cod. 988593

TELWIN

SUPERIOR TIG 242-362
AC/DC - HF/LIFT
inverter

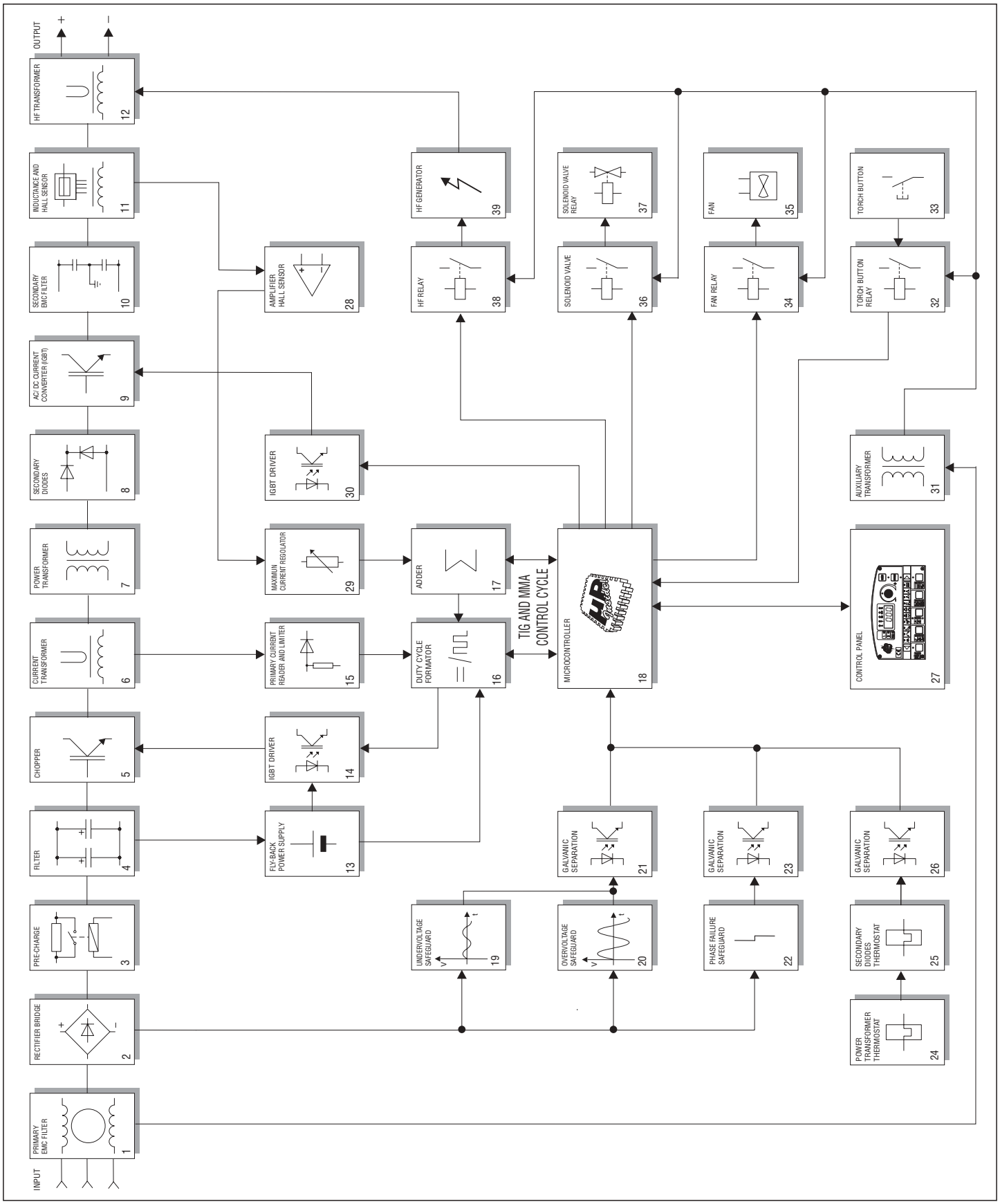
TROUBLESHOOTING AND REPAIR MANUAL

CONTENTS

"reparation no problem !"

OPERATION AND WIRING DIAGRAMS

BLOCK DIAGRAM



ANALYSIS OF THE BLOCK DIAGRAM

NOTE: Unless indicated otherwise, it should be assumed that the components are assembled on thewelding machine.

Block 1

EMC Filter

Consisting of: C1, C2, C3, C4, C5, C6, C7, L1 (input board).
Prevents noise from the machine from being transmitted along the main power line and vice versa.

Block 2

Rectifier bridge

Consisting of: D1, D2, D3 (primary board).
Converts the mains alternating voltage into continuous pulsed voltage.

Block 3

Pre-charge

Consisting of: K1, K2, K3, R1, R2 (primary board).
Prevents the formation of high transient currents that could damage the main switch, the rectifier bridge and the electrolytic capacitors.
When the power source is switched on relays K1, K2 and K3 are de-energised, capacitors C1, C1A, C2, C2A, C3, C3A, C4, C4A are therefore charged via R1, R2. When the capacitors are charged the relays will be energised.

Block 4

Filter

Consisting of: C1, C1A, C2, C2A, C3, C3A, C4, C4A (primary board).
Converts the pulsed voltage from the rectifier bridge into continuous voltage.

Block 5

Chopper

Consisting of: IGBT ÷ 10 (primary board).
Converts the continuous voltage from the filter into a high frequency square wave capable of piloting the power transformer.
Regulates the power according to the required welding current/voltage.

Block 6

Current transformer

Consisting of: TA.
The C.T. is used to measure the current circulating in the power transformer primary and transmit the information to block 15 (primary current reader and limiter).

Block 7

Power transformer

Consisting of: T1.
Adjusts the voltage and current to values required for the welding procedure. Also forms galvanic separation of the primary from the secondary (welding circuit from the power supply line).

Block 8

Secondary diodes

Consisting of: D1, D3, D4, D5, D6, D7, D8, D10 (Secondary board).
Positive polarity diodes in the circuit:
D1, D5 convert the current circulating in the positive OUT of the power transformer to a single direction, preventing saturation of the nucleus (No D5 on version of Superior Tig 242).
D3, D4 recirculate the inductance output current (block 9) during the time when the IGBT's are not conducting, bypassing the power transformer (block 7).
Negative polarity diodes in the circuit:
D6, D10 convert the current circulating in the negative OUT of the power transformer to a single direction, preventing saturation of the nucleus (No D10 on version of Superior Tig 242).
D7, D8 recirculate the inductance output current (block 9) during the time when the IGBT's are not conducting, bypassing the power transformer (block 7).
DC Operation: The positive polarity diodes in the circuit are involved.
AC Operation The positive and negative polarity diodes in the circuit are involved alternately.

Block 9

AC/DC current converter

Consisting of: Q1 (secondary board Superior Tig 242).
Consisting of: G1, G2 (secondary board Superior Tig 362).
The IGBT modules are piloted by block 18 (microcontroller) and block 27 (IGBT module driver) transforming the secondary output current from DC to AC when TIG AC welding is required.

Block 10

Secondary EMC Filter

Consisting of: C4, C7 (secondary board).
Prevents noise from the power source from being transmitted through the welding cables and vice versa.

Block 11

Inductance and Hall Sensor

Consisting of: L1, Hall Sensor
The inductance levels the output current from the secondary board diodes making it practically direct. The Hall sensor detects the current circulating in the secondary and sends a voltage signal to block 25 (Hall sensor amplifier), which will process it.

Block 12

HF Transformer

Consisting of: T3.
The HF transformer boosts the signal from block 39 (hf power source), raising the voltage impulse in the secondary at the instant when arc strike is generated.
It also isolates the welding circuit from the primary circuit

Block 13

Flyback power supply

Consisting of: T2, U4 (power supply board).
Uses switching methods to transform and stabilise the voltage obtained from block 4 (filter) and supplies auxiliary voltage to power block 14 (IGBT driver) and the control board correctly.

Block 14

IGBT Driver

Consisting of: Q1, Q2, Q3, Q4 (primary board), optoisolator board.

Takes the signal from block 13 (flyback power supply) and, controlled by block 16 (duty cycle maker), makes the signal suitable for piloting block 5 (chopper).

Block 15

Primary current reader and limiter

1st version:

Consisting of: D34, R99, R101 (control board).

Detects and limits the signal from block 6 (current transformer) and, via trimmer R101, adjusts the maximum allowable primary current. The signal is also redimensioned so that it can be processed and compared in block 16 (duty cycle maker).

2st version:

Consisting of: D54, D66, R67, R17, R69, R48, R6 (control board).

Detects and limits the signal from block 6 (current transformer) and adjusts the maximum allowable primary current. The signal is also redimensioned so that it can be processed and compared in block 16 (duty cycle maker).

Block 16

Duty cycle maker

Consisting of: U11 (control board).

Processes the information arriving from block 17 (adder) and block 15 (primary current reader and limiter), producing a square wave with variable duty cycle, limiting in any case the primary current to a maximum preset value.

Block 17

Adder

Consisting of: U9C, U9D (control board 1st version).

Consisting of: U4B, U4C (control board 2st version).

Collects the information from block 29 (maximum current regulator) and block 18 (microcontroller), producing a voltage signal that is suitable for processing by block 16 (duty cycle maker).

Block 18

Microcontroller

Consisting of: U1 (control board 1st version).

Consisting of: U8 (control board 2st version).

Control logic, which manages typical timing for the TIG and MMA cycles. Also drastically limits power source output current when it detects an alarm event. In the event of an alarm it acts directly on block 16 (duty cycle maker) and directly changes the reference signal obtained from block 27 (control panel).

Block 19

Undervoltage safeguard

Consisting of: U5B, R30, R32 (power supply board) and part of primary board.

If the main supply voltage falls below the minimum allowed value this safeguard triggers (a tolerance of approx. ±15% of the power supply voltage is allowed: outside this range the safeguard triggers).

Block 20

Overvoltage safeguard

Consisting of: U5A, R38, R40 (power supply board) and part of primary board.

If the main supply voltage exceeds the maximum value this safeguard triggers (a tolerance of approx. ±15% of the power supply voltage is allowed: outside this range the safeguard triggers).

Block 21

Galvanic separation

Consisting of: ISO1 (power supply board).

The signal arriving from blocks 19 and 20 (over- and under-voltage safeguard) is separated galvanically and sent to block 18 (microcontroller) for detection of a possible alarm event.

Block 22

Phase failure safeguard

Consisting of: R28, R27, R30, R31 (primary board)

If one of the three input phases fails this safeguard triggers.

Block 23

Galvanic separation

Consisting of: optoisolator board

The signal arriving from block 22 (phase failure safeguard) is separated galvanically and sent to block 18 (microcontroller) for detection of a possible alarm event.

Block 24

Power transformer thermostat

Consisting of: ST1

When the temperature of the power transformer is too high the thermostat cuts in, sending an alarm signal to block 18 (microcontroller). It is reset automatically when this alarm condition is no longer present.

Block 25

Secondary diode thermostat

Consisting of: ST1, ST2 (secondary board).

When the temperature of the secondary diode dissipator is too high the thermostat cuts in, sending an alarm signal to block 18 (microcontroller). It is reset automatically when this alarm condition is no longer present.

Block 26

Galvanic separation

Consisting of: optoisolator board.

The signal arriving from blocks 24 and 25 (power transformer thermostat and secondary diodes) is separated galvanically and sent to block 18 (microcontroller) for detection of a possible alarm event.

Block 27

Control panel

Consisting of: Control panel board.

Panel for setting and displaying the parameters and operating modes of the power source, all controlled by block 18 (microcontroller).

Block 28

Shunt Amplifier Hall sensor

Consisting of: U10 (control board 1st version).
Consisting of: U2 (control board 2st version)
Amplifies the signal arriving from block 10 (Hall sensor), and makes it appropriate for block 29 (maximum current regulator).

Block 29

Maximum current regulator

Consisting of: R92 (control board).
Processes the information arriving from block 28 (shunt amplifier Hall sensor) and, via trimmer R92, allows calibration of the maximum welding current that can be supplied by the power source. The signal is re-dimensioned so that it can be processed and compared with block 17 (adder).

Block 30

IGBT Driver

Consisting of: ISO1, Q3, Q4 and ISO2, ISO6, Q5, Q6 (secondary board).
Receives the signals arriving from block 18 (microcontroller) and makes them appropriate for piloting block 9 (AC/DC current converter).

Block31

Auxiliary transformer

Consisting of: T2.
Its purpose is to re-dimension the voltage from 400Vac to 230Vac for powering the relays piloting blocks 32, 34, 36 and 38.

Block 32

Torch button relay

Consisting of: K2 (secondary board).
The HF safeguard also separates the control board from the high frequency so as to prevent the residual signal from the torch button cables from entering the board.

Block 33

Torch button

Consisting of: TIG Torch
When the torch button is operated, a separate signal is sent to block 18 (microcontroller), to achieve arc strike and enable the solenoid valve.

Block 34

Fan Relay

Consisting of: Q13, K3 (control board)
When the power source is powered, block 18 (microcontroller) activates relay K3 which supplies the mains voltage needed to power block 35 (fan).

Block 35

Fan

Consisting of: V1, V2 (V2 only for Superior Tig 362).
Powered directly by block 34 (fan relay) to cool the power components.

Block 36

Solenoid valve relay

Consisting of: Q15, K4(control board).
When the torch button is pressed, block 18 (microcontroller) activates relay K4 which supplies the mains voltage needed to power block 37 (solenoid valve).

Block 37

Solenoid valve

Consisting of: Y1
Supplies an appropriate amount of the desired gas mixture to strike the arc in the torch and the quantity needed to operate and cool the torch itself.

Block 38

HF Relay

Consisting of: Q14, K2 (control board).
When the torch button is pressed, block 18 (microcontroller) activates relay K2 which supplies the mains voltage needed to power block 39.

