



TELWIN®

TECHNOLOGY TIG

inverter

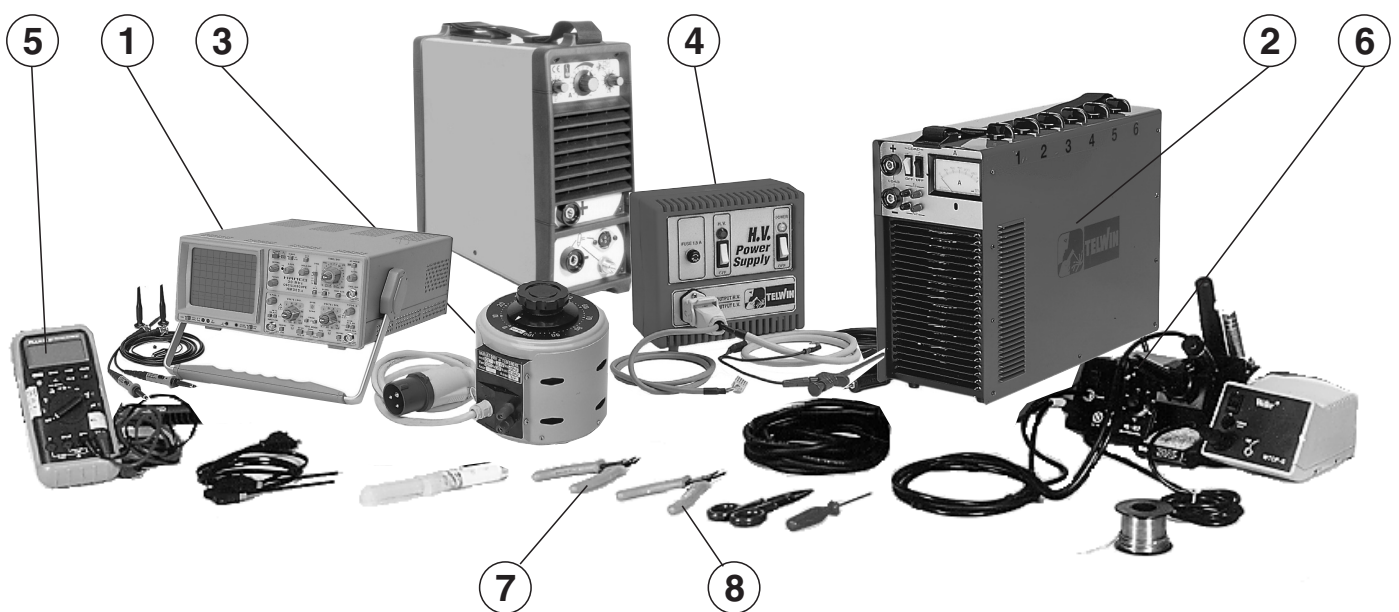


TROUBLESHOOTING AND REPAIR MANUAL



"trouble-free repair!"

INVERTER REPAIR LABORATORY



ESSENTIAL INSTRUMENTS

1 Oscilloscopio 20Mhz dual-trace	cod. 802401 (*)
2 Static load generator	cod. 802110 (*)
3 Variac 0 - 300v 1Kw	cod. 802402 (*)
4 Power supply unit HV	cod. 802403(*)
5 Digital multimeter	

USEFUL INSTRUMENTS

6 Unwelding station

MISCELLANEOUS

- 7 Flat-jaw pincers**
8 Cutting nippers

(*) The instruments with codes can be supplied by TELWIN. Sale price on request.

Dismantling the inverter (see fig. 8)

- Ensure that the power supply cable is disconnected from the mains..
- Unscrew the 12 screws located at the four corners of the two black plastic shells.
- Slide out firstly the upper shell and then the lower shell.
- Unscrew the two screws located below the wording "Technology TIG 165" on the inverter side panel (13, 14).
- Slide out the casing by gently pulling it upwards.
- Once you have completed the repair, proceed in reverse order to re-fit the casing and the shells, ensuring that the fold on the upper part of the shell is fitted inside the frame and the lower part of the side walls is fitted outside the frame.

Guide to repair of the inverter Tig

1) Clean and visually check the inverter

Open the inverter shell and clean thoroughly using compressed air.

Dirt is dangerous mainly in the power areas of the inverter which are subject to high voltage or for those components galvanically separating the primary from the secondary.

Thus, check carefully the following components:

1) H.F. Transformer:

Clean and check whether on the primary coil there are cuts or cracks which could jeopardize the insulation of the secondary.
(Tig 165 DC/HF version.).

2) H.F. Filter

code 112478

3) H.F. Box

(Tig 165 DC/HF version)

4) Electrovalve

5) Check cables with high silicone insulation which connect the H.F. transformer to the filter board and from the filter board to the inverter shunt. (Tig 165 DC/HF 165 version.)

(See figure 2.)

6) Control board Tig: cod. 112488

A) Check whether on the power transformer T1 or near connector Jp1 there are signs of burns.

B) Visually check the post-gas and the gradual decreasing of current potentiometers, the 2-4 phases electrode and relays k1, k2.

These components must NOT have signs of dents, in particular, the rotation of the potentiometers shaft must be perfect and free from mechanical slacks.

7) Primary board: (see Technology Repairs Manual)

8) Secondary board: (see Technology Repairs Manual)

(See Figure 3-5)

2) Checking the power and signal cables.

1) Primary board: (see Technology Repairs Manual)

2) Secondary board: (see Technology Repairs Manual)

3) Tig control board: check the cables fasten on connectors J1, J2, J3. Specifically, check carefully the wires of connector Jp1 in that there are subject to alternating network voltage.

4) Filter board: check Cn01, Cn02, Fs01, Fs02

(see Figure 2).

3) Electrical measurements while the machine is off.

(See Technology Repairs Manual.)

4) Electrical measurements while the machine is in operation.

1) Disconnect the power supply cables of H.F. Box

(see figure 2).

2) Shortcircuit Jp2 on the primary board by means of a jumper (placed between the SMD board and the electrolytic condensers. (See Figure 1.)

3) Remove all connectors from the tig control board. The inverter is now set to work as a technology 165 with the switch located on the front panel, in a central position ("hard welding").

4) Now follow the repair and test procedures of the inverter, keeping in mind the following information:

1) the yellow led is not present on the board

2) the inverter carries the arc force and hod start functions.

