

# **TS 200 BS/EL TS 200 BS/EL P**

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**232039003 - GB**

## **USE AND MAINTENANCE MANUAL SPARE PARTS CATALOG**



**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](http://www.icim.it)

**INDEX** (for all MOSA models)

M 01	QUALITY SYSTEM	
M 1.01	COPYRIGHT	
M 1.1	NOTES	
M 1.4	NOTES	
M 2- ...	SYMBOLS AND SAFETY PRECAUTIONS	
M 2.3	ABBREVIATIONS LEGEND	
M 2.4	SYMBOLS	
M 2.5...	INSTALLATION AND ADVICE BEFORE USE	
M 2.6	INSTALLATIONS AND ADVICE	
M 2.7	INSTALLATION	
M 3	PACKING	
M 4	TRANSPORT AND DISPLACEMENTS	
M 6	ASSEMBLY: CT.....	
M 20	SETTING-UP THE UNIT (DIESEL ENGINE)	
M 21	ENGINE STARTING AND USE (DIESEL ENGINE)	
M 22	STOPPING THE ENGINE (DIESEL ENGINE)	
M 25	SETTING-UP THE UNIT (GASOLINE ENGINE)	
M 26	STARTING THE ENGINE (GASOLINE ENGINE)	
M 27	STOPPING THE ENGINE (GASOLINE ENGINE)	
M 30	CONTROLS LEGEND	
M 31	CONTROLS	
M 32	CONTROLS (FRONT PANEL)	
M 33	USE AS HYDRAULIC POWER TAKE-OFF	only for TS
M 34	USE AS A WELDER	only for TS
M 35	USE AS AN ENGINE STARTER	only for TS
M 36	USE AS A BATTERY CHARGE	
M 37	USE AS A GENERATOR	
M 38	USE OF THE REMOTE CONTROL	
M 39	USE OF THE ENGINE PROTECTION	
M 40	TROUBLE SHOOTING	
M 43	MAINTENANCE	
M 44	PERIODIC MAINTENANCE	
M 45	STORAGE	
M 46	CAST OFF	
M 51	TECHNICAL DATA	
M 52	TECHNICAL DATA ENGINE DRIVEN WELDER	only for TS
M 53	DIMENSIONS	
M 55	RECOMMENDED ELECTRODES	only for TS
M 60	ELECTRICAL SYSTEM LEGENDE	
M 61	ELECTRICAL SYSTEM	
M 65	HYDRAULIC SYSTEM	
R 1	SPARE PARTS LIST	
.....	SPARE PARTS	
K...	ACCESSORIES	



## 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.*

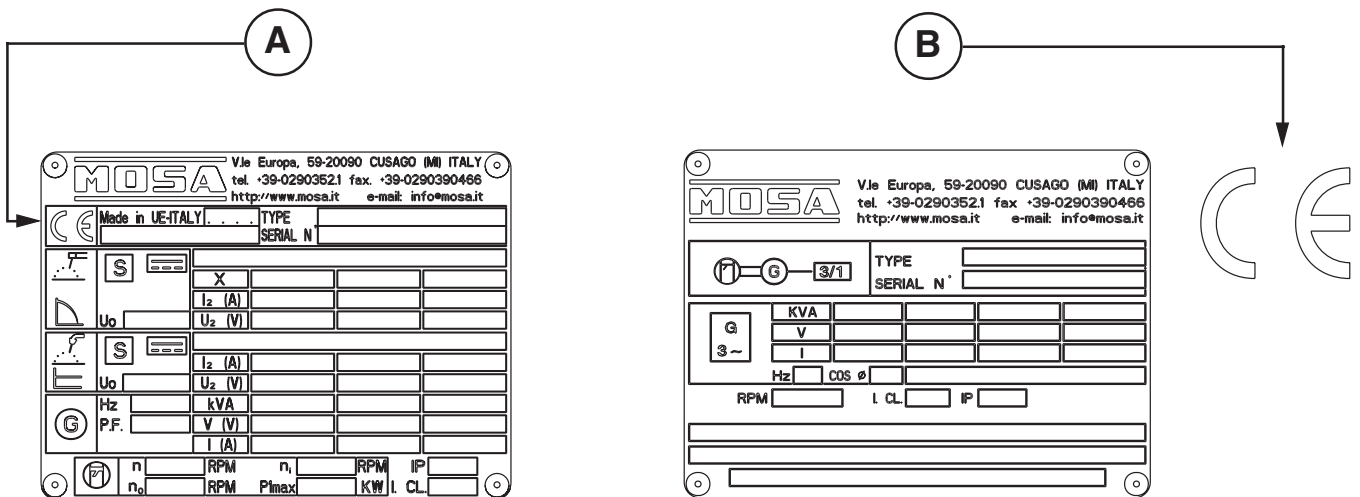


Any of our product is labelled with CE marking attesting its conformity to appliable directives and also the fulfillment of safety requirements of the product itself; the list of these directives is part of the declaration of conformity included in any machine standard equipment.

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)



## 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.


<b>ENGINE</b>	Stop engine when fueling	<b>CHECKING BOARD</b>	Do not touch electric devices if you are barefoot or with wet clothes.
	Do not smoke, avoid flames, sparks or electric tools when fueling.		Always keep off leaning surfaces during work operations
	Unscrew the cap slowly to let out the fuel vapours.		Static electricity can damage the parts on the circuit.
	Slowly unscrew the cooling liquid tap if the liquid must be topped up.		An electric shock can kill
	The vapor and the heated cooling liquid under pressure can burn face, eyes, skin.		
	Do not fill tank completely.		
	Wipe up spilled fuel before starting engine.		
	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			














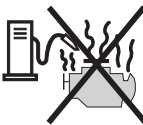





 **FIRST AID.** In case the operator should be sprayed by accident, from corrosive liquids a/o hot toxic gas or whatever event which may cause serious injuries or death, predispose the first aid in accordance with the ruling labour accident standards or of local instructions.

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.

<b>EXTINCTION MEANS</b>	
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.

 <b>WARNING</b>					 <b>CAUTION</b>		 <b>DANGEROUS</b>
							
							

 <b>WARNING</b>	<b>THE MACHINE MUST NOT BE USED IN AREAS WITH EXPLOSIVE ATMOSPHERE</b>
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## 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).



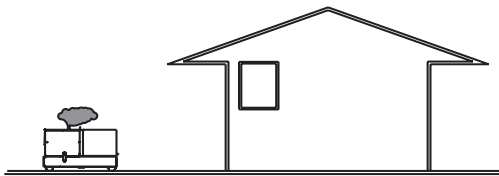
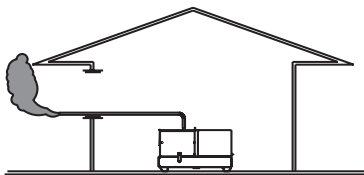
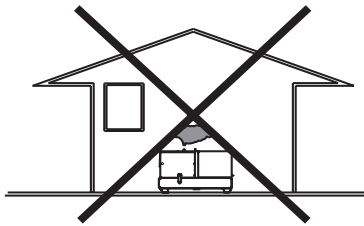
**INSTALLATION AND ADVICE BEFORE USE**

**GASOLINE ENGINES**

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

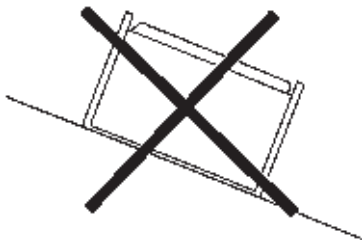
**DIESEL ENGINES**

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

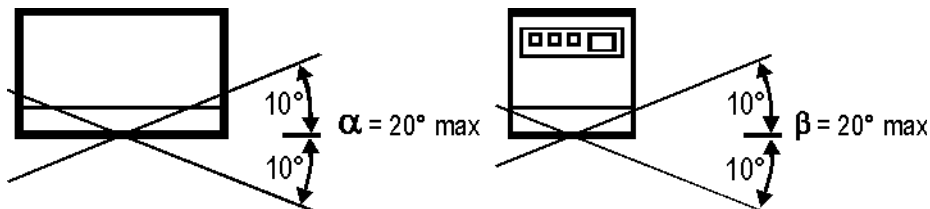


**POSITION**

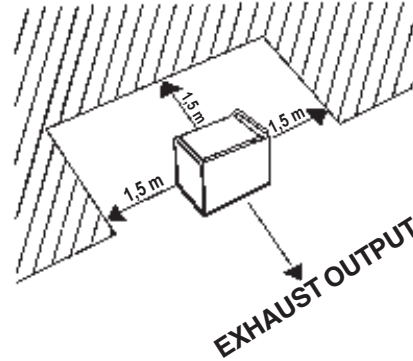
Place the machine on a level surface at a distance of at least 1,5 m from buildings or other plants.



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**

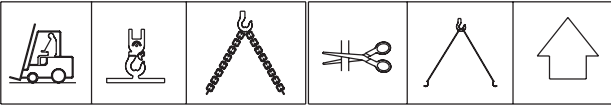
☞ At any move check that the engine is **off**, that there are no connections with cables which impede the moves.

**PLACE OF THE MACHINE**

	<b>ATTENTION</b>
	<p>For a safer use from the operator <b>DO NOT</b> fit the machine in locations with high risk of flood.</p> <p>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.</p>



**NOTE**



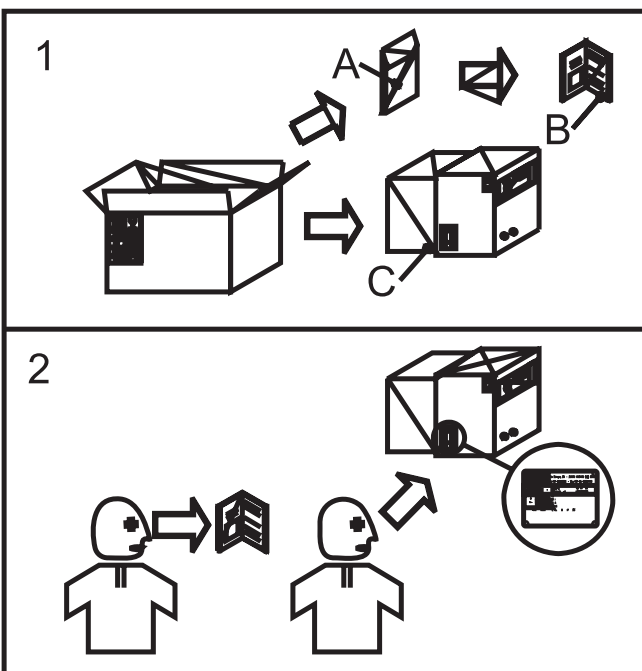
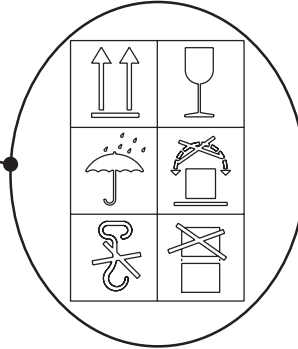
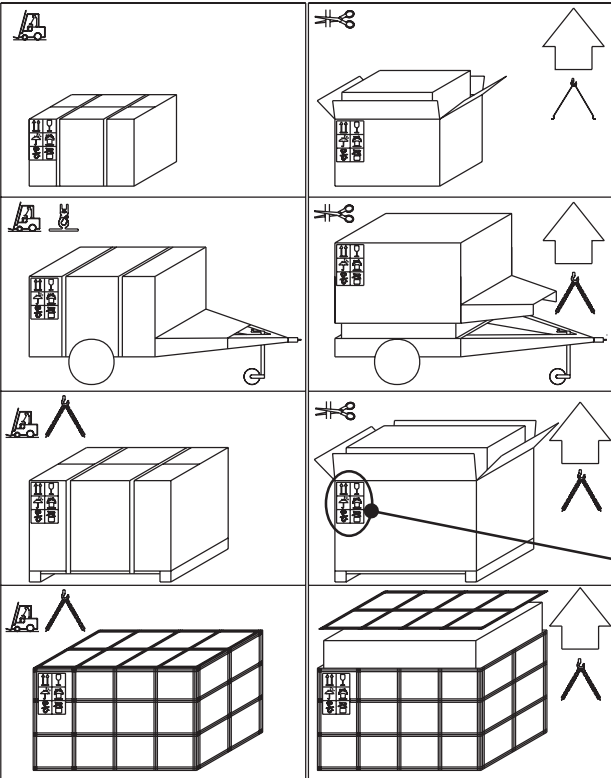
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with its packaging, and conforms to local rules and regulations.

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.

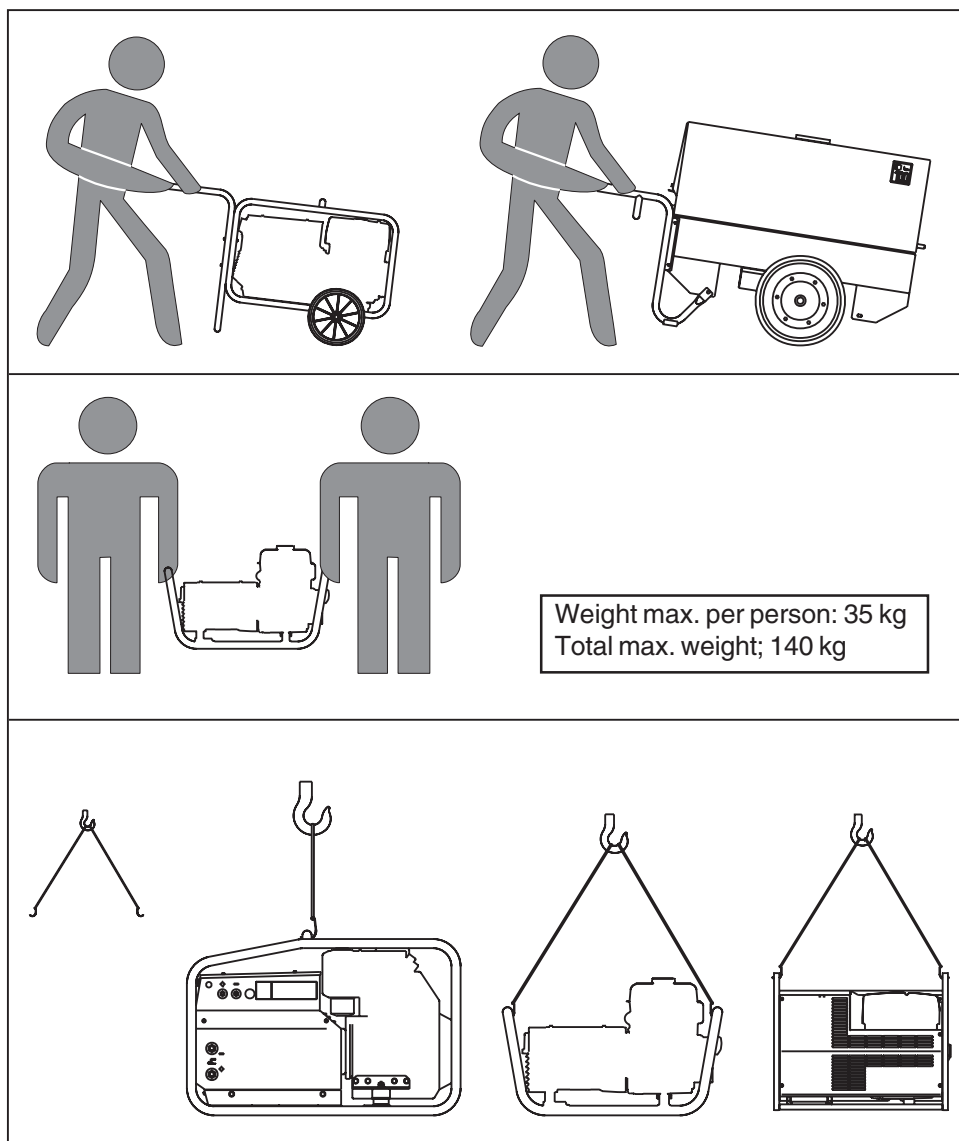
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conform to local rules and regulations.