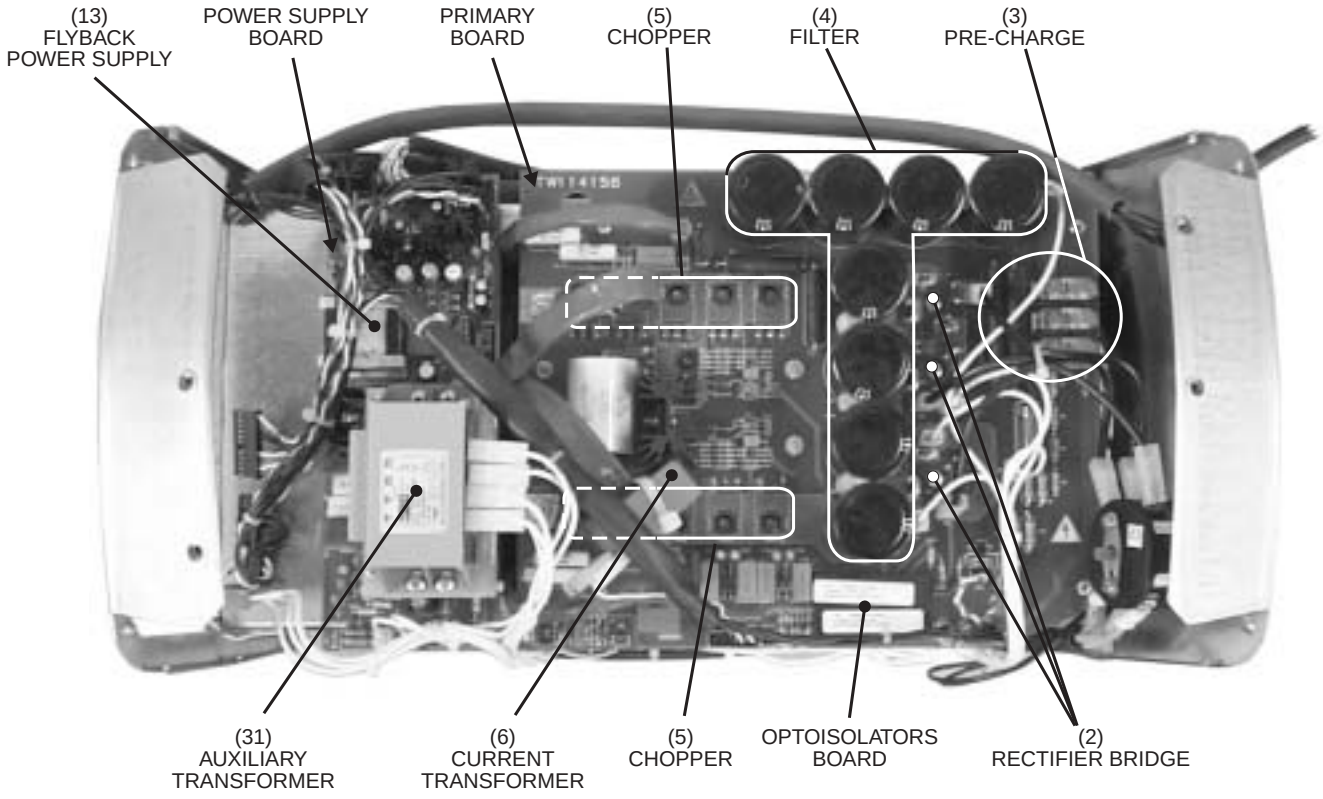
Block 39

HF generator

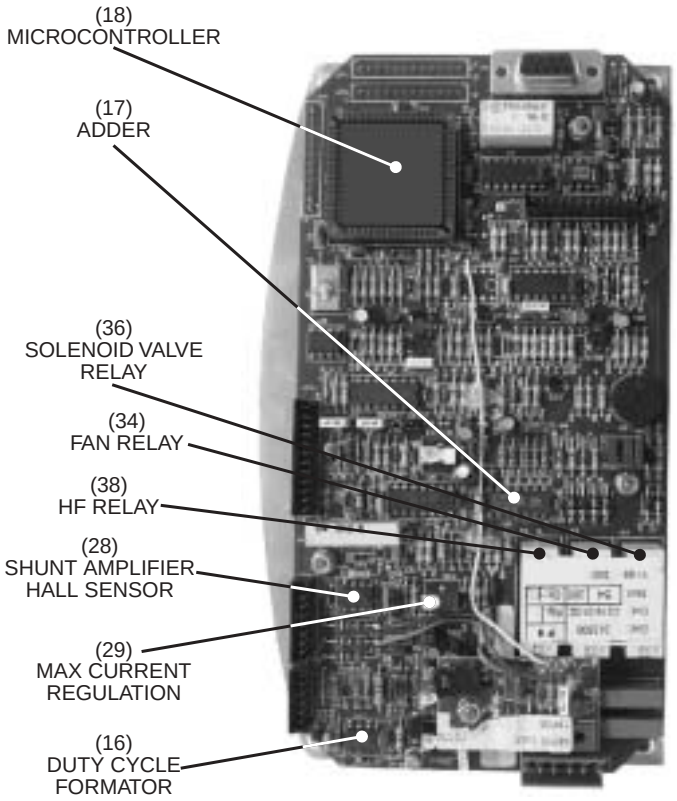
Consisting of: HF board.
Using the signal sent by block 38 (HF relay), the HF board produces a high frequency signal that is sufficient for powering block 12 (HF transformer).

