

BELLATRIX - User Manual

LIGHTING TOWER WITH HYDRAULIC LIFTING SYSTEM



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1. INTRODUCTION

1.1 Key to symbols

The safety warning symbols used in this Operations and Maintenance Manual indicate the risk incurred if the instructions provided are not followed.



GENERAL HAZARD - Failure to comply with this warning, may result in personal injury or property damage



HIGH VOLTAGE - Some parts may be live and dangerous to touch. Failure to comply with this warning may result in danger of death.



FIRE- Fire hazard. Failure to comply with this warning may cause a fire



HEAT - Hot surfaces. Failure to comply with this warning may result in burns or property damage.



EXPLOSION - Explosive material or general risk of explosion. Failure to comply with this warning may produce an explosion.



ACIDS - Danger of corrosion. Failure to comply with this warning may result in corrosion damage for people or property.



PRESSURE - Danger of scalding from jets of pressurised hot liquids



FIRE PREVENTION MEASURES - Fire prevention measures should be set up according to current safety laws and/or local regulations, to prevent the working area from going on fire for accidental reasons, causing serious injuries or death.



FIRST AID MEASURES - First-aid measures should be set up according to current safety laws and/or local regulations, in the case any operator is hit accidentally by corrosive and/or hot liquids, asphyxiating gases and/or anything which may cause serious injuries or death.

Warnings

The lighting tower described in this manual provides electric lighting by transforming the mechanical energy from an alternator-powered combustion engine.

Before operating the lighting tower, carefully read the manual and follow the instructions provided.

This manual was designed to be used by qualified personnel with knowledge of the laws in force on the safety and installation of generator sets. It contains important information on how to use and service the equipment supplied. Before operating the equipment, we advise you to read it and carefully follow the instructions and highlighted warnings it contains.

The manual comes with the original documentation for the engine and the alternator: we recommend keeping it all in a safe place and have qualified personnel to carry out operations. In case of transfer of equipment ownership, attach all the documentation, as it is an integral part of the product.

Our customer service and technical assistance department is available to assist you in any way.

Only use genuine parts in case replacement is required; failure to comply will void your warranty automatically. .

Use of the product, other than the intended use, relieves the producer from any risks arising from its improper use. The producer cannot be held liable for any injury to people, animals or property damage.

Do not damage this manual, do not remove or tear any pages and keep it away from moisture and heat sources . Please note that the drawings contained in the manual are merely to help you identify the parts described and, therefore, they might not correspond precisely to your machine .

The contents of this manual are not binding. The producer reserves the right to make changes and improvements to accessories and details without altering the essential characteristics of the model described and illustrated here and without committing to promptly updating this manual.

1.2 Safety standards

The data contained in this manual may be changed without prior notice. The instructions in this manual are to be intended as general guidelines. The user is responsible for assessing potential risks and damage to people and objects when the product is used under the specific conditions of use. Failure to comply with the instructions given herein, may cause damage to people and things. It is understood that compliance with local provisions and/or laws in force is compulsory.

- Before starting the machine, carefully read the safety instructions contained in this manual and in the other manuals provided (engine, alternator, etc.).
- Handling, installation, use, maintenance and repair operations must be carried out by authorised and qualified personnel.
- During operations, wear your personal protective equipment (PPE): footwear, gloves, helmet, etc.
- The owner is responsible for ensuring safe equipment use.
- Only use the equipment under perfect technical conditions. Machines or equipment must be in perfect technical status. Any defects which may impair safe conditions of use must be removed immediately.
- Before operating the equipment, make sure you know all the controls to operate and position the equipment, in order to avoid accidents to people and/or damage to the equipment. Namely, it is important to know how to stop the equipment quickly in the event of an emergency.
- Do not allow anyone to use the equipment until they have been trained and given all the information on how to use it correctly and safely.
- Do not allow unauthorised people, children or pets to access the operational area, to protect them from serious injury caused by any part of the equipment.

SAFETY INSTRUCTIONS DURING HANDLING AND TRANSPORT

- Only use the specific points provided to lift the equipment. The hoist eye or eyes and the correct position of the lift truck forks are marked with special stickers.
- Lower the telescopic mast before handling the equipment and use the lock devices provided to lock any parts which might move, e.g. hatches, mast, stabilisers, lights.
- Clear the handling area from any obstacles and unnecessary personnel.
- Always use adequately sized lifting equipment, checked by certified bodies.
- Never fasten objects or accessories to the lighting tower frame that may change the weight and centre of gravity of the unit and might expose the hoist points to unexpected stresses.
- Do not subject the machine and lifting equipment used to undulating or sudden movements, which transmit dynamic stresses to the structure.