Warning! Although the repair and test procedure are similar, **the technology 114187 primary board cannot be mounted on this machine.**

5) Remove the shortcircuit from Jp2 and put the connectors, which were previously taken off from the tig control board, in their places. precedentemente tolti dalla scheda controllo tig.

6) Switch the inverter on and check the following power supplies on the tig control board:

- Jp1 Connector

Tester set in Vac

1) Place test prods on pins 1, 2 and you should have 220 Vac +/- 10%

- J2 Connector

Tester set in Vac

Place test prods on pins 7, 8 and you should have 9 Vac +/- 10%.

- J1 Connector

1) Place negative test prod on pin 2 (mass) and positive test prod on pin 1. The voltage should be +12 V +/- 3%.

2) Place negative test prod on pin 2 and positive test prod on pin 3. The voltage should be -12 V +/- 3%.

7) Checking the operation of H.F. filter board, code 112478.

- Ensure that the trimmer of pre-gas R 64 is rotated counterclockwise.

Insert the tig torch and set the tig at two phases, press the torch push-button. The electrovalve should be excited and, after a short delay, the high frequency should be excited too. If this does not happen, shortcircuit pins 1, 2 on connector J2.

If both the electrovalve and the high frequency are excited, it means that there a failure on the filter board, probably due to the following components:

a) Bridge rectifier P01.

b) Relay RI 1

c) The alternating voltage 9 V on connector Cn 01 pin 7, 8 is missing.

d) The wire on the torch is cut off.

8) Checking the operation of tig control board, code 112488.

A J4 jumper is mounted on this board (see Figure 3), which allows you to select two operation modes:

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- A) Jumper set towards connectors J1, J2 (H), high frequency striking (tig 165 DC-HF).
- B) Jumper set towards pre-gas and lift trimmers (L), "lift" striking (tig 161 DC-LIFT).

- 1) Ensure that the aforementioned jumper is in H position.
- 2) Set the machine in electrode through the commutator.
- 3) Through static load or directly in welding, ensure the correct operation of the inverter. (See "Final Testing" in Paragraph 5 of the Technologic Repairs Manual.)
- 4) Set the inverter up for tig welding. (Connect torch and argon gas bottle.)

A) Checking the Tig 165 DC/HF machine cycle

- 1) Set the switch at two phases () down slope and post-gas potentiometers at the middle of the scale, the pre-gas trimmer at the minimum (the trimmer is inside the board).
- 2) Press the torch push-button:
The high frequency and the gas electrovalve should excite. If after two seconds the welding arc does not strike, the high frequency will automatically disexcite. On the other hand, if the arc strikes, the current should reach the value of about 80 A; when releasing the torch push-button the current decreases gradually for about 2-3 seconds. From this time on, the electrovalve remains excited for about 3 seconds.
- 3) Repeat the same testing procedure, however turning the pre-gas trimmer clockwise and setting it at the maximum. By pressing the torch push-button, the electrovalve will excite but the high frequency will set off after a 4-second delay. Set this trimmer as to have 4-5 second delay or according to the customer's needs.
- 4) Set the commutator at 4 phases ().
Repeat the preceding testing procedures, keeping in mind that, in order to strike the arc you must press the torch push-button. When releasing it, the welding current will remain at the preset value (80 A). If the operator presses and releases the torch push-button for a second time, the gradual decreasing of current and the post-gas phases will begin.
- 5) Bring the electrode in contact with the element to be welded; if you do not press the torch push-button, the yellow led (D26) located on the front panel should switch on.

B) Checking the Tig 161 DC-LIFT machine cycle

Set the welding current of the post-gas and the gradual decreasing of current potentiometers as you did for the two-phase cycle.

1) Checking the lift current:

- A) Set the switch on front panel at two-phase() bring the tungsten electrode in contact with the element to be welded, the led located on the front panel will switch on, press the torch push-button. Through the plier-shaped amperometer connected to the mass cable, check whether there is a flow of current of about 20 A +/- 3 A. Should you need to reset this value, act on trimmer R53. (In this phase, the yellow led is switched off.)
- 2) Checking lift striking and the 2-phase cycle.
 - a) Bring the tungsten electrode in contact with the element to be welded, press the torch push-button and lift the electrode by about 2 mm. If the lift current (20 A trimmer

R53) is properly set, the welding arc should strike.

- b) Release the torch push-button, check the gradual decreasing of current and the post-gas potentiometers.

3) Checking the 4-phase cycle.

- a) Set the switch located on the front panel at 4-phase position ().
- b) Bring the tungsten electrode in contact with the element to be welded, press and release the torch push-button then lift the electrode for about 2 mm; the welding arc should strike. In order to obtain a gradual decreasing of current, you must press and release the torch push-button for the second time. Finally, check whether there is a post-gas.

Checking the remote control.

- 1) Switch the remote control on (code 802109) and ensure that it works correctly.

Warning! The following remote control adjusts the current in function of the current set on the front panel; thus, if we set a value of 50 A on the inverter, we could adjust this value from 5 A to 50 A by acting on the remote control.

- 2) Switch the "tig pulse" box on (code 802320) and ensure that it works correctly by checking the current parameters relative to peak, pause and work phases.

High frequency striking

If striking a welding arc by means of high frequency proves to be difficult (weak high frequency), the failure could be due to the following components:

- Torch
- High frequency box
- High frequency transformer
- High frequency filter
- Primary coil with inverted polarity

If after having replaced these components the failure persists, we suggest to check carefully the high frequency silicone insulated cable as well as the high frequency transformer connection on the positive inverter, which must NOT touch the carpentry or the wire of the torch push-button. Furthermore, we suggest you disassemble the positive dinse plug and check for signs of discharges due to high frequency.

5) Changes and Updates

There are two types of tig control board and high frequency transformers:

- | | |
|----------------------------|------------------|
| Tig control board | (See Figure 4-5) |
| High frequency transformer | (See Figure 6-7) |

- The two tig control boards are perfectly compatible insofar as the tig 165 DC-HF is concerned (high frequency striking). The board with code 112453 instead, cannot be mounted on tigs with lift striking (tig 161 DC-LIFT).
- The high frequency transformer in Figure 8 is equipped with a different mechanical fastening system thus, should you need to make a replacement on a tig mounting a transformer like the one in Figure 5, you must drill three new holes on the carpentry (see Figure 6).