ILLUSTRATIONS

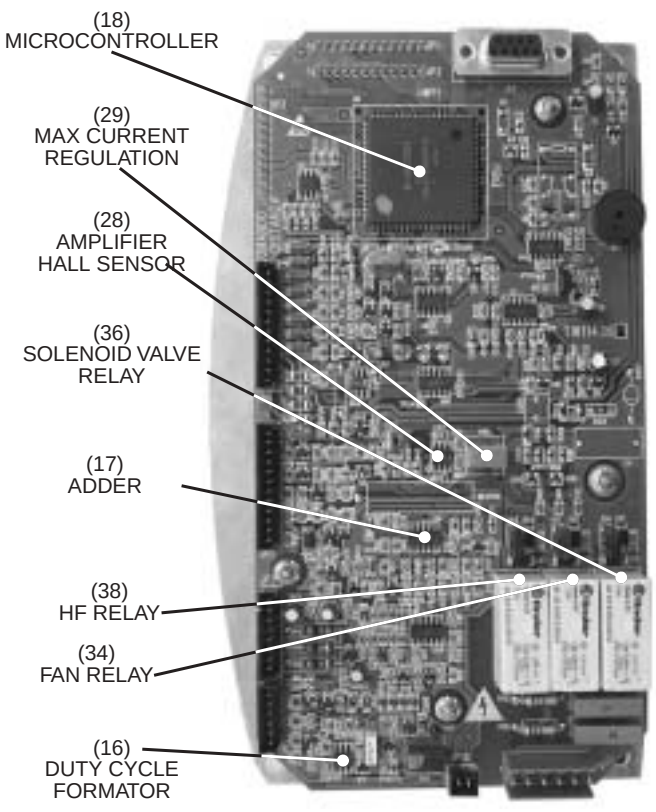
Primary board Power supply board



Control board - 1st version

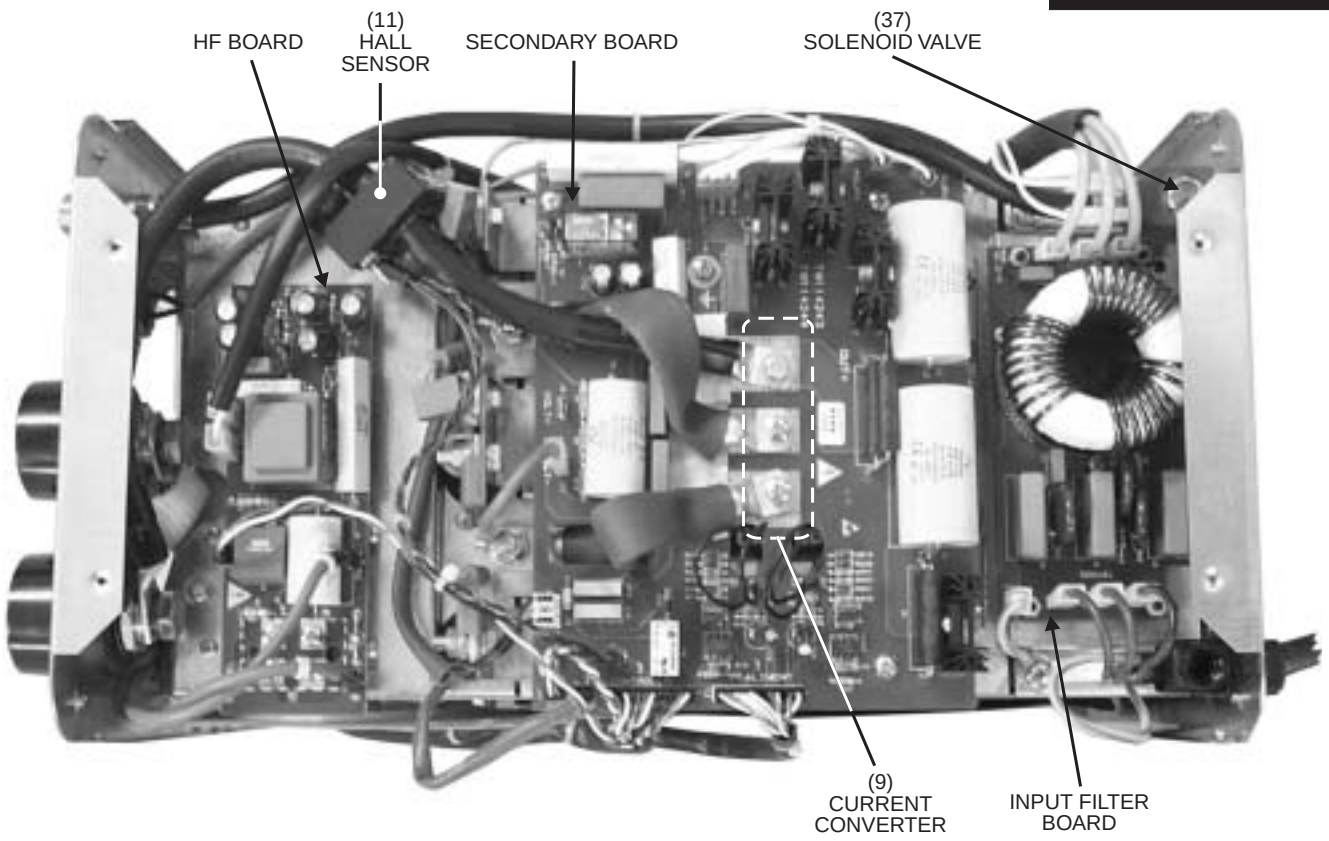


Control board - 2st version



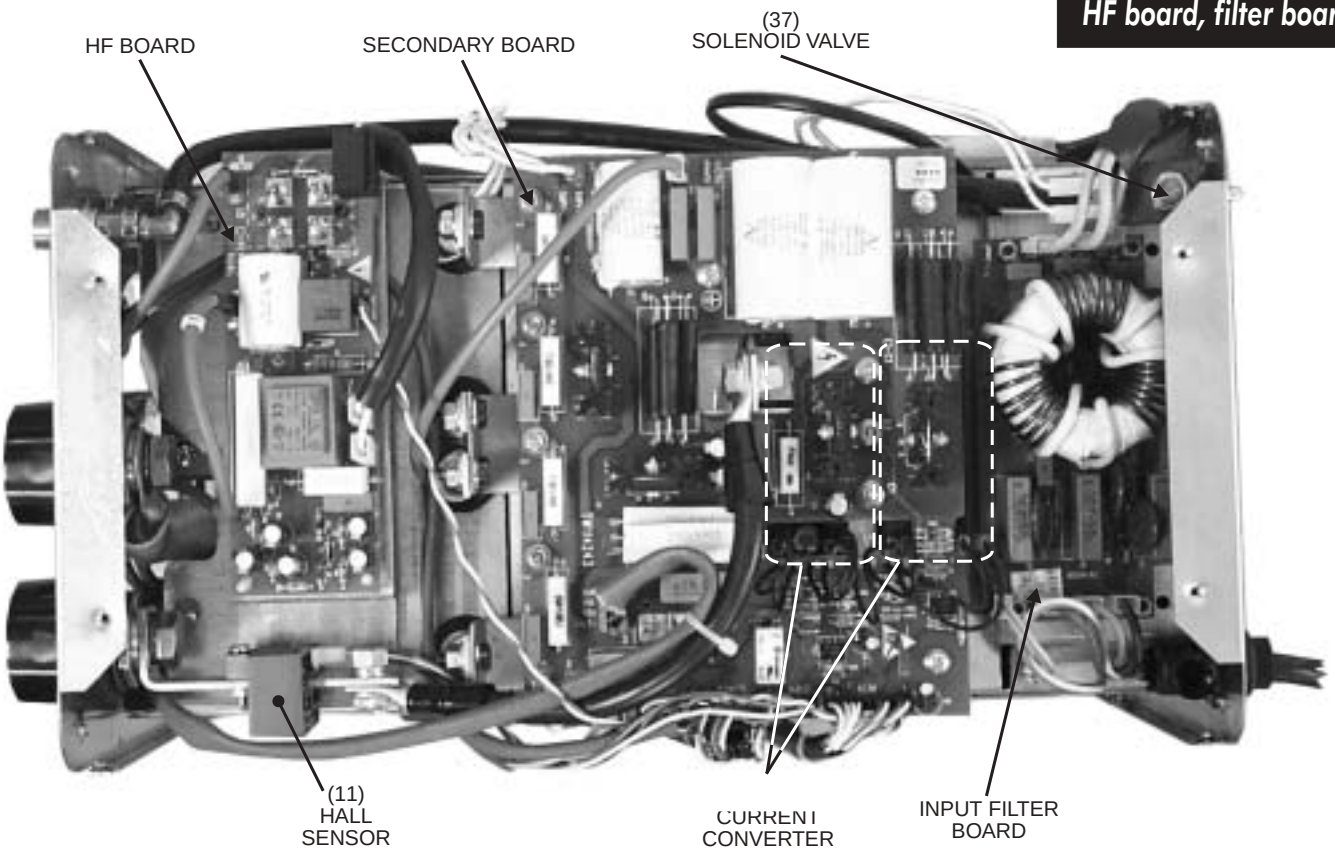
SUPERIOR TIG 242

Secondary board
HF board, filter board



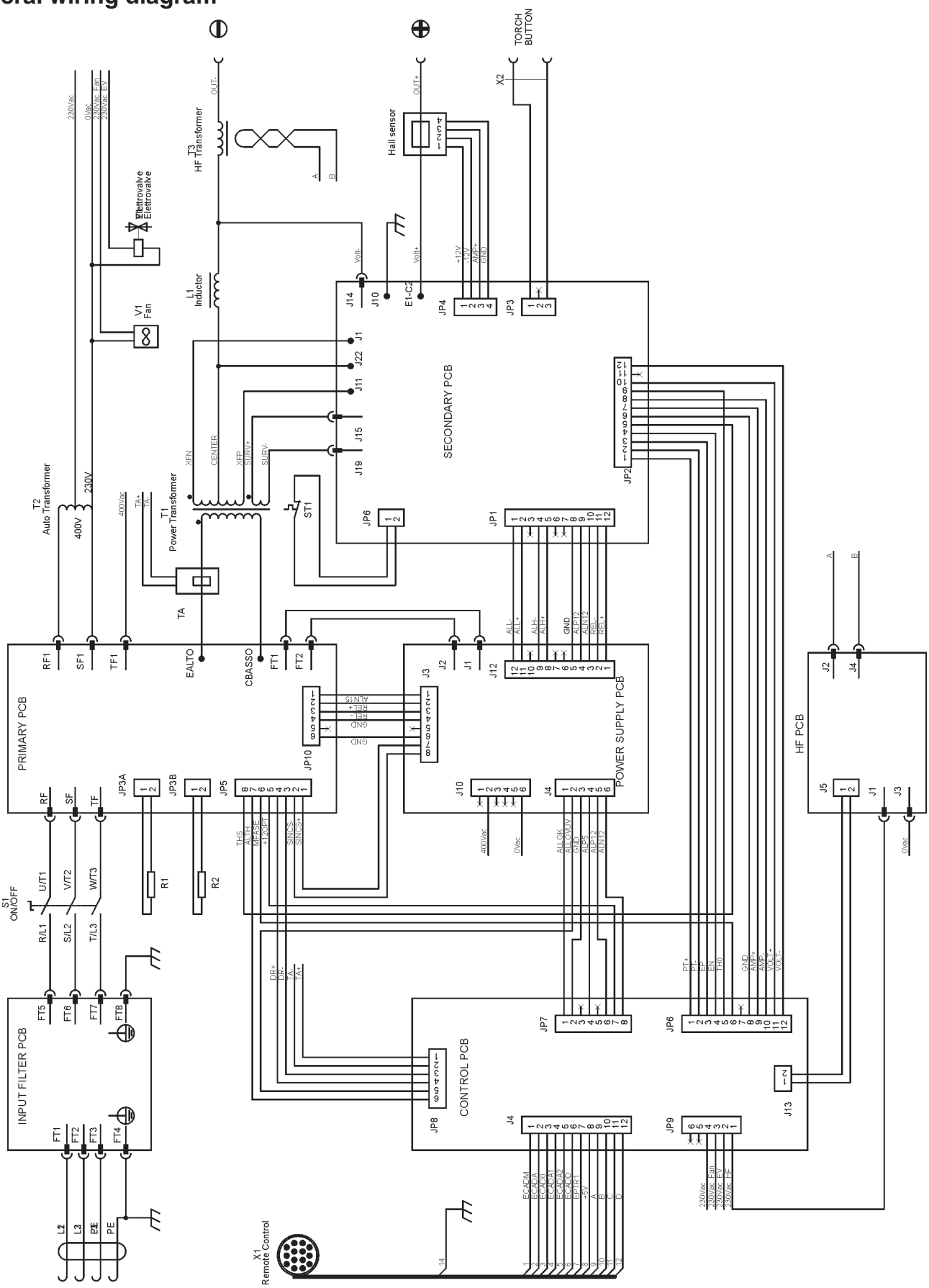
SUPERIOR TIG 362

Secondary board
HF board, filter board

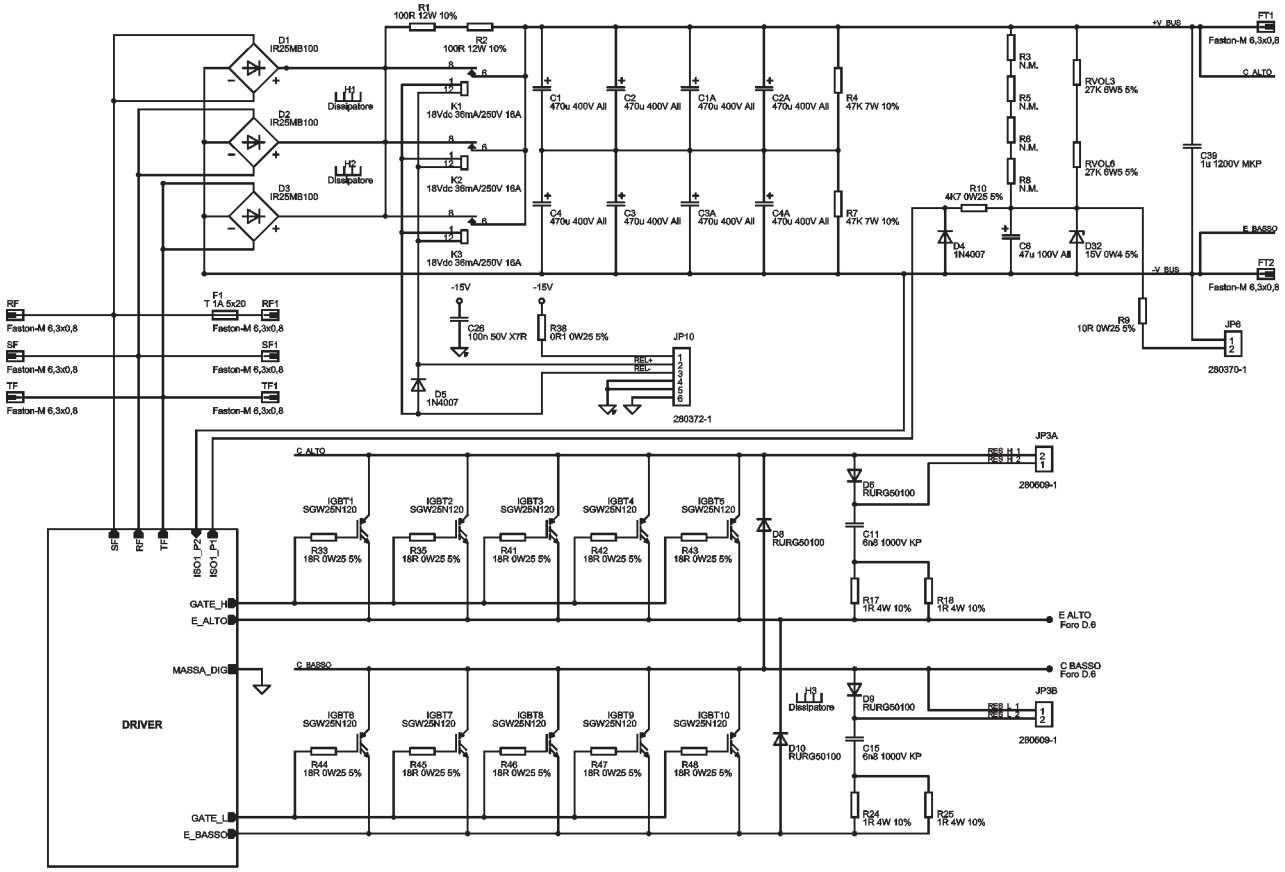


WIRING DIAGRAMS