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 CTM accessory).**

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



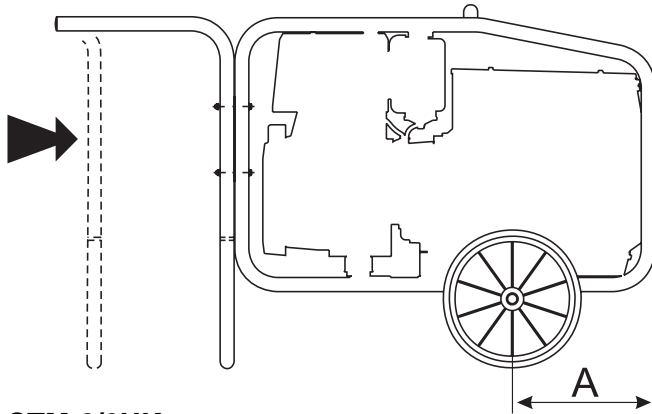


**ATTENTION**

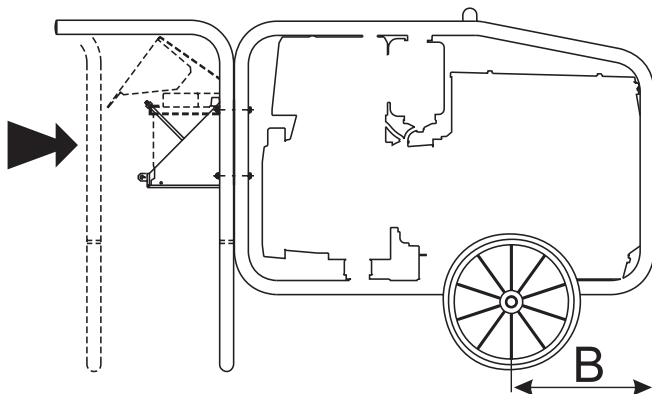
The CTM accessory cannot be removed from the machine and used separately (actioned manually or following vehicles) for the transport of loads or anyway for used different from the machine movements.

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

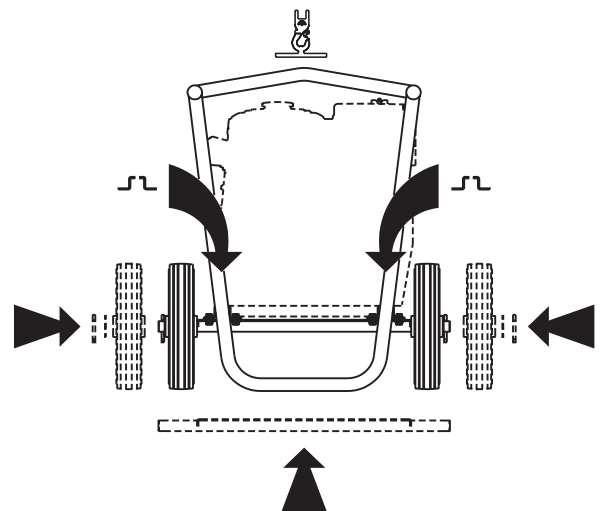
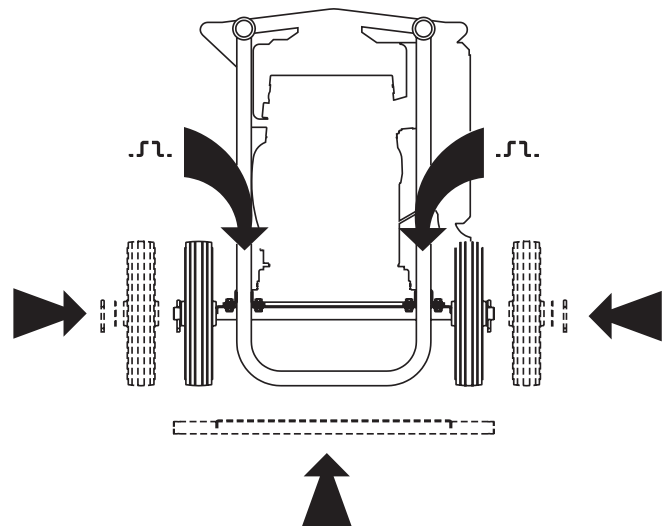
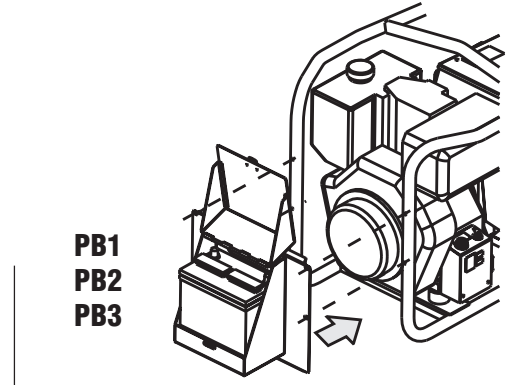
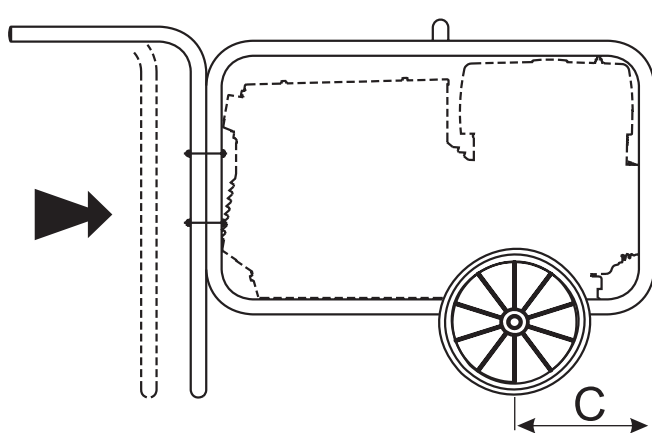
**CTM 6/2**



**CTM 6/6UK**



**CTM 200**



GE 7000 BS/GS	CTM 200	C	145 mm
GE 6000 DS/GS	CTM 6/2	A	310 mm
GE 6000 DES/GS	CTM 6/6UK	B	400 mm
GE 7500 BS/GS	CTM 200	C	205 mm
GE 6500 DS/GS	CTM 6/2	A	400 mm
GE 6500 DES/GS	CTM 6/6UK	B	400 mm





**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**



Check the level of the engine oil using the (appropriate oil dipstick: the level should be between the minimum and maximum marks.

If necessary, add more oil through the appropriate inlet

Fill the air filter using the same oil up to the level indicated on the filter (machine with oil bath air filter).

**OIL RECOMMENDED**

MOSA advises to choose **AGIP** for the type of oil.

Please keep to the label put on the engine for the recommended products.

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

**NOTE:** before starting and switching off, see instructions in the engine owner's manual herewith attached.



**FUEL**

Check the level of fuel in the tank and, if necessary, add more standard gasoline of any type you can buy (e.g. 84-96 ON).



If during the filling of the tank some gasoline is accidentally spilled around the engine chassis, clean it immediately before starting up the engine.

**ENGINE WITH OIL ALERT DEVICE**

The OIL ALERT device will stop the engine in case of no oil or insufficient amount of oil in the engine.

In case one tries to start the engine with oil below the minimum level, the warning light (when assembled) will light and the device will not allow starting.



**CLEANING OF DRY AIR FILTER**

See page M43.



**GROUND CONNECTION**

It is **obligatory** to connect the ground connection point (12) by means of a sure efficient cable (please follow the installation local rules and/or regulations in force) in order to integrate or ensure the working of various electric protection devices referring to the several distribution systems TN.

*The unit can be started only when the above operations have been correctly performed.*

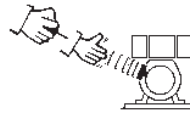


*Check daily*

Pull the rope hard and fast. Pull it all the way out. Use two hands if necessary.

**NOTE**

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



Then returning it slowly.

**ENGINES WITH ELECTRIC START**

Insert the electric protection device (D-Z2-N2) lever towards above and, where mounted, check the isolation monitor (A3) see page M37 -

Check the battery connection with the respective terminals (+) (-).

Open the gasoline cock; use the starter if the engine is cold and the temperature is low.



Introduce the key (Q1), turn it clockwise completely, leaving it as soon as the engine starts and/or the push button (32) (models without key) leaving it as soon as the engine starts.

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

Once the engine is started, with the starter off, let it turn for a few minutes before drawing the load.

Accelerate the machine by means of the right lever (16), when it is assembled.

**ENGINE WITH NO ELECTRIC START**

Insert the electric protection device (D-Z2-N2) lever towards above and, where mounted, check the isolation monitor (A3) see page M37-

Open the gasoline cock; use the starter if the engine is cold and the temperature is low.



Hold the starting handle firmly.

Once the engine is started, with the starter off, let it turn for a few minutes before drawing the load.

Accelerate the machine by means of the right lever (16), when it is assembled.

**EMERGENCY START**

(with rope)

In the versions with electric start, in case of need, it is possible to start the engine with the rope.

**CAUTION**

*If the engine fails to start, do not insist for at least 15 seconds.*

*Space the further operations waiting for at least 4 minutes.*

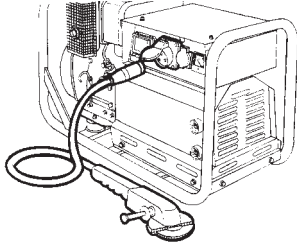
**CAUTION****RUNNING-IN**

*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.*

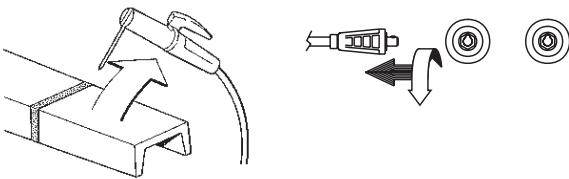


☞ Before stopping the engine **it is compulsory** to effect the following operations:

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



- stop to draw power from the welding sockets (only for TS models).

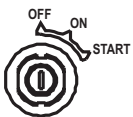


### **ENGINES WITH ELECTRIC START**

☞ Make sure that the machine is not under load.

Wait for a few minutes to allow the engine to cool down, anyway follow the instructions contained in the engine manual.

Shut the gasoline cock.



Take out the key (Q1), turning it counter clockwise (when assembled) or pressing the stop button (32) until the engine stops.

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

### **ENGINES WITHOUT ELECTRIC START**

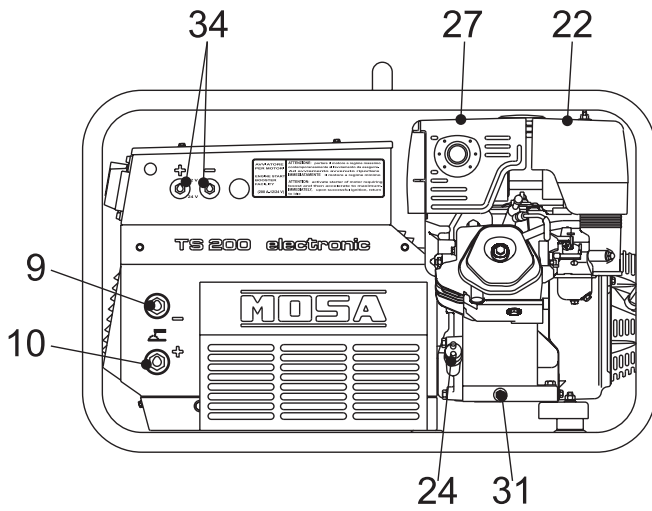
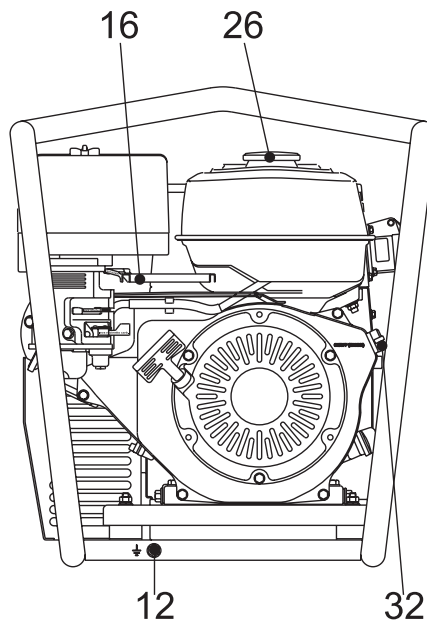
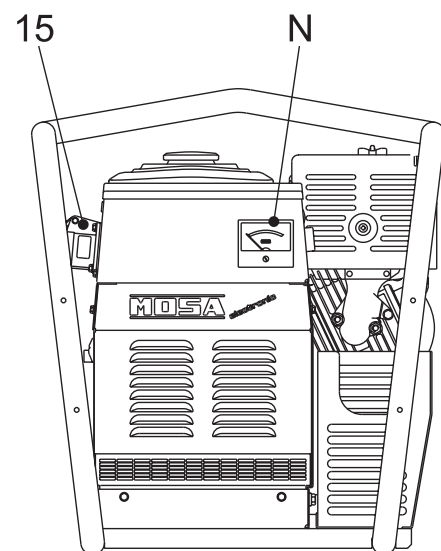
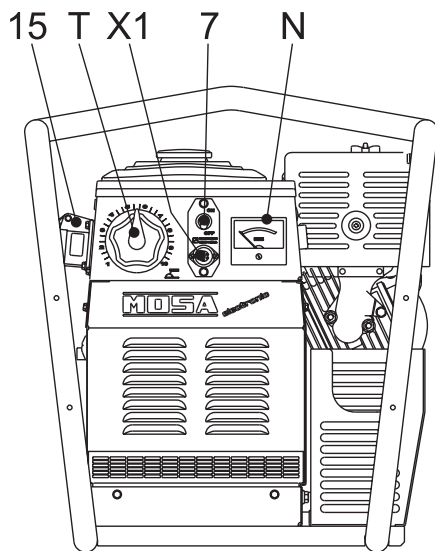
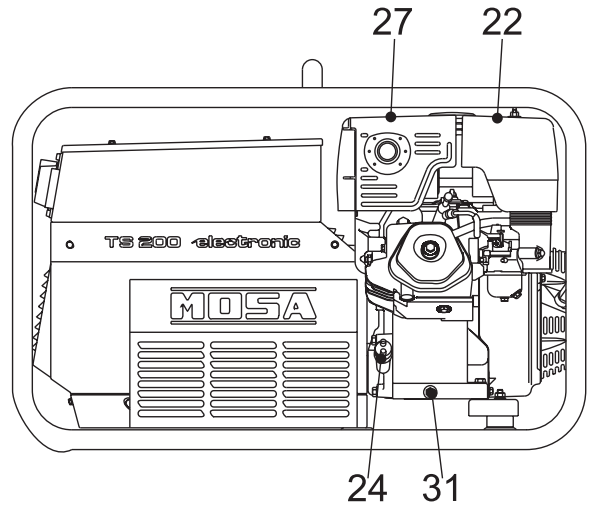
☞ Make sure that the machine is not under load.

Wait for a few minutes to allow the engine to cool down, take however into consideration the prescriptions given in the engine use manual.

Shut the gasoline cock.

Set the engine switch (32) to the OFF position.

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

**TS 200 BS****GE 6000 BS**



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 sockets, after the machine is started (see pages M21-26), also with no cables, are anyway under voltage.



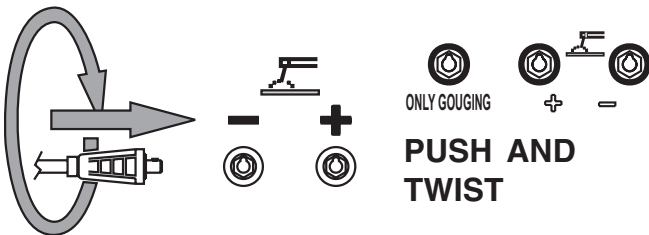
**ATTENTION**

The areas, access of which is forbidden to unqualified personel, 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 (keep to installation local rules and/or to national laws), in order to integrate or ensure the working of varius electric protection devices referring to the several distribution system TT/TN/IT, operation unnecessary for machine with isometer.

Fully insert the welding cable plugs into the corresponding sockets ("only gauging", 9+/10-) 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.

When using the welder for air arc gouging connect the ground lead to the - socket and the gouging lead to the socket marked "only gouging" (if present).

**MACHINES WITH E.V. PROTECTION**

Accelerate the engine at max. with the accelerator lever (16).See page M 39.

**MACHINE WITH E.P.2 PROTECTION (B2)**

Accelerate the engine at max. with the accelerator lever (16) (when assebled).

See page M 39

**MACHINE WITH E.P.1 PROTECTION (D1)**

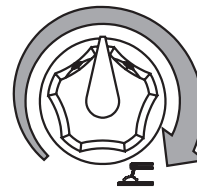
See page M 39.1

**REMOTE CONTROL TC...**



See page M 38

**WELDING CURRENT REGULATOR**



Position welding current adjusting knob (T) in correspondance of the chasen current value, so as to obtain the necessary amperage, taking into acount the diameter and the type of the electrode.

For technical data see page M52



**ATTENTION**

To reduce the risk of electromagnetic interferences, use the minimum lenght 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 and/or M25). 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 Thechnical Assistance Service.



