



USE AND MAINTENANCE MANUAL

TRANSLATION OF THE ORIGINAL INSTRUCTIONS – ENGLISH

LIGHT & ENERGY

TF 119 Y (STAGE V)

- Torri Faro
- Lighting Towers
- Tours D'éclairage
- Torres de iluminación
- Lichtmasten
- Torres de iluminação
- По вышкам
- Verlichting Towers

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Dear Customer,

We wish to thank you for having bought a high quality set. Our sections for Technical Service and Spare Parts will work at best to help you if it were necessary.

To this purpose we advise you, for all control and overhaul operations, to turn to the nearest authorized Service Centre, where you will obtain a prompt and specialized intervention.

☞ In case you do not profit on these Services and some arts are replaced, please ask and be sure that are used exclusively original parts; this to guarantee that the performances and the initial safety prescribed by the norms in force are re-established.

☞ **The use of non original spare parts will cancel immediately any guarantee and Technical Service obligation.**

NOTES ABOUT THE MANUAL

Before actioning the machine please read this manual attentively. Follow the instructions contained in it, in this way you will avoid inconveniences due to negligence, mistakes or incorrect maintenance. The manual is for qualified personnel, who knows the rules: about safety and health, installation and use of sets movable as well as fixed.

You must remember that, in case you have difficulties for use or installation or others, our Technical Service is always at your disposal for explanations or interventions.

The manual for Use Maintenance and Spare Parts is an integral part of the product. It must be kept with care during all the life of the product.

In case the machine and/or the set should be yielded to another user, this manual must also given to him.

Do not damage it, do not take parts away, do not tear pages and keep it in places protected from dampness and heat.

You must take into account that some figures contained in it want only to identify the described parts and therefore might not correspond to the machine in your possession.

INFORMATION OF GENERAL TYPE

In the envelope given together with the machine and/or set you will find: the manual for Use Maintenance and Spare Parts, the manual for use of the engine and the tools (if included in the equipment), the guarantee (in the countries where it is prescribed by law).

The Manufacturer shall not be liable for ANY USE OF THE PRODUCT OTHER THAN THAT PRECISELY SPECIFIED IN THIS MANUAL and is thus not liable for any risks which may occur as a result of IMPROPER USE. The Company does not assume any liability for any damage to persons, animals or property.

Our products are made in conformity with the safety norms in force, for which it is advisable to use all these devices or information so that the use does not bring damage to persons or things.

While working it is advisable to keep to the personal safety norms in force in the countries to which the product is destined (clothing, work tools, etc.).

Do not modify for any motive parts of the machine (fastenings, holes, electric or mechanical devices, others..) if not duly authorized in writing: the responsibility coming from any potential intervention will fall on the executioner as in fact he becomes maker of the machine.

☞ **NOTICE:** the manufacturer, who keeps the faculty, apart the essential characteristics of the model here described and illustrated, to bring betterments and modifications to parts and accessories, without putting this manual uptodate immediately.



Any of our product is labelled with CE marking attesting its conformity to applicable directives and also the fulfillment of safety requirements of the product itself; the list of these directives is part of the declaration of conformity included in any machine standard equipment.

Here below the adopted symbol:



ENGLISH

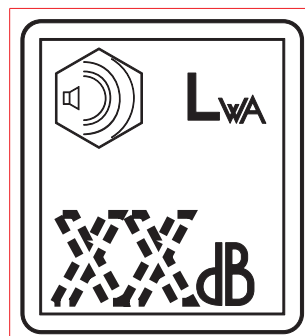
ENGLISH

CE marking is clearly readable and unerasable and it can be either part of the data-plate.

①										
CE	TYPE	②			Made in UE-ITALY			④		
	SERIAL N°	③								
Lamp	TYPE/N°	⑤								
	VOLTAGE(V)	⑥								
	POWER(W)	⑦								
G	Hz	⑧	KVA	⑪	⑫	⑬				
	P.F.	⑨	V(V)	⑭	⑮	⑯				
	I.CL.	⑩	I(A)	⑰	⑱	⑲				
	LTP POWER IN ACCORDANCE WITH ISO 8528									
Motor	n	⑳	RPM	TEMP.	㉒	°C	IP	㉔		
	P _{max}	㉑	kW	ALTIT.	㉓	m	Kg	㉕		
⑳										

- | | |
|---|---|
| 1. Name or brand supplier | 14. Generating set rated voltage (V) |
| 2. Light tower model | 15. Generating set rated voltage (V) |
| 3. Serial number registration number | 16. Generating set rated voltage (V) |
| 4. Year of production | 17. Generating set rated current(A) |
| 5. Type and number of lamps | 18. Generating set rated current(A) |
| 6. Lamps voltage supply | 19. Generating set rated current(A) |
| 7. Lamps total power | 20. Engine rated speed |
| 8. Generating set rated frequency | 21. Engine maximum power |
| 9. Generating set power factor cosφ | 22. Generating set max ambient temperature |
| 10. Generating set insulation class | 23. Generating set rated altitude (above sea level) |
| 11. Generating set rated power (kVA/kW) | 24. IP degree protection |
| 12. Generating set rated power (kVA/kW) | 25. Dry weight (kg) |
| 13. Generating set rated power (kVA/kW) | 26. Any additional information |

Furthermore, on each model it is shown the noise level value; the symbol used is the following:









The indication is shown in a clear, readable and indeleble way on a sticker.

SYMBOLS IN THIS MANUAL

- The symbols used in this manual are designed to call your attention to important aspects of the operation of the machine as well as potential hazards and dangers for persons and things.
Moreover, this symbolism intends to draw your attention with the aim to give you indications for a correct use and, as a result, to obtain a good operation of the machine or equipment used.

SAFETY PRECAUTIONS

	DANGEROUS
This heading warns of an <u>immediate</u> danger for persons as well for things. Not following the advice can result in serious injury or death.	
	WARNING
This heading warns of situations which could result in injury for persons or damage to things.	
	CAUTION
To this advice can appear a danger for persons as well as for things, for which can appear situations bringing material damage to things.	
	IMPORTANT
	NOTE
	ATTENTION
These headings refer to information which will assist you in the correct use of the machine and/or accessories.	

SIMBOLS



STOP - Read absolutely and be duly attentive



Read and pay due attention



DANGER



GENERAL ADVICE - If the advice is not respected damage can happen to persons or things.



HIGH VOLTAGE - Attention High Voltage. There can be parts in voltage, dangerous to touch. The non observance of the advice implies life danger.



FIRE - Danger of flame or fire. If the advice is not respected fires can happen.



HEAT - Hot surfaces. If the advice is not respected burns or damage to things can be caused.



EXPLOSION - Explosive material or danger of explosion. In general. If the advice is not respected there can be explosions.



ACIDS - Danger of corrosion. If the advice is not respected the acids can cause corrosions with damage to persons or things.



PRESSION - Danger of burns caused by the expulsion of hot liquids under pressure.

PROHIBITIONS

It is prohibited to smoke while filling the tank with fuel.



The cigarette can cause fire or explosion. If the advice is not respected fires or explosions can be caused.

It is prohibited to use water to quench fires on the electric machine



If the advice is not respected fires or damage to persons can be caused.

Use only with non inserted voltage -



It is prohibited to make interventions before having disinserted the voltage.



ACCES FORBIDDEN to non authorized people.

ADVICE

Use only with safety clothing -



It is compulsory to use the personal protection means given in equipment.



WRENCH - Use of the tools. If the advice is not respected damage can be caused to things and even to persons.



FIRST AID. In case the operator should be sprayed by accident, from corrosive liquids a/o hot toxic gas or whatever event which may cause serious injuries or death, predispose the first aid in accordance with the ruling labour accident standards or of local instructions.

Skin contact	Wash with water and soap
Eyes contact	Irrigate with plenty of water, if the irritation persists contact a specialist
Ingestion	Do not induce vomit as to avoid the intake of vomit into the lungs, send for a doctor
Suction of liquids from lungs	If you suppose that vomit has entered the lungs (as in case of spontaneous vomit) take the subject to the hospital with the utmost urgency
Inhalation	In case of exposure to high concentration of vapours take immediately to a non polluted zone the person involved



FIRE PREVENTION. In case the working zone, for whatsoever cause goes on fire with flames liable to cause severe wounds or death, follow the first aid as described by the ruling norms or local ones.

EXTINCTION MEANS	
Appropriated	Carbonate anhydride (or carbon dioxide) powder, foam, nebulized water
Not to be used	Avoid the use of water jets
Other indications	Cover eventual shedding not on fire with foam or sand, use water jets to cool off the surfaces close to the fire
Particular protection	Wear an autorespiratory mask when heavy smoke is present
Useful warnings	Avoid, by appropriate means to have oil sprays over metallic hot surfaces or over electric contacts (switches, plugs, etc.). In case of oil sprinkling from pressure circuits, keep in mind that the inflamability point is very low.

GENERAL SAFETY INSTRUCTIONS

NOTE: the information contained in this manual are subject to change without notice.

The instructions in this manual are intended as indicative only. It is the responsibility of the owner/operator to evaluate risks and potential damages in relation to the use of the product in the specific conditions of application. Remember that the non observance of the indications of this manual may result in damage to people or things.

In all cases, however, it is understood that the use shall be in compliance with the applicable laws/regulations.

- Before operating the machine, read carefully the safety instructions contained in this manual and other manuals supplied (engine, alternator, etc.).
- All operations, handling, installation, use, maintenance, repair should be carried out by authorized and qualified personnel.
- When operating, wear personal protective equipment (PPE): footwear, gloves, helmet, etc..
- The owner is responsible for maintaining the equipment in safe conditions.

Use only in perfect technical conditions

The machinery or equipment must be used in perfect technical condition. Remove immediately any defects that may affect the safe conditions of use.

- Before starting to use this equipment it is important to take knowledge of all the controls of the machine, all its functions and its correct installation in order to avoid accidents to people and damage to the machine itself. In particular, it is important to know how to stop the equipment quickly in case of emergency.
- Do not allow the use of the machine to people unless previously instructed with all the information for a proper, safe use.
- Forbid the access in the operational area to non authorized personnel, children and pets so as to protect them from possible injury caused by any part of the machine.

SAFETY PRECAUTIONS DURING HANDLING AND TRANSPORTATION

- Lift the machine using only the points allocated for this function.
The lifting eye (or eyes) and the correct positioning of the forks of the forklift are marked with specific adhesives.
- Clear the operational area of possible obstacles and all unnecessary personnel.
- Always use lifting equipment properly sized and controlled by enabled bodies.
- It is forbidden to set on the frame of the equipment objects or accessories that alter weight and center of gravity and cause stresses not foreseen to the lifting points.
- Do not submit the machine and the lifting equipment to swinging or shock which may transmit dynamic stress to the structure.

Equipments with trailers or site tows

- Never drag the machine without trailer (or site tow)
- Check for a correct assembly of the machine to the towing device.
- Always make sure that the hook of the vehicle is suitable for towing of the total mass of the trailer.
- Do not tow the trailer if the coupling devices are worn or damaged.
- Check for proper tire pressure.

- Do not replace the tires with types different from the original ones.
- Check that the brakes and the optical signaling of the trailer are working properly.
- Verify that the bolts of the wheels are in place and well tightened.
- Do not park the machine (on trailer or site tow) on a steep slope.
For the stops, not followed by a work session, always engage the parking brake and / or block the wheels by means of wheel chocks.
- Do not tow the trailer on bumpy roads.
- Do not exceed the maximum permissible speed on public roads of 80 km/h with the trailer, in any case comply with the legislation applicable in the country of use.
- Do not use the site tow on public roads, this is intended for use only in private and delimited areas. The maximum permitted speed is 40 km/h on smooth surfaces (asphalt or concrete), adapt in each case the speed to the type of ground.

SAFETY PRECAUTIONS DURING INSTALLATION AND USE

- Always locate the machine on a flat and solid ground, so as to avoid tipping, slipping or falling during operation. Avoid using the machine on slopes greater than 10 degrees.
- Make sure the area immediately surrounding the machine is clean and free from debris.
- Connect the machine to an earthing system according to the regulations in force at the place of installation. Use the ground terminal on the front of the machine.
- Do not use the machine with wet or damp hands and / or clothing.
- Use plugs suitable for the output sockets of the machine and make sure that electrical cords are in good condition.
- The machine must always be positioned so that the exhaust gases are dispersed in the air without being inhaled by people or living beings.
- If you use the machine indoors is necessary that the installation is designed and built by skilled technicians in a workmanlike manner.
- During normal operation, keep doors closed. The access to the internal parts should be allowed only for maintenance reasons.
- Do not place objects or obstructions in the vicinity of the air intakes and air outlets, a possible overheating of the generator could cause a fire.
- Keep area near to the muffler free from objects such as rags, paper, cardboard. The high temperature of the muffler could cause the burning of objects and cause fire.
- Immediately stop the machine in case of malfunction.
Do not restart the machine without first having found and fixed the problem.

SAFETY PRECAUTIONS DURING MAINTENANCE

- Make use of **qualified** personnel to carry out maintenance and troubleshooting.
- It is mandatory to stop the engine before performing any maintenance on the machine.
- Always use protective devices and suitable equipment.
- Do not touch the engine, the exhaust pipes and the muffler during operation or immediately after. Allow the engine to cool before performing any operation.
- With the machine running pay attention to moving parts such as fans, belts, pulleys.
- Do not remove the protections and the safety devices unless absolutely necessary, restore them after completion of the maintenance or repair.
- Do not refuel while the engine is running or hot. Do not smoke or use naked flames when refueling.
- Refuel only outdoors or in well ventilated areas.
- Avoid spilling fuel, especially on the engine. Clean and dry any leaks before restarting the machine.
- Slowly unscrew the cap of the fuel tank and put it back always after refueling.
- Do not fill the tank completely to allow for expansion of the fuel inside.
- Do not remove the radiator cap when the engine is running or still hot, the coolant may spurt out and cause serious burns.
- Do not handle the battery without the use of protective gloves, the battery fluid contains sulfuric acid, which is very corrosive and dangerous.
- Do not smoke, avoid any naked flames or sparks near the battery, the vapors exhaled could cause the battery to explode

ADDITIONAL PRECAUTIONS FOR LIGHTING TOWERS**ATTENTION**

The lighting tower is designed to be used with a generating set or with a fixed mass on its base. The weight and positioning of the generating set on the base are essential for the safety of the lighting tower. Failure to comply with this provision causes a serious danger of tipping or instability during operation and during handling with site tow. If necessary, contact the service.

SAFETY PRECAUTIONS DURING HANDLING AND TRANSPORTATION

- Before moving a lighting tower lower the telescopic mast and block properly all movable parts such as the access doors, the mast, the outriggers, the floodlights.
- Check the fastening of the wheels of the trolley.

SAFETY PRECAUTIONS DURING INSTALLATION AND USE

- Make sure the area above the lighting tower is free from overhead cables or other obstacles.
- Before raising the mast extract the outriggers located at the sides of the machine. Acting on the outriggers level the lighting tower making use of the bubble, so as to bring the equipment in a horizontal position. Make sure that the tower rests securely on the outriggers. If the lighting tower is mounted on road trailer pull the handbrake.
- Do not operate the lighting tower if the wind speed exceeds the safe speed indicated or if it is expected the arrival of storms or thunderstorms in the area.
- Lower the telescopic mast when the tower is not used.
- Always check the good condition of the power cable before connecting the lighting tower to the generating set.
- Do not touch and do not place objects on the lamps during operation or immediately after use. The lamps become very hot.
- Do not turn on the lamps without the protective glass or with the same broken or damaged.
- Make sure all the ropes and the manual winch are in perfect condition.
- Place the lighting tower in order to avoid that the winch can receive shocks which may cause damage to the automatic brake.

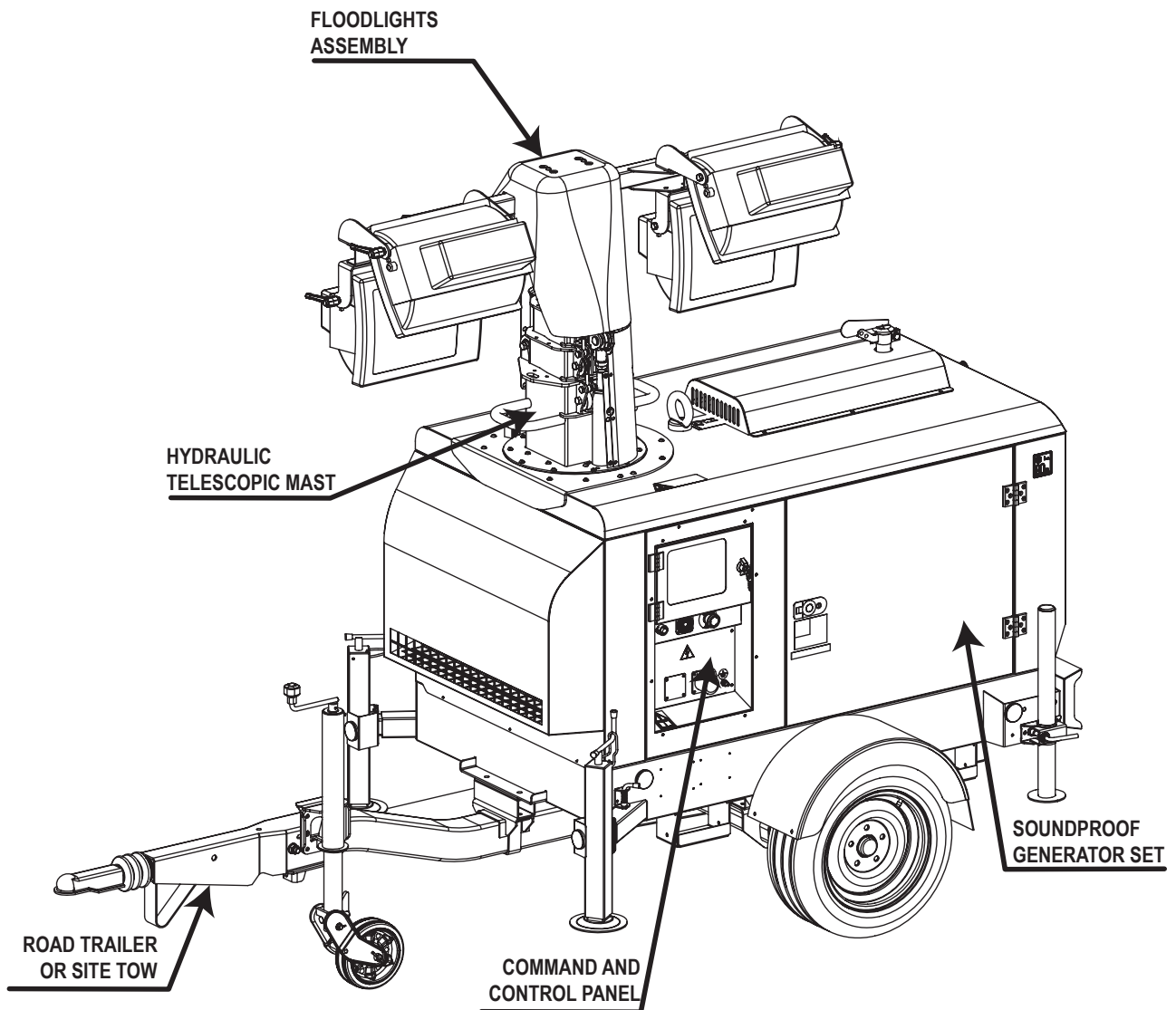
SAFETY PRECAUTIONS DURING MAINTENANCE

- Turn off the generating set or unplug the power cable before carrying out any type of maintenance on the lighting tower.
- Always cut off power to the lamps and wait for their cooling before performing any maintenance or replacement.
- Before carrying out any type of maintenance or repairs on the generating set refer to the manual of the generating set and the other manuals supplied.