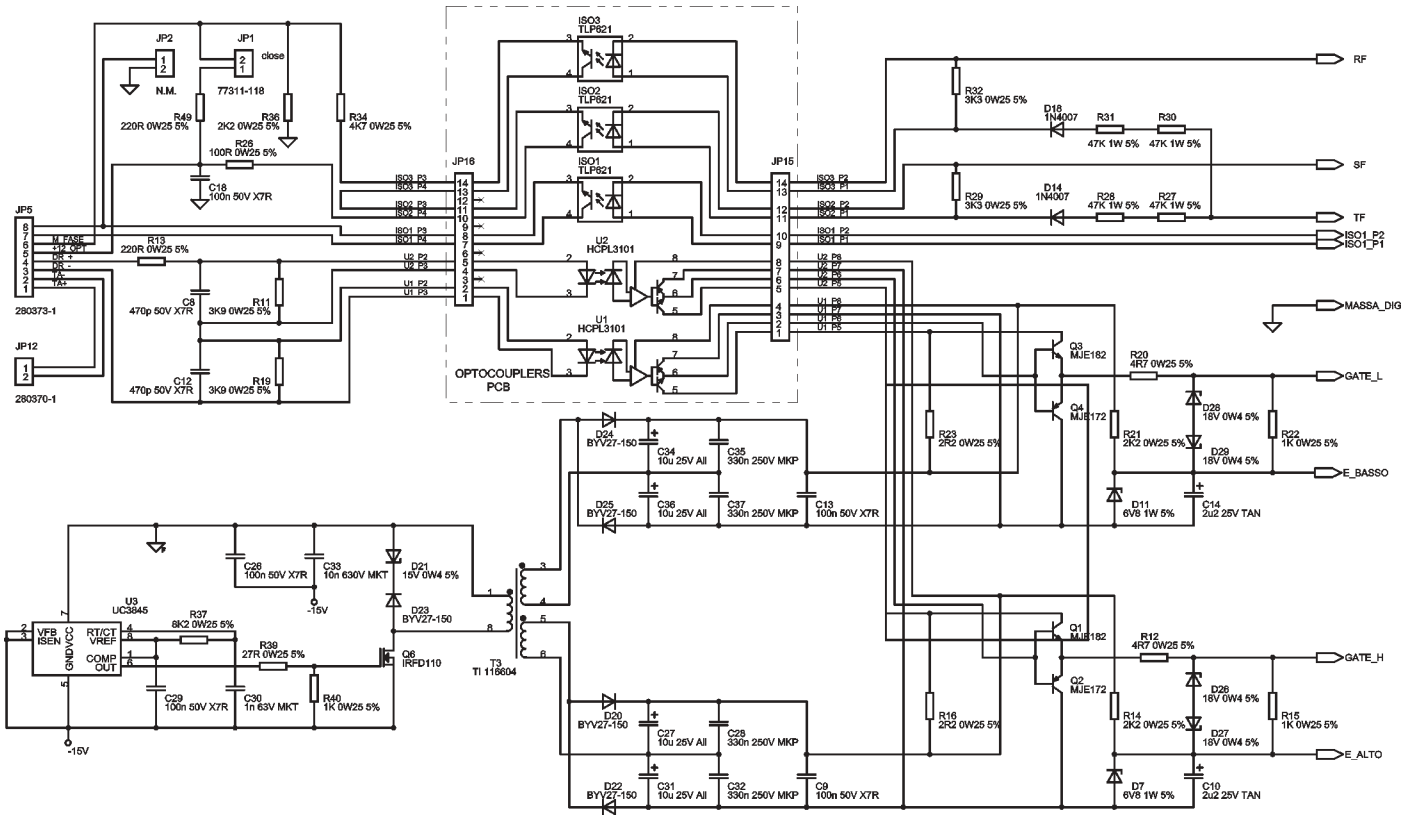
General wiring diagram



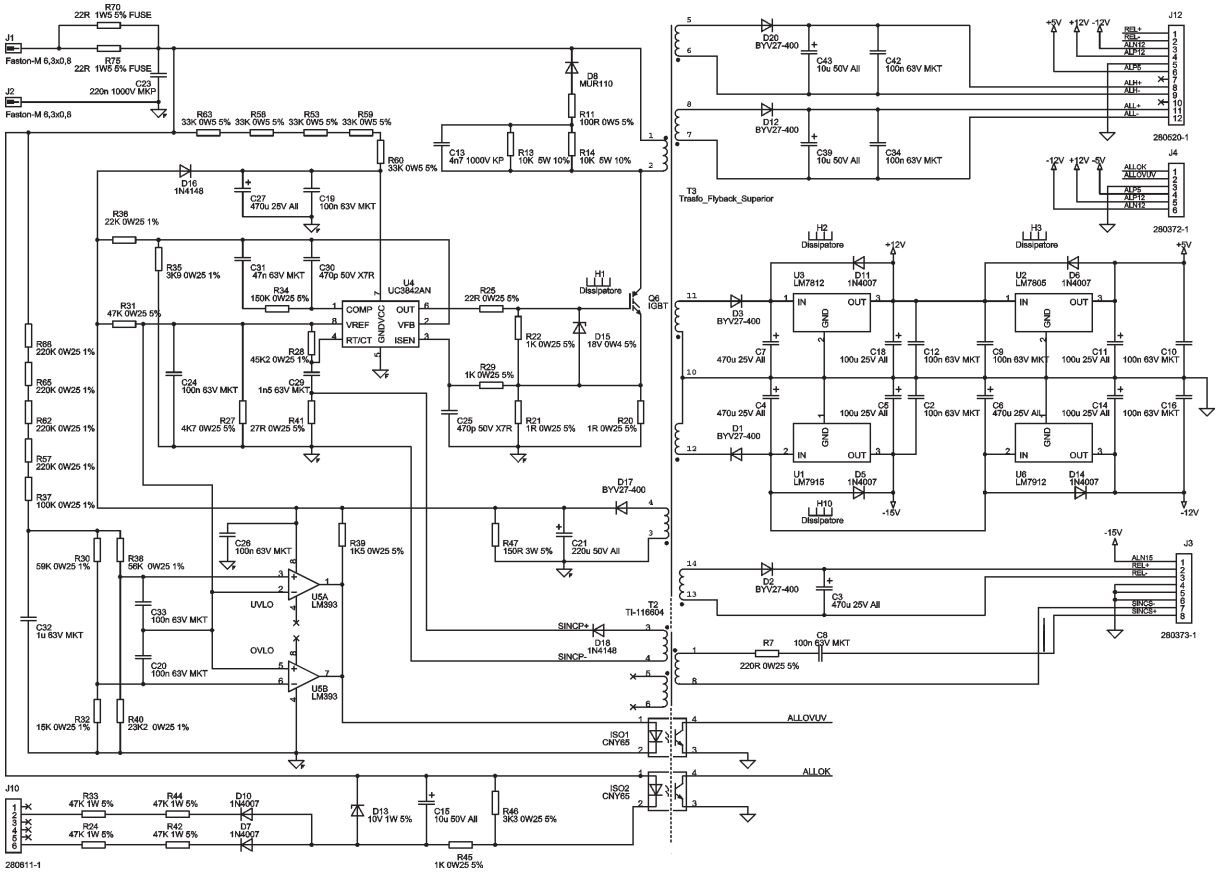
Wiring diagram primary board - Power



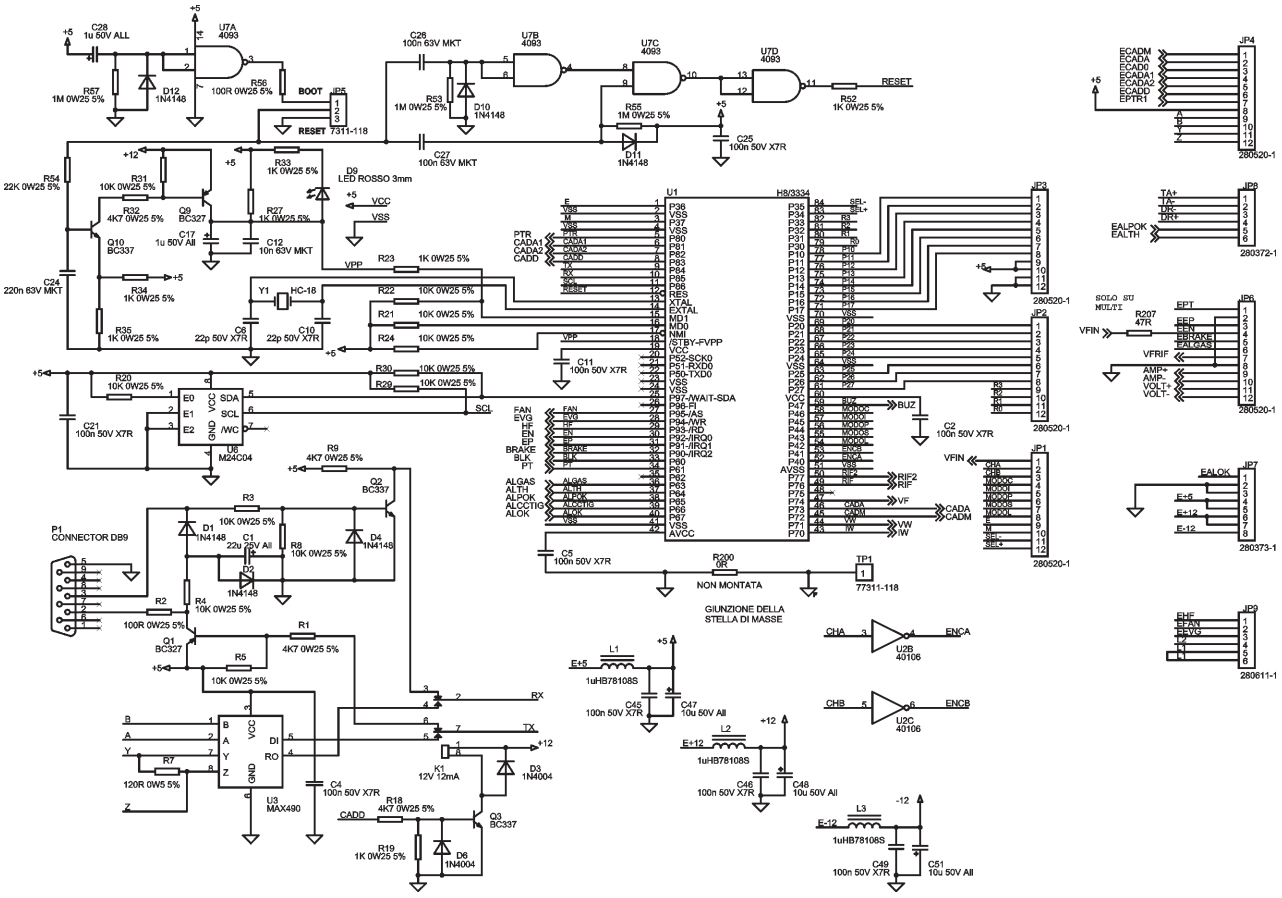
Wiring diagram primary board - Driver



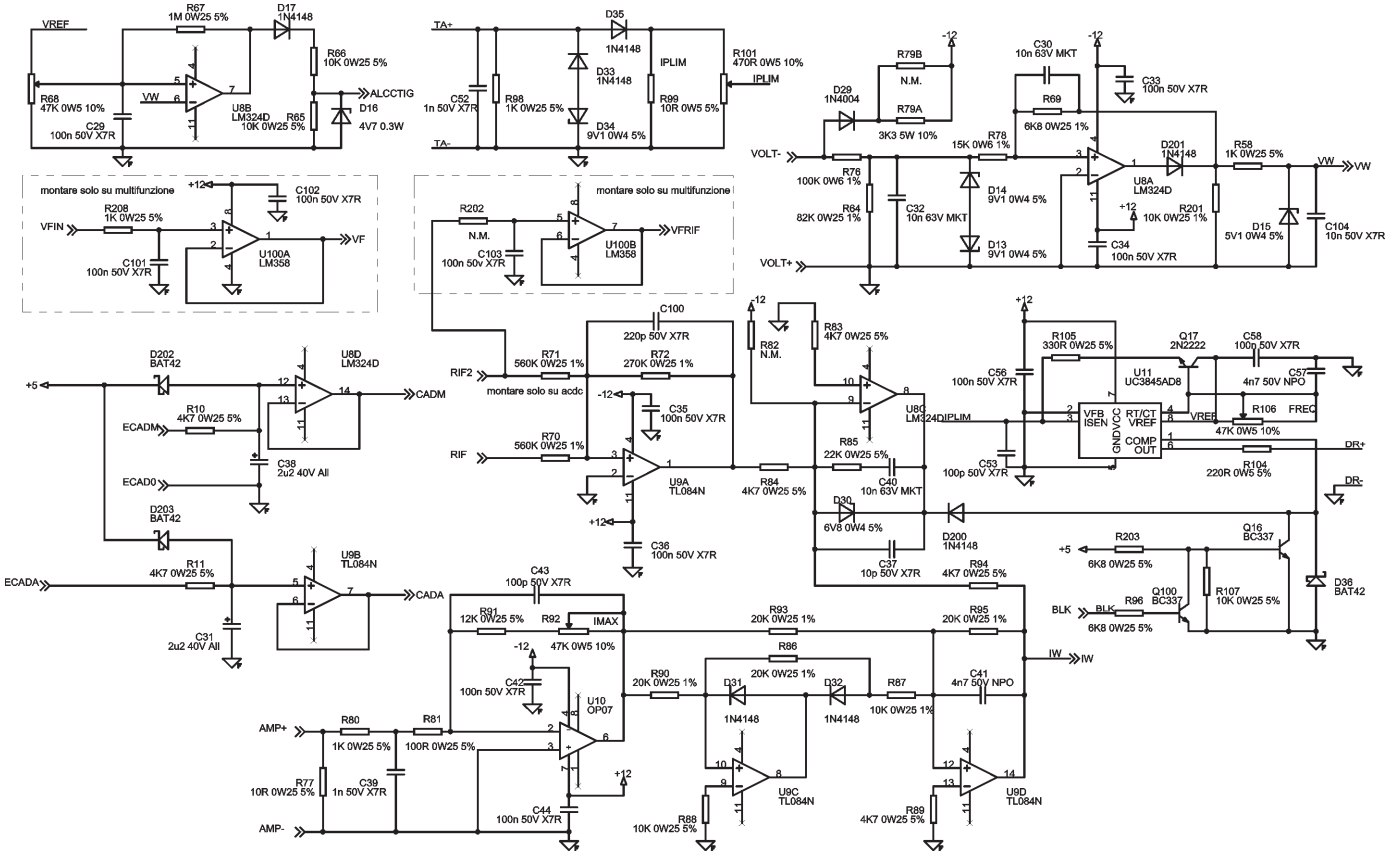
Wiring diagram power supply board



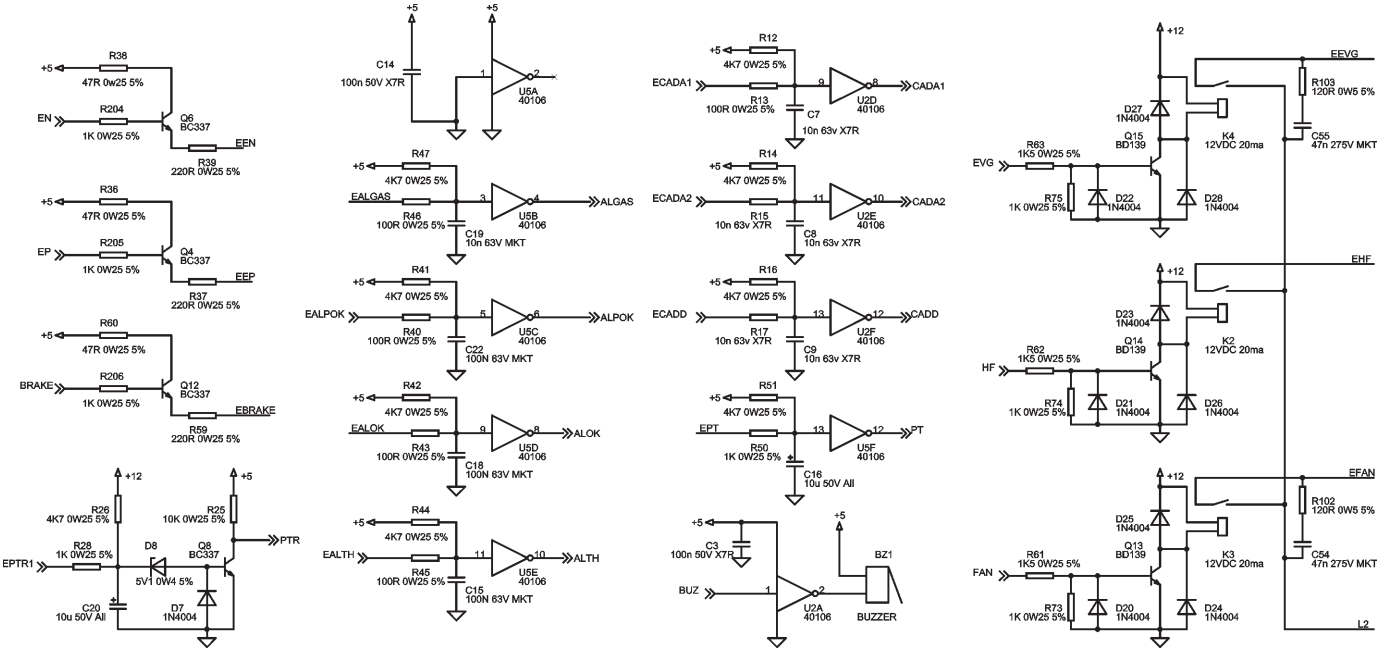
Wiring diagram control board 1st version - Micro



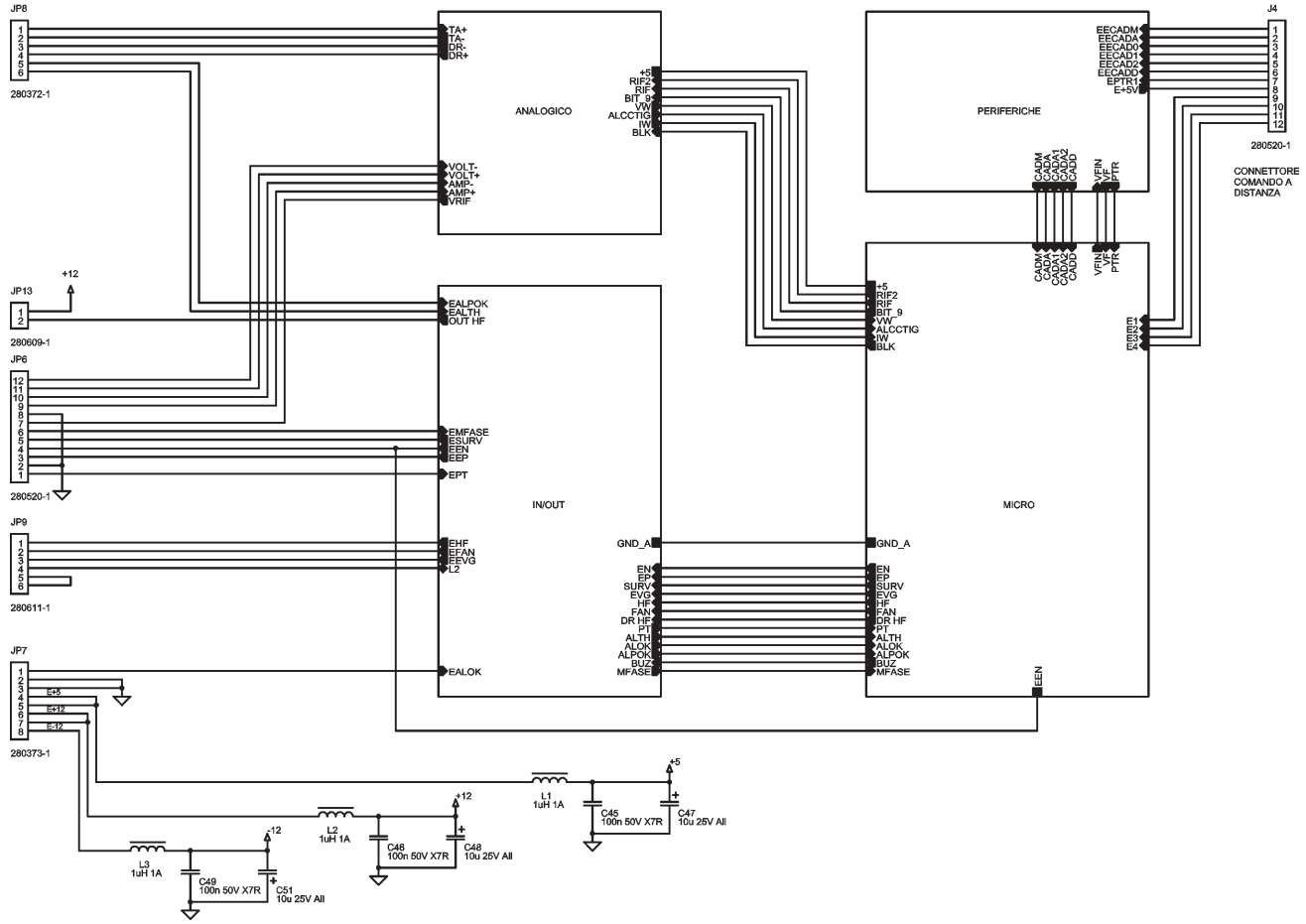
Wiring diagram control board 1st version - In/Out