**CAUTION**

With a welding cable length up to 20 m is suggested a section of 35 mm<sup>2</sup>; with longer cables a bigger section is required.



**MACHINE WITH REDUCTION SCALE SWITCH**

100%  
XXX A  
max



For small electrodes (up to Ø 3.25-130A and 4-200A) it is recommended to use the reduction scale switch (I3) allowing a more accurate regulation of the welding current (lever position at 130 A and/or 200A).

When using electrodes of a diameter greater than 3.25 and/or 4 set the welding scale knob to 100% and/or max. position.

The arc regulator (T) functions equally between both positions (100%-130A and/or 200A).



Protection fuse (when assembled):the fuse protects the electronic welding PCB in case the remote control is short circuited.

**MACHINE WITH O.C.V.**

It permits to choose, according to the work to be done and/or the electrode type used, the best O.C.V.



**MACHINE WITH POLARITY INVERTER**



It permits to have at the electrode holder the positive or negative polarity of the welding diode bridge. It is used above all in the first run with cellulosic electrodes to lower the bath temperature and so doing ease up the welding on pipes of small thickness

**MACHINE WITH BASIC CURRENT "BC"**

Positioning the switch on „ON“, is obtained a low voltage welding current which keeps, always, the lit arc necessary for some types of cellulosic electrodes or when a high penetration is wanted.



For electrodes of basic or rutile type, position the switch on "OFF", the welding current will always remain constant.

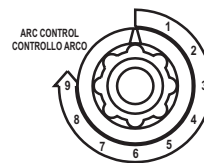
**"CC/CV" MODELS**



These models can be used with electrodes or for TIG welding by selecting the CC (constant current) mode, and with solid wire (MIG, MAG) or flux cored wire selecting the CV (constant voltage) mode. The mode of operation is selected by a switch on the front panel.



**MACHINE WITH ARC CONTROL OR SELECTOR "ARC FORCE"**



Set the welding arc using adjuster knob (6) so as to obtain, for the chosen current value, the best arc characteristic according to the electrode type and to the work to be performed.



On machines with an Arc Force selector, the same result can be obtained by turning the selector "ON" or "OFF". When switched "ON" a base current is applied to the welding current output acting as a sort of "automatic" arc forcing that does not need to be regulated.

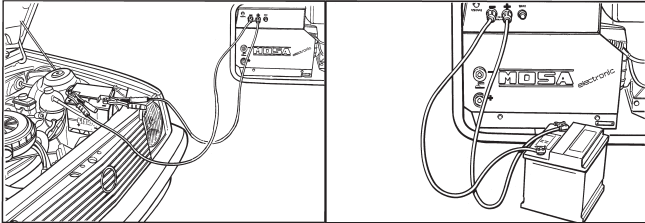
For technical data see page M52

At the end of every welding process and/or work, proceed with all the use operations in inverted sense.

To stop the machine see pages M 22-27.

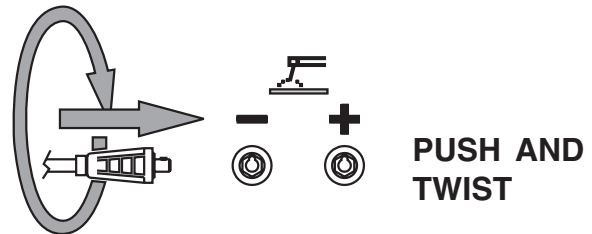
**ENGINE STARTER**

Keep to the advice indicated page M 21, 26 -



Connect the machine with the battery taps (12V or 24V) of the machine engine of which must be started, respecting the polarities (+) et (-).

Fully insert the cable plugs into the corresponding sockets (34-34A) turning them clockwise to lock them in position.  
Accelerate the engine so that the voltmeter (N) shows the value reported on table (\*).



TS Model	Battery voltage	Voltmeter indication(*)	Battery voltage	Voltmeter indication(*)
180	12V	120V	24V	235V
180 P	12V	190V		
181	12V	120V	24V	235V
181 P	12V	190V		
200	12V	120V	24V	235V
200 P	12V	190V		
222	12V	235V	24V	235V

Once the engine is started, bring back the engine IMMEDIATELY to MINIMUM speed.

Disconnect the connection cables of the battery.

**CAUTION**

If the engine fails to start, do not insist for at least 15 seconds.

Space the further operations waiting for at least 4 minutes.

**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.**

**ENGINES WITH ACCELERATOR LEVER**

Connect with the right cable the battery clips and the machine taps respecting the polarities (+) and (-).

Operate the accelerator lever bringing the engine to **MAXIMUM** speed.

Start the engine.

**ENGINE WITHOUT ACCELERATOR LEVER**

Connect with the right cable the battery clips and the machine taps respecting the polarities (+) and (-).

**CAUTION**

It is possible to draw at the same time direct current as battery charger and alternating current (auxiliary).

**MACHINE WITH THERMIC PROTECTION**

If the thermic protection is released, disconnect the cable from the machine.

Reset the thermic protection pressing the central pole.



Then connect again the cable with the machine.

In case the thermic protection should still intervene, check the battery.

If the trouble persists, please turn to your Service Station.

☞ **It is strictly forbidden to connect the group to the public mains a/o to another source of electric power.**



**WARNING**

Sockets are not **self-locked**: tension is available immediately after starting also with no plug.



**WARNING**

The areas, **access** of which is forbidden to unqualified personel, are:  
- the control switchboard (front), the exhaust of the endothermic engine.

☞ At the beginning of every work, check the electric parameters and/or the controls placed on the front.

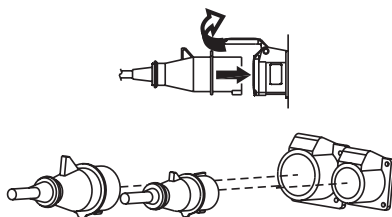
Make sure the unit is properly grounded (12) (where it is assembled).  
- See page M20, 21, 22, 25, 26, 27 -.

Move the accelerator lever (16) and reach the engine maximum speed, except for the engines with constant rpm; the voltmeter (N) (where it is assembled) shows the single-phase voltage whether three or single-phase current has to be drawn.

Nominal voltage	Indicative no-load voltage	
	asynchronous	synchronous (*)
110V	±10%	±5%
230V	±10%	±5%
230V	±10%	±5%
400V	±10%	±5%

\*N.B.: with electronic tens. regul. RVT ±1%

Connect up the machine, using proper plugs and cables in good condition to the AC socket (15) to draw single or three-phase power, or, by cables with adequate section, to the terminal board, placed inside the derivation box (Q3).



The warning light (L), located near the current socket, lights up when the unit can supply alternated current, on condition that the engine is at the maximum rpm.

☞ N.B.: if the warning light does not flash, check the accelerator which must be at its maximum, or the fuse of the relevant socket. (single-phase) or the thermoprotection.

Using several sockets at the same time, the maximum power possible is that indicated on the data plate.

To draw power simultaneously in the TS welder version see page M52.



**CAUTION**

*The replacement of the fuse must absolutely be done with the engine off (remove the mechanical protection, then shift down the small lever of the fuse holder placed on the front panel).*

The max. continuous power of the generating set or the load current must not be exceeded.

**MACHINE WITH THERMOPROTECTION**

If you overload the genset the thermoprotection will automatically switch off. If the thermoprotection is released, disconnect all the connected loads.



CIRCUIT BREAKER

Reset the thermoprotection pressing the central pole.

When reset, connect the loads again. In case the protection should act furtherly, check: the connections, the wires or others, and if necessary call the Assistance Service.



Avoid to hold the central pole of the thermoprotection pressed for a long time.

Otherwise, in case of trouble, it will not click, **damaging** the generating set.





**TS ... PL VERSION**

Start the machine and wait for the end of the preheating time imposed by the EP1, EP2, EP5 engine protection device. - See pages M39... - Press the „generation possibility“ push button (B5) placed on the front side of machine.

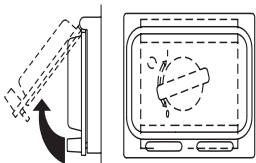
The voltmeter will show the auxiliary voltage which, for machines at 1500/1800 RPM, must. be approx.  $\approx 230V \pm 10\%$  and for machines at 3000/3600 RPM (engine idling) must. be approx.  $\approx 180V \pm 10\%$ .

Push upwards the lever of magnetothermic switch referring to the socket from which load is to be drawn.

**MACHINE WITHOUT PROTECTIVE DEVICE**

In case machine is not equipped with protective device of indirect contacts, by means of automatic breaking of supply, it is **necessary** to put between the load and the generation a differential switch or a similar equipment capable, in any case, to observe the regulations in force CEI 64/8 (and/or successive) Part 4 Par. 4.13.1 and harmonized by directive Nr. 72/23/EEC.

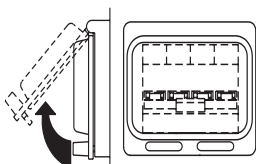
**UNIT FITTED WITH GROUND FAULT INTERRUPTER SWITCH (GFI)**



Turn on the GFI safety-switch (D) by pushing it upwards.

The GFI is a safety device which protects the circuit in the event of a malfunction. In this case the switch disconnects the three and single-phase circuit when in any part of the electric connections a current leakage of more than 30 mA occurs.

**UNIT FITTED WITH THERMAL MAGNETIC BREAKER**

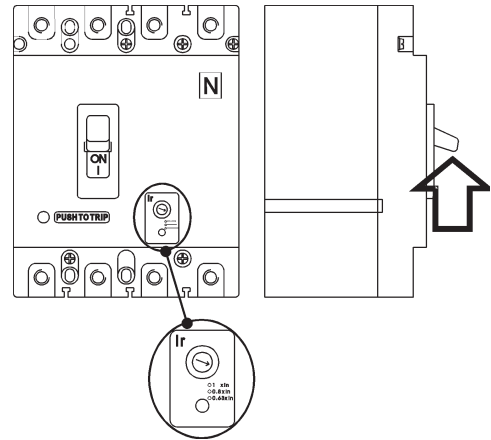


Turn on the thermal magnetic breaker (Z2) by pushing it to the ON position.

The thermal-magnetic breaker is a safety device which protects the circuit in the event of a malfunction. In this case the switch disconnects the three and single-phase circuit when in any part of the electric connections a short circuit or a current absorption occurs above the data specified on the label of the unit.

In the model with setting **DO NOT INTERVENE** on the setting itself. To modify it, please contact our Technical Assistance Service.

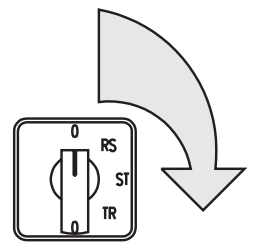
**UNIT FITTED WITH GFI SWITCH THERMAL MAGNETIC BREAKER**



This switch includes the characteristics of both types of breakers (N2).

**UNIT WITH VOLTMETRIC COMMUTATOR (ONLY FOR GENERATING SET)**

**WARNING:** the possible single-phase loads must be correctly divided in the three phases, in order to avoid any possible voltage fall on one phase that results excessively loaded.



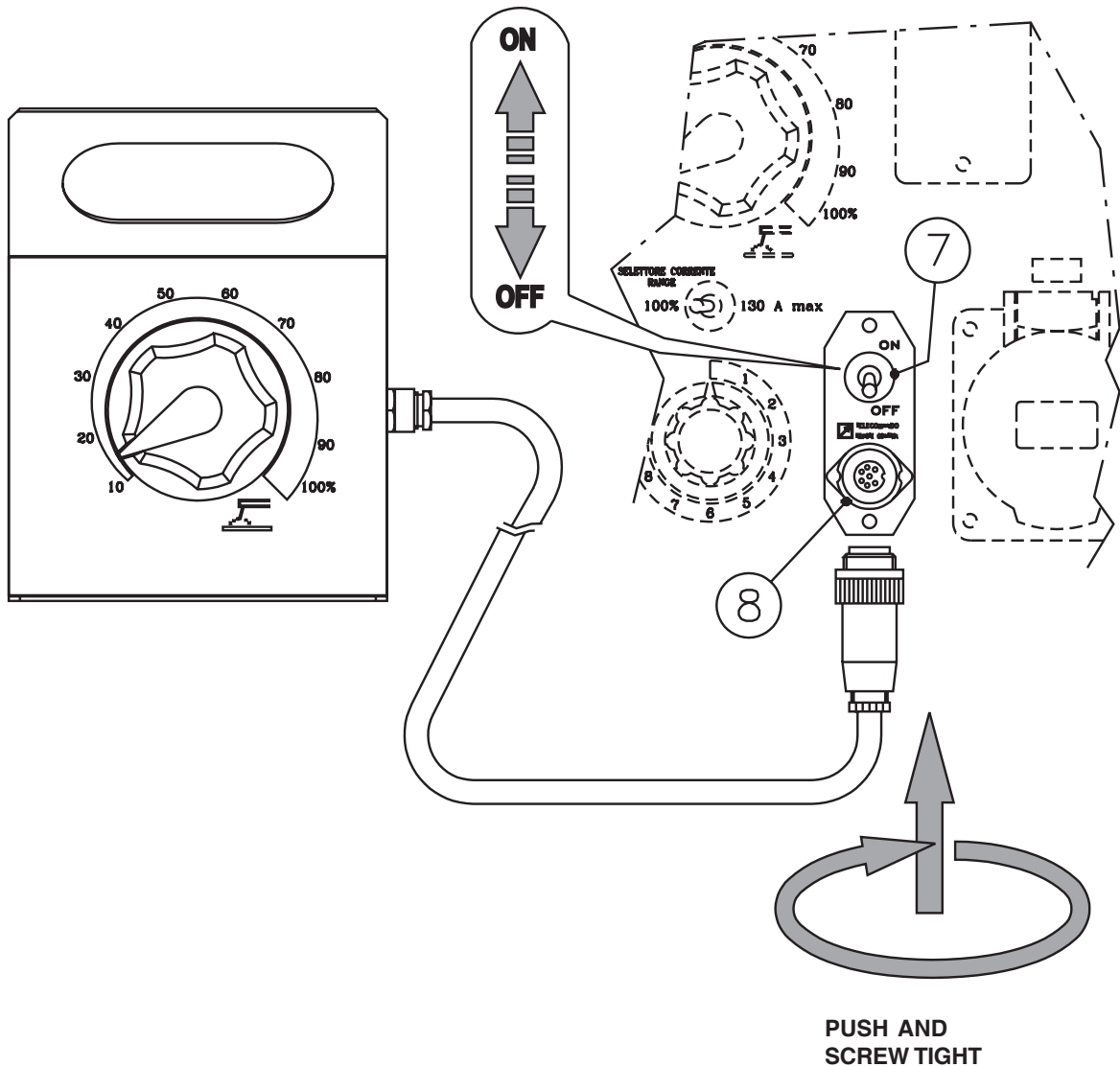
Check the voltages on the various phases with the switch located on the front (H2) and check, reading on the voltmeter (N) about the same voltage value

**N.B.:** in case of overload, it is possible that the engine lowers its speed and the voltage is reduced remarkably. In this case, it is necessary to reduce immediately the load.

**CAUTION**

For machines at 3000/3600 RPM the EP1 safety device will automatically provide to accelerate engine when load is drawn.  
- See page M39.1 -





The remote control device for regulating the welding current is connected to the front panel by means of a multipole connector.

To regulate the current from the TC2 / TC2/50, move the switch (7), located above the multipole connector (8), to "ON" position.

Position welding current adjusting (T) knob at the necessary current value for the diameter and type of electrode.

- See page M51 -

PROBLEM	POSSIBLE CAUSE	WHAT TO DO
No welding current but auxiliary output is OK	1) Defective diode bridge 2) Problem with welding current control (PCB)	1) Check the diodes of the bridge 2) Is the remote control switch in the internal position? 3) Check the diodes and SCR's of the bridge. 4) Check the transformer which supplies power to the welding control PCB. If it is OK replace the PCB
Weld poorly	1) Defective diode bridge  2) Problem with welding current control (PCB)	1) Check the open circuit welding voltage. If it is OK the diode bridge is OK. If it is 1/3 or 2/3 of the nominal value check the diodes or the SCR's. 2) If the diode bridge is OK replace the PCB.
Intermittently welds poorly	1) Bad connections to welding current PCB  2) Problem with welding current control PCB	1) Check that the pins of the green connectors are clean and making good contact. Check that shunt connections are tight.  2) Replace the welding current control PCB
No welding output and no auxiliary power output	1) Short circuit in wiring  2) Defective condenser  3) Defective stator  4) Short circuited diode bridge	1) Check the wiring inside the welder for a short circuit between cables or to ground.  2) If the wiring is OK, short circuit the condenser to be sure that it is discharged, disconnect all wires from condenser and, using an ohmmeter, check that the condenser is not short circuited.  3) If the condenser box is OK, disconnect all leads from the stator except for those going to the condenser box and check the output from the alternator. If there is no output from the welding winding and the auxiliary winding, replace the stator.  4) If there is output from all windings reconnect the diode bridge and check if there is welding current. If not the diode bridge is defective. If there is welding current connect the auxiliary power leads one at a time until there is no output; at this point, the short circuit is in that line.