The Lighting Tower a compact and functional model which integrates the functions of lighting tower and electric power generator into a single machine.

The lighting tower is composed of:

- A hydraulic telescopic mast, which can be raised up to a maximum height of 9 meters and manually oriented within a range of 340°
- A light assembly consisting of IP65 or higher floodlights and various types of lamps: LED, metal halide, exc..
- A silent generator driven by a water-cooled, low fuel consumption engine
- A command and control panel for the overall management and protection of the lighting tower
- 4 outriggers, 2 extendable and adjustable in height, to ensure the stability of the tower on any working surface
- The lighting tower is on base but can be equipped with a road trailer or a site tow.



.....
The manual is for the range of machines indicated on the front cover.

With the scope to facilitate the search of the spare parts and maintain information of the bought machine, is necessary to record some data.

Please write the requested data inside the squares to side:

1. Model of machine
2. Serial number of the machine
3. Serial number of the engine
4. Name of the dealer where bought the machine
5. Address of the dealer
6. Phone number of the dealer
7. Date of the bought machine
8. Notes

ENGLISH

ENGLISH

RECORDING DATA

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

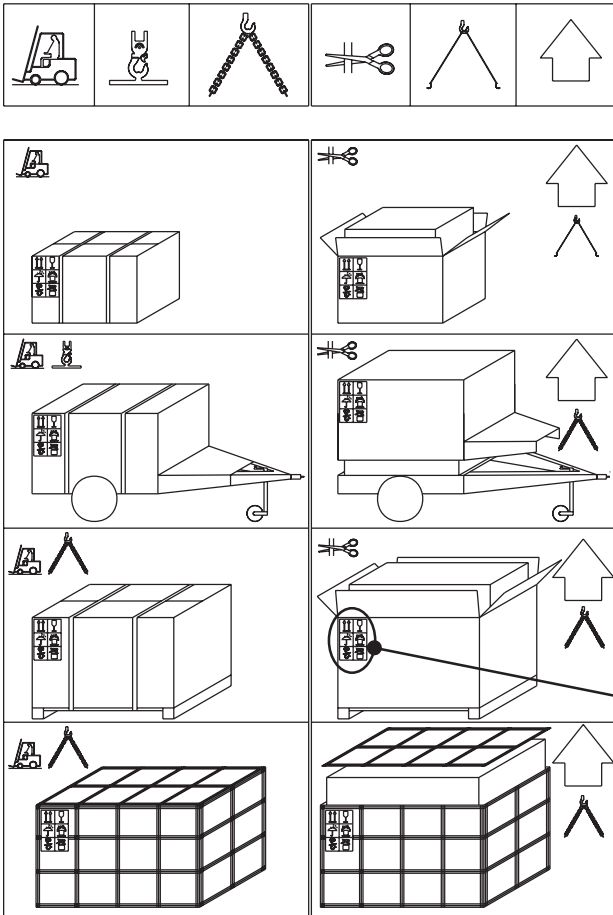
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NOTE

ENGLISH

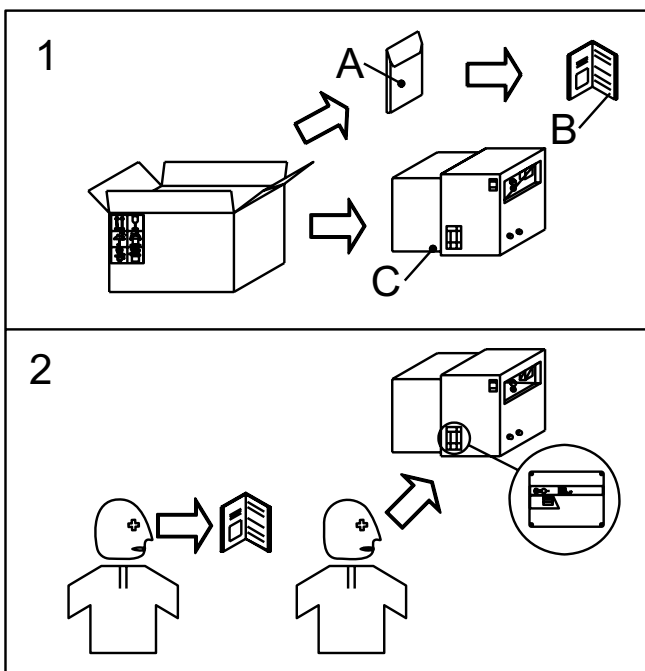
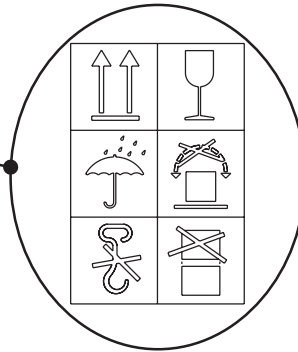
ENGLISH



Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with its packaging, and conforms to local rules and regulations. When receiving the goods make sure that the product has not suffered damage during the transport, that there has not been rough handling or taking away of parts contained inside the packing or in the set. In case you find damages, rough handling or absence of parts (envelopes, manuals, etc.), we advise you to inform immediately our Technical Service.




For eliminating the packing materials, the User must keep to the norms in force in his country.




- 1) Take the machine (C) out of the shipment packing. Takeout of the envelope (A) the user's manual (B).
- 2) Read: the user's manual (B), the plates fixed on the machine, the data plate.



GENERAL PRECAUTION WHEN HANDLING THE MACHINE.



ATTENTION



During handling of the lighting tower is essential to pay close attention.
All handling operations must be performed by qualified personnel.
For the characteristics of weight and size, an error during the handling of the machine may result in serious damage to the surrounding people and to the machine itself.

In order to minimize the dangers involved in moving the equipment it is important to follow carefully the requirements below:

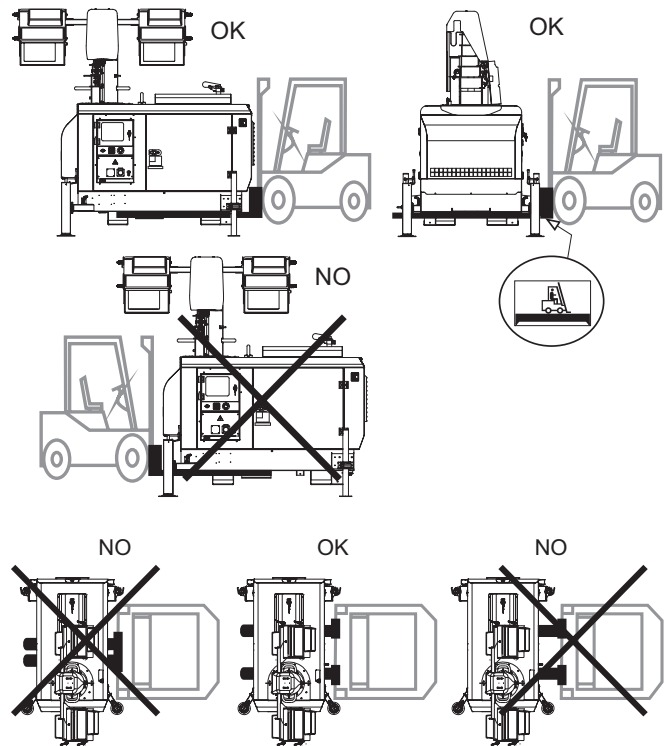
- The transport must always be done with the engine off, with electrical cables and starting battery disconnected, fuel tank empty.
- Clear the moving zone of all possible obstacles and from all unnecessary personnel.
- Use properly sized lifting equipment regularly submitted to major overhaul by an authorized organisation. **It is prohibited to fasten objects or accessories on the lighting tower baseframe** that may modify weight and center of gravity and may cause movements unforeseen by the lifting eyes.
- Do not subject the **lighting tower** and lifting equipment to abrupt or undulating movements that pass on stress dynamics to the structure.
- Do not lift the equipment at heights greater than those strictly necessary.
- To access the attachment points on the roof of the machine, use approved ladders only. Climb the ladder being supported by a second operator and wear special non-slip shoes.

MOVING THE GENERATING SET VIA FORKLIFT

When lifting with a forklift it is necessary to:

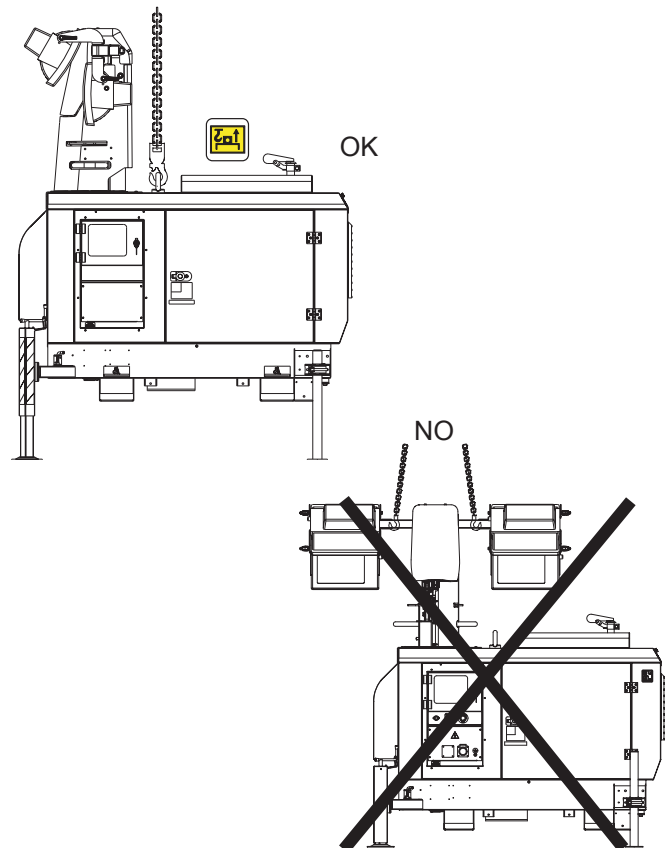
- Insert the forks of the forklift into the specific pockets located sideways and frontally on the baseframe, as indicated in the figures.
- Fully insert the forks so that they stick out from the opposite side and be careful to keep the equipment in horizontal position.

Stickers on the base indicate where to place the lifter forks.



MOVING THE GENERATING SET VIA CABLES OR CHAINS

When lifting the genset with the aid of cables or chains it is necessary to use equipment periodically checked by a licensed organisation. Hook the cables only on to the points provided for this use and shown via the appropriate stickers.



MOVING BY SITE TROLLEY / TRAILER



CAUTION

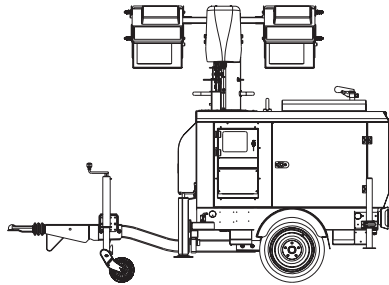
the trailer can be driven only after you have done the following:

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

BEFORE STARTING TO TOW DO THE FOLLOWING:

- Fully raise the outriggers and lock the crank with its clamp
- Fully retract the outriggers up to snap the locking pins
- Use the crank of the jockey wheel to raise / lower the drawbar on the hook of the towing vehicle lock the hook
- lock the hook
- Connect the cable from the trailer to the towing vehicle and make sure all the lights work properly
- Make sure that the doors are locked
- Check for proper tire inflation of the trailer

ROAD TRAILER (CTV):



It is homologated for use on public roads. The maximum speed allowed is 80 km/h, in any case, the transportation laws in force in the place of use shall be respected.

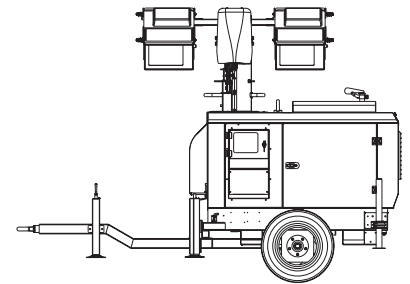
SITE TOW CTL:

this trailer is made by the manufacturer, it can not be towed on public roads. Therefore it can only be used on private roads and no through traffic zones.

The maximum speed allowed is 40 km/h on smooth surfaces (asphalt, cement) and, in any case, the laws in force in the place of use should be respected.

Always follow the directions below for any tipe of tow:

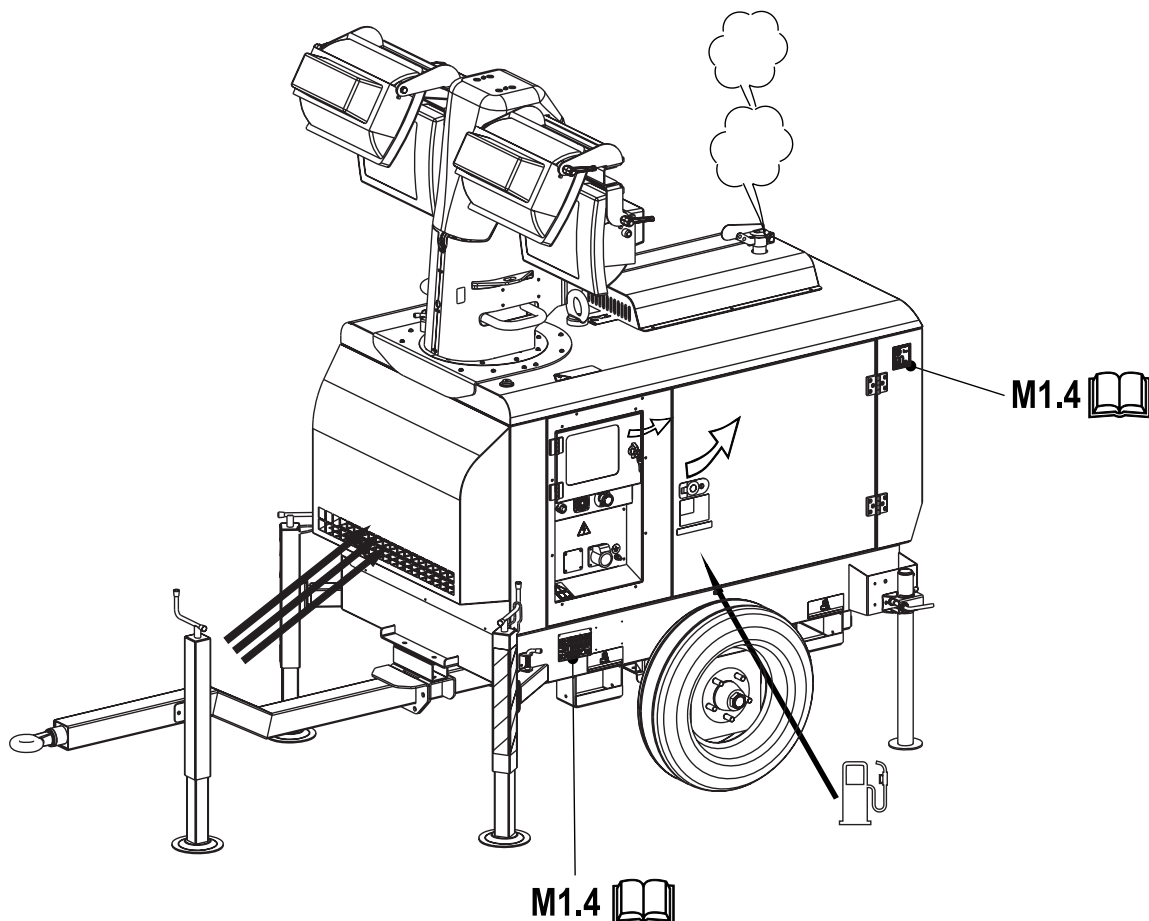
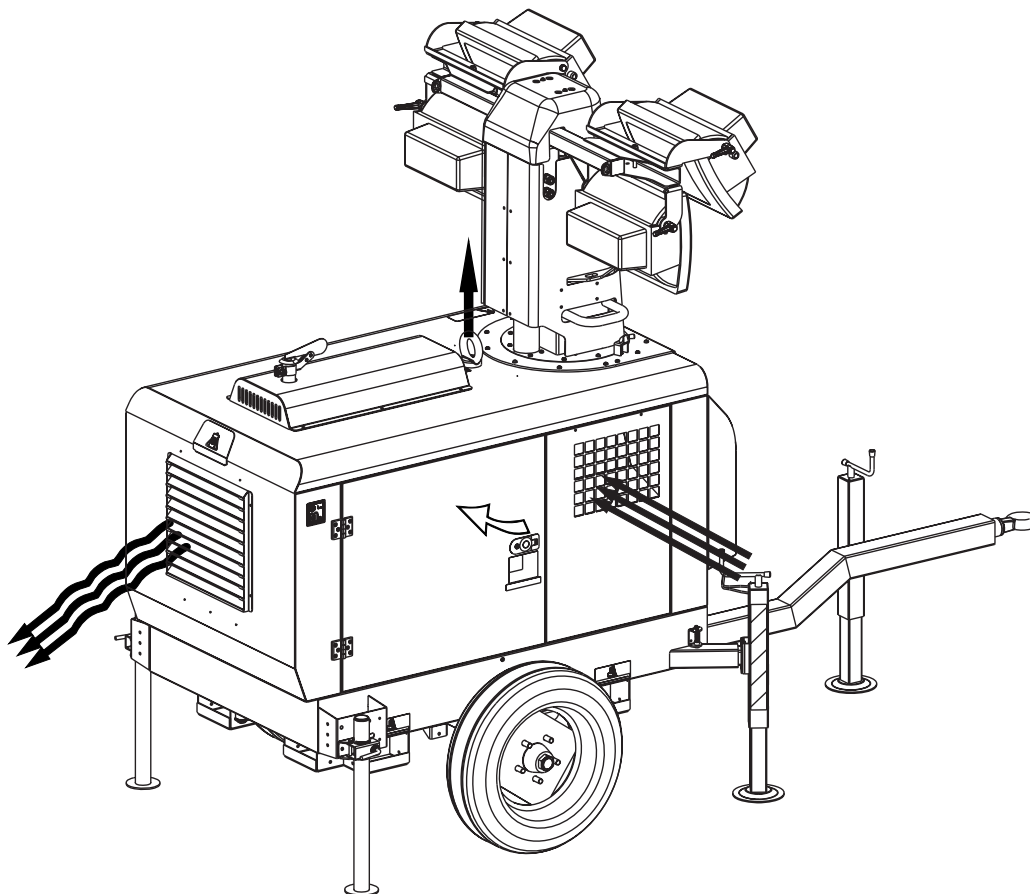
- Do not park the machine (on trailer or site tow) on a slant ground.
- When parking always use the emergency/hand brake and/ or safety clamps.
- DO NOT tow the trailer on bumpy roads.



