



MODEL

NOVATIG 325 DC
NOVATIG 505 AC/DC
G.R.W.

INSTRUCTION MANUAL

for installation,
use and maintenance
of welding
machines.

Original instructions in Italian.
Please keep for future use.

1.995.202 EN - Rev. 1.1



Contents

1. PREFACE	4
1.1. PURPOSE OF THE INSTRUCTION MANUAL FOR USE AND MAINTENANCE	4
1.2. RECIPIENTS	4
1.3. STORAGE OF THE INSTRUCTION MANUAL	5
1.4. UPDATING THE INSTRUCTION MANUAL	5
1.5. HOW TO READ THE INSTRUCTION MANUAL	5
1.6. TERMS, SYMBOLS AND PICTOGRAMS	5
2. GENERAL INFORMATION	6
2.1. MANUFACTURER IDENTIFICATION DATA	6
2.2. MACHINE IDENTIFICATION DATA AND PLATES	6
2.3. DECLARATIONS OF CONFORMITY	8
2.4. SAFETY STANDARDS	8
2.5. INFORMATION ON TECHNICAL ASSISTANCE	9
2.6. PREPARATION BY THE CUSTOMER	9
3. SAFETY	9
3.1. GENERAL SAFETY WARNINGS	9
3.2. INTENDED USE	14
3.3. CONTRAINDICATIONS FOR USE	14
3.4. HAZARDOUS AREAS	14
3.5. SAFETY DEVICES	14
3.6. SIGNS	15
3.7. RESIDUAL RISKS	16
4. INSTALLATION	16
4.1. SHIPPING	16
4.2. PACKAGING	16
4.3. MACHINE RECEIPT	16
4.4. HANDLING AND LIFTING	17
4.5. UNPACKING	17
4.6. STORAGE	18
4.7. PREPARATIONS	18
4.8. ASSEMBLY/POSITIONING	19
4.9. CONNECTIONS	19
4.10. PRELIMINARY CHECKS	20
5. OVERVIEW	20
5.1. OPERATING PRINCIPLE	20
5.2. FEATURES	20
5.3. ENVIRONMENTAL CONDITIONS	21
5.4. LIGHTING	21
5.5. VIBRATIONS	21
5.6. NOISE	21
5.7. TECHNICAL SPECIFICATIONS	22

6. MACHINE USE	23
6.1. MACHINE LAYOUT DESCRIPTION	23
6.1.1. Layout for the front panel	23
6.1.2. Layout for the rear panel	23
6.1.3. Preparing for welding	24
6.2. FRONTAL PANEL NOVATIG 325 DC	27
6.2.1. Interface user	27
6.3. FRONTAL PANEL NOVATIG 505 AC/DC	30
6.3.1. Interface user	30
6.4. UNIT POWER - UP	33
6.4.1. RESET (LOAD FACTORY SETTINGS)	33
6.4.2. PARTIAL RESET	33
6.4.3. TOTAL RESET	33
6.5. SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE)	34
6.5.1. COOLER ACTIVATION	34
6.6. WELDING SETTINGS	36
6.6.1. TORCH TRIGGER PROCEDURE	36
6.7. REMOTE CONTROL CONFIGURATION	52
6.7.1. Wireless remote control Configuration	52
6.7.2. Wire foot pedal Configuration	52
6.8. START-UP	52
6.9. NORMAL STOP	52
6.10. DECOMMISSIONING	52
7. MAINTENANCE	53
7.1. MACHINE ISOLATION	53
7.2. SPECIAL PRECAUTIONS	53
7.3. CLEANING	53
7.4. ROUTINE MAINTENANCE	53
7.5. WELDING MACHINE REPAIRS	54
7.6. DIAGNOSTICS AND TROUBLESHOOTING	55
8. ACCESSORIES AND SPARE PARTS	57
8.1. CUSTOMER SERVICE	57
8.2. SPARE PARTS	57
9. ADDITIONAL INSTRUCTIONS	57
9.1. WASTE DISPOSAL	57
9.2. DECOMMISSIONING AND DISMANTLING	57
10. ANNEXES	59
10.1. WIRING DIAGRAMS	59
10.2. SPARE PARTS	65

1. PREFACE

1.1. PURPOSE OF THE INSTRUCTION MANUAL FOR USE AND MAINTENANCE

This manual has been designed to provide the user with general knowledge of the machine and to allow it to be used safely.

This instruction manual is an integral part of the machine and has the purpose of providing all the information necessary to ensure:

1. safe handling of the machine, either packaged and unpackaged;
2. correct machine installation;
3. knowledge of the technical specifications of the machine;
4. thorough understanding of machine operations and limitations;
5. indication of the qualifications and specific training required of those operating and carrying out maintenance work on the machine
6. in-depth knowledge of its intended, unforeseen and prohibited uses;
7. its proper and safe use;
8. how to carry out correct and safe maintenance and repair operations;
9. technical assistance and management of spare parts;
10. disposal of waste produced by the machine;
11. the safe dismantling of the machine in accordance with applicable regulations to protect workers' health and the environment.

This document assumes that the applicable occupational health & safety and hygiene regulations are complied with at the site where the machine will be used.

IMPORTANT: Those in charge have the responsibility, in accordance with current legislation, to carefully read the contents of this Instruction Manual and ensure that operators and maintenance personnel read the parts relevant to them.

The customer has the responsibility to make sure that, if this document is modified by the Manufacturer, only the updated versions of the manual are actually present at the workplace.

The instructions, documentation and drawings found in this Manual are of a confidential technical nature and strictly the property of the Manufacturer, therefore, aside from the purpose for which it was produced, any reproduction in whole or in part of the contents and/or format must have the prior consent of the Manufacturer.

THE OFFICIAL LANGUAGE CHOSEN BY THE MANUFACTURER IS ITALIAN. The manufacturer cannot be held liable for translations in other languages that do not conform to the original meaning (ORIGINAL INSTRUCTIONS).

1.2. RECIPIENTS

This Instruction Manual is intended for the installer, the operator/user, the system manager, the system safety manager and the qualified or qualified and authorised technician authorised to maintain the machine.

INSTALLER: Technician authorised by the manufacturer and expert in handling, installation, connection and adjustment of the machine.

OPERATOR/USER: This is the person in charge of using the machine and cleaning it.

PLANT MANAGER: The individual who makes the adjustments and the programming.

PLANT SAFETY MANAGER: Person responsible for verifying that all applicable safety regulations and the provisions set out in this manual are observed.

QUALIFIED TECHNICIAN: Qualified person who, by virtue of an accurate technical knowledge of the machine and all the safety procedures, performs ordinary maintenance and minor repairs.

QUALIFIED AND AUTHORISED TECHNICIAN: Highly qualified person, trained and authorised by the manufacturer to make significant adjustments and extraordinary maintenance or repairs during the warranty period.

EXPOSED PERSON: Any person who is wholly or partly in a dangerous area (near the machine and exposed to risk due to his or her safety).

The machine is intended for industrial use, so its use is strictly for qualified, skilled technical personnel, in particular those:

- over 18 years of age;
- physically and psychologically capable of performing particularly difficult technical work;
- sufficiently trained to use the machine and carry out maintenance work on it;
- deemed suitable for carrying out the task entrusted to them by their employer;

- capable of comprehending and interpreting the operator manual and the safety instructions;
- familiar with the emergency procedures and how to implement them;
- have understood the operational procedures established by the machine's Manufacturer.

1.3. STORAGE OF THE INSTRUCTION MANUAL

The Instruction Manual must be carefully stored and must accompany the machine each time it changes hands throughout its life cycle.

It should be kept in good condition by handling it with care, with clean hands, and not placing it on dirty surfaces.

Parts of the manual must not be removed, torn or changed.

The Manual should be kept close to the machine to which it refers in an environment free from humidity and heat.

1.4. UPDATING THE INSTRUCTION MANUAL

The Manufacturer is only liable for the Instructions issued and validated by itself (Original Instructions); any translations **MUST** always be accompanied by the Original Instructions to verify the correctness of the translation. In any case, the Manufacturer is not liable for translations that have not been approved by the Manufacturer himself, thus if an inconsistency is detected, attention must be paid to the original language and, if necessary, the manufacturer's sales office should be contacted, which will make the changes deemed appropriate.

The Manufacturer reserves the right to make changes to the project, changes/improvements to the machine and updates to the Instruction Manual without previously informing Customers. However, should changes be made to the machine installed at the Customer's site, in agreement with the Manufacturer and involving the adaptation of one or more chapters of the Instruction Manual, the Manufacturer shall provide the Customer with the parts of the Instruction Manual that concern the change, with the new global revision model. The Customer shall be responsible, following the instructions that accompany the updated documentation, for replacing any parts that are no longer valid with the new ones.

1.5. HOW TO READ THE INSTRUCTION MANUAL

The Manual is split into chapters, each one dedicated to a specific category of information addressed to the personnel for whom the relevant qualifications have been defined.

To facilitate immediate comprehension of the text, terms, abbreviations and pictograms are used, the meanings of which can be found in Paragraph 1.6.

1.6. TERMS, SYMBOLS AND PICTOGRAMS

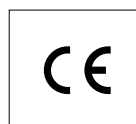
To highlight parts of text of significant importance the following symbols were adopted:

ATTENTION: Indicates the need to adopt appropriate behaviours so as not to put people's health and safety at risk and not to cause damage to the machine or the environment.

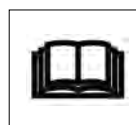
HAZARD: Indicates situations of serious danger that can seriously endanger the health and safety of people.

IMPORTANT: Indicates technical information of particular importance which should not be neglected.

The following pictogram stickers are affixed to the machine, depending on the version:



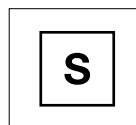
The product complies with the safety requirements provided by the applicable EU directives or regulations.



Carefully read the instructions listed in the manual.



Machine subjected to general danger (see instruction manual).



Machine used in environments with a high risk of electric shock.



WARNING!
Moving mechanical parts.
(For MIG generators only)

2. GENERAL INFORMATION

2.1. MANUFACTURER IDENTIFICATION DATA

MANUFACTURER: SINCOSALD S.r.l

HEADQUARTERS - OFFICES

via della Fisica, 26/28

20864 Agrate Brianza (MB) Italy

Tel: +39 039 641171

Fax: +39 039 6057122

CONTACTS:












export@sincosald.it www.sincosald.it

2.2. MACHINE IDENTIFICATION DATA AND PLATES

Each machine is identified by a CE plate on which its reference data is indelibly marked. For any communication with the manufacturer or service centre always quote these references.

IMPORTANT: The plate must not be removed for any reason, under penalty of forfeiture of the guarantee and the unavailability of spare parts due to failure to be identified. The position of the nameplate on the Machine can vary from machine to machine.

NOVATIG 325 DC Plate

															
Via della Fisica n. 26/28 20864 Agrate Brianza - Monza Milano ITALIA															
Model: NOVATIG 325 DC															
S.n:															
		EN 60974 - 1													
		10A/20.4V 300A/32.0V													
		<table border="1"> <tr> <td>X</td> <td>-</td> <td>60%</td> <td>100%</td> </tr> <tr> <td>I_2</td> <td>-</td> <td>300A</td> <td>250A</td> </tr> <tr> <td>U_2</td> <td>-</td> <td>32.0V</td> <td>30.0V</td> </tr> </table>		X	-	60%	100%	I_2	-	300A	250A	U_2	-	32.0V	30.0V
X	-	60%	100%												
I_2	-	300A	250A												
U_2	-	32.0V	30.0V												
		5A/10.2V 320A/22.8V													
		<table border="1"> <tr> <td>X</td> <td>-</td> <td>60%</td> <td>100%</td> </tr> <tr> <td>I_2</td> <td>-</td> <td>320A</td> <td>260A</td> </tr> <tr> <td>U_2</td> <td>-</td> <td>22.8V</td> <td>20.4V</td> </tr> </table>		X	-	60%	100%	I_2	-	320A	260A	U_2	-	22.8V	20.4V
X	-	60%	100%												
I_2	-	320A	260A												
U_2	-	22.8V	20.4V												
		<table border="1"> <tr> <td>I_{max}</td> <td>20.9A</td> </tr> <tr> <td>I_{eff}</td> <td>16.7A</td> </tr> </table>		I_{max}	20.9A	I_{eff}	16.7A								
I_{max}	20.9A														
I_{eff}	16.7A														
		<table border="1"> <tr> <td>I_{max}</td> <td>16.6A</td> </tr> <tr> <td>I_{eff}</td> <td>12.8A</td> </tr> </table>		I_{max}	16.6A	I_{eff}	12.8A								
I_{max}	16.6A														
I_{eff}	12.8A														
															
WARNING EXTERNAL FUSE															
															
WEEE - Reg. - Nr. RAEEB2B															



J22G123456



W.008.0059

NOVATIG 325 DC plate explanation

- Pos. 1** Name and address of the manufacturer and trademark
- Pos. 2** Identification of the welding machine model
- Pos. 3** Welding machine serial number
- Pos. 4** Welding machine type symbol: Transformer - Rectifier for arch welding
- Pos. 5** Reference to the legislation followed for welding machine construction: EN 60974-1
- Pos. 6a** Welding with MMA procedure
- Pos. 6b** Welding with TIG procedure
- Pos. 7** Symbol indicating that the welding machine can be used in environments with an increased risk of electric shock
- Pos. 8** Welding current symbol: Direct/Alternating Current
- Pos. 9** Rated no-load voltage U_0 in V
- Pos. 10** Electric adjustment range of the welding machine: minimum and maximum rated welding current, with the relevant charged voltages
- Pos. 11** Welding machine service factor (X): this figure indicates the welding machine service factor as a percentage of a 10-minute work cycle. Example $X = 60\%$ - I_2 350 A, these data indicate that the welding machine on a work cycle can weld with a current $I_2 = 350$ A for a time of 6 minutes out of 10, that is 60%.
- Pos. 11a** Service factor: 60 %
- Pos. 11b** Service factor: 100 %
- Pos. 12** Rated welding current (I_2)
- Pos. 12a** Value of the rated welding current at 60 %
- Pos. 12b** Value of rated welding current at 100 %
- Pos. 13** Conventional load voltage (U_2)
- Pos. 13a** Voltage at 60 % load
- Pos. 13b** Voltage at 100 % load
- Pos. 14** Symbol for the welding machine power supply and number of phases (3) followed by the direct/alternating current symbol
- Pos. 15** Rated power voltage
- Pos. 16** Indicates the degree of welding machine protection: IP 23
- Pos. 17** Maximum current in MMA welding
- Pos. 18** Actual current in MMA welding
- Pos. 19** Maximum current in TIG welding
- Pos. 20** Actual current in TIG welding
- Pos. 21** Insulation class
- Pos. 22** Cooling system

NOVATIG 505 AC/DC Plate

sincosald
Via della Fisica n. 26/28
20864 Agrate Brianza - Monza Milano
ITALIA

Model: **NOVATIG 505AC/DC**

S.n:

EN 60974 - 1

MMA		TIG	
I_2	U_2	I_2	U_2
10A/20.4V	500A/40.0V	500A/40.0V	500A/40.0V
30%	60%	30%	60%
60%	100%	60%	100%
340A	370A	340A	370A
33.6V	34.8V	33.6V	34.8V
5A/10.2V	500A/30.0V	500A/30.0V	500A/30.0V
30%	60%	30%	60%
60%	100%	60%	100%
380A	380A	380A	380A
25.2V	23.6V	25.2V	23.6V

WARNING: EXTERNAL FUSE

T 2.0A 500V

WEEE - Reg. - Nr. RAEEB2B

C22G1

W.008.0058

NOVATIG 325 DC plate explanation

- Pos. 1** Name and address of the manufacturer and trademark
- Pos. 2** Identification of the welding machine model
- Pos. 3** Welding machine serial number
- Pos. 4** Welding machine type symbol: Transformer - Rectifier for arch welding
- Pos. 5** Reference to the legislation followed for welding machine construction: EN 60974-1
- Pos. 6a** Welding with MMA procedure
- Pos. 6b** Welding with TIG procedure
- Pos. 7** Symbol indicating that the welding machine can be used in environments with an increased risk of electric shock
- Pos. 8** Welding current symbol: Direct/Alternating Current
- Pos. 9** Rated no-load voltage U_0 in V
- Pos. 10** Electric adjustment range of the welding machine: minimum and maximum rated welding current, with the relevant charged voltages
- Pos. 11** Welding machine service factor (X): this figure indicates the welding machine service factor as a percentage of a 10-minute work cycle. Example $X = 60\%$ - $I_2 350$ A, these data indicate that the welding machine on a work cycle can weld with a current $I_2 = 350$ A for a time of 6 minutes out of 10, that is 60%.
- Pos. 11a** Service factor: 30 %
- Pos. 11b** Service factor: 60 %
- Pos. 11c** Service factor: 100 %
- Pos. 12** Rated welding current (I_2)
- Pos. 12a** Value of the rated welding current at 30 %
- Pos. 12b** Value of the rated welding current at 60 %
- Pos. 12c** Value of rated welding current at 100 %
- Pos. 13** Conventional load voltage (U_2)
- Pos. 13a** Voltage at 30 % load
- Pos. 13b** Voltage at 60 % load
- Pos. 13c** Voltage at 100 % load
- Pos. 14** Symbol for the welding machine power supply and number of phases (3) followed by the direct/alternating current symbol
- Pos. 15** Rated power voltage
- Pos. 16** Indicates the degree of welding machine protection: IP 23
- Pos. 17** Maximum current in MMA welding
- Pos. 18** Actual current in MMA welding
- Pos. 19** Maximum current in TIG welding
- Pos. 20** Actual current in TIG welding
- Pos. 21** Insulation class
- Pos. 22** Cooling system

G.R.W. plate

SINCOSALD s.r.l. 20864 AGRATE BRIANZA (MB) ITALY Via della Fisica, 26 / 28			
1	2		3
G.R.W 400V		IEC 60974-2	
4	U1 = 400V - 1 - 50/60 Hz		5
6	IP 23		7
P1 l/min = 0.725 KW		Pmax = 0.32 MPa	
8			9

Explanation of the G.R.3 plate

- Pos. 1** Name and address of the manufacturer and trademark
- Pos. 2** Cooling unit model identification
- Pos. 3** Reference to the regulation followed for cooling unit construction: IEC 60974-2
- Pos. 4** Cooling unit power voltage
- Pos. 5** Maximum current
- Pos. 6** Cooling unit protection grade: IP 23
- Pos. 7** See chapter 9.
ADDITIONAL INSTRUCTIONS
- Pos. 8** Maximum flow (LT/min)
- Pos. 9** Absorbed power

2.3. DECLARATIONS OF CONFORMITY

The machine is constructed in compliance with the relevant EU Directives, applicable at the time of its entering onto the market.

2.4. SAFETY STANDARDS

The machine was built in accordance with the following standards and directives:

Harmonised standards
IEC 60974-1 - IEC 60974-5 - IEC 60974-10
Directives
EN 60204-1 - 2014-35-EV - 9231 EEC - 9368 EEC
Standards
EN/IEC 61000-3-12 - EN/IEC 61000-3-11 - EN/IEC 61000-3-3

2.5. INFORMATION ON TECHNICAL ASSISTANCE

The machines are covered by a warranty, as provided for in the general conditions of sale.

If during the warranty period you experience a malfunction or failure of the machine parts, which fall under the cases covered by the warranty, the manufacturer, after the necessary machine checks, will repair or replace defective parts.

The goods travel at the customer's risk; product damage caused by transportation or unloading is not covered by the warranty. All equipment and consumables supplied with the product are also excluded from the warranty.

It is reminded that any modifications carried out by the user, without the express written consent of the manufacturer, will void the warranty and free the manufacturer from any liability for damage caused by a defective product.

This applies in particular to alterations made to safety devices that reduce their effectiveness.

The same considerations apply when using non-original spare parts or those different to the ones explicitly specified by the manufacturer.

For these reasons, we recommend our customers to always contact our Customer Service.

2.6. PREPARATION BY THE CUSTOMER

Unless otherwise agreed in the contract, the following are normally the Customer's responsibility:

- Room preparations, including any building work and/or ducting systems required;
- Electrical supply of the equipment, in compliance with the standards in force in the country of use. Particular care must be given to the protective conductor commonly known as "earthing" and to the efficiency of the circuit breaker installed to protect the power outlet. It is the purchaser's responsibility to keep the above system adequately efficient, in compliance with current accident prevention regulations.
- Consumables or material normally subject to wear;
- Equipment unloading at delivery and the consequent liabilities.

3. SAFETY

3.1. GENERAL SAFETY WARNINGS

WARNING: your safety depends on you!!!

- Follow all safety rules carefully.
- It is your duty to protect yourself and others from the risks of welding operations.
- The operator is responsible for his own safety and that of those in the work area. He must therefore know all the safety rules and observe them.

Nothing can replace common sense!!!

IMPORTANT: Before operating the machine, carefully read the instructions contained in this manual and follow them thoroughly.

The manufacturer has made every effort to design this machine and to make it as **INTRINSICALLY SAFE** as possible.

The manufacturer has also equipped the machine with all the protective and safety devices considered necessary. Finally, it has provided enough information for it to be used safely and correctly.

IMPORTANT: This information must be scrupulously followed.

The user may choose to appropriately add to the information provided by the manufacturer with additional processing instructions, which, obviously, do not contradict that contained in this Instruction Manual, in order to contribute to safe machine use.

For example, you must pay close attention to the clothing that anyone working on the machine is wearing:

- Avoid using clothes with hooks that can remain attached to parts of the machine;
- Avoid using ties or other fluttering clothing parts;
- Avoid wearing bulky rings or bracelets that may get caught in parts of the machine.

Whenever necessary, further recommendations for use will be provided in the Manual for the user related to preventive measures, personal protective equipment, information to prevent human error and any reasonably foreseeable prohibited behaviour.

It is, however, essential to diligently follow the following indications:

- It is absolutely forbidden to operate the machine automatically with the fixed and/or mobile guards removed;
- It is strictly prohibited to disable the safety mech-

- anisms installed on the machine;
- Operations at reduced safety levels must be carried out in strict accordance with the instructions given in the relevant descriptions;
 - After any operation with reduced safety levels, guards/safety devices should be replaced on the machine as soon as possible;
 - Any cleaning must be carried out with the electrical and pneumatic separation devices sectioned.
 - Do not alter parts of the machine for any reason; in the event of malfunction, due to non-compliance with the above, the manufacturer cannot be held liable for the consequences. We recommend that you request any changes to be made directly to the manufacturer;
 - Clean the casing of the machines, the panels and the controls with soft cloths that are dry or have been lightly soaked in a mild detergent solution; do not use any type of solvent, such as alcohol or petrol, as the surfaces may be damaged;
 - Position the machines as determined at the time of order according to the diagrams provided by the manufacturer, otherwise it cannot be held liable for any problems.

ATTENTION:

The Manufacturer cannot be held liable for damage caused by the machine to persons, animals or property in the event of:

- **use of the machine by personnel who are not adequately trained;**
- **improper use of the machine;**
- **electrical, hydraulic or pneumatic power supply faults;**
- **incorrect installation;**
- **failure to perform scheduled maintenance;**
- **unauthorised modifications or operations;**
- **the use of spare parts that are not original or not specific to the model;**
- **total or partial failure to follow the instructions;**
- **use contrary to the specific national regulations;**
- **calamities and exceptional events.**

General requirements

The moving parts must always be used according to the manufacturer's instructions, as indicated in this manual, which must always be available at the workplace.

All safety features placed on moving parts to prevent accidents and safeguard safety can not be modified or removed, but must be adequately safeguarded.

The user must promptly inform the employer or his direct superior of any defects or anomalies presented on the mobile parts.

A) Electric shock

ELECTRIC SHOCK CAN BE FATAL!!!

- All electric shocks are potentially fatal.
- Do not touch live parts.
- Insulate yourself from the piece to be welded and from the earth, wearing insulating gloves and clothes.
- Keep clothing (gloves, shoes, headgear, clothes) and body dry.
- Do not work in damp or wet environments. Do not lean on the piece to be welded.
- If you have to work near or in an area at risk, use all possible precautions.
- If you also feel a little electric shock, stop welding immediately; do not use the device until the problem is identified and resolved.
- Provide an automatic wall switch, of adequate capacity and possibly in the vicinity of the machine, to immediately cut off the device in the event of an emergency situation.
- Frequently inspect the power cord.
- Disconnect the power cord from the mains before working on the cables or before opening the machine.
- Do not use the machine without the protective bulkheads.
- Always replace any damaged parts of the machine with original materials.
- Never bypass machine safety devices.
- Make sure that the power supply line is equipped with an efficient earth socket.
- Make sure that the work bench and the work piece are connected to an efficient earth socket.
- Never electrically and simultaneously touch "hot" parts of pliers connected to two welders because the voltage between the two can be the total of the no-load voltage of both welding machines.
- Any maintenance must be performed only by expert personnel, aware of the risks due to the voltages necessary for the operation of the equipment.