SAFETY INSTRUCTIONS FOR TOWING TROLLEYS

- Do not drag the machine manually or hitched to vehicles without a towing trolley.
- Check for a correct assembly of the equipment to the towing device.
- Always check that the hitch of the vehicle is suitable for towing the total mass of the trolley.
- Do not tow the towing trolley if the coupling devices are worn or damaged.
- Check for proper tyre pressure.
- Do not replace the tyres with types different from the original ones.
- Check that the brakes and optical signals of the road towing trolley are working properly.
- Check that the bolts of the trolley wheels are in place and well tightened.
- Do not park the lighting tower and towing trolley on a steep slope. When parking, always engage the parking brake and/or safety chocks.
- Do not tow the trolley on bumpy roads.
- Do not exceed the maximum permissible speed on public roads of 80 km/h with the road towing trolley. In any case comply with the laws applicable in the country of use.
- Do not use the slow towing trolley on public roads, as this can be used only in private and delimited area. The highest permitted speed is 40 km/h on smooth surfaces (asphalt or concrete). In any case, adjust the speed to the type of soil.

SAFETY INSTRUCTIONS DURING INSTALLATION AND USE

- Always place the lighting tower on a solid, flat surface, which is not subject to subsidence, in order to avoid tipping, sliding or falls during operation. Avoid using the tower on a ground with a slope of over 10°.
- Ensure the area surrounding the machine is clean and free from debris.
- Ensure the area above the lighting tower is free from overhead cables or other obstacles. The lighting tower reaches a max operating height of 8.5 metres.
- Before raising the telescopic mast, pull out the stabilisers located on the side of the mast and use a spirit level to place the lighting tower on a perfectly horizontal plane. Ensure the lighting tower is safely resting on the stabilisers.
- Do not use the lighting tower if the wind speed exceeds the safe speed specified, or if storms or thunderstorms are expected in the area.
- Lower the telescopic mast when the tower is not in use.
- Earth the machine in compliance with the local legislation in force .
- Use the earth terminal inside the machine.
- Do not use the lighting tower with wet or damp hands and/or clothes.
- Use electric plugs suitable for the equipment output sockets and check the electric cables are always in good condition.
- The equipment must always be positioned so the exhaust gases are released into the atmosphere without being inhaled by people or living creatures.
- When using the unit in a closed environment, installation must be carried out by qualified technicians and made to the highest standard.
- Keep the hatches closed during normal operations. The internal parts must be accessed exclusively for maintenance purposes.

- Do not place objects or obstacles near the air intake and outlet. Possible generating set overheating, may cause a fire.
- Keep the area near the exhaust muffler free of objects, such as rags, paper or boxes. High muffler temperature might cause the combustion of objects and cause a fire.
- Do not touch and place objects on the floodlights while they are on, nor immediately after use. The lamps become extremely hot.
- Do not switch on the lamps without the protective glass or with broken or damaged glass.
- Immediately stop the equipment in case of malfunctioning. Do not switch the equipment back on until you have identified and resolved the problem.

