



USE AND MAINTENANCE MANUAL

TRANSLATION OF THE ORIGINAL INSTRUCTIONS — ENGLISH

CS 230 YSX CC/CV

- Motosaldatrice
- Engine Driven Welder
- Motosoudeuse
- Motosoldadoras
- Schweißaggregat
- Motosoldadora
- По Вышкам
- Lassers

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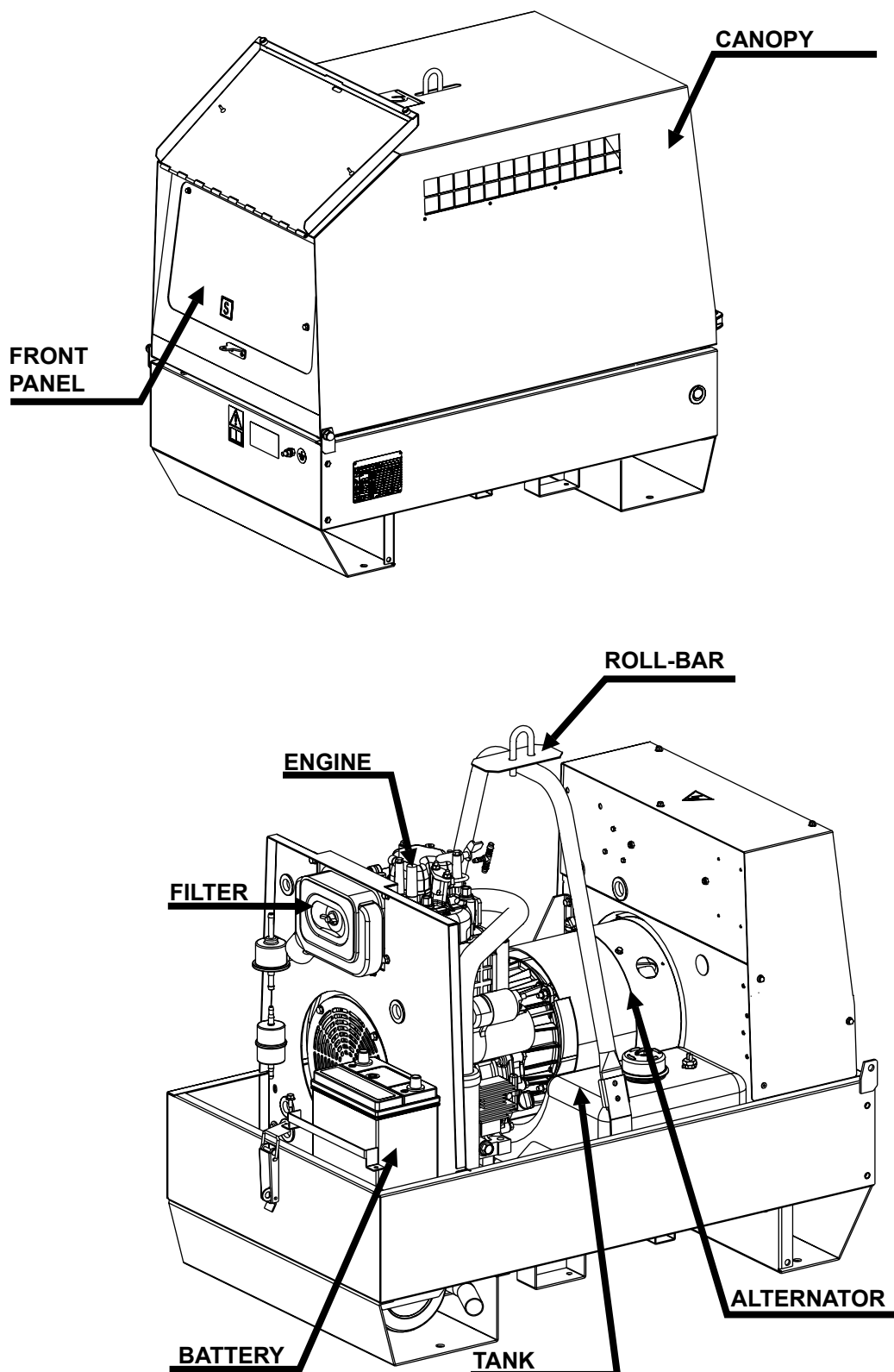
MADE IN ITALY

MOSA Weld

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

- a) a current source for are welding
- b) a current source for the auxiliary generation

The unit is composed of: a structured base which includes a tank, an engine/alternator unit fixed on the base by elastic dampers, a roll-bar, with hook for an easy and sure lifting, a chest hinged to the base for a quick access to the engine, to the air filter and to the battery. The set is completed by a frontal panel where there is the possibility to start the engine, adjust welding parameters and obtain full AUX power.



| | |
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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 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 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 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).

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:



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

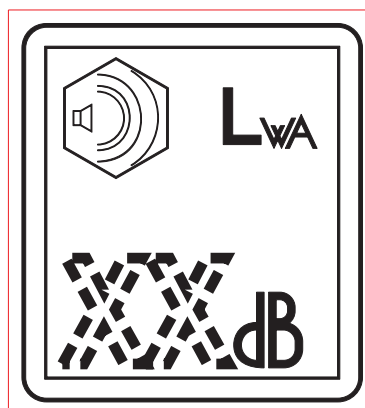
| | | | |
|--|--------------------|--------------------|-------------------|
| | Made in UE-ITALY | TYPE | |
| | SERIAL N° | | |
| | X | | |
| | I ₂ (A) | | |
| | U ₀ | U ₂ (V) | |
| | I ₂ (A) | | |
| | U ₀ | U ₂ (V) | |
| | Hz | kVA | |
| | P.F. | V (V) | |
| | | I (A) | |
| | n | RPM | n ₁ |
| | n ₀ | RPM | P _{1max} |
| | | IP | |
| | | KW | I. CL. |

| | | | |
|--|-------------------------|-------------|---------------------------------------|
| | Made in UE-ITALY | TYPE | |
| | Generating Set ISO 8528 | SERIAL N° | |
| | KVA | | |
| | V | | |
| | I | | |
| | Hz | P.F. | LTP POWER IN ACCORDANCE WITH ISO 8528 |
| | RPM | I. CL. | IP |
| | ALTIT. 100 m | TEMP. 25 °C | MASS |



| | | |
|--|---------------------------------------|------------------|
| | TYPE | |
| | SERIAL N° | Made in UE-ITALY |
| | TYPE/N° | |
| | VOLTAGE(V) | |
| | POWER(W) | |
| | Hz | KVA |
| | P.F. | V(V) |
| | I.C.L. | I(A) |
| | LTP POWER IN ACCORDANCE WITH ISO 8528 | |
| | n | RPM |
| | P _{max} | TEMP. °C |
| | | ALTIT. m |
| | | IP |
| | | Kg |

| | | | |
|--|------------------|----------------|-------------------|
| | Made in UE-ITALY | I. CL. | |
| | IEC 60974-1 | IP | |
| | U ₀ | | |
| | X | I ₂ | U ₂ |
| | n | RPM | n ₁ |
| | n ₀ | RPM | P _{1max} |
| | | RPM | kw |
| | P | V | I |

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.

| | | |
|---|---|--|
| GENERATOR | | CS 230 YSX CC/CV |
| Three-phase generation | 6 kVA / 400 V / 8.7 A | |
| Single-phase generation | 5 kVA / 230 V / 21.7 A | |
| Single-phase generation | 2.5 kVA / 110 V / 22.7 A | |
| Frequency | 50 Hz | |
| ALTERNATOR | | Self-excited, self-regulated, brushless |
| Type | three-phase, asynchronous | |
| Insulating class | H | |
| ENGINE | | |
| Mark / Model | Yanmar L 100 N | |
| Type / Cooling system | Diesel 4-Stroke / air | |
| Cylinders / Displacement | 1 / 435 cm ³ | |
| Output max | 6.5 kW (8.8 HP) | |
| Speed | 3000 rpm | |
| Fuel consumption (welding 60%) | 1 l/h | |
| Engine oil capacity | 1.6 l | |
| Starter | Electric | |
| GENERAL SPECIFICATIONS | | |
| Tank capacity | 23 l | |
| Running time (welding 60%) | 23 h | |
| Protection | IP 23 | |
| *Dimensions / max. Lxwxh (mm) | 1020x645x930 | |
| *Weight | 230 kg | |
| Measured acoustic power L _{wA} (pressure L _{pA}) | 91 dB(A) (66 dB(A) @ 7 m)  | |
| Guaranteed acoustic power L _{wA} (pressure L _{pA}) | 92 dB(A) (67 dB(A) @ 7 m)  | |
| <small>* Dimensions and weight are inclusive of all parts without wheels and towbar</small> | | |

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

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

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

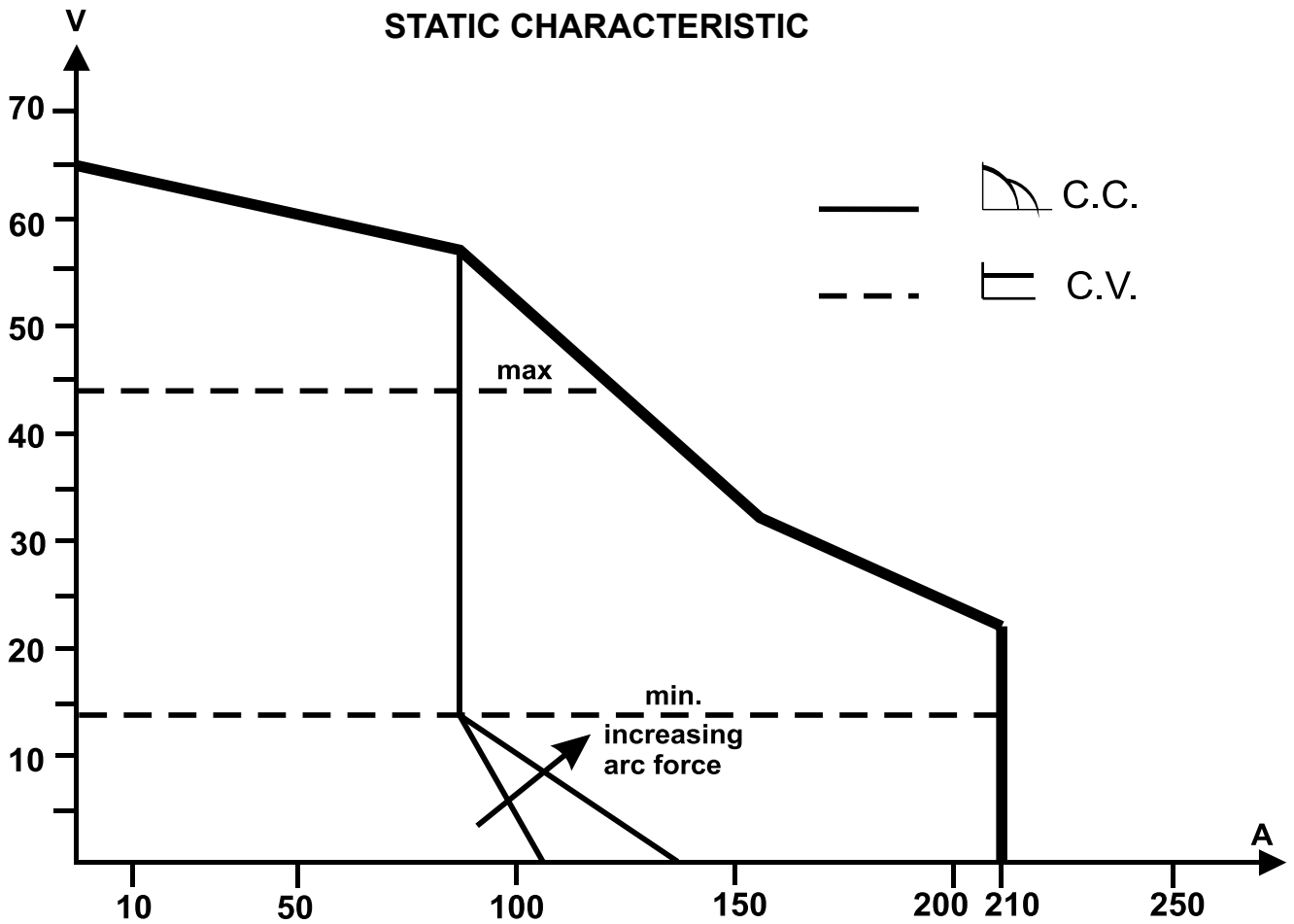
PLEASE NOTE: the symbol  when with acoustic noise values, indicates that the device respects noise emission limits according to 2000/14/CE directive.