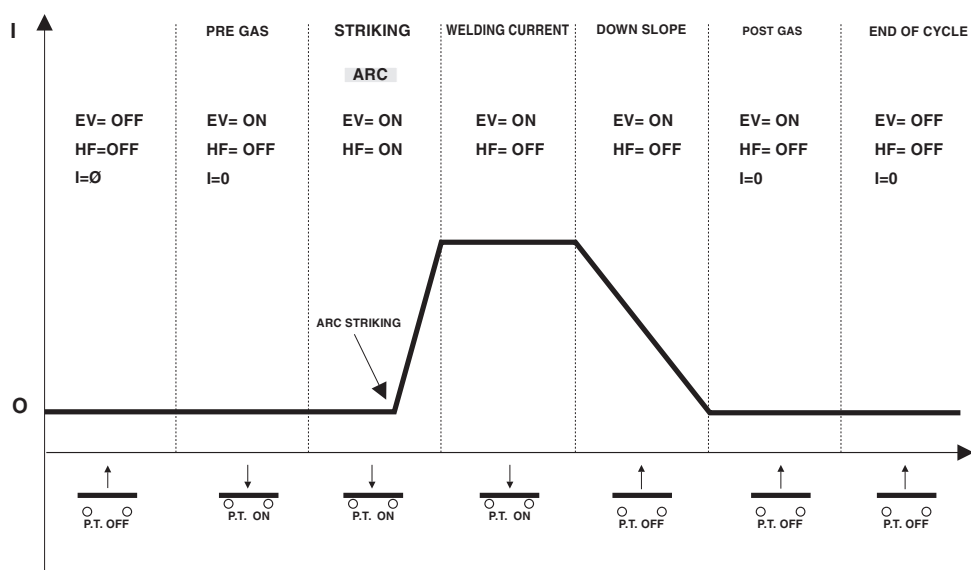


LEGEND

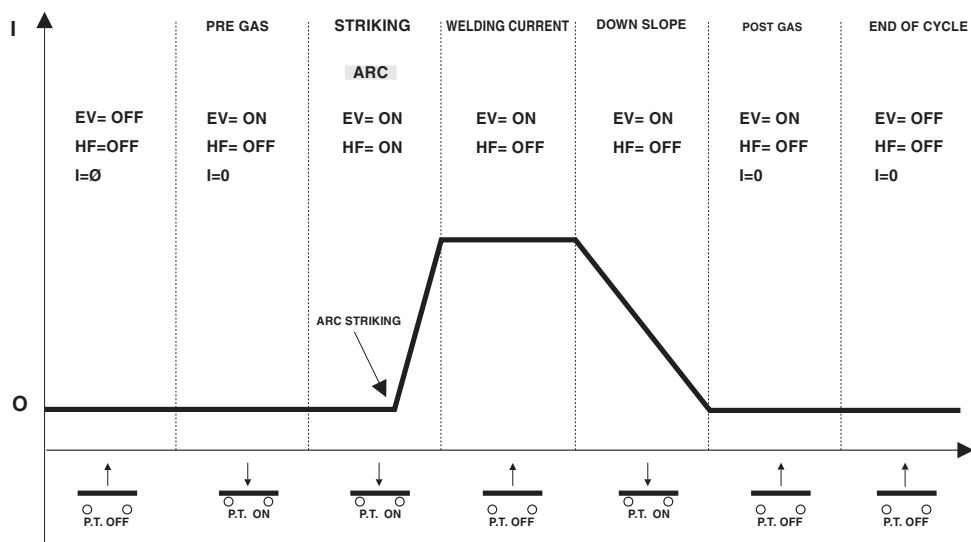
EV = Electrovalve
HF = High frequency

I = Welding current
D26 = Yellow led located on Tig front

TWO-PHASE MACHINE CYCLE AT HIGH FREQUENCY



FOUR-PHASE MACHINE CYCLE AT HIGH FREQUENCY



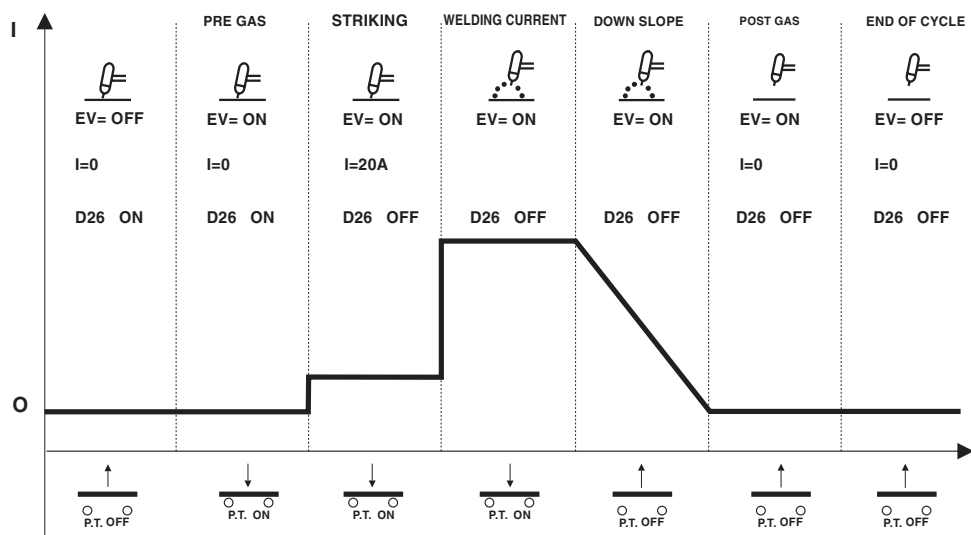
D26: This led will switch on when between the electrode and the element to be welded there is direct current thus stopping the inverter operation.