SAFETY INSTRUCTIONS DURING MAINTENANCE



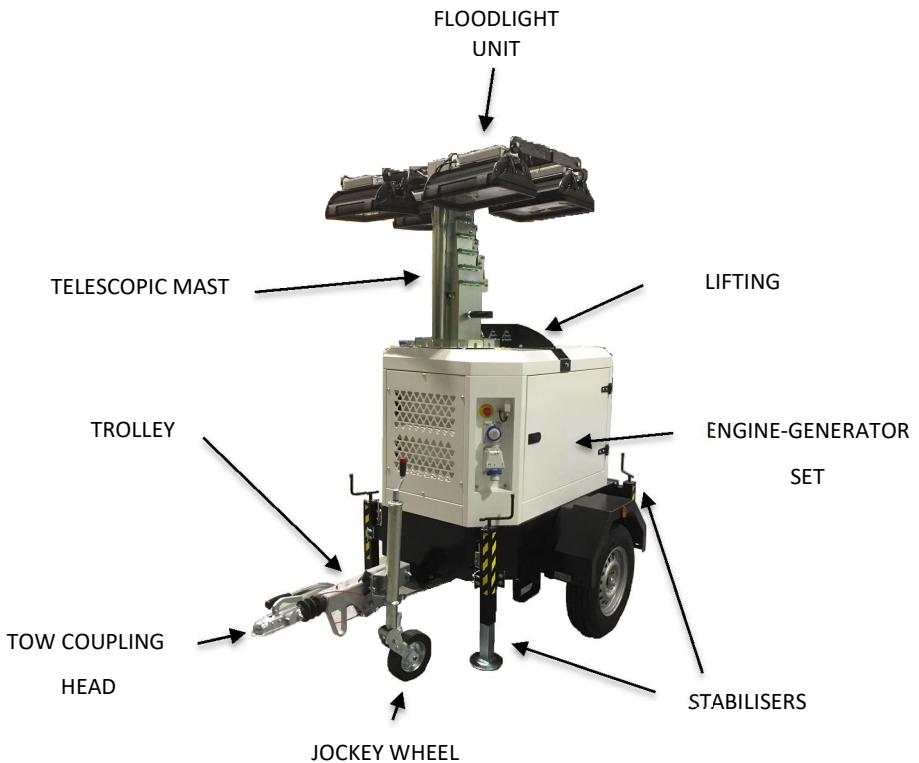
- Only qualified personnel is authorized to carry out maintenance and troubleshooting.
- Switch off the engine before carrying out any maintenance operation on the equipment.
- Always use personal protective equipment and adequate tools.
- Always disconnect the lamps from the power supply and wait for them to cool before carrying out any maintenance or replacement on them.
- Do not touch the engine, pipes and exhaust muffler while the engine is running or immediately after it has stopped. Allow the engine to cool before you carry out any operation.
- During equipment operation, beware of any rotating parts e.g. fans, belts, pulleys.
- Do not remove any protective or safety devices unless strictly necessary. Reset them when maintenance or repairs have finished.
- Do not refuel while the engine is running or with a warm engine. Do not smoke or use naked flames whilst refuelling.
- Only refuel in the open air or in well-ventilated environments.
- Avoid any fuel spillage, especially on the engine. Clean and dry any spills before you restart the machine.
- Slowly unscrew the fuel tank cap and always replace it after refuelling.
- Do not fill the tank completely to allow the fuel to expand inside.
- Do not remove the radiator cap with the engine running or still hot, as the cooling fluid could leak and cause severe burns.
- Never handle the battery without using gloves, as the battery fluid contains very corrosive, hazardous, sulphuric acid.
- Do not smoke and avoid naked flames near the battery, as it gives off fumes which could cause the battery explosion.

2. OVERVIEW

The lighting tower consists mainly of a lighting tower and a generating set integrated into a single piece of equipment.

The lighting tower consists of:

- a hydraulic telescopic mast, maximum vertical operating height of 8.5 metres and 355° manual rotation;
- floodlight unit;
- soundproof generating set with water-cooled engine;
- command and control panel for lighting tower protection and operation;
- 4 extendable, height adjustable stabilisers to guarantee tower stability.
- the lighting tower can be equipped with a road or slow towing trolley.



3. HANDLING

3.1 General precautions for transportation and handling of the equipment



Outmost care must be taken when handling and moving the lighting tower. All handling operations must be carried out by qualified personnel. Due to the overall size and weight, an error during equipment handling may cause very serious damage to the unit and people in the vicinity.

To minimise the hazards arising from handling the lighting tower, it is mandatory to follow the instructions below:

- Always transport the tower with the engine switched off, disconnected electric cables, disconnected starter battery and empty fuel tank.
- Clear the handling area from any obstacles and unnecessary personnel.
- Always use adequately sized lifting equipment, checked by certified bodies. Never fasten objects or accessories to the lighting tower frame that may change the weight and centre of gravity of the unit and might expose the hoist points to unexpected stresses.
- Do not subject the unit and lifting equipment to undulatory or sudden movements, which might transfer dynamic stresses to the structure.
- Do not lift the generator set at heights other than those strictly necessary.
- To access the attachment points on the equipment roof, only use approved ladders or a ladder held by a second operator. Wear special non-slip shoes to climb the ladder.