D.C. WELDING

Duty cycle 210A - 60%, 180 A - 100%
 Welding current regulation 20 - 210 A
 Open circuit voltage 65V

C.V. WELDING

Welding current 210 A - 60%, 180 A - 100%
 Welding voltage regulation 14 - 44V




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 | 210 A | 150 A | 100 A | 0 |
| AUXILIARY POWER | 0 kVA | 0 kVA | 2.7 kVA | 6.5 kVA |

The installation and general warnings regarding operations are aimed achieving correct use of the machine and/or apparatus in the place where it is used as a genset and/or motor welder.

- Advice to the User about the safety:

 NB: The information contained in the manual can be changed without notice.

Any damage caused in connection with the use of these instructions shall not be considered as they 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.

 **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.



 **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. |

SYMBOLS



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 authorized 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.

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 transmitters.
3. Computer and other checking devices.
4. Critical devices for safety and/or for industrial checks.
5. People 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).



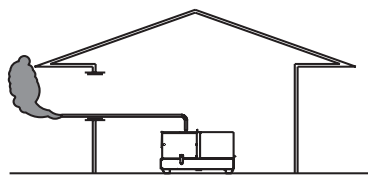
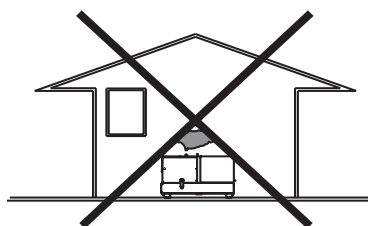
INSTALLATION AND ADVICE BEFORE USE

GASOLINE ENGINES

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

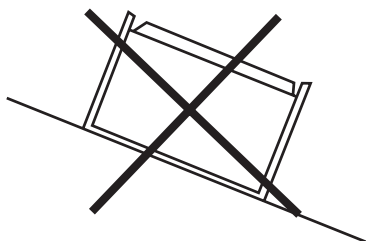
DIESEL ENGINES

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

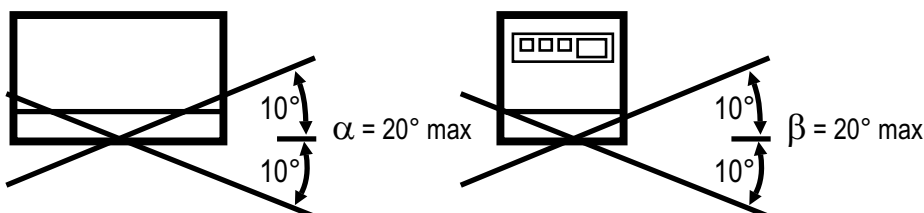


POSITION

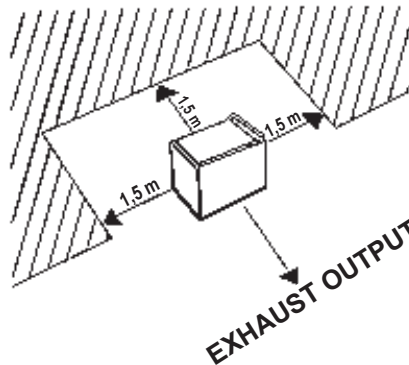
Place the machine on a level surface at a distance of at least 1,5 m from buildings or other plants.



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



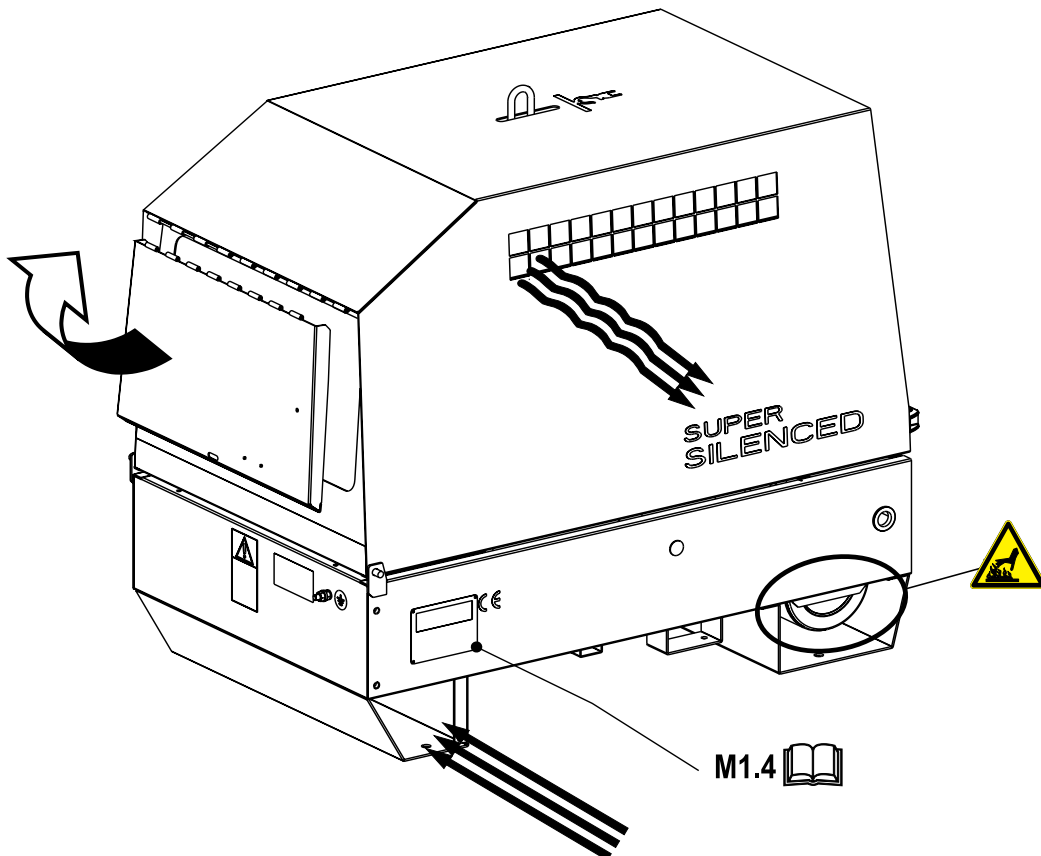
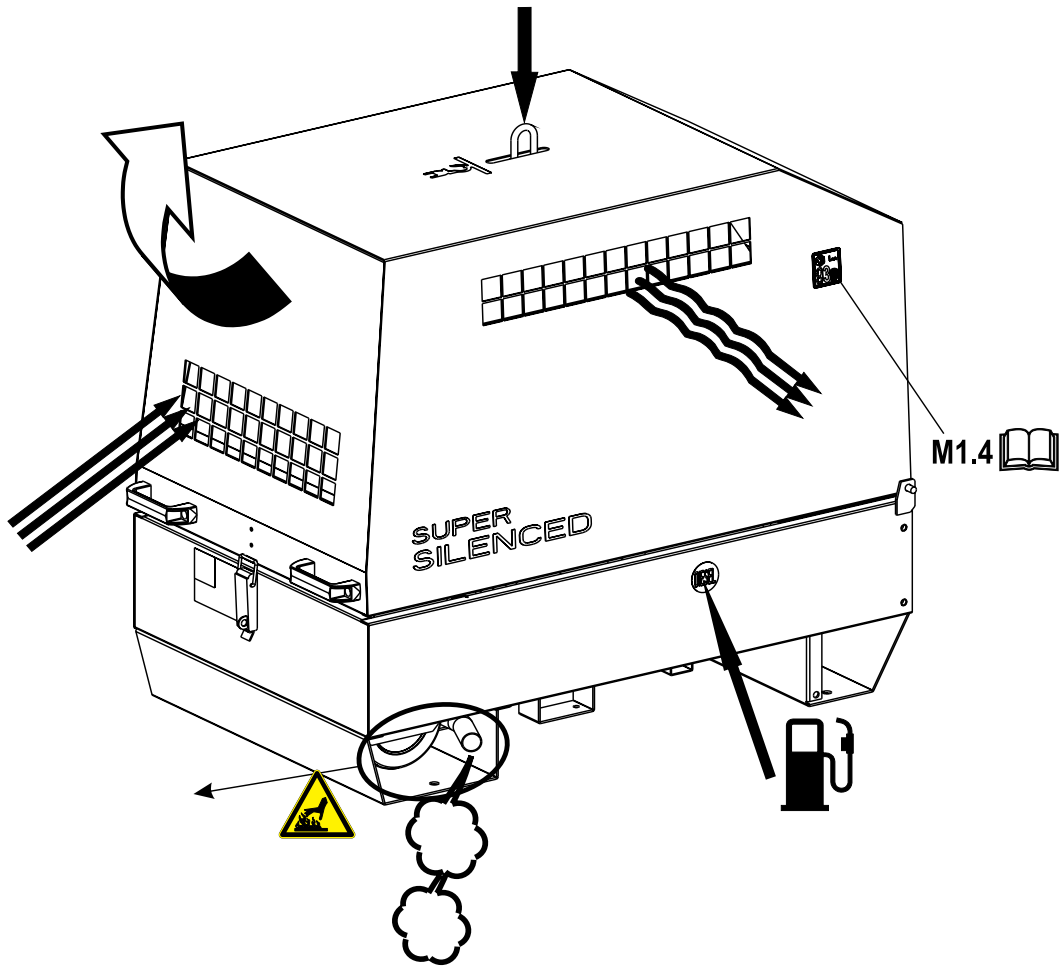
For a safer use from the operator **DO NOT** fit the machine in locations with high risk of flood.

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.