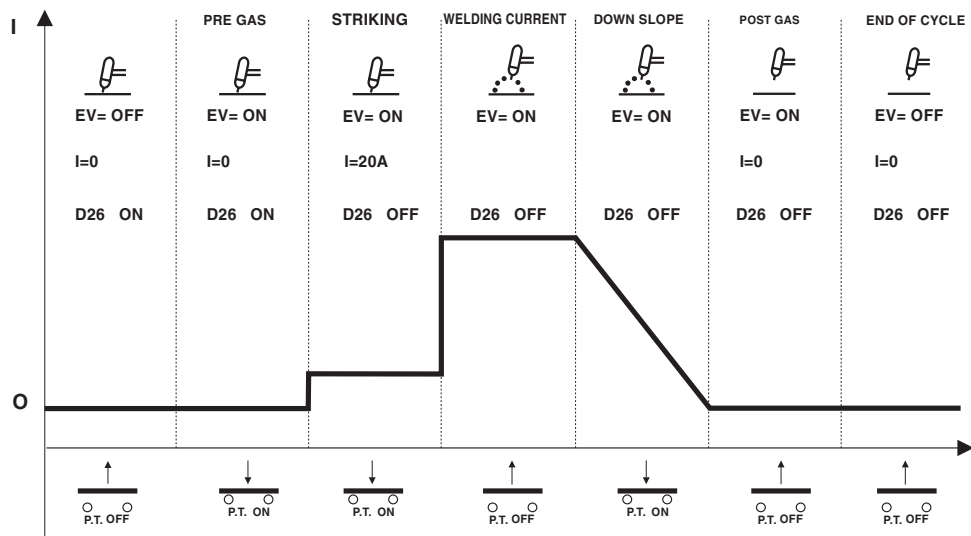
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TWO-PHASE MACHINE CYCLE LIFT STRIKING



FOUR-PHASE MACHINE CYCLE LIFT STRIKING



	MINIMUM TIME (s)	MAXIMUM TIME (s)
PRE GAS TRIMMER R 54	≈ 0	≈ 45
POST GAS POTENTIOMETER R 58	≈ 0	≈ 11
DOWN SLOPE POTENTIOMETER R 59	≈ 0	≈ 8
	CURRENT MINIMUM (A)	CURRENT MAXIMUM (A)
LIFT CURRENT R 53	≈ 0	≈ 40

Illustrated references

Figure n° 1

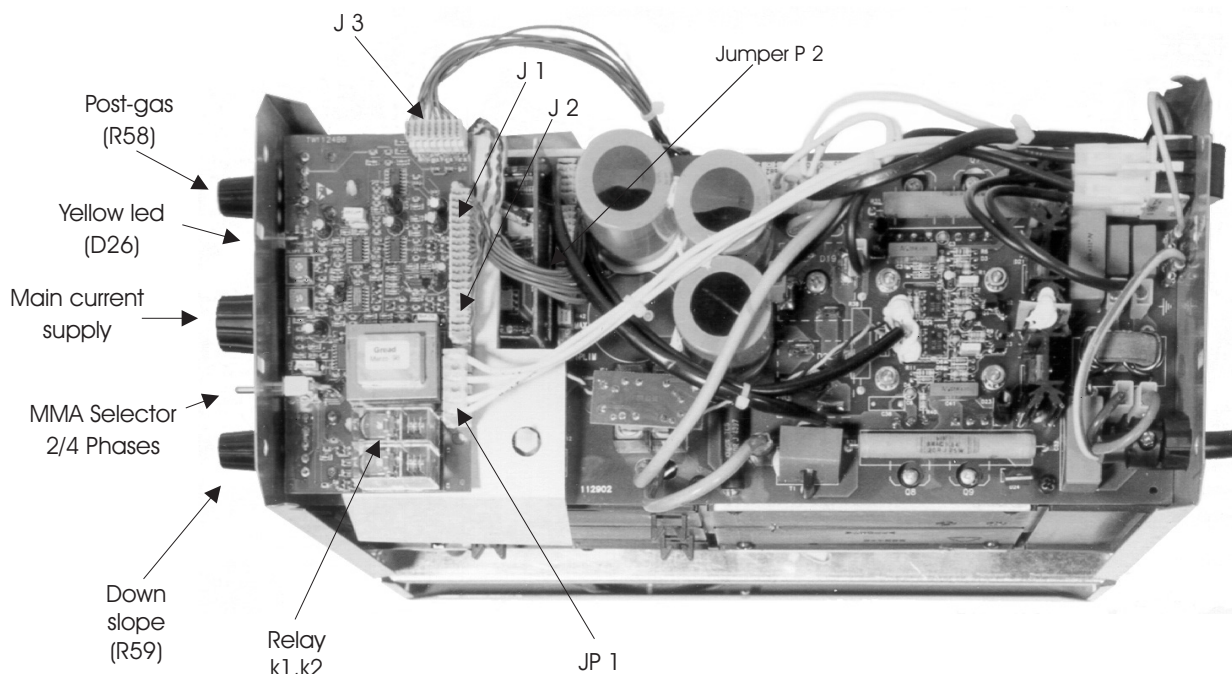
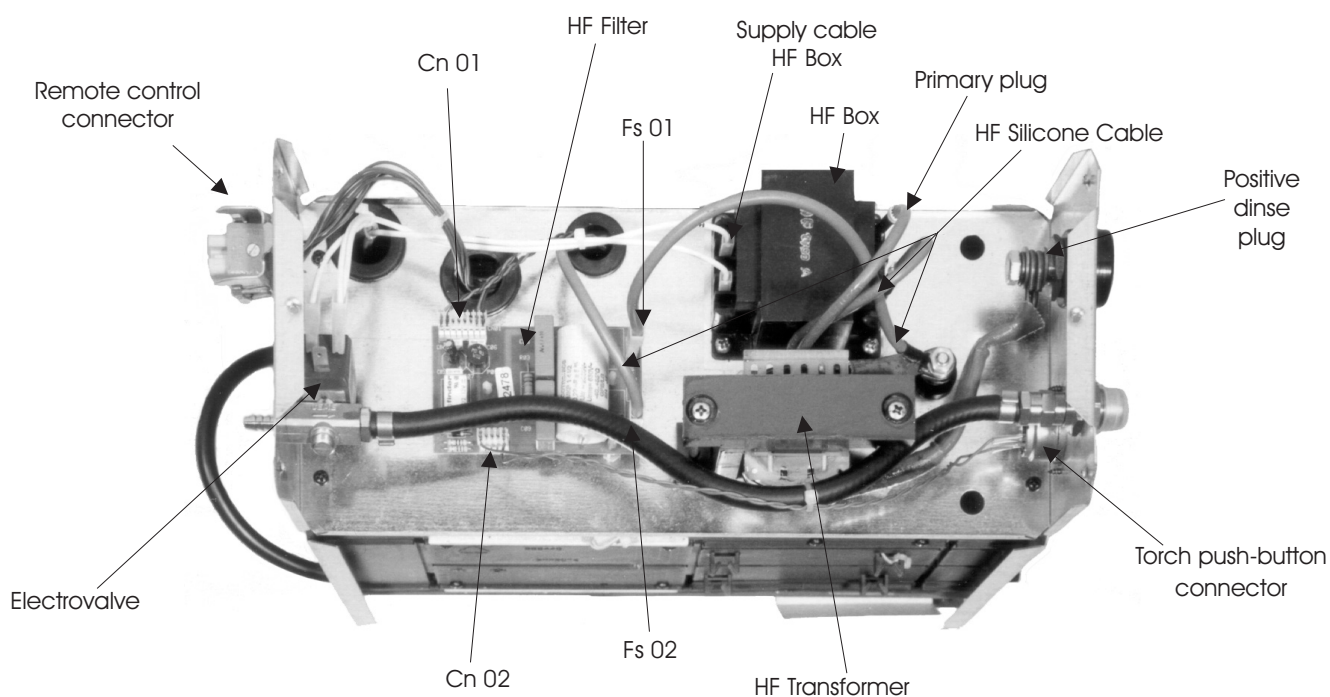