B) Radiation

Ultraviolet radiation, emitted from the electric arc, can damage the eyes and burn the skin.

Follow the instructions below:

- Wear appropriate clothing and protective masks.
- **DO NOT use CONTACT LENSES!!!** The intense heat emanating from the electric arc could stick them to the cornea.
- Use masks with lenses, with a minimum DIN 10 or DIN 11 protection grade.
- Protect people near the welding area.
- **REMEMBER:** The arc can blind or damage your eyes. The arc is dangerous up to a distance of 15 metres. Never look at the arc with the naked eye!

- Prepare the welding area so as to reduce reflection and transmission of ultraviolet radiation: paint walls and exposed surfaces black to reduce reflection, installing protective screens or curtains, to reduce ultraviolet transmissions.
- Replace the mask lenses when they are damaged or broken.

C) Welding wire

Attention: the welding wire can cause perforated wounds.

- Do not press the button on the welding torch before carefully reading the instructions for use.
- Do not point the torch towards parts of the body, other people or metals, when mounting the welding wire on the welding machine.

D) Explosions

- Do not weld above or near pressurised containers.
- Do not weld in an atmosphere containing explosive powders, gases or vapours.

This welder uses inert gases such as CO₂, ARGON, or ARGON + CO₂ mixtures to protect the arc, therefore it is necessary to pay the utmost attention to:

1) Cylinders:

- Handle or use pressurised cylinders in accordance with the regulations in force.
- Do not connect the cylinder directly to the machine's gas pipe, without using a pressure regulator.
- Do not use cylinders that leak or are physically damaged.
- Do not use cylinders that are not well secured to the welding machine or to suitable supports.
- Do not transport cylinders without the valve protection fitted.
- Do not use cylinders whose contents have not been clearly identified.
- Do not put the cylinder in electrical contact with the arc.
- Do not expose cylinders to excessive heat, sparks, molten slag or flames.
- Do not tamper with the cylinder valves.
- Do not attempt to unlock blocked valves with hammers, keys, tools or other systems.
- Never delete or alter the name, number or other markings on the cylinders. It is illegal and dangerous.
- Do not lift the cylinders from the ground by holding them by the valve or by the cap, or by using chains, slings or magnets.
- Do not attempt to mix any gas inside the cylinders.
- Never refill the cylinders, but have them refilled by specialised companies.
- Do not modify or exchange the cylinder fittings.

2) Pressure regulators:

- Keep pressure regulators in good condition. Damaged regulators can cause damage or serious accidents; they must be repaired only by qualified personnel.
- Do not use regulators for gases other than those for which they were manufactured.
- Never use a regulator that leaks or appears physically damaged.
- Never lubricate a regulator with oil or grease.

3) Hoses:

- Replace hoses that appear damaged.
- Keep hoses taut to avoid accidental creases.
- Keep the excess hose collected and keep it out of the work area to prevent damage.

E) Fire

- Avoid igniting fire due to sparks and hot slag or incandescent parts.
- Ensure that appropriate fire protection devices are available near the work area.
- Remove flammable and combustible materials from the work area and the surrounding area (minimum 10 metres).
- Do not weld/cut fuel and lubricant containers, even if empty; these must be carefully cleaned before being processing.
- Allow the piece to cool before touching it or putting it in contact with combustible or flammable materials.
- Do not work on parts with cavities containing flammable materials.
- Do not operate in atmospheres with high concentrations of combustible vapours, flammable gases or dust.
- Always check the work area thirty minutes after the end of work to ensure that there are no fires.
- Do not keep combustible materials such as lighters or matches in your pocket.

F) Burns

Protect the skin against burns caused by ultraviolet radiation emitted by the electric arc, by sparks and slag from molten metal, using fireproof clothing, which covers all exposed surfaces of the body.

Wear protective clothing and welder gloves, headgear and high shoes with safety tip. Button the shirt collars and pocket flaps and wear trousers without cuff to avoid the entry of sparks and slag.

Wear a mask with protective glass on the outside and adiacinic glass filter inside. This is MANDATORY for welding/cutting operations, in order to protect the eyes from radiant energy and volatile metals. Replace

the protective glass if it is broken, pitted or spotted. Avoid oily or greasy clothes; a spark could ignite them. Incandescent metal parts, such as work pieces, should always be handled with gloves.

First aid equipment and a qualified person should be available for each shift, unless there are health facilities nearby for immediate treatment of eye and skin burns.

G) Fumes

Welding/cutting operations produce harmful fumes and metal dust, which can damage health:

- Do not work in spaces without adequate ventilation. Keep your head out of the fumes.
- In closed environments, use suitable exhaust fans. If ventilation is not adequate, use suitable respirators.
- Clean the material to be welded/cut if there are solvents or halogen degreasers, which give rise to toxic gases. During work, some chlorinated solvents can decompose in the presence of radiation emitted by the electric arc and produce phosgene gas.
- Do not weld/cut coated metals or those containing lead, graphite, cadmium, zinc, chromium, mercury or beryllium, unless a suitable respirator is available.

The electric arc generates ozone. Prolonged exposure, in environments with high concentrations of ozone, can cause headaches, irritation of the nose, throat and eyes and severe congestion and chest pain.

IMPORTANT: DO NOT USE OXYGEN FOR VENTILATION!!!

Gas leaks must be avoided in small spaces. Large gas leaks can dangerously change the oxygen concentration.

Do not place cylinders in small spaces.

DO NOT WELD or CUT where solvent vapours can be drawn into the welding atmosphere or if radiant energy can penetrate into atmospheres containing even tiny amounts of trichloroethylene and perchloroethylene.

H) Moving parts can cause damage

Moving parts, such as the fan, can cut fingers and hands and catch clothes.

Keep all doors, covers and guards closed and securely in place.

Protections and coverings can be removed, for possible maintenance and checks, only by qualified personnel.

Keep hands, hair, loose clothing and tools away from moving parts.

Refit the covers and guards and close the doors when

the operation is completed and before restarting the machine.

I) Noise

These welders do not in themselves produce any noise exceeding 70 dB. Arc welding processes can produce noise levels above this limit. Therefore, users must implement the precautions required by law.

Ear plugs should be used when working overhead or in a small space.

A rigid helmet should be used when others work in the area above.

Welders should not use flammable hair products.

WARNINGS ABOUT ELECTROMAGNETIC COMPATIBILITY

Although these welding machines have been built according to the regulations, they can generate electromagnetic disturbances, that is disturbances to the telecommunication systems (telephone, radio, television) or to the control and safety systems. Read the instructions carefully to eliminate or minimise interference.

ATTENTION: the welding machine has been designed to work in an industrial environment, therefore, to operate in domestic environments it may be necessary to observe special precautions in order to avoid possible electromagnetic interference.

You must install and use the welding machine according to the manufacturer's instructions. If electromagnetic interference is detected, countermeasures must be taken to eliminate the problem, possibly using the manufacturer's technical assistance. In any case, do not modify the welding machine without the manufacturer's approval.

Work area control to prevent E.M. interference

Before installing the welding machine it is necessary to check the work area to detect the existence of services that could malfunction in the event of electromagnetic disturbances.

Below is a list of services to consider:

- a) Power cables, control cables, transmission system and telephone cables that pass near the welding machine.
- b) Radio or television transmitters and receivers.
- c) Computer or control equipment.
- d) Safety and industrial process control equipment.
- e) Calibration and measurement instruments.
- f) Check the level of electromagnetic immunity of the equipment operating in the work area.

- g) The health of people in the vicinity, for example people who use pacemakers and earphones for hearing.
- h) The daily duration of welding operations or other activities.

The other devices must be electromagnetically compatible. This operation may require additional protective measures.

The dimensions of the area to be considered depend on the structure of the building and the type of activity in progress.

PACEMAKERS AND HEARING AIDS

Magnetic fields deriving from high currents can affect the correct functioning of pacemakers and hearing aids. Wearers of electronic equipment should consult a physician before approaching arc welding operations.

METHODS FOR REDUCING EMISSIONS

A) Power supply

The welding or cutting device must be connected to the power supply following the manufacturer's recommendations.

When interference problems arise, it may be necessary to take measures to solve the problem, such as the addition of filters on the power supply.

In the case of permanent installation of the equipment, the metal shielding of the power cables can be taken into consideration. The shielding must be connected to the welding machine so that there is good electrical contact between it and the mantle of the welding machine itself.

B) Welding machine maintenance

The welding machine must be periodically subjected to maintenance, according to the manufacturer's instructions.

Remove dust or foreign materials every 6 months, which may have been deposited on the transformer or on the diodes of the rectifier unit; to do this use a jet of dry, clean air.

The mantle and all the possible accesses inside the welding machine must be correctly closed during the welding and cutting operations. The welding machine must never be modified in any part except for modifications planned and authorised by the manufacturer and carried out by persons authorised by the manufacturer.

In particular, the distance of the arc from the work piece and the stabilisation devices must be adjusted and maintained according to the manufacturer's recommendations.

C) Cables

Cables must be kept as short as possible and must be placed close to each other and passed on the floor or as low as possible.

D) Work piece earthing

The earth connection of the work piece can reduce electromagnetic emissions in some cases.

The operator must pay attention to avoid that the earthing of the piece is not a source of danger for people and damage to the equipment. Where necessary, earthing must be carried out with a direct connection between the work piece and the ground, while in countries where this is not permitted, the connection must be made using a capacitor in accordance with the regulations of the country.

E) Shielding

Cable and equipment shielding in the work area can reduce interference. Shielding of the entire welding or cutting installation can be considered for special applications.

F) Equipotential connections

The equipotential connections of all metal components in and near welding installations should be considered.

In any case the metal components connected to the piece to be welded will increase the risk for the operator to receive an electric shock from the simultaneous contact with these metal components and the electrode. The operator should be isolated from all these metal components rendered equipotential.

Checks and inspections

Checks must be carried out by a qualified technician or a qualified and authorised technician; they must be visual and functional, with the aim of guaranteeing the safety of the machine.

They include:

- inspection of all supporting structures, which must not show any signs of cracking, breakage, damage, deformation, corrosion, wear or alteration to the original characteristics;
- checking all mechanical parts;
- inspection of all the safety devices installed on the machine;
- II connections with pins and screws;
- inspection of the machine operations;
- inspection of the machine status;
- verification of the correct operation and efficiency of the electrical system;
- checking the seal and efficiency of the pneumatic and/or hydraulic system.

The results of these checks must be reported on a specific sheet.

ATTENTION: If worn or faulty parts are not promptly replaced, the manufacturer cannot be held in any way liable for the damage caused by accidents that may result.

If faults or anomalies are detected, they must be eliminated before the machine is put into operation, and the expert carrying out the inspection will have to certify that the repair has been made, thus allowing the machine to be used.

If the person performing the inspection detects hazardous faults, they must promptly inform the machine manufacturer.

Place the machine out of service if operating faults are found while performing the appropriate checks/inspections and/or repairs. Check that no objects are left between the moving parts after any maintenance work.

In order to guarantee maximum safety of the machine it is, nonetheless, PROHIBITED to:

- Tamper with any part of the machine;
- Leave moving parts unattended;
- Use the machine when not operating at full efficiency;
- Modify the machine to change the originally established use, without explicit authorisation from the Manufacturer;
- Run moving parts with manual operations in case of power failure.

3.2. INTENDED USE

The system should only be used for the purpose for which it was manufactured meaning to generate an electrical arch for MIG/MAG, TIG, MMA welding or plasma cutting accordingly.

ATTENTION: It cannot therefore be used as a device for thaw pipes; any improper use automatically voids the warranty and excludes the manufacturer from any liability in case of damage to persons and property.

3.3. CONTRAINDICATIONS FOR USE

The machine must not be used:

- For uses other than those specified by the manufacturer, for different uses or not mentioned in this manual;

- In explosive, corrosive atmospheres or with a high concentration of dust or oily substances suspended in the air;
- In atmospheres with high fire risks;
- Exposed to adverse weather conditions;
- With safety devices bypassed or out of order;
- With electrical bridges and/or other means that exclude power/parts of the machine.

3.4. HAZARDOUS AREAS

The work area pertaining to the operator which is substantially the entire perimeter of the machine is considered hazardous.

It is the responsibility of the operator to keep the work area clear of persons or objects while using the machine and to avoid damage to persons, things or animals.

The use of the machine near other equipment or machines introduces additional risks. The operator is asked to evaluate these risks in order to prevent accidents.

3.5. SAFETY DEVICES

Welding machines are equipped with safety devices designed to prevent damage to the operator or to the welding machine itself. A safety device is any object or system that can reduce the risk of such damage.

Do not tamper with active safety devices or their connections.

Do not operate with the welding machine without the metal covers or with non-insulated connections. If necessary, during installation and connection, they must be integrated with others in order to guarantee compliance with the laws in force.

IMPORTANT: Daily check that the safety devices are functioning properly and efficient.

3.6. SIGNS

The safety signs must always be clearly visible and it is absolutely forbidden to remove or hide them. Generally there are signals or signs on the machine or in the work environment that indicate dangerous situations, prohibitions or instructions during use or operations connected to it, as in the following examples:



Emission of optical radiation:

The risk of optical radiation exists where the sign is affixed. Cat. 2 (EN 12198).



Fire hazard:

Fire hazards exist where the sign is affixed.



General warning:

This symbol indicates a hazard of any nature that may cause personal and property damages.



Explosion hazard:

This symbol indicates the presence of explosive substances or explosion hazard.



Warning:

Contact injuries may occur in this point (i.e. Electrical shock).



Blinding:

Protection goggles or mask must be worn near this symbol.

**Fatal hazard:**

Pay the utmost attention near this indication!!! Never touch the area indicated by this symbol since it indicates a fatal hazard.

**Noise:**

Hearing protection must be worn near this symbol.

3.7. RESIDUAL RISKS

Careful use of the machine minimises the probability of accidents; however, during the use of the machine it is necessary to strictly observe the safety rules described in this manual.

4. INSTALLATION

4.1. SHIPPING

The shipment, also depending on the destination, can be carried out by different means.

The packed machine must be properly anchored to the means of transport in order to avoid uncontrolled movements.

The shipment is always carried out under the responsibility of the purchaser who assumes all charges for accidents and thefts that could occur during the transport itself.

4.2. PACKAGING

The machine is shipped packed in a special container and, if necessary, it is suitably stabilised with shock-proof material to ensure its integrity.

The packaging is made, with containment of the overall dimensions, also depending on the type of transport adopted.

To facilitate transport, the shipment can be performed with some components disassembled and properly protected and packaged.

THE PACKAGING CONTAINS:

No. 1 **NOVATIG** welding machine

No. 1 Trolley TOTEM + G.R.W.

No. 1 Instruction manual

4.3. MACHINE RECEIPT

Upon receipt of the machine, check that the information in the shipping document actually corresponds to the material received and check that the packaging is perfectly intact.

IMPORTANT: in case of damage or absence of some parts, immediately report the anomaly to the carrier, making any descriptive notes of the damage on the transport document before signing. Do not use the machine, but contact the seller to agree on the procedure to be adopted.

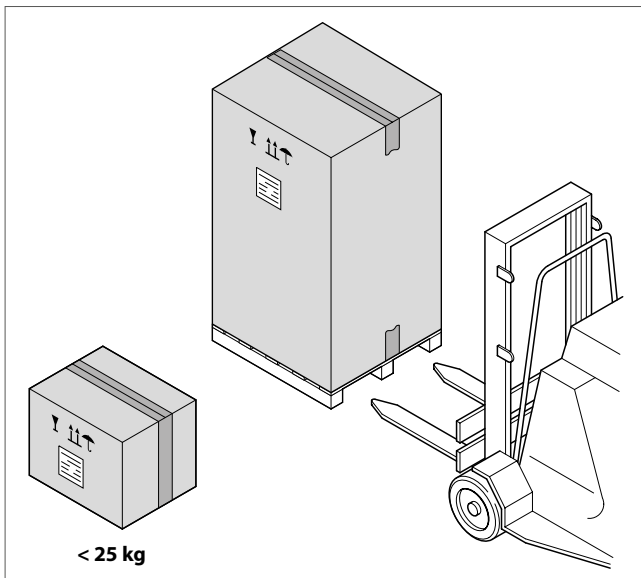
To this end, it is advisable to carry out a check of the packaging during the unloading phase and, in suspicious cases, open the packaging and to verify the safety of the machine and any loose units.

4.4. HANDLING AND LIFTING

ATTENTION: handling and lifting must be carried out by trained and qualified operators, using appropriate means and methods, to avoid risks to personal health and damage to the machine. Before carrying out handling and lifting, check the position of the centre of gravity of the load; always check the correct weight balance of the machine when it is transported, so as to prevent unexpected machine movements or falls. It is recommended to always use vehicles capable of supporting the weight and dimensions of the machine ("TECHNICAL SPECIFICATIONS" paragraph of this manual), so as to avoid damage to the machine or to persons or things around it.

IMPORTANT: the customer is always exclusively liable during the equipment loading and unloading phases.

For transport to the final installation site, it is preferable to use a forklift or pallet truck, taking care that the lifting forks support the entire crate.



For movements within the plant, the machine may be transported with a crane by properly harnessing it using cables with the appropriate resistance characteristics, depending on the weight of the machine itself. If the supply includes only the welding machine, generally weighing less than 25 kg, the packaging consists of a cardboard box without lifting pallets. It can be easily lifted by two operators and taken to the place of use.

ATTENTION: The machine must remain packed during unloading from the means of transport and until it is transferred to its destination.

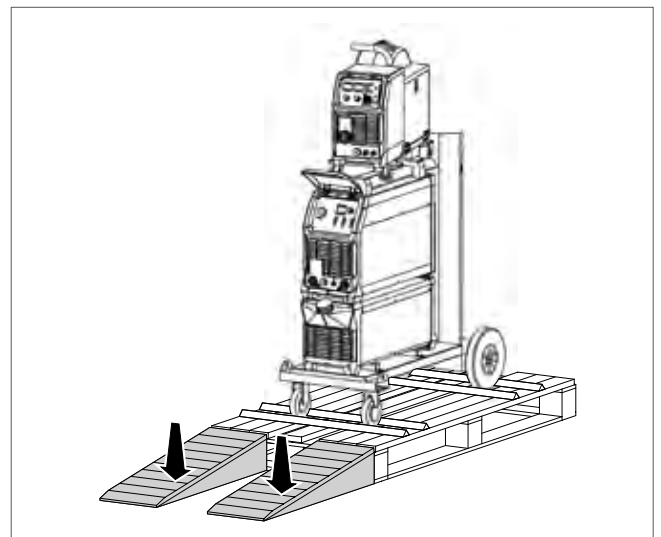
IMPORTANT: The Manufacturer cannot be held liable for damage caused to persons or property due to utilising lifting systems other than those described above.

4.5. UNPACKING

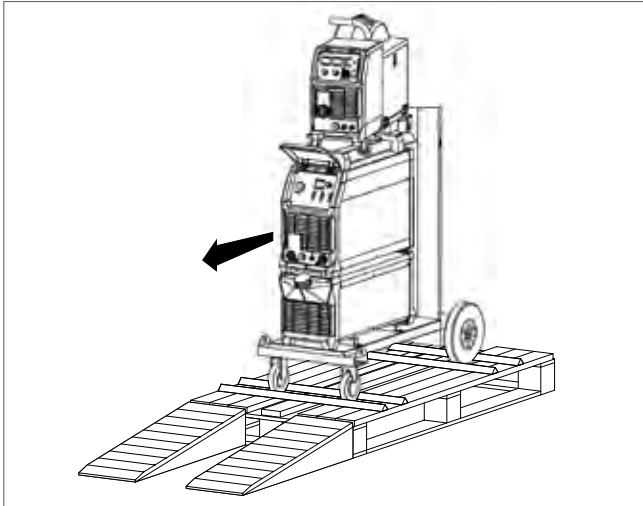
IMPORTANT: Consult the "Handling and lifting" paragraph to correctly handle the machine.

ATTENTION: To remove the machine from the packaging, use appropriate means and methods to avoid risks to human health. The packaging material must be properly disposed of in compliance with the laws in force.

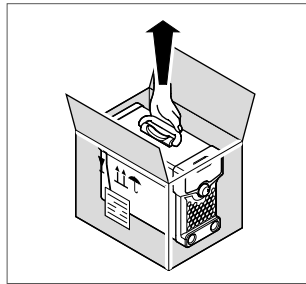
- Remove the protective covers such as straps, boxes, etc. using appropriate tools so as not to ruin the content.
- Remove the protective covers such as straps, boxes, etc. using appropriate tools so as not to ruin the content.
- Position appropriate descent ramps from the pallet verifying that the slides are well hooked to the pallet.



- Complete the unloading operations by carefully lowering the machine from the pallet.



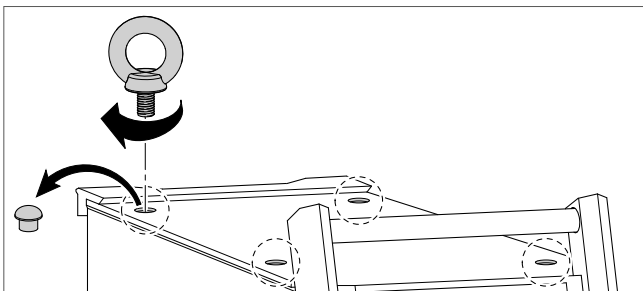
If only the welding machine is present, this must be handled using the convenient handle on the upper part of the welding machine itself.



ATTENTION: risk of overturning when unloading the machine from the pallet equipped with descent ramps.

ATTENTION: when carrying out unpacking operations, it may be necessary to have two persons equipped with suitable personal protective equipment.

IMPORTANT: in addition to handling the machine using the special trolley, it can be lifted from the ground after having wrapped it with lifting straps, by slinging it from the bottom in a stable and safe way. If provided, the machine must be lifted only and exclusively by using M10 eye-bolts which are not supplied. Remove the protective caps from the threaded holes and tighten up the lifting eye-bolts.



Do not lift the machine by the FEEDER or generator handles.

The machine has a sturdy handle integrated in the frame for handling.

N.B. These lifting and handling devices comply with the provisions prescribed by European standards. Do not use other devices such as lifting and handling equipment.

ATTENTION: do not lift and / or move the system with the gas cylinder connected.

4.6. STORAGE

In the case of inactivity, the machine must be stored in compliance with the following precautions:

- Store the machine in an enclosed area accessible only to employees; the storage area must have a stable support surface with an adequate load coefficient and must be free of fire and/or explosion risk; it must have adequate humidity and temperature and sufficient lighting.
- Protect the machine from any impact and stresses;
- Protect the machine from humidity and high temperatures;
- Ensure the machine does not come into contact with corrosive substances;
- In the event of prolonged storage, periodically check that there are no variations in the condition of the packages.

4.7. PREPARATIONS

Installation preparations

For the installation, it is necessary to prepare a manoeuvring area suited to the machine dimensions and selected lifting means. The machine must be positioned so that it is ideally ergonomic and provides maximum safety in the work place: leave an area around it large enough to allow easy operations and handling of the material to be processed and for maintenance and adjustment operations to be carried out.

Before installing the machine, check that the selected area is suitable and has the necessary authorisations to carry out the activity, sufficiently ventilated and illuminated, with a stable and levelled support surface. For installations on a raised floor, check that the slab can withstand the load.

Electrical system preparation

Connection to the electrical system which powers and combines the synchronisation with other machines should be done by specialised and qualified staff following the wiring diagram and arrangements set out

in Laws and/or Technical Standards currently in force for safety in workplaces and electrical installations. Appropriate safety devices must be provided for its operation in line with those required in the area of safety in the workplace.

IMPORTANT: The manufacturer cannot held liable for any damage to property, persons and/or animals caused by non-compliance with this provision.

To achieve an adequate level of safety, the electrical system to which the machine is connected must provide, at the user's full charge, an earthing system according to the provisions of the user's country, a circuit breaker to protect the power supply socket with value ΔI (current variation) not less than 30mA and anything else for a correct execution in a workmanlike manner, according to Laws and/or Technical standards in matters of safety in the workplace and electrical systems. Prepare connections for earthing the machine casing.

ATTENTION: These preparations are always the sole liability of the user and nothing can be attributed to the manufacturer for damage to property, persons and/or animals due to poor electrical connections.

4.8. ASSEMBLY/POSITIONING

WARNING: the assembly of any detached units and the installation of the machine must be carried out exclusively by technicians authorised by the manufacturer.