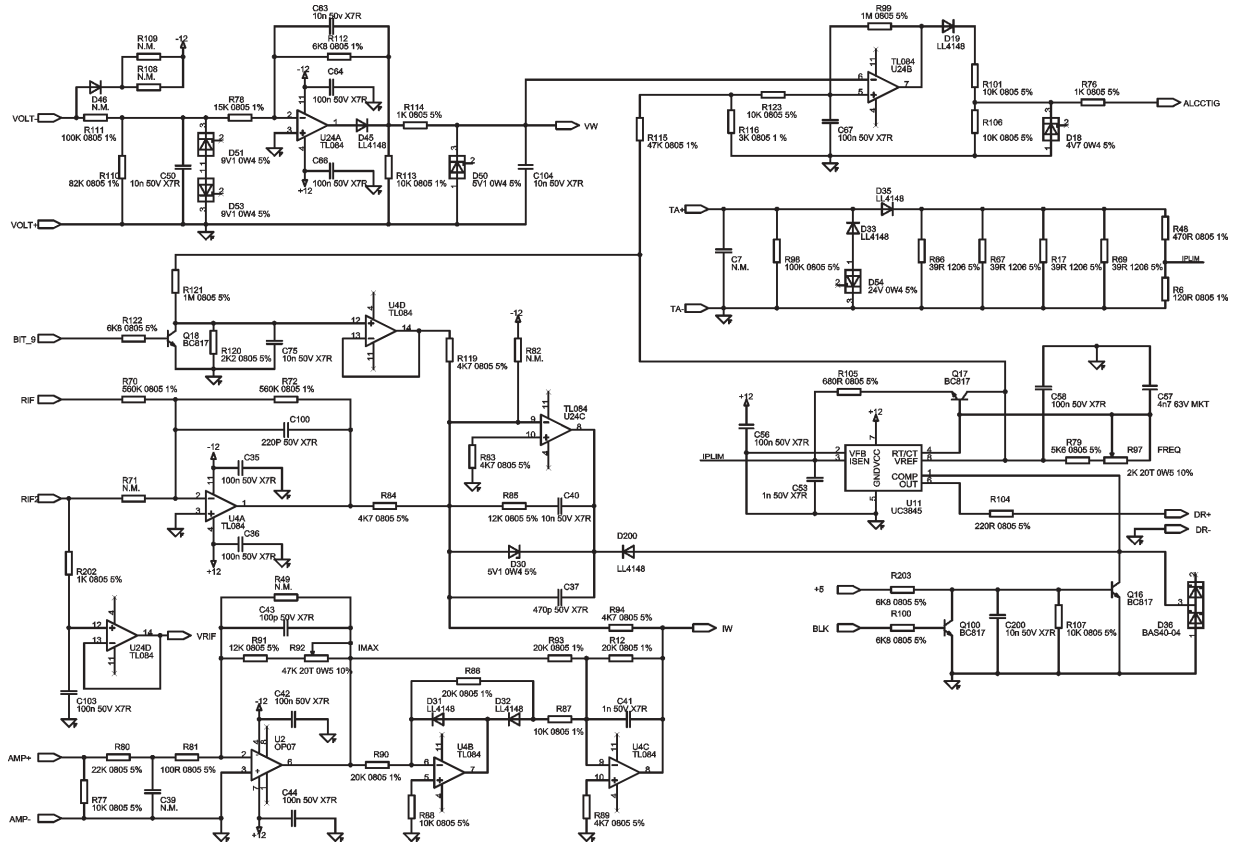
Wiring diagram control board 1st version - Analogic



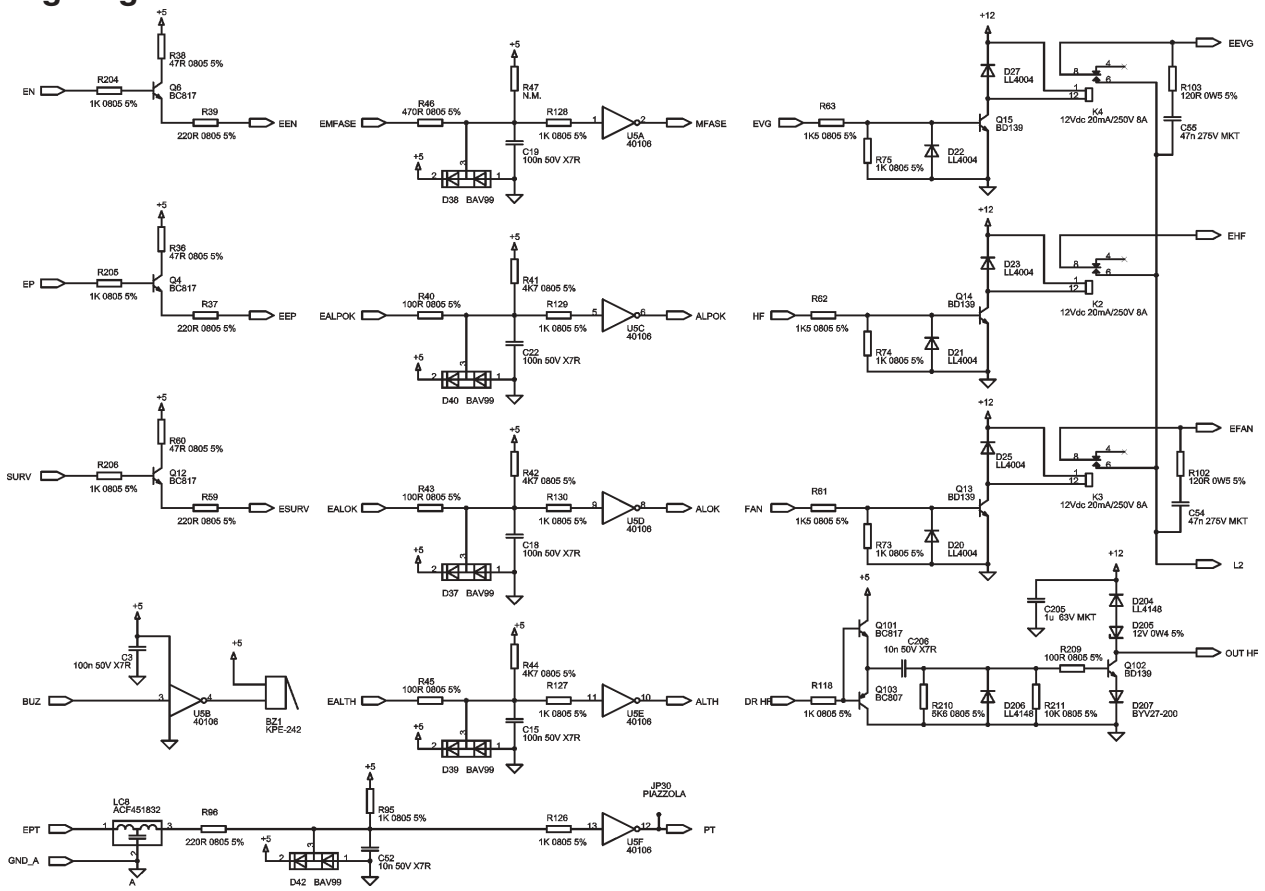
Wiring diagram control board 2st version



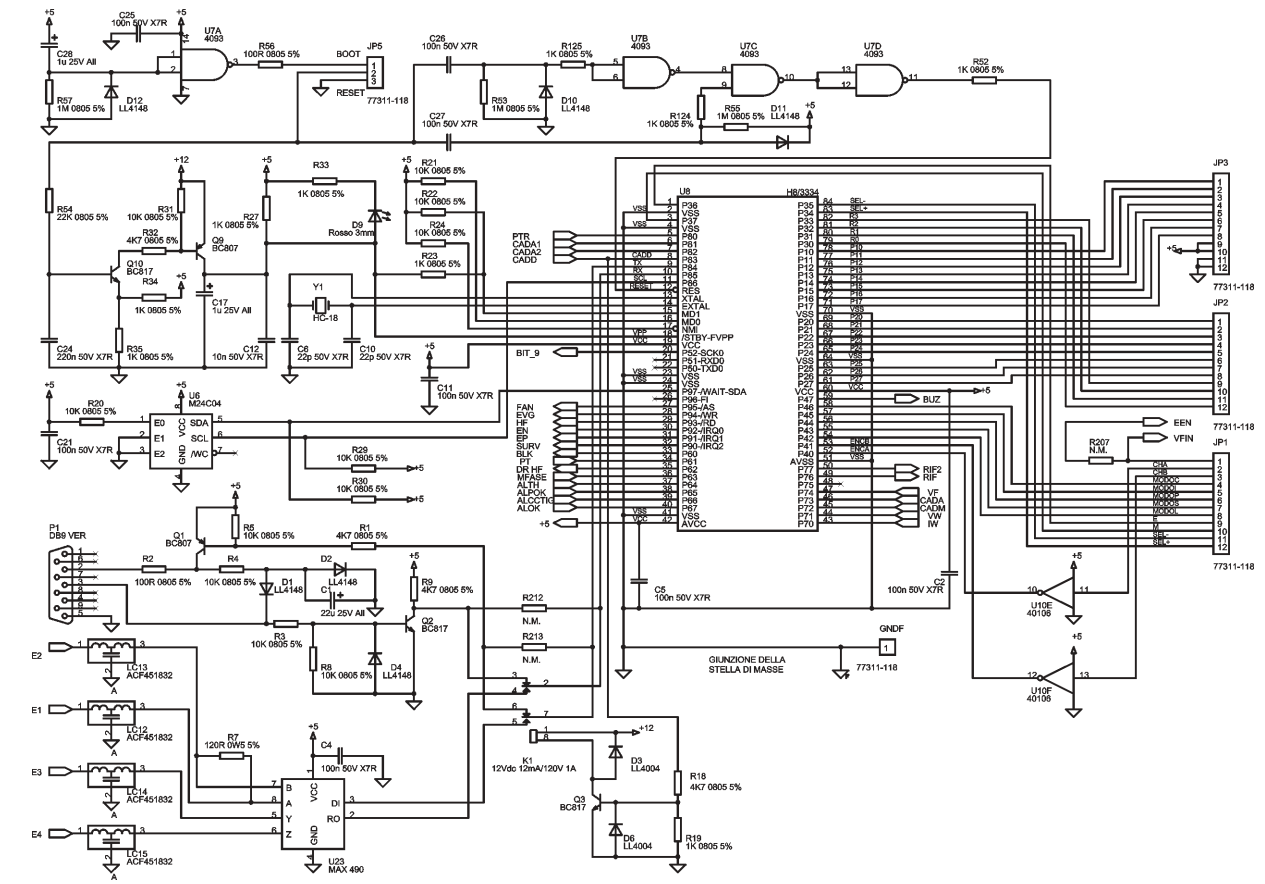
Wiring diagram control board 2st version - Analogic