Figure n° 2





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Figure n° 3

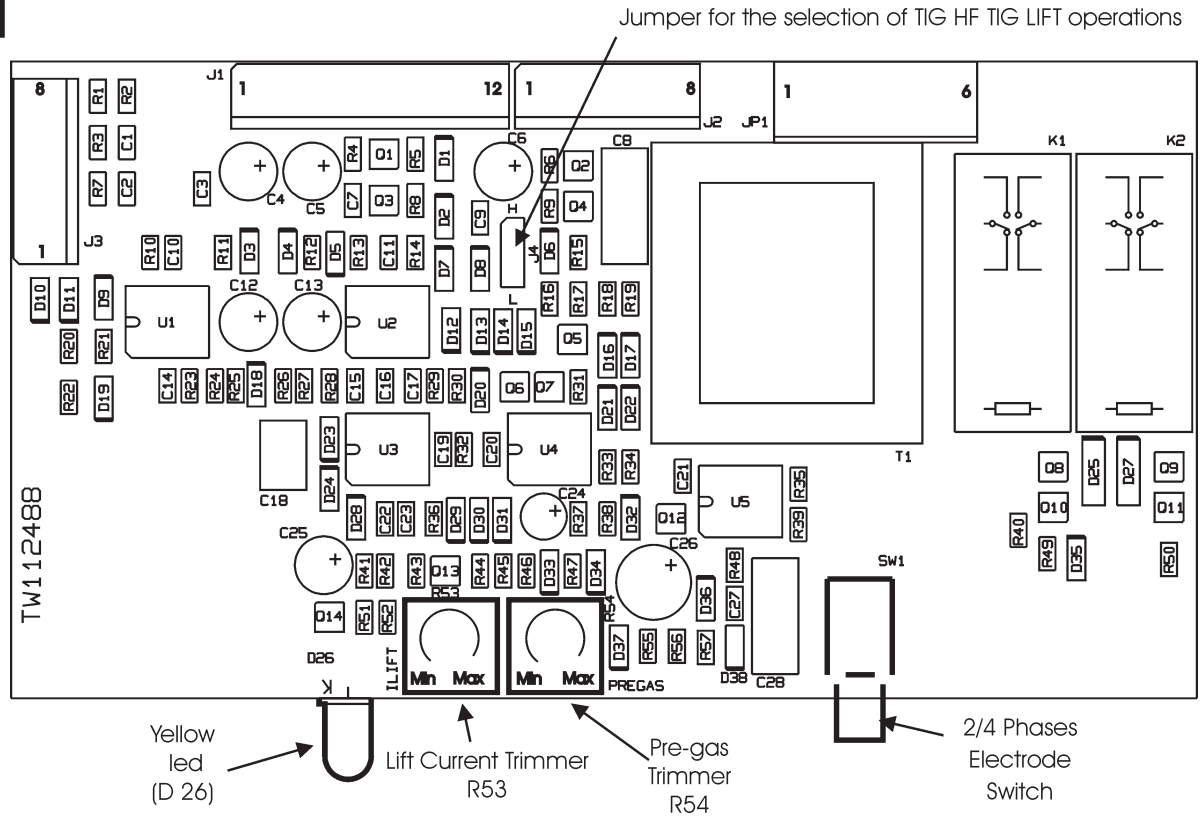


Figure n° 4

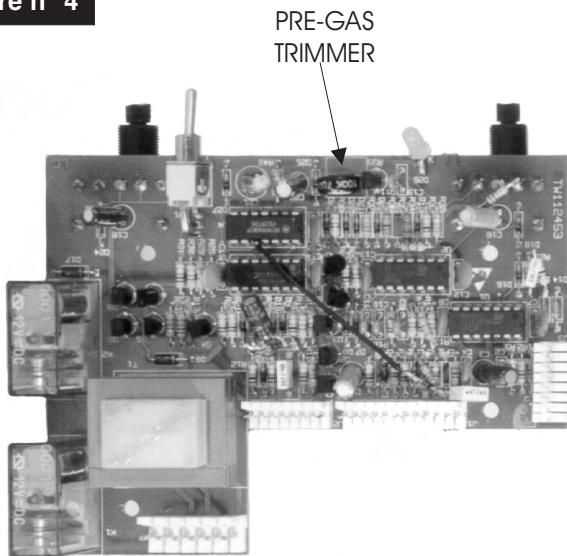


Figure n° 5

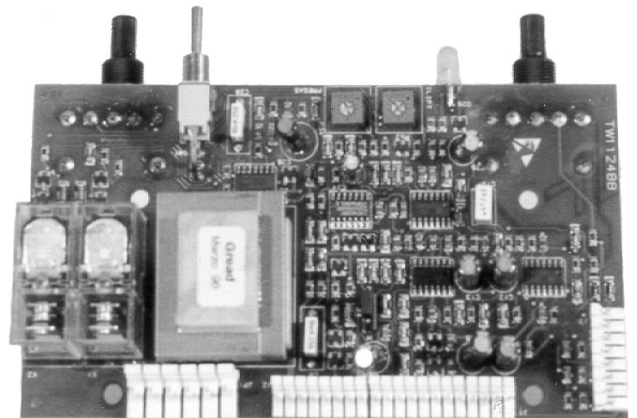