Ⓡ Installazione
Ⓢ Installation
Ⓣ Installation

Ⓛ Luftzirkulation
Ⓜ Instalación
Ⓝ Instalação

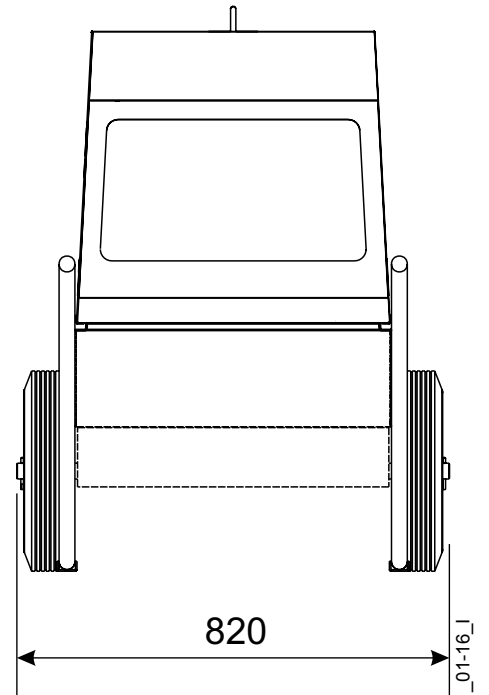
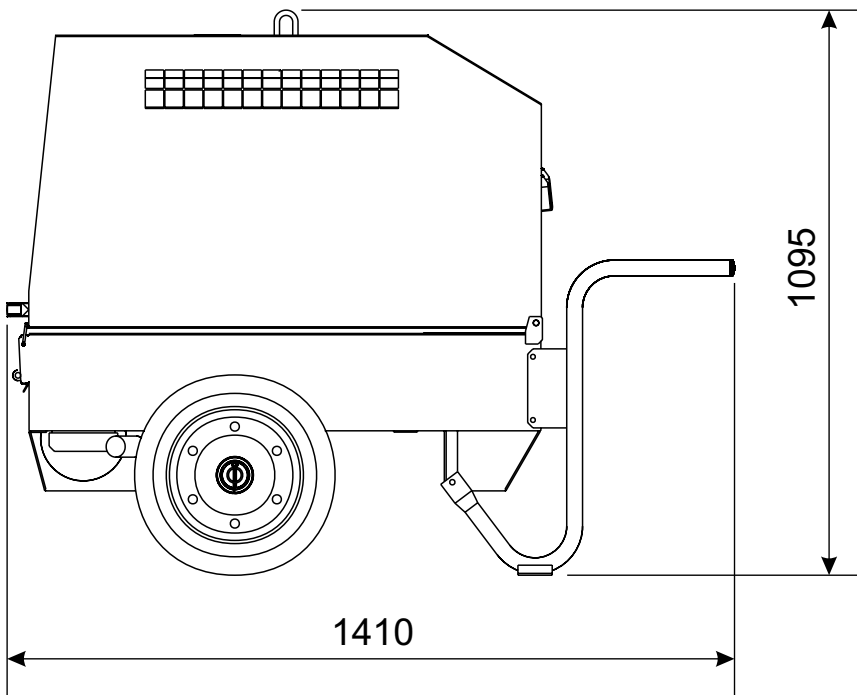
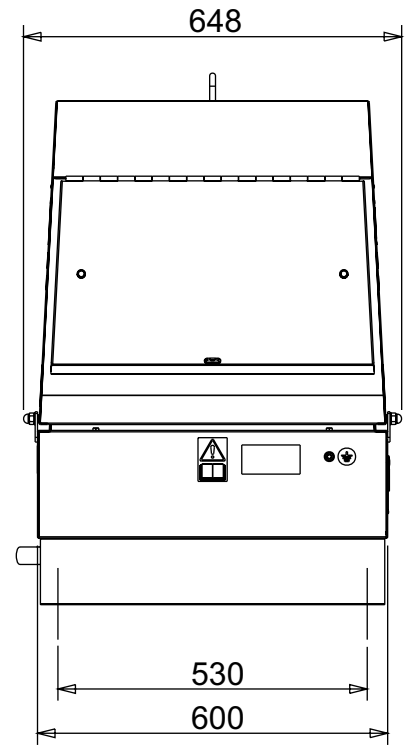
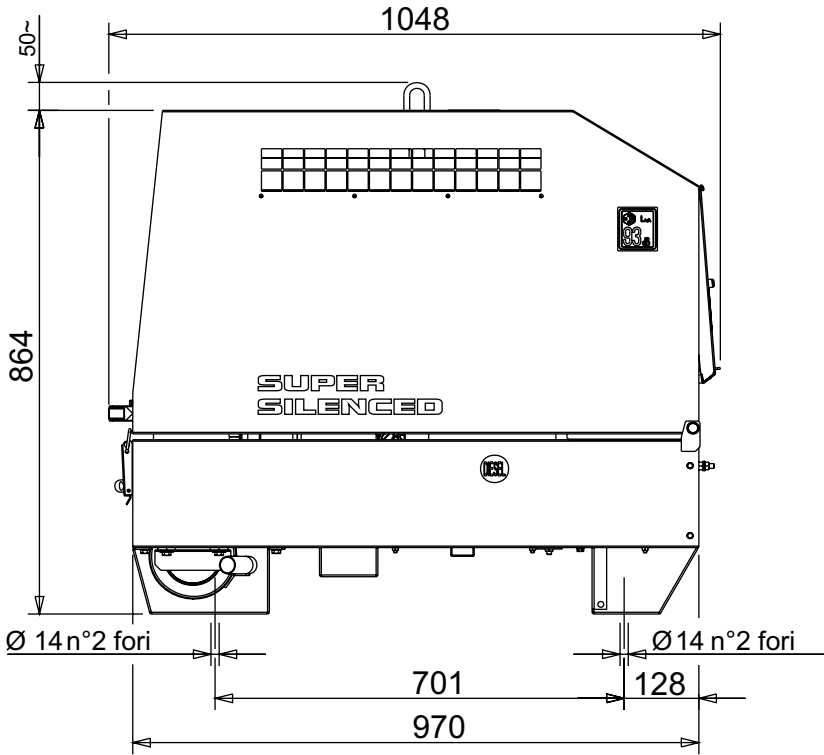
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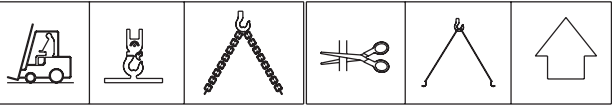
Ⓛ Dimensioni
ⓖⓔ Dimensions
ⓕ Dimensions

Ⓛ Abmessungen
ⓔ Dimensiones
ⓐ Dimensões

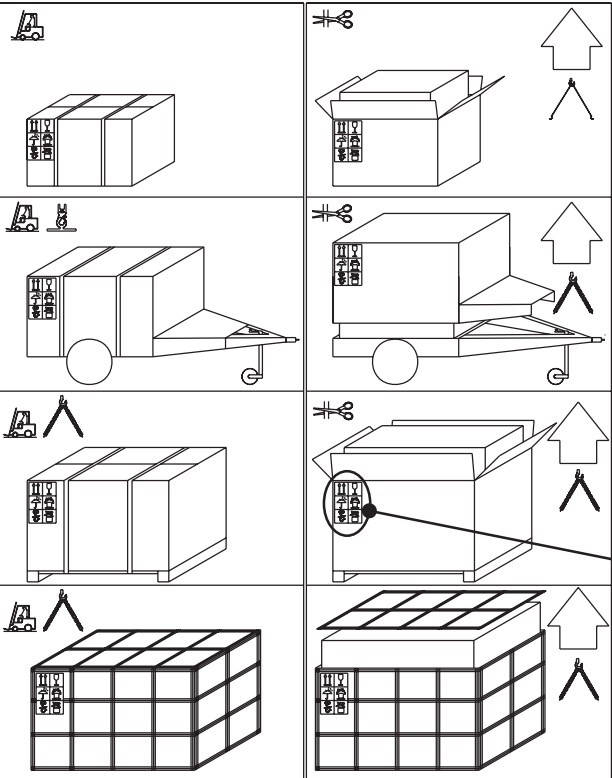
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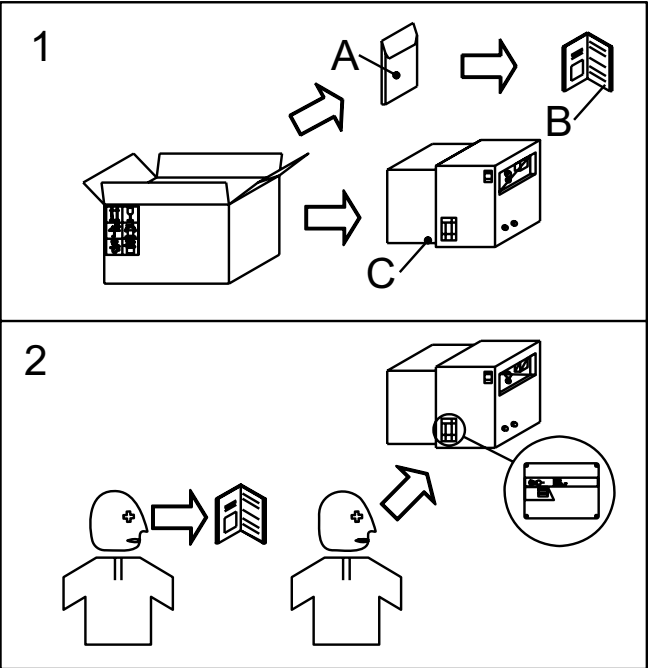
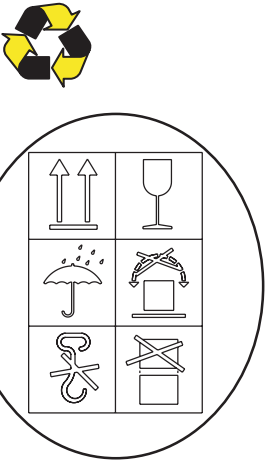
 **NOTE**



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

Transportation must always take place with the engine off, electrical cables and starting battery disconnected and fuel tank empty.

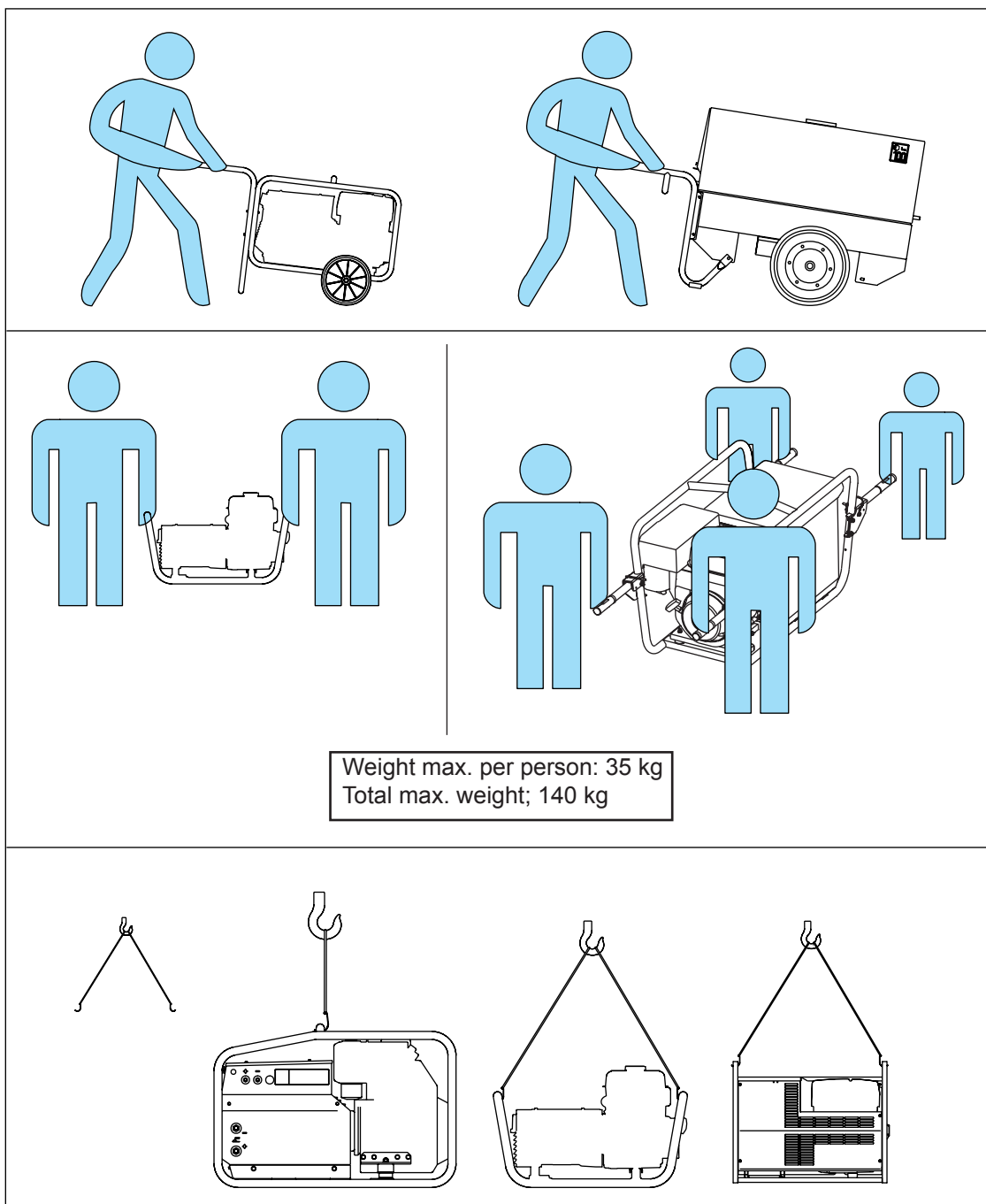
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with its packaging, and conform to local rules and regulations.

