

DSP 400 YSX

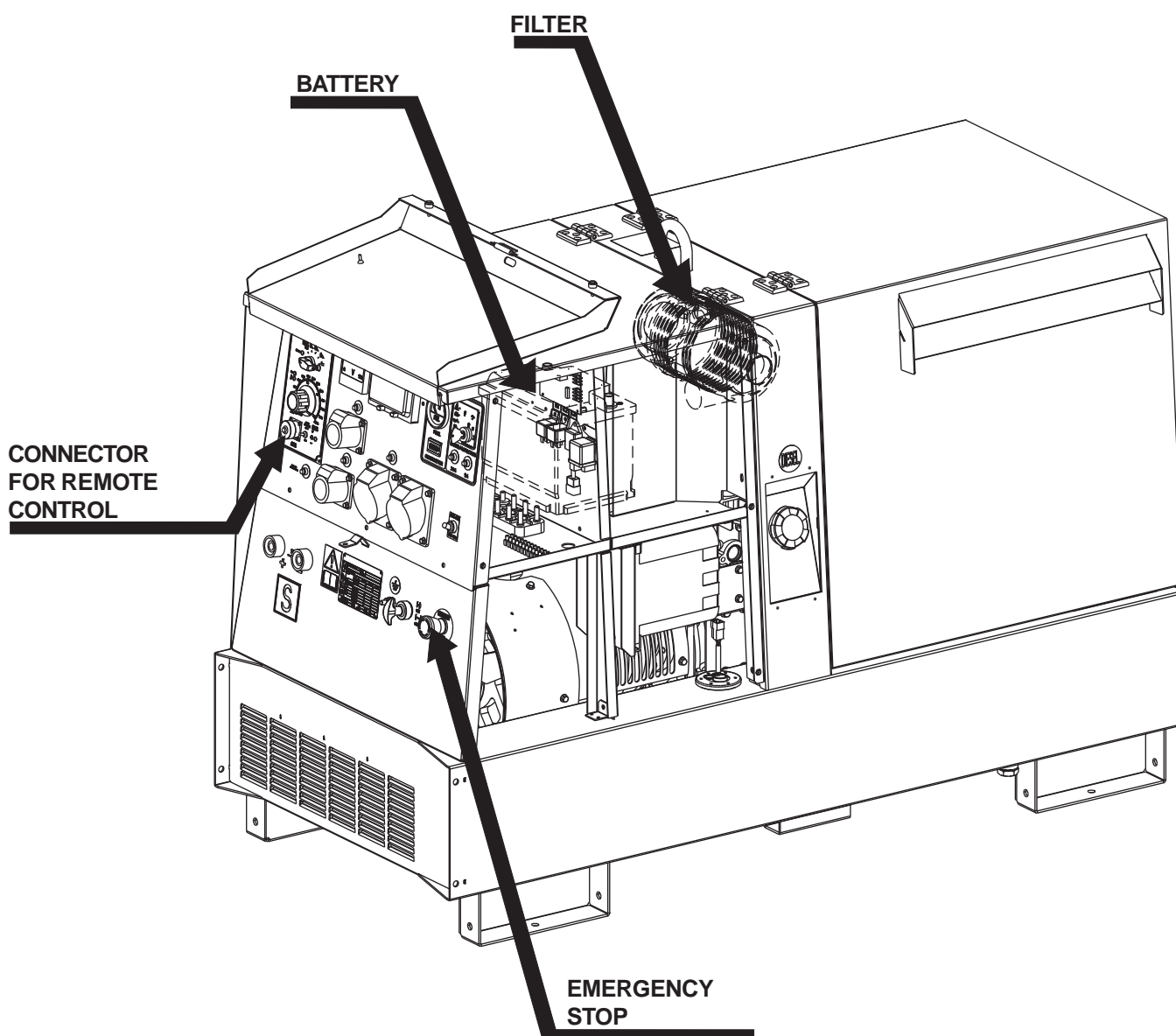
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USE AND MAINTENANCE MANUAL

Main Characteristics of the unit:

- Control of current with CHOPPER technology at high frequency
- Digital control technique by means of DSP
- Major productivity of 15% in comparison to welders with diode controls and controlled diodes.
- 5 Welding processes: TIG contact start, STICK arcforce 1, STICK arcforce 2, STICK arcforce 3, MIGMAG
- Maximum welding current 400A
- 12 kVA of power in three phase generation 400 V / 50 Hz
- Diesel engine Yanmar 3TNV76 emissioned EURO 2
- Noise level at 7m 68dBA
- Dimensions / weight: 1610x720x1100 / 535 Kg.



The DSP 400 YSX engine driven welder has a base constructed in steel which includes the tank. A cover (bonnet) which is hinged to the roll bar facilitates rapid checks for daily maintenance. A central hook on the roll bar facilitates the removal or loading of the machine. The maintenance-free battery reduces checks on the state of charge to a minimum.


UNI EN ISO 9001 : 2000

ISO 9001:2000 - Cert. 0192

MOSA has certified its quality system according to UNI EN ISO 9001:2000 to ensure a constant, high quality of its products. This certification covers the design, production and servicing of engine driven welders and generating sets.

The certifying institute, ICIM, which is a member of the International Certification Network IQNet, awarded the official approval to MOSA after an examination of its operations at the head office and plant in Cusago (MI), Italy.

This certification is not a point of arrival but a pledge on the part of the entire company to maintain a level of quality of both its products and services which will continue to satisfy the needs of its clients, as well as to improve the transparency and the communications regarding all the company's activities in accordance with the official procedures and in harmony with the MOSA Manual of Quality.

The advantages for MOSA clients are:

- Constant quality of products and services at the high level which the client expects;
- Continuous efforts to improve the products and their performance at competitive conditions;
- Competent support in the solution of problems;
- Information and training in the correct application and use of the products to assure the security of the operator and protect the environment;
- Regular inspections by ICIM to confirm that the requirements of the company's quality system and ISO 9001 are being respected.

All these advantages are guaranteed by the CERTIFICATE OF QUALITY SYSTEM No.0192 issued by ICIM S.p.A. - Milano (Italy) - www.icim.it

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ATTENTION

This use and maintenance manual is an important part of the machines in question.

The assistance and maintenance personnel must keep said manual at disposal, as well as that for the engine and alternator (if the machine is synchronous) and all other documentation about the machine.

We advise you to pay attention to the pages concerning the security (see page M1.1).



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INFORMATION

Dear Customer,
We wish to thank you for having bought from MOSA 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 parts are replaced, please ask and be sure that are used exclusively original MOSA 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 from MOSA.**

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 integrant 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).

Our products have been designed for the use of generation for welding, electric and hydraulic system; ANY OTHER DIFFERENT USE NOT INCLUDED IN THE ONE INDICATED, relieves MOSA from the risks which could happen or, anyway, from that which was agreed when selling the machine; MOSA excludes any responsibility for damages to the machine, to the things or to persons in this case.

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 by MOSA: the responsibility coming from any potential intervention will fall on the executioner as in fact he becomes maker of the machine.

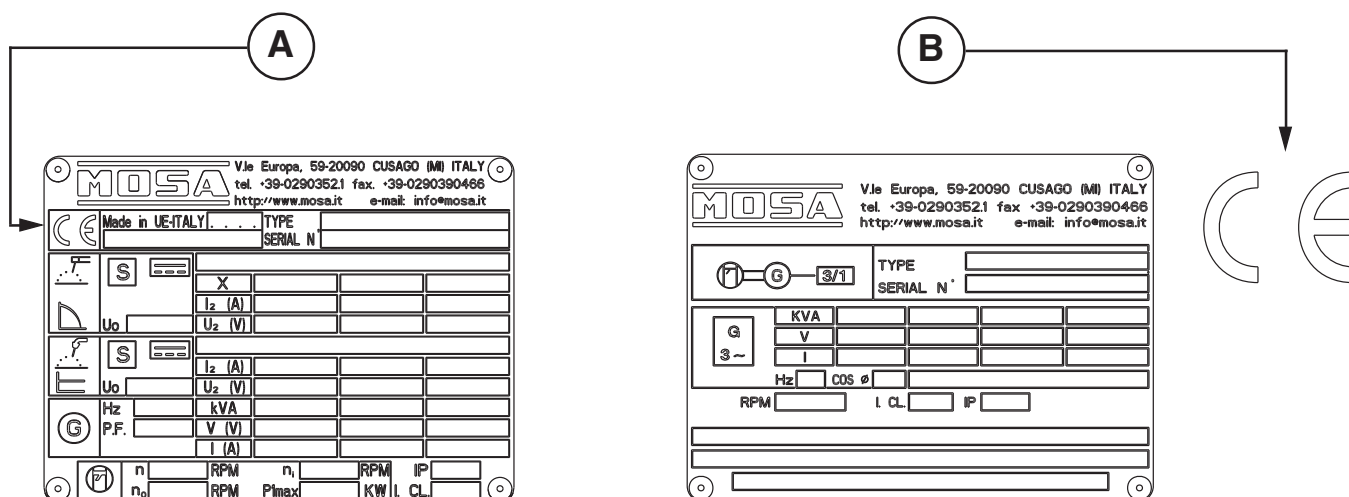
☞ **Notice:** *this manual does not engage MOSA, who keeps the faculty, apart the essential characteristics of the model here described and illustrated, to bring betterments and modifications to parts and accessories, without putting this manual uptodate immediately.*



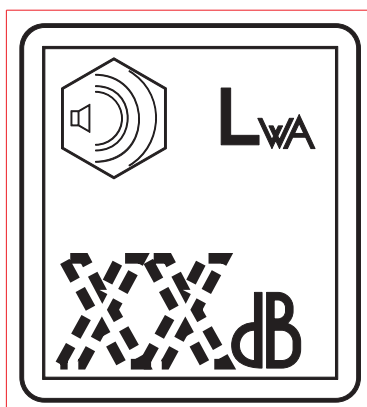
Any of our product is labelled with CE marking attesting its conformity to appliable directives and also the fulfillment of safety requirements of the product itself; the list of these directives is part of the declaration of conformity included in any machine standard equipment.
 Here below the adopted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



CE marking is clearly readable and unerasable and it can be either part of the data-plate (A) or placed as a sticker near the data-plate (B)



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.

The DSP 400 engine driven welder is a unit which ensures the function as:

- a) a current source for arc welding
- b) a current source for the auxiliary power generation

It is meant for industrial and professional use, powered by an endothermic engine; it is composed of various main parts such as: engine, alternator, electric and electronic controls, the fairing or a protective structure. The assembling is made on a steel structure, on which are provided elastic support which must damp the vibrations and also eliminate sounds which would produce noise.

Technical data	DSP 400 YSX
GENERATOR	
Potenza trifase	12 kVA / 400 V / 17.3 A
Potenza monofase	7 kVA / 230 V / 30.4 A
Potenza monofase	5 kVA / 48 V / 104 A
Frequency	50 Hz
Cos φ	0.8
ALTERNATOR	
Type	self-excited, self-regulated, brushless
Insulating class	three-phase, asynchronous H
ENGINE	
Mark / Model	YANMAR / 3TNV76
Type / Cooling system	Diesel 4-Stroke / Liquid
Cylinders/Displacement	3 / 1116 cm ³
Power	16.5 kW (22.3 HP)
Speed	3000 rpm
Fuel consumption	306 g/kWh
Cooling system capacity	4 l
Engine oil capacity	4 l
Starter	elettrico
GENERAL SPECIFICATIONS	
Tank capacity	45 l
Running time	13 h
Protection	IP 23
Dimensions / max. Lxwxh (mm) *	1610x720x1100
Weight *	535 Kg
Measured acoustic power	93 LWA (68 dB(A) - 7 m)
Guaranteed acoustic power	94 LWA (69 dB(A) - 7 m)

* Dimensions and weight are inclusive of all parts without wheels and towbar



POWER

Declared power according to ISO 3046-1 (temperature 25°C, 30% relative humidity, altitude 100 m above sea level). It's admitted overload of 10% each hour every 12 h.

In an **approximative** way one reduces: of 1% every 100 m altitude and of 2.5% for every 5°C above 25°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 (L_{WA}) - 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 (L_p) - 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 (L_p) at different distances from a machine with Acoustic Noise Level (L_{WA}) of 95 dB(A)

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

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

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

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

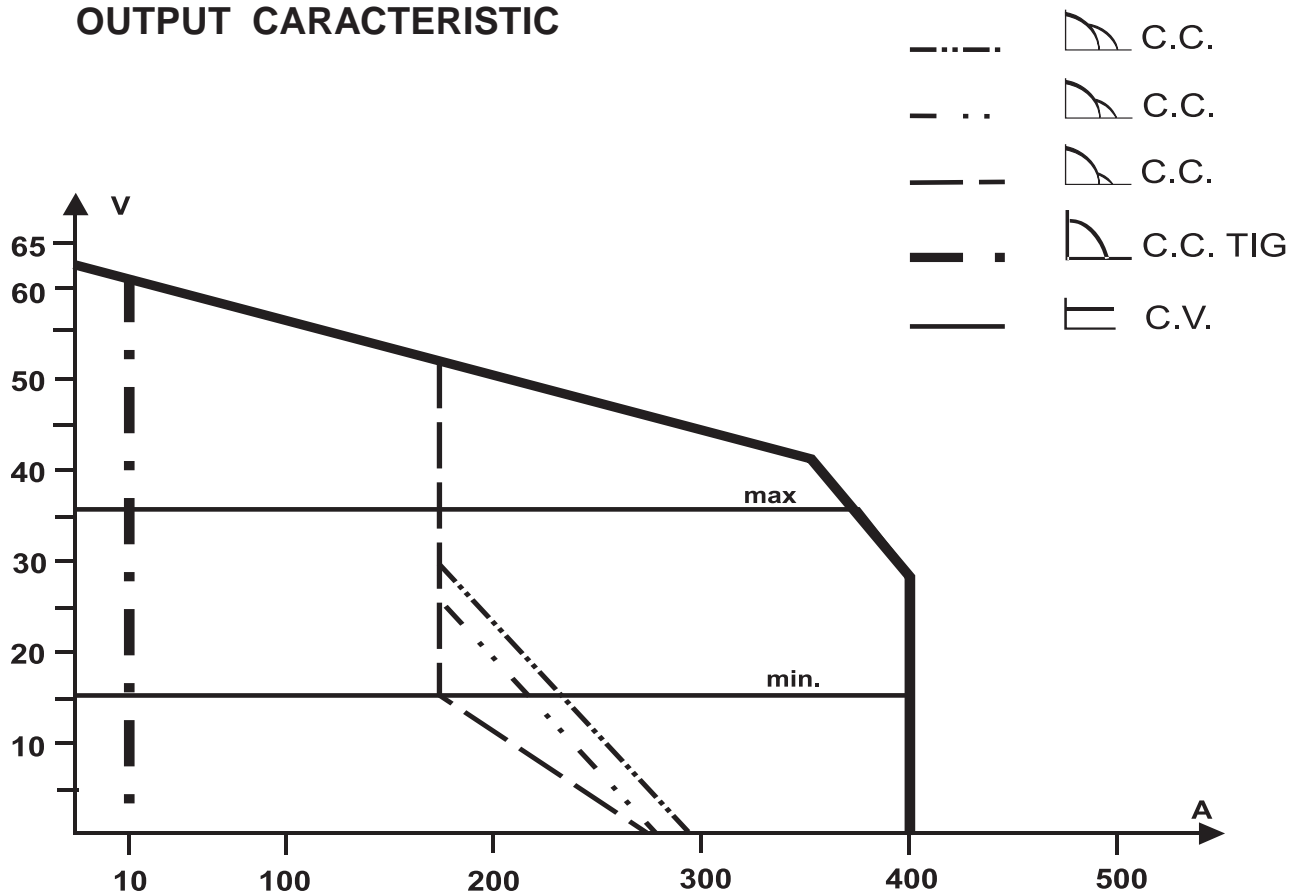
PLEASE NOTE: the symbol when with acoustic noise values, indicates that the device respects noise emission limits according to 2000/14/CE directive.