MACHINE TRANSPORTATION BY A MOTOR VEHICLE

During the transportation with a motor vehicle it is important to use appropriate belts/straps to stabilise the unit, thus avoiding that unexpected jumps or jolts can cause damage to the baseframe and to the engine or even worse the loss or the overturning of the load. It is the carriers responsibility to always respect the Highway Code in force.







BATTERY WITHOUT MAINTENANCE



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

Before starting the gen-set connect the cable + (positive) to the pole + of the battery, by properly tightening the clamp. In case of models with warning light: check the state of the battery by

means of the indicator placed in the upper part.

- Green colour: battery OK
- Black colour: battery to be recharged
- White colour: battery to be replaced

DO NOT OPEN THE BATTERY.



LUBRICANT

RECOMMENDED OIL

The manufacturer recommends selecting **AGIP** engine oil. Refer to the label on the motor for the recommended products. Please refer to the motor operating manual for the recommended viscosity.

REFUELLING AND CONTROL:

Carry out refuelling and controls with motor at level position.

1. Remove the oil-fill tap (24)
2. Pour oil and replace the tap
3. Check the oil level using the dipstick (23); the oil level must be comprised between the minimum and maximum indicators.



AIR FILTER

Check that the dry air filter is correctly installed and that there are no leaks around the filter which could lead to infiltrations of non-filtered air to the inside of the motor.



FUEL



ATTENTION



Stop engine when fueling. Do not smoke or use open flames during refuelling operations, in order to avoid explosions or fire hazards.

Fuel fumes are highly toxic; carry out operations outdoors only, or in a well-ventilated environment. Avoid accidentally spilling fuel. Clean any eventual leaks before starting up motor.

Refill the tank with good quality diesel fuel, such as automobile type diesel fuel, for example.

For further details on the type of diesel fuel to use, see the motor operating manual supplied.

Do not fill the tank completely; leave a space of approx. 10 mm between the fuel level and the wall of the tank to allow for expansion.

In rigid environmental temperature conditions, use special winterized diesel fuels or specific additives in order to avoid the formation of paraffin.



ATTENTION

It is dangerous to fill the motor with too much oil, as its combustion can provoke a sudden increase in rotation speed.



COOLING LIQUID



ATTENTION

Do not remove the radiator tap with the motor in operation or still hot, as the liquid coolant may spurt out and cause serious burns. Remove the tap very carefully.

Remove the tap and pour the liquid coolant into the radiator; the quantity and composition of the liquid coolant are indicated in the motor operating manual. Replace the tap, ensuring it is perfectly closed.

After refilling operations, allow the motor to run for a brief time and check the level, as it may have diminished due to air bubbles present in the cooling circuit; restore the level with water. To replace the liquid coolant, follow the operations described in the motor operating manual.

ATTENTION:

The engine cooling system is originally filled with coolant type: **AGIP ANTIFREEZE EXTRA**

During the engine life it is strongly recommended to use the same coolant type. This is because a coolant change would require a careful cleaning of the cooling system, which is not an easy job. A lack in tacking these precautions would result in the mix of different additives used in different coolants which would originate gelatinous substances capable of obstructing the cooling system.

 PRODOTTI RACCOMANDATI RECOMMENDED PRODUCTS	
AGIP SIGMA TURBO PLUS 15W/40 API CG4 - ACEA E3	OLIO MOTORE DIESEL DIESEL ENGINE OIL
AGIP SUPERMOTOROIL 20W/50 API CC-SF	OLIO MOTORE BENZINA GASOLINE ENGINE OIL
AGIP ANTIFREEZE EXTRA INIBITE ETHYLENE GLYCOL (50% + 50% + H ₂ O)	CIRCUITO DI RAFFREDDAMENTO COOLING CIRCUIT (CUNA NC 956-16 ED 97)

ELECTRICAL CONNECTIONS

ATTENTION

A qualified electrician should carry out electrical connections according to the norms in force.

The electrical connection to the User system is a very important operation: safety and good operation of the genset and User system depend on a correct electrical connection.

Before supplying User system always check:

- that wires connecting gen-set to the user plant are suitable to the supplied voltage and are in accordance to the applicable rules;
- wire type, section and length have been calculated considering environment conditions and in force norms;
- ground is functioning correctly: earth fault relay device works only if this connection is operating;
- that direction of the phases corresponds to the user plant phase rotation, and none of the phases has been accidentally connected to neutral.




EARTHING WITHOUT GROUND FAULT INTERRUPTER

The protection against electric shock from contact indirect is ensured by the “electrical separation” with equipotential bonding between all the exposed conductive parts of the generating set.

The generating set is **NOT** equipped with a earth leakage circuit breaker because its windings are not connected to ground, hence the machine should **NOT** be intentionally connected to a grounding circuit.

The limitation of the extension of the electric circuit is very important for safety, do not power supply to electric plants with a length greater than 200 meters.

It is important that the power cords of the equipment are equipped with the protective conductor, yellow-green cable, in order to ensure the connection between the exposed conductive parts of the generating set and the equipment; this provision does not apply to the class II equipment (double insulation or reinforced insulation) recognizable by the symbol .

The cables must be suitable environment in which it operates. It should be noted that with temperatures below 5°C PVC cables become stiff and PVC insulation tends to cut to the first fold.

The protection by electrical separation is **NOT** suitable if the machine is destined to supply power complex plants or located in special environments with greater risk of electric shock.

In these cases it is necessary to adopt security measures electricity provided by law.

For EXAMPLE, you can install a GFI (Ground Fault Interrupter or Earth Leakage Circuit Breaker) high sensitivity 30mA, and grounding the Neutral of the generating set: this operation must be performed by a qualified electrician or at a authorized service provider.

The grounding of the generating set is now mandatory to ensure protection against indirect contact by means of the GFI.

Connect the generating set to an earthing system via a cable certain efficiency using the ground terminal (12) on the machine.

EARTHING WITH GROUND FAULT INTERRUPTER

The grounding connection to an earthed installation **is obligatory** for all models equipped with a differential switch (circuit breaker). In these groups the generator star point is generally connected to the machine’s earthing; by employing the TN or TT distribution system, the differential switch guarantees protection against indirect contacts.

In the case of powering complex installations requiring or employing additional electrical protection devices, the coordination between the protection devices must be verified.

For the grounding connection, use the terminal (12); comply to local and/or current regulations in force for electrical installations and safety

EARTHING WITH ISOMETER

Machines equipped with insulation resistance monitor allow intentionally not to connect the ground terminal PE (12) to an earthing system.

Located on the front of the machine the insulation resistance monitor has the function of continuously monitoring the ground insulation of live parts.

If the insulation resistance falls below the pre-set fault value, the insulation resistance monitor will interrupt the supply of the connected equipment.

It is important that the power cords of the devices are provided with the green-yellow circuit protective conductor, so as to ensure the bonding among all the grounds of the equipment and the ground of the machine; the latter provision does not apply to equipment with double insulation or reinforced insulation.

NOTE: it is possible to connect the PE terminal (12) to an own ground connection. In this case an IT earthing system is accomplished, this means with the active parts isolated from earth and the equipment cases grounded.

In this case, the insulation resistance monitor checks the insulation resistance of the active parts both towards case and ground, for example, the insulation towards ground of the power cables.



Check daily



NOTE

Do not alter the primary conditions of regulation and do not touch the sealed parts.

The starting of the unit can be effected in 3 different modes:

1) Start with EP6 key (Engine Control)

Put the "Local/Remote" selector on Local. Turn the key on "ON", the EP6 display shows, only on the machines with mounted glow plugs for 5 secs, the symbol "UUUU", then the message "Sta" appears the engine can be started, for then turn the key on "start" and start the engine.

On the display the word "Sta" remains for about 20 sec then automatically disappears; the engine **must be** started within 20 secs, otherwise the EP6 blocks the starting and on the display the word "fail" appears. Turning the key on "OFF" the EP6 is reset and a new starting cycle can be fixed.

Stop:

it is COMPULSORY to disconnect the load first, then to stop the engine turn the key on "OFF".

2) Remote starting with TCM35

Put the "Local/Remote" selector on Local. Connect TCM35 to the plug on the front panel and put the switch on "0".

Turn the key on ON in the EP6, wait for the various signals to go out then press the button "AUTO" in the EP6 until the led "AUTO" flashes.

Shift the switch on "1" in the TCM35 and automatically the starting cycle will start. On the machines with mounted glow plugs appears in the display EP6 (for about 5 secs), the symbol "UUUU"; the starting cycle includes 3 starting trials. When the engine starts the led "AUTO" remains lit continuously and simultaneously the red warning light will light in the TCM35.

Stop:

it is COMPULSORY to disconnect the load first, then shift the switch of the TCM35 on "0", the engine will stop immediately.

3) Start with Automatic start unit (EAS)

Put the "Local/Remote" selector on Remote.

Connect the EAS to unit.

The EAS controls the starting as well as the stop of the engine.

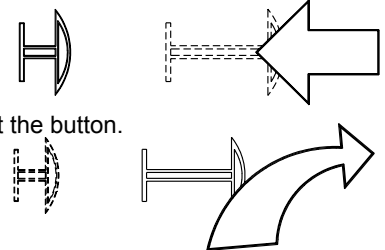
Follow attentively the instructions reported in the EAS manual.



CAUTION

MACHINE WITH EMERGENCY BUTTON

Pressing the button the engine will stop immediately in any working condition.



Turn clockwise to reset the button.



CAUTION

RUNNING-IN

During the first 50 hours of operation, do not use more than 60% of the maximum output power of the unit and check the oil level frequently, in any case please stick to the rules given in the engine use manual.



NOTE

For safety reason the key must be kept by qualified personel.



ATTENTION

Before operating the lighting tower make sure that all safety regulations concerning installation and use are satisfied, as indicated in the relevant section of this manual!

In particular, be sure that:

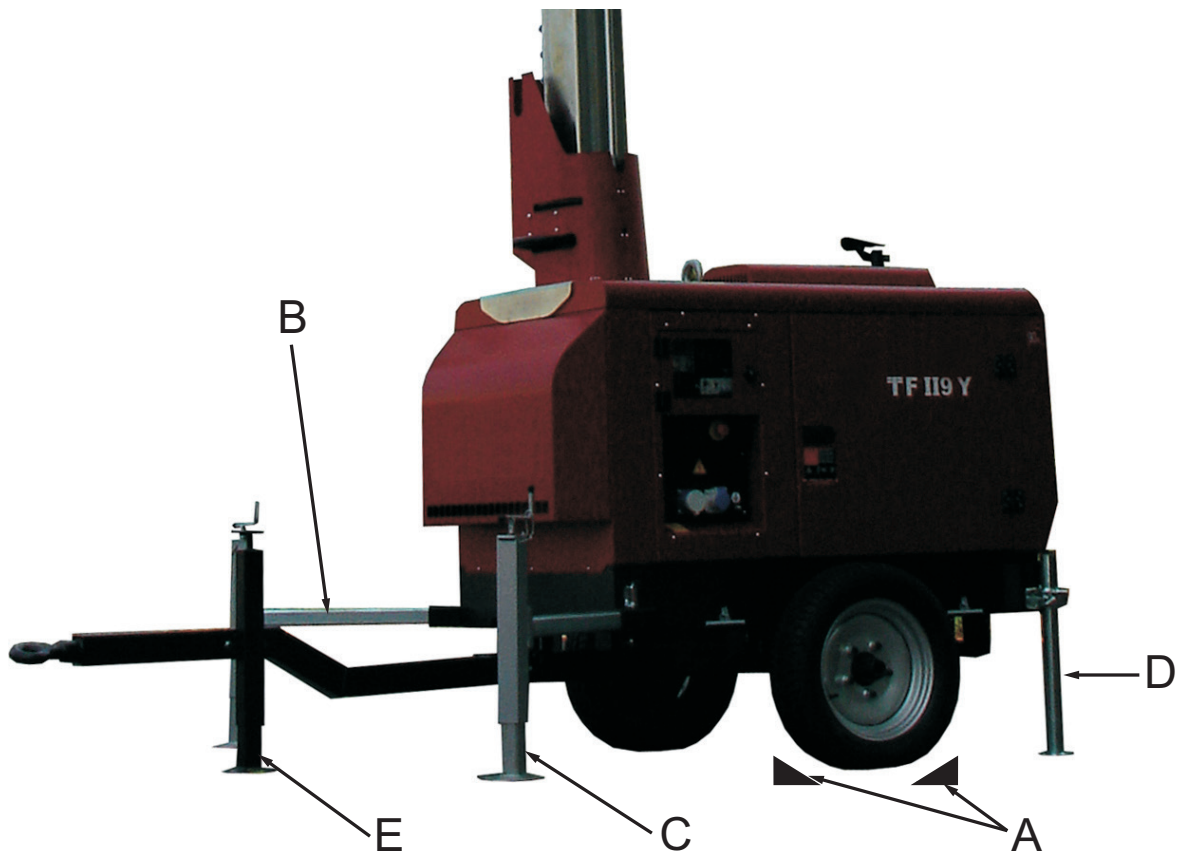
- the surface on which the lighting tower is placed is flat and free of obstacles
- the wind speed does not exceed 80 km/h
- there are no obstacles or overhead power lines above the lighting tower
- the status of the lighting tower is adequate, in general
- the lifting ropes of the mast are in perfect condition.

PRELIMINARY CHECKS

- Check the engine oil level, hydraulic oil and radiator fluid
- Check the fuel level

POSITIONING OF THE OUTRIGGERS AND LEVELLING OF THE TOWER

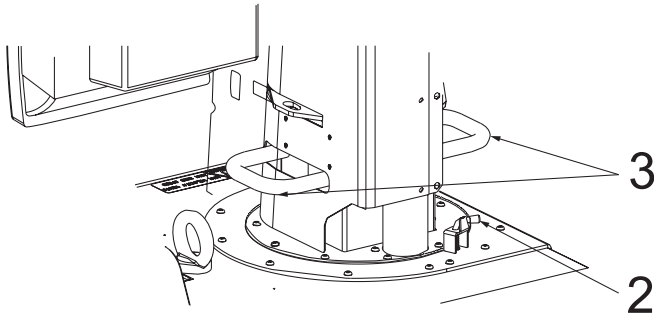
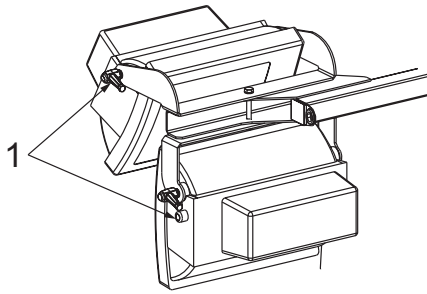
- Block the wheels using the hand brake (road trailer) or chocks (site-tow)
- Raise the locking pins of the extension arms of the front outriggers and extract them until the pins block again the arms in their extended position.
- Lower the rear outriggers and secure them with the locking lever
- Lower the front outriggers and adjust the lighting tower position by acting on their handles, looking at the bubble level on the machine, until the horizontal position is reached.
- Lower the jack of the drawbar (site-tow) or the jockey wheel (road trailer) until it is resting on the ground.



- A Wheel chocks
- B Outriggers extension arm
- C Front outrigger
- D Rear outrigger
- E Jack



ORIENTATION OF FLOODLIGHTS AND MAST



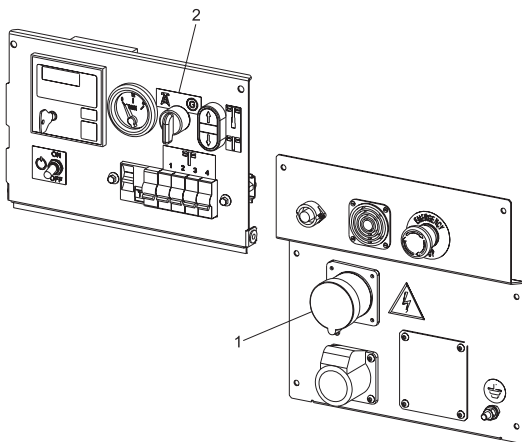
The floodlights beam can be oriented, according to the needs, by acting in the following two ways:

- by adjusting the inclination of each floodlight
- by rotating the mast in the desired direction.

To adjust the angle of the floodlights loosen the clamping lever (1), turn the floodlight to the desired position and lock again.

To rotate the mast lift the pin (2) and turn it in such a way as to keep it extracted. Direct the mast in the desired direction by acting on the handles (3). Unlock the pin (2) and slightly rotate the mast until the pin gets into a hole, thereby locking of the rotation of the mast.

MAINS / GENERATOR SELECTOR



The floodlights and the hydraulic power pack can be charged directly from the 230V mains on request.

Connect a socket with the same features to the 230V 32A 2P+T EEC (1) plug.

The minimum cable section should be selected based on the voltage, the installed power and the distance between the source and application.

To power the Lighting Tower from the mains, move the selector switch to "MAIN" (2) (lattice symbol) and move the selector switch to "GENERATOR" symbol (G) to power from the generating set unit.

RAISING AND LOWERING OF THE MAST



ATTENTION

Before starting the engine, make sure that switches of the lamps on the panel are all in OFF position.

Start the generator with the key on the front panel, following the instructions in the section "START AND STOP (EP6)".

Put the circuit breaker (A) in ON position.

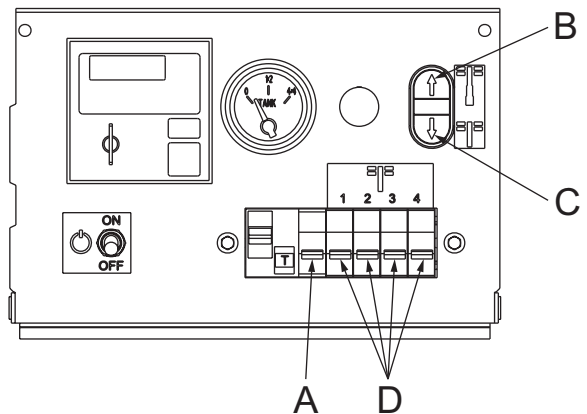
Activate the raise of the mast through the relevant button on the control panel (B) until the mast is fully extended.

Turn on the lamps by means of the circuit breakers (D) on the front panel.

After use, turn off the lamps before actuating the lowering of the mast.

Lower the mast by pressing the appropriate button (C) on the control panel.