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 CTM accessory).

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

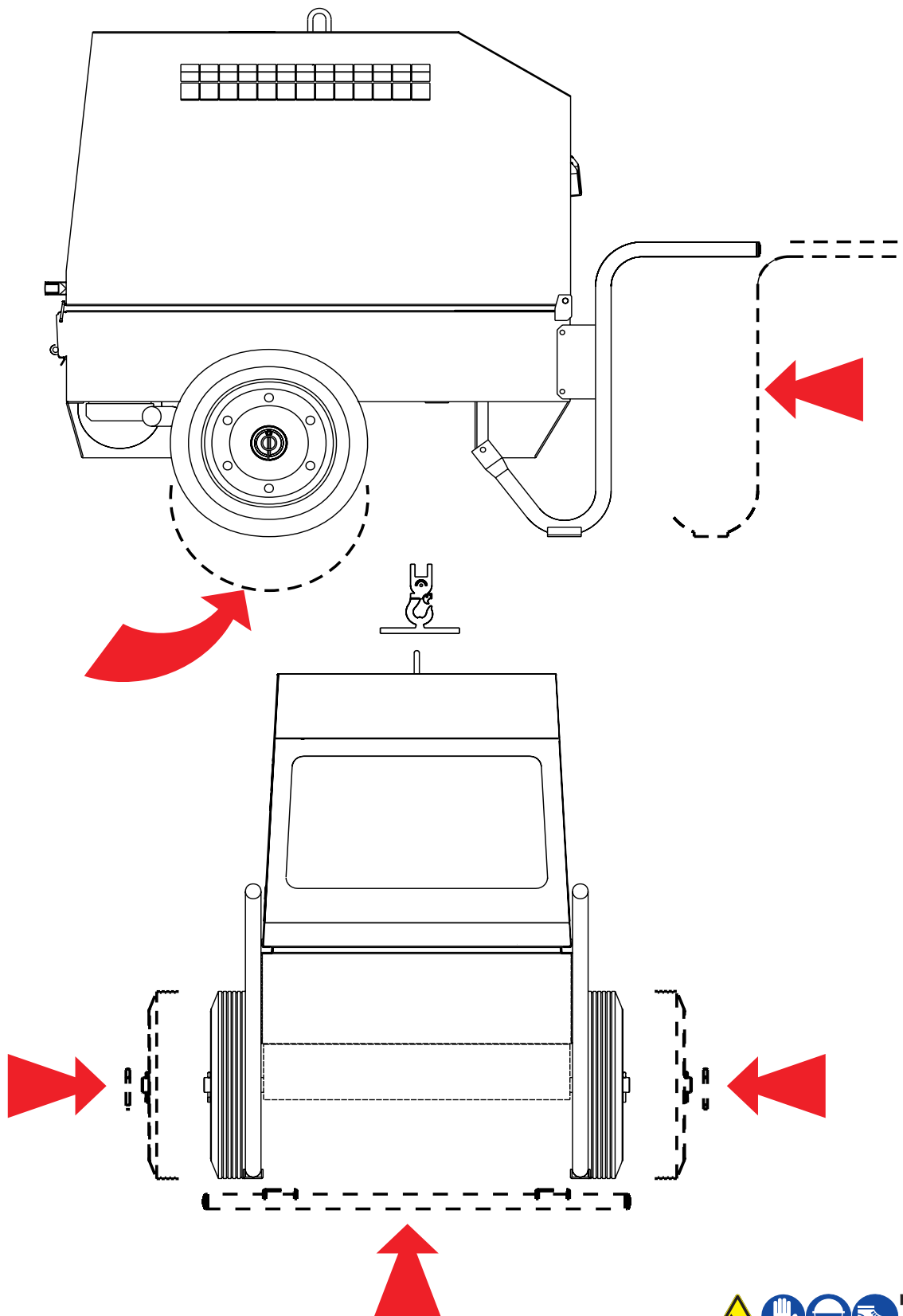




ATTENTION

The CTM 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.

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





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.

|  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) |

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.



ATTENTION

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



DRY 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.



OIL BATH AIR FILTER

Fill the air filter using the same engine oil up to the level indicated on the filter.



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.



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

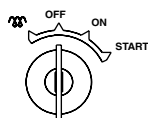


NOTE

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

STARTING THE ENGINE

Insert the electric protection device (D) lever towards above, see page M37 –



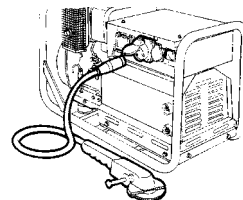
Introduce the key (Q1), turn it clockwise completely, leaving it as soon as the engine starts.

Let the engine run for some minutes before drawing the load.

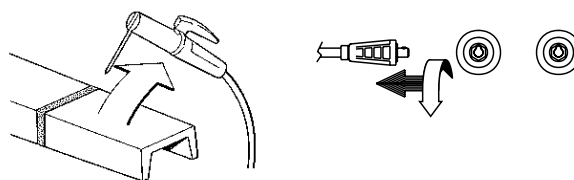
STOPPING THE ENGINE

Before stopping the engine **it is compulsory** to effect the following operations:

- stop to draw three/single-phase current from the auxiliary sockets

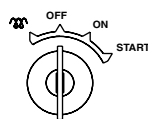


- stop to draw power from the welding sockets.



Make sure that the unit is not supplying any power.

Disconnect the electrical protection device (D) lever downward.



Stop the engine turning the key (Q1) it counter clockwise, OFF position, then take it out.

NB.: for safety reason the key must be kept by qualified personnel.



ATTENTION

If the engine fails to start, do not insist for at least 15 seconds. Space the further operations waiting for at least 4 minutes.

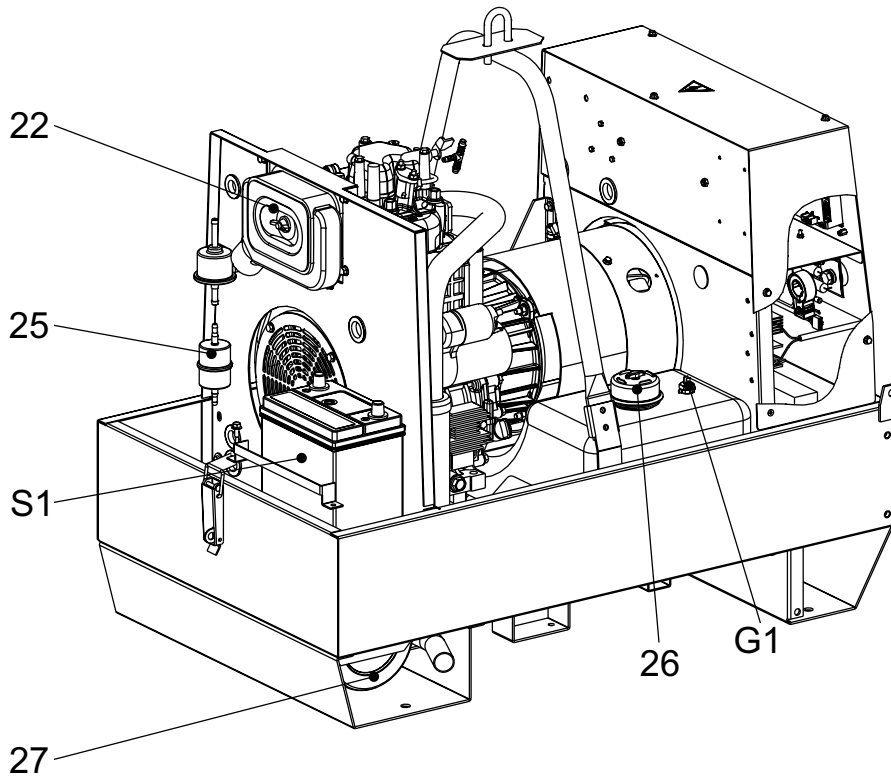
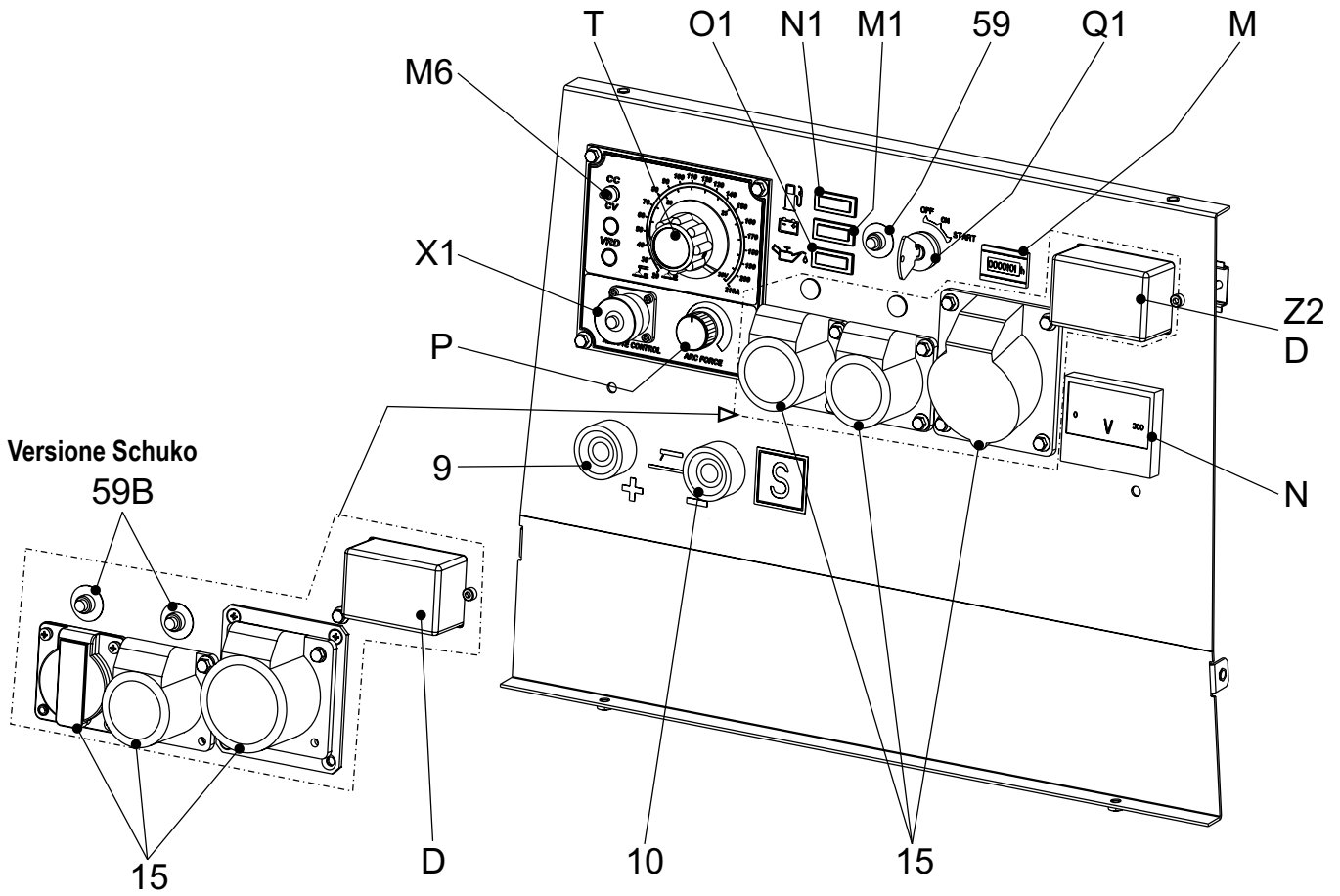