C.C. WELDING

Welding current 400A/35% - 350A/60% - 300A/100%
Starting voltage 65V

C.V. WELDING

Welding current 350A/60% - 300A/100%
Welding voltage 15 - 40V

OUTPUT CHARACTERISTIC

SIMULTANEOUS UTILIZATION FACTORS

In case **Welding** and **Generation** can be used simultaneously, however, the engine **cannot** be overloaded. The table below gives the maximum limits to be respected:


WELDING CURRENT	400 A	300 A	250 A	150 A	100 A	0 A
AUXILIARY POWER	0	3 kVA	5 kVA	8 kVA	10 kVA	12 kVA

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.

IMPORTANT ADVICE

- Advice to the User about the safety:

 N.B.: The information contained in the manual can be changed without notice.
Potential damages caused in relation to the use of these instructions will not be considered because these are only indicative.
Remember that the non observance of the indications reported by us might cause damage to persons or things.
It is understood, that local dispositions and/or laws must be respected.

WARNING



Situations of danger - no harm to persons or things

Do not use without protective devices provided

Removing or disabling protective devices on the machine is prohibited.

Do not use the machine if it is not in good technical condition

The machine must be in good working order before being used. Defects, especially those which regard the safety of the machine, must be repaired before using the machine.

SAFETY PRECAUTIONS



DANGEROUS

This heading warns of an immediate 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.

SYMBOLS (for all MOSA models)


STOP - Read absolutely and be duly attentive



Read and pay due attention



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.



WATER - Danger of shortcircuit. If the advice is not respected fires or damage to persons can be caused.



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



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



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



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



ACCES FORBIDDEN to non authorizad people.

PROHIBITIONS No harm for persons

Use only with safety clothing -


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

Use only with safety clothing -


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

Use only with safety protections -


It is a must to use protection means suitable for the different welding works.

Use with only safety material -


It is prohibited to use water to quench fires on the electric machines.

Use only with non inserted voltage -


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

No smoking -


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

No welding -


It is forbidden to weld in rooms containing explosive gases.

ADVICE No harm for persons and things

Use only with safety tools, adapted to the specific use -

It is advisable to use tools adapted to the various maintenance works.

Use only with safety protections, specifically suitable


It is advisable to use protections suitable for the different welding works.

Use only with safety protections -


It is advisable to use protections suitable for the different daily checking works.

Use only with safety protections -


It is advisable to use all protections while shifting the machine.

Use only with safety protections -


It is advisable to use protections suitable for the different daily checking works.and/or of maintenance.



The installation and the general advice concerning the operations, are finalized to the correct use of the machine, in the place where it is used as generator group and/or welder.

ENGINE	Stop engine when fueling	CHECKING BOARD	Do not touch electric devices if you are barefoot or with wet clothes.
	Do not smoke, avoid flames, sparks or electric tools when fueling.		
	Unscrew the cap slowly to let out the fuel vapours.		Always keep off leaning surfaces during work operations
	Slowly unscrew the cooling liquid tap if the liquid must be topped up.		
	The vapor and the heated cooling liquid under pressure can burn face, eyes, skin.		Static electricity can damage the parts on the circuit.
	Do not fill tank completely.		
	Wipe up spilled fuel before starting engine.		An electric shock can kill
	Shut off fuel of tank when moving machine (where it is assembled).		
	Avoid spilling fuel on hot engine.		
	Sparks may cause the explosion of battery vapours		



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 inflammability point is very low.

WARNING					CAUTION		DANGEROUS



**THE MACHINE MUST NOT BE USED IN AREAS WITH
EXPLOSIVE ATMOSPHERE**



INSTALLATION AND ADVICE BEFORE USE

The operator of the welder is responsible for the security of the people who work with the welder and for those in the vicinity.

The security measures must satisfy the rules and regulations for engine driven welders.

The information given below is in addition to the local security norms.

Estimate possible electromagnetic problems in the work area taking into account the following indications.

1. Telephonic wirings and/or of communication, check wirings and so on, in the immediate vicinity.
2. Radio and television receptors and transmettors.
3. Computer and other checking devices.
4. Critical devices for safety and/or for industrial checks.
5. Peapol who, for instance, use pace-maker, hearing-aid for deaf or something and else.
6. Devices used for rating and measuring.
7. The immunity of other devices in the operation area of the welder. Make sure that other used devices are compatible. If it is the case, provide other additional measures of protection.
8. The daily duration of the welding time.



Make sure that the area is safe before starting any welding operation.

- Do not touch any bare wires, leads or contacts as they may be live and there is danger of electric shock which can cause death or serious burns. The electrode and welding cables, etc. are live when the unit is operating.
- Do not touch any electrical parts or the electrode while standing in water or with wet hands, feet or clothes.
- Insulate yourself from the work surface while welding. Use carpets or other insulating materials to avoid physical contact with the work surface and the floor.
- Always wear dry, insulating gloves, without holes, and body protection.
- Do not wind cables around the body.
- Use ear protections if the noise level is high.
- Keep flammable material away from the welding area.
- Do not weld on containers which contain flammable material.
- Do not weld near refuelling areas.
- Do not weld on easily flammable surfaces.
- Do not use the welder to defrost (thaw) pipes.
- Remove the electrode from the electrode holder, when not welding.
- Avoid inhaling fumes by providing a ventilation system or, if not possible, use an approved air breather.
- Do not work in closed areas where there is no fresh air flow.
- Protect face and eyes (protective mask with suitable dark lens and side screens), ears and body (non-flammable protective clothers).



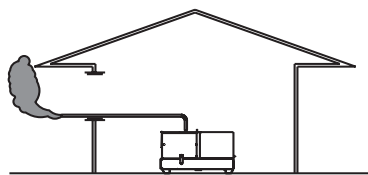
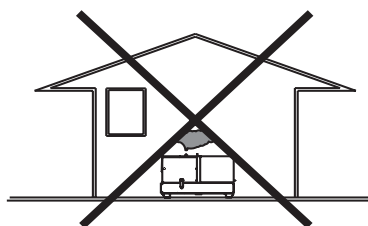
INSTALLATION AND ADVICE BEFORE USE

GASOLINE ENGINES

- Use in open space, air swept or vent exhaust gases, which contain the deathly carbone oxyde, far from the work area.

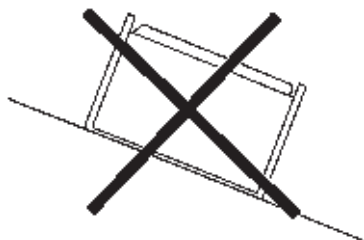
DIESEL ENGINES

- Use in open space, air swept or vent exhaust gases far from the work area.

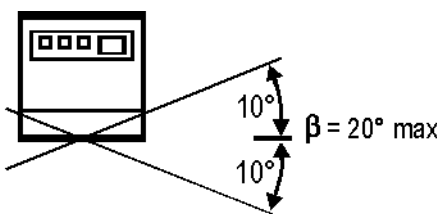
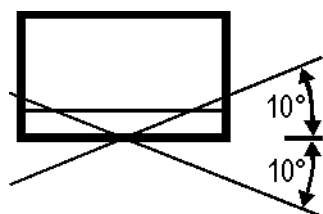


POSITION

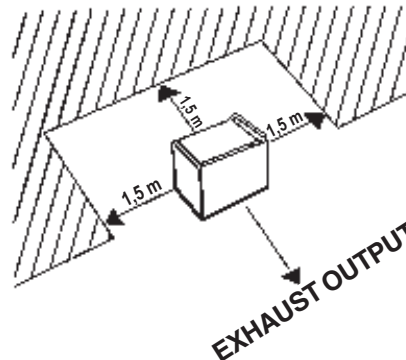
Place the machine on a level surface at a distance of at least 1,5 m from buildings or other plants.



Maximum leaning of the machine (in case of dislevel)



Check that the air gets changed completely and the hot air sent out does not come back inside the set so as to cause a dangerous increase of the temperature.



- ☞ Make sure that the machine does not move during the work: **block** it possibly with tools and/or devices made to this purpose.

MOVES OF THE MACHINE

- ☞ At any move check that the engine is **off**, that there are no connections with cables which impede the moves.

PLACE OF THE MACHINE

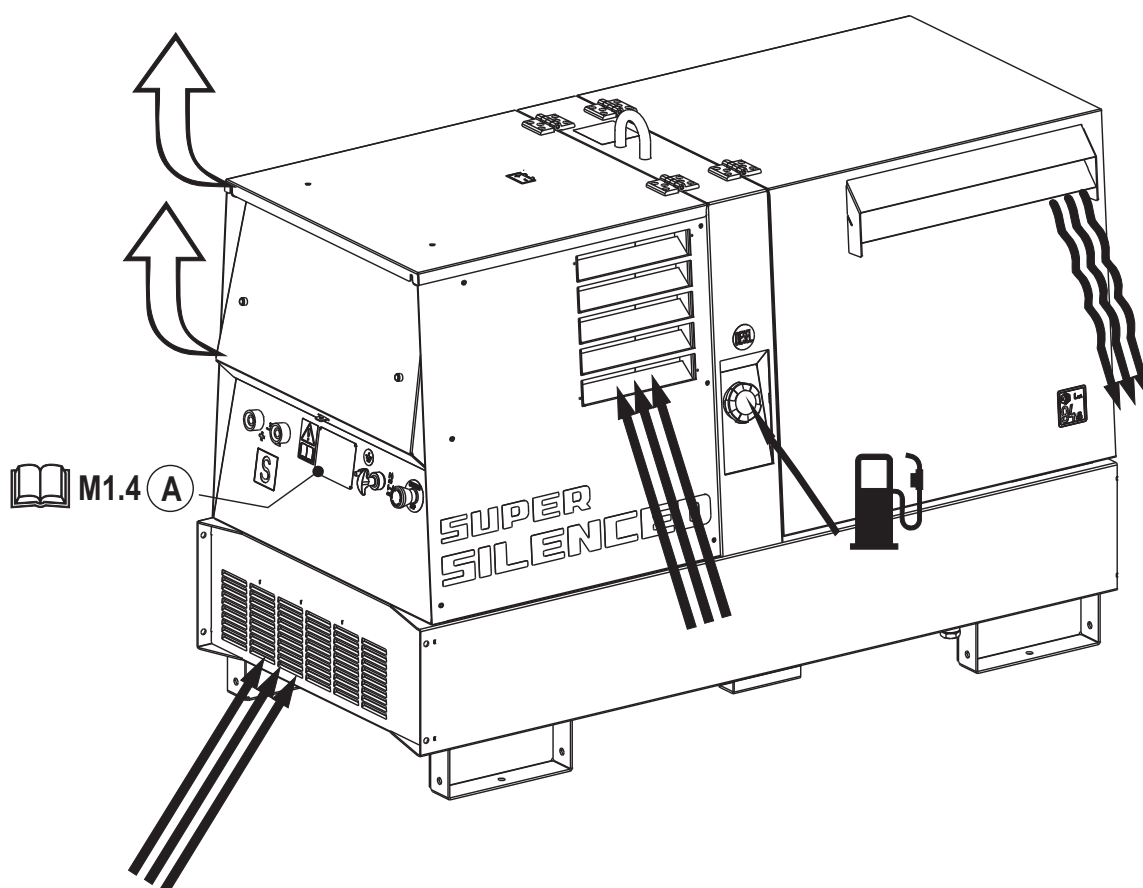
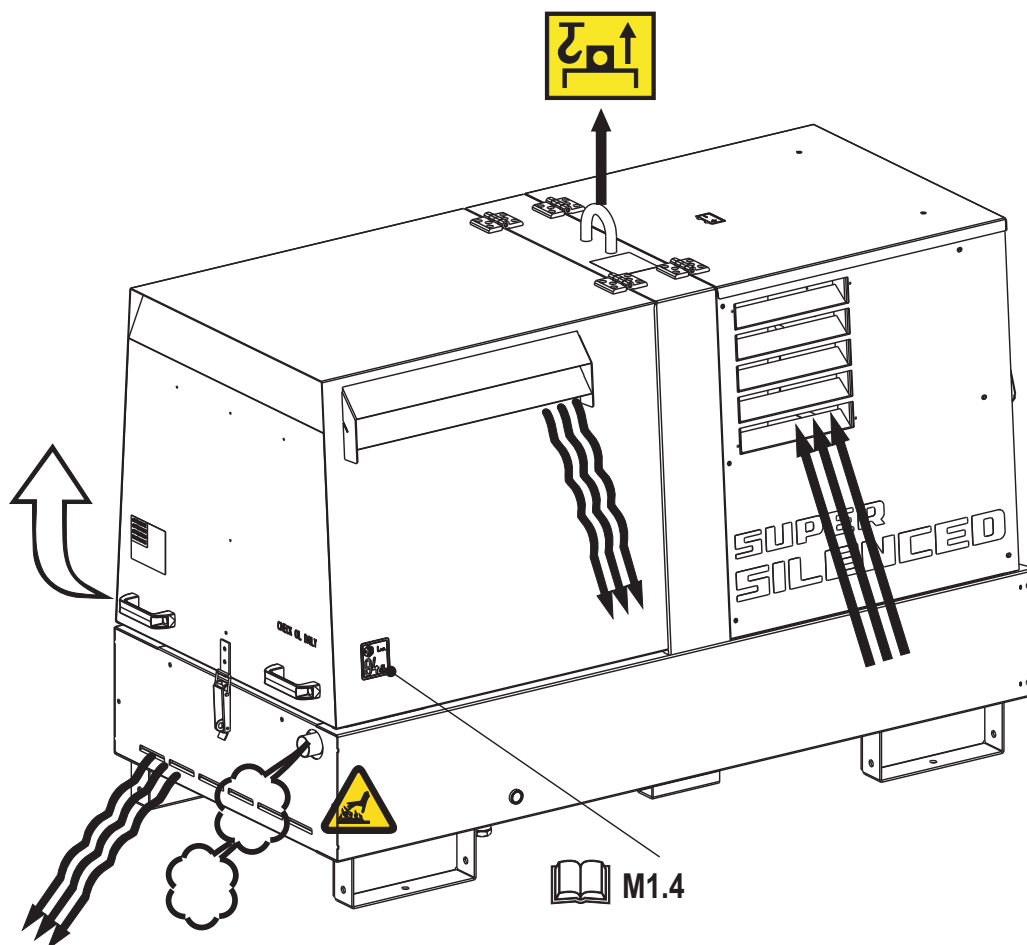


ATTENTION



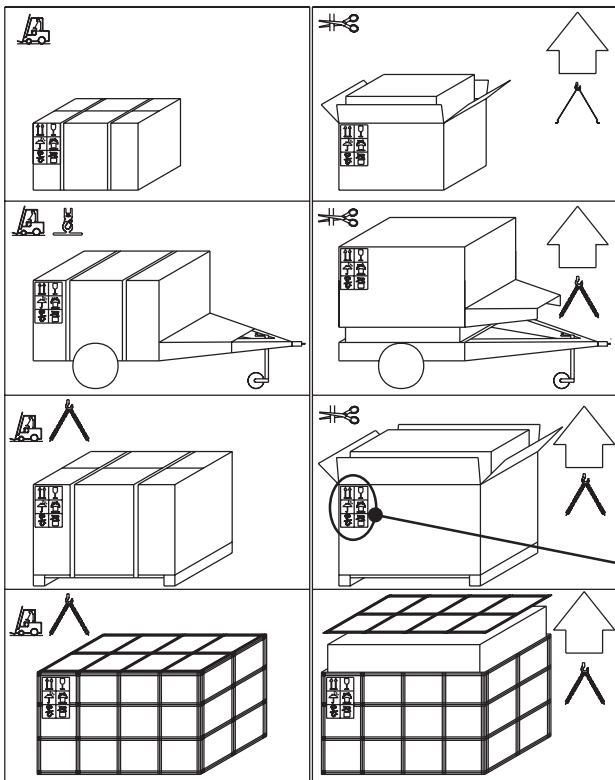
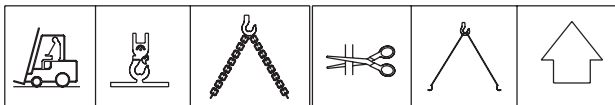
For a safer use from the operator **DO NOT** fit the machine in locations with high risk of flood.