[ . ] only for models with electronic control of welding current.



**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.

**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



**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.



**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 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**



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 TS 200 BS 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	TS 200 BS EL	TS 200 BS EL-P
<b>ALTERNATOR</b>	self-excited, self-regulated, brushless	
Type	Three-phase, asynchronous	
Insulating class	H	
<b>A.C. GENERATOR</b>		
Three-phase generation	6 kVA / 400 V / 8.7 A	
Single-phase generation	4 kVA / 230 V / 17.4 A	
Single-phase generation	2 kVA / 110 V / 18.2 A	
Frequency	50 Hz	
Service	100 %	
<b>ENGINE</b>		
Mark	HONDA	
Model	GX 390	
Type	4-Stroke	
Displacement	389 cm <sup>3</sup>	
Cylinders	1	
Output	8.3 kW (211.3 HP)	
Speed	3000 rpm	
Fuel consumption	313 g/kWh	
Cooling system	Air	
Engine oil capacity	1.1 l	
Starter	Recoil	
Fuel	Gasoline	
<b>GENERAL SPECIFICATIONS</b>		
Battery	12V - 45Ah	
Tank capacity	6.5 l	
Running time (60%)	3.5 h	
Protection	IP 23	
Dimensions / max. (LxIhx in mm) *	870x525x590	
Weight	105 Kg	
Noise Level	98 LWA (73 dB(A) - 7m)	
* Dimensions and weight are inclusive of all parts without wheels and towbar CTM.		

## OUTPUT

Declared powers at the following ambient conditions: temperature 20°C, relative humidity 30% altitude 100 m above sea level. In an **approximative** way one reduces: of 1% every 100 m altitude and of 2.5% for every 5°C above 25°C.

For possible modifications or changes to be brought on the engines, with climate conditions different from those above mentioned, please call our Assistance Authorized Centers.

## ACOUSTIC POWER LEVEL

The machine respects the noise limits, expressed in sound power, given in the a.m. directives.

These limits can be used to judge the sound level produced on site.

For example: the sound power level of 100 LWA.

The sound pressure (noise produced) at 7 meters distance is about 75dBA (the limit value less 25).

To calculate the sound level at other distances use this formula:

$$dBA_x = dBA_y + 10 \log \frac{r_y^2}{r_x^2} \quad \text{At 4 meters the noise level becomes: } \frac{r_y^2}{r_x^2} = 75 \text{ dBA} + 10 \log \frac{7^2}{4^2} = 80 \text{ dBA}$$

**Technical data**

**TS 200 BS EL**

**TS 200 BS EL-P**

D.C. WELDING C.C.

Welding current regulation

20 - 155

20 - 170 A

Service

155 A - 60%, 120 A - 100%

170 A - 60%, 140 A - 100%

Welding voltage

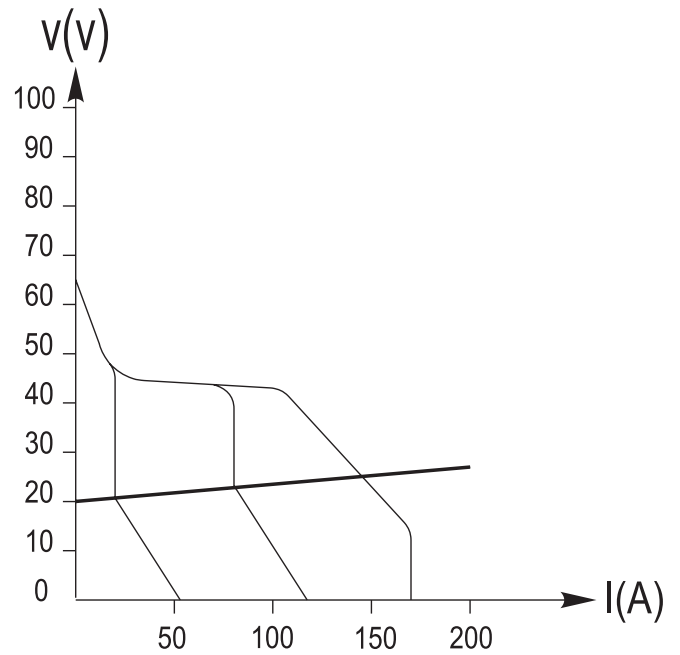
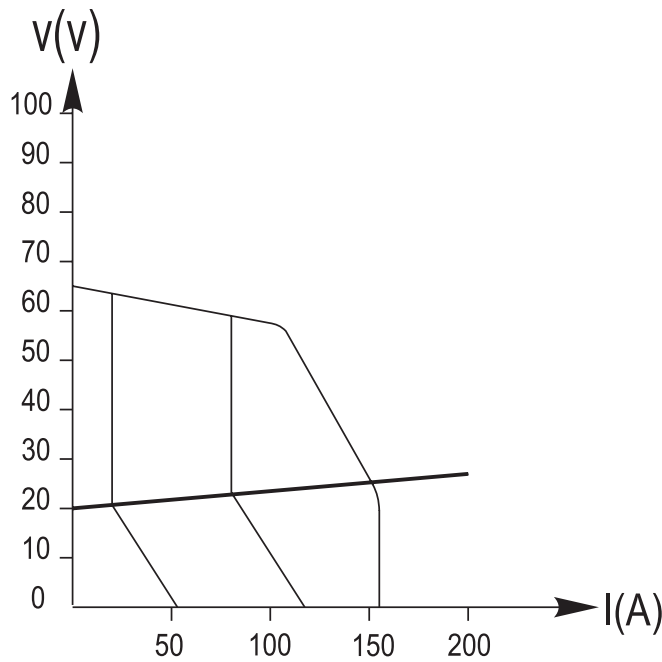
56 V

56 V

**OUTPUT CHARACTERISTIC**

**TS 200 BS EL**

**TS 200 BS EL-P**

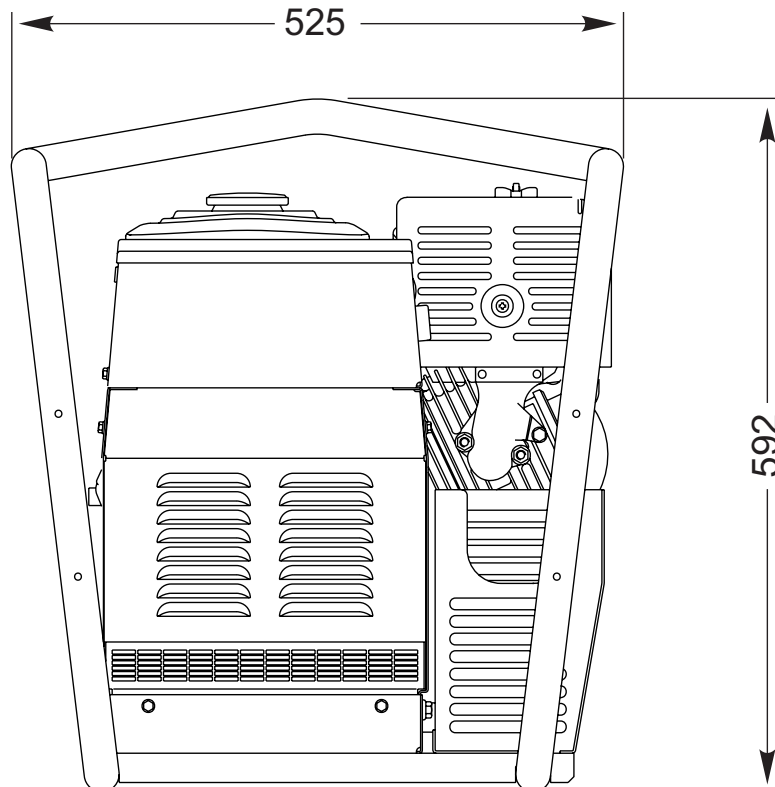
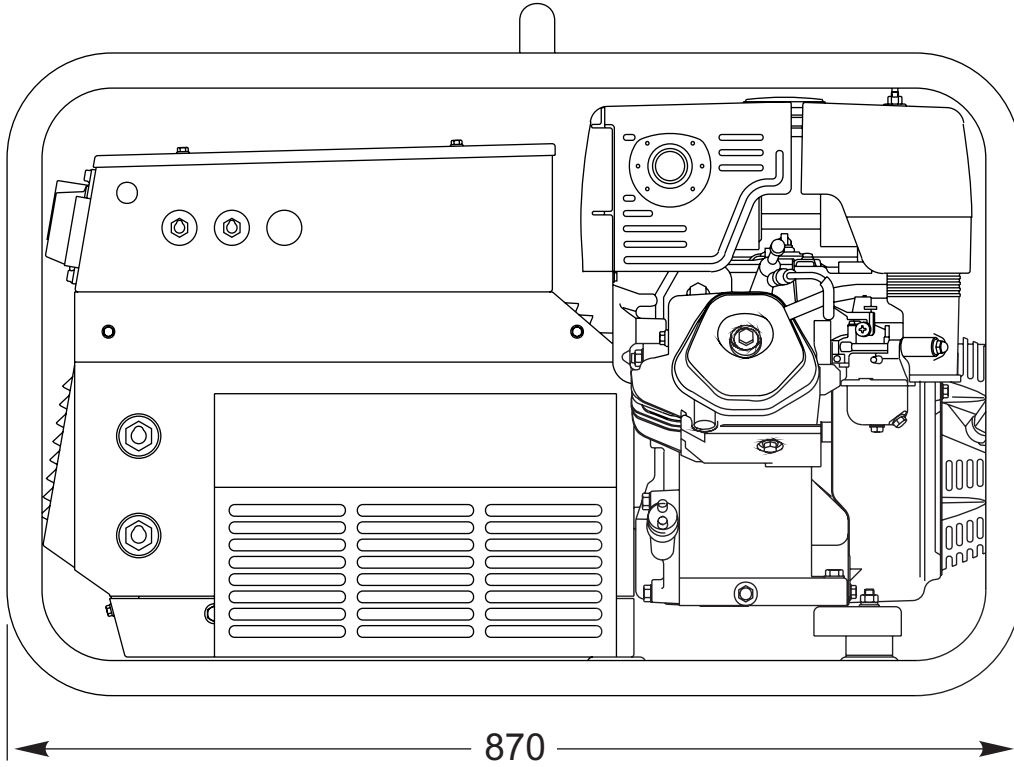


**SIMULTANEOUS UTILIZATION FACTORS**

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:

<b>WELDING CURRENT</b>	<b>&gt;155 A</b>	<b>120 A</b>	<b>70 A</b>	<b>0</b>
<b>AUXILIARY POWER</b>	<b>0</b>	<b>1.8 kVA</b>	<b>4 kVA</b>	<b>6 kVA</b>





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/mm<sup>2</sup>. 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.

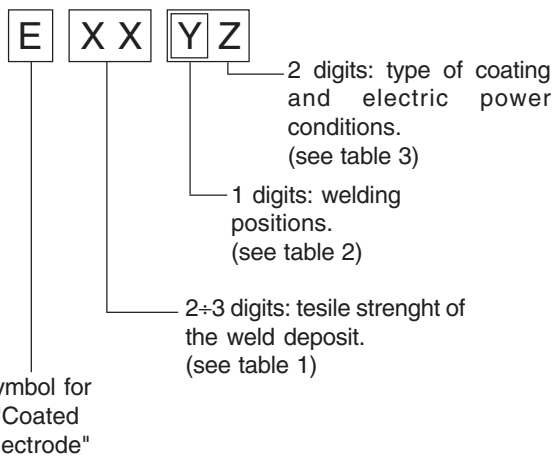
#### HIGH YIELD BASIC ELECTRODES: E 7018

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/mm<sup>2</sup>. Weld in all position. volatile slag.

## ELECTRODES IDENTIFICATION ACCORDING TO A.W.S. STANDARDS



Number	Strength	
	K.s.l.	Kg/mm <sup>2</sup>
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

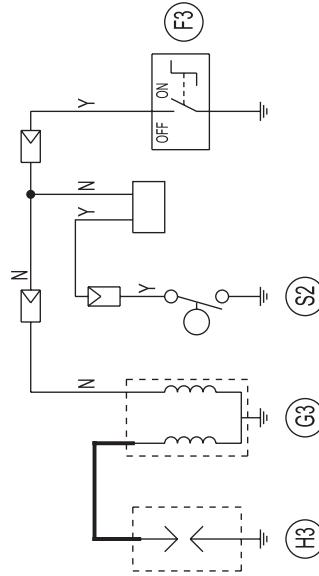
N°	Descrizione
10	Cellulose electrodes for d.c.
11	Cellulose electrodes for a.c.
12	Rutile electrode for d.c.
13	Rutile electrode for a.c.
14	High yield rutile electrodes
15	Basic electrodes for d.c.
16	Basic electrodes for a.c.
18	High yield basic electrodes for d.c. (inverse polarity)
20	Acid electrodes 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: R.C. net
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:
D2: Ammeter	D5: Actuator	D8:
E2: Frequency meter	E5: Pick-up	E8:
F2: Battery charge transformer	F5: Warning light, high temperature	F8:
G2: Battery charge PCB	G5: Commutator auxiliary power	G8: Polarity inverter two way switch
H2: Voltage selector switch	H5: 24V diode bridge	H8:
I2: 48V a.c. socket	I5: Y/s commutator	I8:
L2: Thermal relay	L5: Emergency stop button	L8:
M2: Contactor	M5: Engine protection EP5	M8:
N2: G.F.I. and circuit breaker	N5: Pre-heat push-button	N8:
O2: 42V EEC socket	O5: Accelerator solenoid PCB	O8:
P2: G.F.I. resistor	P5: Oil pressure switch	P8:
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 relais	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:

