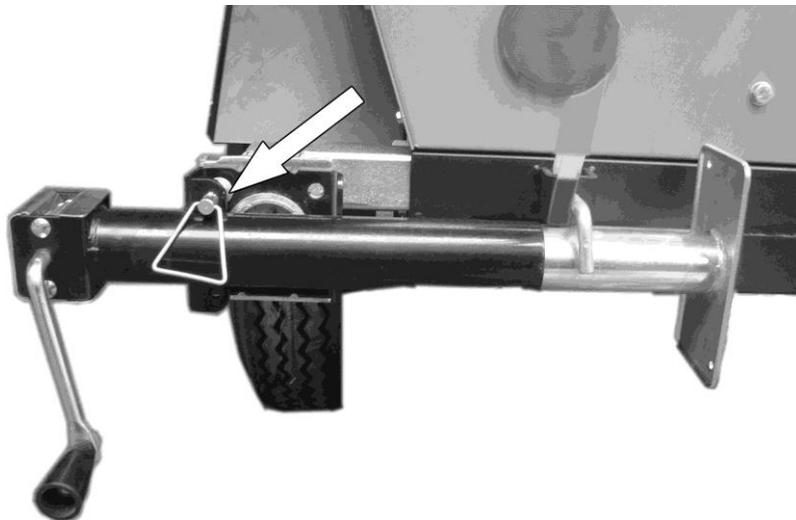
- Always ensure that only qualified people operate the lighting tower. **UNAUTHORIZED MODIFICATIONS** to the machine may impair the function or safety and affect machine life.
- When the lighting tower needs to work on any slope please use anti-skid blocking placed under both wheels to avoid the lighting tower from moving.

- Always make sure that the stabilizer legs are secured and the lighting tower is level and stable before operation. Moving equipment must not be around the lighting tower.
- Always wear protective gloves, clothes and other protective equipments, as required.

**NOTE : Manufacturer will not bear any responsibility of any damage to persons or products due to violation of safety regulations for this lighting tower along with local area safety guidelines.**

### 8.3 Use of the lighting tower

(1) Release the locking-pin from the hole (Fig.1) and then pull out the stabilizer legs until the pins locks in place with the stabilizer fully extended. Check that the locking-pins have seated properly preventing the stabilizer legs from moving any further out or back in.



(Fig.1)

(2) Level the trailer, using the stabilizer legs as follows (Fig.2)

A. Extend the rear stabilizer legs until the springs lock into place. Swing the stabilizer legs on each outrigger into vertical position.

B. Start at highest stabilizer position. Rotate the stabilizer handle until the stabilizer legs are fully extended and locked into place.



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## WARNING:

- Do not extend the mast until the trailer has been adjusted to the level position and the stabilizer legs have been extended and are supported completely.
- Do not retract the stabilizer legs until the mast is fully retracted and down in the horizontal position with its lock pin in place.



(Fig.2)

(3) When the mast is in the horizontal position, tilt and rotate the spotlights (Fig.3).

To tilt the spotlights, unscrew the "T" handled wrench and adjust the angle of the spotlight.

To rotate the spotlights simply grab the light on each end and turn it to your desired location.



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(Fig. 3)

(4) Rotation the handle clockwise that allows to raise and to lower the telescopic mast in easy way (Fig.5). The attainment of the maximum height is evidenced by red Line placed on the base of the mast.





**WARNING: Stop raising the mast when the red line comes out**

(5) Starting the engine;

A: Open the engine compartment (6) of the lighting tower and then open the “fuel isolation valve” (21).

B: Make sure all breakers are in the “OFF” position or “OPEN” position.

C: Turn the engine starting key counter-clockwise (16) to the “PREHEAT” position and hold for a count of 10. Then turn the key clockwise to the “START” position and hold here until the engine starts. Once the engine starts and is running then simply let go of the key. Release the key when the engine starts, and then the key should go to the “RUN” position.

(6) Turning on the floodlights;

Switch the circuit breakers (9) to the “ON” position one at a time allowing 10 seconds between each breaker switching.

When the lamps have been on and turned back off it can sometimes take as long as 10 minutes for the lights to heat back up to full brightness.



**WARNING :**

**The lighting tower is constructed to withstand 65 mph wind at the maximum height. Be careful when raising or lowering the mast in heavy wind and rain.**

**NOTE: When relocating lighting tower to a new location, please make reference to chapter “7.1 lighting tower’s travel”.**



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## 9. Lighting Tower Storage

If the lighting tower is not used for a long period of time, measures have to be taken for good storage to prevent corrosion or any damage.

### 9.1 Fuel tank sealing

- (1) Drain the fuel completely and wash the inner tank with gasoline.
- (2) Dry-type sealing: Put 100g deoxidant or 20g antirust in the tank cock and then tighten the cock.
- (3) Wet-type sealing: Fill the tank with clean diesel to 95% of the specified capacity and then tighten the cock.