3.2 Handling via forklift truck

When lifting the tower using a forklift truck, it is mandatory to:

- Insert the forks into the dedicated openings on the side and front of the frame.
- Let the forks protrude from one side to the other and always keep the lighting tower horizontal.

The stickers on the base signal how to position the truck forks correctly.

3.3 Handling via cables or chains

When lifting the tower using cables and/or chains, the use of equipment regularly checked by certified organisations is mandatory. Hook the ropes or chains exclusively to the dedicated anchoring points and marked by special stickers.

3.4 Moving via towing trolley



The trolley can be towed only having completed the following operations:

- complete lowering of the mast
- engine shutdown
- positioning of floodlights for transportation

BEFORE STARTING TO TOW, COMPLETE THE FOLLOWING STEPS:

- fully raise the stabilisers and lock the crank with its pin
- fully retract the stabilisers until they engage the locking pins
- use the jockey wheel crank to raise/lower the drawbar on the tow hitch
- block the hitch
- connect the trolley cable to the towing vehicle and check that all lights are working
- make sure all access panels are locked
- check that trolley tyres are properly inflated

Road Towing Trolley

It is approved for public road transportation. Its maximum permissible speed is 80 km/h. In any case the current road transport regulations of the country of use must be observed.

Slow Towing Trolley

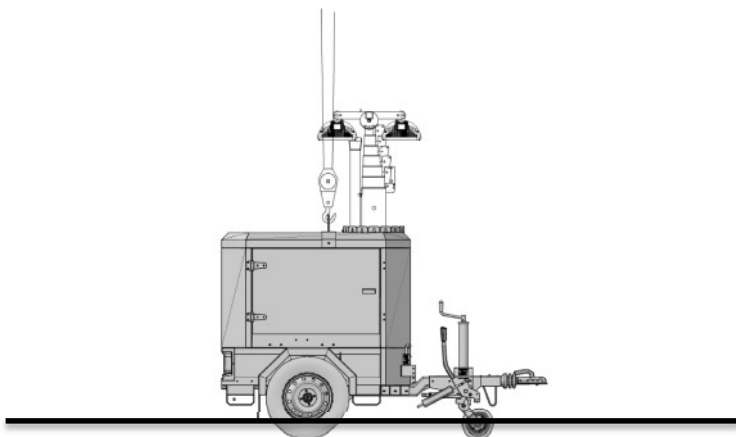
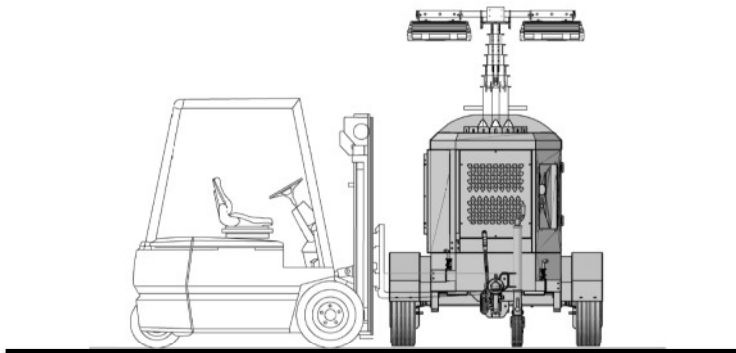
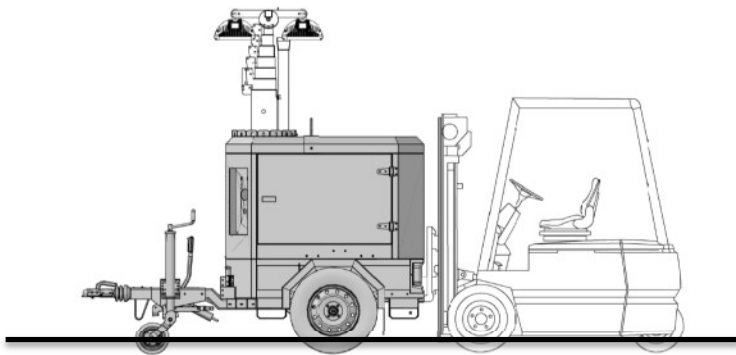
It cannot be used on public roads, as it is intended only for use in private and delimited area. The maximum permitted speed is 40 km/h on smooth surfaces (asphalt or concrete). In any case, the road transport laws in force in the country of use must be observed.