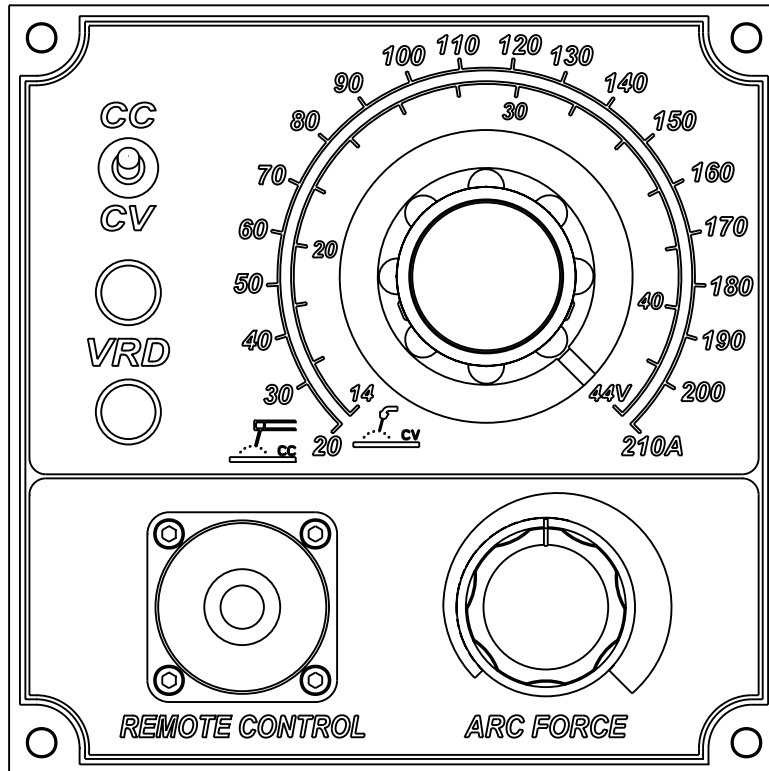
CAUTION

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.

| | | | | | |
|-----|--|----|---|----|--|
| 4A | Hydraulic oil level light | B4 | Exclusion indicating light PTO HI | W3 | Selection push button 30 I/1' PTO HI |
| 9 | Welding socket (+) | B5 | Auxiliary current push button | W5 | Battery voltmeter |
| 10 | Welding socket (-) | C2 | Fuel level light | X1 | Remote control socket |
| 12 | Earth terminal | C3 | E.A.S. PCB | Y3 | Button indicating light 20 I/1' PTO HI |
| 15 | A.C. socket | C6 | Control unit for generating sets QEA | Y5 | Commutator/switch, serial/parallel |
| 16 | Accelerator lever | D | Ground fault interrupter (30 mA) | Z2 | Thermal-magnetic circuit breaker |
| 17 | Feed pump | D1 | Engine control unit and economiser EP1 | Z3 | Selection push button 20 I/1' PTO HI |
| 19 | 48V D.C. socket | | | Z5 | Water temperature indicator |
| 22 | Engine air filter | D2 | Ammeter | | |
| 23 | Oil level dipstick | E2 | Frequency meter | | |
| 24 | Engine oil reservoir cap | E6 | Frequency rpm regulator | | |
| 24A | Hydraulic oil reservoir cap | E7 | Voltmeter regulator | | |
| 24B | Water filling cap | F | Fuse | | |
| 25 | Fuel prefilter | F3 | Stop switch | | |
| 26 | Fuel tank cap | F5 | Warning light, high temperature | | |
| 27 | Muffler | F6 | Arc-Force selector | | |
| 28 | Stop control | G1 | Fuel level transmitter | | |
| 29 | Engine protection cover | H2 | Voltage commutator | | |
| 30 | Engine cooling/alternator fan belt | H6 | Fuel electro pump | | |
| 31 | Oil drain tap | H8 | Engine control unit EP7 | | |
| 31A | Hydraulic oil drain tap | I2 | 48V A.C. socket | | |
| 31B | Water drain tap | I3 | Welding scale switch | | |
| 31C | Exhaust tap for tank fuel | I4 | Preheating indicator | | |
| 32 | Button | I5 | Y/▲ switch | | |
| 33 | Start button | I6 | Start Local/Remote selector | | |
| 34 | Booster socket 12V | I8 | AUTOIDLE switch | | |
| 34A | Booster socket 24V | L | A.C. output indicator | | |
| 35 | Battery charge fuse | L5 | Emergency button | | |
| 36 | Space for remote control | L6 | Choke button | | |
| 37 | Remote control | M | Hour counter | | |
| 42 | Space for E.A.S. | M1 | Warning level light | | |
| 42A | Space for PAC | M2 | Contactora | | |
| 47 | Fuel pump | M5 | Engine control unit EP5 | | |
| 49 | Electric start socket | M6 | CC/CV switch | | |
| 54 | Reset button PTO HI | N | Voltmeter | | |
| 55 | Quick coupling m. PTO HI | N1 | Battery charge warning light | | |
| 55A | Quick coupling f. PTO HI | N2 | Thermal-magnetic circuit breaker/ Ground fault interrupter | | |
| 56 | Hydraulic oil filter | | | | |
| 59 | Battery charger thermal switch | N5 | Pre-heat push-button | | |
| 59A | Engine thermal switch | N6 | Connector - wire feeder | | |
| 59B | Aux current thermal switch | O1 | Oil pressure warning light/Oil alert | | |
| 59C | Supply thermal switch wire feeder-42V | O8 | V/A digital instruments and led VRD PCB | | |
| 59D | Pre-heater (spark plug) thermal switch | P | Welding arc regulator | | |
| 59E | Supply thermal switch oil/water heater | P8 | Water in fuel | | |
| 59F | Electropump thermal switch | Q1 | Starter key | | |
| 63 | No load voltage control | Q3 | Derivation box | | |
| 66 | Choke control | Q4 | Battery charge sockets | | |
| 67A | Auxiliary / welding current control | Q7 | Welding selector mode | | |
| 68 | Cellulosic electrodes control | R3 | Siren | | |
| 69A | Voltmeter relay | S | Welding ammeter | | |
| 70 | Warning lights | S1 | Battery | | |
| 71 | Selecting knob | S3 | Engine control unit EP4 | | |
| 72 | Load commut. push button | S6 | Wire feeder supply switch | | |
| 73 | Starting push button | S7 | Plug 230V singlephase | | |
| 74 | Operating mode selector | T | Welding current regulator | | |
| 75 | Power on warning light | T4 | Dirty air filter warning light/indicator | | |
| 76 | Display | T5 | Earth leakage relay | | |
| 79 | Wire connection unit | T7 | Analogic instrument V/Hz | | |
| 86 | Selector | U | Current transformer | | |
| 86A | Setting confirmation | U3 | R.P.M. adjuster | | |
| 87 | Fuel valve | U4 | Polarity inverter remote control | | |
| 88 | Oil syringe | U5 | Release coil | | |
| A3 | Insulation monitoring | U7 | Engine control unit EP6 | | |
| A4 | Button indicating light 30 I/1' PTO HI | V | Welding voltage voltmeter | | |
| B2 | Engine control unit EP2 | V4 | Polarity inverter control | | |
| B3 | E.A.S. connector | V5 | Oil pressure indicator | | |
| | | W1 | Remote control switch | | |

Versione 230V 110V





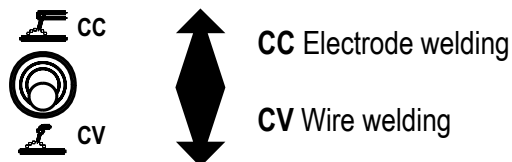
WELDING MODE SELECTION

The Welding Analogue Control unit (WAC) allows two possible control modes:

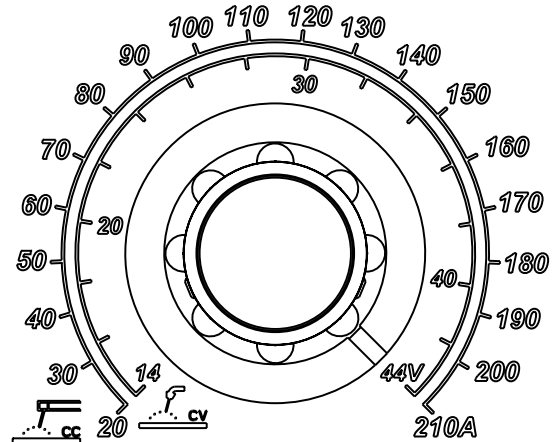
- Constant Current (CC)
- Constant Voltage (CV).

The welding option with C.V. characteristic is possible only on those models which support this mode of operation. On such models there is a switch which allows to select the desired mode.

The regulation with C.C. characteristic can be used to weld with various types of electrodes. The regulation with C.V. characteristic is suitable for the wire welding, both naked and coated.



VOLTAGE AND CURRENT REGULATION



Current regulation

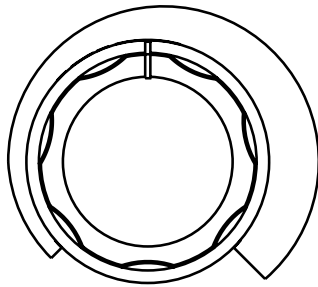
When the CC/CV switch is in CC position the main knob sets the welding current within a range from 20A to 210A.

Voltage regulation

With the CC/CV switch in CV position the main knob sets the welding voltage in a range between 14V - 44V.

ARC FORCE REGULATION

ARC FORCE



This type of regulation, possible only in CC mode, it is made via the “arc force” potentiometer located on the WAC panel.

For the welding processes which require a constant current the potentiometer must be left in the minimum position.

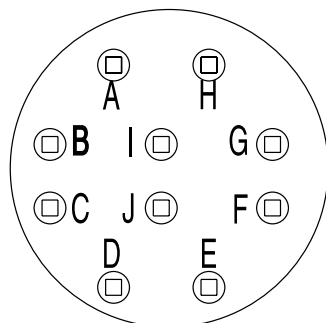
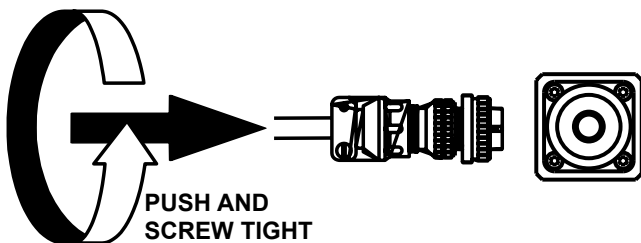
For the welding processes where a certain degree of arc force is suitable, the potentiometer has to be properly adjusted, depending on the electrode type and the welding position.

REMOTE CONTROL

The WAC can accept the connection to a remote control box (optional) through a circular connector placed on the EAC panel.

After connection to a remote controller, the regulation function of the main knob is automatically switched to the knob on the remote controller.

The following table describes the pin function of the circular connector.



| CONTACTS | DESCRIPTION |
|------------|--|
| A (Ground) | To the RC1 potentiometer – GND terminal |
| B | To the RC1 potentiometer – V_{CONTR} terminal |
| C | To the RC1 potentiometer – V_{REF} terminal |
| D | Remote connection presence contact – wire bridge towards (C) cabling side |
| E | Non connected |
| F | Non connected |
| G | Welding enable contact in CV – enables when the contact is closed towards (I) |
| H | Negative pole of the welding voltage – to monitor the welding voltage by means of an instrument on the wire feeder |
| I | 42Vac $\pm 10\%$ – phase A – for the power supply of the wire feeder |
| J | 42Vac $\pm 10\%$ – phase B – for the power supply of the wire feeder |

WIRE FEEDER

The welding control unit WAC is ready for connection to a wire feeder (optional), to be used in C.V. mode. The wire feeder can be supplied from a 42Vac $\pm 10\%$ source through the circular connector of the WAC. In this case, the same connector is used to interface the controller with a contact which enables the welding (conditioned by the torch trigger) and a remote potentiometer located on the wire feeder (where present).

In case of wire feeders directly supplied from the welding power, the operation is anyway possible. With this type of wire feeders there is no need for any connection to the circular connector of the WAC.

VRD FUNCTION (VRD = Voltage Reduction Device)

The VRD function (present only on some versions) fulfills the purpose of drastically reducing the harm which may result to a person from inadvertent contact with the electrode during non-welding pauses. The VRD automatically switches the control mode in CV and sets the voltage to a safe value (typically <13V) each time the welding process is interrupted for a period longer than 0,5 sec.