Please do not use the machine in weather conditions which are beyond IP protection shown both in the data plate and on page named "technical data" in this same manual.





NOTE



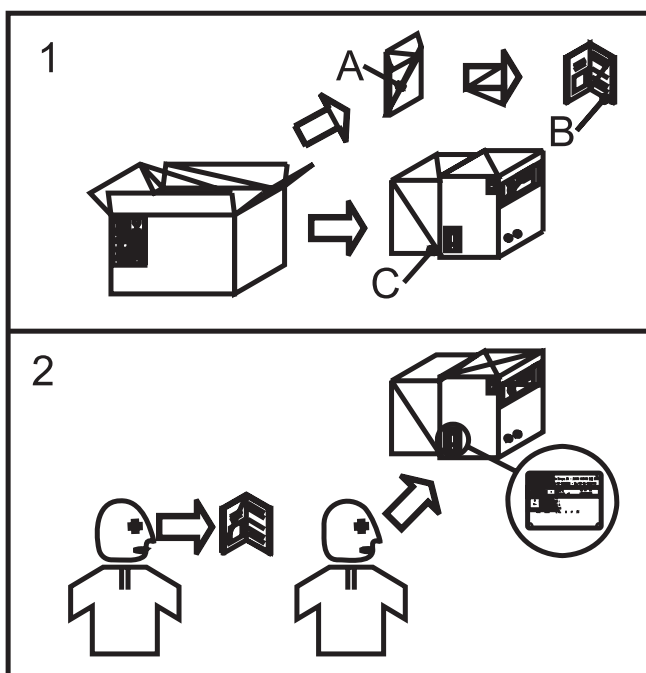
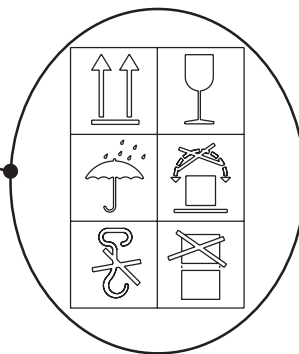
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with its packaging, and conforms to local rules and regulations.

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. Take out 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.





NOTE

In case you should transport or move the machine, keep to the instructions as per the figures.

Make the transportation when the machine has **no** petrol in its tank, **no** oil in the engine and and electrolyte in the battery.

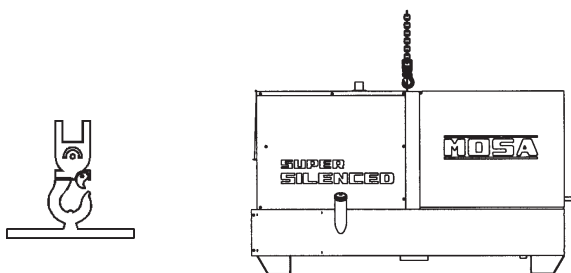
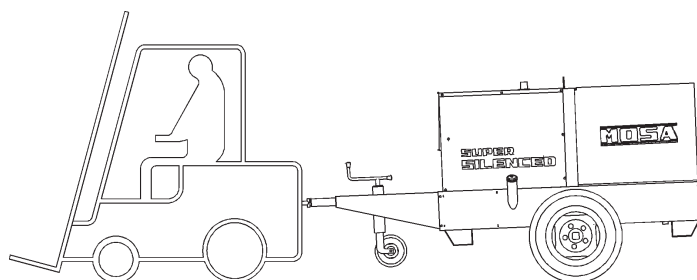
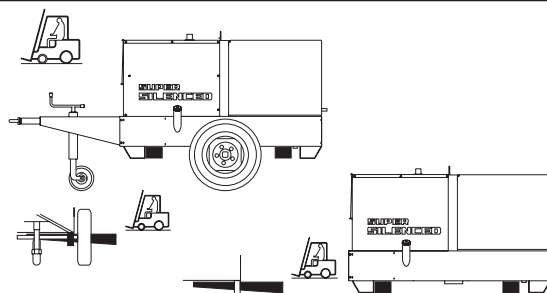
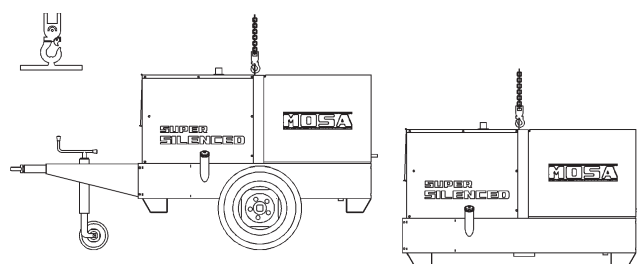
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conform to local rules and regulations.

Only authorized persons involved in the transport of the machine should be in the area of movement.

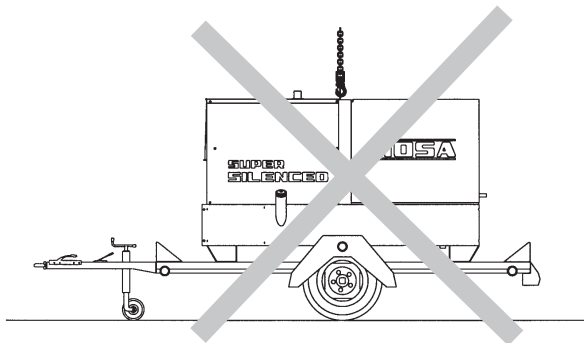
DO NOT LOAD OTHER PARTS WHICH CAN MODIFY WEIGHT AND BARICENTER POSITION.

IT IS STRICTLY FORBIDDEN TO DRAG THE MACHINE MANUALLY OR TOW IT BY ANY VEHICLE (model with no CTL accessory).

If you did not keep to the instructions, you could damage the structure of the machine.



LIFT ONLY THE MACHINE



DO NOT LIFT THE MACHINE AND TRAILER



DANGER: LIFTING EYE IS NOT DESIGNED TO SUPPORT ADDED WEIGHT OF ROAD TOW TRAILER





ATTENTION

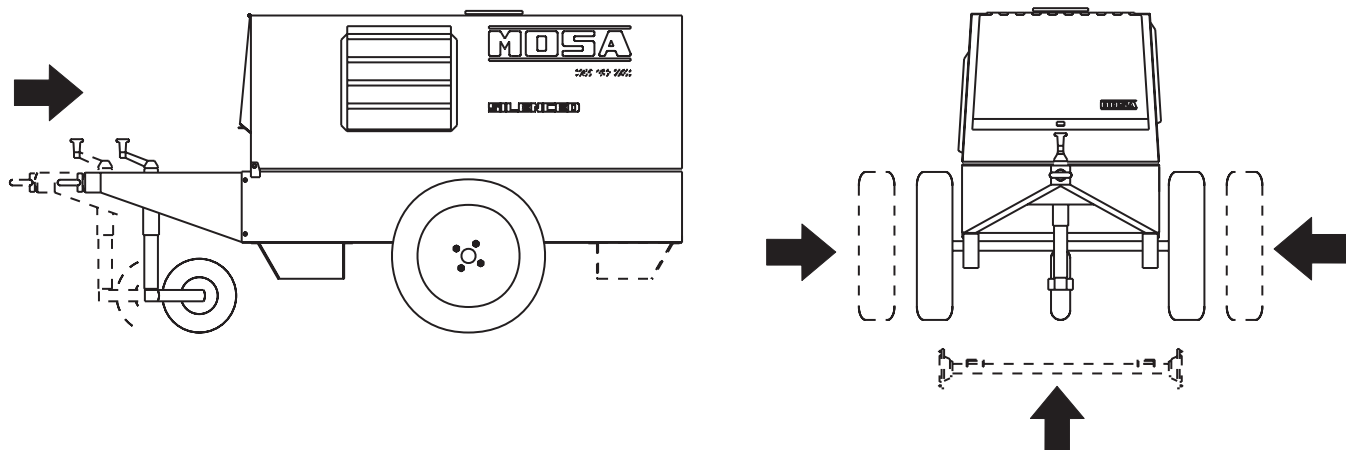
The CTL accessory cannot be removed from the machine and used separately (actioned manually or following vehicles) for the transport of loads or anyway for used different from the machine movements.

TRAILERS

The machines provided for assembling the CTL accessory (slow towing trolley) can be towed up to a **maximum** speed of **40 Kms/hour** on asphalted surfaces.

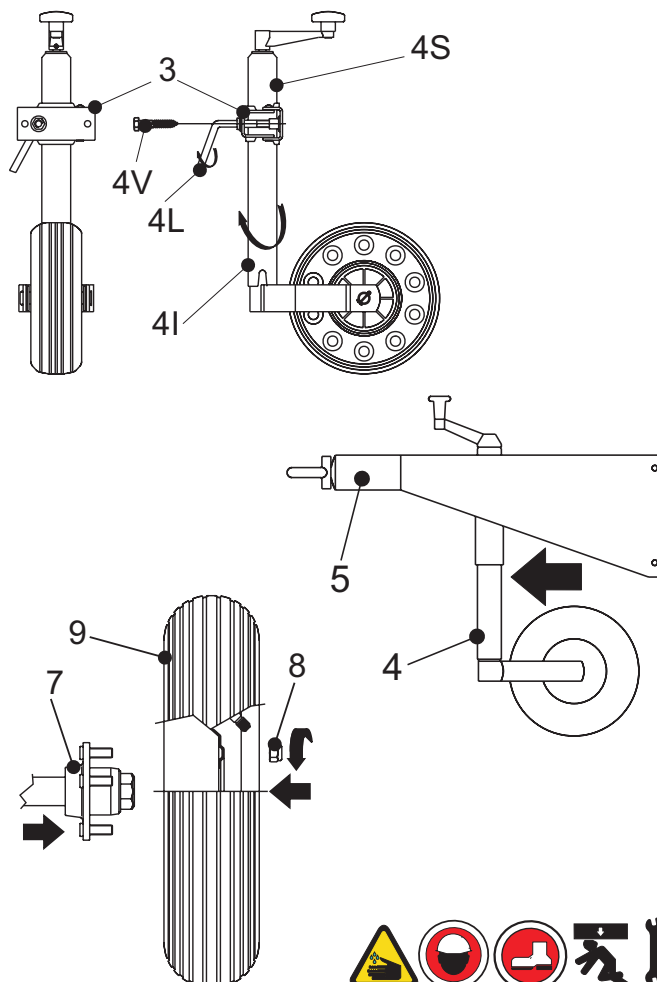
Towing on public roads or turnpikes of any type **IS EXCLUDED**, because **not** in possession of the requirements by national and foreign traffic norms.

Nota: Lift the machine and assemble the parts as shown in the drawing



For assembling the generating set on the trolley CTL400 please keep to following instructions:

- 1) - Lift the generating set (by means of suitable hook).
- 2) - Slightly fix the jaw (3) of the parking foot to the bar with the M10x20 screws, the M10 nuts and the washers (so as to let the foot sprag go through).
- 3) - Split (unscrewing them) the two parts of the foot (4S-4I) to be able later to assemble them on the jaw.
- 4) - Introduce into the jaw (3) the upper part (4S) of the foot and screw again the lower part (4I), then tighten the screws (4V) of the jaw to the towbar and block momentarily with the lever (4L) the whole foot.
- 5) - Assemble on the machine the towbar (5) complete of foot with the M10x20 screws, nuts and washers (see fig. page M6.2).
- 6) - Assemble the axle (7) to the base of the machine (see fig. page M6.2) with the M 10x20 screws and relative washers (two per part) so that their supports coincide.
- 8) - Insert the wheel (9) on the axle then screw the self blocking nuts (8).
- 9) - Pump the tyre (9) bringing the pressure to four atms.
- 10) - Lower the machine to the ground and place the parking foot definitively (regulating at the best height).



ATTENTION

Do not substitute the original tires with other types.





BATTERY WITHOUT MAINTENANCE



Connect the cable + (positive) to the pole + (positive) of the battery (after having taken away the protection), by properly tightening the clamp.

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
- DO NOT OPEN THE BATTERY.**



LUBRICANT

RECOMMENDED OIL

MOSA recommends selecting **AGIP** engine oil. Refer to the label on the motor for the recommended products.

PRODOTTI RACCOMANDATI RECOMMENDED PRODUCTS	
AGIP SUPERDIESEL 15W/40 API CF4-SG	OLIO MOTORE DIESEL DIESEL ENGINE OIL <input type="checkbox"/>
AGIP SUPERMOTOROIL 20W/50 API CC-SF	OLIO MOTORE BENZINA GASOLINE ENGINE OIL <input type="checkbox"/>
AGIP ANTIFREEZE EXTRA INIBITE ETHYLENE GLYCOL (50% + 50% H ₂ O)	CIRCUITO DI RAFFREDDAMENTO COOLING CIRCUIT (CUNA NC 956-16 ED 97) <input type="checkbox"/>

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



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.

**GROUNDING CONNECTION**

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.





Check daily



NOTE

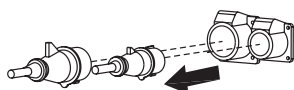
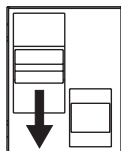
Do not alter the primary conditions of regulation and do not touch the sealed parts.



ATTENTION

1. By start-up of the generator the welding circuit is immediately operative, i.e. under voltage. Make sure that there are no unwished electrical contacts between the components of the outside welding circuit (electrode, electrode holder gun, workpiece, etc...).

2. Check that at the start-up the a.c. auxiliary generation sockets do not feed any load. Open the electric protection interrupter of the generator or disconnect the plugs of the loads from the sockets.



3. START-UP

Starting is actuated using the key which is an integral part of the EP7 post on the front panel.

- Turn the key in a clockwise direction until all the LED lights are illuminated.
- Wait until the "OIL PRESSURE" and "BATTERY VOLTAGE" LEDs remain illuminated. If the timer lamp is used, the yellow "PREHEAT" LED comes on for the set time of the imposed settings.
- As soon as the green "ENGINE RUNNING" LED starts to flash, actuate the key switch in a clockwise direction (momentarily in the position then with return to rest) until obtaining starting of the engine.

If the motor does not start within 15 seconds, the non starting alert will intervene: the two LEDs "Engine running" and "glow plug" will flash alternately (see motor protection description).

- At any time it is possible to stop the engine by turning the key in an anti-clockwise direction (OFF position).

In case of engine anomaly due to low oil pressure, high temperature, broken transmission belt, low fuel level or emergency the EP7 will automatically stop the engine.

- the motor starts up at its operating speed, 1500 or 1800 rpm. After start-up, allow the motor to run for a few minutes before powering on the utilities. See table;

Temperature	Time
$\leq -20^{\circ}\text{C}$	5 min.
to -20°C from -10°C	2 min.
to -10°C from -5°C	1 min.
$\geq 5^{\circ}\text{C}$	20 sec.

- start-up at low temperatures.