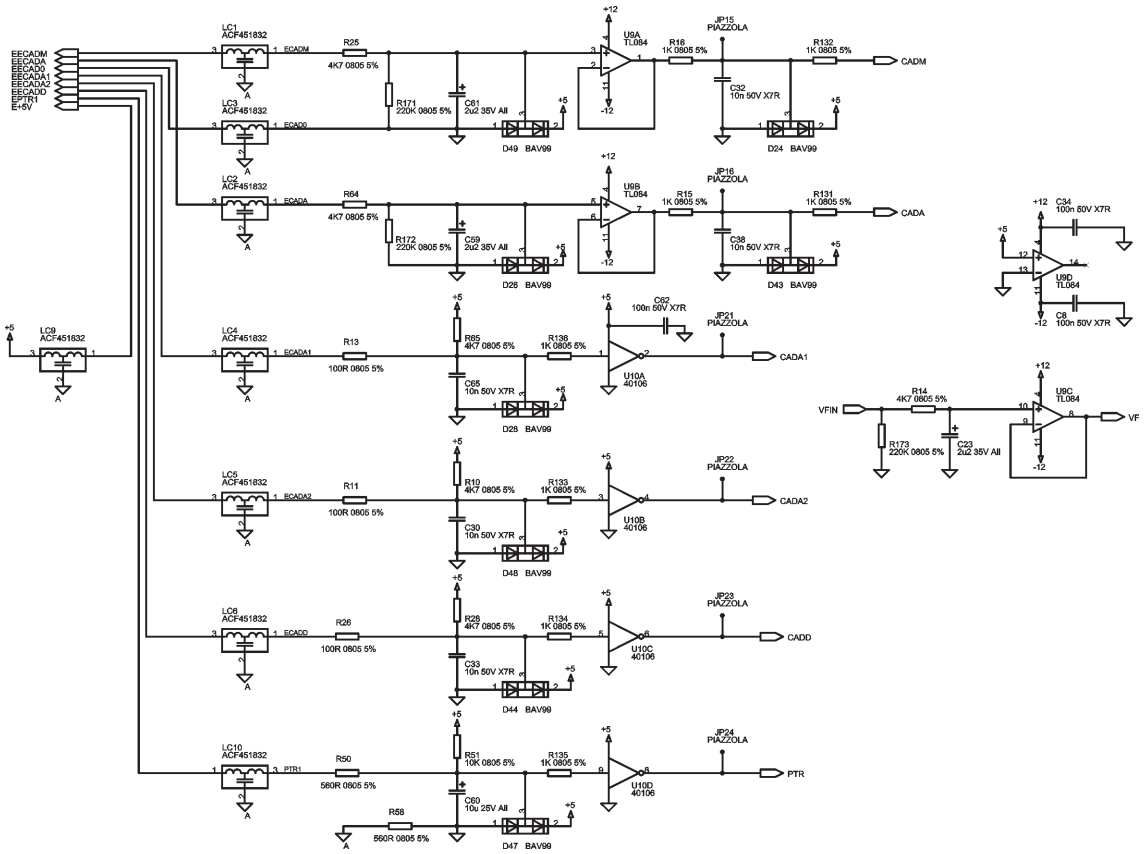
Wiring diagram control board 2st version - In/Out



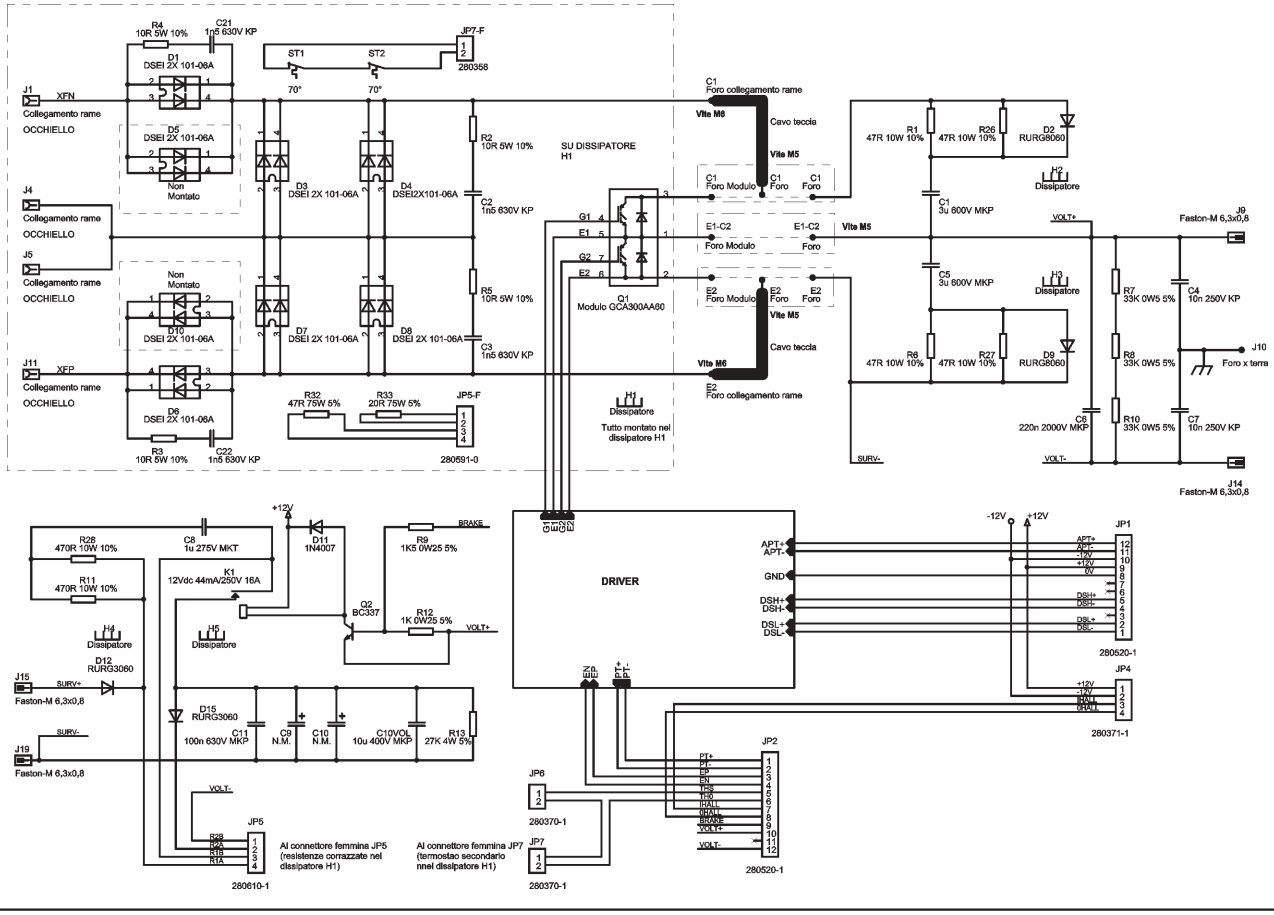
Wiring diagram control board 2st version - Micro



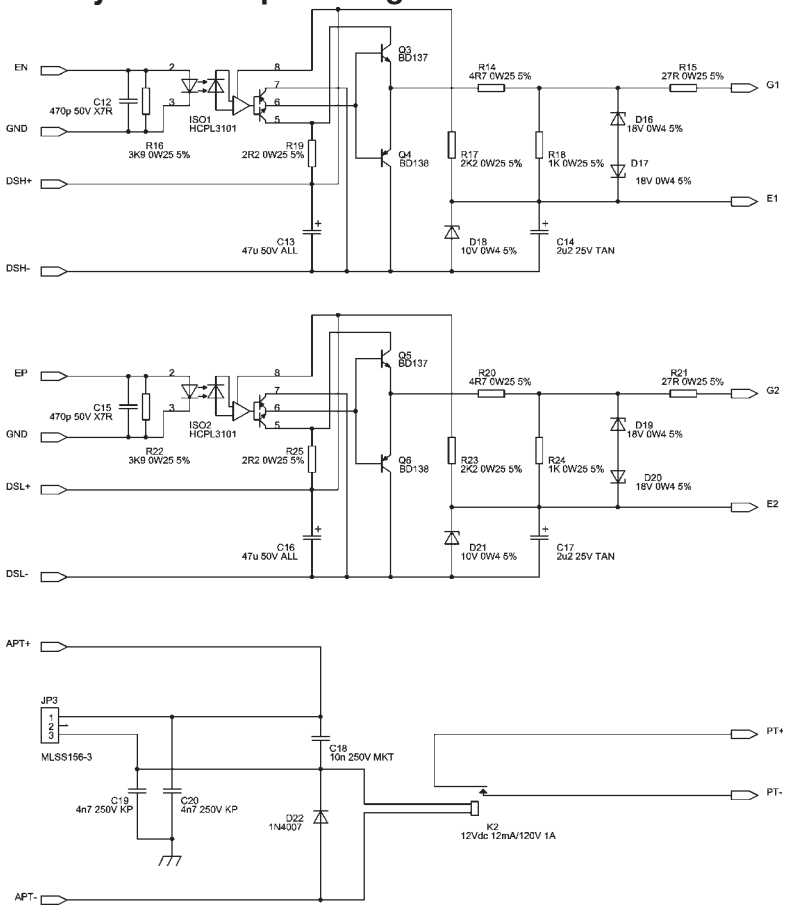
Wiring diagram control board 2st version - Peripherics



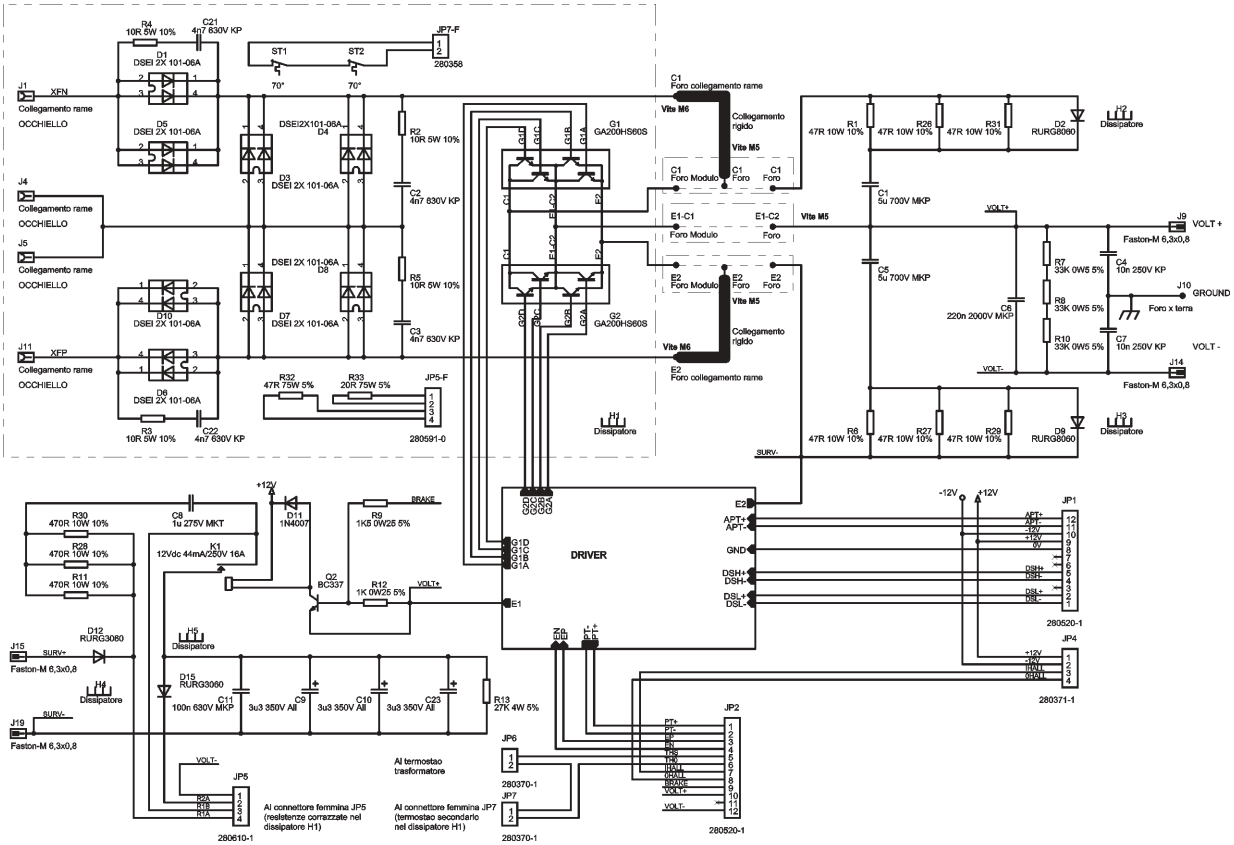
Wiring diagram secondary board Superior Tig 242 - Power



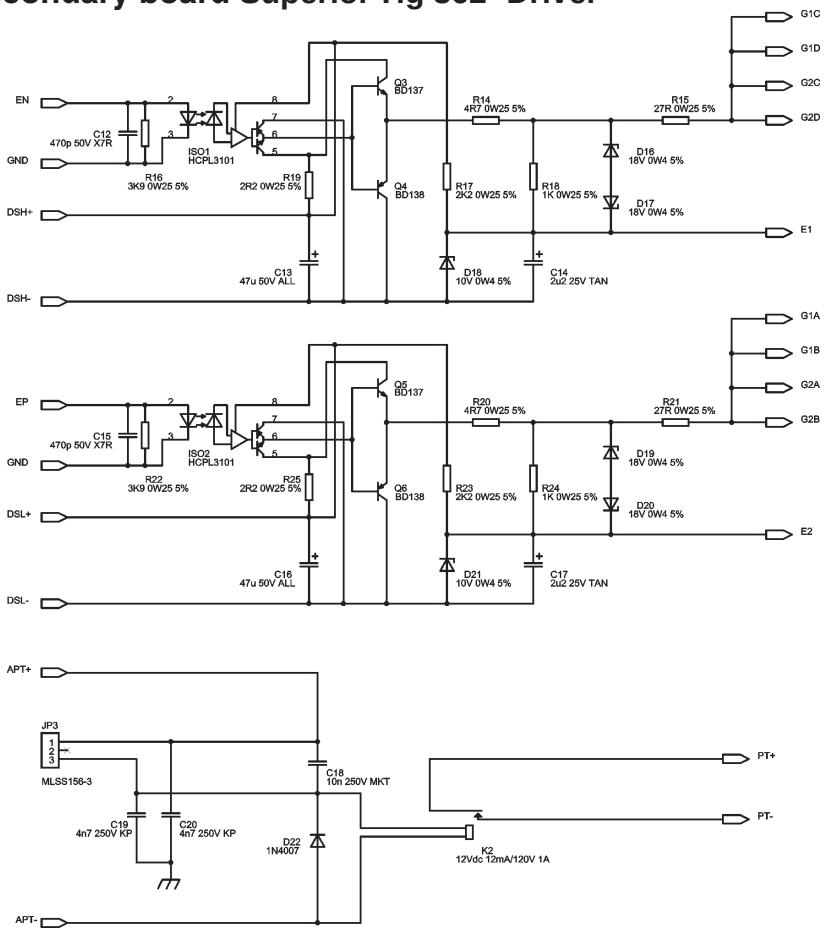
Wiring diagram secondary board Superior Tig 242 - Driver