To allow for correct operations, the machine must always be positioned in places that comply with the environmental conditions described in this manual. The machine must always be positioned in a perfectly levelled area; levelling can also be carried out using any adjustment systems present on the machine.

ATTENTION: The machine must be positioned so as not to obstruct the entry and exit of the air from the cooling slots. REDUCED FLOW OF AIR causes overheating and possible damage to internal parts. Keep at least 500 mm of free space around the device.

IMPORTANT: Do not place any filtering device on the air intake passages of this welding machine. The warranty is void if any type of filtering device is used.

4.9. CONNECTIONS

Electrical connections

The machine's internal connections are carried out by qualified personnel sent by the manufacturer. The electrical connection between the machine panel and the customer's power distribution supply line must be carried out by qualified personnel from the Customer.

IMPORTANT: The personnel qualified to carry out the electrical connection must make sure of the perfect efficiency of the earthing of the electrical system and must check that the line voltage and the frequency correspond to the data shown on the identification plate. Incorrect supply voltages can cause serious damage to the system.

If the system is set to operate at single-phase 230 V at 50-60 Hz, wire the end of the power cable to an EEC plug with the same capacity as the socket on the line switch as per the following diagram:

SINGLE-PHASE connections

Wire colour	Connection
Brown	Phase
Blue	Neutral
Yellow/Green	Earth

If the system is set to operate at three-phase 400 V at 50-60 Hz, wire the end of the power cable to an EEC plug with the same capacity as the socket on the line switch as per the following diagram:

THREE-PHASE connections

Wire colour	Connection
Black	"R" phase
Brown	"S" phase
Blue/Grey	"T" phase
Yellow/Green	Earth

ATTENTION: Make sure the system line switch is in the "0" position before connecting the power cable.

ATTENTION: It is mandatory to install a circuit breaker with interlocked CEE socket, of adequate capacity and verifying that the earth socket is efficient and separate from the rest of the electrical system of the working environment.

ATTENTION: the yellow-green wire of the welding machine power cable must always be connected to the protection conductor (system earth). The yellow-green wire should NEVER be combined with another phase wire for a voltage withdrawal. Do not touch live parts.

Gas hose connection

ATTENTION: Cylinders can explode if damaged!!!

- Keep the cylinders upright and chained to the appropriate support.
- Keep the cylinders in a place where they cannot be damaged accidentally.
- Do not lift the machine with the cylinder attached.
- Never touch the cylinder with the welding wire.
- Keep the cylinder away from the welding area or from non-insulated electrical circuits.

The inert gas cylinder must be equipped with a pressure reducer and possibly also a flow meter. Only after having correctly positioned the cylinder, connect the gas hose, exiting from the rear of the machine, to the pressure reducer. Next you can open the cylinder and adjust the pressure reducer.

4.10. PRELIMINARY CHECKS

It is necessary to carry out the following operations before each machine start-up:

- Check all the safety systems;
- Check protection and signs.

Before putting the machine into operation, a number of checks and controls must be carried out in order to prevent errors or accidents during the Start-up phase:

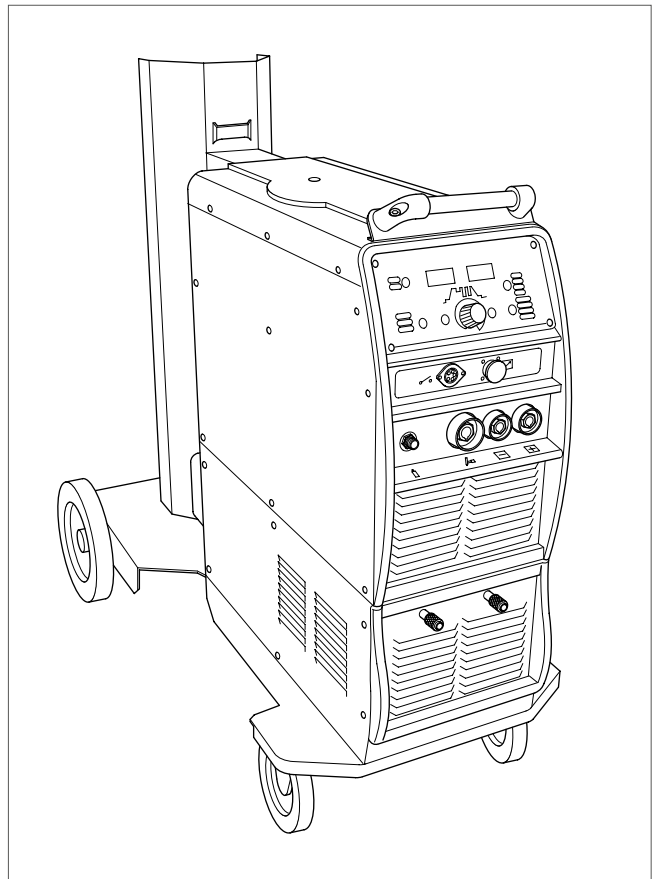
- Check that the machine has not been damaged during assembly;
- Verify, with particular care, the integrity of the electrical panels, control panels, electrical wiring and tubing;
- Check the exact connection of all external power sources;
- Check the free movement and free rotation of all moving parts;
- Check that hydraulic and pneumatic connections are tight so that they do not cause dangerous leakage.

5. OVERVIEW

5.1. OPERATING PRINCIPLE

The **NOVATIG** series welding systems were designed for TIG welding.

The **NOVATIG** series welding system composition is shown below.



5.2. FEATURES

- IGBT module inverter technology for smooth & stable output, increased reliability and high duty cycle.
- Automatic protection against lack of a phase of the supply voltage to avoid damage to the inverter.
- Integrated heavy duty industrial trolley and water cooler (optional).
- Arc ignition mode with HF or LIFT ARC which allows to preserve the electronic equipment.
- Adjustable ARC FORCE and HOT START with electrode anti sticking system for greater control and ease of use during MMA welding.
- 2T/4T trigger control.
- AC waveforms include square wave, sine wave, triangular wave.
- AC balance control monitors the oxide and helps better cleaning during aluminum welding.

- Dual digital display for accurate pre-setting and feedback of welding parameters & output.
- Remote control potentiometer of the torch and the amperage on it (optional).
- Wireless Remote Control and Wire / Wireless Foot Pedal (optional).

5.3. ENVIRONMENTAL CONDITIONS

The machine does not require particular environmental conditions. The machine must be installed indoors in a well-lit, ventilated industrial building with solid and level flooring.

The machine is suitable for operating in environments that:

- have an altitude not exceeding 2000 m a.s.l.;
- temperature between + 5 ° and + 35 ° C;
- relative humidity not higher than 80%.

It is forbidden to use the machine in environments that are:

- dusty;
- in corrosive atmosphere;
- at fire risk;
- in an explosive atmosphere.

ATTENTION: The welding machine has an IP 23 protection grade, therefore its use is precluded in certain environmental situations, such as rain, excessive presence of metallic dust, presence of acids and corrosive atmospheres.

5.4. LIGHTING

The lighting of the area of installation must comply with the laws in force in the country where the machine is installed and must, however, ensure good visibility at all points, not create hazardous reflections and allow clear reading of the control panels as well as identification of emergency buttons.

As the machine does not have its own light, it is necessary for the working environment to be equipped with general lighting to guarantee the machine has a value of 200 and 300 lux at all points of the machine.

5.5. VIBRATIONS

Under operating conditions that comply with the indications for proper use, the vibrations are not such as to cause hazardous situations. If this happens, you must request technical assistance and suspend the use of the equipment until the fault is resolved.

5.6. NOISE

The equivalent continuous A-weighted sound pressure level, emitted by the machine at the workplace in full operating conditions, is less than 70 dB (A). These emissions comply with the limits of the regulations in force and are not such as to generate danger for operators.

Arc welding processes can, however, produce noise levels above this limit. Therefore, users must implement the precautions required by law.

5.7. TECHNICAL SPECIFICATIONS

The following table shows the main technical specifications relating to the machine:

Parameters	NOVATIG 325 DC	NOVATIG 505 AC/DC
Three-phase feed	400 V- 50/60 Hz	400 V- 50/60 Hz
MAX current	22A	37.3A
Fuse	25A	40A
Noise emissions	< 70dB	< 70dB
MAX power	11.6 KW	14.32 KW
Duty cycle 100%	260 (TIG)	340A
Duty cycle 60%	320 (TIG)	380A
Open circuit voltage	73V	81V
Output range	5 - 320 A	5 - 500 A
Efficiency (%)	87.8	83.2
Max energy consumption value in the inactive state (W)	28.2	45.5
Compliant with standards	EN 60974 - 1- 10	EN 60974 - 1- 10
Application class	s	s
Weldable electrodes diameters	1.6-4 mm	1.6-6 mm
Dimensions, mm (L x W x H)	1100 x 280 x 970	1100 x 280 x 970
Weight, kg	44	55
Insulation class	H	H
Protection class	IP23	IP23
Cooling system	AF	AF
Operating temperature	-10+40°C	-10+40°C

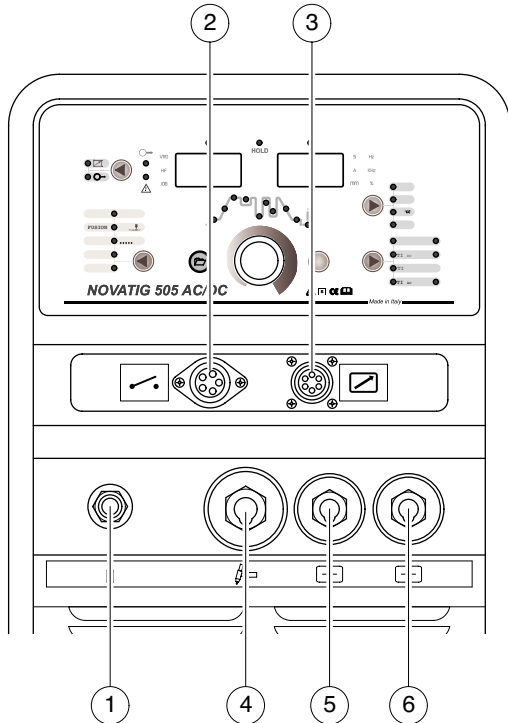
Parameters	U.M.	G.R.W.
Power supply, three phases	(V)	400
Absorbed power	(VA)	300
Power cooling (1L/min)	(KW)	0,725
Pressure MAX	(bar)	3.2
Tank capacity	(Lt)	11
Dimensions : length x width x height	(mm)	760 x 270 x 280
Weight including coolant	(Kg)	21

Parameters	U.M.	TROLLEY G.R.W. H2O
Dimensions : length x width x height	(mm)	1100 x 600 x 1070
Weight including coolant and G.R.	(Kg)	64

6. MACHINE USE

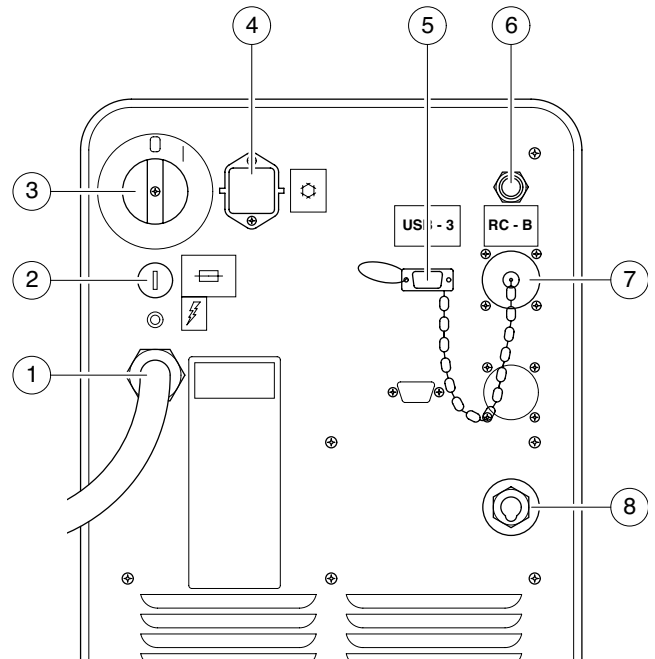
6.1. MACHINE LAYOUT DESCRIPTION

6.1.1. Layout for the front panel



1. Connector for gas feed hose:
power source → torch
2. Connector for logic signals of TIG torch.
3. Remote controller connector.
4. TIG TORCH welding socket.
5. Negative pole welding socket.
6. Positive pole welding socket.

6.1.2. Layout for the rear panel



1. Power cable.
Total length (including internal part): 5,0 m
Number and cross section of wires: 4 x 2,5 mm²
Power plug type: not supplied
2. Power supply transformer fuse.
Type: Delayed acting (T)
Amperage: 2 A
Voltage: 500 V a.c.
3. Switch ON / OFF
4. Cooler power feeding connector.
Voltage: 400 V a.c.
Current output: 1.0 A
IP protection rating: IP20 (cap open) / IP66 (cap closed)
5. Connector for connection to the programmer.
(Programming connector for the "frontal logic" circuit board). You can update the software of the equipment using the programming kit.
6. Connector for gas feed hose: cylinder → power source
7. Connector of the bundle of cables for connecting the power source to the remote control device.
8. Socket for connecting the power cable between the power source and the remote control device.

6.1.3. Preparing for welding

MMA

1. Set the welding power source ON/OFF switch to "O" (unit de-energized).
2. Plug the power cable plug into a mains socket outlet.
3. Choose the electrode based on the type of material and thickness of the workpiece to be welded.
4. Insert the electrode in the electrode holder.
5. Connect the electrode holder cable to the welding socket based on the polarity requested by the type of electrode used.
6. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
7. Connect the earth clamp to the workpiece being processed.
8. Set the welding power source ON/OFF switch to "I" (unit powered).
9. Select the following welding mode on the user interface: MMA
10. Set the required welding parameter values on the user interface.

When the remote controller [RC] is connected and the relative locking screw is tightened, welding current can be adjusted using the remote controller.

The system is ready to start welding.

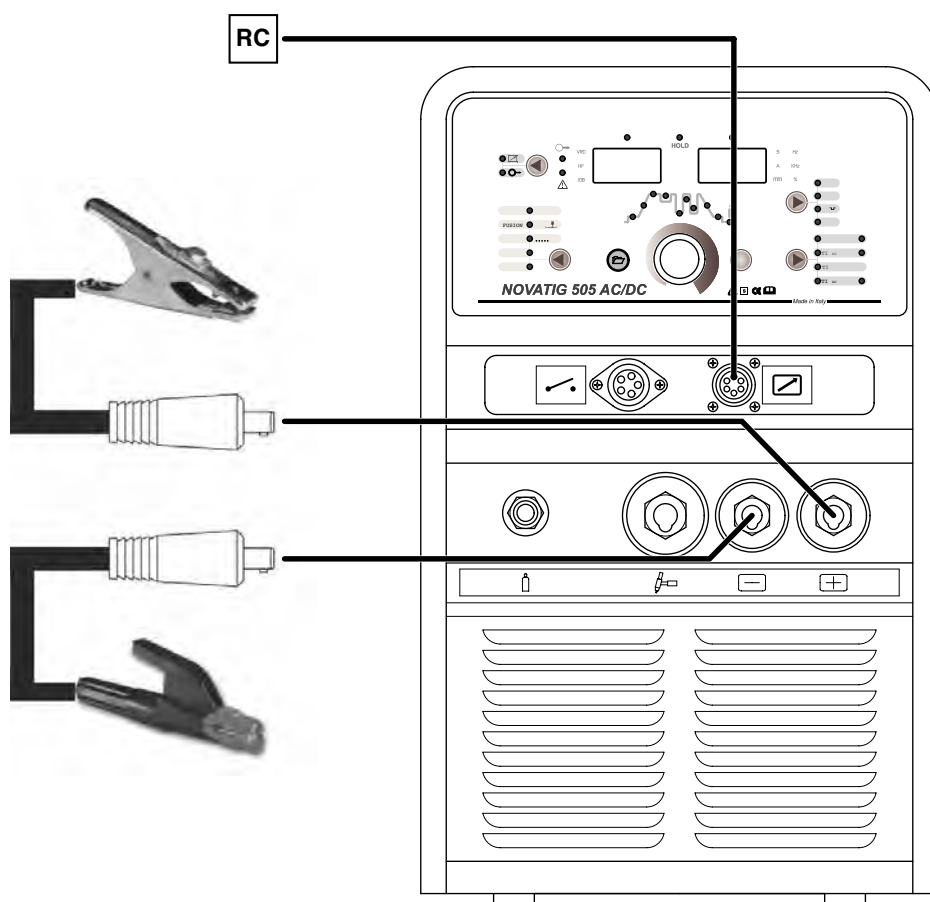
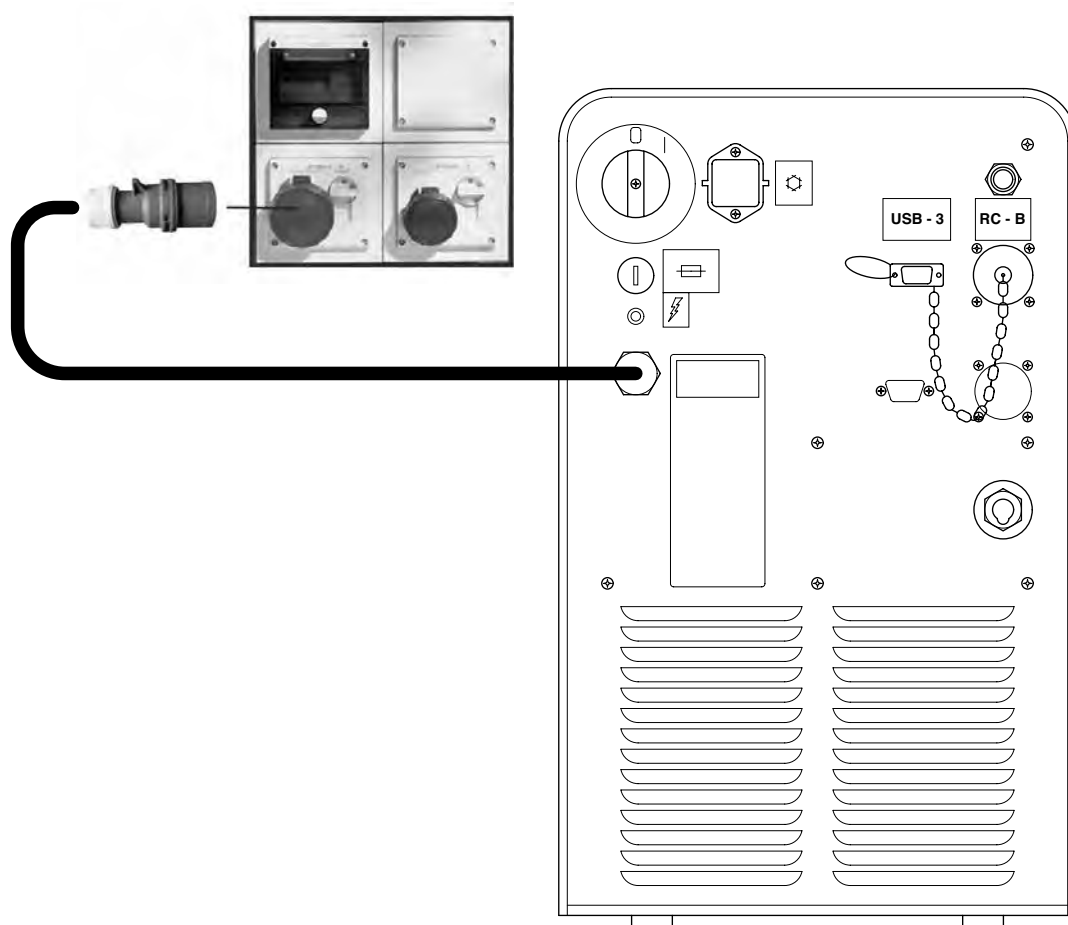
TIG

1. Set the welding power source ON/OFF switch to "O" (unit de-energized).
2. Plug the power cable plug into a mains socket outlet.
3. Connect the gas hose from the welding gas cylinder to the rear gas socket.
4. Open the cylinder gas valve.
5. Choose the electrode based on the type of material and thickness of the workpiece to be welded.
6. Insert the electrode in the TIG torch.
7. Connect the torch plug to the welding socket on the basis of the polarity required by the type of electrode in question.
8. Connect the plug of the ground clamp to the welding socket on the basis of the polarity required.
9. Connect the gas hose from the welding torch to the front gas socket.
10. Couple the welding torch connector to the TIG torch signals connector.
11. Connect the earth clamp to the workpiece being processed.
12. Set the welding power source ON/OFF switch to "I" (unit powered).
13. Select the following welding mode on the user interface : DC TIG
14. Press the torch trigger with the torch well clear of any metal parts. This serves to open the gas solenoid valve without striking the welding arc.
15. Use the flow control valve to adjust the flow of gas as required while the gas is flowing out.
16. Set the required welding parameter values on the user interface.

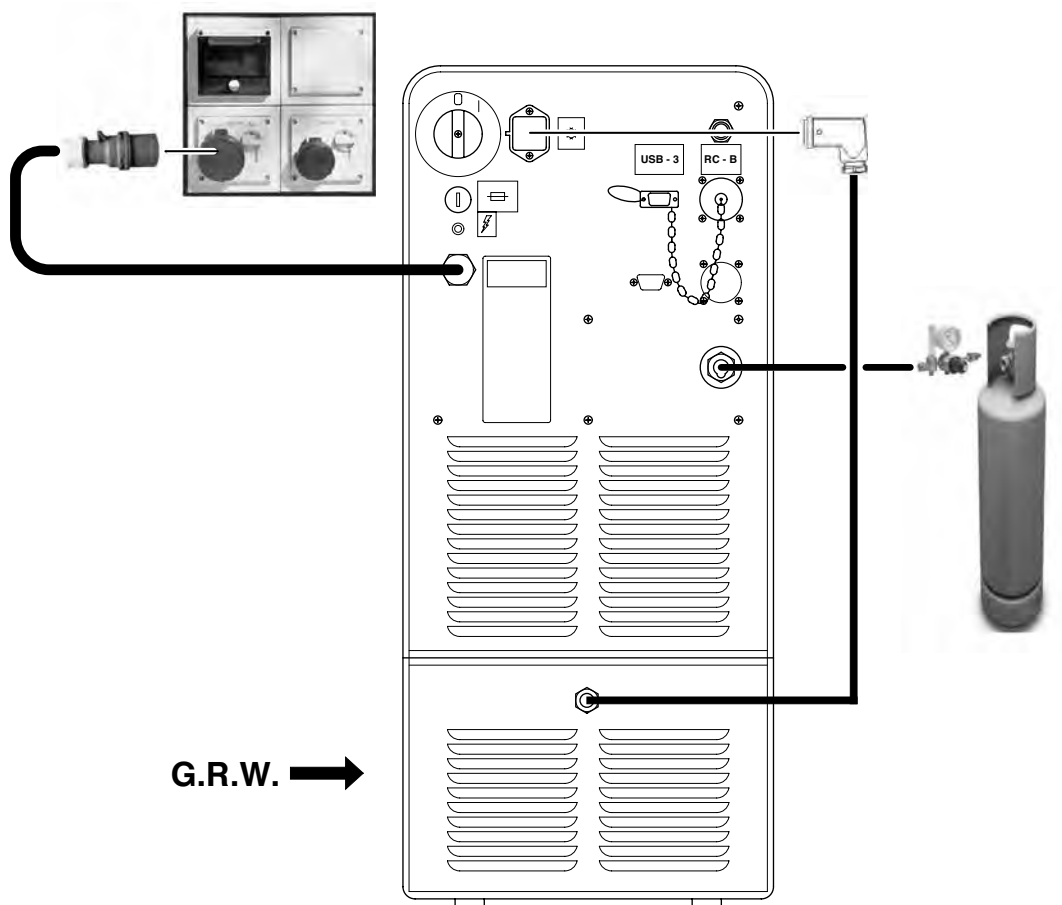
When the remote control pedal is connected and the relative locking screw is tightened the welding current will vary in relation to the pressure exerted on the pedal.

The system is ready to start welding.