The motor will normally start up without problems down to temperatures of -10°C , -15°C . In case of starting difficulty, it is possible to repeat the starting preheating for a max. time of 10 second, lightly turning the trimmer situated at the back of the EP7 in a clockwise direction (see page M39.13 relating to engine protection "trimmer/glow plug"). For start-up and use at lower temperatures please see the engine manual or turn to our Technical Assistance Center.

In case of unsuccessful start-up, do not insist for longer than 5 seconds. Wait 10 - 15 seconds before attempting another start-up.



CAUTION

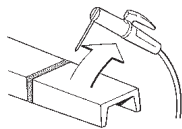
RUNNING-IN

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.

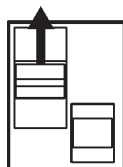
STOP

For shutdown under normal conditions, proceed as follows:

1. Break the welding process in course

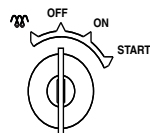


2. Break the production of a.c. auxiliary generation dividing the loads or opening the GFI (D).

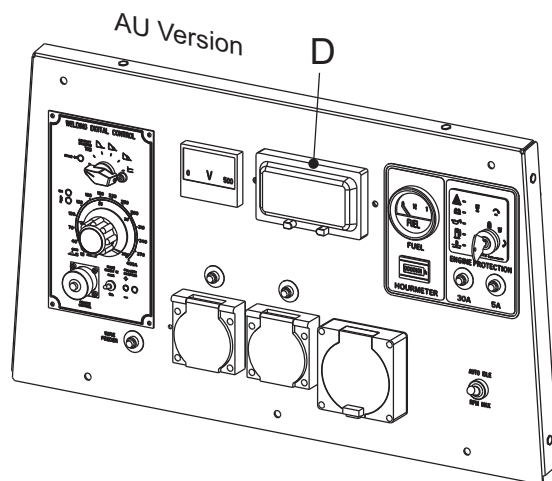
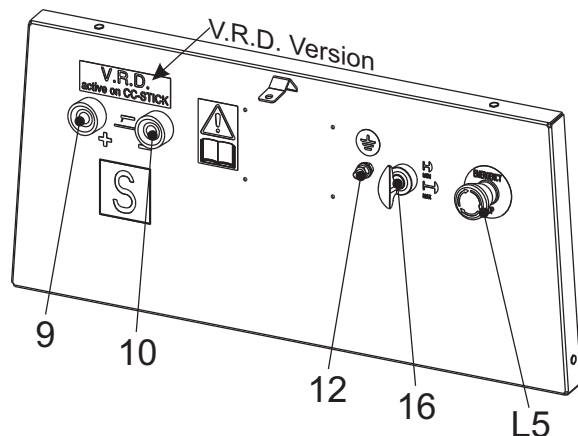
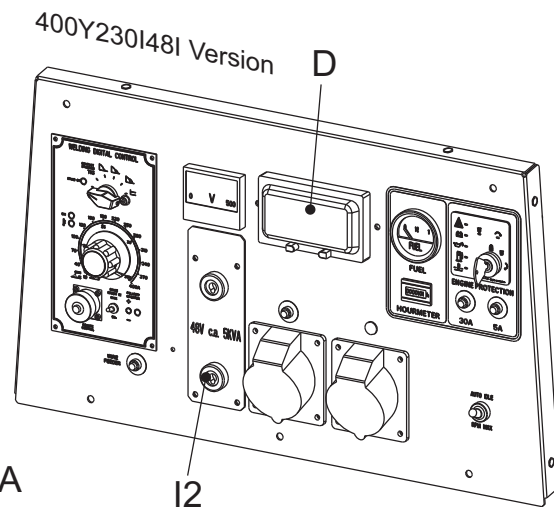
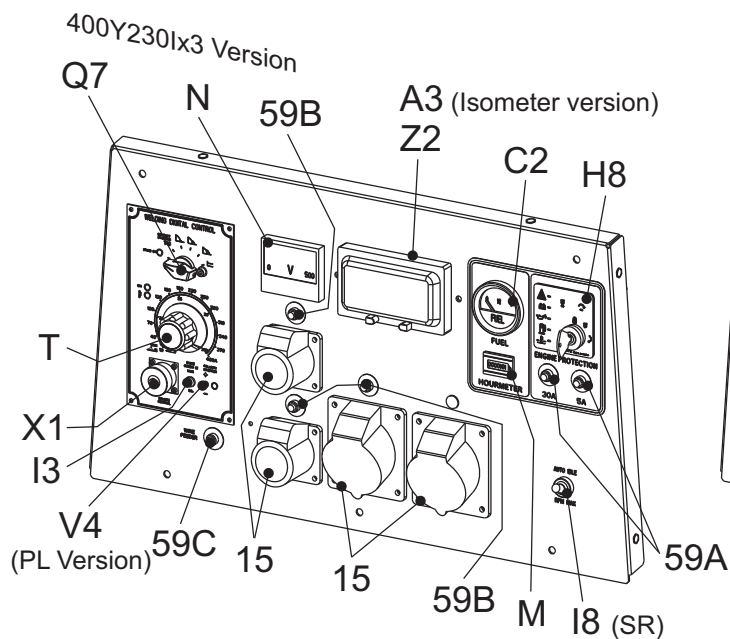


3. Let the engine run with no load for a few minutes.

4. Turn the start key on the EP7 to the OFF position.

**EMERGENCY SHUTDOWN**

To stop the group in a dangerous situation, press the emergency stop button (L5) (or turn the start key (Q1) to the OFF position). To reset the knob, turn it clockwise.



Pos.	Descrizione	Description	Description	Referenzliste
9	Presa di saldatura (+)	Welding socket (+)	Prise de soudage (+)	Schweißbuchse (+)
10	Presa di saldatura (-)	Welding socket (-)	Prise de soudage (-)	Schweißbuchse (-)
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
16	Comando acceleratore	Accelerator lever	Commande accélérateur	Beschleuniger (Gashebel/Gaszug)
59A	Protezione termica motore	Engine thermal switch	Protection thermique moteur	Thermoschutz Motor
59B	Protezione termica corrente aux	Aux current thermal switch	Protection thermique courant aux.	Thermoschutz Hilfsstrom
59C	Protezione termica alim.trainafilo 42V	Supply therm.switch wire feeder 42V	Protection thermique alimentation 42V fil	Thermoschutz 42V Drahtvorschub
A3	Sorvegliatore d'isolamento	Insulation monitoring	Contrôle d'isolation	Isolationsüberwachung
C2	Indicatore livello combustibile	Fuel level light	Indicateur niveau carburant	Anzeige Kraftstoffpegel
D	Interruttore differenziale (30mA)	G.F.I.	Interrupteur différentiel	FI-Schalter (GFI)
H8	Unità controllo motore EP7	Engine control unit EP7	Protection moteur EP7	Motorschutz EP7
I2	Presa di corrente 48V (c.a.)	48V A.C. socket	Prise de soudage 48V (c.a.)	Steckdose 48V AC
I3	Commut. riduzione scala saldatura	Welding scale switch	Commutateur échelle soudage	Bereichsschalter Schweißstrom
I8	Selettore AUTOIDLE	AUTOIDLE switch	Selecteur AUTOIDLE	Wahlschalter Drehzahlverstellung
L5	Pulsante stop emergenza	Emergency button	Bouton d'urgence	Notschalter
M	Contaore	Hour counter	Compte-heures	Stundenzähler
N	Voltmetro	Voltmete	Voltmètre	Voltmeter
Q7	Selettore modalità saldatura	Welding selector mode	Sélecteur madalité soudage	Schweissschalter
T	Regolatore corrente di saldatura	Welding current regulator	Régulateur courant soudage	Schweißstromregler
V4	Comando invertitore polarità	Polarity inverter control	Commande inverseur polarité	Polwendeschalter
X1	Presa per comando a distanza	Remote control socket	Prise pour télécommande	Steckdose Fernbedienung
Z2	Interruttore magnetotermico	Thermal-magnetic circuit breaker	Interrupteur magnétothermique	Thermomagnetschalter



ATTENTION

Access to non qualified personnel is prohibited in proximity of these areas:

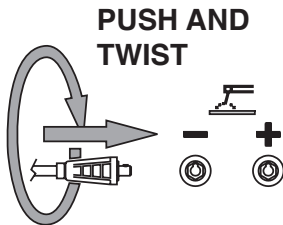
- the control panel (front-end) - the engine exhaust fumes - the welding process.



This symbol (regulation EN 60974-1 on safety requirements for arc welding apparatus) indicates that the engine driven welder is suitable for use in environments with an increased risk of electrical shock.

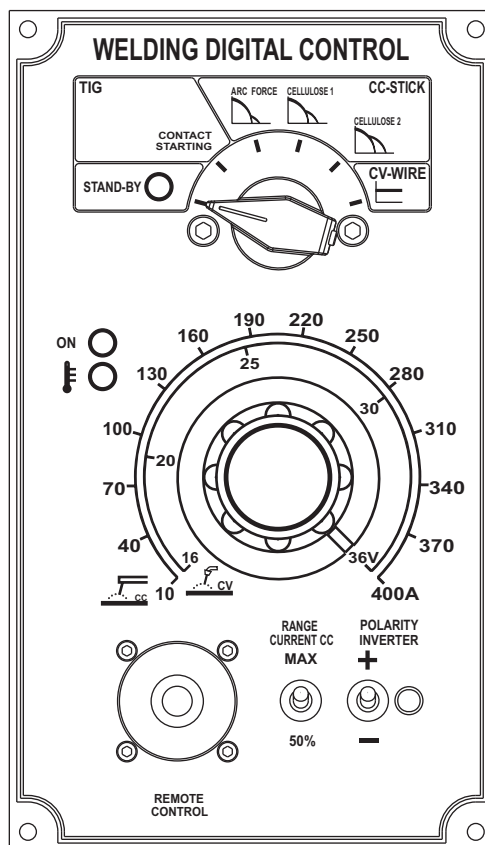
WELDING CABLE CONNECTION

Fully insert the welding cable plugs into the corresponding sockets turning them clockwise to lock them in position.



- Make sure that the ground clamp, whose cable must be connected to the + or - terminal, depending on the type of electrode, makes a good connection and is near to the welding position.

Pay attention to the two polarities of the welding circuit, which must not come in electric contact between themselves.



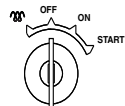
GETTING STARTED

1) After having prepared the machine (charged the battery, put in oil and fuel) the machine is ready for operation.

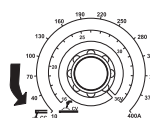
Before starting the engine please note the following:

- The welder should only be operated by qualified personnel with experience in working with engine driven welders.
- Check the oil level daily. Fuel should be put in before starting the engine.
- Before using the welder or the auxiliary power let the engine warm up and before stopping the engine let it run without load to cool down.

Refer to the following instructions regarding the function of the various controls on the front panel.

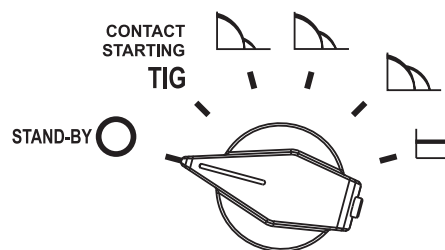


2) Start the engine of the welder



3) Turn the welding current/voltage adjusting knob to the minimum setting.

SETTING THE WELDING PROCESS



There is a manual switch for selecting the various welding processes on the welding control panel.

There are 5 processes to choose from:

- 1 for TIG welding
- 3 for STICK welding (electrode)
- 1 for MIG/MAG welding (continuous wire).

The switch can also be set to “stand-by” (first position). In this position there is no current at the welding connections; led “ON” off.

The process can be selected either before or after starting the motor powered welder.

After selecting the mode, the “ON” LED lights up.

If the wirefeeder connector is connected on remote control connector the “ON” LED lights only when the button torch is pressed.

TIG MODE

Contact starting TIG

This position is specifically for TIG welding. To create the arc simply place the tip of the TIG electrode on the piece that requires welding then gently move the tip away. The arc starts automatically and at the same time the welding current rises to the preset value, first using the welding current adjustment knob which is on the lower part of the control panel. The welding current can be adjusted continuously from a minimum of 10 A to a maximum which depends on the power of the machine 400 A, 500 A, 600 A.



WARNING

For EP1 version it is compulsory to accelerate the engine manually.

STICK MODE (Electrode)

Features C.C. (Constant Current)

There are three stick modes which feature increasing "arc forces" so that the arc has different levels of penetration according to the electrode and/or welding position.

MIG/MAG MODE (continuous wire)

Features C.V. (Constant Voltage)

All wire type welding processes can be carried out, naked or coated.

The voltage can be adjusted using the same knob which adjusts the current in STICK mode. Adjustment is continuous and goes from a minimum of 15 V to a maximum of 36V, 40 V.

Optional remote control

The welding current can also be set from a distance using the optional remote control. Once the remote control is connected to the connector (X1), the current is controlled by the remote control. To return to front panel control remove the connector.

Optional VRD program (Voltage Reduction Device VRD)

When you choose the program stick or stick arc force the Open Circuit Voltage (OCV) go up, red light switch ON and green light switch OFF, but only for about 3", then the OCV go down, green light switch ON and red light switch OFF, about 11V and stop there, until the welder start welding. When you make a short circuit with the stick the OCV immediately go up, so you can start to welding.

Inversion of polarity (Optional, available on request)

In order to invert polarity, press the switch on the remote control unit.

By selecting "inversion" the "ON" LED switches off and the voltage at the welding socket becomes zero. The power contactor is switched inside the electrical box and the voltage reappears at the welding sockets. The "ON" LED switches back on at the same time.


The "Invert polarity" LED on the front panel near the welding current adjuster switches on.

You cannot invert polarity in "MIG/MAG" mode.



PROTECTIONS

The Welding Digital Control features 3 protections for the control and chopper.

1) "ON" LED blinking

 **ON** When the engine of the welder is started the control unit automatically goes to the stand by mode for few instants (stand-by LED on) and performs a self-diagnosis of the current sensor connector and power source voltage + 15V; than the last process is loaded (on led turned ON). In case of malfunction the "ON" LED blinks.



2) Red LED blinking

  The chopper has a thermal protection, which intervenes in case the operating temperature exceeds 85°C.

If the protection intervenes, the red LED begins to flash and the welding current/voltage goes to zero. In this case do not switch off the welder, since the alternator fan will help cool down the chopper more quickly.

After a few minutes, the LED will automatically switch itself off and the welding voltage/current will once again be available at the plugs.

3) Red LED continuously lit

  If an anomalous current is detected in the chopper, the control blocks the conversion immediately, the output welding current/voltage goes to zero and the red LED lights up. To reset everything, it is necessary to switch off the machine.

If the protections 1) and 3) should intervene, it is best to immediately contact the nearest authorised Service Centre.

DIGITAL INSTRUMENTS

(Optional, available on request)

Two digital instruments showed the operating value of welding current and welding voltage.

WIRE FEEDER CONNECTED WITH REMOTE CONTROL CONNECTOR

Wire feeder connection

Connect the wire feeder to the welder with the welder turned off:

- Welding cable between the machine's (9) welding plug (+) and the wire feeder.
- Welding cable between the machine's (10) welding plug (-) and the piece to be welded.
- Control/power cable between the machine's connector (X1) and the corresponding connector on the wire feeder.