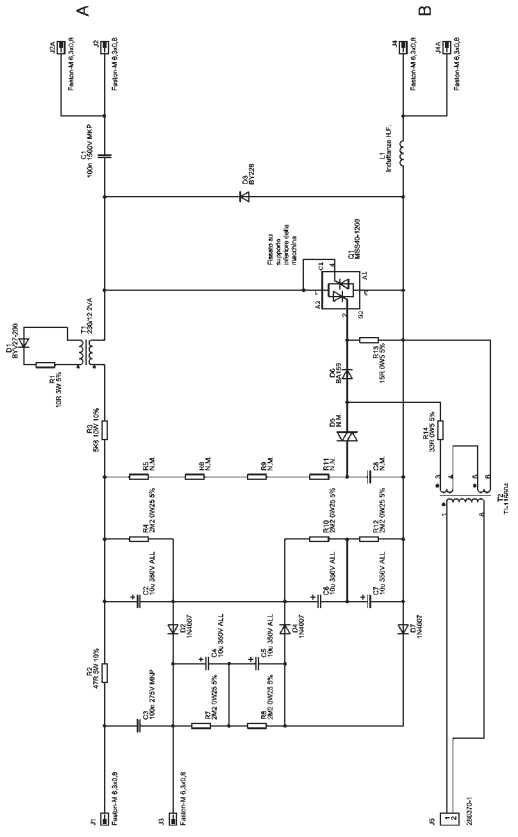
Wiring diagram secondary board Superior Tig 362 - Power



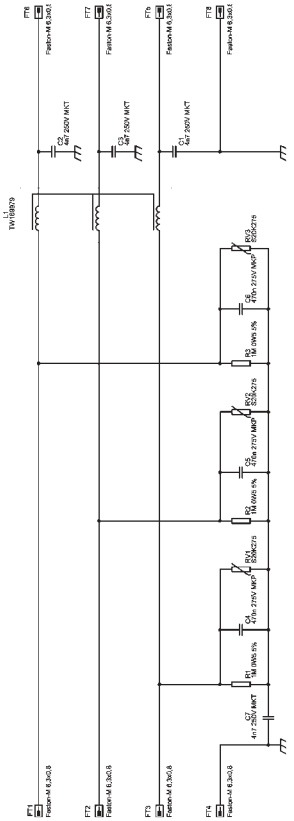
Wiring diagram secondary board Superior Tig 362- Driver



Wiring diagram HF board

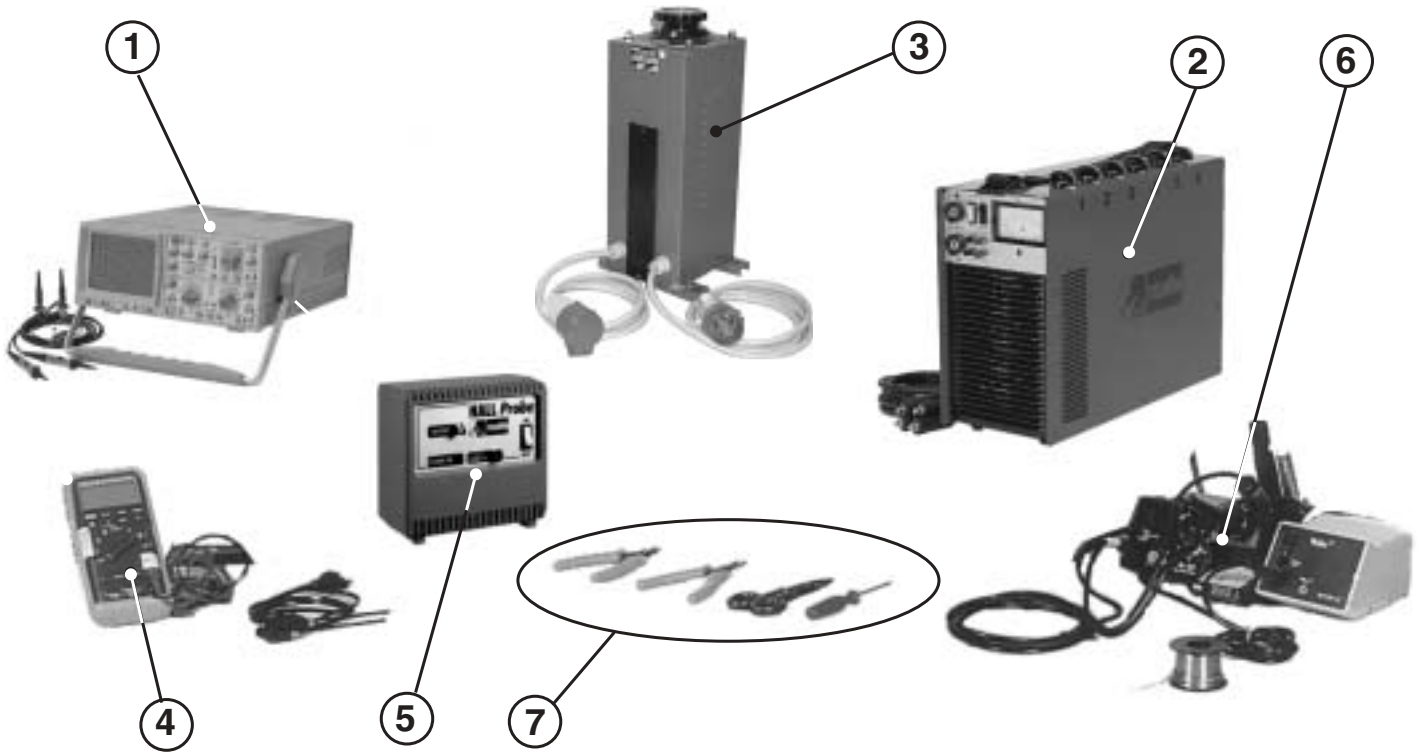


Wiring diagram input filter board



REPAIR GUIDE

EQUIPMENT REQUIRED



ESSENTIAL INSTRUMENTS

1 Dual trace oscilloscope	***cod. 802401 (*)***
2 Static load generator	***cod. 802110 (*)***
3 Variac 0 - 300v 1500 VA	***cod. 802402 (*)***
4 Digital multimeter	
5 Hall Probe	***cod. 802406 (*)***

USEFUL INSTRUMENTS

6 Unsoldering station
7 Miscellaneous tools

(*)The instruments with codes can be supplied by Telwin. The sale price is available on request.

WARNING:

BEFORE PROCEEDING WITH REPAIRS TO THE MACHINE READ THE INSTRUCTION MANUAL CAREFULLY.

WARNING:

EXTRAORDINARY MAINTENANCE SHOULD BE CARRIED OUT ONLY AND EXCLUSIVELY BY EXPERT OR SKILLED ELECTRICAL-MECHANICAL PERSONNEL.

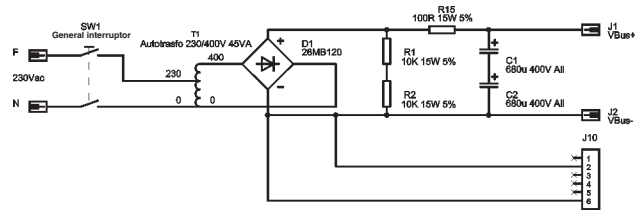
WARNING:

ANY CHECKS CARRIED OUT INSIDE THE MACHINE WHEN IT IS POWERED MAY CAUSE SERIOUS ELECTRIC SHOCK DUE TO DIRECT CONTACT WITH LIVE PARTS.

HV POWER SUPPLY MODULE

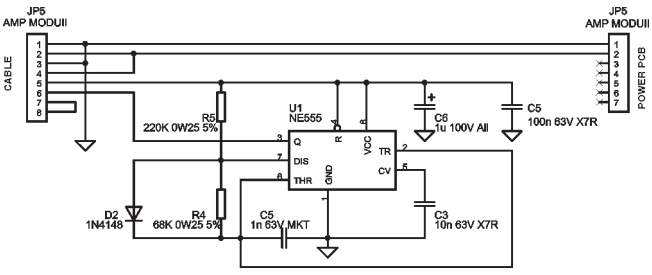
THE HV POWER SUPPLY is used to ensure operation of the switching power supply (the circuit on the primary board supplying auxiliary voltages), even when the machine is operating at low voltage.
It is easy to build using the electrical diagrams in fig. A for reference and using the following components or, alternatively, it can be ordered from Telwin.

FIGURE A



NOTE: To test the machine at low voltage special testing wiring should also be used so as to be able to force a number of alarm signals between the primary and control boards.
This wiring is supplied with the HV power supply (or it can be obtained on request from Telwin: wiring KIT code 902760), or it can be easily assembled referring to the electrical diagram in **figure B:**

FIGURE B



GENERAL REPAIR INSTRUCTIONS

The following is a list of practical rules which must be strictly adhered to if repairs are to be carried out correctly.

A) When handling the active electronic components, the IGBT's and Power DIODES in particular, take elementary antistatic precautions (use antistatic footwear or wrist straps, antistatic working surfaces etc.).
B) To ensure the heat flow between the electronic components and the dissipator, place a thin layer of thermo-conductive grease (e.g. COMPOUND GREASIL MS12) between the contact zones.
C) The power resistors (should they require replacement) should always be soldered at least 3 mm above the board.
D) If silicone is removed from some points on the boards, it should be re-applied. **N.B.** Use only non-conducting neutral or oximic reticulating silicones (e.g. DOW CORNING 7093). Otherwise, silicone that is placed in contact with points at different potential (rheophores of IGBT's, etc.) should be left to reticulate before the machine is tested.
E) When the semiconductor devices are soldered the maximum temperature limits should be respected (normally 300°C for no more than 10 seconds).
F) It is essential to take the greatest care at each disassembly and assembly stage for the various machine parts.
G) Take care to keep the small parts and other pieces that are dismantled from the machine so as to be able to position them in the reverse order when re-assembling (damaged parts should never be omitted but should be replaced, referring to the spare parts list given at the end of this manual).
H) The boards (repaired when necessary) and the wiring should never be modified without prior authorisation from Telwin.
I) For further information on machine specifications and operation, refer to the Instruction Manual.
J) **WARNING!** When the machine is in operation there are dangerously high voltages on its internal parts so do not touch the boards when the machine is live.

TROUBLESHOOTING AND REMEDIES

1.0 Disassembling the machine

WARNING! Every operation should be carried out in complete safety with the power supply cable disconnected from the mains outlet:

- Undo the 12 screws fastening the 2 plastic covers (6 each) to the front and back **(figure 1A)**. **NOTE:** to extract the front plastic shell it is necessary to disconnect all connectors on the control board assembly. Fasten the control board assembly to the metal front piece using its 4 screws and reconnect all the connectors;
- undo the 2 screws on the handle fastened to the top cover (**fig. 1A)**;
- Undo the 14 screws fastening the top cover to the structure **(figure 1B)**.
- Slide out the top cover by pulling gently outwards **(figure 1B)**.
- Undo the 4 screws fastening the bottom to the structure **(figure 1B)**.
- Separate the top metallic structure from the base and put it on the work bench(figure 3).

NOTE: Because the base is an integral part of support structure it should be removed if it is necessary to gain access to internal boards.
After completing the repairs, proceed in the reverse order to re-assemble the cover and do not forget to insert the toothed washer on the ground screw.

2.0 Cleaning the inside of the machine

Using suitably dried compressed air, carefully clean the

components of the power source since dirt is a danger to parts subject to high voltages and can damage the galvanic separation between the primary and secondary.
To clean the electronic boards we advise decreasing the air pressure to prevent damage to the components.
It is therefore important to take special care when cleaning the following parts

Fan (fig. 2B):
Check whether dirt has been deposited on the front/back air vents and whether it prevents the blades from rotating correctly; if there is still damage after cleaning replace the fan.

Primary board (fig. 3):
- rheofores of IGBT's 1-10;
- rheofores of recirculating diodes D8, D10;
- rheofores of snubber network diodes D6, D9;
- rheofores of optoisolator board;

Power supply board (fig. 3)
- rheofores of IGBT Q6;
- rheofores of optoisolators ISO1, ISO2.

Auxiliary transformer (fig. 3)

Power transformer and inductance assembly (fig. 2A)
This is done if it is necessary to remove the primary board, otherwise it is possible to clean the part superficially from the side of the secondary board.

HF transformer
In this case it is necessary to remove the primary board, or else it is possible to clean the part superficially from the sides of the metal structure.

Parts fastened to the base (fig. 4)
If the base is removed, carefully clean all the components attached to the structure:

Secondary board (fig. 4):
- rheofores of secondary power diodes D1, D3, D4, D5, D6, D7, D8, D10; (D5 and D10 not present on Superior Tig 242);
- top and bottom bump contacts on PCB of IGBT module Q1 for Sup.Tig 242 and G1,G2 for Sup.Tig 362;
- thermostats ST1 and ST2 on secondary diode dissipator;
- rheofores of optoisolators ISO1, ISO2;
- Hall Sensor.

Input filter board (fig. 4);
HF board (fig. 4);
Solenoid valve (fig. 4).

3.0 Visual inspection of the machine

Make sure there is no mechanical deformation, dent, or damaged and/or disconnected connector.
Make sure the power supply cable has not been damaged or disconnected internally and that the fan works with the machine switched on. Inspect the components and cables for signs of burning or breaks that may endanger operation of the power source. Check the following elements:

Main power supply switch (fig. 2A)
Use the multimeter to check whether the contacts are stuck together or open. Probable cause:
- mechanical or electric shock (e.g. bridge rectifier or IGBT in short circuit, handling under load).

Relays K1, K2, K3 primary board (fig. 3)
Probable cause:
- see main power supply switch. **N.B.** If the relay contacts are stuck together or dirty, do not attempt to separate them and clean them, just replace the relay.

Electrolytic capacitors C1, C1A, C2, C2A, C3, C3A, C4, C4A primary board (fig. 3)
Probable cause:
- mechanical shock;
- machine connected to power supply voltage much higher than the rated value;
- broken rheophore on one or more capacitor: the remainder will be overstressed and become damaged by overheating;
- ageing after a considerable number of working hours;
- overheating caused by thermostatic capsule failure.