THE FOLLOWING INSTRUCTIONS APPLY TO ALL TYPES OF TOW:

- DO NOT park the trolley with the equipment on a sloped ground.
- When parking, always engage the parking brake and/or safety chocks.
- DO NOT tow the trolley on uneven or bumpy roads.

3.5 Transportation by a motor vehicle

Only use suitable belts to fasten the equipment during vehicle transport to avoid impacts or unexpected jolts that could damage the frame and the engine or, even worse, result in the loss or overturning of the load. The carrier must always comply with the transportation regulation in force.



4. PREPARATION FOR USE

4.1 Battery



The starter battery is supplied already charged and ready for use.

Before starting the generator set, connect the cable to the battery terminal and firmly tighten the clamp.

The battery contains sulphuric acid; contact with the skin or eyes can cause serious injuries and burns. Take the utmost care during maintenance and handling operations.

4.2 Lubricant oil



To replace the engine oil, please refer to the engine instruction manual as regards the recommended viscosity and type.

TOP-UPS AND CHECK:

Carry out top-ups and checks when the engine is on a flat ground.

1. Remove the oil filling cap.
2. Pour in the oil and replace the cap.
3. Use the appropriate dipstick to check the level, which must be between the minimum and maximum notch.



Too much oil in the engine is dangerous as it could combust and cause a sudden increase in the rotation speed.

4.3 Air filter



Check the dry air filter has been correctly installed and there are no leaks around it, which could lead to unfiltered air infiltrating the engine.

Keep the filter clean to avoid performance loss or increased noise of the engine: remove it from its housing and eliminate the impurities with a jet of dry air. If this is not sufficient to completely clean the filter and ensure full efficiency, replace the entire filter.

4.4 Fuel



Switch off the engine when you refuel. Do not smoke or use naked flames whilst refuelling to avoid explosions or fires. Fuel fumes are highly toxic, so only refuel in the open air or in well ventilated environments. Do not spill the fuel. Clean any spills before starting the engine.

Fill the tank with good quality diesel, such as car diesel.

For details on the type of diesel to use, please read the engine manual supplied. Do not fill the tank completely. Leave a space of approximately 10 mm between the level of the fuel and the top wall of the tank to allow for expansion. In very cold temperatures, use special winter diesel or add specific additives to avoid the formation of paraffin.

4.5 Cooling fluid



Do not remove the radiator cap when the engine is running or still hot, as the cooling fluid could spill out abruptly and cause serious burns. Remove the cap very carefully.

Remove the cap and pour the cooling fluid into the radiator. The quantity and composition of the fluid are indicated in the engine user manual. Replace the cap and make sure it is perfectly closed. At the end of the operation switch on the engine briefly and check the level, as it could have decreased due to air bubbles present in the cooling circuit. Adjust the level by adding water. To replace the cooling fluid, follow the instructions in the engine user manual. During the life cycle of the engine, we advise to use the same refrigerating fluid rather than replace it with a different one. In case of change of the type of cooling fluid, accurately wash out the system; this operation is quite difficult, therefore we advise to stick with one type of refrigerating fluid. Not complying with this precaution might cause the production of gelatinous substances deriving from the mix of different residuals, which could cause the system to block.

5. INSTALLATION

5.1 Electrical specifications



It is mandatory to earth all models equipped with a differential switch (RCCB). In these units the neutral point of the generator set is usually connected to the machine earth. By using the TN or TT distribution system, the differential switch guarantees protection against indirect contact. If you need to power complex systems, which require or use additional electrical protective devices, you must check the coordination between the protective devices. Use the prepared terminal to earth. Comply with local and/or current regulations on installation and electrical safety.

5.2 Preliminary checks

Before operating the lighting tower, make sure to follow all the safety instructions concerning installation and use, as indicated in the relative section in this manual. More specifically, make sure that:



- the plain on which the lighting tower is placed is even and without any obstacles;
 - the wind speed does not exceed 80 km/h;
 - there are no overhead obstacles or power lines above the lighting tower;
 - the maintenance of the lighting tower has been regularly carried out;
 - the cables to raise the mast are in perfect condition.
- check the levels of the engine oil, hydraulic oil and radiator liquid;
 - check the fuel level.