EMERGENCY LOWERING OF THE MAST



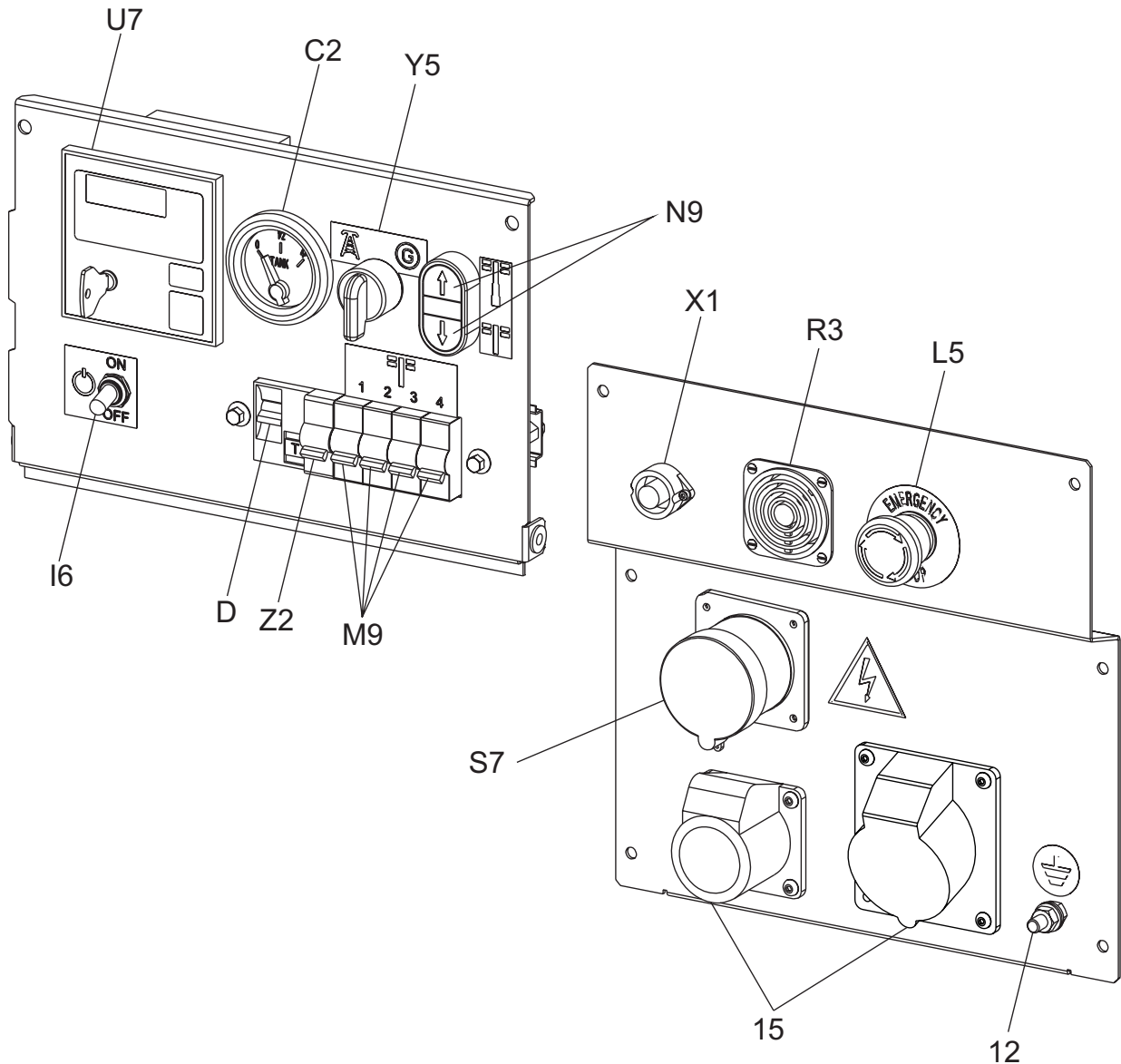
In case of emergency due to engine failure, or due to failure of the hydraulic or the electrical system, use the bypass tap of the solenoid valve to lower the mast. When the mast is completely down, close the tap again.



ATTENTION

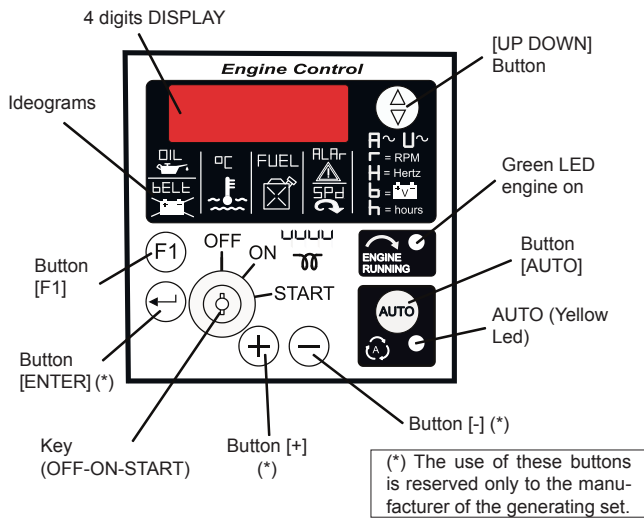
After switch off, the metal halide lamps require a cooling time of about 15 minutes before subsequent switch on.





POS.	DESCRIZIONE	DESCRIPTION	DESCRIPTION	REFERENZLISTE
C2	Indicatore livello carburante	Fuel level light	Indicateur niveau carburant	Anzeige Kraftstoffpegel
D	Interruttore differenziale	Ground fault interrupte	Interrupteur différentiel	FI-Schalter GFI
I6	Selettore Start Local/Remote	Start Local/Remote selector	Selecteur Start Local/Remote	Umschalter Fernstart
L5	Pulsante stop emergenza	Emergency button	Bouton d'urgence	Notschalter
M9	Interruttore ON/OFF lampada	ON/OFF switch lamp	Interrupteur ON/OFF lampe	Schalter ON/OFF Lampe
N9	Pulsante comando salita/discesa palo	UP/DOWN button mast	Bouton commande montée/descendue poteau	Taste Mast Steuerung ansteigen/sinken
R3	Avvisatore acustico	Siren	Avertisseur sonore	Hupe
S7	Spina 230V Monofase	Plug 230V Singlephase	Fiche 230V Monophasée	Stecker 230V Einphasig
U7	Unità controllo motore EP6	Engine control unit EP6	Protection moteur EP6	Motorschutz EP6
X1	Presa per comando a distanza	Remote control socket	Prise pour télécommande	Steckdose Fernbedienung
Y5	Commutatore di tensione	Voltage switch	Commutateur de tension	Spannungsschalter
Z2	Interruttore magnetotermico	Thermal magnetic circuit breaker	Interrupteur magnétothermique	SCR-Schutzeinheit
12	Presa di messa a terra	Earth terminal	Prise de mise à terre	Erdanschluss
15	Presa di corrente in c.a.	A.C. socket	Prises de courant en c.a.	Steckdose AC

FRONT PANEL



1.0 INTRODUCTION

The EP6 features Engine and Generating Set control and monitoring. The EP6 provides visual indication by means of LEDs (solid state lamps) and a Display (see section 10.0). It features OFF, MAN and AUTO operating modes. The display gives Messages for alarms and Measurement indications.

EP6 has programmable parameters. Please contact the producer of the generating set to receive instructions related to programming.

2.0 OPERATING MODE selection

The EP6 features AUTO (section 2.1), MANUAL (section 2.2) and OFF (section 2.3) operating modes. When the power supply is switched on, the EP6 behaves as follow:

- if the KEY-SWITCH is in the **OFF position**, the EP6 enters the OFF operating mode.
- if the KEY-SWITCH is in the **ON position**, the EP6 enters the AUTO operating mode. That is, if the EP6 was in AUTO prior to the supply removal. If not, the EP6 enters the MANUAL operating mode.

2.1 AUTO OPERATING MODE

To enter the "AUTO" operating mode use the following instructions:

- Turn ON the key switch: the Display and LEDs illuminate for 1 second.
- Wait for the end of the LAMP test, then push the AUTO pushbutton after the [UUUU] (Pre-glow) or [Sta-] (Start prompt) has been displayed. After this, the yellow Led AUTO will illuminate. If the REMOTE START input is not operative, the LED will flash. If operative, the LED illuminates continuously and a start cycle will take place (**NOTE**: the EP6 shuts down the display during the crank).
- In order to cancel the AUTO operating mode, push the AUTO pushbutton (the yellow Led will turn OFF) or turn the KEY-SWITCH to OFF.

Once in AUTO, the EP6 waits for a REMOTE START activation (see section 7.0).

In case of an Automatic Periodic Test (A.P.T.), the display will show the message [tEst].

2.2 MANUAL OPERATING MODE

To start the engine follow the instructions:

- Turn ON the KEY-SWITCH; the EP6 illuminates the LEDs and Display.
- If the display shows the message [uuuu], the EP6 is counting the PRE-GLOW time; wait until the message disappears.
- After the display shows the flashing message [StA-] (**NOTE**), turn the Key to START position (momentary position with spring-loaded return) until the engine starts. The message [. . .] indicates a MANUAL start.
- To stop the engine, turn the KEY SWITCH to OFF.

NOTE: EP6 shows the blinking [StA-] message for 20 seconds. After this time, if the engine does not start, the EP6 displays the message [FAIL] (Fail to start, see section 4.07). To clear the alarm, turn the KEY-SWITCH to OFF.

2.3 OFF OPERATING MODE

This function is obtained by turning the KEY SWITCH to OFF. The OFF operating mode clears the fault alarms and shuts down the Display after 5 seconds. A blinking dot indicates the presence of the power supply. Press one of the pushbuttons to energize the display. In OFF operating mode, the EP6 allows reading of the parameters (see section 6.0).

3.0 DISPLAY FEATURES

The EP6 features a 4 Digit Display (section 10.0) to show measurements, settings and error messages. The [UP-DOWN] pushbutton selects one of the following menus:

- [Axxx] (*) Generator Current measurement
- [Uxxx] The Voltage of the Generating Set
- [rPM] [xxxx] Speed of the engine
- [Hxx.X] Frequency of the Generator
- [bxx.X] Battery Voltage
- [cXX.X] Charger Alternator Voltage
- [h] [xxxx] HOUR METER (the message [h] appears for a moment, and then, the counter will be displayed continuously).

(*): the symbol "X" means a numerical field.

4.0 ALARM MESSAGES

The alarms are displayed by means of messages. In case of alarm consult your Generating Set manufacturer. To remove the message, turn OFF the KEY-SWITCH. The EP6 may show one of the following:

[OIL]	Low Oil Pressure
[°C]	High Temperature
[O.SPd.]	Over Speed of the engine
[U.SPd]	Under Speed of the engine
[bELt]	Failure of the belt
[ALAr]	External Emergency Stop
[FUEL](1)	Low Fuel in the tank
[FAIL]	Starting Failure Alarm
[E 04]	Alternator Failure
[E 05](2)	Generator Overload
[Hi H](2)	Generator Over Frequency
[Lo H](2)	Generator Under Frequency
[Hi U] (2)	Generator Under Voltage
[Lo U](2)	Generator Under Voltage
[XX.X]	Battery Voltage
[Err]	Memory error

(1) **[FUEL]** This message indicates Low Fuel in the tank . The engine stops if the contacts remain closed for 5 minutes continuously.

(2) To determine the value that caused the failure, push the [F1] pushbutton.

4.1 OPERATING messages

EP6 features messages to inform you about the following:

[uuuu]	Glow-plugs timing
[U—]	Voltage out of range
[StA-]	Start prompt
[. . .]	Starting by key switch
[rESt]	Rest timing
[tESt]	Automatic Test
[CAL]	Calibration
[ProG]	Programming
[StOP]	Stopping cycle

5.0 LEDS FOR VISUAL INDICATION

The EP6 features two LEDs (see section 10.0) to indicate the following conditions:

[ENGINE RUNNING]: this green led illuminates when the engine is running.

[AUTO]: this yellow LED blinks to indicate a standby mode. The EP6 monitors the REMOTE CONTROL and expects a command. The LED illuminates continuously when the REMOTE START is activated.

5.1 LEDS AND DISPLAY TEST

A test of the LEDs and DISPLAY is obtained automatically anytime the key switch is turned ON. The LEDs and DISPLAY light up for about 1 second.

6.0 PARAMETERS AND SETTINGS

The unit is programmed by the supplier of the Generating Set. Contact the Generator manufacturer in order to have the permission to program the module. It is possible to read the status of the internal programming at anytime. Follow the instructions:

- Turn the Key in OFF (if the display indicates [STOP], wait until it disappears)
- Push the pushbutton [F1] the display will show the first programmable parameter **[P.0]**.
- Push the pushbutton [F1] the display will indicate the value of the parameter ([1"]).
- Push the pushbutton [UP-DOWN] to select a parameter. Push [F1] to display the setting.
- The display returns to menu mode if you have not used the pushbuttons for 2 minutes.

The list of the parameters follows (['] means minutes and ["] means seconds). Some parameters may differ according to the programming done by the genset manufacturer.

Display	Parameter [Default]
[P.0]	Remote Start Delay Timing (Input #7) [1"] Range: 1-59 secs or 1-15 mins Seconds or minutes of continuous REMOTE START command to initiate the automatic engine start (see section 7.0 and [P.20] in this section).
[P.1]	Remote Stop Delay Timing (Input #7) [1"] Range: 1-59 secs or 1-15 mins Seconds or minutes of continuous absence of the REMOTE START command to initiate the stop cycle (see section 7.0 and [P.20] in this section).
[P.2]	Crank Timing (Output #10) [5"] Range: 1-20 seconds Maximum insertion time of the <i>Starter Motor</i> .
[P.3]	Engine Running Trigger (Input #1) [8.0] Range: 3V-24V, [inh.]. If the voltage of the Charger Alternator rises above the [setting], the <i>Starter Motor</i> is disconnected.
[P.4]	Rest Timing [3"] Range: 3-20 secs. Time interval between starting attempts
[P. 5]	Starting Attempts [3] Range: 1-10 This parameter sets the number of attempts in the automatic start cycle
[P.6]	Generator UnderVoltage, short-circuit [inh.] Range: 80-400V. If the voltage drops under the [setting] for at least 6 secs, or under [setting]-20% for 1 sec, the Under-Voltage protection [Lo U] will shut down the engine.
[P.7]	Generator Over-Voltage [500V] Range: 110-550V or [inh.]. If the Generator voltage rises above the [setting] for at least 2 seconds, the EP6 will energize the over voltage protection [Hi U] (see section 4.0) to stop the engine. The [inh.] code inhibits the over voltage.
[P.8]	Generator Under-Frequency [Inh.] [inh.] 1 to 99Hz ([inh.]=disables the under frequency) This protection is delayed by about 6 seconds. The EP6 shuts down the engine and the display will show the [Lo H] message.
[P.9]	Generator Over-Frequency [55] 45 Hz to [inh.] ([inh.] disables the over frequency) This protection is delayed by about 2 seconds. The EP6 shuts down the engine and displays [Hi H]
[P.10]	Current Transformer Size [...] The range is 10/5 up to 1000/5
[P.11]	Generator Overload Setting [inh.] Range: [inh.] to 1000 A The EP6 shuts down the engine after a delay of 6 secs and shows the message [E05].
[P.12]	Generator Failure Alarm [OFF] selection: [on] or [OFF]. The code [on] enables the <i>Generator</i> failure alarm. The EP6 shows the [E04] message and the engine will shut down.
[P.13]	Glow Plugs/Choke Control (Output #11) [5"] Range: 1 to 99 secs. The EP6 energizes the output #11 for the programmed time.
[P.14]	Output Control [0] The following options are available: [0] None - [1] Choke Control - [2] Glow Plugs Control - [3] Choke Control
[P.15]	Belt Break Control [ON] Selection: [on] or [OFF]. The Belt Break alarm is indicated by means of the message [bELT]
[P.16]	Stop Solenoid Timing [2"] Range: 2-99 secs. Duration of the Stop cycle.
[P.17]	Alarm Output Timing [1'] [inh.] 1-59 secs 1-15 mins and [cont]. Time-out of the alarm output. The code [cont] disables the time-out, and the alarm remains energized until the OFF operating mode is selected. The [inh.] mode enables the use of the external contactor
[P.18]	Temperature Switch [n.o.] Selection: [n.o.] or [n.c.] [n.o.] the engine shuts down if the contact closes [n.c.] the engine shuts down if the contact opens
[P.19]	ALARM Control [n.c.] Selection: [n.o.] or [n.c.] [n.o.] the engine shuts down if the contact closes [n.c.] the engine shuts down if the contact opens
[P.20]	Remote Start [n.o.] Selection: [n.o.] or [n.c.]

[n.o.] the engine starts if the contact closes

[n.c.] the engine starts if the contact opens

[P.21]

Under Speed setting [1200]

[Inh.] or 100-4000 r.p.m. The [Inh.] code disables the Under Speed shut down.

[P.22]

Over Speed setting [1700]

100-4000 rpm or [Inh.]. The EP6 provides one second bypass delay. The [Inh.] code (>4000 r.p.m.) disables the Over Speed shut down.

[P.23]

Number of Teeth of the Flywheel [Inh.]

[Inh.] or 1-500 teeth.

The [Inh.] code disables the reading of the Speed (section 3.0), the Over/Under Speed alarms, and the Crank termination (see [P.24]).

[P.24]

Crank OFF [Inh.]

Crank Termination setting: 100-800 rpm

If the speed rises above the setting, the EP6 terminates the crank cycle. One second delay avoids false termination. The code [Inh.] inhibits the crank termination

[P.25]

Low Oil Pressure Alarm By-Pass [6"]

Range: 0-99 secs. By-Pass Delay to ignore the Oil Pressure (input #3) during the engine starting cycle.

This input requires normally closed contact

[P.26]

Automatic Periodic Test Cycle [inh.]

Range: [inh.], 1-99 days

This is the interval time between the automatic periodic tests of the engine. The code [inh.] disables the Automatic Periodic Test (see section 19.0)

[P.27]

Automatic Engine Test Duration [10']

Range: 1-99 minutes.

This is the duration of the automatic engine test.

[P.28]

Generator warm-up timing [20"]

Range [inh.] 1-59 secs or 1-15 mins ([inh.] = No warm-up)

Active only when [P17] = [inh.] and the ALARM output is used to drive the contactor

[P.29]

Generator cooling timing [30"]

Range [inh.] 1-59 secs or 1-15 mins ([inh.] = No cooling)

Active only when [P28] = [inh.] and the ALARM output is used to drive the GEN-SET contactor

[P.30]

N° poles of the alternator [...]

Range [inh.] - [2] = 2 pole alternator - [4] = 4 pole alternator

[P.31]

Engine shut-down delay for low fuel [5']

Range [inh.] = provides only optical - acoustical warning - 1 - 99 min.

7.0 REMOTE START

The EP6 features REMOTE START only in AUTO operating mode.