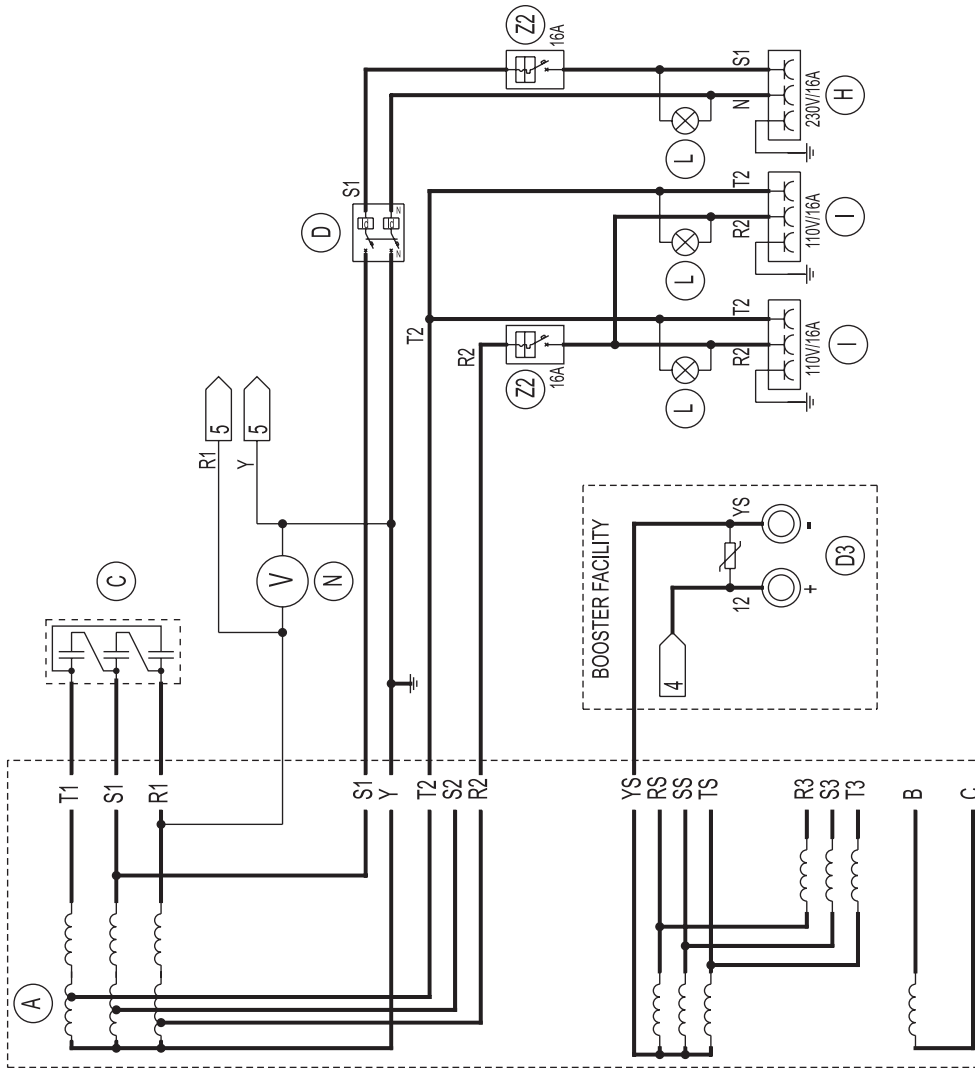
**MOTORI HONDA**  
**HONDA ENGINES**

**AVVIAMENTO A STRAPPO**  
**MANUAL RECOIL STARTER**

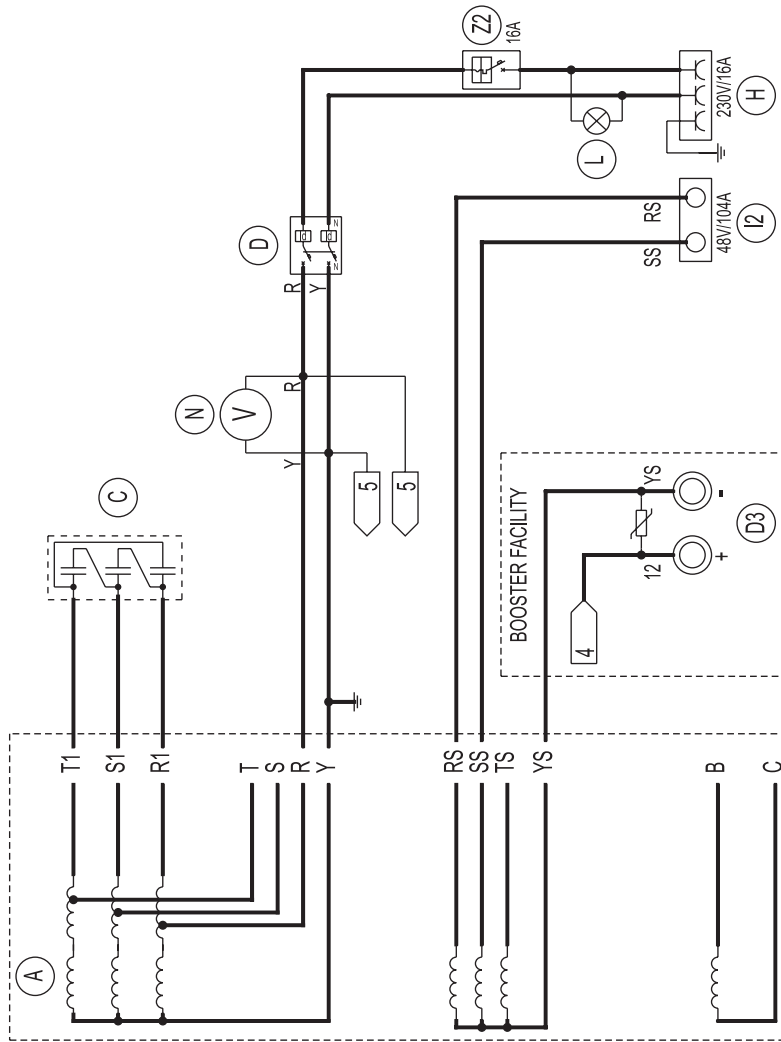


LEGENDA COLORI KEY COLOR	
B	NERO/BLACK
Y	GIALLO/YELLOW

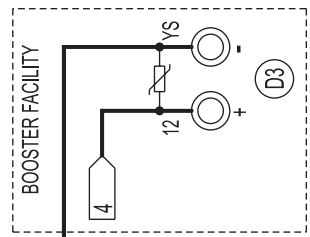
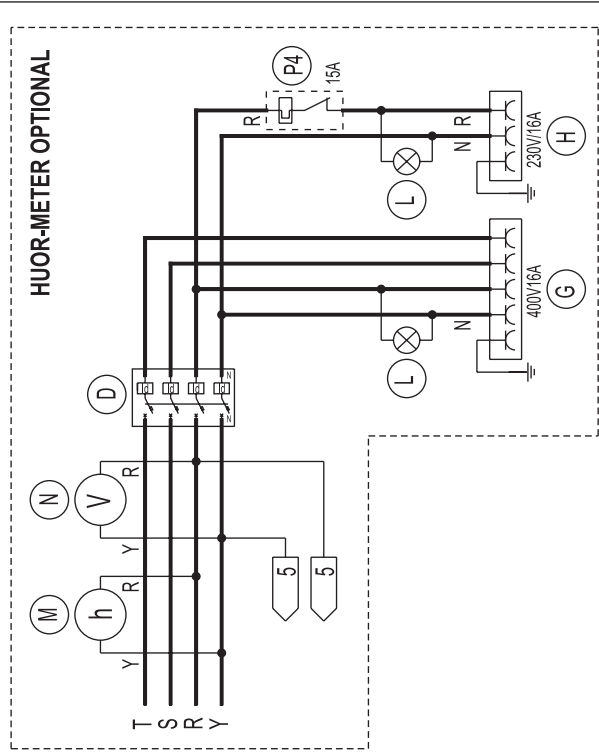
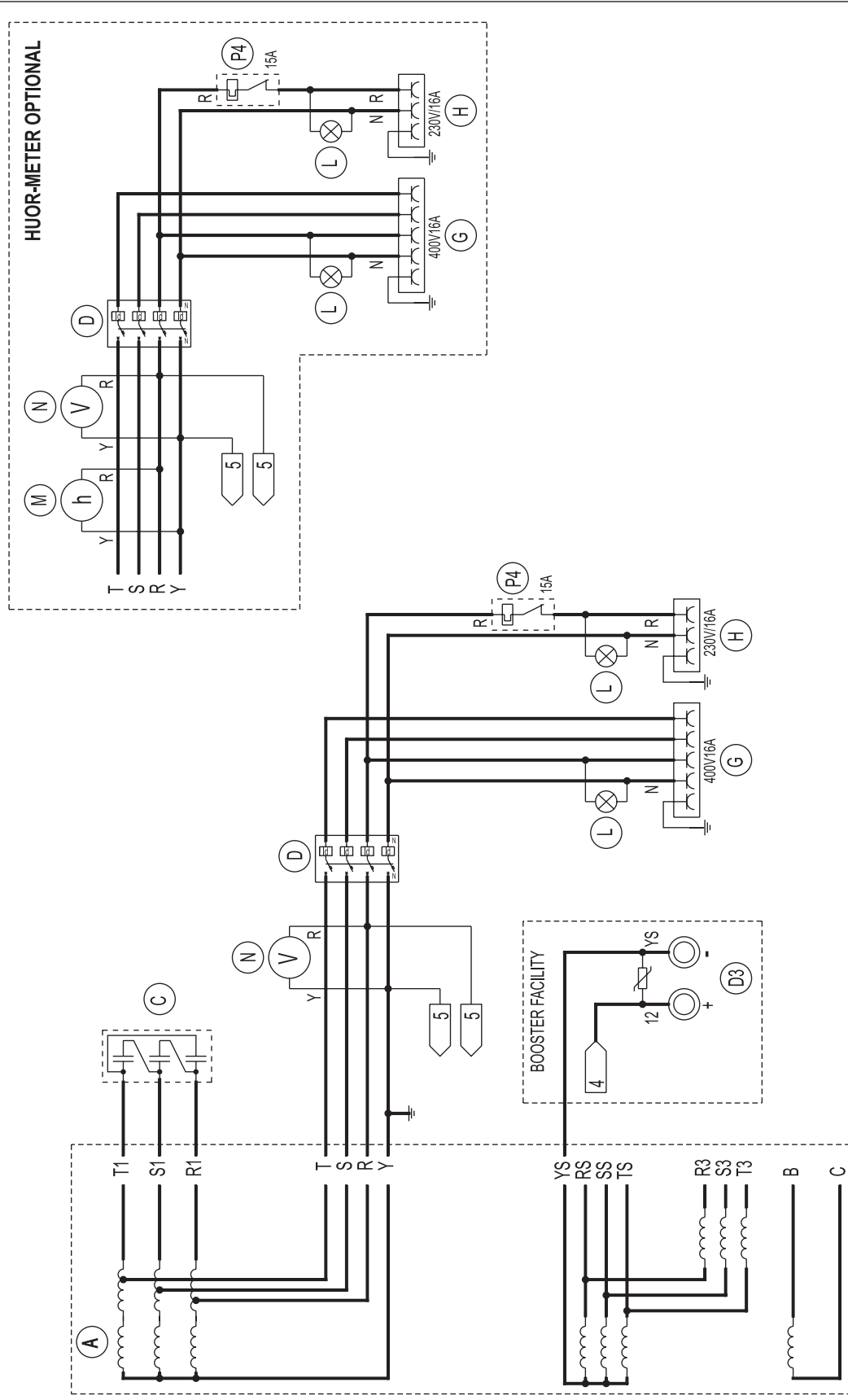
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	Engine Honda (manual recoil starter-oil alert)	23212.ptg	2	
Denominazione:		Progetto:	Pag.n° di n°	
Macchina:		Disegnato:	-	
20090-CUSAGO (MI)-ITALY		Leporace N.	-	
La MOSA si riserva a termini di legge la proprietà del presente disegno con diritto di riproduzione o comunicato a terzi senza sua autorizzazione		Data:	-	
		20/12/2000	-	
		Dis n.:	-	
		23212.S.010	-	
		Approvato:	-	
			-	



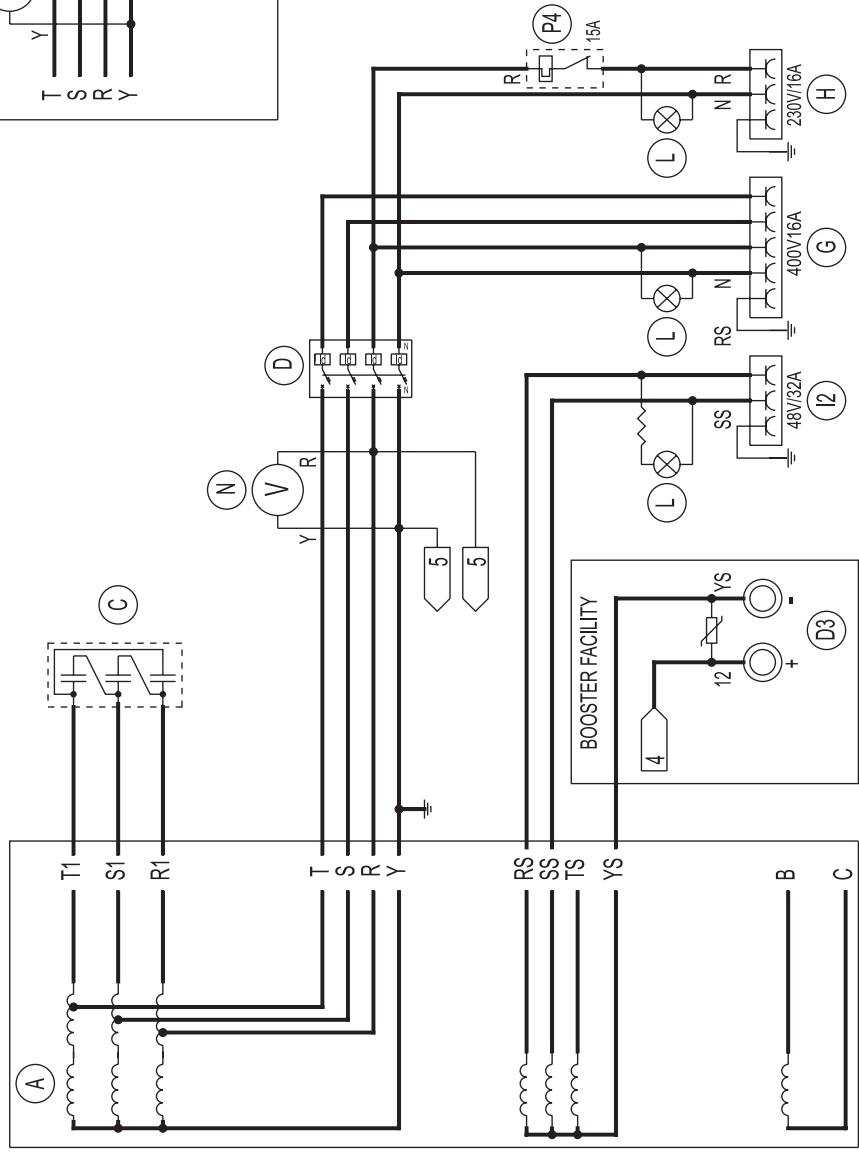
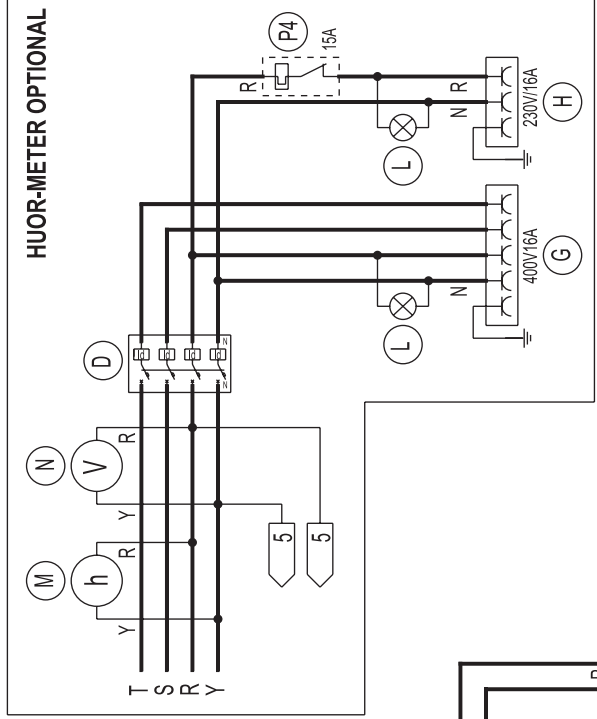
Modifica	Dis.	Apr.	Dis.	Apr.
Denominazione: <b>AUX. (230M/110CTEX2) DM</b>	Progetto:	Pac.n°	di n°	
Macchina: <b>TS 200 BS/ELP</b>	Disegnatore: <b>Leporace N.</b>	Data:	Dis n°:	23202.S.020
La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione		Approvato: 		



Esp.	Modifica	Data	Dis.	Appr.
	Denominazione: AUX. (230M/48M) DM	Progetto: 23203.prg	Pag. n° 3	di n° 5
	Macchina: TS 200 BS/EL	Disegnato: Leporace N.	Dis. n°: 23203.S.020	Approvato: <i>[Signature]</i>
	Data: 20/12/2000			
La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurre o comunicare a terzi senza sua autorizzazione				