5.3 Positioning the stabilisers and levelling the lighting tower

- Unlock the pins of the front stabilisers' extension arms; extract the extension arms until the pins lock again with the arms fully extended.
- Lower the rear stabilisers and fasten them with the clamping lever.
- With the aid of the spirit level on the unit, lower the front stabilisers and adjust the levelling of the lighting tower by means of the cranks.

5.4 Adjusting floodlights and mast orientation

The floodlight beam can be turned as required in two ways:

- by adjusting the tilt of each floodlight;
- by turning the mast in the required direction.

To tilt the floodlights, loosen the clamping screw, rotate the floodlight in the desired position and fasten it back. To rotate the mast, pull the pin out and turn to hold it in that position. Use the handles to turn the mast in the direction required. Unblock the pin and slightly rotate the mast until the pin falls back into lock position, avoiding the free rotation of the mast.



Before you switch on the engine, make sure the floodlight switches on the panel are all turned OFF.

FOR FURTHER INFORMATION ON HOW TO OPERATE THE CONTROL PANEL, PLEASE REFER TO ITS MANUAL.

Use the key on the front panel and press the START key to switch on the generator.

Switch the thermal magnetic circuit breaker ON.

Raise the mast to its full height using the dedicated pushbutton on the control panel. Switch on the lamps acting on the thermal magnetic circuit breakers on the front panel. After using the unit, switch off the lamps before lowering the mast. Lower the mast using the pushbutton on the control panel.



- 1 Key
- 2 START pushbutton
- 3 Mast up pushbutton
- 4 Mast down pushbutton
- 5 Main switch
- 6 Floodlight switches
- 7 MAN-O-AUT dusk switch
- 8 Dusk sensor
- 9 Pump thermal switch
- 10 Socket thermal switch
- 11 MAINS-O-GEN switch



- 12 Emergency stop button
- 13 Dusk sensor
- 14 Service socket
- 15 Mains plug



MACHINE WITH EMERGENCY PUSHBUTTON

By pressing the emergency pushbutton the engine will immediately stop, whatever work phase it has reached. Turn the pushbutton clockwise to reset.

5.5 Emergency lowering of the mast

In an emergency case because of engine, hydraulic unit or electric plant failure, lower the mast using the bypass valve of the solenoid valve on the hydraulic unit. When the mast has fully lowered, close the valve.



5.6 MAINS-0-GEN switch

Position 1
Mains supply

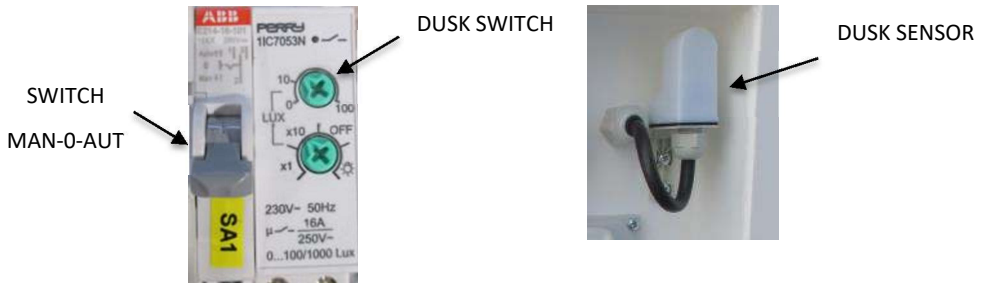


Position 2
Generator set supply

The floodlights and hydraulic unit can be supplied directly from the 230V mains.

Connect a 230V, 32A 2P+E plug to a socket having the same characteristics. The minimum cross-section of cables must be selected depending on voltage, installed power and the distance between the source and user points. To supply the Lighting Tower from the mains, move the switch to "MAINS" (position 1), while to supply it from the generator set, move the switch to "GEN" (positions 2). No energy is supplied when the switch is on 0.

5.7 Dusk switch (optional)



The electric panel includes a dusk relay and its relative dusk sensor, controlled by a switch. When the switch is on MAN, the dusk relay is bypassed and the floodlights operation is according to the position of the relative switches.

When the switch is on 0, the dusk relay is disabled and the floodlights do not work.

When the selector is on AUT, the floodlights are controlled by the dusk relay (floodlights switches must be set to ON).

FOR MORE INFORMATION ON THE DUSK RELAY AND ITS CONTROLS, PLEASE REFER TO ITS MANUAL.