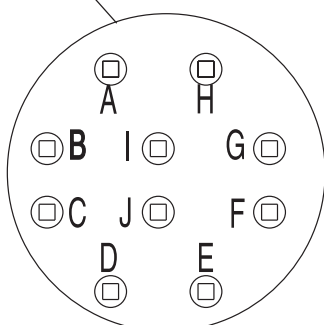
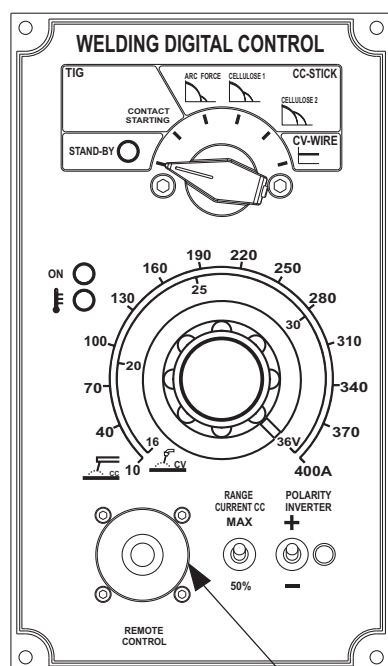
Start the machine welder

The "ON" LED will be off and will turn on only when there is voltage at the welding plugs (and therefore at the wire).

The voltage is only present when the welding torch button is pressed.

The setting of the welding voltage is done using the knob on the wire feeder.

The adjusting knob on the welder is automatically inhibited.



WARNING

You can use the wire feeder only by respecting the pin configuration as shown on the below mentioned table.

"WIRE FEEDER connected without remote control connector"

Welding voltage is always present on welding sockets and also VRD is active.

- Welding cable between the machine's (9) welding plug (+) and the wire feeder.
- Welding cable between the machine's (10) welding plug (-) and the piece to be welded.

The setting of the welding voltage is done by using the knob on the front panel.

NAME OF CONTACT	DESCRIPTION
A (electric ground)	To potentiometer RC1 "terminal a"
B	To potentiometer RC1 "central b"
C (5 V d.c.)	To potentiometer RC1 "terminal c"
D	short circuit with contact "C"
E	To switch "Polarity Inverter"
F (5 V d.c.)	(Close for negative polarity)
G	Return from switch on CV welding gun, 1-phase (44 - 48V a.c.)
H (welding ground)	Welding ground for d.c. voltmeter on wire feeder
I (44 - 48V a.c.)	Voltage supply for wire feeder
J (44 - 48V a.c.)	



WARNING

It is strictly forbidden to connect the group to the public mains and/or to any other source of electric power.

GENERATION IN AC (ALTERNATING CURRENT)

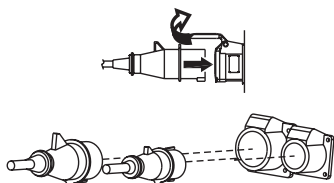
Make certain of the efficiency of the ground connection (12) - See page M20 -.

Position the G.F.I. switch to ON.

☞ Voltage is now immediately available to the AC sockets.

Verify that the voltmeter displays the nominal voltage value + 10%.


Connect the electric devices to be powered to the AC sockets, using suitable plugs and cables in good condition.



☞ Verify that the electrical characteristics (voltage/frequency/power) of the device being powered are compatible with those of the generator.

Low frequency and/or voltage can irreparably damage some electrical devices.

Verify that the ground lead of the electrical appliance/tool to be powered is correctly connected to the terminal of the plug.

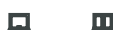
☞ For double insulation devices with the symbol , the plug's ground terminal does not need to be grounded.

THERMAL PROTECTION

The monophase outputs are protected against overloads by the thermal protection (59B).

When the rated current is exceeded, the protection intervenes to cut off the voltage to the AC socket.

. Note: the intervention of the thermal protection is not instantaneous, but reacts according to an overcurrent/time characteristic, whereby the greater the overcurrent the quicker the intervention. In case of intervention by the protection device, verify that the total power for the loads connected does not exceed the declared rating and decrease if necessary. Disconnect the loads and wait a few minutes to allow the thermal protection to cool down.



CIRCUIT BREAKER



Before resetting by pressing the central button and then connect the load again.

If the protection should intervene again, replace it with another one with matching intervention current specifications and/or contact the Service Department.

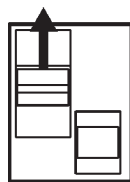
. Note: do not forcibly hold the central button of the thermal protection device to prevent its intervention, as this could irreparably **damage** the unit's alternator.

☞ Note: the three phase output does not require any protection against overcurrents, since it uses a self-protecting asynchronous type alternator.

GROUND FAULT INTERRUPTOR SWITCH

The high-sensitivity ground fault interruptor switch [G.F.I.] (30mA) (D), guarantees protection against indirect contacts due to faulty ground currents .

When the G.F.I. switch picks up a faulty ground current that is higher than 30mA, it intervenes by immediately cutting off voltage to the AC sockets.



In case of intervention by this protection device, reset the G.F.I. switch by moving the lever to the ON position. In case of another intervention, verify that there are no faults in the tools connected, or replace the G.F.I. switch with another one of matching specifications and/or contact the Service Department.

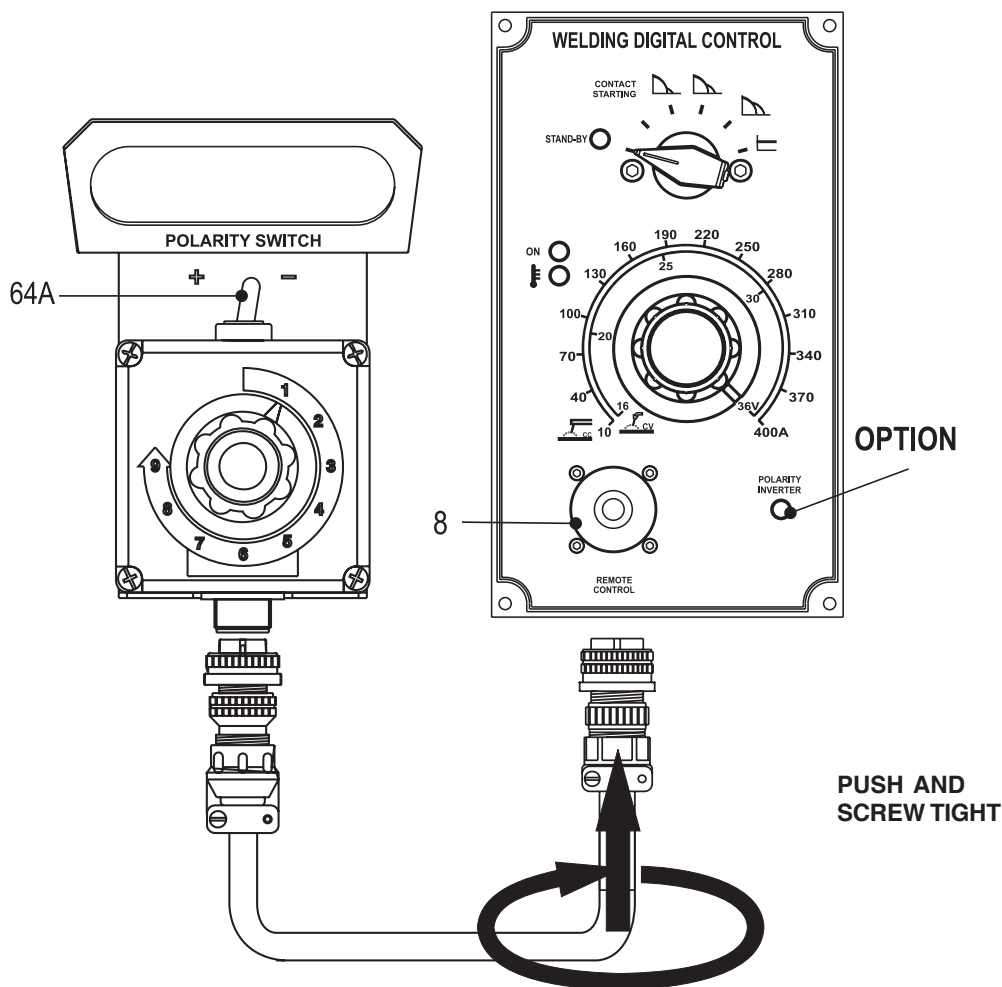
☞ Notes: Verify the operation of the G.F.I. switch at least once a month by pressing the TEST button. The generator must be running and the G.F.I. lever in the ON position.

SIMULTANEOUS USE

The welder's alternator permits the simultaneous use of auxiliary power and welding current. The auxiliary power available to the AC plugs (15) diminishes as the welding current drawn increases. The table on page M52 TECHNICAL SPECIFICATIONS shows the amount of auxiliary power available as the welding current varies.

COMBINED USE

The output available from the various auxiliary power sockets is limited, not only by the declared output of the unit but also by the capacity of each individual socket.



Is it possible to connect the RC1, to all **DSP** engine driven welders.

The remote control RC1, which regulates the welding current in the CC mode and the welding voltage in the CV mode, is connected to the front panel by means of a multipole connector.

When the remote control is connected to the remote control connector (8), it is functional and automatically excludes the front panel regulation. The remote control can also be connected to the connector on the wire feeder front panel but in this case it is necessary to switch the wire feeder commutator so it can operate.

The polarity inverter (64A), if installed, can be operated from the remote control.

Adjust the welding current control knob to the correct current for the diameter and type of electrode being welded.



ATTENTION

When the RC1 is not used, it is necessary to disconnect the multipole connector

Description

The EP7 includes the basic safeguards to protect an DIESEL engine. The EP7 features 7 LEDs, 3 Static Outputs and a 30A Key Switch. The EP7 monitors an Oil Pressure-switch, Temperature-switch, Fuel Level-switch, Charger Alternator Voltage, and an Emergency-switch.

Specification

DC Supply, Battery Plant	8V up to 36 Vdc
Static Outputs (short circuit proof)	200 mAdc
Key Switch Rating	30 A (30 secs)/80 A (5 secs)
Dimensions-DIN 96 Size	72X72X55 (ex switch /key)
Weight	300 gr
Operating Temperature	-30° C /+70° C
Operating Humidity	96% (non-condensing)

[PREHEAT] yellow LED

This indicator illuminates during the Pre-Glow cycle (10 secs to 60 secs).

[EMERGENCY] red LED

This LED illuminates continuously when a shut down has been caused by the Emergency switch.

[ALTERNATOR FAILURE] red LED

This LED illuminates before engine starting or if a Belt Break shut down occurs (than 20 secs).

[OIL PRESSURE] red LED

This LED illuminates before engine starting or if an Oil Pressure shut down occurs.

[FUEL LEVEL] red LED

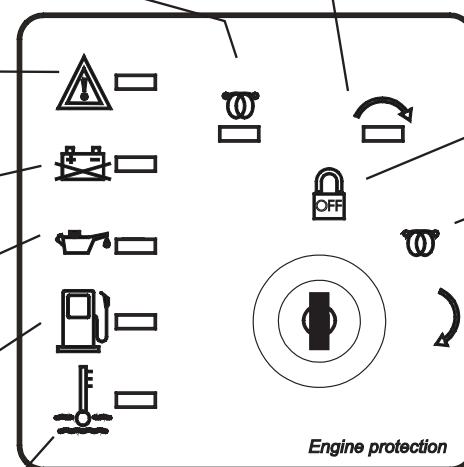
This LED blinks when a low fuel condition occurs. This LED illuminates continuously to indicate a shut down, if the switch has been closed for more than 5 minutes.

[TEMPERATURE] red LED

This LED illuminates when an High Temperature shut down occurs.

[ENGINE RUNNING] green LED

This LED blinks for 15 seconds, indicating that the EP7 is ready to start the engine (you have to turn the key to start). If the engine does not run within 15 seconds, the "Starting Failure" alarm will take place. This LED illuminates continuously if the engine runs.



[KEY-SWITCH]
OFF position

[KEY-SWITCH]
Pre-Heat position

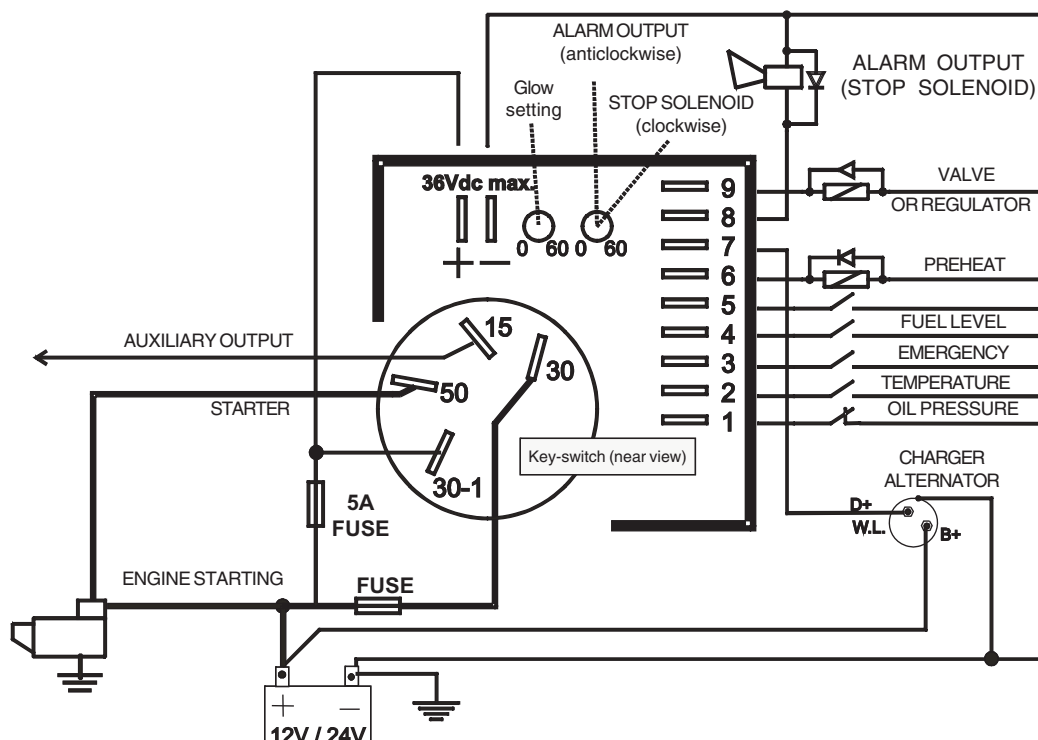
[KEY-SWITCH]
START position



[STARTING FAILURE ALARM] indication

These 2 LEDs blink alternately (slowly) to indicate a starting failure alarm.

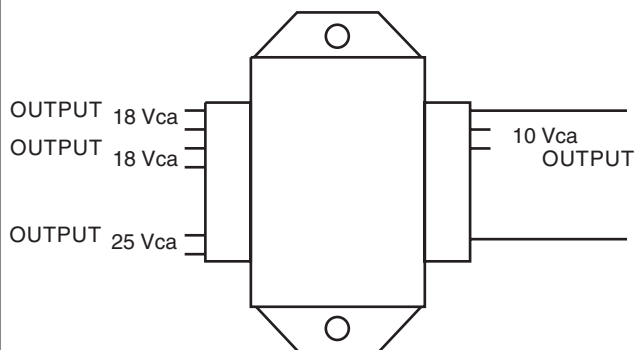
[OPTIONAL ALARM] indication

These 2 LEDs blink alternately (quickly) to indicate the intervention of the alarm.