To operate the REMOTE START, follow the instructions.

- A) - Turn the KEY-SWITCH to the ON position; the Display and LEDs illuminate for 1 sec.
- B) - Wait until the end of the LEDs test.
- C) - Push the AUTO pushbutton as soon as possible (otherwise, after 20 seconds the EP6 enters the STARTING FAILURE); the [AUTO] yellow LED will illuminate as described in the section 4.

REMOTE START SWITCH:

If the REMOTE START input is activated, the [AUTO] yellow LED illuminates continuously and the display will indicate the count down of the internal **start delay** timer. The engine will start after the programmed **start delay** time. If the REMOTE START is deactivated, the EP6 drives the **stop delay time**. The display will indicate the count down and the [AUTO] yellow LED will flash. The engine will stop after the programmed **stop delay** time.

8.0 SAFETY



NOTE

High voltage is present inside the EP6. To avoid electric-shock hazard, operating personnel must not remove the protective cover. Do not disconnect the grounding connection. Any interruption of the grounding connection can create an electric shock hazard. Before making external connections, always ground the PANEL first by connecting the control panel to ground.

9.0 AUTOMATIC PERIODIC TEST

The EP6 does not use a clock to count the programmed days ([P.26] setting, section 6.0). The maximum error and drift of the counter is +/-0,5%. The user may experiment with shifting the periodic tests. To avoid error accumulation, and in case your unit is programmed to allow Automatic Periodic Test, we recommend the following procedures.

- disconnect the power supply of the EP6 (*consult your genset supplier*)
- wait for the desired start time (external clock reference)
- apply the power supply to the EP6 (*consult your genset supplier*)
- select the "AUTO" operating mode

The EP6 will start the engine after the programmed number of days and the engine will run for the programmed time. To determine how the Automatic Periodic Test is programmed enter the Reading Mode (section 6.0 parameter [P.26] and [P.27]).

IMPORTANT NOTES

If the supply (battery voltage) is removed, the EP6 loses the counts and timings. If the supply restores, the EP6 starts to count the A.P.T. according to the programmed parameters [P.26] and [P.27]. It is important to synchronize the power on sequence with the desired Automatic Periodic Test.

**WARNING**




- Have **qualified** personnel do maintenance and troubleshooting work.
- Stop the engine before doing any work inside the machine. If for any reason the machine must be operated while working inside, pay attention moving parts, hot parts (exhaust manifold and muffler, etc.) electrical parts which may be unprotected when the machine is open.
- Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete.
- Please wear the appropriate clothing and make use of the PPE (Personal Protective Equipment), according to the type of intervention (protective gloves, insulated gloves, glasses).
- Do not modify the components if not authorized. - See pag. M1.1 -

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Problem	Possible cause	Solution
PETROL ENGINE		
The motor does not start up, or starts up and then stops immediately.	1) Key / engine switch in the wrong positions 2) Lack of or insufficient oil in the motor 3) Faulty motor stopping device (oil-alert) 4) Lack of fuel in tank or fuel tap closed 5) Fuel filter clogged 6) Bad gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting 7) Dirty or faulty spark plug 8) Battery not activated, low or faulty 9) Battery cable terminals loose or corroded 10) Cold motor 11) Other causes	1) Verify start-up procedure 2) Refill or top off 3) Replace 4) Refill the tank. Open the fuel tap 5) Clean or replace 6) Drain fuel tank and carburetor. Refuel with fresh gasoline. 7) Clean or check and eventually replace 8) Activate, recharge, or replace the battery 9) Tighten and clean. Replace if corroded 10) Hold the command CHOKE, after starting, for a time longer 11) Consult the motor Operating Manual.
The motor does not accelerate. Inconstant speed. Too little power provided by motor.	1) Air or fuel filter clogged 2) Bad gasoline 3) Overload	1) Check the air filter 2) Drain fuel tank and carburetor. Refuel with fresh gasoline 3) Check the connected loads and if necessary reduce
Other problems or inconveniences on the engine.	Consult the motor Operating Manual	
DIESEL ENGINE		
The motor does not start up, or starts up and then stops immediately.	1) Lack of fuel in tank or fuel tap closed 2) Fuel filter clogged 3) Air leaks in fuel system 4) Battery not activated, low or faulty 5) Battery cable terminals loose or corroded 6) Faulty motor stopping device 7) Other causes	1) Refill the tank. Open the fuel tap 2) Replace 3) Check the feeding circuit 4) Activate, recharge, or replace the battery 5) Tighten and clean. Replace if corroded 6) Replace 7) Consult the motor Operating Manual.
The motor does not accelerate. Inconstant speed. Too little power provided by motor.	1) Air or fuel filter clogged 2) Overload	1) Clean or replace filter element(s) Consult the engine Operating Manual. 2) Check total load and eventually decrease
Other problems or inconveniences on the engine.	Consult the engine Operating Manual.	

<i>Problem</i>	<i>Possible cause</i>	<i>Solution</i>
GENERATOR		
Absence of output voltage	<ol style="list-style-type: none"> 1) Protection tripped due to overload 2) Differential protection device tripped 3) Protection devices defective 4) Alternator not excited 6) Faulty AVR 7) AVR fuse faulty 	<ol style="list-style-type: none"> 1) Check the load connected and decrease 2) Check the insulation of the whole system: wiring, connections, connected load and check that there are no insulation fault that cause leakage currents to earth 3) Replace 4) Carry out external excitation test as indicated in alternator manual. Ask for intervention of Service Department 6) Replace 7) Replace
No-load output voltage too low or too high	<ol style="list-style-type: none"> 1) Incorrect engine running speed 2) Alternator fault 3) AVR with setting wrong or fault 	<ol style="list-style-type: none"> 1) Regulate speed to its nominal no-load value 2) Check winding, diodes, etc. on alternator (See to alternator manual). Repair or replace. Ask for intervention of Service Department. 3) Adjust the Volt trimmer of AVR or replace
Corrected no-load voltage too low with load	<ol style="list-style-type: none"> 1) Incorrect engine running speed due to overload 2) Load with $\cos \varphi$ less than the nominal one 3) Alternator fault 4) Faulty AVR 	<ol style="list-style-type: none"> 1) Check the load connected and decrease 2) Reduce or rephase load 3) Check winding, diodes, etc. on alternator (See to alternator manual). Repair or replace. Ask for intervention of Service Department. 4) Replace
Unstable tension	<ol style="list-style-type: none"> 1) Contacts malfunctioning 2) irregular engine revolution 3) Alternator fault 	<ol style="list-style-type: none"> 1) Check electrical connections and tighten 2) Ask for intervention of Service Department 3) Check winding, diodes, etc. on alternator (See to alternator manual). Repair or replace. Ask for intervention of Service Department.
LIGHTING TOWER + TELESCOPIC MAST AND LAMPS		
Telescopic mast blocked	<ol style="list-style-type: none"> 1) Lack of lubrication on the mast 2) Defective winch 3) Defective or damaged cable 	<ol style="list-style-type: none"> 1) Check and lubricate mast, winch, cable, etc 2) Replace 3) Check and replace
Lamps do not illuminate	<ol style="list-style-type: none"> 1) Lamps switch or main switch open 2) Bulbs broken 3) Power supply (LED) defective power system (METAL HALIDE) 4) Incorrect supply voltage 5) Defective electrical connections 	<ol style="list-style-type: none"> 1) Close circuit breaker 2) Replace 3) Replace 4) Check supply voltage 5) Check electrical connections (see wiring diagrams)
Lamps are "on" but light is low	<ol style="list-style-type: none"> 1) Defective or dirty protection glass projector 2) Worn lamp 	<ol style="list-style-type: none"> 1) Clean or replace 2) Replace lamp due to normal use

 WARNING		
	<ul style="list-style-type: none"> • Have qualified personnel do maintenance and troubleshooting work. • Stop the engine before doing any work inside the machine. If for any reason the machine must be operated while working inside, pay attention moving parts, hot parts (exhaust manifold and muffler, etc.) electrical parts which may be unprotected when the machine is open. • Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete. • Please wear the appropriate clothing and make use of the PPE (Personal Protective Equipment), according to the type of intervention (protective gloves, insulated gloves, glasses). • Do not modify the components if not authorized. <p style="text-align: center;">- See pag. M1.1 -</p>	
MOVING PARTS can injure		HOT surface can hurt you

NOTE

By maintenance at care of the utilizer we intend all the operatios concerning the verification of mechanical parts, electrical parts and of the fluids subject to use or consumption during the normal operation of the machine.

For what concerns the fluids we must consider as maintenance even the periodical change and or the refills eventually necessary.

Maintenance operations also include machine cleaning operations when carried out on a periodic basis outside of the normal work cycle.

The repairs **cannot be considered** among the maintenance activities, i.e. the replacement of parts subject to occasional damages and the replacement of electric and mechanic components consumed in normal use, by the Assistance Authorized Center as well as by manufacturer.

The replacement of tires (for machines equipped with trolleys) must be considered as repair since it is not delivered as standard equipment any lifting system.

The periodic maintenance should be performed according to the schedule shown in the engine manual. An optional hour counter (M) is available to simplify the determination of the working hours.

VENTILATION

Make certain there are no obstructions (rags, leaves or other) in the air inlet and outlet openings on the machine, alternator and motor.

ELECTRICAL PANELS

Check condition of cables and connections daily. Clean periodically using a vacuum cleaner, **DO NOT USE COMPRESSED AIR.**

DECALS AND LABELS

*All warning and decals should be checked once a year and **replaced** if missing or unreadable.*

STRENUOUS OPERATING CONDITIONS



Under extreme operating conditions (frequent stops and starts, dusty environment, cold weather, extended periods of no load operation, fuel with over 0.5% sulphur content) do maintenance more frequently.

**BATTERY WITHOUT MAINTENANCE
DO NOT OPEN THE BATTERY**

The battery is charged automatically from the battery charger circuit supplied with the engine.

Check the state of the battery from the colour of the warning light which is in the upper part.


- Green colour: battery OK
- Black colour: battery to be recharged
- White colour: battery to be replaced

 IMPORTANT
 <p>In the maintenance operations avoid that polluting substances, liquids, exhausted oils, etc. bring damage to people or things or can cause negative effects to surroundings, health or safety respecting completely the laws and/or dispositions in force in the place.</p>

ENGINE AND ALTERNATOR

PLEASE REFER TO THE SPECIFIC MANUALS PROVIDED.

Every engine and alternator manufacturer has maintenance intervals and specific checks for each model: it is necessary to consult the specific engine or alternator USER AND MAINTENANCE manual.

 NOTE
<p>THE ENGINE PROTECTION NOT WORK WHEN THE OIL IS OF LOW QUALITY BECAUSE NOT CHARGED REGULARLY AT INTERVALS AS PRESCRIBED IN THE OWNER'S ENGINE MANUAL.</p>



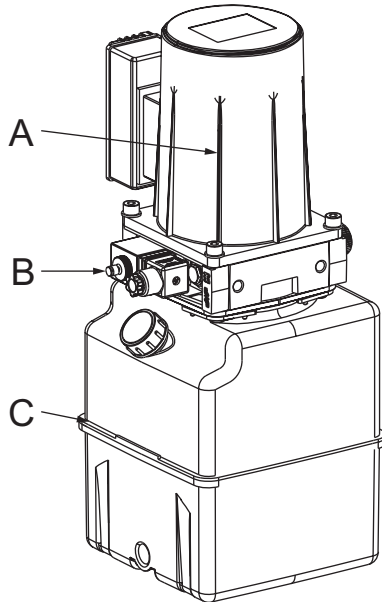


ATTENTION

Any maintenance or troubleshooting must be carried out in compliance with the requirements given in section: SAFETY PRECAUTIONS DURING MAINTENANCE.

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HYDRAULIC POWER PACK



- A. Electric Motor
- B. Bypass tap for manual lowering of the mast
- C. Hydraulic fluid tank

- Check the level and condition of the hydraulic fluid. Carry out the check with the mast down and cool fluid.
- It is recommended a first fluid change after the first 10 hours. Do the following oil changes within 3000 hours or once a year.
- The hydraulic power pack is supplied from factory with hydraulic oil type: **AGIP OSO 46**
- When topping up, it is important not to mix hydraulic fluids of different manufacturers, or different types, which may cause the formation of sludge and sediments that could affect the proper operation of the power pack.
- Each time you change the hydraulic fluid, replace (or wash and clean) the inlet filter and do an internal cleaning of the tank.
- For the oil replacement, use oils with a high viscosity index and temperature range appropriate to the conditions of use.

LIGHTING TOWER MANUAL

MANUAL WINCH

the manual winch requires regular maintenance in particular the parts that need to be lubricated.

Refer to the manual of use and maintenance of the winch supplied with the lighting tower

WIRE ROPES

Periodically check that the steel ropes of the mast are in perfect conditions. If there is evidence of wear, abrasion, broken wires or loose connection do not use the lighting tower and plan immediately the cables replacement .

CAUTION: When replacing use ropes of the same type of the originals. For this purpose, it is highly advisable to use original spare parts.

PULLEYS

Periodically check the regular rotation of the pulleys and the correct position of the ropes on the pulleys. Periodically lubricate with lithium multifunctional grease.

TELESCOPIC MAST

Check the regular movement of the mast during the raise and the lowering. Periodically grease the mast with anti-corrosion waterproof spray lubricant.

LAMPS

In case of need of replacement, do not directly touch the lamps with your fingers, use a cloth or use cotton gloves. Pay attention to the high temperature that the lamps reach during operation: wait them to cool down before replacing.

TIRES

On the trailer/site-tow versions periodically verify the proper tire pressure (2.2 bar).

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IMPORTANT



In the maintenance operations avoid that polluting substances, liquids, exhausted oils, etc. bring damage to people or things or can cause negative effects to surroundings, health or safety respecting completely the laws and/or dispositions in force in the place.



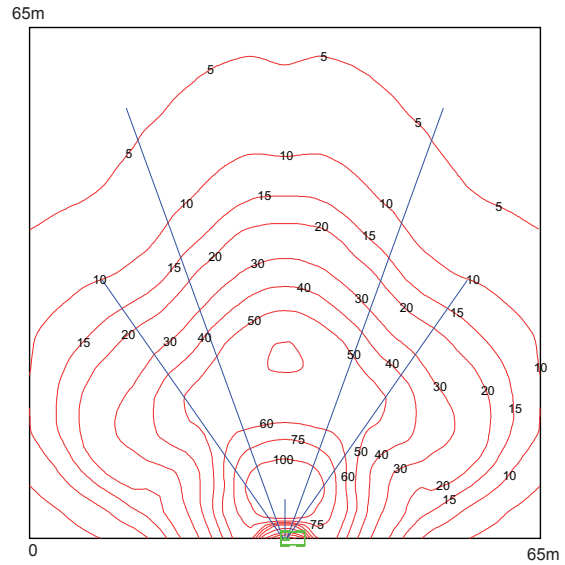
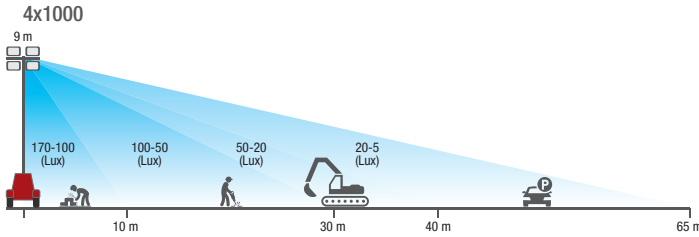
LIGHTS AND MAST			
LAMP TYPE:	4 x 1000 W – METAL HALIDE ILLUMINATED AREA 4200 mq 25 LUX AVERAGE - 340000 TOTAL LUMEN	4 x 280 W – LED ILLUMINATED AREA 4200 mq 18 LUX AVERAGE - 144700 TOTAL LUMEN	
MAST ROTATION:	340° - MANUAL		
MAST:	TELESCOPIC - HYDRAULIC		
GENERAL CHARACTERISTICS			
WIND LOAD STABILITY:	UP TO 80 km/h		
TANK CAPACITY:	110 l		
RUNNING TIME:	75 h (LIGHTS LOAD ONLY)		197 h (LIGHTS LOAD ONLY)
IP PROTECTION:	IP 44		
ACOUSTIC POWER:	LwA = 90 dBA LpA = 65 dBA @ 7 m		
STABILIZERS:	4 (2 ADJUSTABLE)		
DIMENSIONS (L x W x H) (mm):	- FULLY DEPLOYED (WORKING CONDITIONS) -		
	Length (mm)	Width (mm)	Height (mm)
BASE ASSEMBLY WITH STABILISERS	2210	1885	9000
SITE TOW TRAILER	3160	1885	9000
FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	3327 (max)	1885	9000
	- TRANSPORT CONDITIONS -		
BASE ASSEMBLY WITH STABILISERS	1780	1330	2050
SITE TOW TRAILER	3160	1330	2250
FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	3327 (max)	1400	2295
WEIGHT (DRY):	BASE ASSEMBLY WITH STABILISERS	910 kg (M.H.) - 885 kg (Led)	
	SITE TOW TRAILER	1000 kg (M.H.) - 975 kg (Led)	
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	1095 kg (M.H.) - 1070 kg (Led)	
TYRES:	SITE TOW TRAILER	2 x 185 / 65 R 14	
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	2 x 195 / 50 R 13	
ENGINE - WATER COOLING			
MODEL:	YANMAR 3TNV80 STAGE V		
NET POWER (ST-BY / PRP):	9.2 kW / 8.3 kW @ 1500 rpm		
CYLINDERS / DISPLACEMENT:	3 / 1267 cm ³		
FUEL CONSUMPTION:	1.5 l / h (LIGHTS LOAD ONLY); 2.4 l / h (PRP)		0.6 l / h (LIGHTS LOAD ONLY); 2.4 l / h (PRP)
BATTERY:	12V - 45 Ah		
GENERATOR			
ALTERNATOR:	LINZ E1C13SC/4 - 8 kVA, SINGLE PHASE, SYNCHRONOUS, BRUSHLESS, 4 POLES PF = 0.9 ISOLATION CLASS = H		
OUTPUT POWER:	3.5 kVA 230V / 15.2A 50 Hz 1x16A / 230V 2P+T CEE	6.5 kVA 230V / 28.3A 50 Hz 1x32A / 230V 2P+T CEE	1x16A / 230V 2P+T CEE
CONTROL PANEL			
EP6 CONTROLLER FUNCTIONS:	High temperature engine shut down; Low oil pressure shut down; Overspeed shut down; Battery charge failure shut down; Delayed (5 min.) low fuel shut down; Overvoltage shut down; Battery over / undervoltage alarm.		
• STARTER KEY • AUTOSTART • PROTECTIONS AND ALARMS:			
• MEASUREMENTS:	Hourmeter; r.p.m. meter; battery charge alternator voltage; Battery voltage; generator voltage; generator current; generator frequency.		
FUEL LEVEL GAUGE EMERGENCY STOP BUTTON SIREN GENERAL PROTECTION CIRCUIT BREAKER OUTPUT SOCKET PROTECTION CIRCUIT BREAKER INDIVIDUAL CIRCUIT BREAKER SWITCHES FOR THE LAMPS MAST UP / DOWN PUSH BUTTONS 1 SOCKET 230V / 16A 2P+T CEE (for version J-4x1000) 1 SOCKET 230V/ 32A 2P+T CEE + 1 SOCKET 230V/ 16A 2P+T CEE (for version L-4x280)			