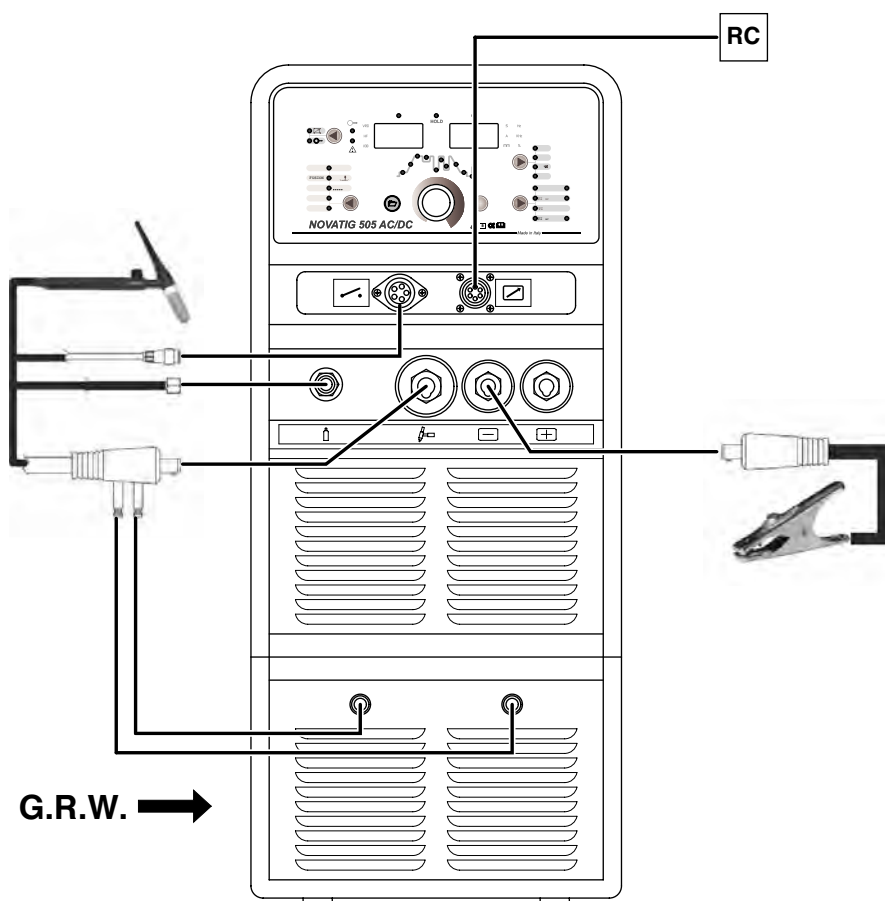
MMA



TIG



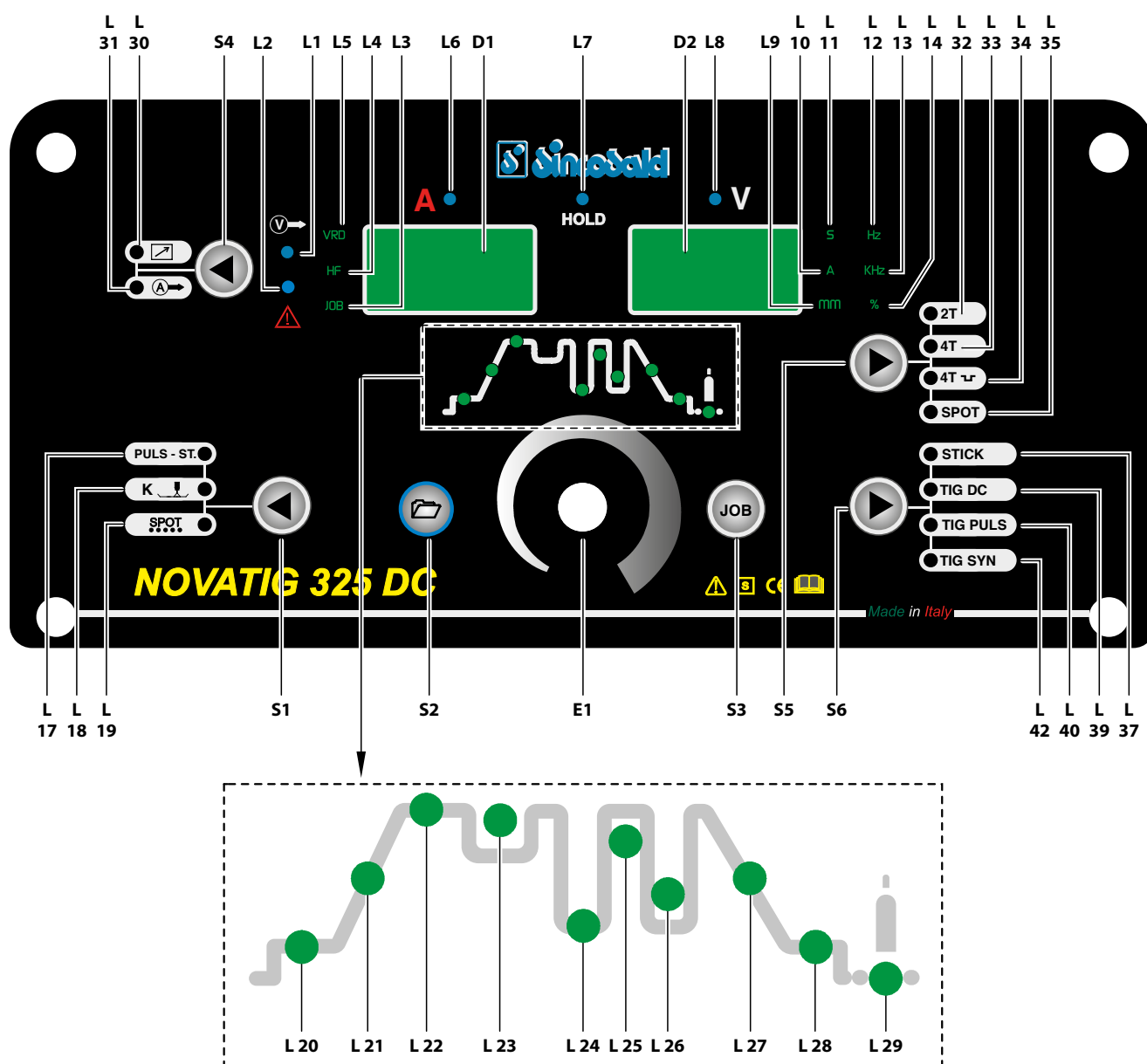
G.R.W. →



G.R.W. →

6.2. Frontal panel NOVATIG 325 DC

6.2.1. Interface user



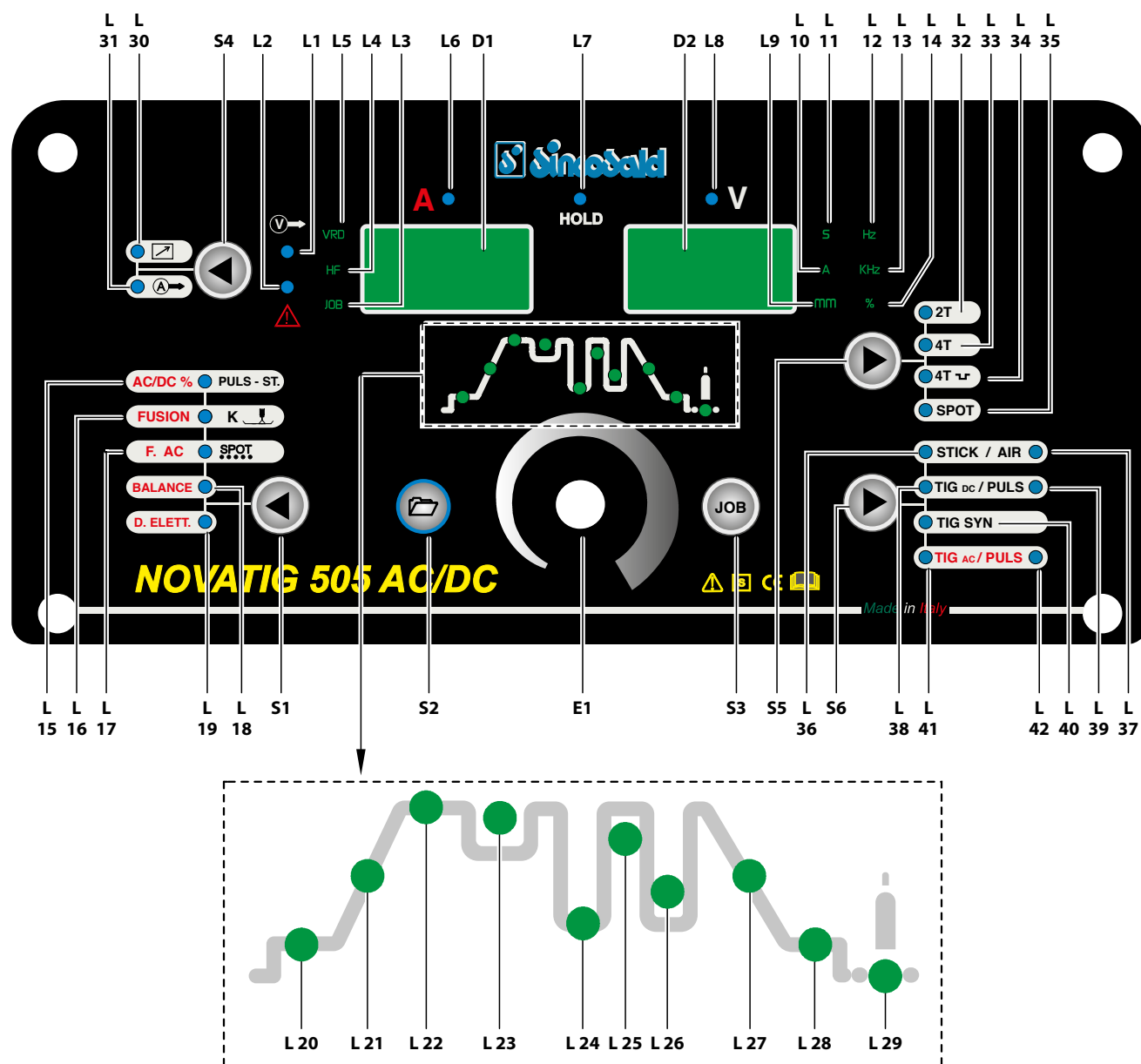
CODE	DESCRIPTION
L1	This LED illuminates to confirm the presence of power on the output sockets.
L2	This LED illuminates to show an anomaly in the operating conditions.
L3	Illuminates to show that a previously saved JOB has been loaded.
L4	Illumination shows that the following function has been activated: HIGH FREQUENCY ARC STRIKE (HF)
L5	Illumination shows that the following function has been activated: VRD (reduced output voltage). The no-load voltage between the welding sockets is switched from U0 to Ur (see technical data).

CODE	DESCRIPTION
L6	Illuminates to show a value in the following unit of measurement: AMPERES
L7	Illuminates to show the last voltage and current values measured during welding. The value appears on the following displays: D1-D2 The LED switches off when a new welding procedure is started, or when any of the welding settings is modified.
L8	Illuminates to show a value in the following unit of measurement: VOLTS
L9	Illuminates to show a value in the following unit of measurement: MILLIMETRES
L10	Illuminates to show a value in the following unit of measurement: AMPERES
L11	Illuminates to show a value in the following unit of measurement: SECONDS
L12	Illuminates to show a value in the following unit of measurement: HERTZ
L13	Illuminates to show a value in the following unit of measurement: KILOHERTZ
L14	Illuminates to show a value in the following unit of measurement: PERCENTAGE
L17	DC TIG mode : When this LED illuminates the following parameter can be set: PULS – ST.
L18	DC TIG mode : When this LED illuminates the following parameter can be set: K
L19	DC TIG mode : When this LED illuminates the following parameter can be set: SPOT
L20	When this LED illuminates the following parameter can be set : STARTING CURRENT
L21	When this LED illuminates the following parameter can be set: SLOPE UP
L22	When this LED illuminates the following parameter can be set: WELDING CURRENT
L23	When this LED illuminates the following parameter can be set: SECOND CURRENT B-LEVEL
L24	When this LED illuminates the following parameter can be set: BASE CURRENT
L25	When this LED illuminates the following parameter can be set: PEAK TIME
L25+L26	When this LED illuminates the following parameter can be set: PULSED CURRENT FREQUENCY
L26	When this LED illuminates the following parameter can be set: BASE TIME
L27	When this LED illuminates the following parameter can be set: DOWN SLOPE
L28	When this LED illuminates the following parameter can be set: FINAL CURRENT
L29	When this LED illuminates the following parameter can be set: POST-GAS
L30	Illuminates to signal activation of a connected remote control unit, if available.
L31	This LED indicates that the current reference setting is imposed by the remote controller.
L32	Illumination shows that the following function has been activated: 2 stroke procedure.
L33	Illumination shows that the following function has been activated: 4 stroke procedure.
L34	Illumination shows that the following function has been activated: 4 stroke B-level procedure + high frequency arc strike (HF).
L35	Illumination shows that the following function has been activated: 2 stroke spot procedure (Q-SPOT).
L36	This LED illuminates to show that the following welding mode is selected: MMA
L37	This LED illuminates to show that the following welding mode is selected: DESEAMING MODE

CODE	DESCRIPTION
L38	This LED illuminates to show that the following welding mode is selected: TIG DC CONTINUOUS
L39	This LED illuminates to show that the following welding mode is selected: PULSED DC TIG
L40	This LED illuminates to show that the following welding mode is selected: SYNERGIC PULSED DC TIG When this is on, it means that the synergic mode is active and that the operator can set just the welding current while the other parameters are automatically regulated by the machine. The synergy is optimised by angle welding.
D1	Data setting: The display shows the acronym of the parameter to be set.
	Welding: The display shows the effective amperes value during welding.
	HOLD function: The display shows the average current value measured over the entire welding period (excluding the starting and ending ramps).
D2	Data setting: The display shows the value of the selected parameter.
	Welding: The display shows the effective voltage during welding operations.
	HOLD function: The display shows the average voltage value measured over the entire welding period (excluding the starting and ending ramps).
S1	DC TIG mode: Press the button to select the parameter to be set. Possible choices: PULS – ST. - K - SPOT
S2	Press and release: the button selects the first level menu parameters. Hold down for 3 seconds: the button opens the second level menu. When in the menu press and release the button to select the parameters. Keep the button pressed while powering on the power source: the button opens the SETUP menu.
S3	Press and release: the button opens the JOBS upload menu. Hold down for 3 seconds: the button opens the JOBS save and delete menu.
S4	Press and release: the button enables the device to receive the welding current control signal from a remote controller. Hold down for 3 seconds: the button activates a connected remote controller, if available, which is then used to manage all functions of the welding power source from a distance.
S5	TIG DC mode: This button selects the torch trigger procedure. MMA mode: Press the button to show the selected electrode type for MMA welding.
S6	This button selects the welding mode.
E1	Data setting: The encoder sets the value of the selected parameter.
	Welding: The encoder sets the value of the following parameter: WELDING CURRENT

6.3. Frontal panel NOVATIG 505 AC/DC

6.3.1. Interface user



CODE	DESCRIPTION
L1	This LED illuminates to confirm the presence of power on the output sockets.
L2	This LED illuminates to show an anomaly in the operating conditions.
L3	Illuminates to show that a previously saved JOB has been loaded.
L4	Illumination shows that the following function has been activated: HIGH FREQUENCY ARC STRIKE (HF)
L5	Illumination shows that the following function has been activated: VRD (reduced output voltage). The no-load voltage between the welding sockets is switched from U0 to Ur (see technical data).
L6	Illuminates to show a value in the following unit of measurement: AMPERES

CODE	DESCRIPTION
L7	Illuminates to show the last voltage and current values measured during welding. The value appears on the following displays: D1-D2. The LED switches off when a new welding procedure is started, or when any of the welding settings is modified.
L8	Illuminates to show a value in the following unit of measurement: VOLTS
L9	Illuminates to show a value in the following unit of measurement: MILLIMETRES
L10	Illuminates to show a value in the following unit of measurement: AMPERES
L11	Illuminates to show a value in the following unit of measurement: SECONDS
L12	Illuminates to show a value in the following unit of measurement: HERTZ
L13	Illuminates to show a value in the following unit of measurement: KILOHERTZ
L14	Illuminates to show a value in the following unit of measurement: PERCENTAGE
L15	DC TIG mode : When this LED illuminates the following parameter can be set: PULS – ST. AC TIG mode : When this LED illuminates the following parameter can be set: AC/DC
L16	DC TIG mode : When this LED illuminates the following parameter can be set: K AC TIG mode : When this LED illuminates the following parameter can be set: FUSION
L17	DC TIG mode : When this LED illuminates the following parameter can be set: SPOT AC TIG mode : When this LED illuminates the following parameter can be set: AC FREQUENCY
L18	AC TIG mode : When this LED illuminates the following parameter can be set: AC TIG BALANCE
L19	AC TIG mode : When this LED illuminates the following parameter can be set: ELECTRODE DIAMETER. This LED flashes when the set welding current is too high in relation to the chosen electrode diameter.
L20	When this LED illuminates the following parameter can be set : STARTING CURRENT
L21	When this LED illuminates the following parameter can be set: SLOPE UP
L22	When this LED illuminates the following parameter can be set: WELDING CURRENT
L23	When this LED illuminates the following parameter can be set: SECOND CURRENT B-LEVEL
L24	When this LED illuminates the following parameter can be set: BASE CURRENT
L25	When this LED illuminates the following parameter can be set: PEAK TIME
L25+L26	When this LED illuminates the following parameter can be set: PULSED CURRENT FREQUENCY
L26	When this LED illuminates the following parameter can be set: BASE TIME
L27	When this LED illuminates the following parameter can be set: DOWN SLOPE
L28	When this LED illuminates the following parameter can be set: FINAL CURRENT
L29	When this LED illuminates the following parameter can be set: POST-GAS
L30	Illuminates to signal activation of a connected remote control unit, if available.
L31	This LED indicates that the current reference setting is imposed by the remote controller.
L32	Illumination shows that the following function has been activated: 2 stroke procedure.
L33	Illumination shows that the following function has been activated: 4 stroke procedure.
L34	Illumination shows that the following function has been activated: 4 stroke B-level procedure + high frequency arc strike (HF).

CODE	DESCRIPTION
L35	Illumination shows that the following function has been activated: 2 stroke spot procedure (Q-SPOT).
L36	This LED illuminates to show that the following welding mode is selected: MMA
L37	This LED illuminates to show that the following welding mode is selected: DESEAMING MODE
L38	This LED illuminates to show that the following welding mode is selected: TIG DC CONTINUOUS
L39	This LED illuminates to show that the following welding mode is selected: PULSED DC TIG
L40	This LED illuminates to show that the following welding mode is selected: SYNERGIC PULSED DC TIG When this is on, it means that the synergic mode is active and that the operator can set just the welding current while the other parameters are automatically regulated by the machine. The synergy is optimised by angle welding.
L41	This LED illuminates to show that the following welding mode is selected: TIG AC CONTINUOUS
L42	This LED illuminates to show that the following welding mode is selected: PULSED AC TIG
D1	Data setting: The display shows the acronym of the parameter to be set.
	Welding: The display shows the effective amperes value during welding.
	HOLD function: The display shows the average current value measured over the entire welding period (excluding the starting and ending ramps).
D2	Data setting: The display shows the value of the selected parameter.
	Welding: The display shows the effective voltage during welding operations.
	HOLD function: The display shows the average voltage value measured over the entire welding period (excluding the starting and ending ramps).
S1	DC TIG mode: Press the button to select the parameter to be set. Possible choices: PULS – ST. - K - SPOT
	AC TIG mode: Press the button to select the parameter to be set. Possible choices: AC/DC - FUSION - AC FREQUENCY – AC BALANCE - ELECTRODE DIAMETER
S2	Press and release: the button selects the first level menu parameters. Hold down for 3 seconds: the button opens the second level menu. When in the menu press and release the button to select the parameters. Keep the button pressed while powering on the power source: the button opens the SETUP menu.
S3	Press and release: the button opens the JOBS upload menu. Hold down for 3 seconds: the button opens the JOBS save and delete menu.
S4	Press and release: the button enables the device to receive the welding current control signal from a remote controller. Hold down for 3 seconds: the button activates a connected remote controller, if available, which is then used to manage all functions of the welding power source from a distance.
S5	TIG DC / TIG AC mode: This button selects the torch trigger procedure. MMA mode: Press the button to show the selected electrode type for MMA welding.
S6	This button selects the welding mode.
E1	Data setting: The encoder sets the value of the selected parameter.
	Welding: The encoder sets the value of the following parameter: WELDING CURRENT

6.4. UNIT POWER - UP

Set the welding power source ON/OFF switch to "I" to switch on the unit.

Fx.x	The message appears on the following displays: D2
	x.x = software version

First power-up or power-ups following a RESET procedure. The welding power source sets up for welding with the factory presets.

Subsequent power-ups

The welding power source sets up for welding in the latest stable welding configuration that was active at the time of power-off.

6.4.1. RESET (LOAD FACTORY SETTINGS)

The reset procedure involves complete restoration of the default values, parameters and memory settings set in the factory.

The reset procedure is useful in the following cases:


- Too many changes made to the welding parameters so user finds it difficult to restore defaults.
- Unidentified software problems that prevent the welding power source from functioning correctly.

6.4.2. PARTIAL RESET

The reset procedure involves restoration of the parameter values and settings, except the following settings:

- Settings of the SETUP menu.
- Saved JOBS.

Set the welding power source ON/OFF switch to "O" to switch the unit off.

S1 S6	Hold down both buttons simultaneously.	 Simultaneous actions
	Set the welding power source ON/OFF switch to "I" to switch on the unit.	
	• rEC PAr	
		The message appears on the following displays: D1-D2

Exit without confirmation

	Press any button (except S3).
	• This action will automatically close the menu.


Exit with confirmation

S3	Press the button.
	Wait for the memory clear procedure to terminate.
	• This action will automatically close the menu.

6.4.3. TOTAL RESET

The reset procedure involves complete restoration of the default values, parameters and memory settings set in the factory. All memory locations will be reset and hence all your personal welding settings will be lost!

Set the welding power source ON/OFF switch to "O" to switch the unit off.

S1 S6	Hold down both buttons simultaneously.	 Simultaneous actions
	Set the welding power source ON/OFF switch to "I" to switch on the unit.	
	• rEC PAr	
		The message appears on the following displays: D1-D2
E1	Select the following setting with the encoder: rEC FAC	

Exit without confirmation

	Press any button (except S3).
	• This action will automatically close the menu.

Exit with confirmation

S3	Press the button.
	Wait for the memory clear procedure to terminate.
	• This action will automatically close the menu.

6.5. SET-UP (INITIAL SET-UP OF THE WELDING POWER SOURCE)

Set the welding power source ON/OFF switch to "O" to switch the unit off.

S2	Press the button.
	Set the welding power source ON/OFF switch to "I" to switch on the unit.



Simultaneous actions

	SEt UP	• The message appears for a few seconds on the following displays: D1-D2
	Coo Aut	• The message appears on the following displays: D1-D2
S2	Use this button to scroll the settings to edit.	
E1	Using the encoder, edit the value of the selected setting.	

Exit without confirmation

	Press any button (except S2).
	• This action will automatically close the menu.

Exit with confirmation

S2	Press the button.
	• This action will automatically close the menu.

Setup settings

ACRONYM	SETTING	MIN	DEFAULT	MAX
Coo	COOLER ACTIVATION	Aut	Aut	oFF
St.C.	STARTING CURRENT	%	%	A
F.Cu.	FINAL CURRENT	%	%	A
HF.C.	HF CURRENT	20 A	SYn	250 A
HF.t.	HF TIME	0.5 s	2.0 s	3.0 s
PUL.	TYPE OF PULSED CURRENT	SLo.	FA.	FA.
P.A.	PILOT ARC	oFF	on	on
E.C.C.	CONTACT COMMAND EXPANSION	oFF	oFF	on

6.5.1. COOLER ACTIVATION

ON =	The cooler is always running when the power source is switched on. This mode is preferable for heavy duty and automatic welding procedures.
OFF=	The cooler is always disabled because an air-cooled torch is in use.
AUT=	When the unit is switched on the cooler is switched on for 15 s. During welding procedures the cooler runs constantly. When welding is terminated the cooler continues to run for 90 s + a number of seconds equivalent to the average current value shown using the HOLD function.

Power-up with operation of the cooler set to "ON" or "AUT" mode

A check is performed automatically of the presence of liquid in the cooling circuit and the cooler is switched on for 15 seconds. If the coolant circuit is full, the power source sets up in the most recent stable welding configuration. If the coolant circuit is not full, all functions are inhibited and there will be no output power present.

	• AL. Co.	The message appears on the following displays: D1-D2
--	-----------	--

(any)	Press the button or torch trigger to repeat the checking procedure for an additional 15 seconds. If the problem persists rectify the cause of the alarm.
-------	--

Power-up with operation of the cooler set to "OFF"

Operation of the cooler and the cooler alarm are disabled.

Welding is performed without liquid cooling of the torch.

Torch change-over with operation of the cooler set to "ON"

	Press and release the torch trigger.
	• This serves to start the cooler for 15 seconds to fill the torch cooling circuit.