PROBLEM	POSSIBLE CAUSE	WHAT TO DO
WELDING		
P1 All functions performed by the WDC are regular, but there is no tension on the welding sockets	1) Position of regulation potentiometer incorrect knob	1) Adjust the position of the WDC regulation knob on the potentiometer spindle so that the potentiometer is not completely at the end of its travel when the knob reaches its minimum position. Idem for the RC1 remote control knob.
P2 Malfunction in the selection of welding processes or in their confirmation on other functions performed by the WDC	1) WDC defective	1) Replace the WDC.
P3 Blinking "ON" LED	1) Current sensor connector P3 2) Aux power voltage value ($\pm 15V$) too high or too low	1) Connector P3 not inserted or defective - see drawing 5 2) Check the aux transformer, see drawing 1
P4 Blinking red LED 	1) The chopper thermic protection is intervening 2) Temperature sensor situated on chopper (NTC resistor) short circuited or open. 3) WDC defective	1) The output is inhibited automatically; let the motor continue to run to cool down the chopper, and after a few minutes the LED will automatically switch off and there will be current/voltage once again at the welding sockets. 2) Check chopper connector, drawing 2, from pin 1-2. The resistor must be bigger than 1800Ω and less than $25 K\Omega$, otherwise the led blinking. Replace the chopper. In the meantime you can work cutting the wire which arrives to pin 1 - pin 2 and put on it one resistor $10 K\Omega$. In this case the thermic protection don't work but you can use the machine. 3) Replace the WDC.
P5 Red LED always on 	1) WDC defective 2) Chopper defective 3) Current sensor defective	1) Switch off the machine and start it up again; if the LED remains off try to weld, verifying that the welding is regular; if the LED lights up again. Replace the WDC. 2) Check the chopper as shown on drawing 2. 3) Replace the sensor.
P6 PHG1 remote does not operate.	1) Remote control (or cable) defective. 2) WDC defective.	1) Check the remote control as drawing 4 2) Replace the WDC
P7 The welding current is always at max or always at minimum	1) Potentiometer on WDC defective 2) WDC defective 3) Welding current sensor defective	1) Check from pin 1-12 connector P4 (pin 1 - ground see drawing 3) 2) Replace the WDC 3) Replace the current sensor
P8 No voltage at the welding sockets in CV mode	1) Defective wire feeder cable 2) Defective wire feeder 3) Defective WDC	1) Check the connections pin to pin of the wire 2) Check the wire feeder 3) Without wire feeder cable put the pin I in short circuit with G on remote control connector, the led ON must be light - WDC ok otherwise change WDC
P9 No welding or generation output	1) Short circuit of chopper. 2) Short circuit of generation unit. 3) Alternator defective.	1) Disconnect the chopper and re-start the machine; if there is now an output present, replace the chopper 2) Disconnect the auxiliary output circuit and re-start the machine; if there is now an output present, there is a short circuit in the auxiliary output circuit or in one of the components 3) Disconnect all outputs on the alternator (welding and

PROBLEMS	POSSIBLE CAUSE	WHAT TO DO
		generation unless the output going to the condensers) and check the capacity of the condensers. Restart the machine, if there is still no output, replace the alternator.
WELDING WITH V.R.D.		
P10 The welding tension after 3 sec isn't less enough (plus in 12V dc)	1) Net R.C. defective or disconnected from + or - welding socket 2) WDC defective.	1) Check the net R.C. Check the connections. 2) Replace the WDC.
GENERATING		
P1 Voltmeter shows no voltage or low voltage but actual voltage at the sockets is OK.	1) Voltmeter malfunction	1) Replace the voltmeter.
P2 No three-phase voltage present at the socket(s).	1) Differential switch not inserted 2) Differential switch malfunction	1) Turn on the switch. 2) Replace the switch.
P3 No single phase voltage one socket but voltmeter reading is normal and there is voltage on the other sockets.	1) Intervention of thermal switch due to excessive current. 2) Thermal switch malfunction.	1) Push in the thermal switch. 2) Replace the thermal switch.
P4 No voltage present. (See problem P9)	1) Short circuit present on the generator outputs.	1) Disconnect all outputs on the generator except for those on the condensers and re-start machine; check for voltage on condensers.
MOTOR		
P1 The engine does not start or stops immediately after startup.	1) Low battery voltage, battery dead or defective. 2) Presence of air in the fuel supply circuit. 3) Circuit breaker engine protection 4) Engine solenoid	1) Check the warning light "state of the battery": - Green colour: battery OK - Black colour: battery to be recharged - White colour: battery to be replaced - DO NOT OPEN THE BATTERY. 2) Carry out de-aeration on the fuel system. See engine operating manual. 3) Insert the circuit breaker. In case the problem persists, check the electrical circuit and eliminate the problem. Call an authorised service centre. 4) See engine manual
P2 Engine stops due to intervention of EP5/EP7/ES.	1) Engine temperature too high or insufficient oil pressure. 2) High temperature sensor or oil pressure defective. 3) EP5/EP7/ES protection defective.	1) Check oil level. 2) Replace the malfunctioning sensor. 3) Replace the protection.
P3 The battery is not charged.	1) Battery charger alternator defective. 2) Battery charger warning light defective.	1) Replace 2) Replace
P4 For other problems, refer to the attached engine manual		



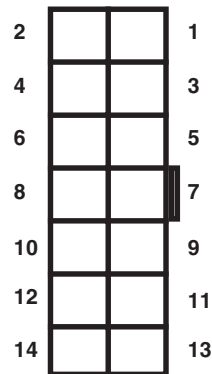
Check the transformer in this way:

input: 220 Vac
output: 18 Vac, 25 Vac, 10 Vac

DRAWING 1

CHECK THE CHOPPER FROM THE CONNECTOR

CHOPPER CONNECTOR
CHECK MOSFET ON CHOPPER

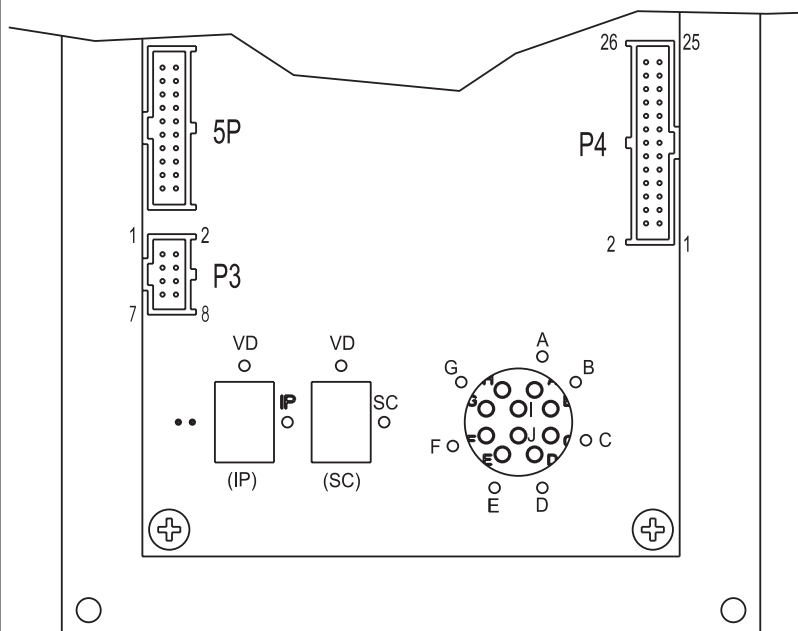


FOR THE CHECK HOLD THE CONNECTOR AS SHOWED ABOVE WITH A TESTER CHECK THERE ARE

Pin 1-2	1,8 ÷ 25 KΩ
Pin 3-4	(open)
Pin 5-6	(open)
Pin 7-8	(open)
Pin 9-10	3,3 KΩ
Pin 11-12	3,3 KΩ
Pin 13-14	3,3 KΩ

DRAWING 2

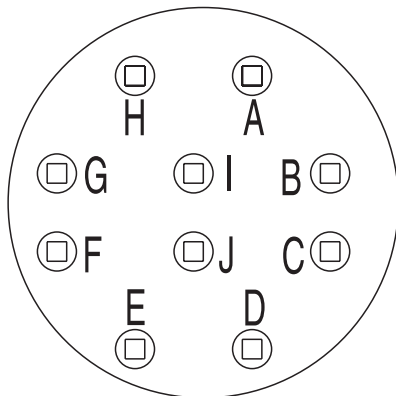
Connector P4 on WDC



- How to check the potentiometer put on WDC
- 1) Start the welding without load (at max RPM)
 - 2) Take the voltage from pin 1 - pin 12 on connector P4
 - 3)

Position Knob	Voltage from pin 1 - pin 12 on P4
Minimum	0 Vdc
Max	4,5 - 4,7 Vdc

DRAWING 3

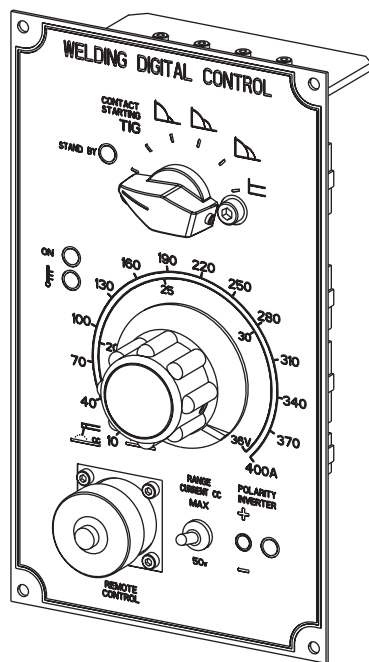
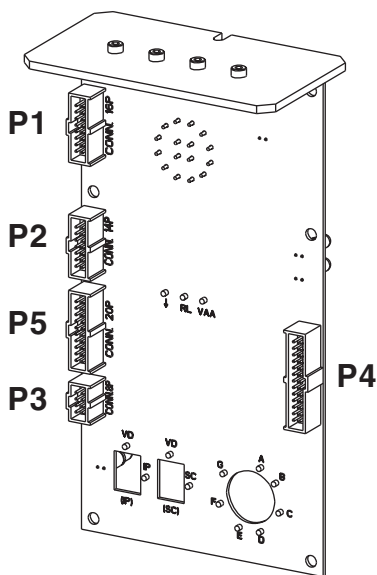


Put the knob on RC1 at minimum/max, put one ohmmeter from pin A - B and measure the resistance.

Knob	Resistance
Minimum	50 ÷ 100 Ω
Max	4,5 - 4,7 KΩ

DRAWING 4

- P1 Supply connector
- P2 Chopper connector
- P3 Current sensor connector
- P4 - P5 Free



DRAWING 5



WARNING



**MOVING
PARTS
can injure**

- 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.
 - Use suitable tools and clothes.
 - Do not modify the components if not authorized.
- See pag. M1.1 -



**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 MOSA.

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.



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.



ENGINE and ALTERNATOR

PLEASE REFER TO THE SPECIFIC MANUALS PROVIDED.

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



NOTE

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.

In case the machine should not be used for more than 30 days, make sure that the room in which it is stored presents a suitable shelter from heat sources, weather changes or anything which can cause rust, corrosion or damages to the machine.

 Have **qualified** personnel prepare the machine for storage.

GASOLINE ENGINE

Start the engine: It will run until it stops due to the lack of fuel.

Drain the oil from the engine sump and fill it with new oil (see page M25).

Pour about 10 cc of oil into the spark plug hole and screw the spark plug, after having rotated the crankshaft several times.

Rotate the crankshaft slowly until you feel a certain compression, then leave it.

In case the battery, for the electric start, is assembled, disconnect it.

Clean the covers and all the other parts of the machine carefully.

Protect the machine with a plastic hood and store it in a dry place.

DIESEL ENGINE

For short periods of time it is advisable, about every 10 days, to make the machine work with load for 15-30 minutes, for a correct distribution of the lubricant, to recharge the battery and to prevent any possible blocking of the injection system.

For long periods of inactivity, turn to the after sales service of the engine manufacturer.

Clean the covers and all the other parts of the machine carefully.

Protect the machine with a plastic hood and store it in a dry place.

In case of necessity for first aid and of fire prevention, see page. M2.5.



IMPORTANT



In the storage 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.

✎ Have **qualified** personnel disassemble the machine and dispose of the parts, including the oil, fuel, etc., in a correct manner when it is to be taken out of service.

As cust off we intend all operations to be made, at utilizer's care, at the end of the use of the machine. This comprises the dismantling of the machine, the subdivision of the several components for a further reutilization or for getting rid of them, the eventual packing and transportation of the eliminated parts up to their delivery to the store, or to the bureau encharged to the cust off or to the storage office, etc.

The several operations concerning the cust off, involve the manipulation of fluids potentially dangerous such as: lubricating oil and battery electrolyte.

The dismantling of metallic parts liable to cause injuries or wounds, must be made wearing heavy gloves and using suitable tools.

The getting rid of the various components of the machine must be made accordingly to rules in force of law a/o local rules.

Particular attention must be paid when getting rid of:

lubricating oils, battery electrolyte, and inflammable liquids such as fuel, cooling liquid.

The machine user is responsible for the observance of the norms concerning the environment conditions with regard to the elimination of the machine being cust off and of all its components.

In case the machine should be cust off without any previous disassembly it is however compulsory to remove:

- tank fuel
- engine lubricating oil
- cooling liquid from the engine
- battery

NOTE: MOSA is involved with custing off the machine **only** for the second hand ones, when not reparable.

This, of course, after authorization.

In case of necessity for first aid and fire prevention, see page M2.5.



IMPORTANT



In the cust-off 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.

The information here below are to be intended only as indicative since the above norm is much larger.
For further details please see the specific norms and/or the manufacturers of the product to be used in the welding process.

RUTILE ELECTRODES: E 6013

Easily removable fluid slag, suitable for welding in all position.
Rutile electrodes weld in d.c. with both polarities (electrode holder at + or -) and in a.c..
Suitable for soft steels R-38/45 kg/mm². Also for soft steels of lower quality.

BASIC ELECTRODES: E 7015

Basic electrodes weld only in d.c. with inverse polarity (+ on the electrode holder) ; there are also types for a.c.
Suitable for impure carbon steels. Weld in all position.

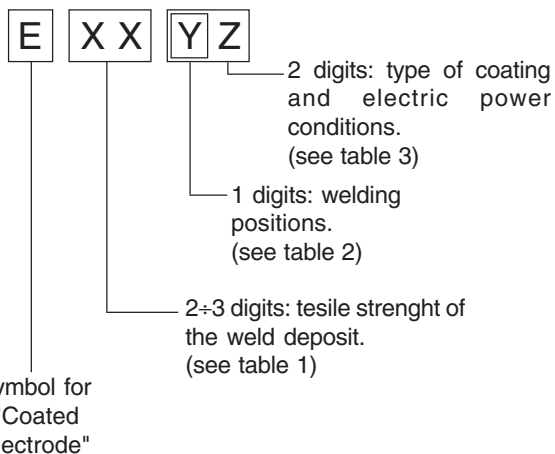
HIGH YIELD BASIC ELECTRODES: E 7018

The iron contained in the coating increases the quality of metal added. Good mechanical properties. Weld in all position.
Electrode holder at + (inverse polarity). Weld deposit of nice aspect, also vertical. Workable; high yield.
Suitable for steels with high contents of sulphur (impurities).

CELLULOSIC ELECTRODES: E 6010

Cellulosic electrodes weld only in d.c. with polarity + electrode holder - ground clamp.
Special for steels run on pipes with R max 55 kg/mm². Weld in all position. volatile slag.