The VRD function is active only in CC mode.

The proper operation of the VRD protection (in the models where it is implemented) is monitored by a couple of LEDs: one green and one red. During welding the red LED indicates that a condition of electrical risk is present. When the welding is stopped for more than 0,5 sec. the green LED turns on (and the red LED turns off) indicating that the VRD function is active. This means that the voltage on the electrode has been lowered to a safe value.





This symbol (Norm EN 60974-1 security standards for arc welders) signifies that the welder can be used in areas with increased risk of electrical shock.



ATTENTION

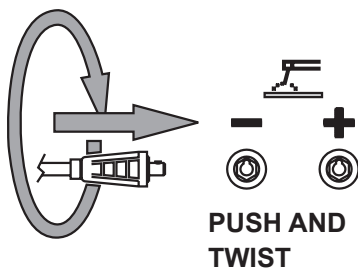
The areas, access of which is forbidden to unqualified personnel, are:

- the control switchboard (front) - the exhaust of the endothermic engine - the welding process.

Check at the beginning of any work the electric parameters and/or the control placed on the front.

Make sure that the ground connection (12) is efficient (when this connection is present, being necessary). See page M20.

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, 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



REMOTE CONTROL

See page M 38



ATTENTION

To reduce the risk of electromagnetic interferences, use the minimum length of welding cables and keep them near and down (ex. on the floor).

The welding operations must take place far from any sensitive electronic device. Make sure that the unit is earthed (see M20). In case the interference should last, adapt further disposition, such as: move the unit, use screened cables, line filters, screen the entire work area.

In case the above mentioned operations are non sufficient, please contact our Technical Assistance Service.



CAUTION

With a welding cable length up to 20 m is suggested a section of 35 mm²; with longer cables a bigger section is required.





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)

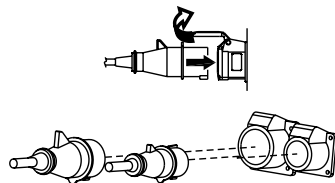
Make certain of the efficiency of the ground connection (12). - See page M20 -

Position the GFI switch to ON.

☞ Voltage is now immediately available to the AC sockets.

Verify that the voltmeter displays the nominal voltage value (at no load it is close to +10% of the nominal value).


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.

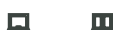
☞ For double insulation devices with the symbol , the plug's ground terminal does not need to be grounded.

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.

☞ **Notes:** 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



CIRCUIT BREAKER



minutes to allow the thermal protection to cool down.

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.

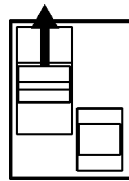
☞ **Note:** the three phase output does not require any protection against overcurrents, since it uses a self-protecting asynchronous type alternator.

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.

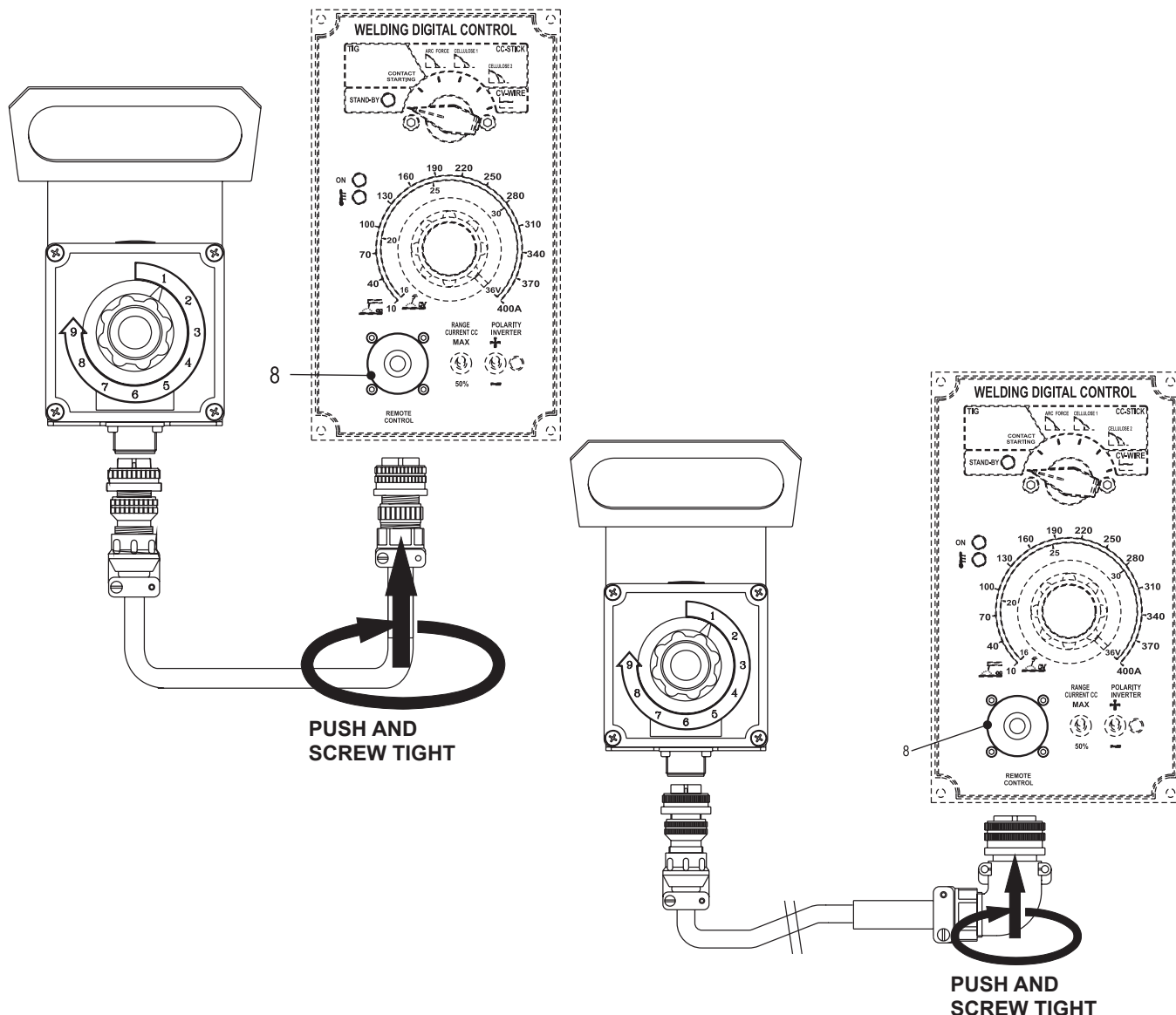
SIMULTANEOUS USE

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 M1.6 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.



The remote control RC, which regulates the welding current in the CC (STICK welding) mode and the welding voltage in the CV (MIG/MAG welding), 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.

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



ATTENTION

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






| PROBLEM | ASSOCIATED SYMPTOMS | POSSIBLE CAUSE | VERIFICATIONS | WHAT TO DO |
|---|---|---|--|--|
| P1 No welding arc (applicable only to machines with WAC) | No open circuit voltage | Failed power supply within the welding control board (WAC) | With the machine running, by means of a multimeter, check if there is a voltage of 5VDC ± 0,125V between the contacts A (-) and C (+) on the circular connector of the WAC. In case of lack of voltage or condition not satisfied consider the suggested action. | Replace the welding control board of the WAC |
| P2 No welding arc (applicable only to machines without WAC) | No open circuit voltage | Failed power supply within the welding control board (WAC) | With the machine running, by means of a multimeter, check if there is a voltage of 5VDC ± 0,125V between the contacts 1 (-) and 2 (+) on the circular connector of the front panel, after having set the remote control switch in ON position. In case of lack of voltage or condition not satisfied consider the suggested action. | Replace the welding control board |
| P3 No welding arc | No open circuit voltage | Failure in the control or drive circuits of the welding control board | In order to check the proper operation of these circuits it is necessary to use specific test and troubleshooting tools. Anyway, a visual inspection could be enough to localise possible damages caused by a failure. In case of evidence of damages consider the suggested action. | Replace the welding control board ATTENTION For the CS 230 only, there is a risk of failure propagation towards the chopper. Before replacing this board please check that the chopper works properly. If not re-place both. |
| P4 Lack of welding current control | Full welding power (without current control) regardless of the knob position | Failure in the control or drive circuits of the welding control board | In order to check the proper operation of these circuits it is necessary to use specific test and troubleshooting tools. Anyway, a visual inspection could be enough to localise possible damages caused by a failure. In case of evidence of damages consider the suggested action. | Replace the welding control board ATTENTION For the CS 230 only, there is a risk of failure propagation towards the chopper. Before replacing this board please check that the chopper works properly. If not re-place both. |
| P5 No welding arc | No open circuit voltage or welding available current low or negligible. With auto-idle installed, the r.p.m. never slows-down to idle. | Hall sensor failed | Disconnect the Hall sensor from the welding control board (on the WAC or within the electrical box, as applicable) and check that, in this condition, the open circuit voltage reading is correct. When the VRD is installed, the voltage goes to VRD value. If a resistive load bank is available, check that it is possible draw power (do not exceed 100A). If the Auto-idle is installed, in this condition the machine does not exit the idle. In any case, don't try to weld with the Hall sensor disconnected. If the test gives positive result, consider the indicated action. | Replace the Hall sensor |



| PROBLEM | ASSOCIATED SYMPTOMS | POSSIBLE CAUSE | VERIFICATIONS | WHAT TO DO |
|---|--|---|---|--------------------------------|
| P6 Lack of voltage control in CV mode (applicable to the CC-CV machines provided with filter board) | The open circuit voltage in CV mode is the same as for the CC mode, regardless of the control knob position | Failure in the EMC filter board on the welding sockets | Check by means of a multimeter (stopped machine) the resistance value between positive welding socket and the corresponding faston connector on the filter board. The condition to check is: ohmic value between + welding socket and + board faston (the one to which the red cables are connected) < 4 ohm In case of condition not satisfied take the indicated corrective action. | Replace the EMC filter board |
| P7 No welding arc (applicable to the machines provided with the filter board on the welding sockets) | The open circuit voltage is zero | Failure in the EMC filter board on the welding sockets | Check by means of a multimeter (stopped machine) the resistance value between positive welding socket and the corresponding faston connector on the filter board. The condition to check is: ohmic value between - welding socket and - board faston (the one to which the black cables are connected) < 4 ohm In case of condition not satisfied take the indicated corrective action. | Replace the EMC filter board |
| P8 Minimum welding current in CC mode too high (applicable to the machines provided with the filter board on the welding sockets) | The welding current in CC mode with the knob at beginning of scale is too high and changes when turning the arc force knob (if present, switch in ON position) | Failure in the EMC filter board on the welding sockets | Check by means of a multimeter (stopped machine) the resistance value between positive welding socket and the corresponding faston connector on the filter board. The condition to check is: ohmic value between + welding socket and + board faston (the one to which the red cables are connected) < 4 ohm In case of condition not satisfied take the indicated corrective action. | Replace the EMC filter board |
| P9 Minimum welding current in CC mode too high | The welding current in CC mode with the knob at beginning of scale is too high and changes when turning the arc force knob (if present, switch in ON position) | Cable interruption between the WAC or the welding control board (as applicable depending on the machine type) and the welding sockets | With the machine stopped, extract the connector plugged to J1 of the WAC / Welding control board (as applicable depending on the machine type). Check by means of a multimeter the continuity between pin 6 of the connector and the positive welding socket. The resistive value shall be < 4 ohm if there is a filter board behind the sockets, otherwise shall be < 0.5 ohm. In case of condition not satisfied take the indicated corrective action. | Fix the cabling or replace it. |
| P10 No welding arc | The open circuit voltage is zero | Cable interruption between the WAC or the welding control board (as applicable depending on the machine type) and the welding sockets | With the machine stopped, extract the connector plugged to J1 of the WAC / Welding control board (as applicable depending on the machine type). Check by means of a multimeter the continuity between pin 5 of the connector and the negative welding socket. The resistive value shall be < 4 ohm if there is a filter board behind the sockets, otherwise shall be < 0.5 ohm. In case of condition not satisfied take the indicated corrective action | Fix the cabling or replace it. |