STARTING CURRENT

The value of this parameter can be set as a percentage of the welding current or as an absolute value expressed in Amperes.

FINAL CURRENT

The value of this parameter can be set as a percentage of the welding current or as an absolute value expressed in Amperes.

HF CURRENT

This parameter establishes the current value during HF discharge. The value of this parameter can be set as an absolute value or in SYN. With SYN setting the HF current value is calculated automatically on the basis of the preset welding current value.

Consequences of a higher value:

Arc striking is facilitated, even on very dirty workpieces.

Risk of piercing excessively thin gauge workpieces.

Consequences of a higher value:

- Arc striking is facilitated, even on very dirty workpieces.
- Risk of piercing excessively thin gauge workpieces.

TYPE OF PULSED CURRENT

SLo.=	This setting enables slow pulsed mode.
FA.=	This setting enables fast pulsed mode.

HF TIME

This parameter defines maximum high frequency (HF) arc strike duration.

PILOT ARC

The function enables the output of a low current between the 1st and 2nd times of the torch trigger to shield the mask in advance and avoid the risk of blinding flashback caused by the welding current.

CONTACT COMMAND EXPANSION

The function enables the emission of the ARC-ON and ALARM signals via the signals connector for automatic application.

6.6. WELDING SETTINGS

6.6.1. TORCH TRIGGER PROCEDURE

2 STROKE LIFT-ARC WELDING (2T)

1. Touch the workpiece with the torch electrode.
2. Press (1T) and keep the torch trigger pressed.
3. Slowly lift the torch to strike the arc.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
4. Release (2T) the trigger to start the weld completion procedure.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc is extinguished.
 - Gas delivery continues for the time set in the post gas parameter.

2 STROKE WELDING WITH HIGH FREQUENCY ARC STRIKE (2T HF)

1. Bring the torch up to the work until the electrode tip is approximately 2 or 3 mm away.
2. Press (1T) and keep the torch trigger pressed.
 - The arc strikes without contact with the workpiece and the voltage discharges (HF) cease automatically.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
3. Release (2T) the trigger to start the weld completion procedure.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc is extinguished.
 - Gas delivery continues for the time set in the post gas parameter.

4 STROKE LIFT-ARC WELDING (4T)

1. Touch the workpiece with the torch electrode.
2. Press (1T) and release (2T) the torch trigger.
3. Slowly lift the torch to strike the arc.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
4. Press (3T) the trigger and keep it pressed to start the weld completion procedure.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc continues and the current output will be the value set in the end current parameter.
 - In these conditions the weld pool can be closed (crater filler current).
5. Release (4T) the trigger to extinguish the arc.
 - Gas delivery continues for the time set in the post gas parameter.

4 STROKE WELDING WITH HIGH FREQUENCY ARC STRIKE (4T HF)

1. Bring the torch up to the work until the electrode tip is approximately 2 or 3 mm away.
2. Press (1T) and release (2T) the torch trigger.
 - The arc strikes without contact with the workpiece and the voltage discharges (HF) cease automatically.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
3. Press (3T) the trigger and keep it pressed to start the weld completion procedure.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc continues and the current output will be the value set in the end current parameter.
 - In these conditions the weld pool can be closed (crater filler current).
4. Release (4T) the trigger to extinguish the arc.
 - Gas delivery continues for the time set in the post gas parameter.

4 STROKE B-LEVEL WELDING (4T B-L)

1. Touch the workpiece with the torch electrode.
2. Press (1T) and release (2T) the torch trigger.
3. Slowly lift the torch to strike the arc.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
3. Press and immediately release the torch trigger to switch to the second welding current.
 The trigger must not be pressed for more than 0.3 seconds; otherwise, the weld completion stage will start.
 When the trigger is pressed and released immediately, the system returns to the welding current.
4. Press (3T) the trigger and keep it pressed to start the weld completion procedure.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc continues and the current output will be the value set in the end current parameter.
 - In these conditions the weld pool can be closed (crater filler current).
5. Release (4T) the trigger to extinguish the arc.
 - Gas delivery continues for the time set in the post gas parameter.

4 STROKE B-LEVEL WELDING WITH HIGH FREQUENCY ARC STRIKE (4T B-L HF)

1. Bring the torch up to the work until the electrode tip is approximately 2 or 3 mm away.
2. Press (1T) and release (2T) the torch trigger.
 - The arc strikes without contact with the workpiece and the voltage discharges (HF) cease au-

tomatically.

- The welding current reaches the preset value, by way of a up slope time, if programmed.
3. Press and immediately release the torch trigger to switch to the second welding current.
The trigger must not be pressed for more than 0.3 seconds; otherwise, the weld completion stage will start.
When the trigger is pressed and released immediately, the system returns to the welding current.
 4. Press (3T) the trigger and keep it pressed to start the weld completion procedure.
The current reaches the end current value in the time set in the down slope time parameter.
 - The arc continues and the current output will be the value set in the end current parameter.
 - In these conditions the weld pool can be closed (crater filler current).
 5. Release (4T) the trigger to extinguish the arc.
 - Gas delivery continues for the time set in the post gas parameter.

2 STROKE TACKING WELDING (2T Q-SPOT)

1. Touch the workpiece with the torch electrode.
2. Press (1T) and keep the torch trigger pressed.
3. Slowly lift the torch to strike the arc.
4. Release (2T) the torch trigger.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
 - The welding procedure continues, at the preset current, for the time set with the spot time parameter.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc is extinguished.
 - Gas delivery continues for the time set in the post gas parameter.

2 STROKE TACKING WELDING WITH HIGH FREQUENCY ARC STRIKE (2T Q-SPOT HF)

1. Bring the torch up to the work until the electrode tip is approximately 2 or 3 mm away.
2. Press (1T) the torch trigger.
 - The arc strikes without contact with the workpiece and the voltage discharges (HF) cease automatically.
3. Release (2T) the torch trigger.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
 - The welding procedure continues, at the preset current, for the time set with the spot time parameter.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc is extinguished.

- Gas delivery continues for the time set in the post gas parameter.

Keep pressed torch trigger procedure

1. Bring the torch up to the work until the electrode tip is approximately 2 or 3 mm away.
2. Press (1T) the torch trigger.
 - The arc strikes without contact with the workpiece and the voltage discharges (HF) cease automatically.
 - The welding current reaches the preset value, by way of a up slope time, if programmed.
 - The welding procedure continues, at the preset current, for the time set with the spot time parameter.
 - The current reaches the end current value in the time set in the down slope time parameter.
 - The arc is extinguished.
 - Gas delivery continues for the time set in the post gas parameter.
3. Touch the workpiece with the torch electrode.
4. Slowly lift the torch to strike the arc.

PILOT ARC WELDING

The pilot arc can be activated in the following torch trigger procedures:

- 4T WELDING
- 4T HF WELDING
- 4T B-L HF WELDING

The welding procedure with pilot arc differs with respect to the procedure without pilot arc in the part of the torch trigger procedure described below.

LIFT-ARC Welding

1. Touch the workpiece with the torch electrode.
2. Press (1T) and keep the torch trigger pressed.
3. Slowly lift the torch to strike the arc.
 - The arc strikes, the welding current assumes the pilot current value.
4. Release (2T) the torch trigger.
 - The welding current reaches the preset value, by way of a up slope time, if programmed. etc.

Welding with HF

1. Press (1T) and keep the torch trigger pressed.
 - The arc strikes without contact with the part and the voltage discharges (HF) cease automatically, the welding current will assume the pilot current value.
2. Release (2T) the torch trigger.
 - The welding current reaches the preset value, by way of a up slope time, if programmed. etc.

SELECTION OF THE WELDING MODE AND TORCH TRIGGER PROCEDURE

Specific torch trigger procedures are available in accordance with the selecting welding mode.

The availability of certain procedures depends on whether or not certain parameters or functions of the unit are enabled or set in the associated menus.

The table shows the settings to be made to enable each procedure.

Legenda

2T:	2 STROKE LIFT-ARC
2T HF:	2 STROKE WITH HIGH FREQUENCY ARC STRIKE (HF)
4T:	4 STROKE LIFT-ARC
4T HF:	4 STROKE WITH HIGH FREQUENCY ARC STRIKE (HF)
4T B-L:	4 STROKE B-LEVEL
4T B-L HF:	4 STROKE B-LEVEL WITH HIGH FREQUENCY ARC STRIKE (HF)
2T Q-SPOT:	2 STROKE TACKING
2T Q-SPOT HF:	2 STROKE TACKING WITH HIGH FREQUENCY ARC STRIKE (HF)
✓:	Always available.
1:	Available with the following setting: HF= on



S6

Use this button to select one of the following welding modes.



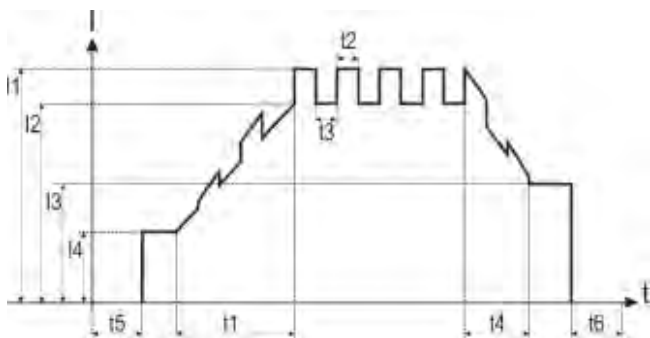
S5

Use this button to select one of the following torch trigger procedures ↓

MODE	PROCEDURE							
	2T	2T HF	4T	4T HF	4T B-L	4T B-L HF	2T Q-SPOT	2T Q-SPOT HF
STICK (MMA)								
AIR (DESEAMING MODE)								
TIG DC (TIG DC CONTINUOUS)	✓	1	✓	1	✓	1	✓	1
PULS (PULSED DC TIG)	✓	1	✓	1	✓	1	✓	1
TIG SYN (SYNERGIC PULSED DC TIG)	✓	1	✓	1	✓	1	✓	1
TIG AC	✓	1	✓	1	✓	1	✓	1
PULS	✓	1	✓	1	✓	1	✓	1

WELDING PARAMETERS

For a better understanding of the parameter functions described in the table, refer to the following diagram.



(I1)	WELDING CURRENT
(I2)	BASE CURRENT
(I3)	FINAL CURRENT
(I4)	STARTING CURRENT
(t1)	UP SLOPE TIME
(t2)	PEAK TIME
(t3)	BASE TIME
(1/t2+t3)	PULSED CURRENT FREQUENCY
(t4)	DOWN SLOPE TIME
(t5)	PRE GAS TIME
(t6)	POST GAS TIME

WELDING CURRENT

Output current value during welding.

MAXIMUM CURRENT WITH REMOTE CONTROLLER

Maximum output current value that can be achieved with remote controller external reference.

HOT-START

This parameter aids electrode melting at the time of arc striking.

Consequences of a higher value:

- Easier arc strike.
- Increased spatter at welding start.
- Increase of strike area.

Consequences of a lower value:

- More difficult arc strike.
- Less spatter at welding start.
- Smaller strike area.

ARC-FORCE

This parameter helps to avoid electrode sticking during welding.

During electrode fusion low conductivity parts of the coating become detached and tend to become

interposed between the electrode tip as it is fusing and the workpiece. This condition results in an interruption of the arc. In addition, it may occur that the electrode comes into contact with the workpiece creating a short circuit and consequent quenching of the arc. To avoid arc quenching the power source therefore delivers instantaneous peak currents in correspondence with preset arc voltage thresholds.

Consequences of a higher value:

- Fluidity during welding.
- Welding arc stability.
- Greater electrode fusion in workpiece.
- More welding spatter.

Consequences of a lower value:

- The arc is extinguished more easily.
- Less welding spatter.

PRE-GAS TIME

Time of gas delivery before the arc strike.

This adjustment is required when fixing points must be created or when welding in hard-to-reach positions that call for the presence of inert atmospheres before striking the arc.

Consequences of a higher value:

- This parameter allows a shielded environment to be created, thereby eliminating contaminants at the start of the welding pass.

STARTING CURRENT

Unit current output value immediately after the arc strike.

The usefulness of having an adjustable initial welding current is that of avoiding welding the part with excessively high current values and thus potentially damaging it.

SLOPE UP

Time during which the current changes from the starting value to the welding value by means of a slope.

This setting is used to avoid damaging the edges of the joint with excessively high current values at the moment of arc striking. The value of the main welding current is increased gradually in order to control the uniformity of material deposition and weld penetration.

SECOND CURRENT B-LEVEL

With a rapid press and release (less than 0.5 seconds) of the torch trigger during welding, the output current value switches to the value set by means of the "B-level second current" parameter.

This function makes it possible to avoid interrupting

the welding process when the geometry of the workpiece changes; alternatively, the welding current can be reduced to decrease heating of the part if it becomes too hot during execution of the welding process.

In DC TIG welding, the parameter is useful when welding different gauge workpieces during the same pass; when moving between different gauges the output current can be changed simply by pressing the torch trigger.

BASE CURRENT

Pulsed wave minimum current.

Consequences of a higher value:

- Faster creation of weld pool.
- Increase of heat-affected zone.

PEAK TIME

Time for which the current pulse is at the maximum value.

Consequences of a higher value:

- Greater weld penetration.
- Facility to make deeper cuts.

Consequences of a lower value:

- Reduction of heat-affected zone.
- Difficult to create a weld pool.

PULSED CURRENT FREQUENCY

Consequences of a higher value:

- Slower melt speed.
- Reduction of heat-affected zone.

BASE TIME

Time during which current output is at the base value.

Consequences of a higher value:

- The filler material is spread more evenly.
- Increase of heat-affected zone.

DOWN SLOPE

Time during which the current changes from the welding value to the end value by means of a slope.

FINAL CURRENT

During electrode welding the parameter makes it possible to obtain a uniform deposit of filler material from the start to the end of the welding process, closing the deposition crater with a current such as to deposit a final droplet of filler material.

By keeping the torch trigger pressed during the 3rd time, the crater filler current is maintained thereby ensuring optimal crater filling, until the post gas time is started by releasing the torch trigger (4th time).

POST GAS TIME

Time of post gas delivery when the welding arc is extinguished.

Consequences of a higher value:

- More effective pickling (improved appearance of workpiece at the end of the welding pass).
- Higher gas consumption.

Consequences of a lower value:

- Lower gas consumption.
- Oxidation of electrode tip (more difficult arc strike).

ELECTRODE TYPE

The type of welding electrode can be selected.

Each electrode is associated with specific threshold values for Arc-Force and long arc Voltage.

VRD

This parameter reduces the potential across the welding sockets when welding is not in progress.

The arc strike procedure is as follows:

- Touch the workpiece with the electrode tip.
- Raise the electrode.
- Power is released for several seconds.
- Touch the workpiece with the electrode tip.
- The welding arc will strike.

LONG ARC VOLTAGE

This parameter inhibits power output when the potential between electrode and workpiece exceeds the preset threshold level.

Consequences of a higher value:

- The welding arc persists even with a significant distance between the electrode and the workpiece.
- Consequences of a lower value:
- Faster exit from weld.

SPOT TIG TIME

When the torch trigger is pressed the welding arc persists for the time set in the parameter.

Press the torch trigger again to resume the welding process.

The result of this is a very precise, not oxidized welding spot without any plastic deformation of the sheet.

HF ARC START

This parameter enables the arc strike in the TIG welding procedure by means of a high frequency (HF) current discharge.

The high frequency arc strike (HF) prevents the inclusion of impurities at the start of the weld pass.

WARNING: The high frequency arc strike (HF) can harm electronic boards when welding is performed on equipment that incorporates such devices.

MINIMUM PEDAL CURRENT

Minimum output current value with foot pedal controller external reference.

The current is set as a percentage with respect to the "maximum foot pedal current" parameter.

AC WAVEFORM

This parameter allows selection of the required AC waveform.

AC WAVEFORM	CHARACTERISTICS
Sine	Low noise
Square	High noise
	Greater penetration
	Reduced pickling
Triangolare	Medium noise

PULS – ST.

This parameter allows the unit to start in synergic pulsed TIG mode for the preset time interval, before switching automatically to the welding procedure selected on the interface panel.

The parameter creates a weld pool faster with respect to the standard starting procedure.

This parameter is useful when spot welding thin gauge sheet.

K

Welding power remains constant even when the distance between electrode and workpiece changes.

Consequences of a higher value:

- The welding arc concentration remains unchanged.
- Prevents electrode sticking.
- Thin workpieces may become deformed more easily.

SPOT

This parameter allows thin gauge sheet to be welded without deformation.

Consequences of a higher value:

- Welding of thinner gauge sheet without deformation.
- Less melting of material, slower welding process.

AC/DC

This parameter serves to set the AC wave percentage with respect to the DC current output.

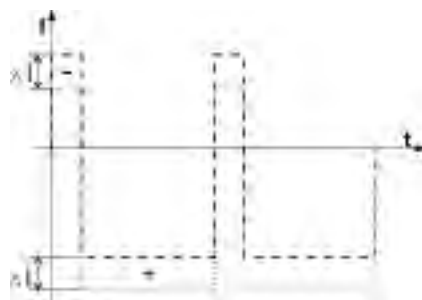
Consequences of a higher value:

- Greater weld penetration.
- Less deformation.
- Faster creation of the weld pool.
- Reduced cleanliness of the workpiece.
- Loss of arc.

FUSION

This parameter establishes the percentage of the positive current wave (pickling) that is subtracted and added to the negative current (fusion).

The following picture shows the positive wave interval ΔI that, if subtracted and added to the negative wave, forms the new form of broken line wave.

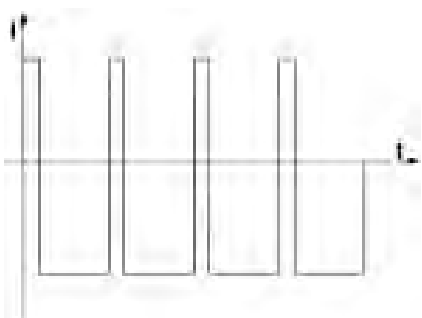
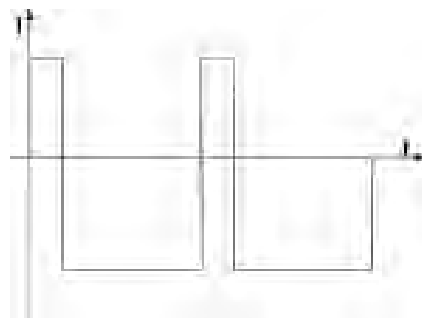


Consequences of a higher value:

- Tighter arc.
- Greater weld penetration.
- Reduced pickling.
- Loss of arc.
- Less deformation of the electrode.

AC FREQUENCY

The picture below shows the example where the wave on the second graph has a double frequency compared with the first.



Consequences of a higher value:

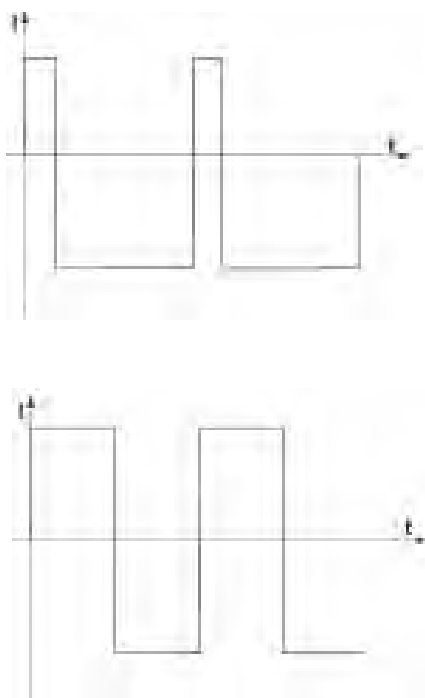
- Arc concentration.
- Reduction of heat-affected zone.
- Slower melt speed.

AC BALANCE

This parameter establishes the positive wave vs. negative wave time ratio.

The following figure shows two graphs with different balance value: the first graph represents the curve of the current with a negative value balance (more penetration) in which it can be seen that there is a low percentage of positive wave compared with the negative.

In the second graph the current curve is shown with a positive value balance (more cleaning); in this case the percentage of the positive wave is greater than the negative one.



Consequences of a higher value:

- Greater weld penetration.
- Less cleanliness.

ELECTRODE DIAMETER

The parameter optimizes the AC TIG welding arc strike on the basis of the diameter of the chosen electrode.

PARAMETERS ACTIVATION

The welding parameters are available in accordance with the selected welding mode and procedure. Certain parameters are available only after other parameters or functions of the unit have been enabled or set.

The table shows the settings required to enable each parameter.

LEGENDA

✓:	Always available.
1:	Available with the following setting: SPOT = OFF
2:	Available when remote control is enabled and a remote control pedal is connected to the unit.
3:	Available with the following setting: HF ARC START = ON
4:	Available when foot pedal controller is disabled.
5:	Available with the following setting: TYPE OF PULSED CURRENT = SLO.
6:	Available with the following setting: TYPE OF PULSED CURRENT = FA.

Interpretazione della simbologia

1+2=	All conditions must be fulfilled (both 1 and 2).
------	--

	MODE	STICK	AIR	TIG DC				PULS				TYG SIN			
	PROCEDURE			2T	4T	4T -_-	SPOT	2T	4T	4T -_-	SPOT	2T	4T	4T -_-	SPOT
MENU	PARAMETER														
1°	WELDING CURRENT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1°	HOT-START	✓													
1°	ARC FORCE	✓													
1°	PRE-GAS TIME			3	3	3	3	3	3	3	3	3	3	3	3
1°	STARTING CURRENT			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1°	SLOPE UP			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1°	SECOND CURRENT B-LEVEL					✓				✓				✓	
1°	BASE CURRENT							✓	✓	✓	✓	✓	✓	✓	✓
1°	PEAK TIME							✓	✓	✓	✓	✓	✓	✓	✓
1°	PULSED CURRENT FREQUENCY							6	6	6	6	6	6	6	6
1°	BASE TIME							5	5	5	5				
1°	DOWN SLOPE			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1°	FINAL CURRENT			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1°	POST GAS TIME			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2°	ELECTRODE TYPE	✓													
2°	VRD	✓	✓												
2°	LONG ARC VOLTAGE	✓													
2°	SPOT TIG TIME						✓				✓				✓
2°	HF ARC START			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2°	MINIMUM PEDAL CURRENT			2			2	2			2	2			2
2°	AC WAVEFORM														
SPECIAL	PULS – ST.			3+1	3+1	3+1		3+1	3+1	3+1					
SPECIAL	K			4+1	1			4+1	1						
SPECIAL	SPOT			3	3			3	3			3	3		
SPECIAL	AC/DC														
SPECIAL	FUSION														
SPECIAL	AC FREQUENCY														
SPECIAL	AC BALANCE														
SPECIAL	ELECTRODE DIAMETER														

	MODE	TIG AC				PULS			
	PROCEDURE	2T	4T	4T -_-	SPOT	2T	4T	4T -_-	SPOT
MENU	PARAMETER								
1°	WELDING CURRENT	1	1	1	1	1	1	1	1
1°	HOT-START								
1°	ARC FORCE								
1°	PRE-GAS TIME	3	3	3	3	3	3	3	3
1°	STARTING CURRENT	✓	✓	✓	✓	✓	✓	✓	✓
1°	SLOPE UP	✓	✓	✓	✓	✓	✓	✓	✓
1°	SECOND CURRENT B-LEVEL				✓				✓
1°	BASE CURRENT					✓	✓	✓	✓
1°	PEAK TIME					✓	✓	✓	✓
1°	PULSED CURRENT FREQUENCY					6	6	6	6
1°	BASE TIME					5	5	5	5
1°	DOWN SLOPE	✓	✓	✓	✓	✓	✓	✓	✓
1°	FINAL CURRENT	✓	✓	✓	✓	✓	✓	✓	✓
1°	POST GAS TIME	✓	✓	✓	✓	✓	✓	✓	✓
2°	VRD								
2°	LONG ARC VOLTAGE								
2°	SPOT TIG TIME		✓				✓		
2°	HF ARC START	✓	✓	✓	✓	✓	✓	✓	✓
2°	MINIMUM PEDAL CURRENT	2	2			2	2		
2°	AC WAVEFORM	✓	✓	✓	✓	✓	✓	✓	✓
SPECIAL	PULS – ST.								
SPECIAL	K								
SPECIAL	SPOT								
SPECIAL	AC/DC	✓	✓	✓	✓	✓	✓	✓	✓
SPECIAL	FUSION	✓	✓	✓	✓	✓	✓	✓	✓
SPECIAL	AC FREQUENCY	✓	✓	✓	✓	✓	✓	✓	✓
SPECIAL	AC BALANCE	✓	✓	✓	✓	✓	✓	✓	✓
SPECIAL	ELECTRODE DIAMETER	✓	✓	✓	✓	✓	✓	✓	✓

PARAMETERS SETTING : (1ST LEVEL)

S2	Press this button to scroll the list of settings to edit.
	• The acronym relative to the setting to be edited appears on the following displays: D1
	• The value relative to the selected setting appears on the following displays: D2
E1	Using the encoder, edit the value of the selected setting.
	The value is saved automatically.
	Press any key (except S2) to save the setting and quit the menu.