LIGHTS AND MAST				
LAMP TYPE:	4 x 1000 W – METAL HALIDE ILLUMINATED AREA 4200 mq 25 LUX AVERAGE - 340000 TOTAL LUMEN	4 x 280 W – LED ILLUMINATED AREA 4200 mq 18 LUX AVERAGE - 144700 TOTAL LUMEN		
MAST ROTATION:	340° - MANUAL			
MAST:	TELESCOPIC - HYDRAULIC			
GENERAL CHARACTERISTICS				
WIND LOAD STABILITY:	UP TO 80 km/h			
TANK CAPACITY:	110 l			
RUNNING TIME:	75 h (LIGHTS LOAD ONLY)	197 h (LIGHTS LOAD ONLY)		
IP PROTECTION:	IP 44			
ACOUSTIC POWER:	LwA = 90 dBA LpA = 65 dBA @ 7 m			
STABILIZERS:	4 (2 ADJUSTABLE)			
DIMENSIONS (L x W x H) (mm):	- FULLY DEPLOYED (WORKING CONDITIONS) -			
		Length (mm)	Width (mm)	Height (mm)
	BASE ASSEMBLY WITH STABILISERS	2210	1885	9000
	SITE TOW TRAILER	3160	1885	9000
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	3327 (max)	1885	9000
	- TRANSPORT CONDITIONS -			
	BASE ASSEMBLY WITH STABILISERS	1780	1330	2050
	SITE TOW TRAILER	3160	1330	2250
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	3327 (max)	1400	2295
	WEIGHT (DRY):	BASE ASSEMBLY WITH STABILISERS	875 kg (M.H.) - 850 kg (Led)	
	SITE TOW TRAILER	970 kg (M.H.) - 945 kg (Led)		
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	1065 kg (M.H.) - 1040 kg (Led)		
TYRES:	SITE TOW TRAILER	2 x 185 / 65 R 14		
	FAST TOW HIGHWAY TRAILER (HOMOLOGATED)	2 x 195 / 50 R 13		
ENGINE - WATER COOLING				
MODEL:	KOLHER KDW 1003 STAGE V			
NET POWER (ST-BY / PRP):	8 kW / 7.7 kW @ 1500 rpm			
CYLINDERS / DISPLACEMENT:	3 / 1028 cm ³			
FUEL CONSUMPTION:	-			
BATTERY:	12V - 45 Ah			
GENERATOR				
ALTERNATOR:	LINZ E1C13SC/4 - 8 kVA, SINGLE PHASE, SYNCHRONOUS, BRUSHLESS, 4 POLES PF = 0.9 ISOLATION CLASS = H			
OUTPUT POWER:	3.5 kVA 230V / 15.2A 50 Hz 1x16A / 230V 2P+T CEE	6.5 kVA 230V / 28.3A 50 Hz 1x32A / 230V 2P+T CEE 1x16A / 230V 2P+T CEE		
CONTROL PANEL				
EP6 CONTROLLER FUNCTIONS:	High temperature engine shut down; Low oil pressure shut down; Overspeed shut down; Battery charge failure shut down; Delayed (5 min.) low fuel shut down; Overvoltage shut down; Battery over / undervoltage alarm.			
• STARTER KEY • AUTOSTART • PROTECTIONS AND ALARMS:				
• MEASUREMENTS:	Hourmeter; r.p.m. meter; battery charge alternator voltage; Battery voltage; generator voltage; generator current; generator frequency.			
FUEL LEVEL GAUGE EMERGENCY STOP BUTTON SIREN GENERAL PROTECTION CIRCUIT BREAKER OUTPUT SOCKET PROTECTION CIRCUIT BREAKER INDIVIDUAL CIRCUIT BREAKER SWITCHES FOR THE LAMPS MAST UP / DOWN PUSH BUTTONS 1 SOCKET 230V / 16A 2P+T CEE (for version J-4x1000) 1 SOCKET 230V/ 32A 2P+T CEE + 1 SOCKET 230V/ 16A 2P+T CEE (for version L-4x280)				

ILLUMINATION DIAGRAM

TYPE N° OF LAMPS	LIGHT POWER	TOT LUMEN
METAL HALIDE N° 4	1000W	340000 lm
COLOR TEMPERATURE	ILLUMINATED AREA	LUX AVERAGE
7250 K	4200 mq	25

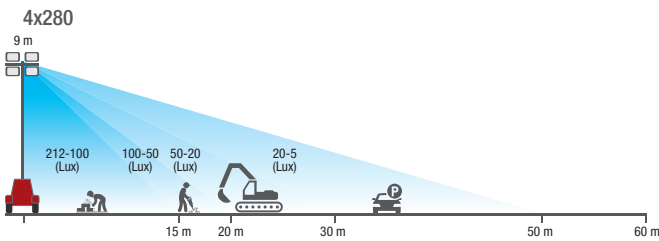
ISOLUX DIAGRAMS – ILLUMINATED AREA 4200 mq



ILLUMINATION DIAGRAM

TYPE N° OF LAMPS	LIGHT POWER	TOT LUMEN
LED N° 4	280W	144700 lm
COLOR TEMPERATURE	ILLUMINATED AREA	LUX AVERAGE
5000 K	4200 mq	18

ISOLUX DIAGRAMS – ILLUMINATED AREA 4200 mq



OUTPUT

Output powers according to ISO 8528-1 (temperature 40°C, 30% relative humidity, altitude 1000 m above sea level).

Stand-by power (LTP): emergency power. Maximum power available for use with variable loads for a number of hours/year limited to 500 h. Overloads are not permitted.

PRP power: continuous power with variable loads. Maximum power available for use with variable loads for an unlimited number of hours/year. The average power output during a 24 h period must not exceed 70% of the stated value.

COP power: continuous power with constant load. Maximum power available for use with constant load for an unlimited number of hours/year.

A 10% overload is permitted one out of every 12 hours.

On average, it reduces by 1% every 1000 m above sea level and by 3% for every 5°C above 40°C.

ACOUSTIC POWER LEVEL

ATTENTION: The concrete risk due to the machine depends on the conditions in which it is used. Therefore, it is up to the end-user and under his direct responsibility to make a correct evaluation of the same risk and to adopt specific precautions (for instance, adopting a I.P.D. -Individual Protection Device)

Acoustic Noise Level (LWA) - Measure Unit dB(A): it stands for acoustic noise released in a certain delay of time. This is not submitted to the distance of measurement.

Acoustic Pressure (Lp) - Measure Unit dB(A): it measures the pressure originated by sound waves emission. Its value changes in proportion to the distance of measurement.

The here below table shows examples of acoustic pressure (Lp) at different distances from a machine with Acoustic Noise Level (LWA) of 95 dB(A)

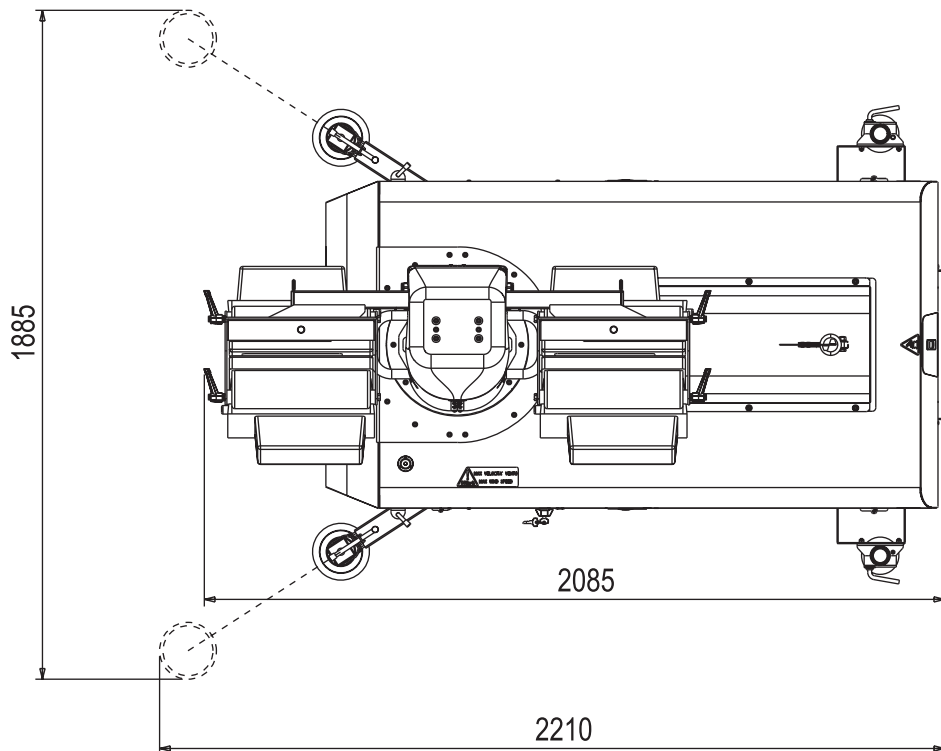
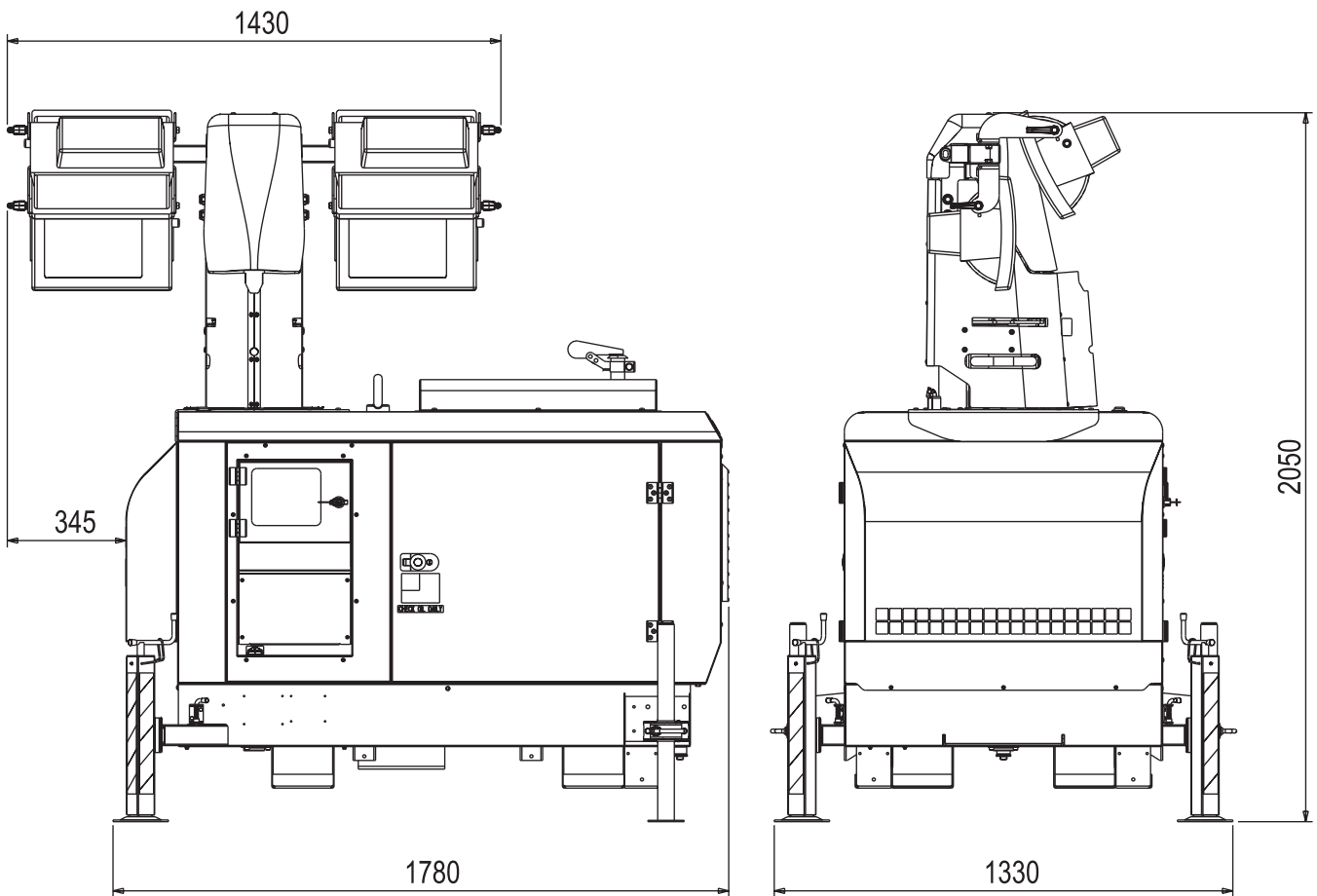
Lp a 1 meter = 95 dB(A) - 8 dB(A) = 87 dB(A)

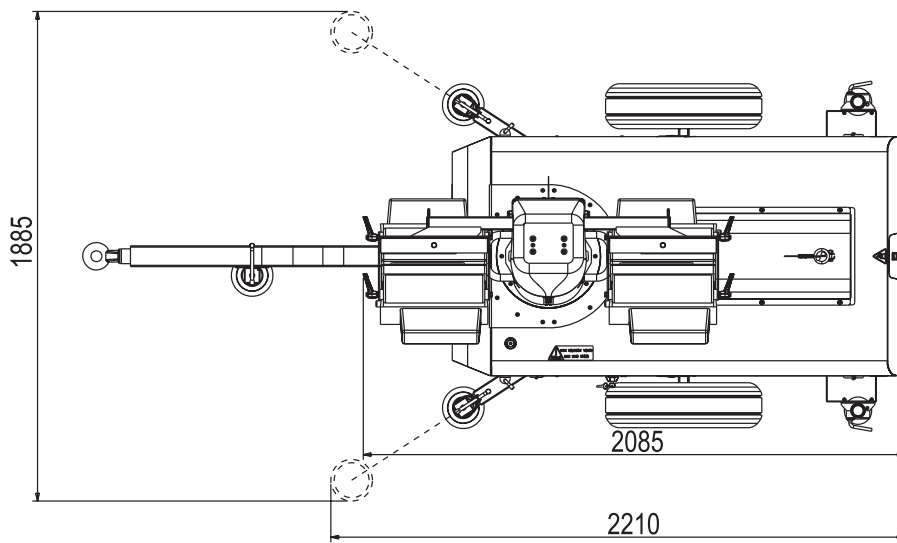
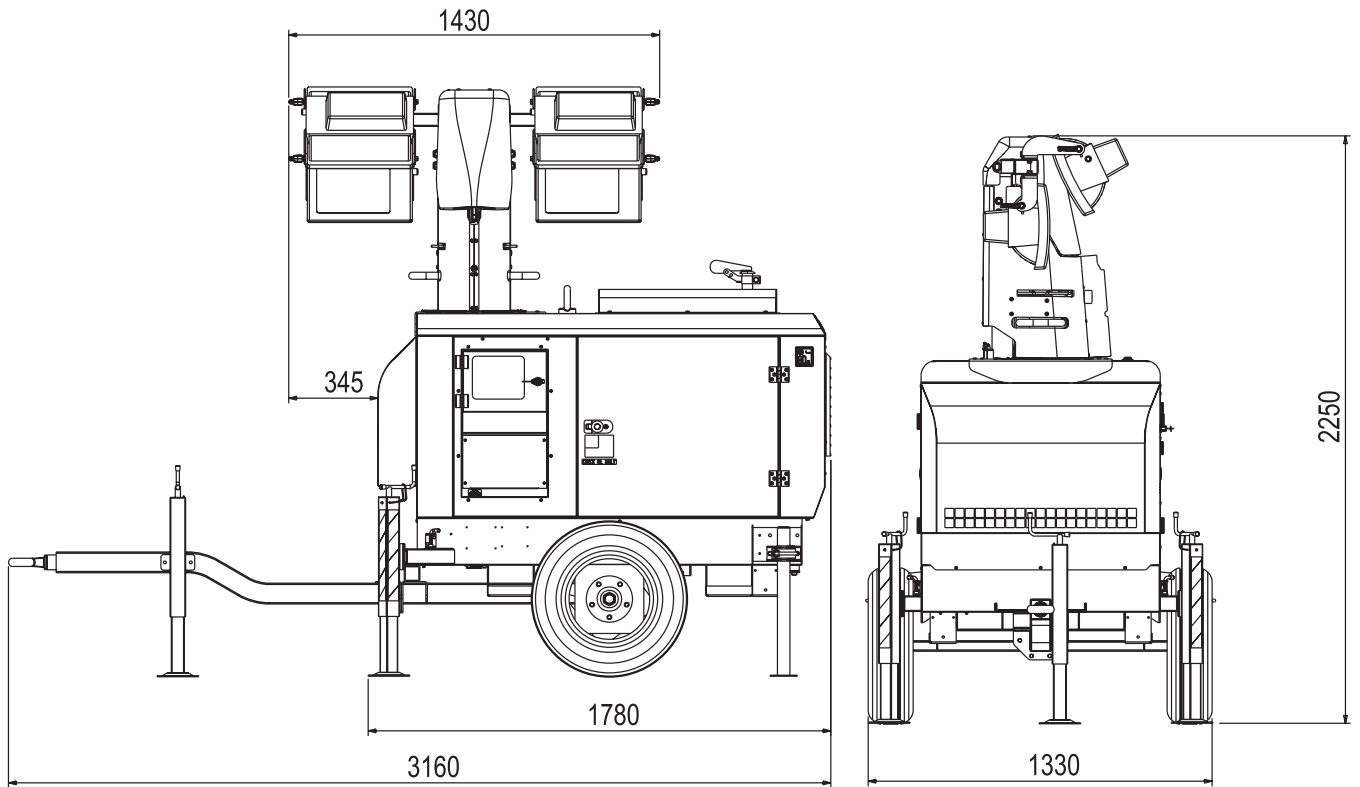
Lp a 7 meters = 95 dB(A) - 25 dB(A) = 70 dB(A)