ELECTRODES IDENTIFICATION ACCORDING TO A.W.S. STANDARDS



Number	Strength	
	K.s.l.	Kg/mm ²
60	60.000	42
70	70.000	49
80	80.000	56
90	90.000	63
100	100.000	70
110	110.000	77
120	120.000	84

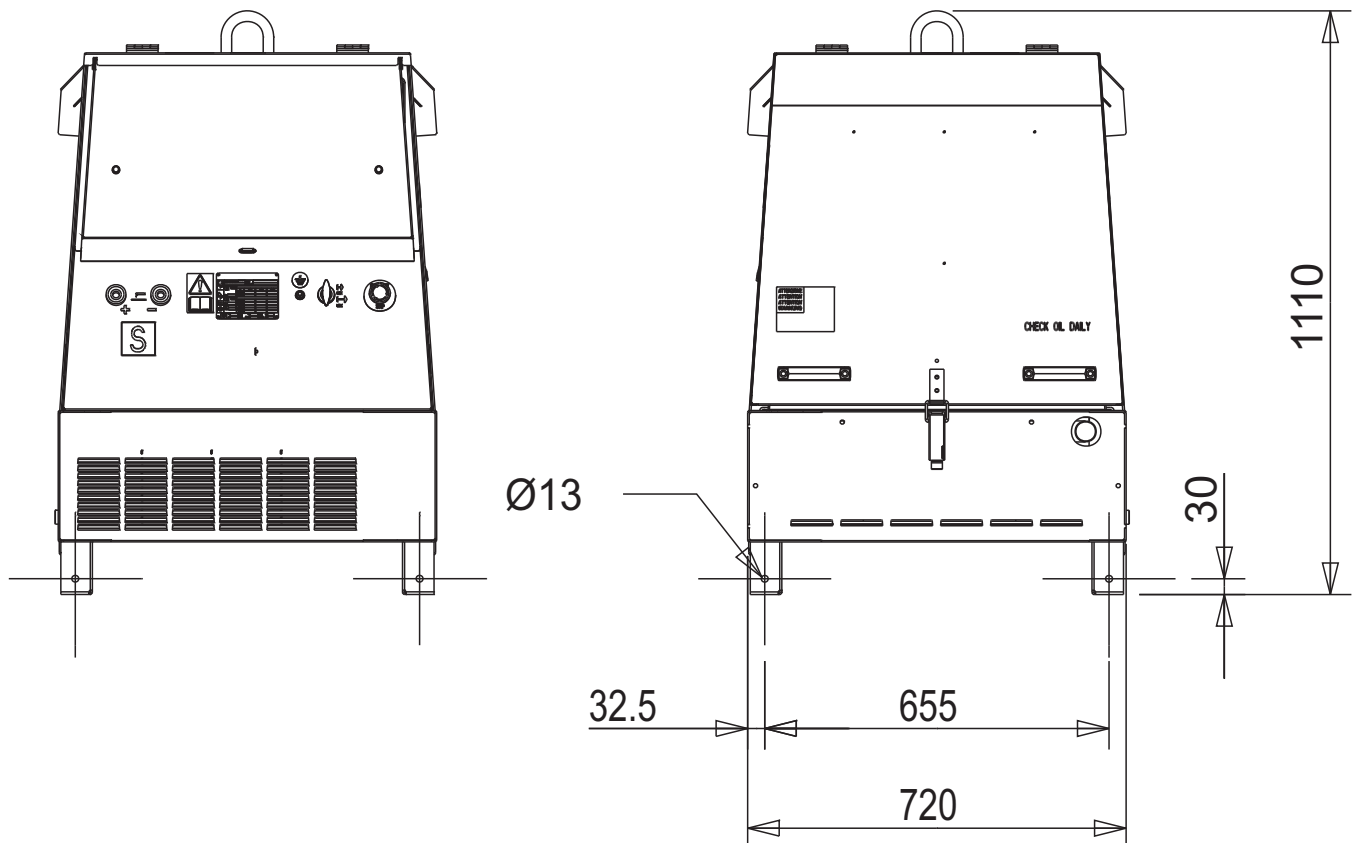
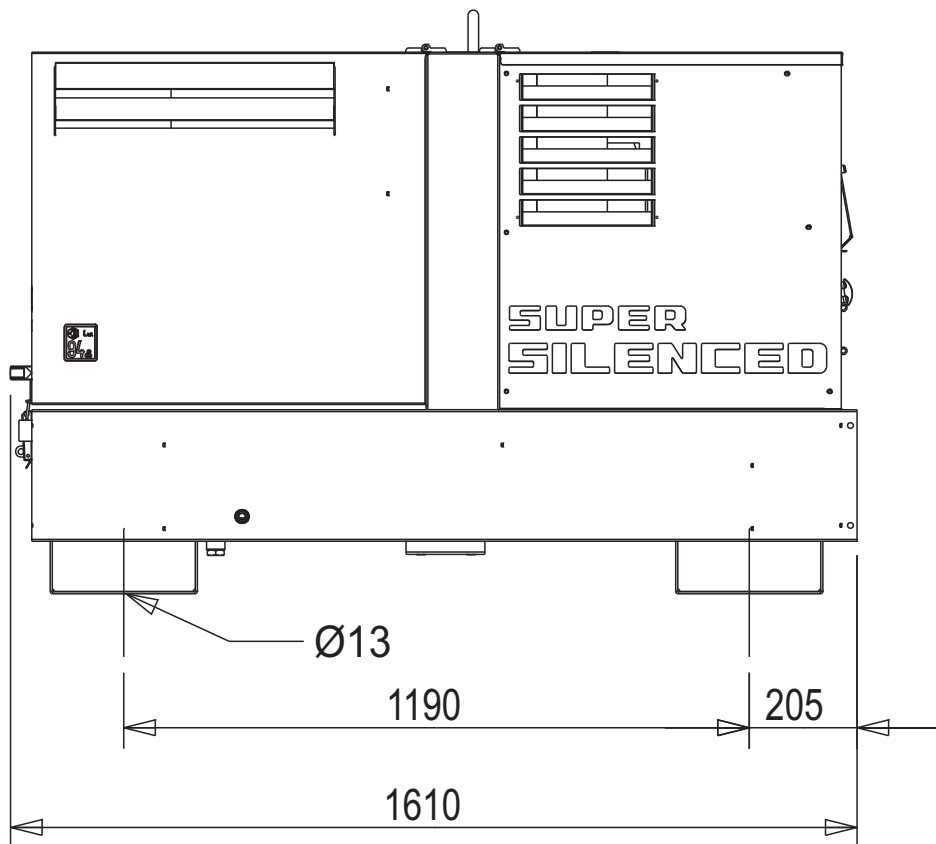
Table 1

1	for all positions
2	for plane and vertical
3	for plane position only

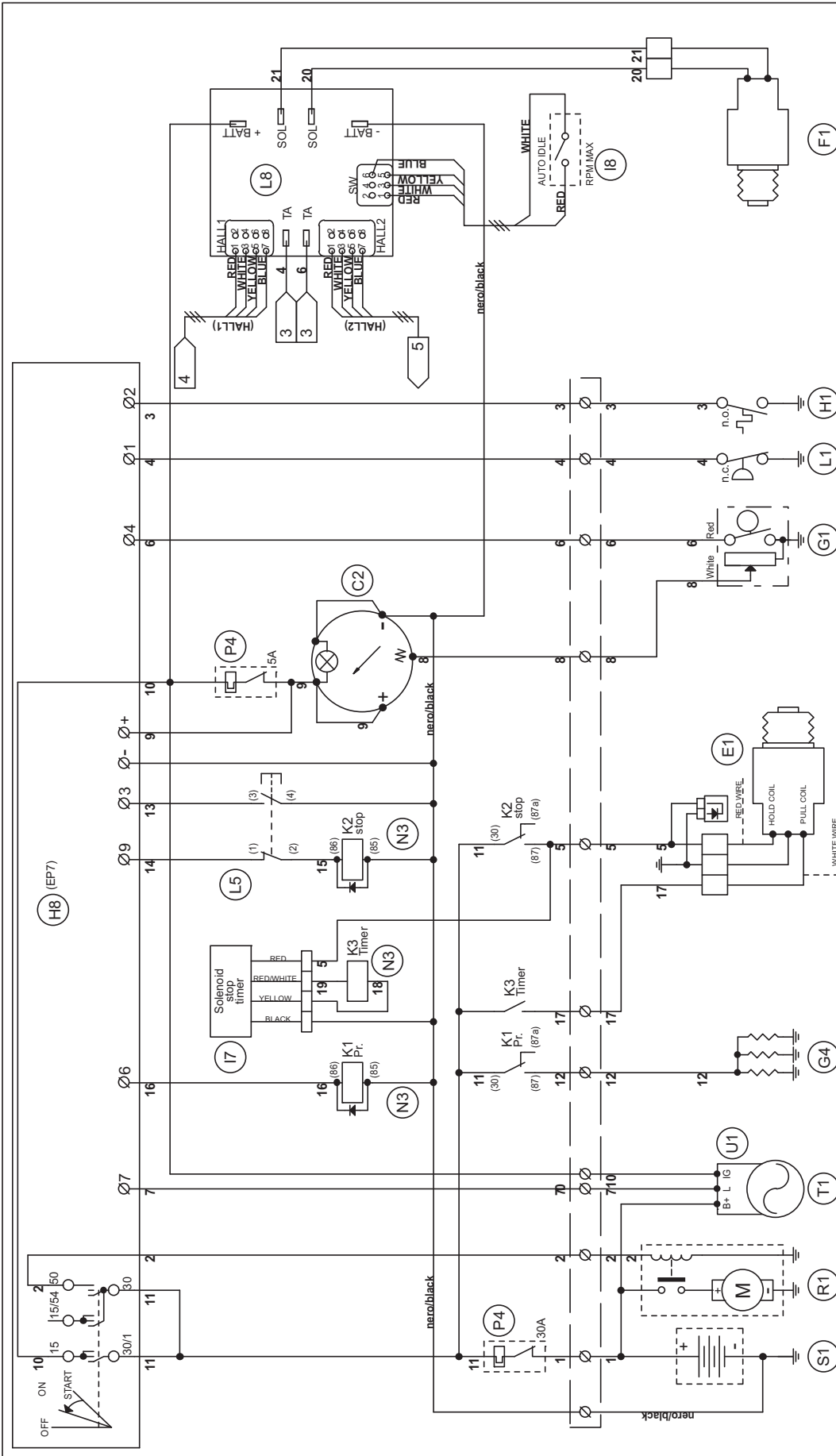
Table 2

N°	Descrizione
10	Cellulose electrodes for d.c.
11	Cellulose electrodes for a.c.
12	Rutile electrode for d.c.
13	Rutile electrode for a.c.
14	High yield rutile electrodes
15	Basic electrodes for d.c.
16	Basic electrodes for a.c.
18	High yield basic electrodes for d.c. (inverse polarity)
20	Acid electrodes for flat or front position welding for d.c. (- pole) and for a.c.
24	High yield rutile electrodes for flat or front plane position welding for d.c. and a.c.
27	High yield acid electrodes for flat or front plane position welding for d.c. (- pole) and a.c..
28	High yield basic electrodes for flat or front plane position welding for d.c. (inverse polarity)
30	Extra high yield acid electrodes, extra high penetration if required, for flat position welding only for d.c. (- pole) and a.c.

Table 3

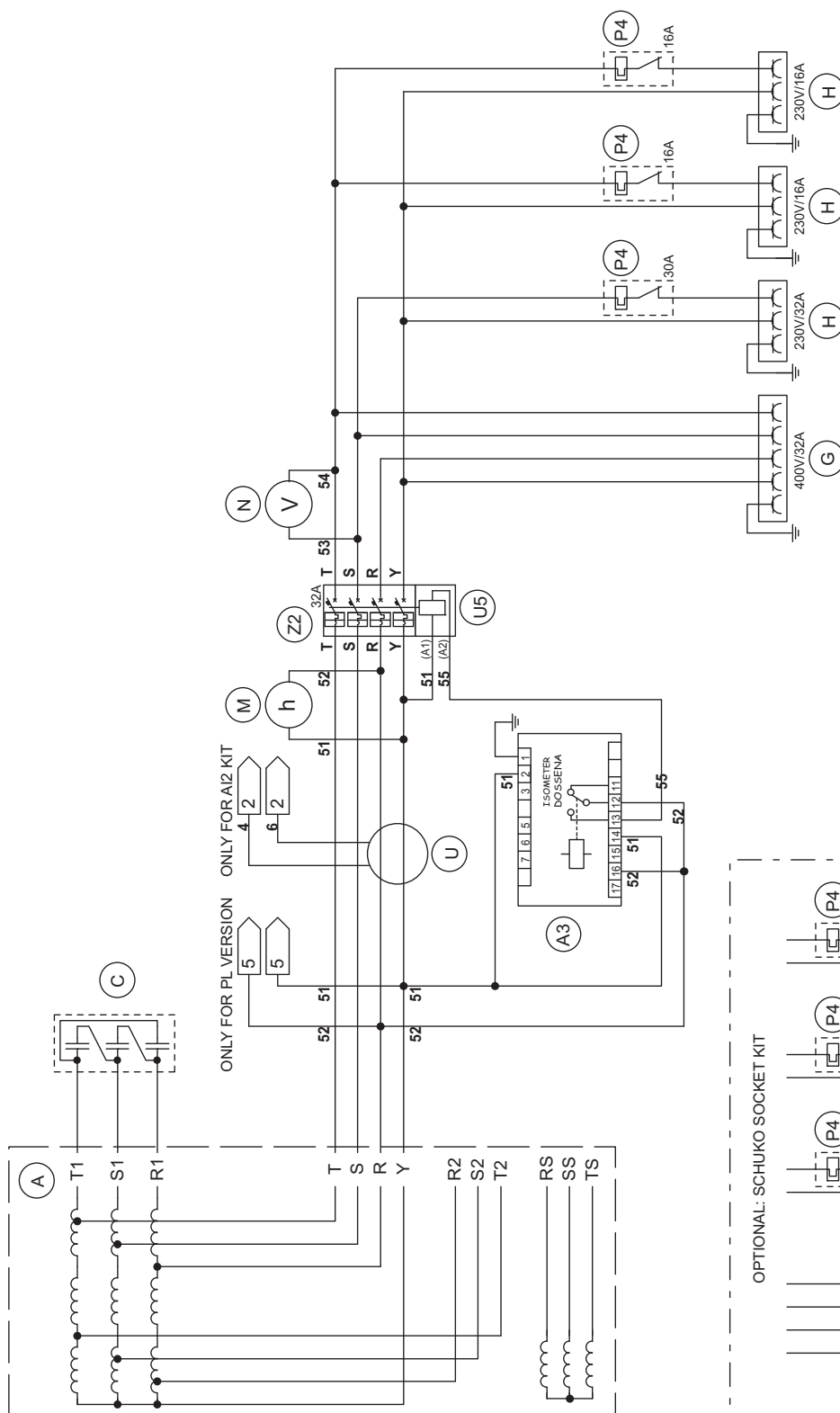


A: Alternator	A3: Insulation monitoring	A6: Commutator/switch
B: Wire connection unit	B3: E.A.S. connector	B6: Key switch, on/off
C: Capacitor	C3: E.A.S. PCB	C6: QEA control unit
D: G.F.I.	D3: Booster socket	D6: Connector, PAC
E: Welding PCB transformer	E3: Open circuit voltage switch	E6: Frequency rpm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