| PROBLEM | ASSOCIATED SYMPTOMS | POSSIBLE CAUSE | VERIFICATIONS | WHAT TO DO |
|---|--|--|---|--|
| P11 Lack of welding current control | Full welding power (without current control) regardless of the knob position. When the auto-idle is installed, the machine remains at low r.p.m. | Hall sensor failed | In order to check the proper operation of the Hall sensor it is necessary to use specific test and troubleshooting tools. Anyway, a visual inspection could be enough to localise possible damages, with particular reference to possible wear of the cable end coming out of the Hall sensor potting. Please check also the connector contacts crimping at the opposite end of the cable. In case of evidence of damages consider the suggested action | Replace the Hall sensor |
| P12 Lack of welding current control (applicable only to CS 350) | Full welding power (without current control) regardless of the knob position | Chopper and/or driver board failed | Disconnect the chopper cable from the connector J3 of the WAC. Check that the open circuit voltage is < 1V. If not put a light resistive load at the welding output (few kohms are enough) and check again the previous condition. If it is not satisfied the chopper is faulty. If a welding load bank and a clamp DC amp meter are available, another test can be done to localise the failed section/s. To this purpose set the load bank for a current of a few tens of amps and measure the current at the output of each chopper section (the group of cables which connect the chopper to one end of the welding current leveling reactor). The sections through which the current flows are failed or improperly driven by the driver board. If the test confirms this type of failure consider the suggested corrective action. | Replace the chopper and the driver board |
| P13 Lack of welding current control (applicable only to CS 230) | Full welding power (without current control) regardless of the knob position | Chopper faulty | Disconnect the chopper cable from the connector J3 of the WAC. Check that the open circuit voltage is < 1V. If not put a light resistive load at the welding output (few kohms are enough) and check again the previous condition. If it is not satisfied the chopper is faulty. In this case consider the suggested corrective action. | Replace the chopper |
| P14 Knob irregular or missing current adjustment | When turning the knob the current setting (and the voltage setting, if applicable) do not change or change irregularly | The potentiometer which regulates the welding current (and the welding voltage, when applicable) is faulty | Check if the regulation through remote control works properly. If confirmed, consider the suggested corrective action. | Replace the potentiometer |

|  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.

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

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



|  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> |

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 bloking 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 | |
|  | <p>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.</p> |

☛ 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.

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

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 entrusted 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: The manufacturer is involved with custing off the machine **only** for the second hand ones, when not reparable.

This, of course, after authorization.



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.

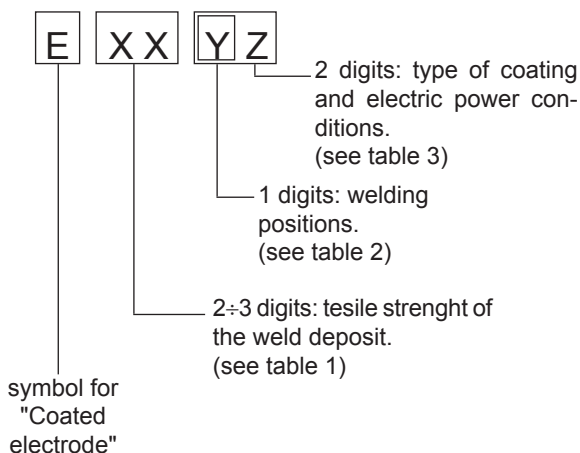
HIGH YIELD BASIC ELECTRODES: E 7018

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



ELECTRICAL SYSTEM LEGENDE

M
60

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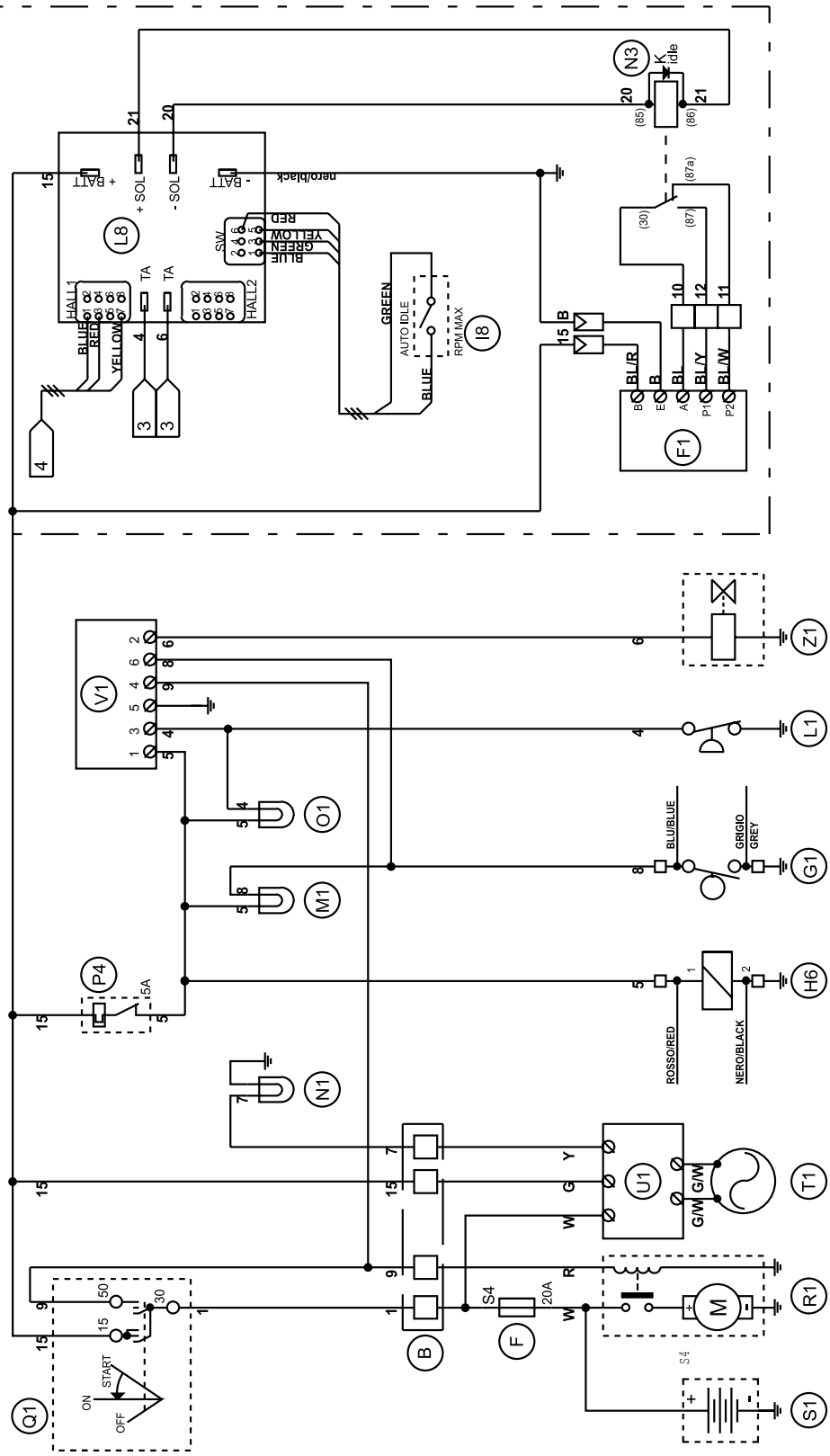
| | | | |
|---|--|--|------------------------------------|
| A : Alternator | E3 : Open circuit voltage switch | I6 : Start Local/Remote selector | N9 : UP/DOWN button mast |
| B : Wire connection unit | F3 : Stop push-button | L6 : Choke button | O9 : Hydraulic unit solenoid valve |
| C : Capacitor | 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 : |
| M : Hour-counter | Q3 : Output power unit | U6 : DSP chopper PCB | W9 : |
| N : Voltmeter | R3 : Electric siren | V6 : Power chopper supply PCB | X9 : |
| 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 : Commutator/switch, series/parallel | D9 : Starter timing card | |
| W2 : S.C.R. protection unit | A6 : Commutator/switch | E9 : Luquid pouring level float | |
| X2 : Remote control socket | B6 : Key switch, on/off | 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. | | |

- (I) Schema elettrico
- (GB) Electric diagram
- (F) Schemas électriques

- (D) Stromlaufplan
- (E) Esquema eléctrica
- (PT) Esquema elétrico

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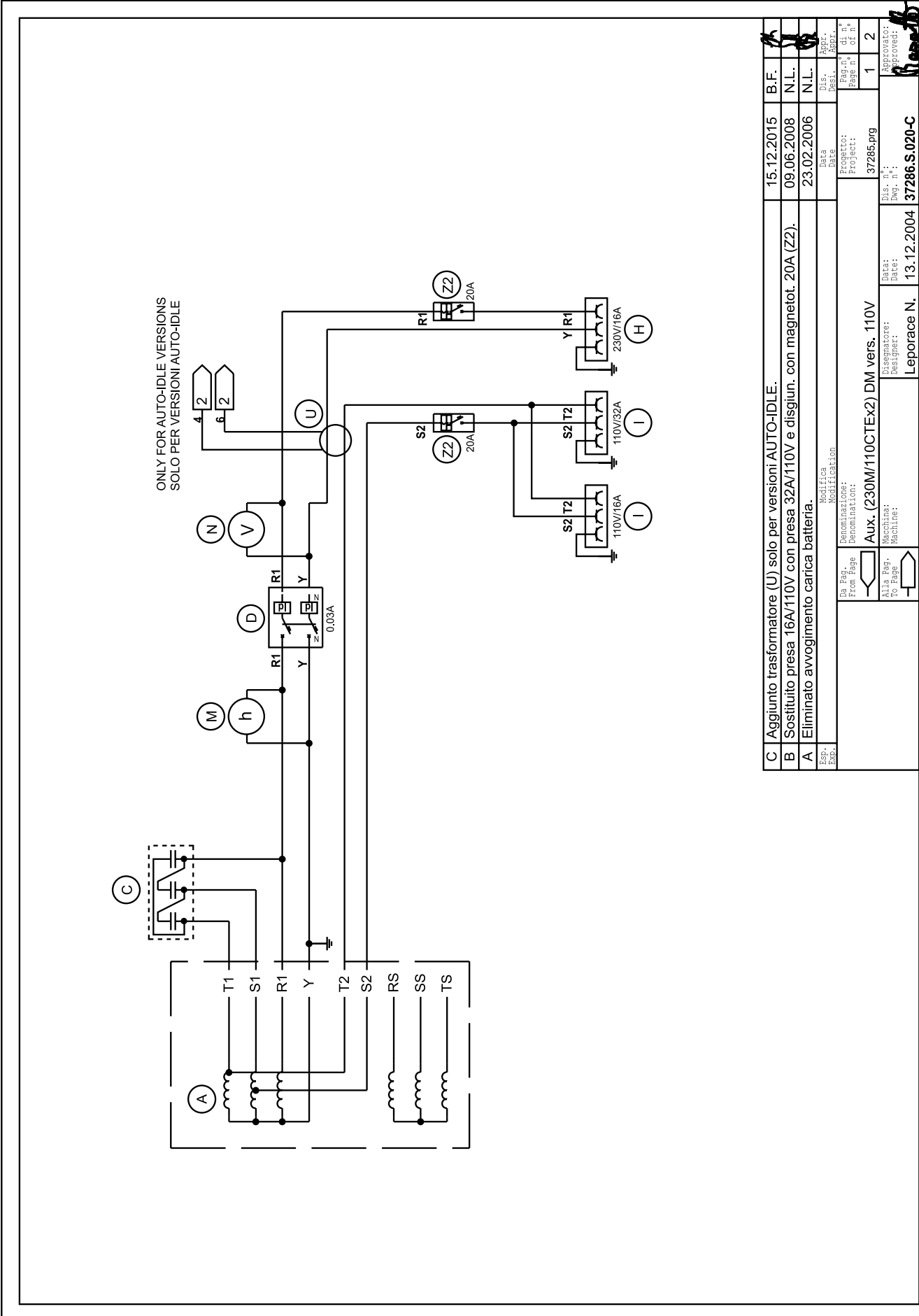
ONLY FOR AUTO-IDLE VERSIONS
SOLO PER VERSIONI AUTO-IDLE



| STARTER KEY | |
|-------------|-------|
| 30 | 15 50 |
| OFF | ON |
| ON | ST. |

| LEGENDA COLORI KEY COLOR | |
|-----------------------------|---------------|
| R | ROSSO/RED |
| G | VERDE/GREEN |
| W | BIANCO/WHITE |
| Y | GIALLO/YELLOW |
| BL | BLU/BLUE |
| B | NERO/BLACK |

| | | | |
|------|--|---------------|-------|
| B | Aggiunto allestimento AUTO-IDLE. | 15.12.2015 | B.F. |
| A | Modificato schema con nuovo motore completo di avvog. carica batteria. | 23.02.2006 | N.L. |
| Exp. | Modifica | Data | Dis. |
| Exp. | Modification | Date | Desi. |
| | Denominazione: | di n° | Appr. |
| | Denomination: | Project: | Appr. |
| | Da Pag. | 37285.prg | 2 |
| | From Page | | 4 |
| | Alleg. n° | | |
| | Machine: | Dis. n° | Appr. |
| | Machine: | Dwg. n° | Appr. |
| | Disegnatore: | 37280.S.010-B | |
| | Designer: | | |
| | Leporace N. | 28.07.2000 | |