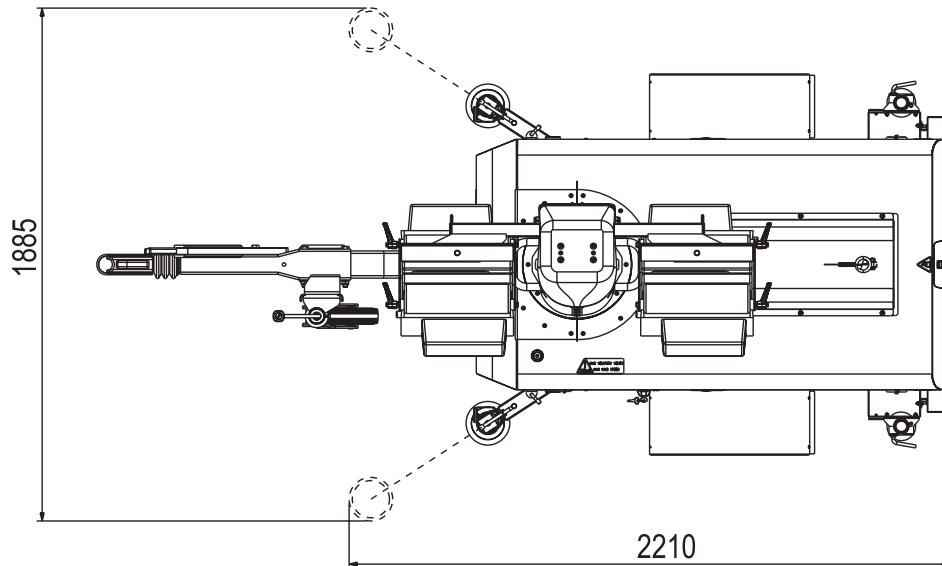
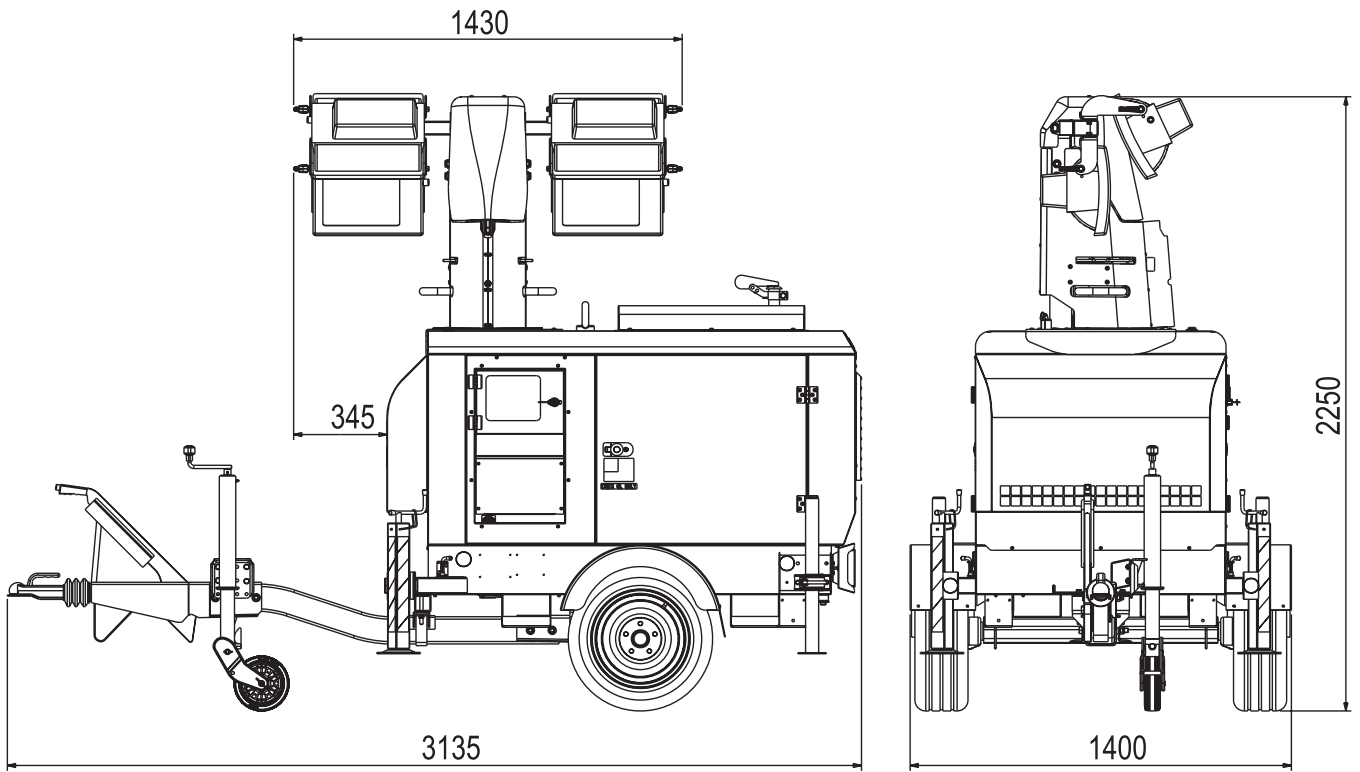
Lp a 4 meters = 95 dB(A) - 20 dB(A) = 75 dB(A)

Lp a 10 meters = 95 dB(A) - 28 dB(A) = 67 dB(A)

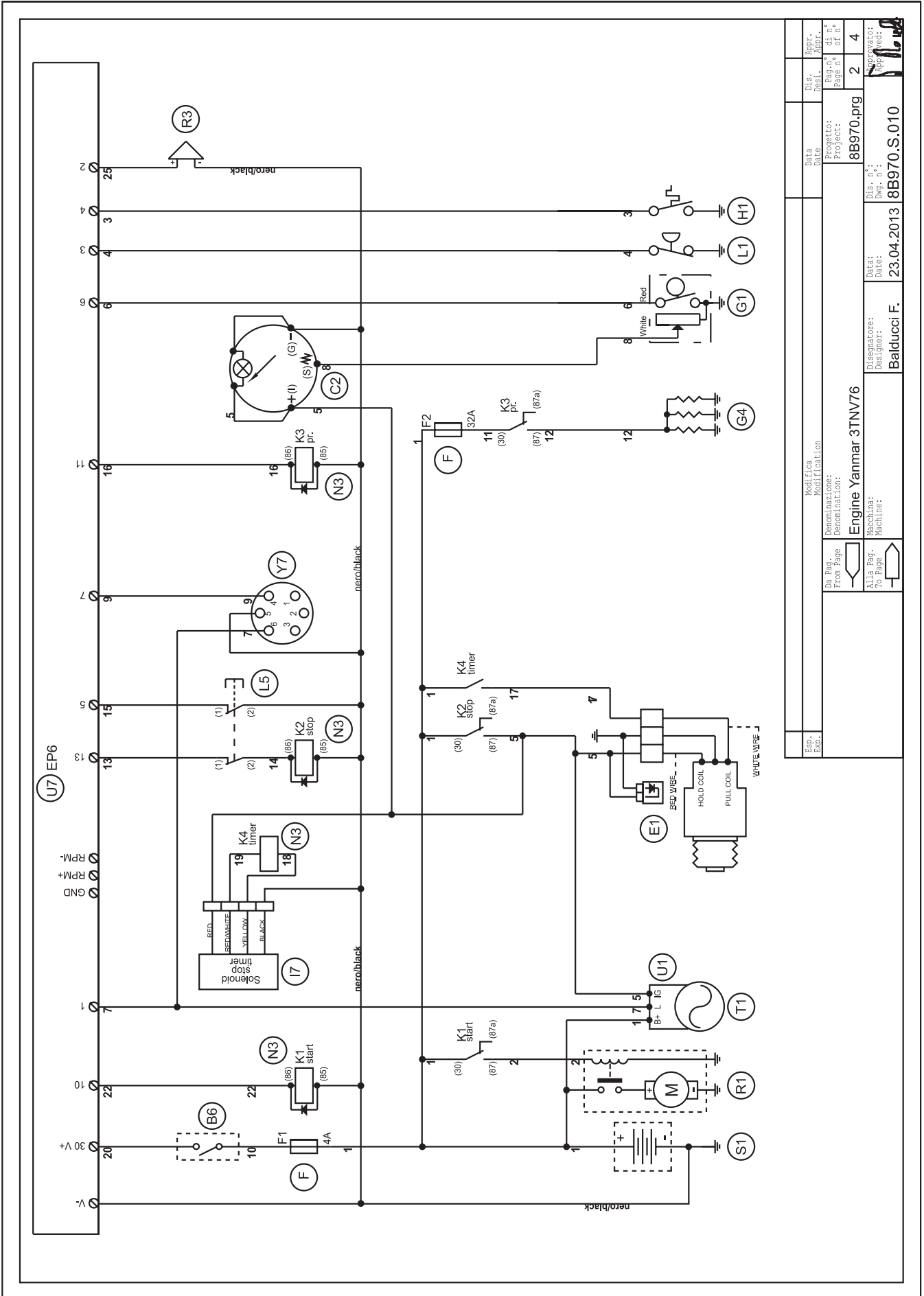
NOTE: the symbol  when with acoustic noise values, indicates that the device respects noise emission limits according to 2000/14/CE directive.



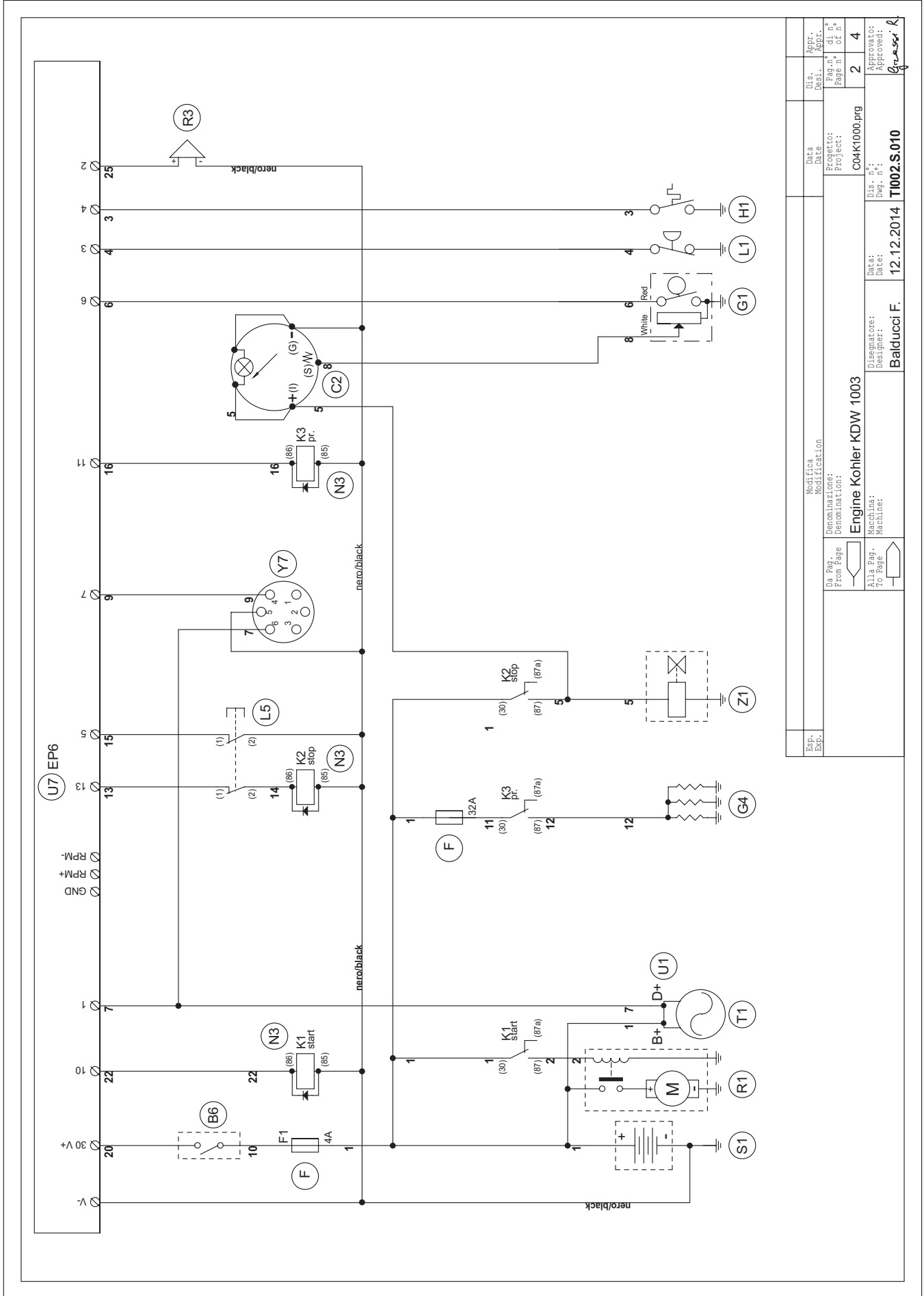




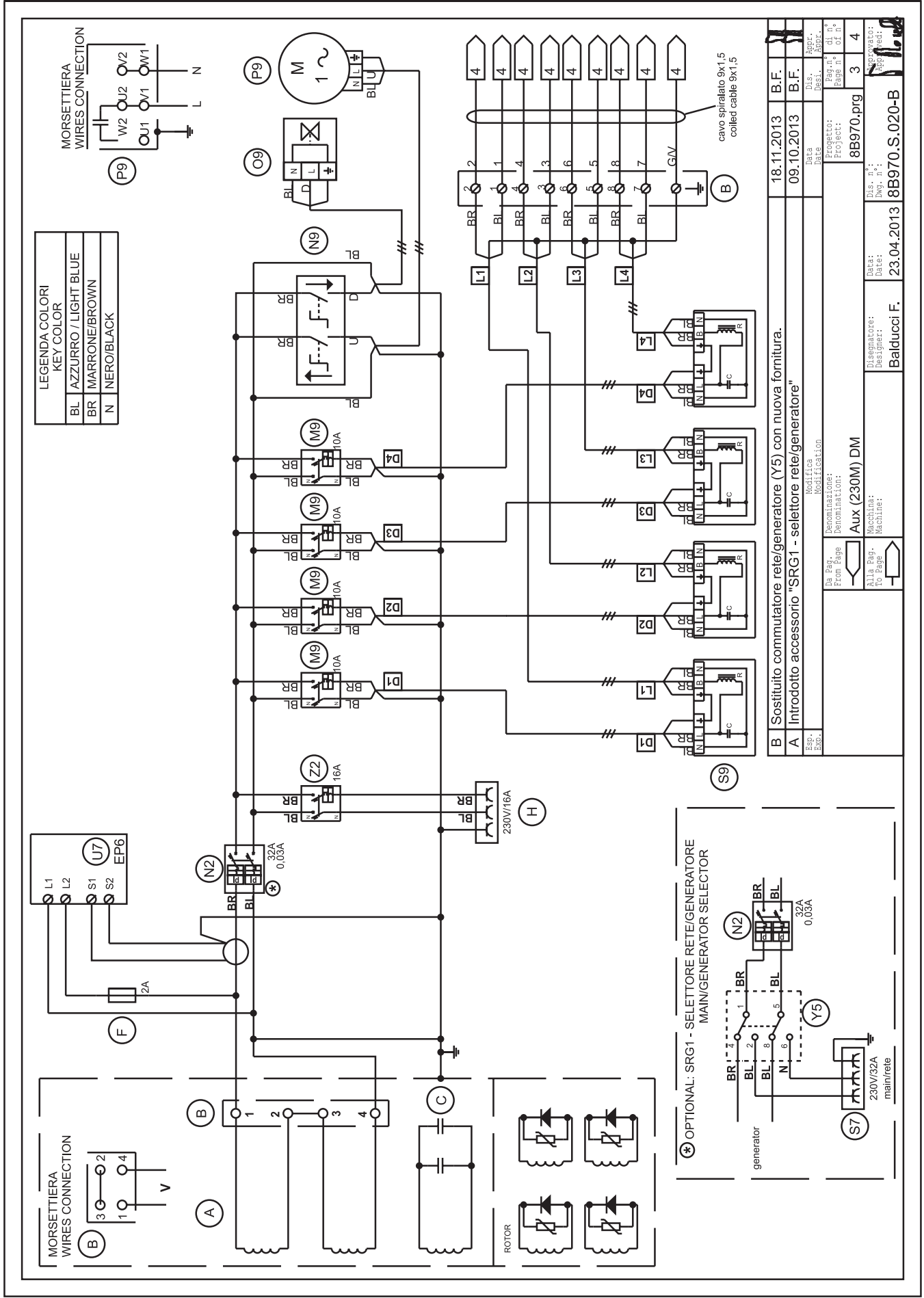
A : Alternator	E3 : Open circuit voltage switch	I6 : Start Local/Remote selector	N9 : UP/DOWN button mast
B : Wire connection unit	F3 : Stop push-button	L6 : Choke button	O9 : Hydraulic unit solenoid valve
C : Capacitor	G3 : Ignition coil	M6 : Switch CC/CV	P9 : Hydraulic unit engine
D : G.F.I.	H3 : Spark plug	N6 : Connector – wire feeder	Q9 : Ignitor
E : Welding PCB transformer	I3 : Range switch	O6 : 420V/110V 3-phase transformer	R9 : Lamp
F : Fuse	L3 : Oil shut-down button	P6 : Switch IDLE/RUN	S9 : Power system
G : 400V 3-phase socket	M3 : Battery charge diode	Q6 : Hz/V/A analogic instrument	T9 : 48Vdc power system
H : 230V 1phase socket	N3 : Relay	R6 : EMC filter	U9 : LED projector
I : 110V 1-phase socket	O3 : Resistor	S6 : Wire feeder supply switch	V9 : 125/250V 1phase socket
L : Socket warning light	P3 : Sparkler reactor	T6 : Wire feeder socket	Z9 : AMF25 generating set test
M : Hour-counter	Q3 : Output power unit	U6 : DSP chopper PCB	W9 : Multifunction LED instrument
N : Voltmeter	R3 : Electric siren	V6 : Power chopper supply PCB	X9 : InteliNano generating set test
P : Welding arc regulator	S3 : E.P.4 engine protection	Z6 : Switch and leds PCB	Y9 :
Q : 230V 3-phase socket	T3 : Engine control PCB	W6 : Hall sensor	
R : Welding control PCB	U3 : R.P.M. electronic regulator	X6 : Water heater indicator	
S : Welding current ammeter	V3 : PTO HI control PCB	Y6 : Battery charge indicator	
T : Welding current regulator	Z3 : PTO HI 20 l/min push-button	A7 : Transfer pump selector AUT-0-MAN	
U : Current transformer	W3 : PTO HI 30 l/min push-button	B7 : Fuel transfer pump	
V : Welding voltage voltmeter	X3 : PTO HI reset push-button	C7 : "GECO" generating set test	
Z : Welding sockets	Y3 : PTO HI 20 l/min indicator	D7 : Flooting with level switches	
X : Shunt	A4 : PTO HI 30 l/min indicator	E7 : Voltmeter regulator	
W : D.C. inductor	B4 : PTO HI reset indicator	F7 : WELD/AUX switch	
Y : Welding diode bridge	C4 : PTO HI 20 l/min solenoid valve	G7 : Reactor, 3-phase	
A1 : Arc striking resistor	D4 : PTO HI 30 l/min solenoid valve	H7 : Switch disconnecter	
B1 : Arc striking circuit	E4 : Hydraulic oil pressure switch	I7 : Solenoid stop timer	
C1 : 110V D.C./48V D.C. diode bridge	F4 : Hydraulic oil level gauge	L7 : "VODIA" connector	
D1 : E.P.1 engine protection	G4 : Preheating glow plugs	M7 : "F" EDC4 connector	
E1 : Engine stop solenoid	H4 : Preheating gearbox	N7 : OFF-ON-DIAGN. selector	
F1 : Acceleration solenoid	I4 : Preheating indicator	O7 : DIAGNOSTIC push-button	
G1 : Fuel level transmitter	L4 : R.C. filter	P7 : DIAGNOSTIC indicator	
H1 : Oil or water thermostat	M4 : Heater with thermostat	Q7 : Welding selector mode	
I1 : 48V D.C. socket	N4 : Choke solenoid	R7 : VRD load	
L1 : Oil pressure switch	O4 : Step relay	S7 : 230V 1-phase plug	
M1 : Fuel warning light	P4 : Circuit breaker	T7 : V/Hz analogic instrument	
N1 : Battery charge warning light	Q4 : Battery charge sockets	U7 : Engine protection EP6	
O1 : Oil pressure warning light	R4 : Sensor, cooling liquid temperature	V7 : G.F.I. relay supply switch	
P1 : Fuse	S4 : Sensor, air filter clogging	Z7 : Radio remote control receiver	
Q1 : Starter key	T4 : Warning light, air filter clogging	W7 : Radio remote control transmitter	
R1 : Starter motor	U4 : Polarity inverter remote control	X7 : Isometer test push-button	
S1 : Battery	V4 : Polarity inverter switch	Y7 : Remote start socket	
T1 : Battery charge alternator	Z4 : Transformer 230/48V	A8 : Transfer fuel pump control	
U1 : Battery charge voltage regulator	W4 : Diode bridge, polarity change	B8 : Ammeter selector switch	
V1 : Solenoid valve control PCB	X4 : Base current diode bridge	C8 : 400V/230V/115V commutator	
Z1 : Solenoid valve	Y4 : PCB control unit, polarity inverter	D8 : 50/60 Hz switch	
W1 : Remote control switch	A5 : Base current switch	E8 : Cold start advance with temp. switch	
X1 : Remote control and/or wire feeder socket	B5 : Auxiliary push-button ON/OFF	F8 : START/STOP switch	
Y1 : Remote control plug	C5 : Accelerator electronic control	G8 : Polarity inverter two way switch	
A2 : Remote control welding regulator	D5 : Actuator	H8 : Engine protection EP7	
B2 : E.P.2 engine protection	E5 : Pick-up	I8 : AUTOIDLE switch	
C2 : Fuel level gauge	F5 : Warning light, high temperature	L8 : AUTOIDLE PCB	
D2 : Ammeter	G5 : Commutator auxiliary power	M8 : A4E2 ECM engine PCB	
E2 : Frequency meter	H5 : 24V diode bridge	N8 : Remote emergency stop connector	
F2 : Battery charge transformer	I5 : Y/▲ commutator	O8 : V/A digital instruments and led VRD PCB	
G2 : Battery charge PCB	L5 : Emergency stop button	P8 : Water in fuel	
H2 : Voltage selector switch	M5 : Engine protection EP5	Q8 : Battery disconnect switch	
I2 : 48V a.c. socket	N5 : Pre-heat push-button	R8 : Inverter	
L2 : Thermal relay	O5 : Accelerator solenoid PCB	S8 : Overload led	
M2 : Contactor	P5 : Oil pressure switch	T8 : Main IT/TN selector	
N2 : G.F.I. and circuit breaker	Q5 : Water temperature switch	U8 : NATO socket 12V	
O2 : 42V EEC socket	R5 : Water heater	V8 : Diesel pressure switch	
P2 : G.F.I. resistor	S5 : Engine connector 24 poles	Z8 : Remote control PCB	
Q2 : T.E.P. engine protection	T5 : Electronic GFI relais	W8 : Pressure turbo protection	
R2 : Solenoid control PCB	U5 : Release coil, circuit breaker	X8 : Water in fuel sender	
S2 : Oil level transmitter	V5 : Oil pressure indicator	Y8 : EDC7-UC31 engine PCB	
T2 : Engine stop push-button T.C.1	Z5 : Water temperature indicator	A9 : Low water level sender	
U2 : Engine start push-button T.C.1	W5 : Battery voltmeter	B9 : Interface card	
V2 : 24V c.a. socket	X5 : Contactor, polarity change	C9 : Limit switch	
Z2 : Thermal magnetic circuit breaker	Y5 : Voltage switch	D9 : Starter timing card	
W2 : S.C.R. protection unit	A6 : Commutator/switch	E9 : Luquid pouring level float	
X2 : Remote control socket	B6 : Control panel power switch	F9 : Under voltage coil	
Y2 : Remote control plug	C6 : QEA control unit	G9 : Low water level warning light	
A3 : Insulation moiting	D6 : Connector, PAC	H9 : Chopper driver PCB	
B3 : E.A.S. connector	E6 : Frequency rpm regulator	I9 : Fuel filter heater	
C3 : E.A.S. PCB	F6 : Arc-Force selector	L9 : Air heater	
D3 : Booster socket	G6 : Device starting motor	M9 : ON/OFF switch lamp	
	H6 : Fuel electro pump 12V c.c.		