### 9.2 Engine sealing

- (1) Keep the engine running at low speed for five minutes.
- (2) Before sealing it, run the genset for 30 minutes with the floodlights on until the coolant and the oil reach appropriating temperature, then drain them completely.
- (3) Remove the fuel drain plug of the cylinder, add about 2ml lubricants.
- (4) Press the decompression handle, do not let go, pull the starter hander 2-3 times (do not start the engine).
- (5) Seal the air filter intake with tape.
- (6) Seal the muffler outlet with plastic.
- (7) Wipe off any oil or dust sticking to the machine completely, put the lighting tower in a safe and dry place.

### 9.3 Battery sealing

- (1) Disconnect the battery.
- (2) Clean the battery connections, coat a thin layer of Vaseline on the connection points,

and pack them with plastic film.

(3) Take out the battery and put it in a safe and dry place.

Un-install the floodlights and put them in cartons. The cartons should be placed at a dry and clean storage room free from rain and dust.

#### 9.4 Spotlight sealing

Un-install the spotlights and put them in cartons. The cartons should be placed at a dry and clean storage room free from rain and dust.

#### 9.5 Wheel sealing

(1) Suspend the wheel

Use a steel or wooden support frame to support the axle and suspend the wheels roughly 3-5cm above the ground. Place a chock under the wheels.

(2) Seal the wheel

Coat the wheel tread with paraffin or cover the wheel with craft paper, newspaper or canvas. JXF rubber antioxidant is used to slow the oxidation of the wheel.

#### 9.6 Lighting tower sealing

After the above components are sealed, cover the lighting tower with canvas.



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## 10. Lighting Tower Unsealing

Unsealing of the lighting tower:

- (1) Remove all the covers and seals.
- (2) Remove the support frame to place the wheels back on the ground.
- (3) Extend all the stabilizer legs to support the lighting tower and make sure it is level.
- (4) Connect the battery to the lighting tower making sure the battery voltage is enough to start the motor.  
start the motor.
- (5) Add quality lubricants; e.g. oil, coolant
- (6) Add quality diesel fuel.
- (7) Start the lighting tower to see if it works properly. Before starting make sure the lighting tower was in operating condition.
- (8) When the lighting tower is running and all breakers are aligned properly then lights may turned on to verify operation.
- (9) Before operating the lighting tower, perform a pre-start checklist (7.4 pre-start checklist).



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## 11. Maintenance of the Lighting Tower

### 11.1 Maintenance of the Lighting Tower



#### **WARNING:**

- **Shut down the machine when performing any repairs or maintenance.**
- **Whenever opening the control panel, take the necessary measures to prevent electrical shocks.**
- **Only qualified persons are permitted to do repair work and use only approved spare parts by the manufacturer.**

#### **Regular Maintenance**

The maintenance circle is determined by run time; after 100 hours and after 500 hours maintenance. For more detailed information please refer to the engine maintenance manual.

#### **Daily maintenance**

- (1) Check for any leaks, such as fuel, oil, or coolant.
- (2) Check the water level in the radiator.
- (3) Check the oil level at the dipstick and fill with correct oil to the specified position when insufficient.
- (3) Check for the tightness of engine mounts.

#### **Maintenance after 100 hours**



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- (1) Replace oil in oil sump.
- (2) Clean or replace oil filter cartridge.
- (3) Clean or replace oil filter cartridge.(or after 200 hours)
- (4) Check the electrolyte level of the battery.
- (5) Replace coolant at 200 hours.

## **Maintenance after 500 hours**

- (1) Check full injection pressure and atomization quality. Clean and adjust when necessary.
- (2) Dismount cylinder head, remove carbon deposit. Check valve sealing and lap when necessary.
- (3) Check connecting rod bolts, main bolts and fly wheel bolts for tightness.
- (4) Replace oil in injection pump and speed adjustor.
- (5) Clean cooling system. Cleaning fluid is mixture of 150g NaOH and 1 liter water completely.
- (6) Drain out cooling water before cleaning, then fill in cleaning fluid and run the engine after 8-12 hours. Stop the engine when working coolant temperature is achieved, drain out coolant immediately to prevent the in-fluid scale depositing, finally clean the cooling system with clean water.
- (7) Check each electrical connection for tightness. Replace any frayed or burnt looking wires or connections.
- (8) Check all engine parts, repair or adjust when necessary.

**NOTE: For more information please refer to the engine's manual and the generator's manual.**

## **11.2 Mast maintenance**

- (1) Always keep the mast clean and free from dust and debris. Wrap it with plastic when not in use for long periods of time.
- (2) The mast should not be hit or bent.



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- (3) When cleaning the mast, do not use acid or alkali liquid and do not let the liquid flow inside the mast.

## 11.3 Wire ropes maintenance

The wire ropes used raising and lowering the masts on the lighting tower are probably some of the most important mechanical parts in day-to-day operation of the machinery. It is therefore very important that the cables are inspected on a frequent basis (before operating the lighting tower) for wear and tear, and immediately in the event of possible damage due to operator error in using the winch, or possible damage from other equipments.