Parameters of the 1st level menu: MMA mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
	WELDING CURRENT	10 A	10 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				
Ho.S.	HOT-START	0 %	*SYn	100 %	*1 *2
Ar.F.	ARC FORCE	0 %	*SYn	250 %	*1 *3

Parameters of the 1st level menu: DESEAMING mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
	WELDING CURRENT	10 A	10 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				

Parameters of the 1st level menu: CONTINUOUS DC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Pr.G.	PARAMETER	0.0 s	0.1 s	10.0 s	
St.C.	PRE-GAS TIME	5 A	50 A	500 A	*4 *8
		2 %	50 %	200 %	*4 *8
Sl.u.	STARTING CURRENT	0.0 s	0.0 s	25.0 s	
	WELDING CURRENT	5 A	80 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER	10 %	50 %	200 %	*1
S.Cu.	SECOND CURRENT B-LEVEL	0.0 s	0.0 s	25.0 s	*8
Sl.d.	DOWN SLOPE	5 A	5 A	500 A	*4 *8
F.Cu.	FINAL CURRENT	5 %	5 %	80 %	*4 *8
Po.G.	POST GAS TIME	0.0 s	10.0 s	25.0 s	

Parameters of the 1st level menu: PULSED TIG DC mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Pr.G.	PRE-GAS TIME	0.0 s	0.1 s	10.0 s	
St.C.		5 A	50 A	500 A	*4 *8
	STARTING CURRENT	2 %	50 %	200 %	*4 *8
Sl.u.	SLOPE UP	0.0 s	0.0 s	25.0 s	
	WELDING CURRENT	5 A	80 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				
S.Cu.	SECOND CURRENT B-LEVEL	10 %	50 %	200 %	*1
b.Cu.	BASE CURRENT	1 %	40 %	200 %	

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
PE.t.	PEAK TIME	1 %	50 %	99 %	
P.Fr.	PULSED CURRENT FREQUENCY	0.1 Hz	100 Hz	2.5 kHz	
bA.t.	BASE TIME	0.1 s	5.0 s	5.0 s	
Sl.d.	DOWN SLOPE	0.0 s	0.0 s	25.0 s	*8
F.Cu.	CORRENTE FINALE	5 A	5 A	500 A	*4 *8
		5 %	5 %	80 %	*4 *8
Po.G.	TEMPO DI POST GAS	0.0 s	10.0 s	25.0 s	

*1:	This parameter is set as a percentage referred to the value of the following parameter: WELDING CURRENT
*2:	The value is limited to 250 A max.
*3:	The value is limited to 500 A max.
*4:	The value of this parameter can be set as a percentage of the welding current or as an absolute value expressed in Amperes.
*5:	This setting is used to adjust both parameters.
*SYN:	This code indicates that parameters control is synergic.
	The optimal value of this parameter is set automatically by the microprocessor on the basis of the preset welding current value.
	When SYN is installed, to display the synergic value press the following button: S5
	This value can be displayed but it is not user-adjustable.
*8:	The parameter is displayed but it is not used the during welding process when the following setting is present: SPOT = ON

Parameters of the 1st level menu: SYNERGIC DC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Pr.G.	PRE-GAS TIME	0.0 s	*7	10.0 s	
St.C.	STARTING CURRENT	5 A	*7	500 A	*4
		2 %	*7	200 %	*4
Sl.u.	SLOPE UP	0.0 s	*7	25.0 s	
	WELDING CURRENT	5 A	*7	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				
S.Cu.	SECOND CURRENT B-LEVEL	10 %	*7	200 %	*1
b.Cu.	BASE CURRENT	1 %	*6 *7	200 %	
PE.t.	PEAK TIME	1 %	*6 *7	99 %	
P.Fr.	PULSED CURRENT FREQUENCY	0.1 Hz	*6 *7	2.5 kHz	
Sl.d.	DOWN SLOPE	0.0 s	*7	25.0 s	
F.Cu.	FINAL CURRENT	5 A	*7	500 A	*4
		5 %	*7	80 %	*4
Po.G.	POST GAS TIME	0.0 s	*7	25.0 s	

1st level menu parameters in AC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Pr.G.	PRE-GAS TIME	0.0 s	0.1 s	10.0 s	
St.C.	STARTING CURRENT	5 A	50 A	500 A	
		2 %	50 %	200 %	
Sl.u.	SLOPE UP	0.0 s	0.0 s	25.0 s	
	WELDING CURRENT	5 A	80 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				
S.Cu.	SECOND CURRENT B-LEVEL	10 %	50 %	200 %	*1
Sl.d.	DOWN SLOPE	0.0 s	0.0 s	25.0 s	
F.Cu.	FINAL CURRENT	5 A	5 A	500 A	
		5 %	5 %	80 %	
Po.G.	POST-GAS TIME	0.0 s	10.0 s	25.0 s	

1st level menu parameters in PULSED AC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Pr.G.	PRE-GAS TIME	0.0 s	0.1 s	10.0 s	
St.C.	STARTING CURRENT	5 A	50 A	500 A	
		2 %	50 %	200 %	
Sl.u.	SLOPE UP	0.0 s	0.0 s	25.0 s	
	WELDING CURRENT	5 A	80 A	500 A	*5
	MAXIMUM CURRENT WITH REMOTE CONTROLLER				
S.Cu.	SECOND CURRENT B-LEVEL	10 %	50 %	200 %	*1
b.Cu.	BASE CURRENT	1 %	40 %	200 %	
PE.t.	PEAK TIME	0.1 s	5.0 s	5.0 s	
		1 %	50 %	99 %	
P.Fr.	PULSED CURRENT FREQUENCY	0.1 Hz	100 Hz	2.5 kHz	
bA.t.	BASE TIME	0.1 s	5.0 s	5.0 s	
Sl.d.	DOWN SLOPE	0.0 s	0.0 s	25.0 s	
F.Cu.	FINAL CURRENT	5 A	5 A	500 A	
		5 %	5 %	80 %	
Po.G.	POST-GAS TIME	0.0 s	10.0 s	25.0 s	

*1:	This parameter is set as a percentage referred to the value of the following parameter: WELDING CURRENT
*4:	The value of this parameter can be set as a percentage of the welding current or as an absolute value expressed in Amperes.
*5:	This setting is used to adjust both parameters.
*6:	This value can be displayed but it is not user-adjustable.
*7:	The optimal value of this parameter is set automatically by the microprocessor on the basis of the preset welding current value.
*8:	The parameter is displayed but it is not used the during welding process when the following setting is present: SPOT = ON

PARAMETERS SETTING: (2ND LEVEL)

S2	Hold down the button for 3 seconds to gain access to the 2nd level menu.
	• The acronym relative to the setting to be edited appears on the following displays: D1
	• The value relative to the selected setting appears on the following displays: D2
S2	Press this button to scroll the list of settings to edit.
E1	Using the encoder, edit the value of the selected setting.
	The value is saved automatically.
	Press any key (except S3) to save the setting and quit the menu.

Parameters of the 2nd level menu: MMA mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
EL.	ELECTRODE TYPE	bAS	bAS	ALU	bAS= basic
					rUt= rutile
					CEL=cellulosic
					Crn= chromium/nickel
					ALU= aluminium
					AC= alternating current
Urd	OUTPUT VOLTAGE REDUCTION	oFF	oFF	on	*2
U.EL.	LONG ARC VOLTAGE	37	*SYn	70	










Parameters of the 2nd level menu: DESEAMING mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
Urd	OUTPUT VOLTAGE REDUCTION	oFF	oFF	on	*3

Parameters of the 2nd level menu: CONTINUOUS DCTIG mode, PULSED DCTIG mode, SYNERGIC DCTIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX
SP.t.	SPOT TIG TIME	0.01 s	0.01 s	10.0 s
HF	HF ARC STRIKE ENABLE	oFF	on	on
r.P.C.	MINIMUM PEDAL CURRENT	1 %	5 %	90 %

2nd level menu parameters in AC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	Value	DC+	WAVE-FORM	DC-
AC	AC WAVEFORM	1	1	9	1	sine		sine
					2	rectangular		rectangular
					3	triangular		triangular
					4	sine		rectangular
					5	rectangular		sine
					6	sine		triangular
					7	triangular		sine
					8	rectangular		triangular
					9	triangular		rectangular

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	Value	DC+	WAVE-FORM	DC-
SP.t.	SPOT TIG TIME	0.01 s	0.1 s	10.0 s				
HF	HF ARC STRIKE ENABLE	on	on	oFF				
r.P.C.	MINIMUM PEDAL CURRENT	1 %	5 %	90 %				

PARAMETERS SETTING: SPECIAL FUNCTIONS

S1	Press this button to scroll the list of settings to edit.							
	• The acronym relative to the setting to be edited appears on the following displays: D1							
	• The value relative to the selected setting appears on the following displays: D2							
E1	Using the encoder, edit the value of the selected setting.							
	The value is saved automatically.							
	Press any key (except S1) to save the setting and quit the menu.							

Special functions in MMA mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX
C.Ar.	K	oFF	oFF	on

SPECIAL FUNCTIONS menu parameters: CONTINUOUS DC TIG mode, PULSED DC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
P.St.	PULS – ST.	0.1 s	oFF	10.0 s	
C.Ar.	K	1	oFF	50	
M.Sp.	SPOT	0.5 Hz	oFF	6.0 Hz	*1

SPECIAL FUNCTIONS menu parameters: SYNERGIC DC TIG mode

ACRONYM	PARAMETER	MIN	DEFAULT	MAX	
M.Sp.	SPOT	0.5 Hz	oFF	6.0 Hz	*1

Special functions in AC TIG and PULSED AC TIG modes

ACRONYM	PARAMETER	MIN	DEFAULT	MAX
M.AC.	AC/DC	10 %	oFF	80 %
Fus.	FUSION	0.1 %	oFF	80 %
F.AC.	AC INVERSION FREQUENCY	20 Hz	65 Hz	200 Hz
bAL	AC BALANCE	-10	0	+10
d.EL.	AC TIG ELECTRODE DIAMETER	0.0 mm	2.4 mm	6.4 mm

*1:	When this function is active welding is performed without the following parameters: SLOPE UP - SLOPE DOWN - START CURRENT - FINAL CURRENT							
*2:	The activation is suitable for the following welding modes: MMA - ELECTRODE GOUGING							
*SYN:	This code indicates that parameters control is synergic.							
	The optimal value of this parameter is set automatically by the microprocessor on the basis of the preset welding current value.							
	When SYN is installed, to display the synergic value press the following button: S5							
	This value can be displayed but it is not user-adjustable.							

JOBS MANAGEMENT

- Personalised welding settings, or JOBS, can be saved in memory locations and subsequently uploaded. Up to 50 JOBS can be saved (j01-j50).
- JOBS can be managed only when the unit is not in welding mode.
- The SETUP menu settings cannot be saved by means of the JOBS.
- When a JOB is loaded and an UP/DOWN torch is installed, press the torch triggers to select the saved JOBS.
- If there are no JOBS loaded, the UP/DOWN buttons on the torch serve to adjust the welding current.

SAVING A JOB

S3	Hold down the button for 3 seconds.	
	• SA. Job	The message appears on the following displays: D1-D2

S3	Press the button to confirm.	
	SA. J.xx	The message appears on the following displays: D1-D2
	xx= number of the first free job.	

E1	Use the encoder to select the required job number.	
	On selecting a currently occupied memory location, the job number flashes.	
	If you confirm at this point, the new job will overwrite the previously saved settings.	

Exit without confirmation

	Press any button (except S3).	
	• This action will automatically close the menu.	

Exit with confirmation

S3	Press the button.	
	• This action will automatically close the menu.	

LOADING A USER JOB OF FACTORY SET JOB

S3	Press and release the button.	
	• Lo. J.xx	Only when the jobs have been uploaded, the message is shown on the following displays: D1-D2
	xx= number of the latest job used.	
	• no Job	If there are no jobs in the memory the message is shown on the following displays: D1-D2
E1	Use the encoder to select the number of the job to be uploaded.	

Exit without confirmation

	Press any button (except S3).	
	• This action will automatically close the menu.	

Exit with confirmation

Exit with confirmation		
S3	Press the button	
	• J.xx	The message appears for a few seconds on the following displays: D1
	• JOB	The LED illuminates
	• This action will automatically close the menu.	
To quit the currently loaded JOB, change any setting on the power source user interface.		

DELETING A JOB

S3	Hold down the button for 3 seconds
	• SA. Job The message appears on the following displays: D1-D2

E1	Select the following setting with the encoder: Er. Job
	The message appears only if there are saved JOBS, on the following displays: D1-D2

S3	Press the button to confirm.
	• Er. J.xx The message appears on the following displays: D1-D2
	xx= number of the latest job used.

E1	Use the encoder to select the number of the job to be deleted
----	---

Exit without confirmation

	Press any button (except S3).
	• This action will automatically close the menu.

Exit with confirmation

S3	Press the button.
	• This action will automatically close the menu.

Selecting a JOB with the torch button

When an UP/DOWN torch is installed you can select the JOBS in a JOB sequence using the buttons on the welding torch.

To create the JOBS sequence, leave a free memory slot before and after the group of JOBS to be included in the sequence

J.01	Sequence 1
J.02	
J.03	
JOB not saved	
J.05	Sequence 2
J.06	
J.07	
JOB not saved	
J.09	Sequence 3
J.10	
J.11	

Select and upload one of the JOBS in the required sequence (e.g. J.06) on the power source user interface. Use the torch buttons to scroll the JOBS of sequence 2 (J.05, J.06, J.07).

6.7. REMOTE CONTROL CONFIGURATION

6.7.1. Wireless remote control Configuration

TIG series of welding machines can be configured to communicate exclusively with wireless foot pedal or remote control panel. This is done by a simple process of synchronising the wireless remote control and the machine frequencies. Each interface frequency assigned is unique, so it is possible to use several wireless controlsystems / machines in the same area with no problems. The direct range of the wireless control system is approximately 100m, this will be affected by the physical location of the machine and the remote control.

To synchronise a remote control to a machine, follow these instructions

1. Ensure the welding power supply is switched off.
2. Press and hold the parameter select/adjust knob on the front panel of the power supply (2-4 seconds) while at the same time turning the machine ON using the ON-OFF switch on the back of the welding power supply.
3. When the display on the front panel of the power supply is blank, release the control knob. Turn on the remote control or foot pedal while at the same time pressing any buttons on the remote control panel or foot pedal, the digital meter on the front panel of the welding power supply flick twice to indicate the synchronization is successful and complete. (Synchronization has to accomplish in 10s after the display is blank).
4. Switch the machine off and back on again to start welding operation.
5. If the operation is unsuccessful, repeat steps 1 to 4.
6. During operation, the front panel control on the power supply is still functional but the remote control panel or foot pedal has higher priority level.
7. When the remote control panel or foot pedal is idles for 10 seconds, it will automatically go into "sleep" mode.
8. Only front Panel Control is active when wireless remote control or foot pedal is in "sleep" mode. Any operation on the wireless remote control panel or foot pedal will "wake it up and resumes control of the machine.

How to remove the control function of Remote control box on welding machine

1. Ensure the welding power supply is switched off.
2. Press the encoder on the front control panel of the power supply, meanwhile turn on the machine.

3. Pressing the encoder about 10 seconds, until the control panel display "rSt", then it succeed.

6.7.2. Wire foot pedal Configuration

- When plug the twelve-lead aero-socket of pedal switch in it. Welder will identify the pedal switch, the welding current knob on the front panel will can't use and only 2T can be selected.
- When use the adjustment knob of max-welding current beside the pedal, can set the max-current you want.

6.8. START-UP

After turning on machine or line power, conduct a careful visual inspection of the entire machine and make sure that no persons or material are obstructing its normal operation, and that no objects have inadvertently been left on it.

Check that all the machine safety devices are enabled; if necessary, reset them, and in particular check for:

- Unlocked emergency stops;
- Correct operation of the safety barriers, if installed, or the guards not removed
- Protection guard.

6.9. NORMAL STOP

Turn the switch on the welder panel to **OFF**.

To completely disconnect the power supply from the power line, turn the switch on the main panel to **O**.

6.10. DECOMMISSIONING

During long periods of inactivity it is necessary to:

- Disconnect the power supply from the general electrical panel and all other power supplies (pneumatic and/or hydraulic) which the machine needs.
- Perform all maintenance operations.
- Accurately clean the machine.
- Store the machine in a protected area with a stable support surface.
- Cover the machine to avoid dust accumulation.
- Make sure that the environmental conditions are suitable for preserving the machine over time.

7. MAINTENANCE

7.1. MACHINE ISOLATION

Before carrying out any type of Maintenance or Repair, it is necessary to isolate the machine from the power supply and from all other energy sources present.

7.2. SPECIAL PRECAUTIONS

When carrying out any maintenance or repair work, the following recommendations should be followed:

- Before starting work, display a sign stating "MACHINE UNDER MAINTENANCE" in a visible spot;
- Do not use flammable materials or solvents;
- Be careful not to pollute the environment with coolants;
- To access the highest parts of the machine, use the appropriate means and procedures;
- Do not climb on the machine parts, as they are not designed to support people;
- When finished, refit and properly secure all safety guards and devices that may have been removed or opened.

IMPORTANT: The Manufacturer cannot be held liable for the failure to comply with the aforementioned recommendations nor for any other use that is inconsistent or not mentioned in these instructions.

7.3. CLEANING

Before carrying out any cleaning operation, disconnect the device from the mains and from the energy sources present.

Do not use corrosive cleaning products, flammable or containing substances harmful to health.

Make sure that the parts being cleaned are completely cold.

Do not wet the internal parts to avoid damaging the electrical and electronic components.

Do not direct any jets of compressed air directly on the electrical and electronic components so as not to damage them.

ATTENTION: Always use the appropriate PPE such as gloves, mask, glasses according to current safety standards.

7.4. ROUTINE MAINTENANCE

General requirements

The machine is designed to minimise routine maintenance, thus it is up to the operator to assess its condition and suitability for use.

It is recommended to stop and perform maintenance whenever non-optimal operation is detected, so as to ensure maximum efficiency at all times. Check the operation of safety devices monthly. In the event of faults or malfunction, entrust only qualified personnel to search for the fault or call the manufacturer's technical support. Check the continuity of the earth circuit every 2 years by performing the continuity measurement according to the provisions of the CEI 44 - 5 III Art. 19 standard. Visually check the condition of the individual parts of the machine, verifying that there is no alteration due to sagging or deformation.

At each use of the machine, if equipped with a cooling unit, check the coolant level and top up if necessary.

ATTENTION: Use only "SincoFluid" coolant supplied on request by the manufacturer or an authorised dealer.

The use of different coolants automatically voids the warranty and excludes the manufacturer from any liability.

ATTENTION: Allow the system to cool before proceeding with maintenance; hot surfaces can cause serious burns.

ATTENTION: For the entire duration of maintenance, it is necessary to stop the system by disconnecting the plug from the mains power supply or by disconnecting the power supply from the main panel circuit breaker, moving it to the "O" position and locking it with a special padlock.

Always use the appropriate PPE - Personal Protective Equipment:

- Gloves;
- Non-slip shoes;
- Suitable clothing.

Scheduled maintenance

The operations described below must be carried out in line with the schedules indicated.

IMPORTANT: Failure to comply with the above shall exempt the manufacturer from any liability as specified in the Warranty.

ATTENTION: These operations, although simple, must be performed by a Qualified or Qualified and Authorised Technician.

Remove dust or foreign materials every 6 months, which may have been deposited on the transformer or on the diodes of the rectifier unit; to do this use a jet of dry, clean air.

Do not direct the compressed air jet directly onto the electrical and electronic components so as not to damage them.

When reassembling the wire feeder roller, after having cleaned or replaced it, make sure that the groove is aligned with the wire and that it corresponds to the diameter of the wire used.

Keep the inside of the gas nozzle constantly clean, so as to avoid metal bridges consisting of welding sprays between the gas nozzle and the contact tip.

Make sure that the output hole of the current collector nozzle is not excessively enlarged, otherwise replace it.

Absolutely avoid beating the torch or subjecting it to violent impacts.

7.5. WELDING MACHINE REPAIRS

Experience has shown that many accidents originate from repairs not performed to perfection.

For this reason, careful and complete control over a repaired welding machine is just as important as that performed on a new welding machine. Moreover, in this way, manufacturers can be protected from being held liable for defects, when the liability is to be attributed to others.

Welding machine repairs must be carried out exclusively by trained and qualified personnel, in possession of the necessary requisites to guarantee a workmanlike repair and in full compliance with safety standards EN 60974-4.

A) Instructions for repairs

- After rewinding the transformer or the inductances, the welding machine must pass the same applied voltage tests, passed at the time of the first test according to the regulations in force.
- If no rewinding has been carried out, a welding machine, which has been cleaned and/or overhauled, must pass a particular applied voltage test with values given by current regulations.
- After rewinding and/or replacing parts, the no-load voltage must not exceed certain values given by current regulations.

- If repairs are not carried out by the manufacturer, repaired welding machines, in which some components have been replaced or modified, must be marked so that the person who carried out the repair can be identified.

B) Additional repair Instructions

- After having carried out a repair, be careful to re-order the wiring, so that there is a secure insulation between the primary side and the secondary side of the machine.
- Do not allow the wires to come into contact with moving parts (i.e. with the fan motor) or parts that become hot during operation.
- Also re-assemble all the clamps that hold the wiring, as originally arranged on the machine, so that, if a conductor is accidentally broken or disconnected, it is still possible to avoid a connection between the primary and the secondary.
- Avoid cleaning the electronic boards with a jet of compressed air to preserve the integrity of the components.
- At the end of any repair, make sure that you have not forgotten any tools inside the machine and close the machine with all the bulkheads available and taking care to replace all the fixing devices of the bulkheads themselves.

7.6. DIAGNOSTICS AND TROUBLESHOOTING

For defects or malfunctions of the machine not described in this manual, please contact the manufacturer.

List of error code

MESSAGE	MEANING	EVENT	CHECKS
AL. HEA.	Overheating alarm Indicates tripping of the welding power source thermal protection. Leave the unit running so that the overheated components cool as rapidly as possible. When the unit has cooled, the welding power source will reset automatically.	All functions disabled. Exceptions: - Cooling fan. - Cooler (if switched on).	- Make sure that the power required by the welding process is lower than the maximum rated power output. - Check that the operating conditions are in compliance with the welding power source data plate specifications. - Check for the presence of adequate air circulation around the welding power source.
	Phase missing alarm Indicates the absence of a phase in the power supply line. The message appears when the mains protection activation LED switches on.	All functions disabled. Exceptions: - Cooling fan.	- Check if the equipment power supply line has all the phases. If the problem persists: - qualified technical personnel are required for repair/maintenance jobs.
AL. Coo.	Cooler alarm Indicates insufficient pressure in the torch liquid cooling circuit.	All functions disabled. Exceptions: - Cooling fan. The alarm message persists on the display until the first operation is performed on the user interface. Signalling of the alarm depends on the following settings: - Coo = on: the alarm is signalled if the cooling unit is connected to the power source and if it is running. - Coo = oFF: the alarm is never signalled, irrespective of the circumstances. - Coo = Aut: the alarm is signalled if the cooling unit is connected to the power source and if it is running.	- Check that the connection to the cooler is correct. - Check that the "O/I" switch is set to "I" and that it illuminates when the pump is running. - Check that the cooler is filled with coolant. - Check that the cooling circuit is liquid tight, notably the torch hoses and the internal connections of the cooler.
E. 69	Software compatibility error Indicates that the welding power source has a software version that is not compatible with the remote device connected to it (remote controller, wire feed unit).	All functions disabled. Exceptions: - Cooling fan.	- Update the remote device software.