Figure n° 6

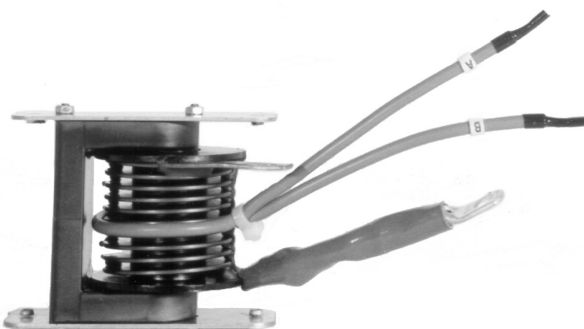
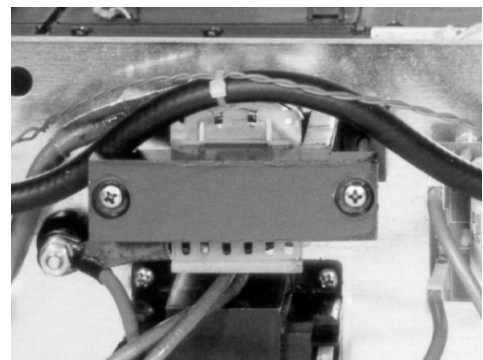
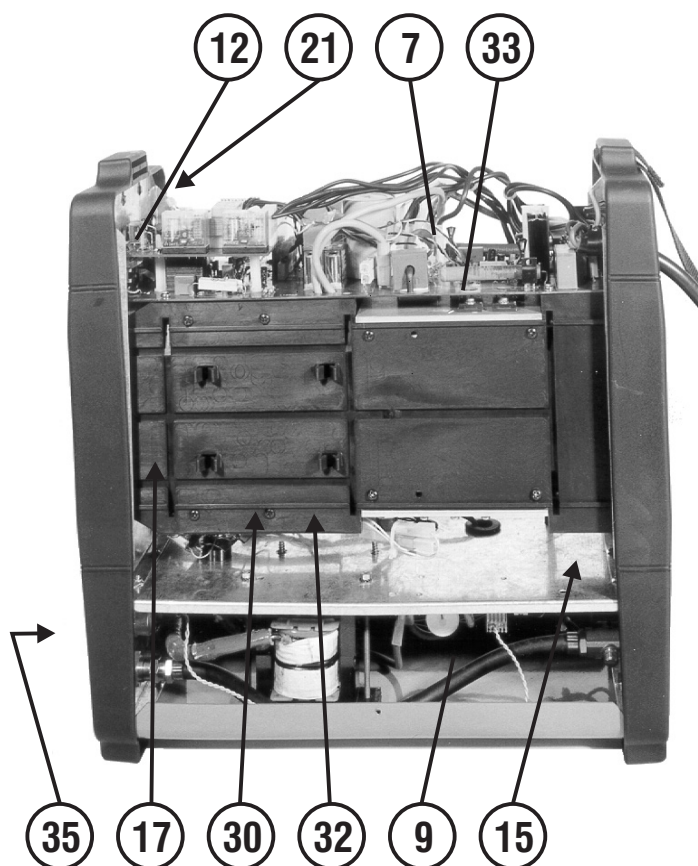
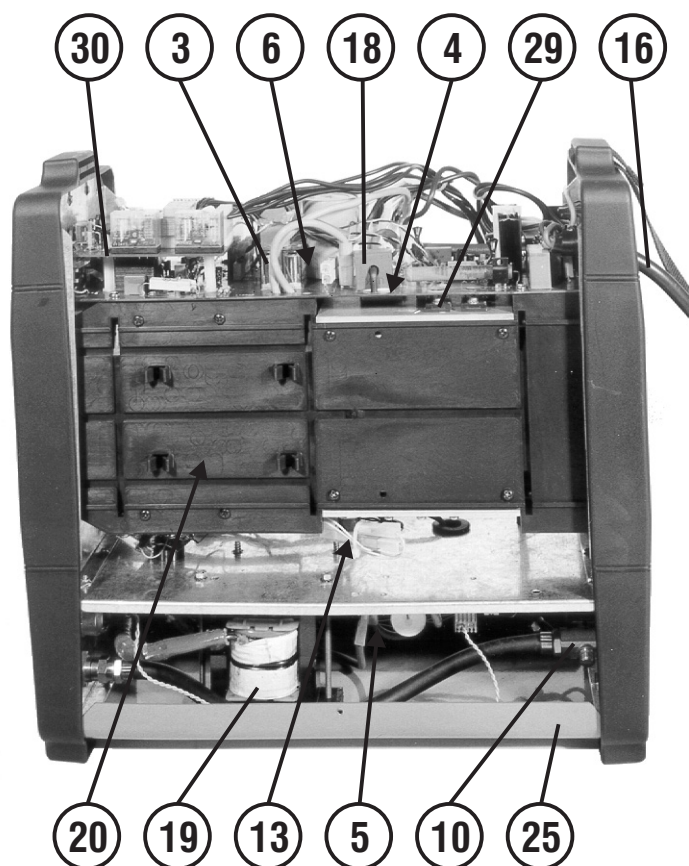
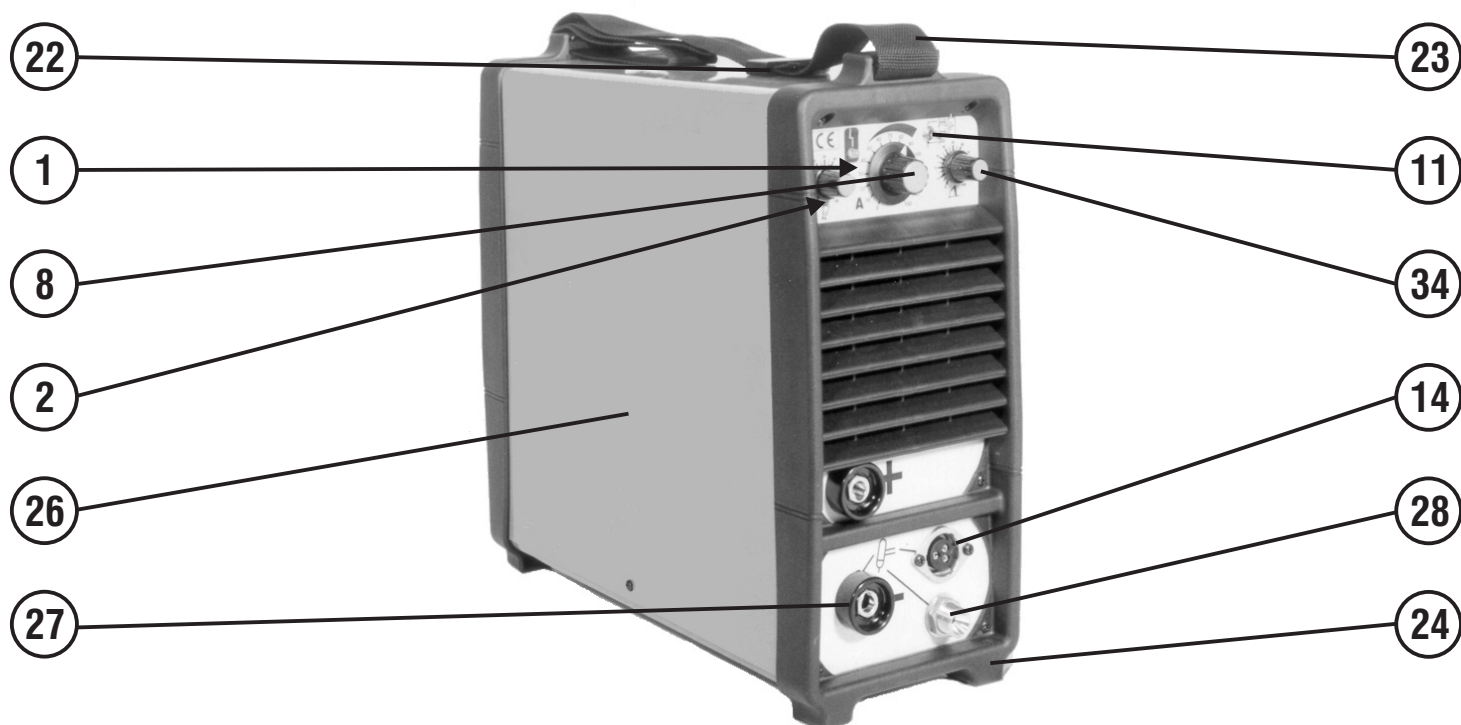