- (1) The wire rope should be regularly maintained in order to get rid of the damage caused by rust or dirt.
- (2) The groove of the reel and pulley should often be cleaned, if there is damage, please repair or replace them promptly.
- (3) In the course of using wire ropes, please avoid contact with dust, sand, coal, and acid-base compounds.
- (4) When the lighting tower is unused, the wire ropes should be coated with anti-rust oil every six months.



### **DANGER :**

**If any nicks (partial strand cut through), kinks(permanent bends), or weld spatter appear on the cable(from field service), the suspect wire rope should be changed immediately.**

## 11.4 Floodlights maintenance

- (1) The metal halide lamp must be used with the correct ballast and trigger which conform to national standards. The fluctuation range of the voltage source should not exceed  $\pm 5\%$ ;
- (2) Please follow the manufacturers guidelines, and choose appropriate lighting;
- (3) Cut off the power source and wait until the lamps are cooled before performing maintenance;
- (4) When the light goes out suddenly, you should first check all the power cords, breakers,



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and connections to see if they are tight and function well, otherwise the light may expire and has to be replaced.

Replacement of the lamps or the floodlights' glass; open the floodlight through the 6 stainless steel hooks (Fig.1), inserting a screwdriver in the appropriate slots previewed on the hooks. The hooks hinged to support the frame when opened. Replace the lamp or the glass. Close the floodlight's glass carefully to the seated position.



(Fig.1)

**Note: Take care not to drop the lamp or fixtures glass. Wipe off any oils from your skin that may have contacted the lamp before turning on this lamp.**

The requirements of the floodlights are as follows:

Type of lamp: metal halide

Base: E40

Nominal power: 1000W

Nominal voltage: 220V



# Generator Joe®

## 13.1 Main troubles

**Turning the starting key to the “ON” position, no signal lamps ignite and the starting motor does not work.**

CAUSE	REMEDY
The battery is disconnected.	Open the door and connect battery.
The battery is discharged.	Recharge the battery.
The battery is defective.	Replace the battery.
Ignition lock failure.	Replace the ignition.
The starting motor does not work.	Contact a Kubota assistance center for assistance.
The emergency stop button is pressed.	Check that the stop button is reset. If it doesn't, turn the grip handle in clockwise direction.
Possible loose or broken wire/cable in the electrical system.	Visually check the electrical system for any loose or disconnected cables/wires.

**The starting motor works but the engine does not start.**

CAUSE	REMEDY
Possible lack of fuel in the tank.	Refuel the machine.
Fuel filter dirty.	Replace the filter.
The fuel pump does not work	Check the electrical connection of the pump and eventually contact an engine assistance center.

**The starting of the engine is difficult and there is insufficient rendering.**

CAUSE	REMEDY
The air filter is dirty.	Clean up the filter and eventually replace it.
Injection pump wear	Do not use poor quality fuel as it will cause pump damage. Check the fuel injection pump element and replace it if necessary.
Overheating of moving parts.	Check lubricating oil system. Check to see if lubricating oil filter is working properly or replace it.

**Output voltage unstable**

CAUSE	REMEDY
Irregular engine speed	The engine is set at the correct speed from the manufacturer. Contact your distributor.
The alternator is defective	Replace the alternator.

**The machine stops with the oil low pressure signal lamp ignited.**

CAUSE	REMEDY
The oil level is low	Verify the level and add oil as necessary
The pressure switch is defective.	Replace the pressure switch

**The machine stops with the high coolant temperature signal lamp ignited.**

CAUSE	REMEDY
The level of the coolant in the radiator is low.	Verify the level and add coolant as necessary.
Radiator fins clogged with dust	Clean fins carefully
Radiator fan does not work	Check the fan and belt



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**The machine stops with the battery charge signal lamp ignited.**

CAUSE	REMEDY
The battery is defective	Replace the battery
The engine's alternator has failed	Replace the engine's alternator

**After refueling, the fuel level monitor does not move.**

CAUSE	REMEDY
The fuel level monitor does not work.	Check the fuel level monitor and its relative electrical connection.

**With the engine running the hour meter does not work.**

CAUSE	REMEDY
The hour meter does not work.	Check the hour meter and its electrical connections. Replace if need be but record hours from old meter.

**The raising and lowering of the telescopic mast does not work.**

CAUSE	REMEDY
Defective electrical connection	Check the electrical connection.
If the mast lifting and extending are electrical operation;	Check the "DC electrical line actuator"
	Check the wire ropes.
	Check whether the telescopic mast has been damaged and possibly bent or dented.
If the mast lifting and extending are manual operation;	Check the wire ropes.
	Check whether the telescopic mast has been damaged and possibly bent or dented.

**One or more lamps does not light.**

CAUSE	REMEDY
Defective or bad lamps	Before replace the lamp, it is advisable to perform a test, install the lamp that it is presumed to be bad in a floodlight with a lamp preciously working.



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## The lamp fails to light.

CAUSE	REMEDY
The lamps did not experience an unexpected shutdown.	The lamps did not come on, it is necessary to wait for lamp cool down (about 10-15 minutes).

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