MESSAGE	MEANING	EVENT	CHECKS
E. 04	Alarm, no-load voltage failure	All functions disabled. Exceptions: - Cooling fan.	<ul style="list-style-type: none"> - Check to ensure the welding torch is not resting on the workpiece connected to ground. - Check that when the power source is switched on there is no short circuit between the sockets (voltage must be greater than/ equivalent to U_r). If the problem persists: - qualified technical personnel are required for repair/maintenance jobs.
E. 05	Torch button alarm Indicates that when the power source was powered up a short circuit was detected on the torch trigger input. When the unit has cooled, the welding power source will reset automatically.	All functions disabled. Exceptions: - Cooling fan.	<ul style="list-style-type: none"> - Make sure the torch trigger is not pressed, jammed, or short circuiting. - Make sure the torch and torch connector are intact.
CAn Err.	No communication alarm Indicates the presence of problems in data communication between the power source and wire feeder. When the unit has cooled, the welding power source will reset automatically. Exit the alarm state by performing one of the following actions: Switch the power source off.	All functions disabled. Exceptions: - cooling fan. - cooler (if switched on).	<ul style="list-style-type: none"> - Check that the connecting cable between power source and wire feeder is intact and make sure the connectors are securely tightened. If the problem persists: - qualified technical personnel are required for repair/maintenance jobs.

8. ACCESSORIES AND SPARE PARTS

8.1. CUSTOMER SERVICE

The Manufacturer is always at your disposal for any type of information regarding the use, maintenance, and installation of the equipment.

It is suggested that the Customer asks clear questions, making reference to this Manual and the instructions listed.

8.2. SPARE PARTS

IMPORTANT: ALWAYS USE ORIGINAL SPARE PARTS. The Manufacturer cannot be held liable for breakages, malfunctions or damage to persons or property arising from the use of non-original parts.

In the event that non-original spare parts are used, the conditions of the Warranty (if still in place) and of the Manufacturer's liability in the use of the machine and any damage deriving to persons and/or property are void.

9. ADDITIONAL INSTRUCTIONS

9.1. WASTE DISPOSAL

It is the responsibility of the user, in accordance with the laws in force in their country, to ensure correct disposal of the waste produced by the machine during production.

The disposal of hydraulic oil lubricants and the replaced parts must be carried out in compliance with the regulations in force in the country where the machine is in use.

9.2. DECOMMISSIONING AND DISMANTLING

With reference to the WEEE Directive 2012/19 / EU (Waste Electrical and Electronic Equipment), the user, during disposal, must dispose of the equipment in the appropriate authorised collection centres, or return it still installed to the seller at the time of a new purchase.

IMPORTANT: do not dispose of polluting materials in the environment. Dispose of such products in compliance with legislation in force.

IMPORTANT: the illegal disposal of Waste Electrical and Electronic Equipment is punished with sanctions regulated by the laws in force in the territory in which the infringement is ascertained. Waste Electrical and Electronic Equipment may contain hazardous substances with potentially harmful effects on the environment and on people's health. It is recommended to dispose of it properly.

WEEE refers to Waste Electrical and Electronic Equipment (EEE) including all components, sub-assemblies and consumables that are an integral part of the product at the time the decision is made to discard it. The law divides these into 2 main categories called **PROFESSIONAL WEEE** or **DOMESTIC WEEE**.

PROFESSIONAL WEEE means all waste electrical and electronic equipment intended for purely industrial use.

DOMESTIC WEEE means all waste electrical and electronic equipment intended for mixed use both in an industrial environment and in a domestic environment.

DOMESTIC WEEE is identified as all single-phase power supply generators with output current MAX $\leq 200A$ with their accessories.

There are 2 ways to discard **DOMESTIC WEEE**:

- a) If you decide to buy a new equivalent equipment, the user can deliver it to the distributor, who will have to collect it for free.
- b) Alternatively, it must be deposited in the Municipal pitch, in the container or specific area identified as "GROUPING 4".

As of the date of preparation of the Instruction Manual, as the application of the Regulations is not yet definitive, please contact the distributor and/or the manufacturer for information on **PROFESSIONAL WEEE** disposal.

THE SYSTEM DESCRIBED IN THE MANUAL BELONGS TO CATEGORY: PROFESSIONAL "EEE"

Per la gestione dei "RAEE" la SINCOSALD si affida a Consorzio Erion

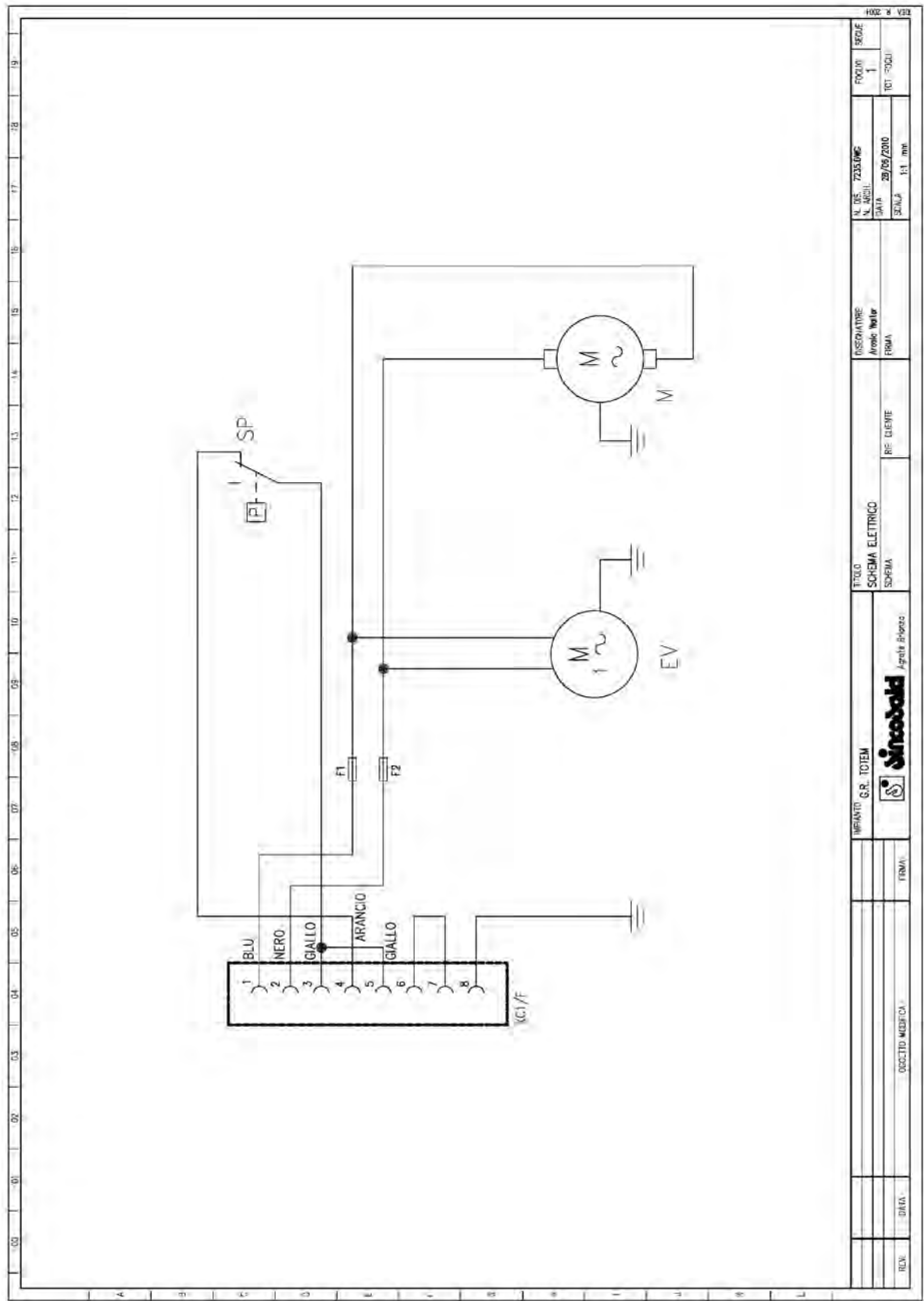


AS OF THE DATE OF THE PREPARATION OF THIS INSTRUCTION MANUAL THIS INFORMATION SHOULD BE CONSIDERED TO BE NON-DEFINITIVE AS SUBJECT TO POSSIBLE CHANGES ACCORDING TO THE OBLIGATIONS LINKED TO LEGISLATIVE DECREE N ° 151/2005 THAT WILL COMPLETE DIRECTIVE 2002/96/EC.

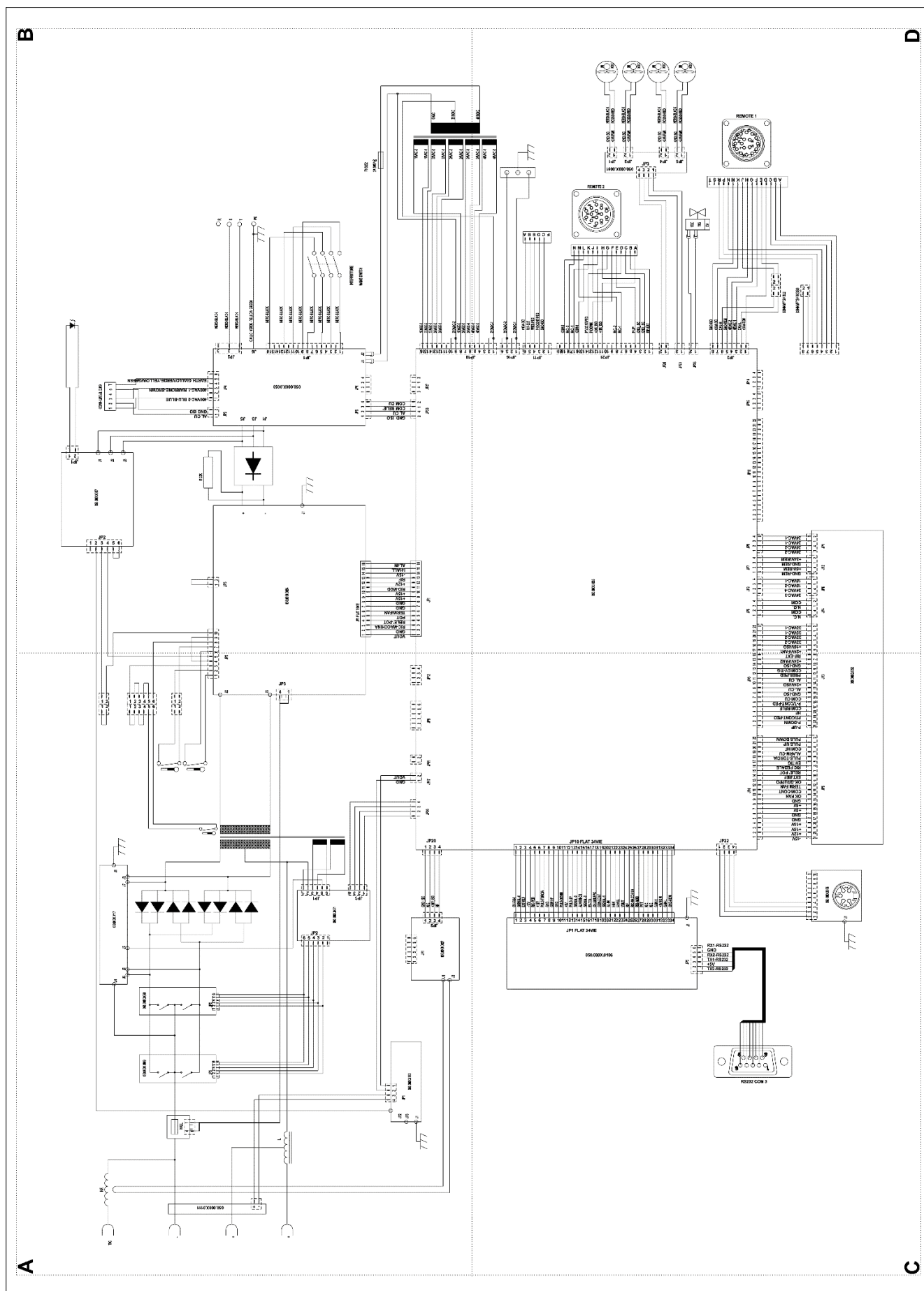
10. ANNEXES

10.1. WIRING DIAGRAMS

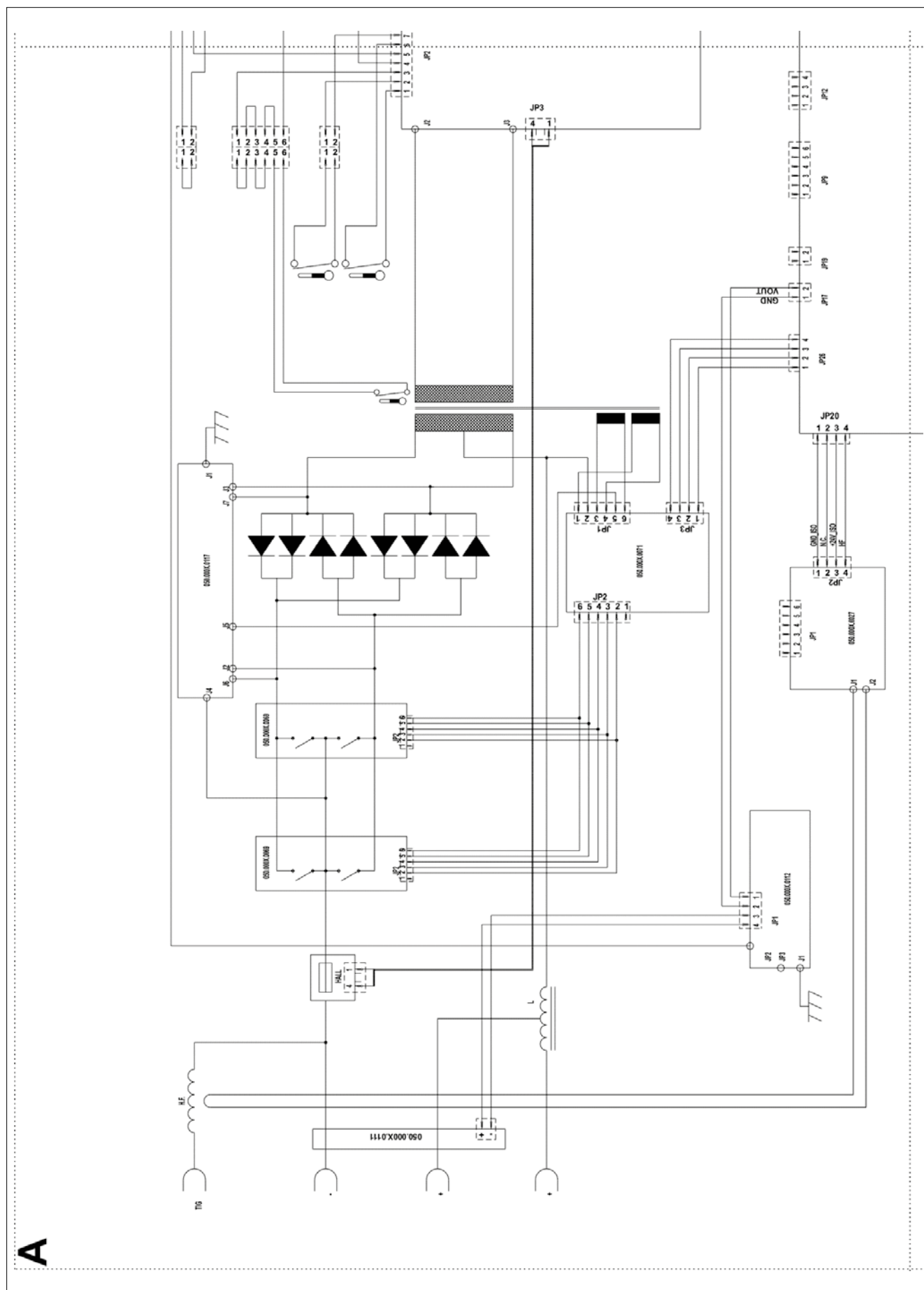
Wiring diagram G.R.W.