Rev. Exp.	Modifica Modification	Data Date	Dis. Desi. Appr.
Denominazione: Project: 8B970.ptg		Page n° of n° 2	4
Da Pag. From Page: Engine Yanmar 3TNV76		Disegnatore: Designer: Balducci F.	Dis. n° Dwg. n°: 8B970.S.010
Macchina: Machine:		Date: 23.04.2013	Approvato: App. Rec:

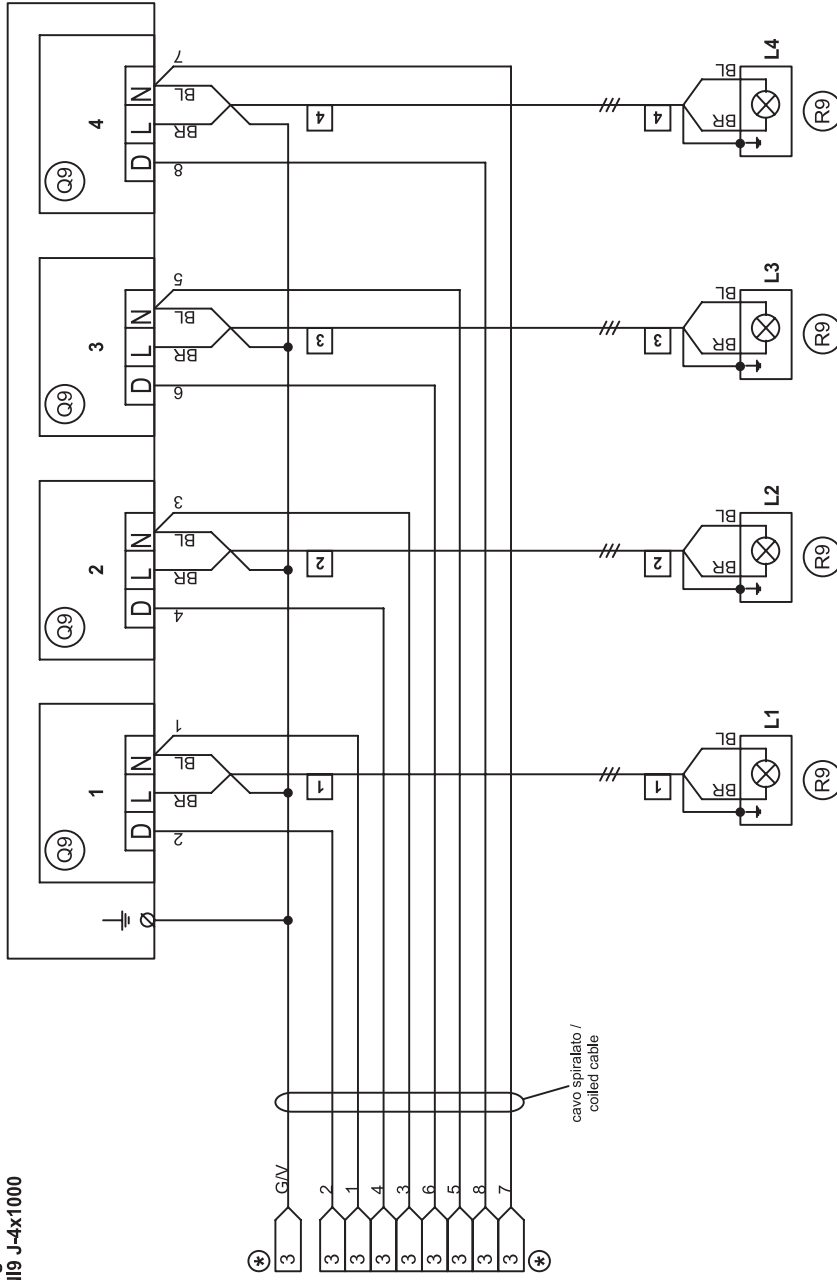


Exp. Exp.	Modifica Modification	Data Date	Dis. Desi. Appr. Appr.
	Denominazione: Denomination: Engine Kohler KDW 1003	Projecto: Project: C04K1000.prg	Dis. n°: Dis. n°: 2
Da Pag. From Page	Macchina: Machine:		Page n° of n°: 4
Alla Pag. To Page	Disegnato: Designer: Balducci F.	Data: Date: 12.12.2014	Dis. n°: Dis. n°: T1002.S.010
			Approvato: Approved: Grassi R.



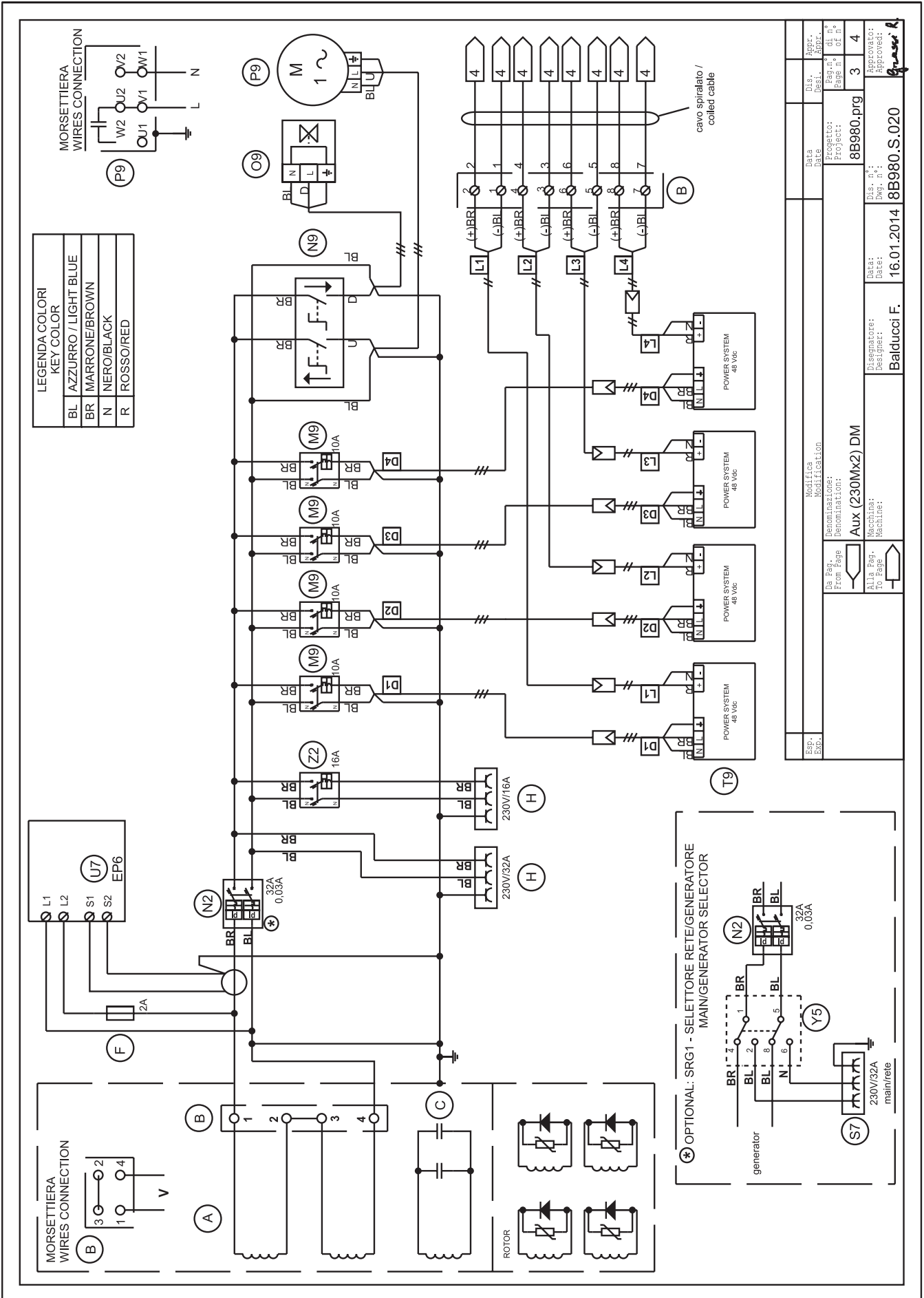
B	Sostituito commutatore rete/generatore (Y5) con nuova fornitura.	18.11.2013	B.F.
A	Introdotta accessorio "SRG1 - selettore rete/generatore"	09.10.2013	B.F.
Exp.	Modifica	Data	Appr.
Da Pag. From Page	Denominazione: Denomination:	Proj. n. Project n.	Page n. of n.
Alla Pag. To Page	Aux (230M) DM	8B970.prg	3 4
Disegnatore: Designer:	Balducci F.	Dis. n. Dwg. n.:	8B970.S.020-B
Approvato: Appr.:			

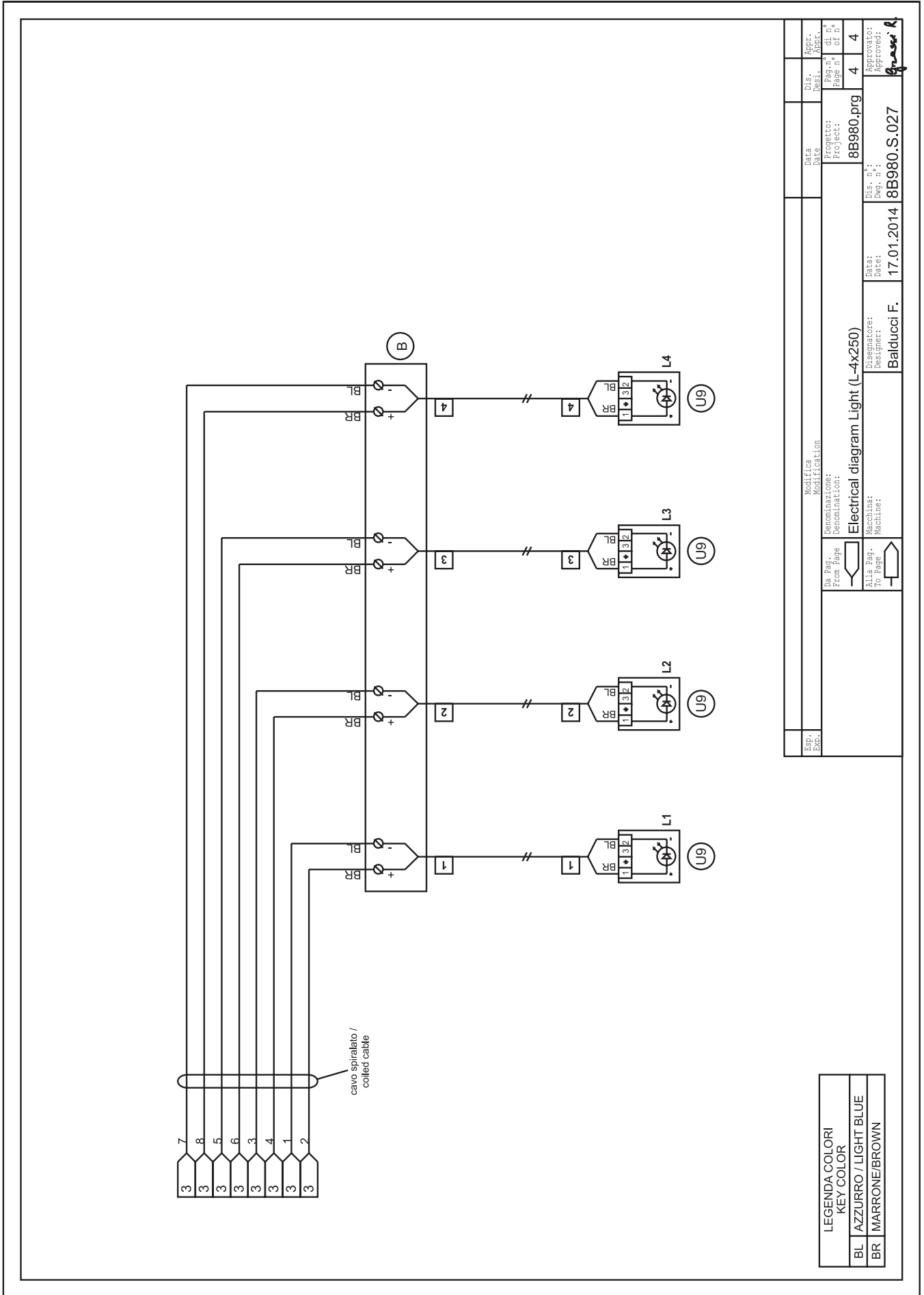
⊛ **ATTENZIONE:**
 Per TF NI9 J-4x1000
 da pag. 2
ATTENTION:
 From page 2
 for TF NI9 J-4x1000



LEGENDA COLORI KEY COLOR	
BL	AZZURRO / LIGHT BLUE
BR	MARRONE/BROWN

A		Unificato schema tra Torre faro integrata e non integrata (vedi NOTA di ATTENZIONE) 02.04.2014		B.F.	
Exp. Exp.	Modifica Modification	Data Date	Dis. Desi.	Appr. Appr.	
Da Pag. From Page	Denominazione: Denomination:	Progetto: Project:	Dis. n° di n°	Appr. n° di n°	
To Page	Electrical diagram Light (J-4x1000)	5A970.prg	3	3	
Alla Pag. Macchina: Machine:	Disegnatore: Designer:	Data: Date:	Dis. n° Dwg. n°	Approvato: Appr.	
To Page	Balducci F.	07.05.2013	8B970.S.027-A		







MOSA

MOSA div. della BCS S.p.A.

Viale Europa, 59 20090 Cusago (Milano) Italy

Tel. +39 - 0290352.1 Fax +39 - 0290390466 www.mosa.it