Figure n° 7



ELENCO PEZZI DI RICAMBIO - LISTE PIECES DETACHEES SPARE PARTS LIST - ERSATZTEILLISTE PIEZAS DE REPUESTO

Esploso macchina, Dessin appareil, Machine drawing, Explosionszeichnung des Geräts, Diseño seccionado maquina.



Per richiedere i pezzi di ricambio senza codice precisare: codice della saldatrice; il numero di matricola; numero di riferimento del particolare sull'elenco ricambi.
Pour avoir les pieces detachees, dont manque la reference, il faudra preciser: modele, logo et tension de l'appareil; denomination de la piece; numero de matricule
When requesting spare parts without any reference, pls specify: model-brand and voltage of machine; list reference number of the item; registration number
Wenn Sie einen Ersatzteil, der ohne Artikel Nummer ist, benoetigen, bestimmen Sie bitte Folgendes: Modell-zeichen und Spannung des Geraetes; Teilliste Nuemmer; Registriernummer
Por pedir una pieza de repuesto sin referencia precisar: modelo-marca e tension de la maquina; numero de riferimento de lista; numero de matricula

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO	REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO	REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO	REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO	REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
1	Potenziometro Potentiometre Potentiometer Potenziometer Potenciometro	10	Elettrovalvola Electrovanne Electrovalve Elektroventil Elektrovalvula	19	Trasformatore H.f. Transformateur H.f. H.f. Transformer H.f. Transformator Transformador H.f.	28	Raccordo Entrata Gas Raccord Entree Gaz Gas Pipe Connector Gaseintritt Racor Entrada Gas		
2	Potenziometro Potentiometre Potentiometer Potenziometer Potenciometro	11	Deviatore Gareur Switch Schalter Interruptor	20	Assieme Trasformatore Transformateur Transformer Assy Transformatorsatz Grupo Transformador	29	Kit Igbt Kit Igbt Kit Igbt Kit Igbt Kit Igbt		
3	Relé Relais Relais Relais Relais	12	Interruttore Interrupteur Switch Schalter Interruptor	21	Pressacavo Presse Cable Cable Bushing Kabelhalter Prensa Cable	30	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo		
4	Raddrizzatore Monofase Redresseur Monophasé Single-phase Rectifier Einphasiger Gleichrichter Rectificador Monofásico	13	Termostato 10,0A Thermostat 10,0A Thermal Switch 10,0A Thermostat 10,0A Termostato 10,0A	22	Fibbia Per Cinghia Boucle Pour Courroie Belt Buckle Gurtschnalle Hebilla Para Correa	31	Kit Scheda Controllo Tig Kit Platine De Control Tig Tig Control Pcb Kit Wig Steuerungskarte Kit Kit Tarjeta De Control Tig		
5	Scheda Filtro Platine Filtre Filter Card Filterkarte Tarjeta Filtro	14	Cablaggio Presa Prise Cablee Socket Wiring Steckdose Mit Kabel Cableado Enchufe	23	Cinghia Courroie Belt Gurt Correa	32	Kit Scheda Secondario Kit Fiche Secondaire Kit Secondary Pcb Kit Sekundaertrafokarte Kit Tarjeta Secundario		
6	Resistenza Resistance Resistor Widerstand Resistencia	15	Assieme Condensatore Condensateur Capacitor Assembly Kondensatorsatz Grupo Capacitor	24	Cornice Cadre Frame Rahmen Marco	33	Kit Scheda Primario Kit Fiche Primaire Kit Primary Pcb Kit Primaertrafokarte Kit Tarjeta Primario		
7	Condensatore Condensateur Capacitor Kondensator Capacitor	16	Cavo Alimentazione Cable De Réseau Mains Cable Netzkabel Cable De Alimentation	25	Fondalino Chassis Bottom Bodenteil Base	34	Manopola Piccola Poignee Petite Small Knob Kleiner Griff Manija Pequena		
8	Manopola Poignee Knob Knopf Manija	17	Motovelocitatore Ventilateur Fan Ventilator Ventilador	26	Mantello Capot Top Cover Gehaeusedeckel Tapa	35	Presca Fiche Plug Stecker Espina		
9	Generatore H.f. Generateur H.f. H.f. Generator H.f. Generator Generador H.f.	18	Trasformatore Di Corrente Transformateur De Courant Current Transformer Stromwandler Transformador De Corriente	27	Presca Dinse Prise Dix Dinse Socket Dinse Steckdose Enchufe Dinse				