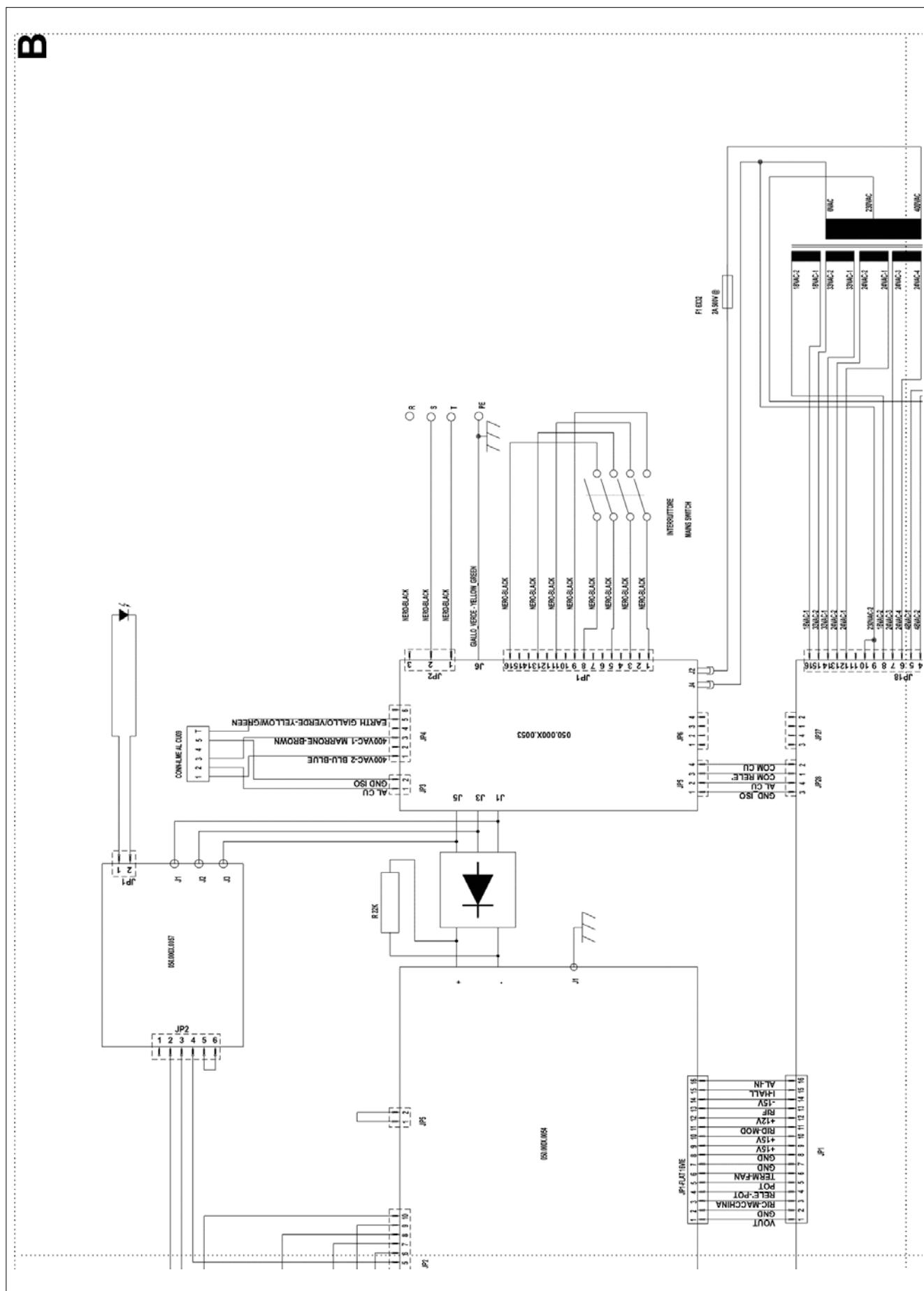
Wiring diagram NOVATIG 325 - 505 AC/DC



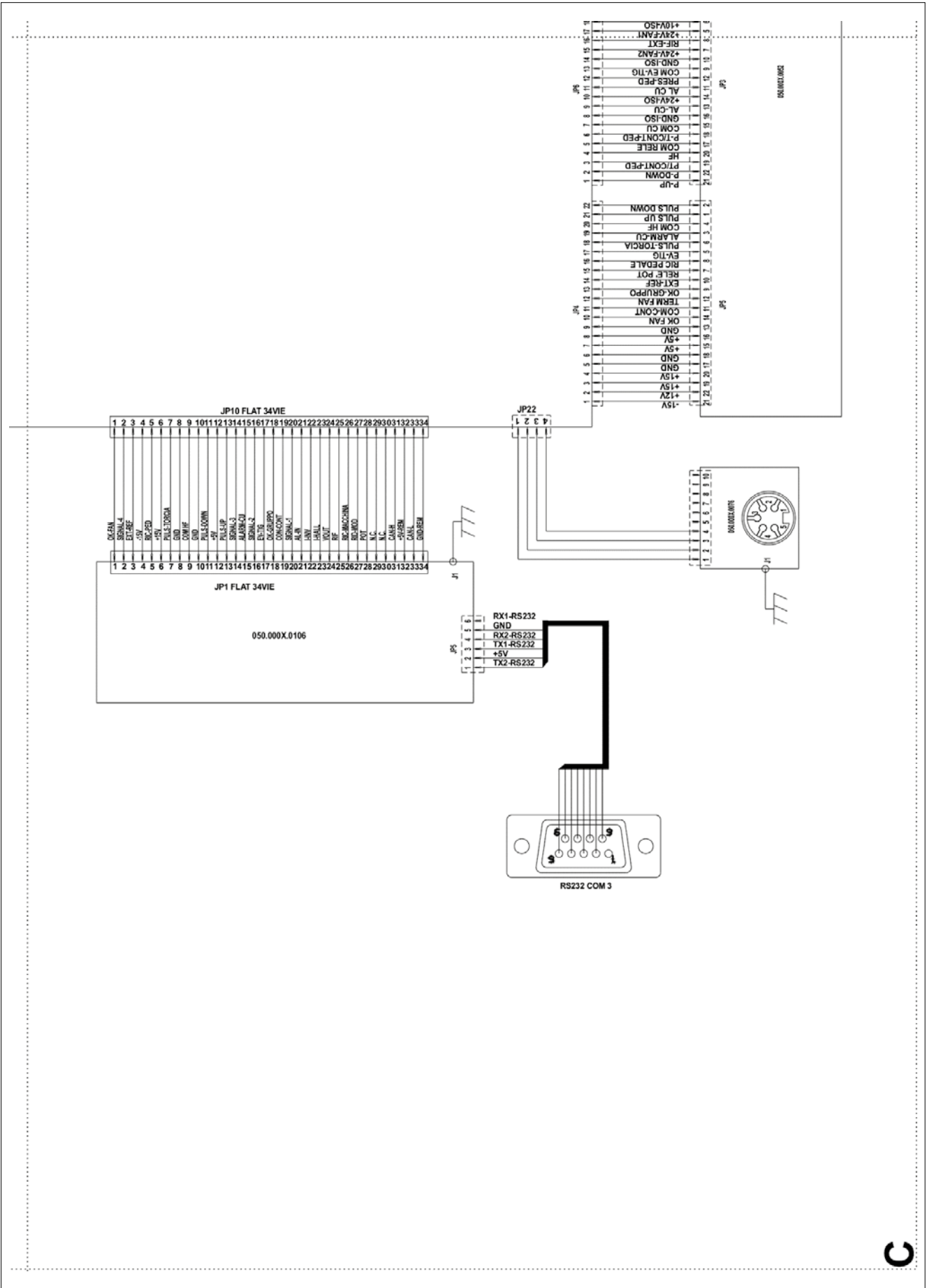
Wiring diagram A

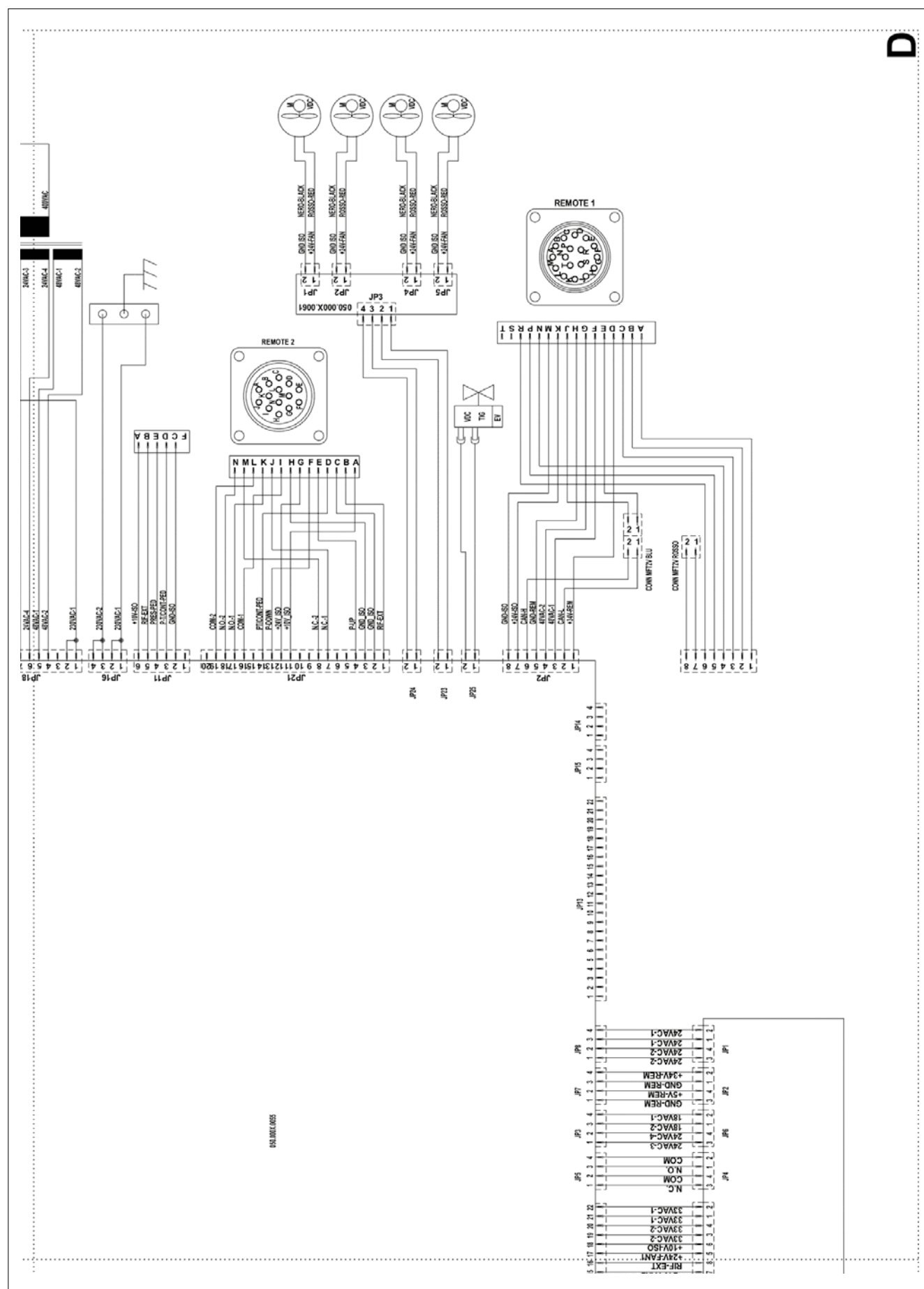


Wiring diagram B



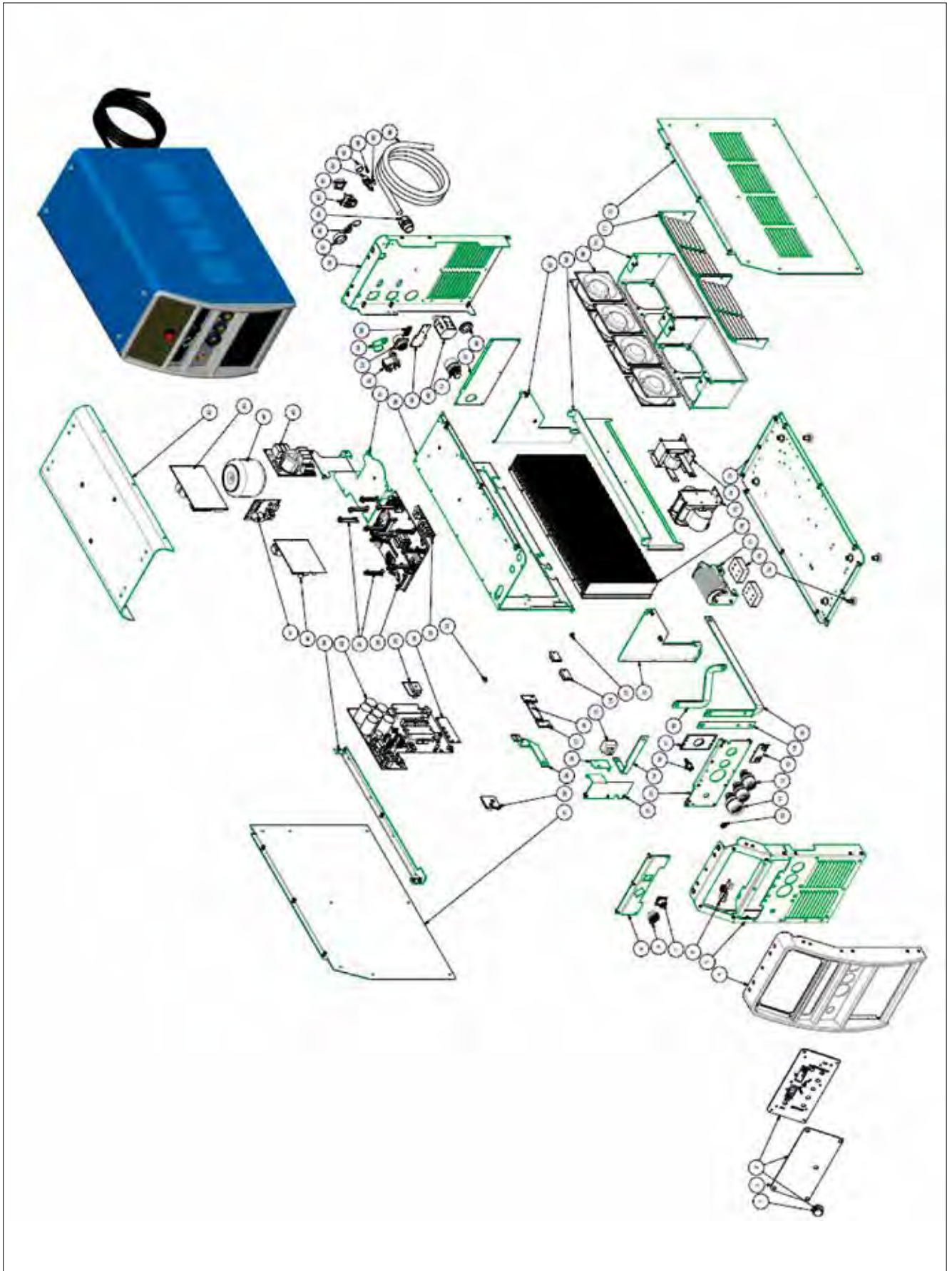
Wiring diagram C





10.2. SPARE PARTS

Spare parts NOVATIG 325 DC

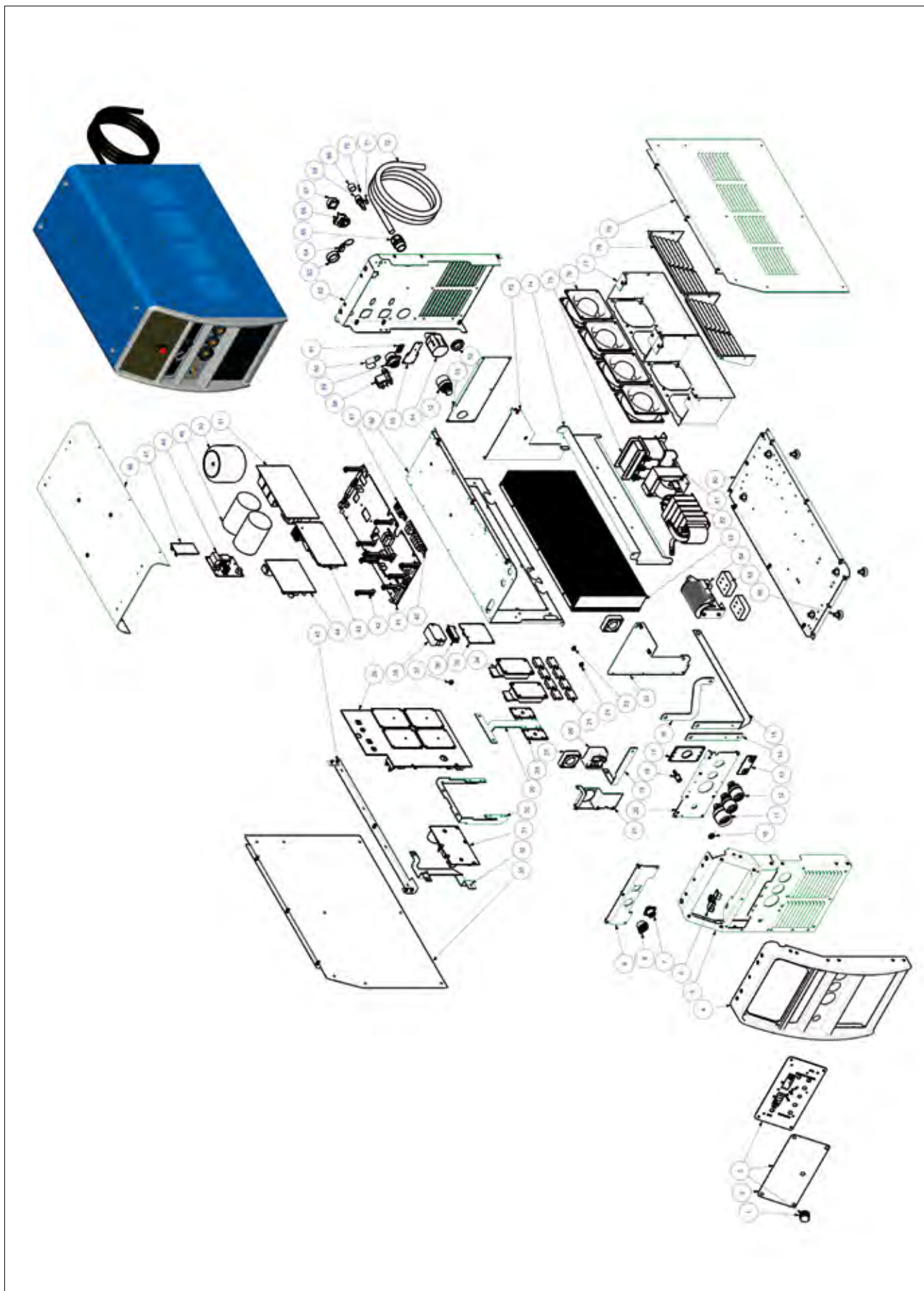


Pos.	Code	Description	Qt.
1	7.225.035	BLUE KNOB HOOD	
2	7.223.015	TARGA FRONT NOVATIG 325 DC	
3	7.223.016	FRONT PANEL LOGIC NOVATIG 325DC	
4	1.023034	PLAST. FRONT. NOVATIG	
5	7.221.024	LAM. FRONT. 325/505 SINCOSALD	
6	7.223.003	SCH. CONN. AMPHENOL FILTERED	
7	7.225.036	CABL. COM. DISTANCE BLOCK 325 DC	
8	7.225.037	CABL. COM. TORCH 325/505	
9	7.221.025	LAM. CONNECTORS 325/505	
10	7.225.038	GHIERA1 / GAS CH 4 = 17 BRASS	
11	7.225.002	TAKING OUT HIGH VOLTAGE	
12	7.225.014	TAKE OUT	
13	7.223.014	VOUT SHEET BLOCK	
14	7.221.023	BRACKET COPPER SUPPLY (-)	
15	7.221.022	BRACKET COPPER SUPPLY (+)	
16	7.221.026	BRACKET COPPER BLOCK HF	
17	7.225.039	SUPPORT JACK BLOCK HF	
18	7.225.040	HOSE BRASS 1/4 GAS	
19	7.221.027	BRACKET COPPER SENSOR BLOCK	
20	7.221.028	SHEET METAL GRIPS FRONT SUPPORT	
21	7.221.029	LAM. CLOSING SENSOR 325	
22	7.221.021	LAM. SUPP. TUNNEL SX BLOCK	
23	7.225.009	THERMAL PROTECTOR 80 ° C	
24	7.225.041	DIODE 300V ISOTOP	
25	7.222.005	SENSOR CURRENT HALL 500A	
26	7.221.030	BRACKET COPPER ISOTOP / OUT	
27	7.221.031	BRACKET COPPER ISOTOP	
28	7.221.003	LAM. SENSOR SUPPORT	
29	7.221.032	BRACKET COPPER OUT / SENSOR	
30	7.223.017	SNUBBER SHEET	

Pos.	Code	Description	Qt.
31	7.221.033	COVER LEFT SIDE	
32	7.225.042	THERMAL PROTECTOR 75 ° C	
33	7.223.007	VOUT SHEET	
34	7.223.018	CONDENSATORI PRIMARY FORM	
35	7.223.019	CARD BRIDGE RECTIFIER	
36	7.223.020	BUS CARD	
37	7.225.012	HELP SUPPORT CARDS	
38	7.223.021	CARD FULL POWER	
39	7.221.034	METAL SUPPORT COVER LEFT SIDE	
40	7.223.022	SUPPLY DATA	
41	7.223.006	CONTROL BOARD OF ENTRY STEPS	
42	7.221.035	HOOD TOP	
43	7.223.023	DATA INPUT FILTER	
44	7.222.000	TRANSFORMER AUXILIARY	
45	7.223.024	FILTER NETWORK CARD	
46	7.225.043	NUT GLAND PG21	
47	7.221.036	PLATE SUPPORT TAKEN BACK	
48	7.225.044	SWITCH POLE 25A	
49	7.221.037	COVER SHEET CONNECTORS MIG	
50	7.221.011	SHEET METAL TUNNEL	
51	7.221.038	LAM SUPPORT SHEETS 325 DC	
52	7.225.004	ELETTROVALVOLA	
53	7.225.015	WIRING COMADI ROBOT-ANALOG	
54	7.221.015	BRACKET LOCK SOLENOID	
55	7.225.026	CABLE PROGRAMMING	
56	7.221.039	REAR PLATE 325/505	
57	7.225.020	PLUG CONNECTOR FOR MILITARY WITH CHAIN	
58	7.225.045	PLUG FOR RS-232 WIRED	
59	7.225.046	GLAND PG21	
60	7.225.023	POWER CABLE CU	
61	7.225.022	PLUG CONNECTOR FOR ILME	
62	7.225.025	FUSE	
63	7.225.024	HOOD FOR VINYL FUSE	
64	7.225.027	WIRING LED ALARM STAGES	
65	7.225.008	PORTALED	

Pos.	Code	Description	Qt.
66	7.225.047	ALIMENTAZIONE4G4 CABLE	
67	7.221.012	LAM. SUPP. TUNNEL DX BLOCK	
68	7.221.013	SHEET METAL DUCT AIR	
69	7.225.029	FAN 120X120 24V 0.5A	
70	7.221.018	SHEET METAL FANS SUPPORT	
71	7.221.040	FINNED SPLASH INSIDE	
72	7.221.041	COVER RIGHT SIDE 325/505	
73	7.221.019	SHEET METAL BASE BLOCK	
74	7.222.023	OUTPUT INDUCTOR 325 DC	
75	7.222.024	POWER TRANSFORMER 325 DC	
76	7.221.020	SINK	
77	7.222.025	HF TRANSFORMER	
78	7.225.048	SUPPORT PLASTIC TRANSFORMER HF	
79	7.225.030	PLASTIC FOOT	

Spare parts NOVATIG 505 AC/DC

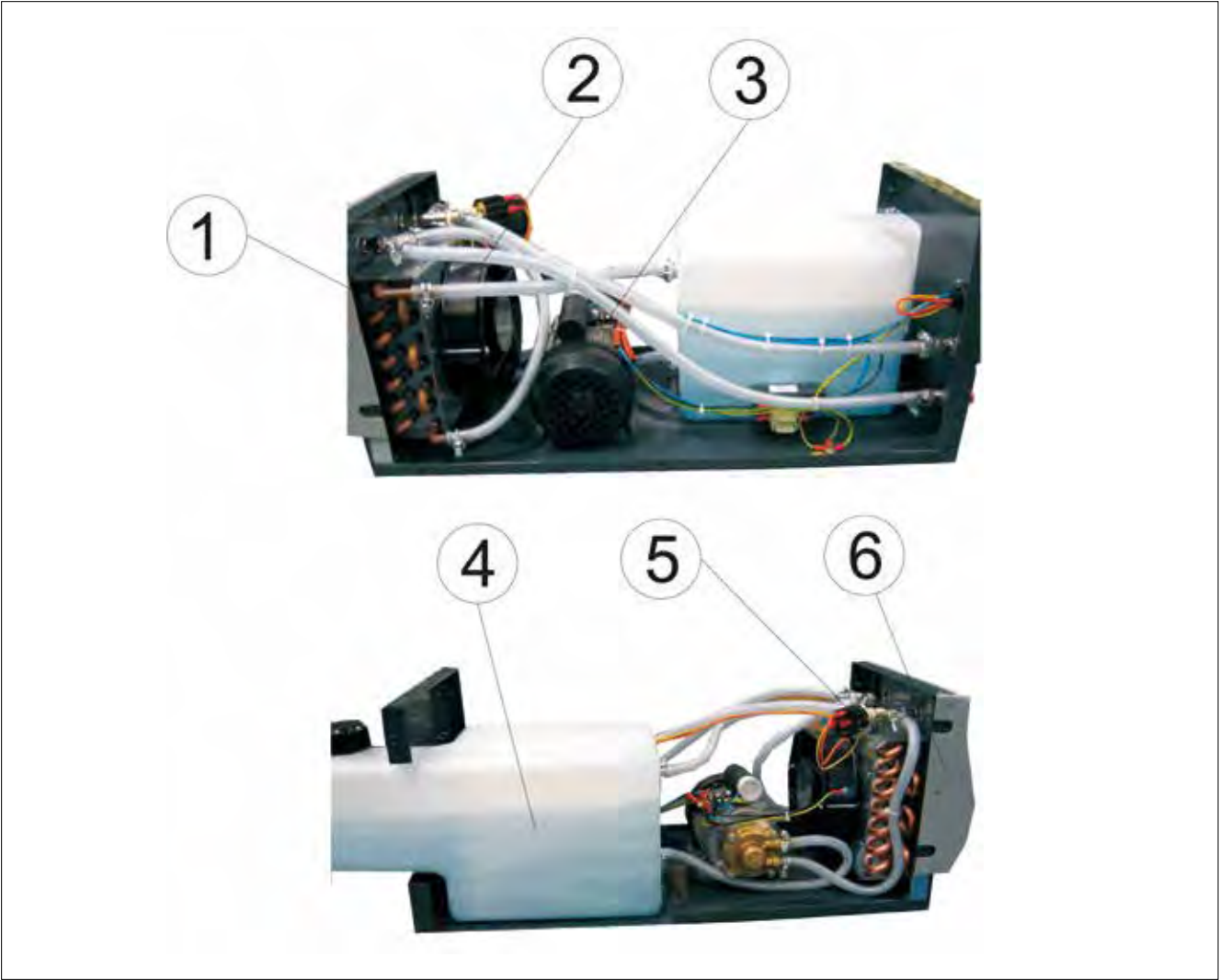


Pos.	Code	Description	Qt.
1	7.225.035	BLUE KNOB HOOD	
2	7.223.015	TARGA FRONT NOVATIG 505 AC/DC	
3	7.223.025	FRONT PANEL LOGIC NOVATIG 505 AC/DC	
4	1.023034	PLAST. FRONT. NOVATIG	
5	7.221.024	LAM. FRONT. 325/505 SINCOSALD	
6	7.223.003	SCH. CONN. AMPHENOL FILTERED	
7	7.225.031	CABL. COM. DISTANCE BLOCK 500	
8	7.225.037	CABL. COM. TORCH 325/505	
9	7.221.025	LAM. CONNECTORS 325/505 SINCOSALD	
10	7.225.038	GHIERA1 / GAS CH 4 = 17 BRASS	
11	7.225.002	TAKING OUT HIGH VOLTAGE	
12	7.225.014	TAKE OUT	
13	7.223.014	VOUT SHEET BLOCK	
14	7.221.023	BRACKET COPPER SUPPLY (-)	
15	7.221.022	BRACKET COPPER SUPPLY (+)	
16	7.221.026	BRACKET COPPER BLOCK HF	
17	7.225.039	SUPPORT JACK BLOCK HF	
18	7.225.040	HOSE BRASS 1/4 GAS	
19	7.221.027	BRACKET COPPER SENSOR BLOCK	
20	7.221.028	SHEET METAL GRIPS FRONT SUPPORT	
21	7.221.029	LAM SUPP. 325/505 SENSOR	
22	7.221.021	LAM. SUPP. TUNNEL SX BLOCK	
23	7.225.049	THERMAL PROTECTOR 85 ° C	
24	7.225.050	THERMAL PROTECTOR 90 ° C	
25	7.225.006	DIODE 600V ISOTOP	
26	7.225.051	SENSOR CURRENT 500A VAC	
27	7.225.052	FAN 24V 50X50	
28	7.221.004	BRACKET COPPER ISOTOP 505ACDC	
29	7.221.005	BRACKET COPPER DIODES / (DC-) 505	
30	7.221.006	BRACKET COPPER DIODES / (DC +) 505	

Pos.	Code	Description	Qt.
31	7.223.004	SNUBBER SHEET	
32	7.221.007	BRACKET COPPER MODULE INV./OUT	
33	7.221.033	COVER LEFT SIDE	
34	7.223.026	SHEET FORM REVERSAL	
35	7.223.006	CONTROL BOARD OF ENTRY STEPS	
36	7.225.053	WIRING RESISTANCE DOWNLOAD CONDENSATORI	
37	7.225.054	THERMAL PROTECTOR 85 ° C	
38	7.223.008	BRIDGE RECTIFIER INPUT	
39	7.223.005	CARD FULL POWER	
40	7.223.007	VOUT SHEET	
41	7.223.027	BUS CARD	
42	7.225.012	HELP SUPPORT CARDS	
43	7.223.028	CONTROL BOARD REVERSE	
44	7.223.022	SUPPLY DATA	
45	7.221.034	METAL SUPPORT COVER LEFT SIDE	
46	7.221.035	HOOD TOP	
47	7.223.029	CONTROL BOARD CURRENT PROBE	
48	7.223.011	TRIGGER SHEET HF-TIG	
49	7.225.013	CAPACITOR CHARGE	
50	7.222.000	TRANSFORMER AUXILIARY	
51	7.223.012	DATA INPUT FILTER	
52	7.225.043	NUT GLAND PG21	
53	7.221.036	PLATE SUPPORT TAKEN BACK	
54	7.225.001	SWITCH POLES	
55	7.221.037	COVER SHEET CONNECTORS MIG	
56	7.221.011	SHEET METAL TUNNEL	
57	7.223.013	CONTROL BOARD FAN	
58	7.225.004	ELETTROVALVOLA	
59	7.225.015	WIRING COMADI ROBOT-ANALOG	
60	7.221.015	BRACKET LOCK SOLENOID	
61	7.225.026	CABLE PROGRAMMING	
62	7.221.039	REAR PLATE 325/505	
63	7.225.020	PLUG CONNECTOR FOR MILITARY WITH CHAIN	

Pos.	Code	Description	Qt.
64	7.225.045	PLUG FOR RS-232 WIRED	
65	7.225.046	GLAND PG21	
66	7.225.023	POWER CABLE CU	
67	7.225.022	PLUG CONNECTOR FOR ILME	
68	7.225.025	FUSE	
69	7.225.024	HOOD FOR VINYL FUSE	
70	7.225.027	WIRING LED ALARM STAGES	
71	7.225.008	PORTALED	
72	7.225.021	POWER CABLE 4G6	
73	7.221.012	LAM. SUPP. TUNNEL DX BLOCK	
74	7.221.013	SHEET METAL DUCT AIR	
75	7.222.001	INPUT INDUCTOR	
76	7.223.055	FAN 120X120 24V 1A	
77	7.221.018	SHEET METAL FANS SUPPORT	
78	7.221.040	FINNED SPLASH INSIDE	
79	7.221.041	COVER RIGHT SIDE 325/505	
80	7.221.019	SHEET METAL BASE BLOCK	
81	7.222.002	OUTPUT INDUCTOR	
82	7.222.003	POWER TRANSFORMER	
83	7.221.020	SINK	
84	7.222.025	HF TRANSFORMER	
85	7.225.048	SUPPORT PLASTIC TRANSFORMER HF	
86	7.225.030	PLASTIC FOOT	

Spare parts G.R.W.



Pos.	Code	Description	Qt.
1	5.725.035	RADIATOR	
2	1.020.011	FAN	
3	3.022.004	ELECTROPUMP	
4	1.023.033	TANK	
5	5.035.220	PRESSOSTATE	
6	1.023.035	PLASTIC FRONTAL	

[illegible]

**SINCOSALD S.r.l**

Headquarters - Offices

via della Fisica, 26/28

20864 Agrate Brianza (MB) Italy

Tel: +39 039 641171

Fax: +39 039 6057122

export@sincosald.it

www.sincosald.it