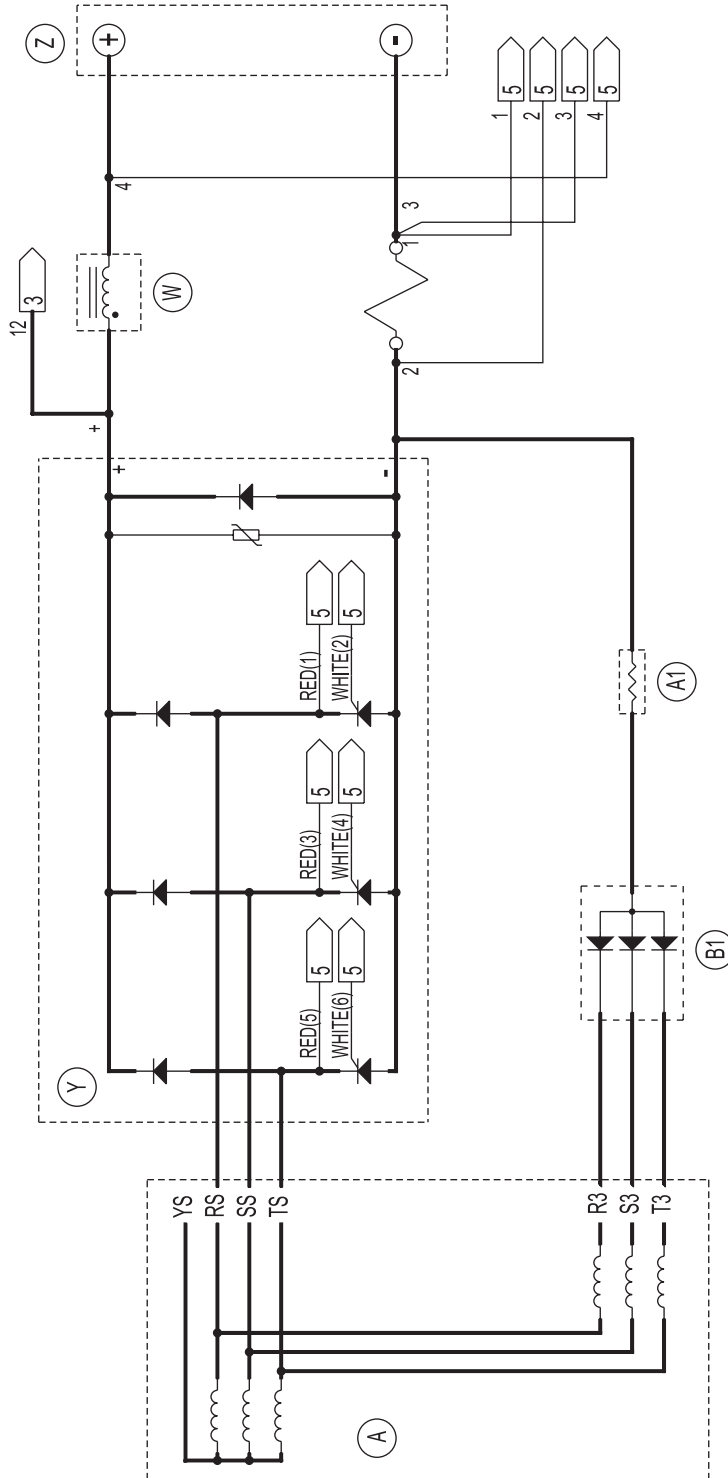


Esp.	Modifica	Data	Dis.	Appr.
	Denominazione:	Progetto:	Pag.n°	di n°
	AUX. (400T/230M) DT	23212.prg	3	5
	Macchina:	Data:	Dis n°:	Approvato:
	TS 200 BS/ELP	20/12/2000	23212.S.020	<i>Grasso</i>
Disegnatore: Leporace N.				
La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione				



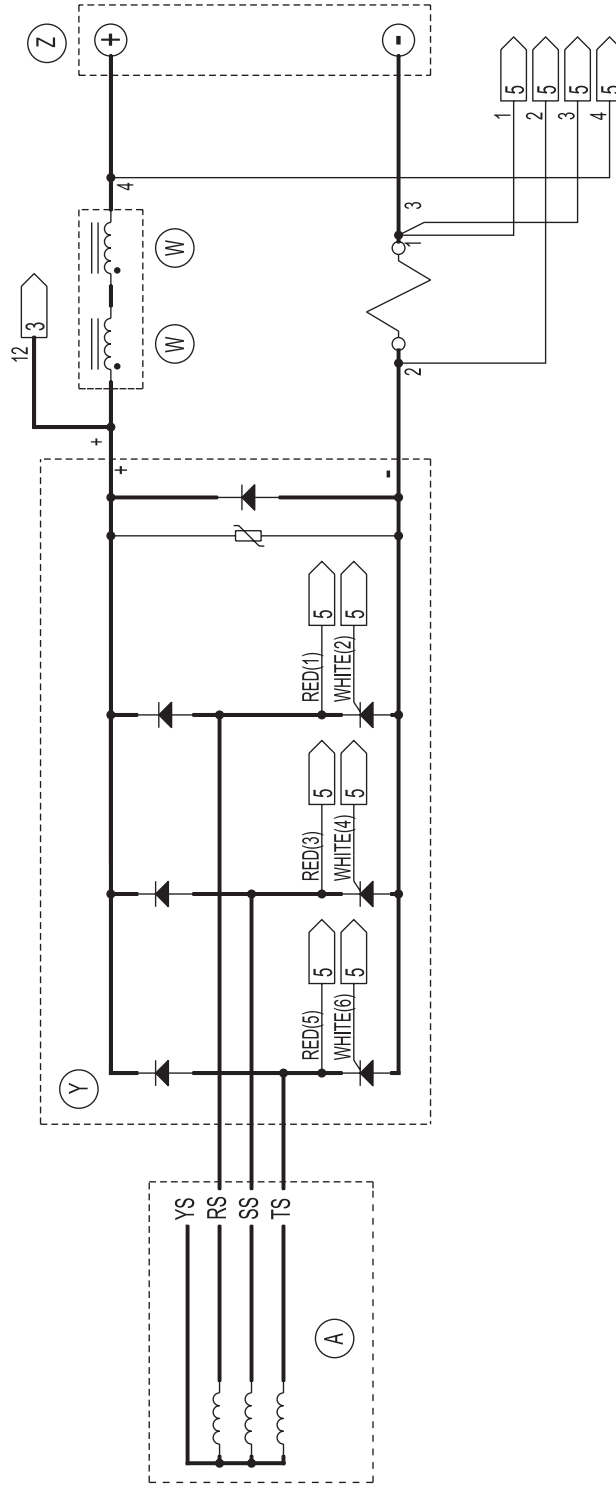
Espl.	Modifica	Data	Dis.	Appr.
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	Macchina:	Data:	Dis n°:	Approvato:
	TS 200 BS/EL	20/12/2000	23213.S.020	<i>[Signature]</i>
La MOSA si riserva i termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione				



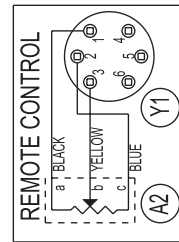
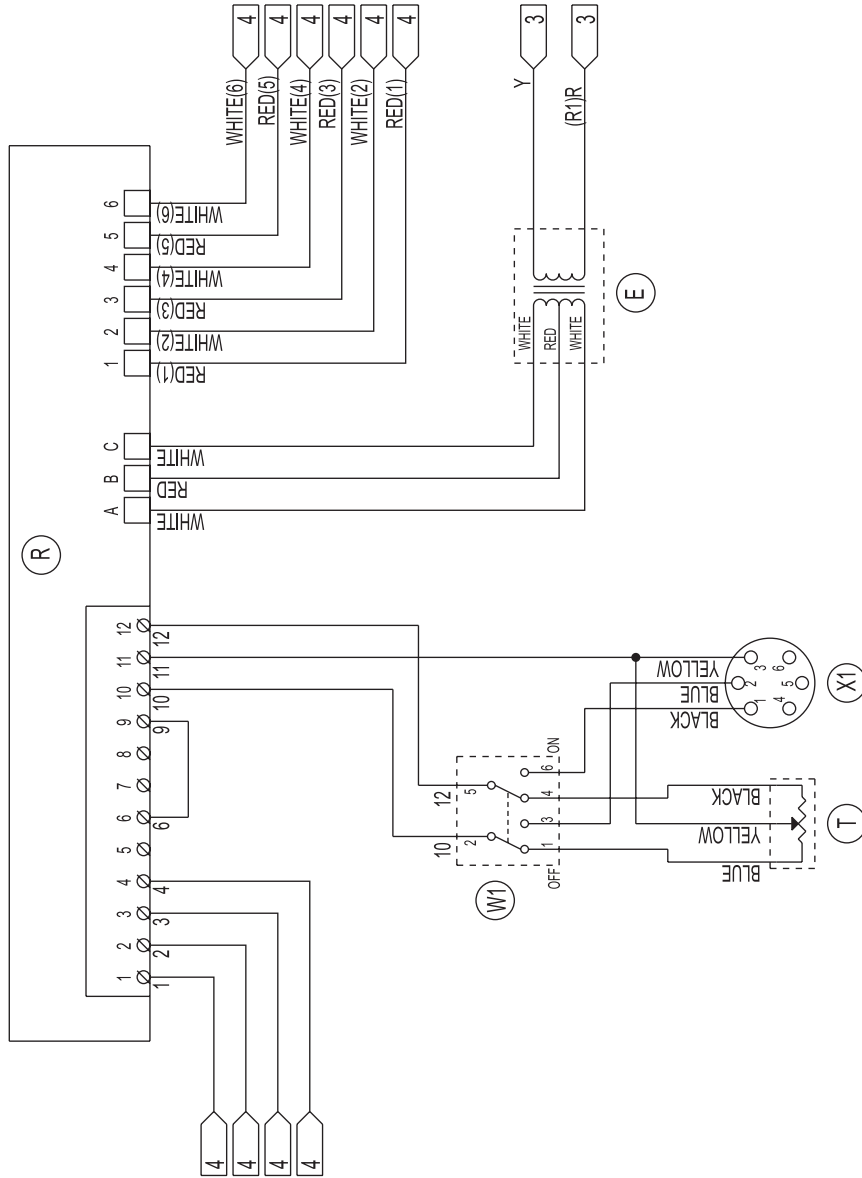


Esp.	Modifica	Data	Dis.	Appr.
	Denominazione: Weldong Power	Progetto: 23212.prg	Pag.n° 4	di n° 5
	Macchina: TS 200 BS/ELP	Disegnatore: Leporace N.	Dis n°: 23212.S.030	Approvato: <i>[Signature]</i>
		Data: 20/12/2000		

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



Esp.	Modifica	Data	Dis.	Appr.
		Progetto:	Pagn.º	di n.º
		23213.prg	4	5
		Dis. n.º:	Approvato:	
		23213.S.030	<i>[Signature]</i>	
	Denominazione:	Disegnatore:	Data:	
	Welding Power	Leporace N.	20/12/2000	
	Macchina:	La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione		
	TS 200 BS/EL			
	MOSA			
	20090-CUSAGO (MI)-ITALY			



Esp.		Modifica		Data		Dis.		Appr.	
Denominazione: <b>Welding Control</b>		Progetto: 23212.prg		Pag.n° 5		Dis.n° 23212.prg		Pag.n° 5	
Macchina: <b>TS 200 BS/ELP</b>		Disegnatore: <b>Leporace N.</b>		Data: 20/12/2000		Dis.n°: 23212.S.040		Approvato: <i>[Signature]</i>	
MOSA 20090-CUSAGO (MI)-ITALY La MOSA si riserva a termini di legge la proprietà del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione									



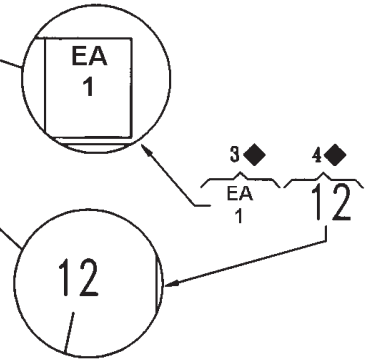
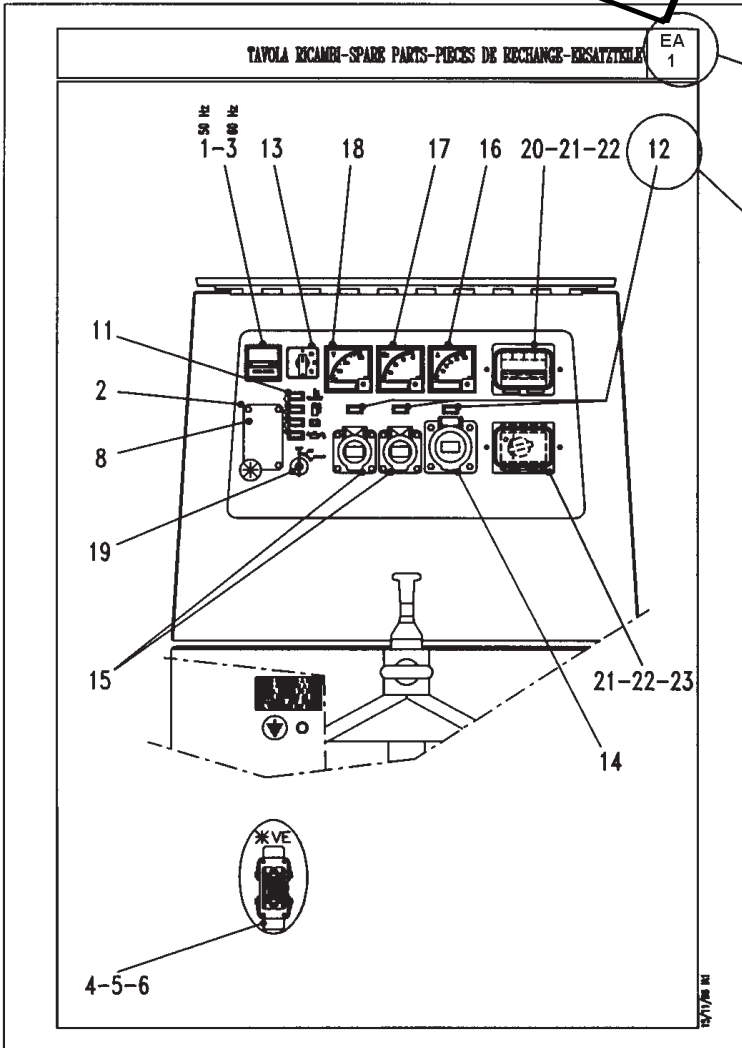
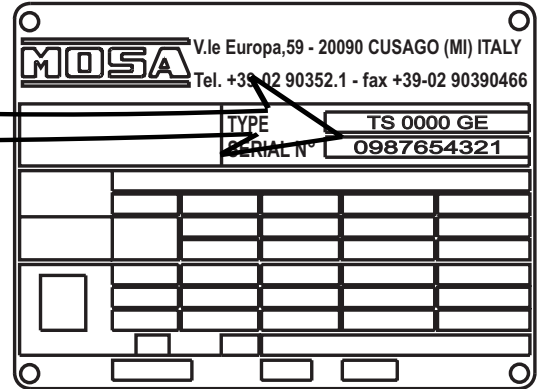
**MOSA guarantees that any request for spare parts will be satisfied.**

To keep the machine in full working order, when replacement of MOSA spare parts is required, always ask for genuine parts only.