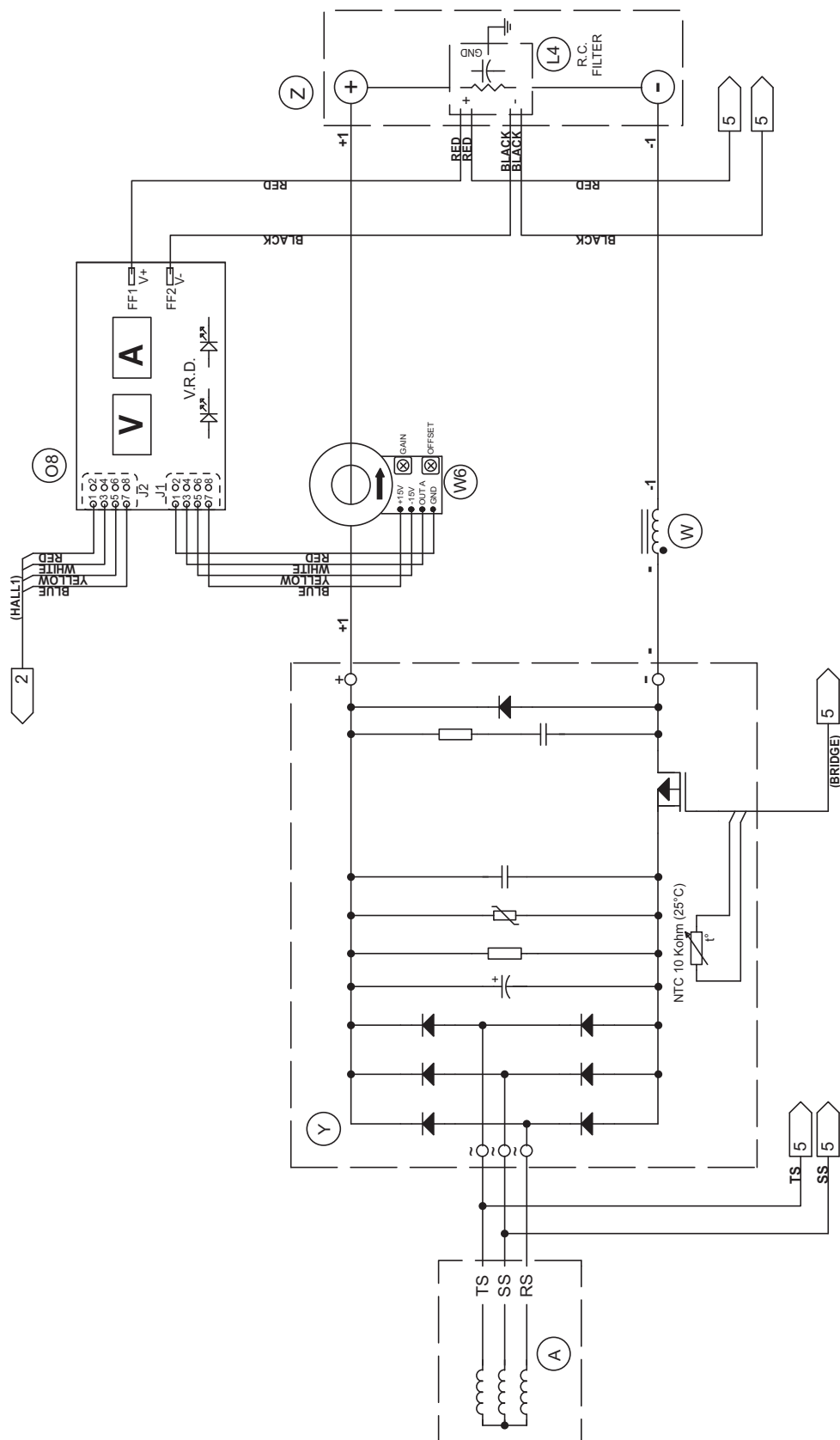
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Esp.	Mod.	Modifica	Modifica	Data	Appr.	Dis.	Appr.
MOSA		Denominazione: Engine Yanmar 3 TNV76-HGE		Project: 89414.prg		Page n° 2 of 5	
20090-CUSAGO (MI)-ITALY		Macchina: DSP 400 YSX		Disegnato: 06.09.2007		Approvato: 06.09.2007	
http://www.mosa.it		Leporace N. 89410.S.010-A		Dis. n°:		Appr. n°:	

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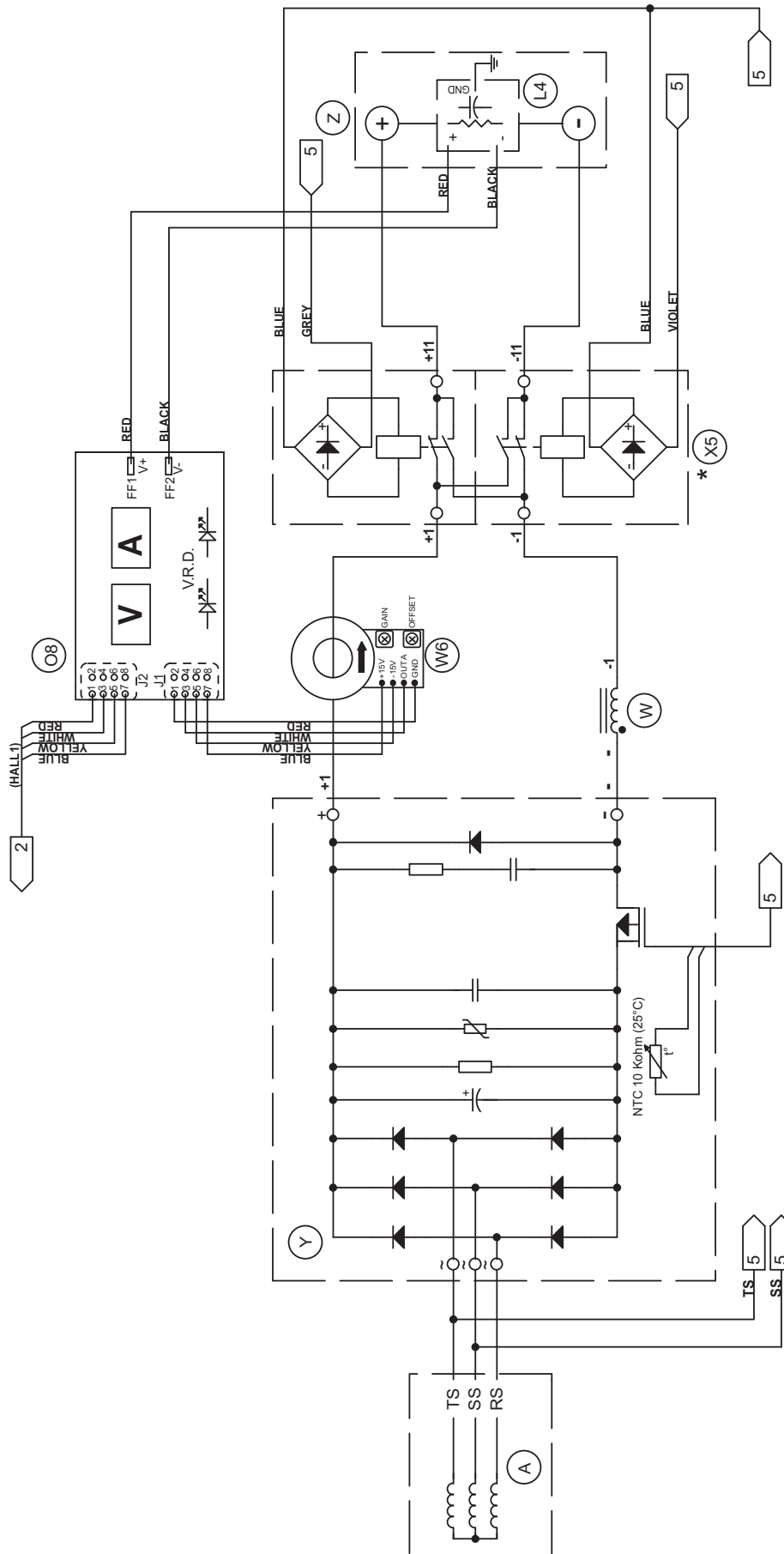
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http://www.moca.it	DOI: 10.1007/s11067-007-9100-0	Copyright © 2007 Springer	0924-6460/07/0010-0000
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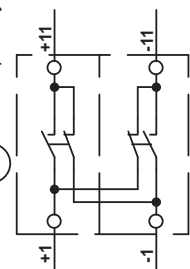
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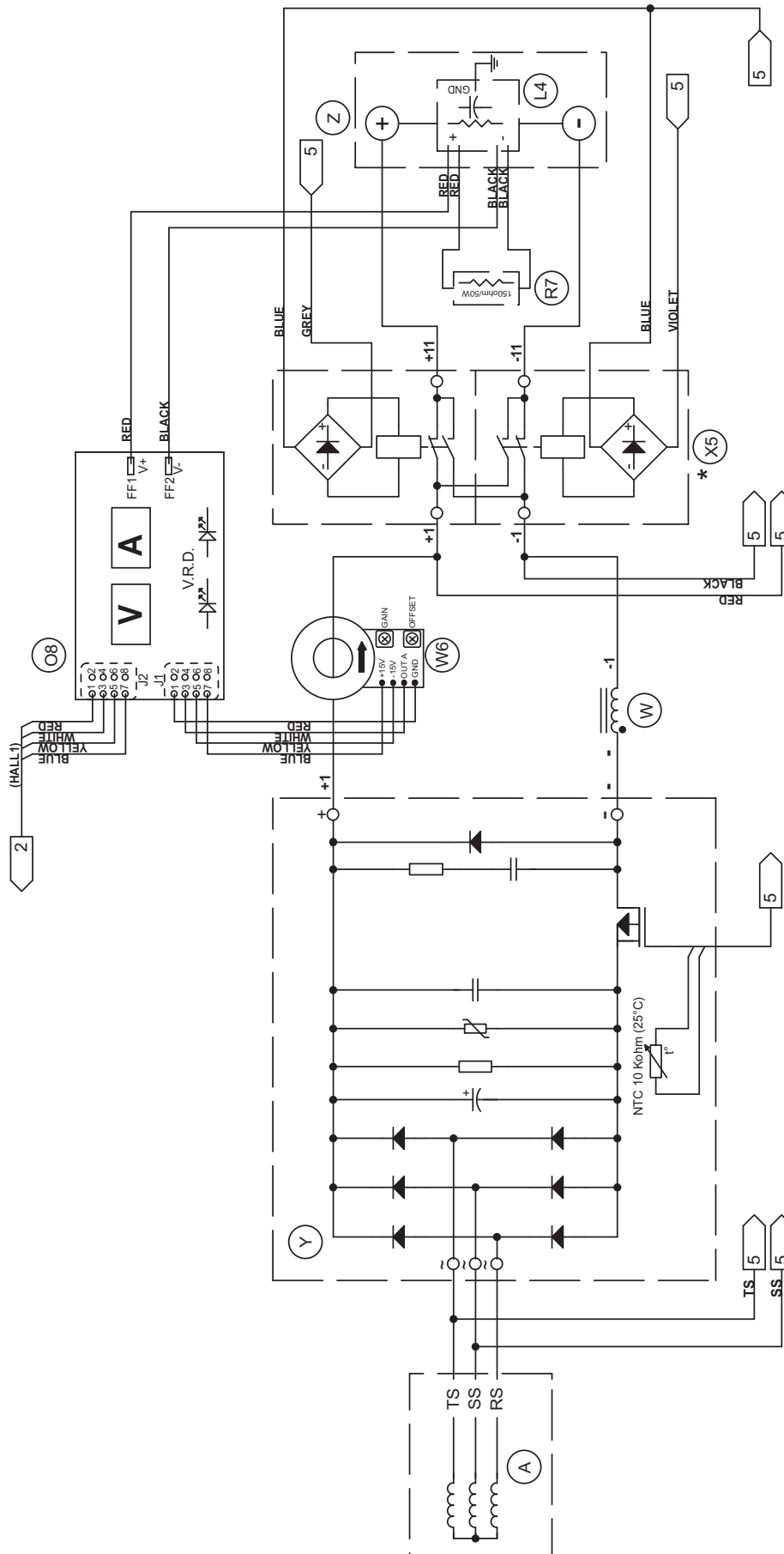


* (X5) reverse polarity

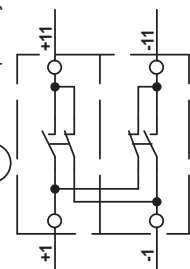





A	Modificato schema con scheda strum. V/A (O8) e aggiornato L4.										
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Exp.	Modification		Date		Dwg. n°		Dwg. n°		Dwg. n°		
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La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione.											

La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione.

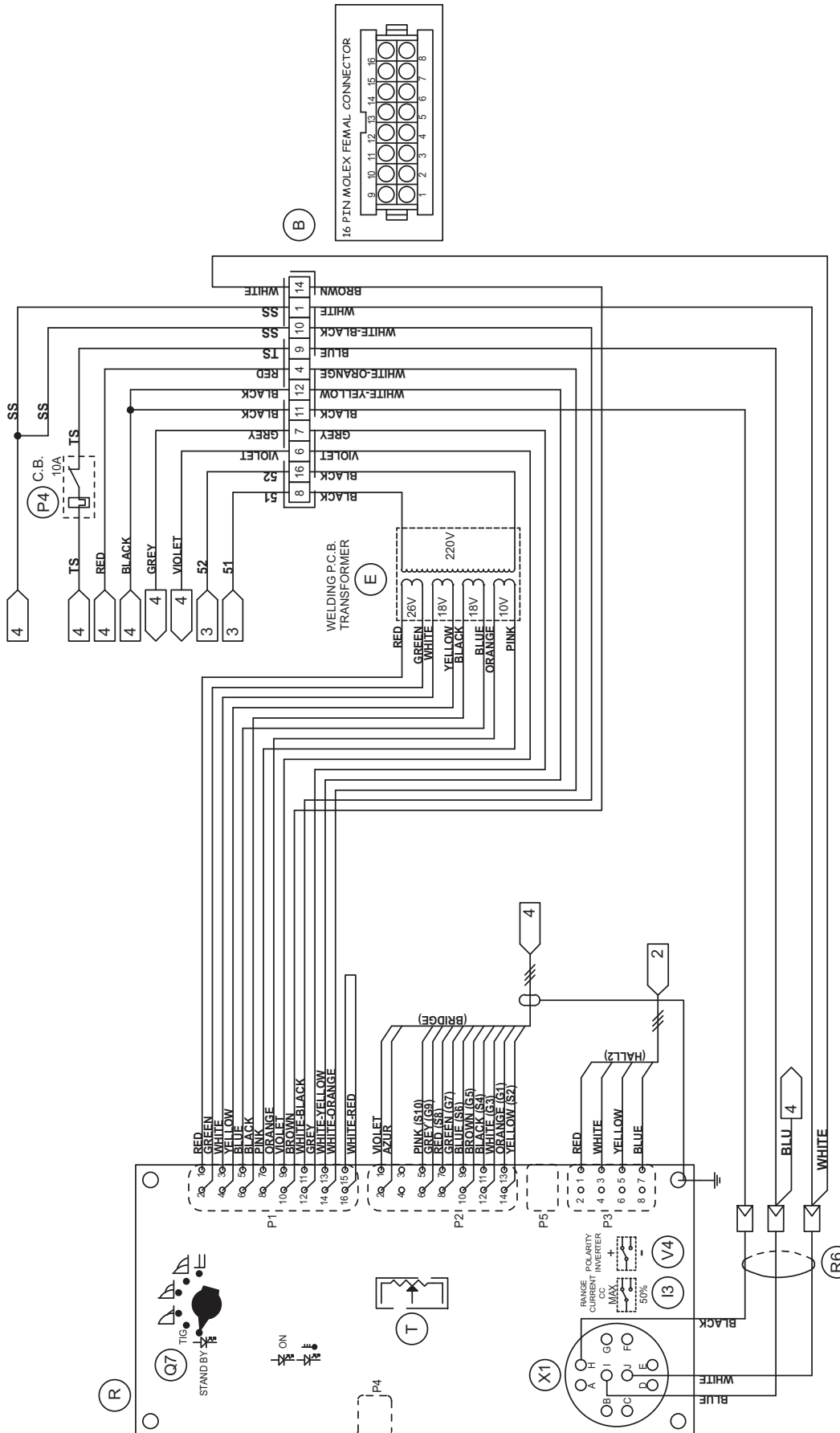


* (X5) reverse polarity



A	Modificato schema con scheda strum. V/A (O8) e aggiornato L4 e R7.										07.05.2008		N.L.																						
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