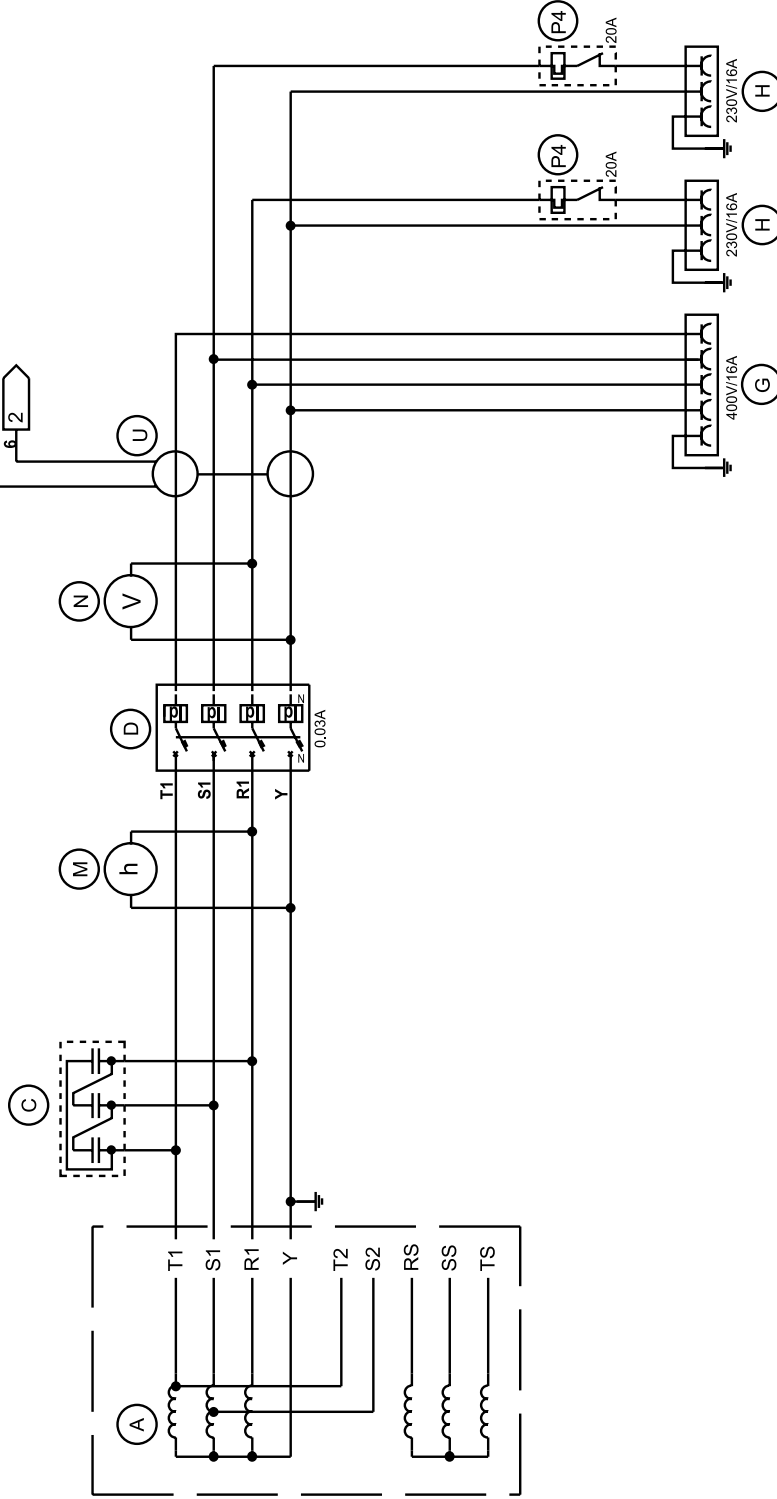


| | | | |
|---------------------|---|------------------------------------|-------|
| C | Aggiunto trasformatore (U) solo per versioni AUTO-IDLE. | 15.12.2015 | B.F. |
| B | Sostituito presa 16A/110V con presa 32A/110V e disgiun. con magnetot. 20A (ZZ). | 09.06.2008 | N.L. |
| A | Eliminato avvolgimento carica batteria. | 23.02.2006 | N.L. |
| Exp. | Modifica | Data | Appr. |
| Exp. | Modification | Date | Appr. |
| Da Pag. / From Page | Progetto: / Project: | 37285.prg | 1 |
| From Page | Denominazione: / Denomination: | Aux. (230M/110CTEx2) DM vers. 110V | 2 |
| Alia Pag. / To Page | Macchina: / Machine: | Leporace N. | |
| | Disegnato: / Designer: | 13.12.2004 | |
| | Disegnato: / Designer: | 37286.S.020-C | |

- (I) Schema elettrico
- (GB) Electric diagram
- (F) Schemas électriques

- (D) Stromlaufplan
- (E) Esquema eléctrico
- (PT) Esquema elétrico

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SOLO PER VERSIONI AUTO-IDLE

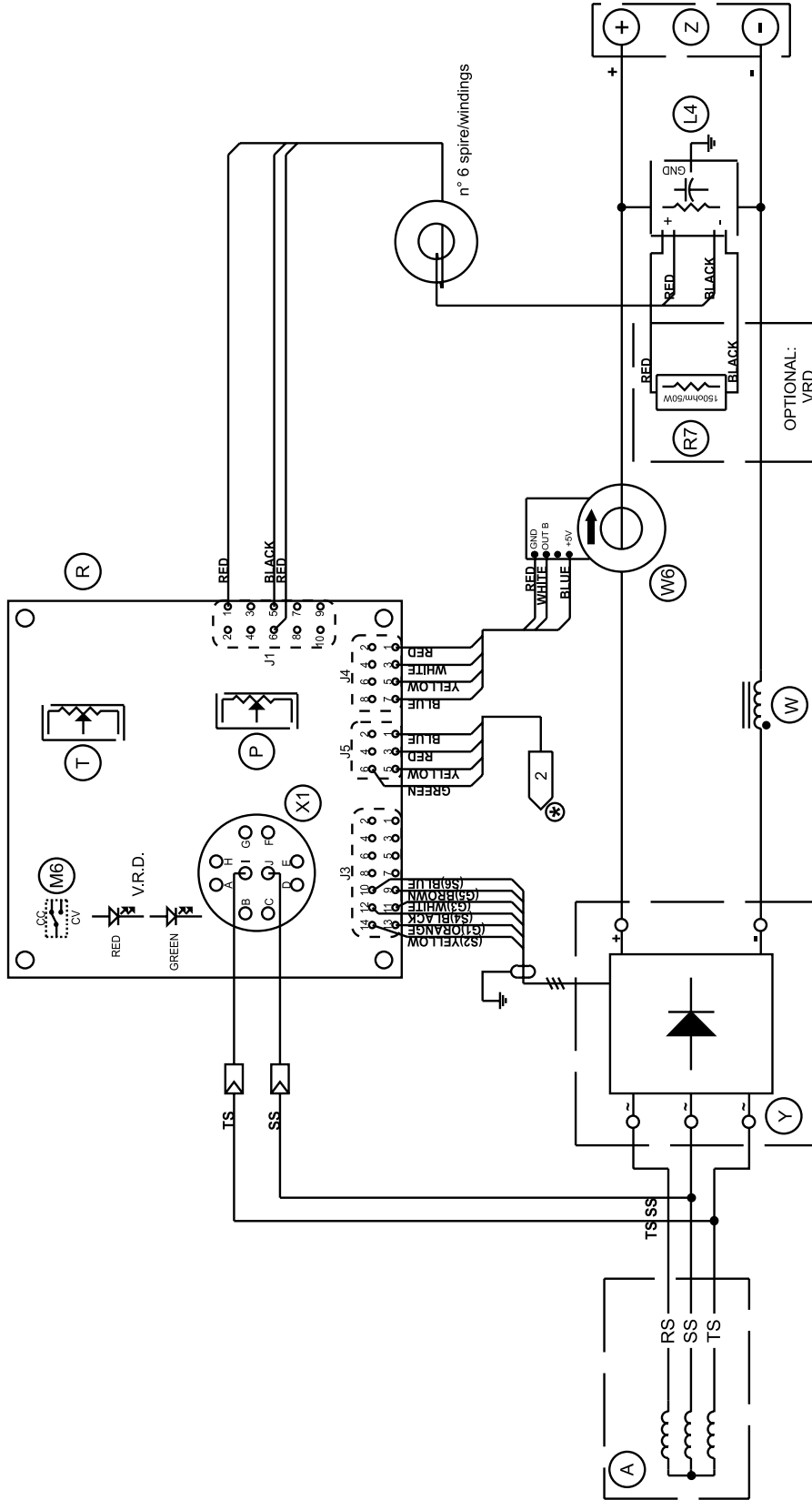


| | | | |
|---|---|------------------------|------------------------|
| A | Aggiunto trasformatore (U) solo per versioni AUTO-IDLE. | 15.12.2015 | B.F. |
| Exp. | Modifica | Data | Appr. |
| Exp. | Modification | Date | Appr. |
| Denominazione: Aux. (400T/230Mx2) DT vers. SCHUKO | | Progetto: 37285.prg | di n° 2 |
| Da Pag. From Page | | Project: 37285.prg | Page n° 2 |
| Tutta Pag. To Page | | Disegnato: Leporace N. | Appr.: |
| Macchina: Machine: | | Data: 19.11.2008 | Dwg. n°: 37299.S.020-A |
| | | Designer: | Appr.: |

(I) Schema elettrico
 (GB) Electric diagram
 (F) Schemas électriques

(D) Stromlaufplan
 (E) Esquema eléctrica
 (PT) Esquema elétrico

M
61.4
 REV.0-01/16



| | | | |
|-----------------------------------|---|------------|---------------|
| B | Aggiunto cavo connessione scheda WAC (R) solo per versioni AUTO-IDLE. | 15.12.2015 | B.F. |
| A | Aggiunto nucleo toroidale | 13.01.2012 | B.F. |
| Exp. | Modifica | Data | Appr. |
| Denominazione: | Projecto: | Proj. n° | di n° |
| From Page | Denomination: | Page n° | of n° |
| Welding Power/Control vers. CC/CV | | | |
| Disegnatore: | Designer: | Data: | Dis. n° |
| Macchina: | Machine: | Date: | Dwg. n° |
| Leporace N. | | 17.11.2008 | 37298.S.065-B |
| Approvato: | | Appr. | |

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