The requested data are to be found on the data plate located on the machine structure, quite visible and easy to consult. \*

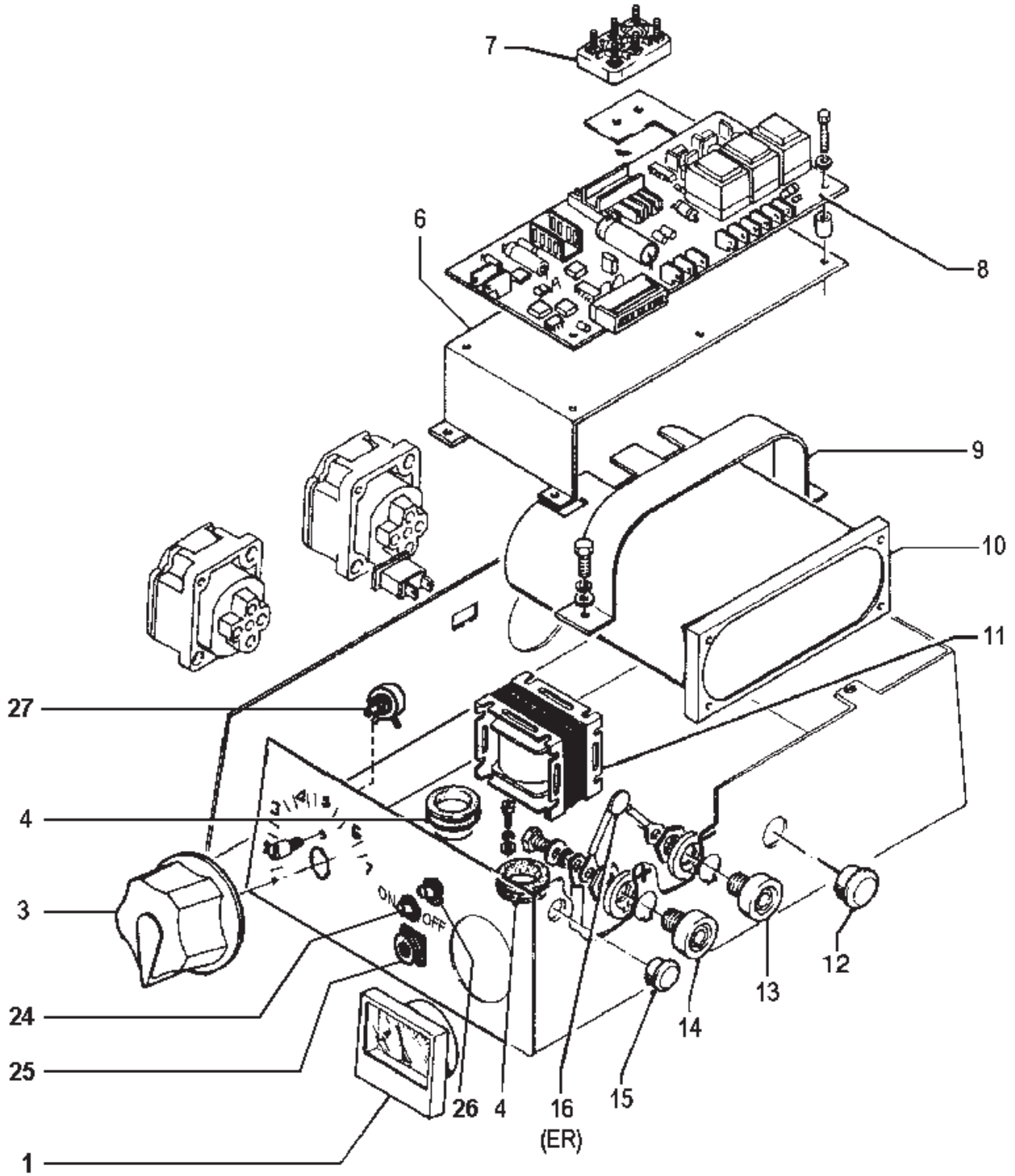
**When ordering the spare parts, it is recommended to indicate:**

- 1) \* serial number
- 2) \* model of welder and/or generating set
- 3) ◆ n. table
- 4) ◆ n. position
- 5) quantity



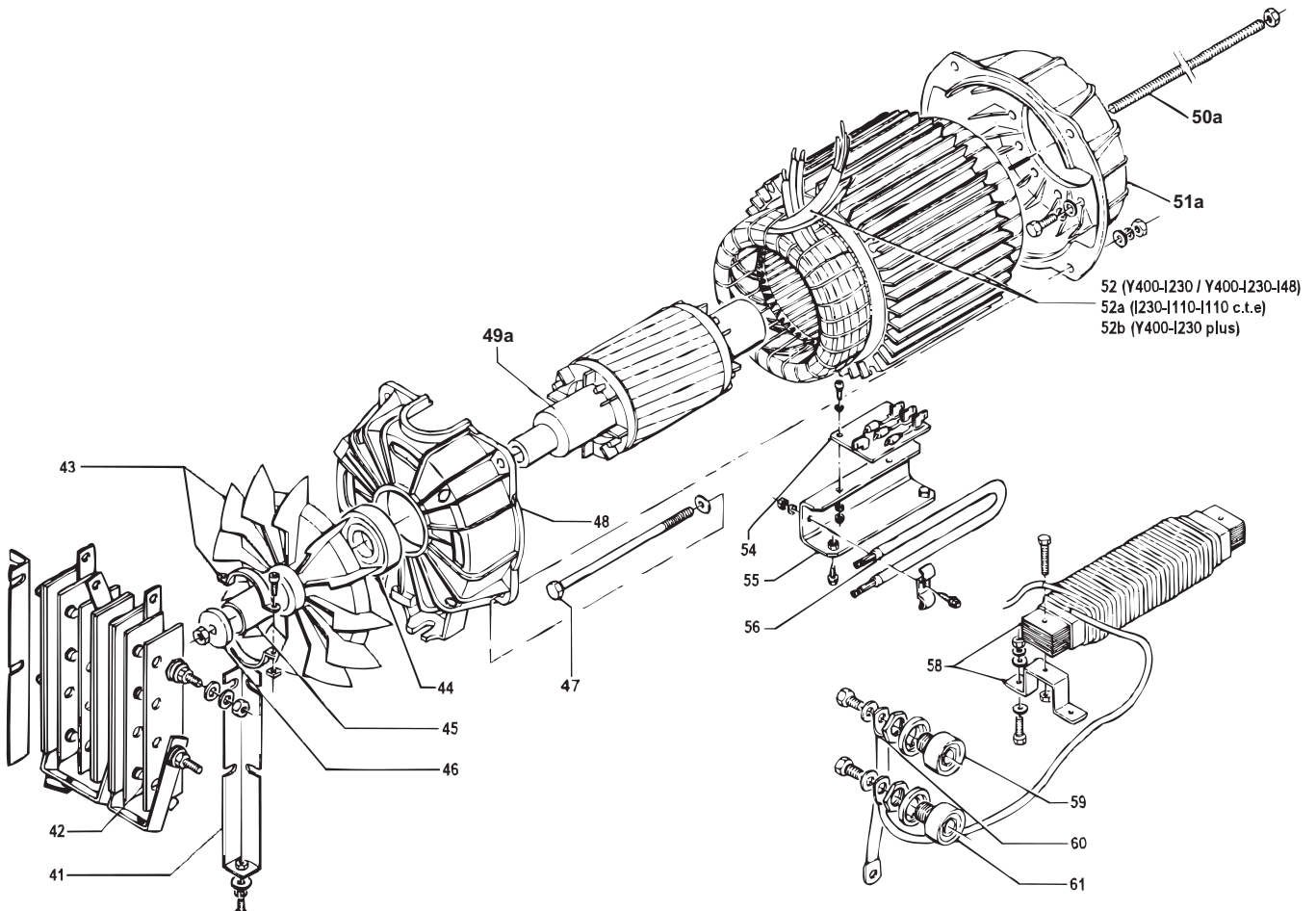
**ABBREVIATIONS AND SYMBOLS:**

- (EV) When ordering, specify the engine type and the auxiliary voltage
- (ER) Engine with recoil starter only
- (ES) Engine with electric starter only
- (VE) E.A.S version only.
- (QM) When ordering, specify the length in meters
- (VS) Special version only
- (SR) By request only



<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>	<i>Note</i>
1	103011310	VOLTMETRO FONDO SCALA 300V	
3	107509702	MANOPOLA REG.CORRENTE SALDAT.	
4	1030060	PASSACAVO	
5	107509715	POTENZIOMETRO CORR.SALDATURA	Fino a REV.0-10/05 Del. 139/06 del 19/09/06
6	208019801	STAFFA	
7	218017226	MORSETTIERA	
8	208019800	SCHEDA DI CONTROLLO SALDATURA	
9	307017037	STAFFA	
10	107509880	BOX CONDENSATORI	
11	107509870	TRASFORMATORE	
12	6062130	TAPPO	
13	101131220	PRESA DINSE	(-)
14	106021220	PRESA DINSE	(+)
15	6062080	TAPPO	
16	208019011	SOPPRESSORE PROTEZ.PONTE DIODI	(ER)
17	1030030	PASSACAVO	
24	102013290	COMMUTATORE A LEVA	
25	23213C042	GR.CAVI SEGNALI E COMANDI	
26	102042740	CAPPUCCIO ISOLANTE	
27	836709715	POTENZIOMETRO COMPL.	Da REV.1-07/07 Del. 139/06 del 19/09/06

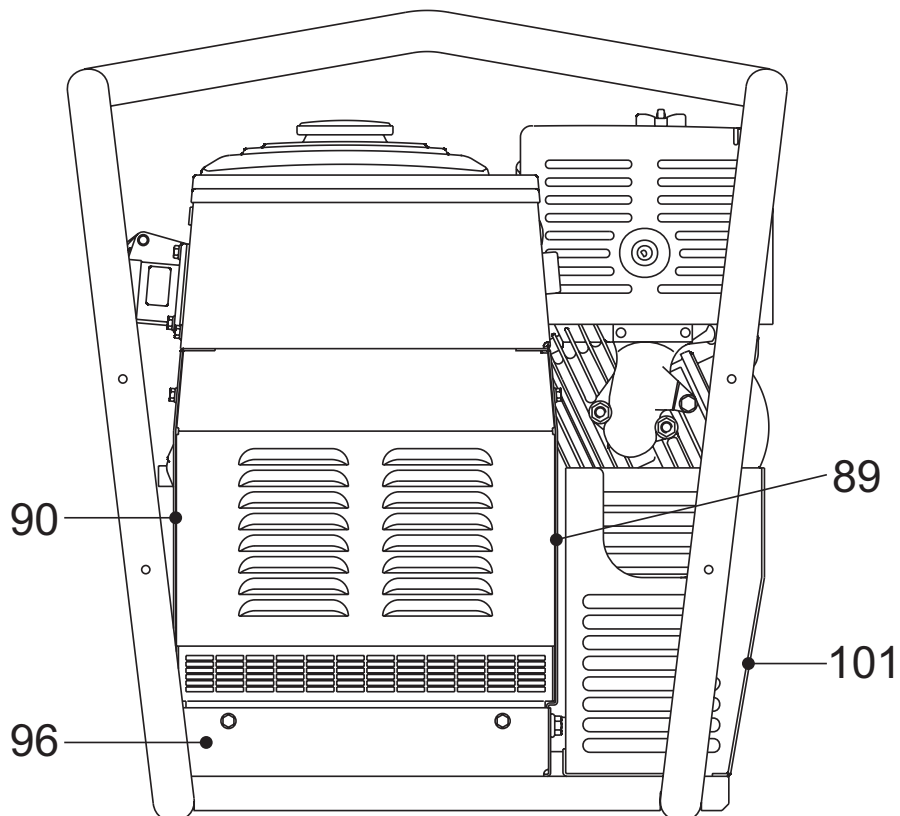
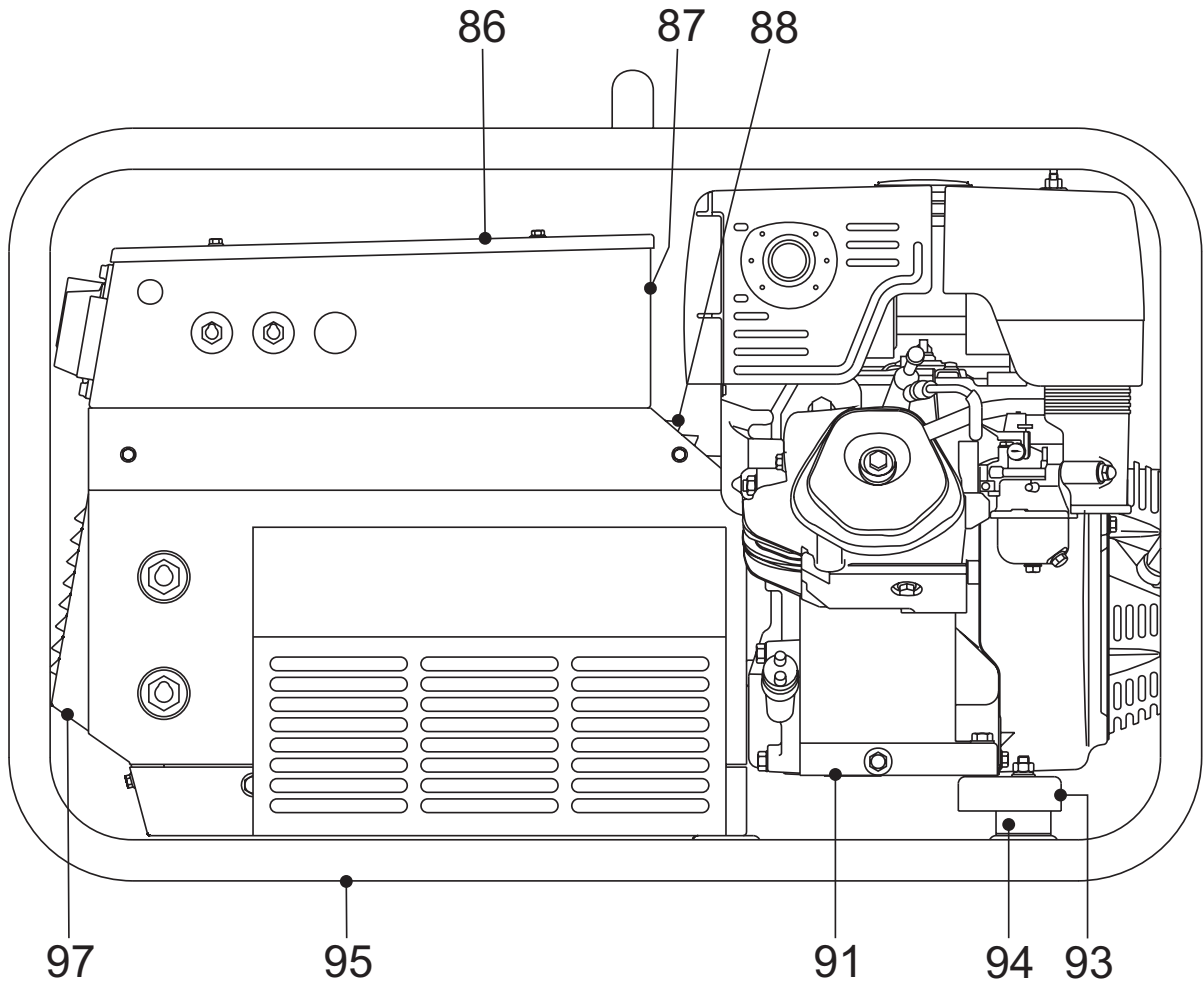
<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>	<i>Note</i>
1	103011310	VOLTMETER 300V	
3	107509702	KNOB, WELDING CURRENT REGULAT.	
4	1030060	GROMMET	
5	107509715	POTENTIOMETER (Compl.)	Up to REV.0-10/05 Del.139/06 - 19/09/06
6	208019801	BRACKET	
7	218017226	TERMINAL BOARD	
8	208019800	PCB, WELDING CONTROL	
9	307017037	BRACKET	
10	107509880	CAPACITOR BOX 3x65	
11	107509870	AUXILIARY TRANSFORMER	
12	6062130	CAP	
13	101131220	SOCKET	(-)
14	106021220	SOCKET, STARTER (+)	(+)
15	6062080	CAP	
16	208019011	SUPPRESSOR PROT. DIODE BRIDGE	(ER)
17	1030030	GROMMET	
24	102013290	COMMUTATOR	
25	23213C042	SIGNALS AND CONTROLS CABLES GR.	
26	102042740	CAP	
27	836709715	WELDING CURRENT REG. (COMPL.)	From REV.1-07/07 Del. 139/06 -19/09/06





<i>Pos.</i>	<i>Rev.</i>	<i>Cod.</i>	<i>Descr.</i>	<i>Note</i>
41		208015041	STAFFA	
42		208015100	GR. PONTE DIODI	
43		105111290	VENTOLA CON FASCETTA	
44		1001030	CUSCINETTO	
45		105311370	DISTANZIALE	
46		105311380	RONDELLA	Fino a REV.0-10/98 Del. 91/06 del 07/06/06
46		356403038	RONDELLA	Da REV.1-11/06 Del. 91/06 del 07/06/06
47		107011280	TIRANTE	
48		105913045	FLANGIA PORTA ALTERNATORE	
49a		232123030	ALBERO CON ROTORE	
50a		232123036	TIRANTE	
51a		232123040	FLANGIA ATTACCO MOTORE	
52		218013025	STATORE 380/220(48)-220/48V	
52a		218023025	STATORE AVVOLTO	
52b		218053025	STATORE 380/220-380/380V	
54		309509035	UNITA' DIODI PRITT	
55		208109067	STAFFA	
56		309509065	RESISTENZA DI PRITT	
58		208014100	REATTANZA DI LIVELLO	
59		102044400	PRESA DI SALDATURA (-)	(-)
60		208019890	SHUNT	
61		102301310	PRESA DI SALDATURA (+)	(+)

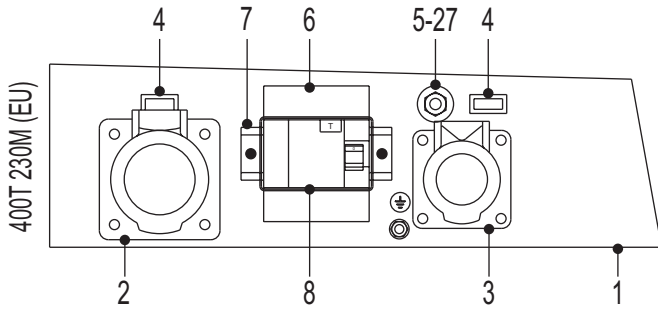
<i>Pos.</i>	<i>Rev.</i>	<i>Cod.</i>	<i>Descr.</i>	<i>Note</i>
41		208015041	BRACKET	
42		208015100	DIODE BRIDGE ASSY	
43		105111290	FAN	
44		1001030	BEARING	
45		105311370	SPACER	
46		105311380	WASHER	Up to REV.0-10/98 Del. 91/06 - 07/06/06
46		356403038	WASHER	From REV.1-11/06 Del. 91/06 - 07/06/06
47		107011280	TIE - ROD	
48		105913045	FLANGE, ALTERNATOR HOLDER	
49a		232123030	SHAFT WITH ROTOR	
50a		232123036	TIE-ROD	
51a		232123040	FLANGE FIXING ENGINE	
52		218013025	STATOR 380/220(48)-220/48V	
52a		218023025	STATOR	
52b		218053025	STATOR 380/220-380/380V	
54		309509035	DIODES UNIT, PRITT	
55		208109067	BRACKET	
56		309509065	RESISTOR PRITT	
58		208014100	REACTOR	
59		102044400	WELDING SOCKET (-)	(-)
60		208019890	SHUNT	
61		102301310	WELDING SOCKET (+)	(+)