6. MAINTENANCE



- Use qualified personnel to carry out maintenance and troubleshooting.
- Always switch off the engine before carrying out any maintenance on the machine. When the machine is running, pay attention to:
 - Rotating parts;
 - Hot parts (manifolds and exhaust silencers, turbines, and/or other);
 - Live parts.
- Remove the casings only if necessary to carry out maintenance. Put them back in place when maintenance has been completed.
- Wear adequate clothing and use suitable instruments; do use the PPE (Personal Protective Equipment) provided, according to the type of intervention (protective gloves, insulated gloves, goggles, etc.).
- Do not modify any components unless authorised.

WARNINGS

Maintenance by the user refers to all the operations and checks of the mechanical, electric and fluid parts subject to wear and tear under normal machine use. With regards to fluids, maintenance operations include the occasional top-ups and regular replacement. Maintenance operations also include regular cleaning of the machine to be carried out outside the normal work cycle. Maintenance does not include repairs or replacement of parts subject to occasional breakdowns and the replacement of worn electric and mechanical components due to normal use, either by Authorised Customer Centres or directly by the company. For regular maintenance to be carried out at intervals defined according to hours of operation, please refer to the hour counter.



During maintenance use extreme caution while handling polluting substances, liquids, spent oils, and any other substance that can damage people or objects, or become a hazard for the environment and the health and safety of the people. Compliance with the local laws and/or provisions in force is mandatory.

ENGINE AND ALTERNATOR

REFER TO THE SPECIFIC MANUALS PROVIDED

Each engine and alternator manufacturer sets out specific maintenance and control schedules. It is mandatory to read the USE AND MAINTENANCE handbooks for the engine and alternator.

VENTILATION

Ensure there are no obstructions (rags, leaves or other) on the equipment air intake and outlet, alternator and engine.

ELECTRICAL CONTROL PANELS

Regularly check the condition of the cables and connections. Clean them regularly using a vacuum cleaner. **DO NOT USE COMPRESSED AIR.**

STICKERS AND PLATES

Regularly check all warning signs on stickers and plates. If illegible and/or missing, **REPLACE THEM.**

HEAVY DUTY WORKING CONDITIONS

Under extreme operational conditions (frequent stops and starts, dusty environment, cold climate, long operational periods without unloading, fuel with a sulphur content exceeding 0.5%), maintenance operations must be carried out more often.



The engine protection devices will not trigger, if you use poor quality oil or if you do not replace it at regular intervals.

HYDRAULIC UNIT

- Regularly check the level and condition of the hydraulic fluid. The unit must be checked when the mast is lowered and the engine is off and cooled down.
- It is recommended to do the first fluid change within 3000 operating hours, or once every 2 years.
- In the case of top-up, do not mix hydraulic fluids of different producers or types, as slurries and sediments may build up which may compromise the smooth operation of the hydraulic unit.
- In the case of replacement, use high-viscosity oils, whose temperature range must be suitable for the conditions of use.

STEEL CABLES

Regularly check the condition of the telescopic mast steel cables. In the case of visible wear and tear, abrasion, broken wires or loose connection, the lighting tower must not be used. Immediately schedule the replacement of the cables.

CAUTION: in the event of a replacement, use a cable with the same characteristics of the original. We strongly recommend the use of original spare parts.

PULLEYS

Regularly check the correct rotation of the pulleys and the smooth operation of the cables.

Regularly lubricate with a multi-purpose, lithium lubricant.

TELESCOPIC MAST

Check the mast's correct extension up and down. Regularly lubricate the mast with anti-corrosive, water-repellent, lubricant spray.

FLOODLIGHTS

In the case of floodlights replacement, do not touch them with bare fingers. Use a cloth or wear cotton gloves. Take care as the headlamps become very hot when they are in use: wait for them to cool down before replacing them.

WHEELS

On equipment with towing trolleys, regularly check the tyre pressure.

7. LIGHTING TOWER DATA

MODEL	
GENERATING SET SERIAL NO.	
ENGINE	
ENGINE SERIAL NO.	
ALTERNATOR	
ALTERNATOR SERIAL NO.	
VOLTAGE	
FREQUENCY	
MAXIMUM CURRENT	
ENGINE REVS	
POWER PRP KVA (KW)	
POWER LTP KVA (KW)	
WEIGHT	
START-UP DATE	

Please complete the table by entering the data given on the model plate on the unit in order to prevent damaged plate or sticker unreadability.

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