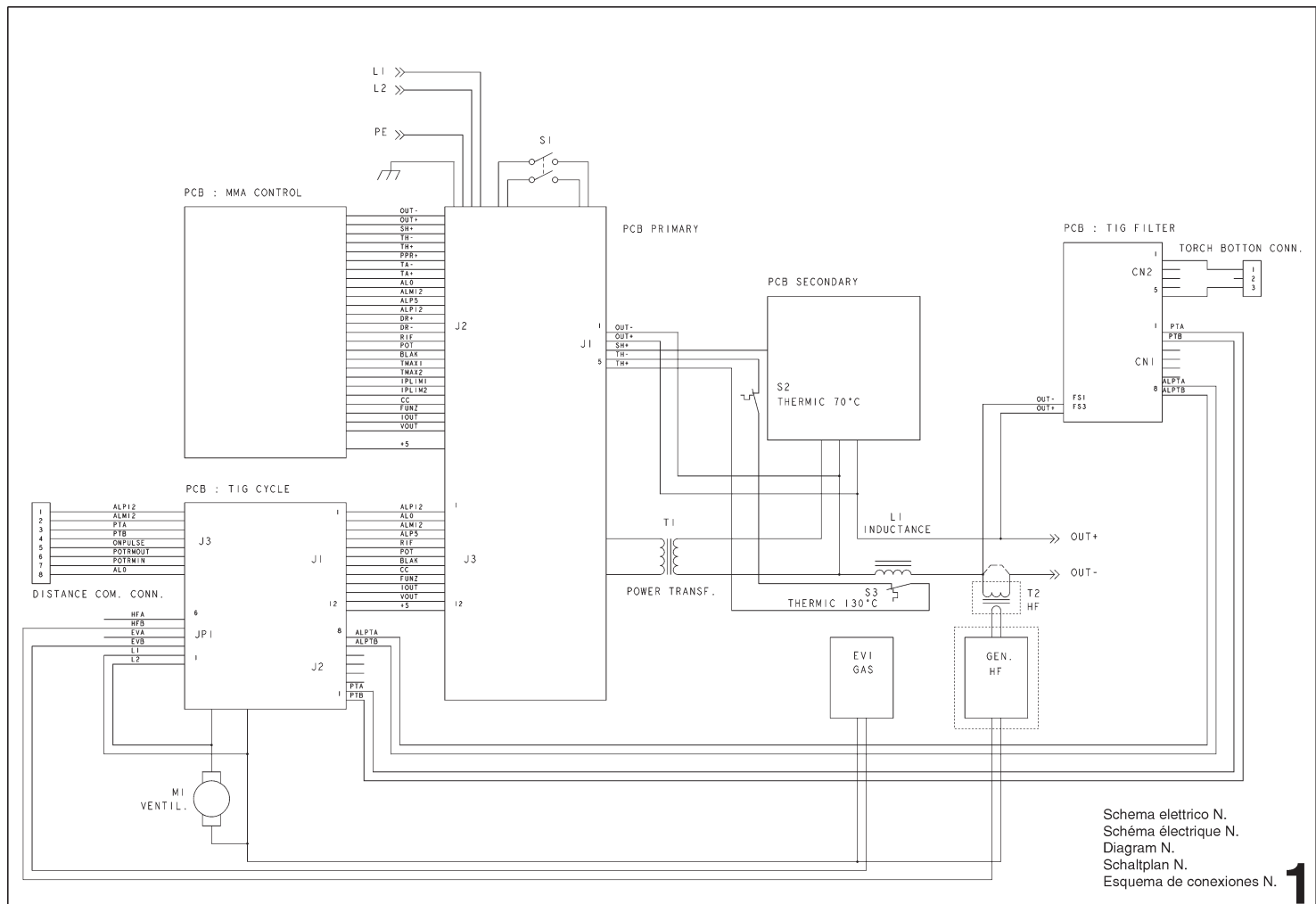
(I) Per individuare lo schema elettrico corrispondente alla vostra macchina, rifarsi all'ultima cifra "X" del numero di matricola (N. 0000/X) riportato sul frontale.

(F) Pour reperer le schema électrique correspondant à votre appareil, vérifier le dernier chiffre "X" du numéro de série (N. 0000/X) reporté sur la partie frontale.

(GB) In order to find the electrical diagram corresponding to your model, check the last number "X" of the serial number (N. 0000/X) printed on front panel.

(D) Um den schaltplan, der ihrem gerät entspricht, ausmachen zu können, müssen sie die letzte ziffer "X" der matrikelnummer (N. 0000/X), die auf der frontseite angebracht ist, beachten.

(E) Para la identificación del esquema eléctrico, correspondientes, a su máquina, refírase a la última cifra "X" del número de placa (N. 0000/X) instalado sobre el frontal.





Official servicing centers Repairing card

Date: _____

Inverter model : _____

Serial number: _____

Company: _____

Technician: _____

In which place has the inverter been used domanda:

- ☐ Building yard
- ☐ Workshop
- ☐ Others: _____

Supply:

- ☐ Power supply
- ☐ From mains without extension
- ☐ From mains with extension m: _____

Mechanical stresses the machine has undergone to

Description: _____

Dirty grade.

Dirty inside the machine

Description: _____

Kind of failure	Component ref.	Substitution of primary circuit board: yes <input type="checkbox"/> no <input type="checkbox"/> Troubles evinced during repair: _____ _____ _____ _____ _____ _____
Rectifier bridges	_____	
Electrolytic capacitors	_____	
Relays	_____	
Pre-charge resistor	_____	
IGBT	_____	
Snubber networks	_____	
Secondary diodes	_____	
Potentiometer	_____	
Potentiometer	_____	

TECHNICAL REPAIR CARD

In order to improve our service, each servicing centre is requested to fill in the technical card above at the end of every repair job.

Please fill in the card as accurately as possible and return in to Telwin.

Thank you in advance!



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CERTIFIED QUALITY SYSTEM