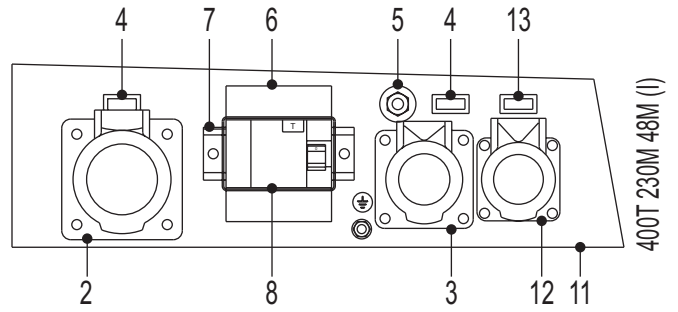
<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>
86	208017015	COPERCHIO 380/220 V
87	218017010	SCATOLA ELETTRICA
88	211018247	LAMIERA DEFLETTORE
89	208118010	FIANCATA DX DIESEL
90	208118015	FIANCATA SX DIESEL
91	A 272612200	MOTORE HONDA GX 390 K1 (VXB)
93	232122035	TRAVERSA SUPP. MOTORE
94	102041250	ANTIVIBRANTE
95	232121050	BARELLA
96	208018205	SCATOLA BASE
97	211418235	GRIGLIA ASPIRAZIONE
101	232129185	CESTELLO

<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>
86	208017015	COVER 380/220 V
87	218017010	ELECTRIC BOX
88	211018247	PROTECTIVE PLATE
89	208118010	SIDE, RIGHT, DIESEL
90	208118015	SIDE, LEFT, DIESEL
91	A 272612200	HONDA ENGINE GX 390 K1 (VXB)
93	232122035	BRACKET
94	102041250	VIBRATION-DAMPER
95	232121050	PROTECTIVE FRAME
96	208018205	CASE, BOTTOM HALF
97	211418235	SCREEN, AIR INLET
101	232129185	HOLDER

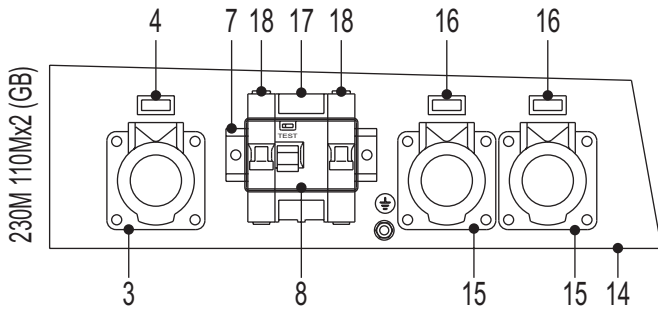
TS 200 / GE 6000



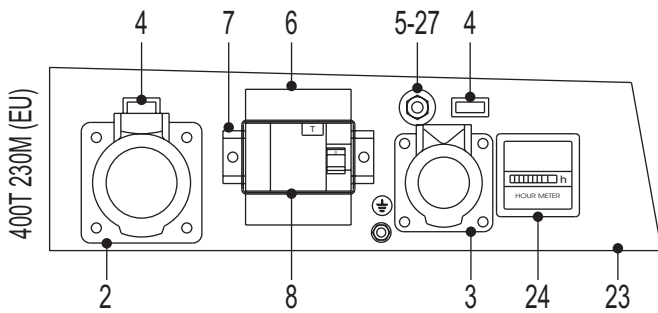
TS 200



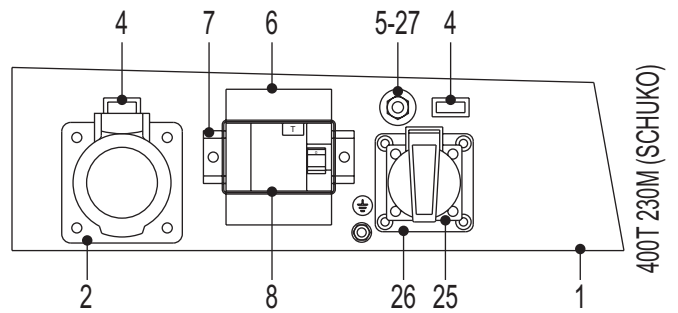
TS 200



TS 200 / GE 6000

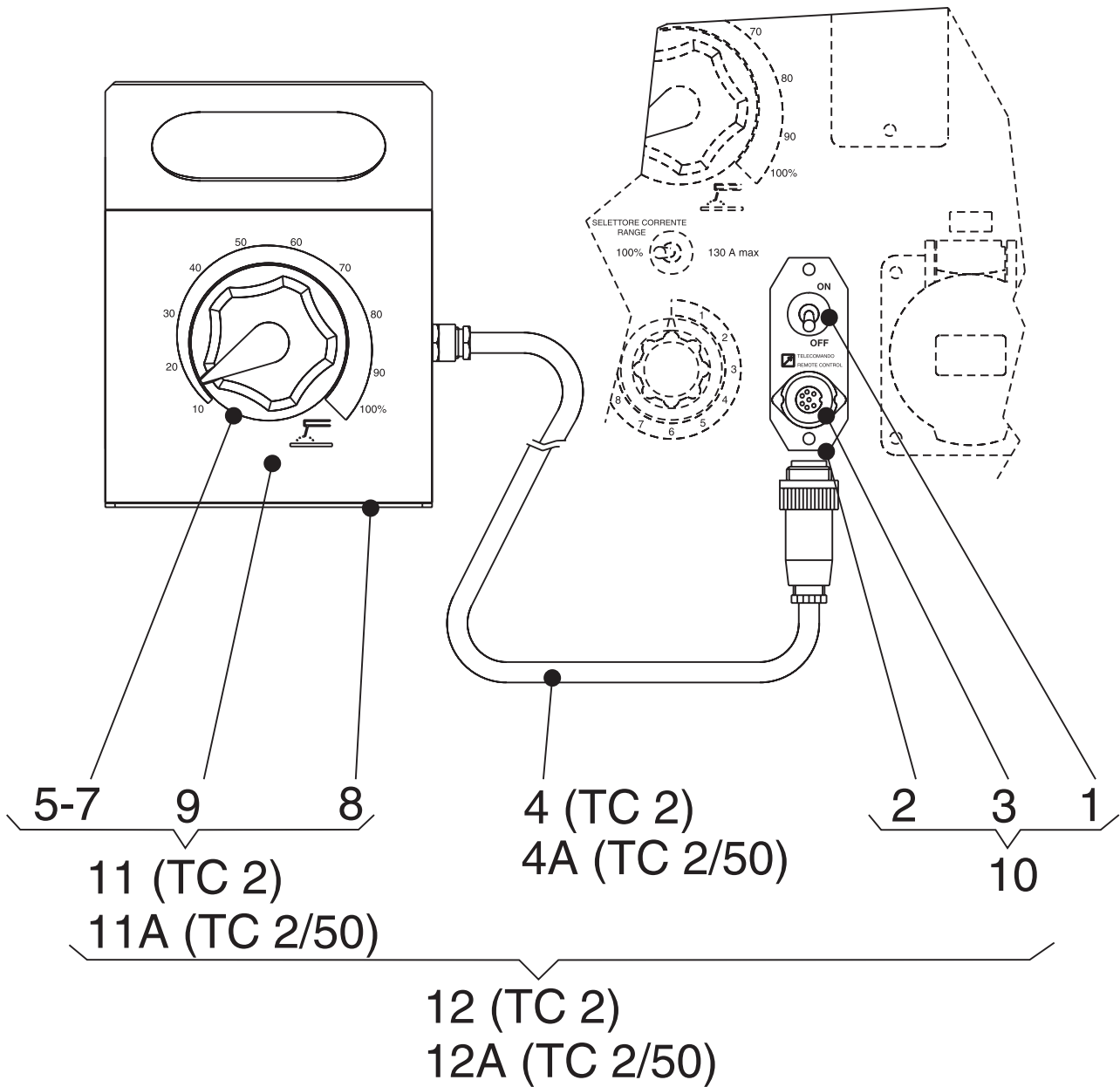


TS 200 / GE 6000

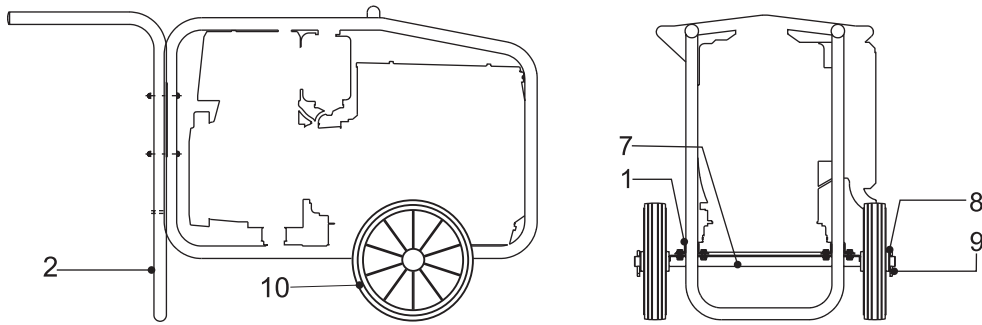


<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>	<i>Note</i>
1	232127020	PANNELLO FRONTALE	400/230 EU
2	305907270	PRESA CEE 16A 400V 3P+N+T	
3	307017240	PRESA 220V 16A	
4	1302220	SPIA 230V	
5	155307107	DISGIUNTORE TERMICO 15A-250V	TS 200
6	105111540	Vedi Cod.219937105	
7	232027036	GUIDA	
8	232027130	CAPPUCCIO PROTEZIONE I.D.	
11	232137020	PANNELLO FRONTALE	400/230/48
12	A 218137280	PRESA CEE 48V 32A	
13	1302080	SPIA PER 48V	
14	232027020	PANNELLO FRONTALE	230/2x110
15	307047250	PRESA CEE 110V 16A 2 POLI + T	
16	1302160	SPIA 110V	
17	220237105	Vedi Cod.256007105	
18	317807325	INT. MAGNETOTERMICO 1 POLO 16A	
23	232207020	PANNELLO FRONTALE	400/230
24	105511810	CONTAORE 230V 50Hz IP65	
25	A 208097245	SPINA SCHUKO 220V	
26	220097032	PIASTRINA	
27	306467107	DISGIUNT. TERMICO 20AMP 250 V	GE 6000 BS

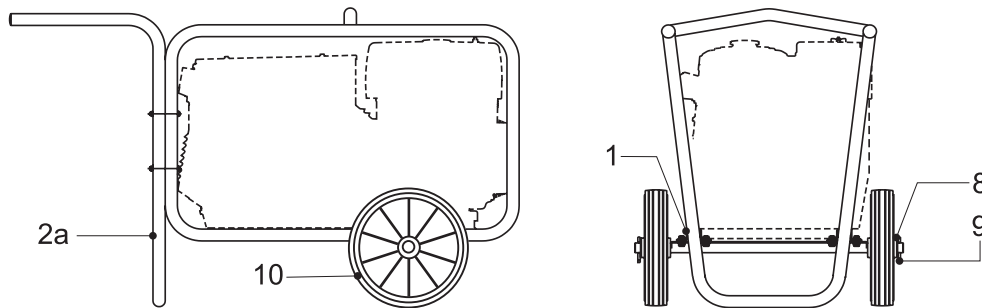
<i>Pos.</i>	<i>Rev. Cod.</i>	<i>Descr.</i>	<i>Note</i>
1	232127020	FRONT PANEL	400/230 EU
2	305907270	EEC SOCKET 16A 400V 3P+N+T	
3	307017240	EEC SOCKET 16A, 220V 2P+T	
4	1302220	WARNING LIGHT 230V	
5	155307107	THERMAL SWITCH 15A-250V	TS 200
6	105111540	See part no. 219937105	
7	232027036	FIXING GUIDE	
8	232027130	CAP	
11	232137020	FRONT PANEL	400/230/48
12	A 218137280	EEC SOCKET 48V 32A	
13	1302080	WARNING LIGHT FOR 48V	
14	232027020	FRONT PANEL	230/2x110
15	307047250	EEC SOCKET 110V 16A 2 POLES +N	
16	1302160	WARNING LIGHT 110V	
17	220237105	See Part n°256007105	
18	317807325	See p/n 734507325	
23	232207020	FRONT PANEL	400/230
24	105511810	HOURMETER 230V 50Hz IP65	
25	A 208097245	PLUG, SCHUKO 220V	
26	220097032	PLATE	
27	306467107	THERMOPROTECTION 20AMP 250 V	GE 6000 BS



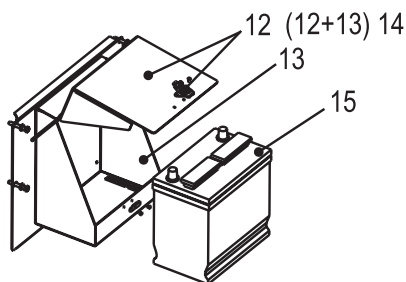
Pos.	Rev.	Cod.	Descr.	Descr.	Note
1		102013290	COMMUTATORE	COMMUTATOR	
2		107507032	COPERCHIO COMANDO A DISTANZA	BLIND PLATE REMOTE CONTROL	
3		209509910	CONNETTORE FEMM.CON CAVI	FEMALE CONNECTOR WITH CABLES	
4		209519904	CONNETTORE COMPLETO DI CAVI	CONNECTOR WITH CABLES	TC2 vers.
4a		930609904	CONNETTORE CON CAVI	CONNECTORS WITH CABLES	TC2/50 vers.
5		107509702	MANOPOLA REG.CORRENTE SALDAT.	KNOB,WELDING CURRENT REGULAT.	
7		107509700	POTENZIOMETRO	WELDING CURRENT REGULATOR	
8		107509900	SCATOLA	CASE, BOTTOM HALF	
9		209519901	COPERCHIO (CD)	COVER	
10		209510017	PREDISPOSIZIONE CD2	SOCKET SWITCH REMOTE CONTROL	
11		209510018	TC2 COMANDO DISTANZA STANDARD	TC2 STANDARD REMOTE CONTROL	
11	A	930600018	TC2 COMANDO DISTANZA STANDARD	TC2 STANDARD REMOTE CONTROL	TC2/50 vers.
12		209510019	KIT TC2 COMPLETO	KIT TC2 COMPL.	
12	A	930600019	KIT TC2 COMPLETO	KIT TC2 COMPL.	TC2/50 vers.



Pos.	Rev.	Cod.	Descr.	Descr.	Note
1		107012150	CAVALLOTTO	U-BOLT	
2		107012130	MANIGLIA	HANDLE	
7		205311160	ASSALE	AXLE	
8		205311180	RONDELLA	WASHER	
9		6075020	COPIGLIA	PIN, SPLIT	
10		105311650	RUOTA	WHEEL	



Pos.	Rev.	Cod.	Descr.	Descr.	Note
1		107012150	CAVALLOTTO	U-BOLT	
2a		208101051	MANIGLIA	HANDLE	
7		205311160	ASSALE	AXLE	
8		205311180	RONDELLA	WASHER	
9		6075020	COPIGLIA	PIN, SPLIT	
10		105311650	RUOTA	WHEEL	



Pos.	Cod.	Descr.	Descr.	Note
12	256020549	GR.COPERCHIO COMPLETO	COMPLETE COVER	
13	256029168	CESTELLO PORTABATTERIA	BATTERY HOLDER	
14	256029160	CESTELLO P/BATT.+COPERCHIO	BATTERY HOLDER WITH COVER	
15	209509150	BATTERIA	BATTERY	(fino a/up to REV.0 04/97 Del. 74/05 del 15/07/05)
15	372859150	BATTERIA	BATTERY	(da/from REV.1 10/05 Del. 74/05 del 15/07/05)