IGBT's 1÷10 primary board (fig. 3)
Probable cause:
- discontinuation in snubber network,
- fault in driver circuit
- poorly functioning thermal contact between IGBT and dissipator (e.g. loosened attachment screws: check),
- excessive overheating related to faulty operation.

Primary diodes D6, D8, D9, D10 primary board (fig. 3)
Probable cause:
- excessive overheating related to faulty operation.

Secondary diodes D1, D3, D4, D5, D6, D7, D8, D10 secondary board (fig. 4)
Probable cause:
- discontinuation in snubber network;
- poorly functioning thermal contact between IGBT and dissipator (e.g. loosened attachment screws: check);
- faulty output connection.

Relay K1, K2 secondary board (fig. 4)
Probable cause:
- see the main power supply switch; **N.B.** If the relay contacts are stuck together or dirty, do not attempt to separate or clean them, just replace the relay.

IGBT Modules Q1 for Sup.Tig 242 and G1, G2 for Sup.Tig362 secondary board (fig. 4)
Probable cause:
- poor thermal contact between IGBT and dissipator (e.g. loosened fastening screws: check);
- excessive overheating due to faulty operation.

SCR Q1, HF board (fig. 4)
Probable cause:
- poor thermal contact between SCR and dissipator (e.g. loosened fastening screws: check);
- excessive overheating due to faulty operation.

Hall Sensor (fig. 4)
Check it for colour changes.
Probable cause:
- loosening of the connector caused by vibration.

Power transformer and filter inductance (fig. 2A)
Inspect the windings for colour changes.
Probable causes:
- aging after a substantial number of working hours;
- excessive overheating related to faulty operation.

HF transformer
Inspect the windings for colour changes. Probable causes:
- aging after a substantial number of working hours;
- excessive overheating related to faulty operation.

Solenoid valve (fig. 4)
Check the solenoid valve to see if it opens. Probable causes:
- the solenoid valve does not open because of a mechanical block; do not attempt to open the valve but used compressed air to carry out thorough cleaning or replace the solenoid valve.

TIG Torch
Maintenance status, referring to the instructions given in the instruction manual. Condition of parts not subject to wear on the connecting cable between torch and power source (insulation).

4.0 Checking the power and signal wiring

It is important to check that all the connections are in good condition and the connectors are inserted and/or attached correctly. To do this, take the cables between finger and thumb (as close as possible to the fastons or connectors) and pull outwards gently: the cables should not come away from the fastons or connectors. N.B. If the power cables are not tight enough this could cause dangerous overheating.

5.0 *Electrical measurements with the machine switched off*

A) With the multimeter set on diode testing check the following components (joint voltages not less than 0.2V):
- rectifier bridges D1, D2, D3 (**fig. 3**);
- IGBT's 1-10 (no short circuits between collector - gate and collector - emitter **(fig. 3));**
- secondary diodes D1, D2, D3, D4, D5, D6, D7, D8, D10 between anode and cathode (**fig. 4**).
- IGBT modules Q1 for Sup.Tig 242 (no short circuits between anode and cathode (**fig. 4**); mIGBT modules G1 and G2 for Sup.Tig 362 (no short circuits between anode and cathode (**fig. 4**);
- IGBT Q6 on power supply board (no short circuits between collector-gate and collector-emitter **(fig. 3)**);

B) With the multimeter in ohm mode check the following components:
- resistors R1, R2: 100 ohm (precharge (**fig. 3**)).
- immersion heaters R1, R2: 33 ohm (primary snubber) on machine.
- immersion heater R32: 47 ohm (secondary snubber).
- immersion heater R33: 20 ohm (secondary snubber).
- thermostat continuity test on transformer: disconnect connector JP6 from the secondary board and make sure the resistance is approx. 0 ohm (**fig. 4**).
- thermostat continuity test on secondary dissipator: disconnect connector JP7 from the secondary board and make sure the resistance is approx. 0 ohm (**fig. 4**).

6.0 Electrical measurements with the machine in operation

WARNING! Before proceeding with faultfinding, we should remind you that during these tests the power source is powered and therefore the operator is exposed to the danger of electric shock.
The tests described below can be used to check the operation of the power and control parts of the power source.

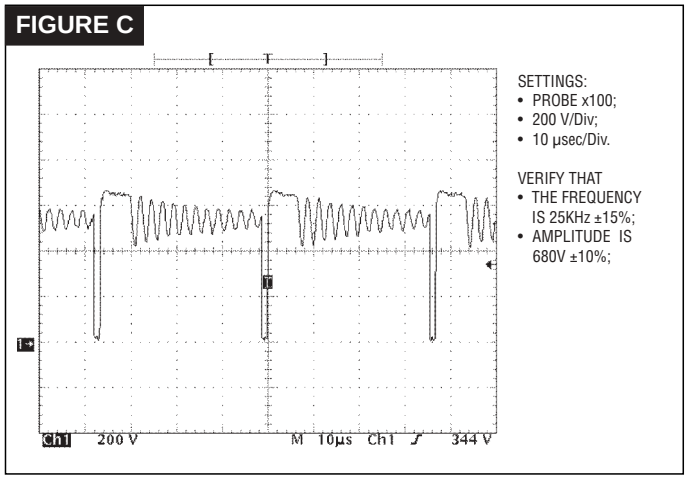
6.1 Preparation for testing

A) Do not connect the gas mixture source.
B) Disconnect fastons J1, J2 and connector J10 from the power supply board (**fig. 3**) and replace them by connecting the HV power supply as in **fig. A**.
C) Disconnect connector JP5 from the primary board and connect the wiring shown in **Fig. B** in series.
D) Disconnect connectors J3 and J4 from the power supply board;
E) From the control board disconnect connector J13 coming from the HF board (**fig.3**).
WARNING! the high frequency voltage will permanently damage any instrument connected to the generator.
Before proceeding make very sure that the fastons listed above have been disconnected and completely isolated from one another.
F) Connect the power supply cable to a single phase variac with variable output 0-400 Vac.
WARNING! during testing do not allow contact with the metal part of the torch because of the presence of high voltages that are hazardous to the operator.

6.2 Scheduled tests

A) Set up the oscilloscope with the voltage probe x100 connected between R13, the outer rheofore (probe), and the anode of diode D15 (earth) on the power supply board (**fig. 3**).
B) Switch on the HV power supply and make sure the waveform resembles **Fig. C; N.B.** if the waveform is absent or different there could be a failure in IGBT Q6 or in component U4 on the power supply board.

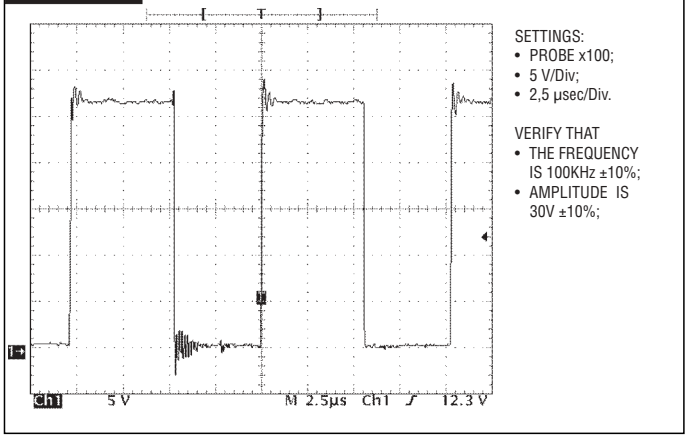
FIGURE C



C) Set up the multimeter in volt mode and make sure the power supply board has the following voltages (**fig.3**):
- over pin 4 (+) and pin 3 (-) of connector J4 it is equal to +5Vdc ±5%;
- over pin 5 (+) and pin 3 (-) of connector J4 it is equal to +12Vdc ±5%;
- over pin 6 (+) and pin 3 (-) of connector J4 it is equal to -12Vdc ±5%;
- over pin 1 (+) and pin 2 (-) of connector J4 it is equal to +15Vdc ±5%;
- over pin 8 (+) and pin 9 (-) of connector J12 it is equal to +30Vdc ±3%;
- over pin 11 (+) and pin 12 (-) of connector J12 it is equal to +30Vdc ±3%;
- over pin 1 (+) and pin 4 (-) of connector J3 it is equal to -15Vdc ±5%;

N.B. if the voltage values are incorrect there could be a failure in components U1, U2, U3, U6 on the power supply board.
D) Switch off the HV power supply and reconnect connectors J3, J4 and J12 on the power supply board.
E) Set up the oscilloscope with the voltage probe x10 connected between anode D23 (probe) and outer rheofore R38 (earth) on the primary board. Switch the HV power supply back on, set up the machine for MMA and make sure that:
- the front panel is powered (LED's lit up);
- pre-charge relays K1, K2 and K3 close; **N.B.** if the relays do not close test the power circuit on the primary board (diode bridges, capacitors, resistors).
- the waveform resembles **Fig.D** (testing operation of Q6). **N.B.** if the waveform is absent or different there could be a failure in components U3, D21, D23 on the primary board.

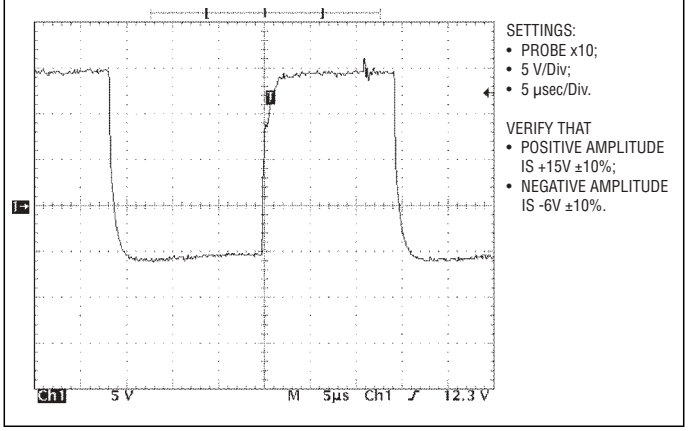
FIGURA D



F) Set up the multimeter in volt mode and make sure the primary board has the following voltages (**fig.3**):
- between cathode D20 (+) and anode D22 (-) equal to 25Vdc 3%;
- between cathode D24 (+) and anode D25 (-) equal to 25Vdc 3%;

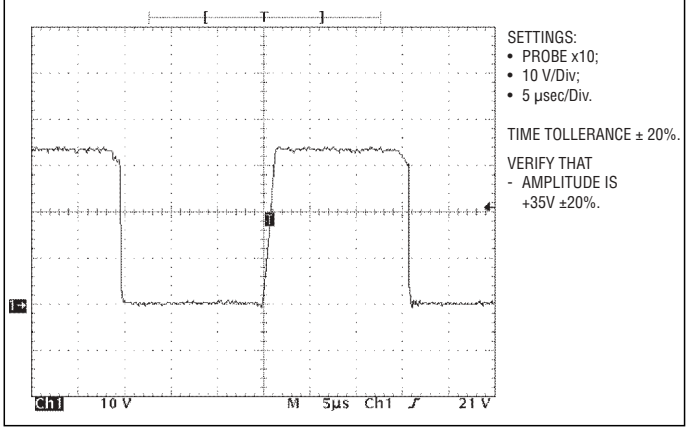
N.B. if the voltage values are incorrect there could be a failure in components T3, D20, D22, D24, D25 on the primary board.
G) Set up the oscilloscope with the voltage probe x10 connected between cathode D23 (probe) and outer rheofore R25 (earth) on the primary board. Make sure the waveform resembles **Fig. E.** (testing operation of bottom branch of gate).
H) Set up the oscilloscope with the voltage probe x10 connected between the cathode D26 (probe) and the outer rheofore R18 (earth) on the primary board. Make sure the waveform resembles **Fig. E**. (testing operation of top branch of gate).
N.B. at points G) and H), if the wave form is absent or different there could be a fault in the optoisolator board or the IGBT driver circuit on the primary board.

FIGURE E



I) Set up the oscilloscope with the voltage probe x100 connected between bush CBASSO (probe) and rheofore C39 towards CBASSO (earth) on the primary board (**fig. 3**).
J) Switch on the variac (initially set to 0V), close the main power supply switch on the machine and gradually increase the voltage generated by the variac until it reaches 26Vac.
K) Make sure the waveform displayed on the oscilloscope resembles **Fig. F**. (testing operation of bottom branch of collector). **N.B.** if the waveform is absent or different there could be a failure in IGBT's 6, 7, 8, 9, 10 on the primary board (**fig. 3**).

FIGURE F



L) Return the variac voltage to 0V, switch off the machine and the HV power supply.
M) Disconnect the HV power supply and restore connector J10 and fastons J1 and J3.
N) Remove the wiring shown in **Fig. B** from connector JP5 on the primary board and restore the original wiring.
O) Switch the machine on again and gradually increase the voltage generated by the variac to 320Vac ±5% then make sure an alarm is registered with yellow LED D8 on and alarm "AL.1" shown on the display.
P) Increase the voltage on the variac to 400 Vac and make sure the alarm ceases (yellow LED D8 goes off) and that the voltage over fastons FT1 and FT2 on the primary board is equal to 560Vdc ±10%. **N.B.** if the voltage value is incorrect test the power circuit on the primary board (diode bridges, capacitors, resistors).
Q) Increase the voltage on the variac yet again to 470Vac ±5% and make sure the machine registers an alarm again. Return the variac voltage immediately to 400Vac and switch off the machine.
N.B. if an alarm persists (and is not caused by a fault in the control board) there could be a fault in the opto-isolator board (**fig. 3**) or in resistors R27, R28, R30, R31 on the primary board (fig. 3).

7.0 Repairs, replacing the boards

If repairing the board is complicated or impossible, it should be completely replaced.
The board is identified by a 6-digit code (printed in white on the component side after the initials TW). This is the reference code for requesting a replacement: Telwin may supply boards that are compatible but with different codes.
WARNING! before inserting a new board check it carefully for damage that may have occurred in transit. When we supply a board it has already been tested and so if the fault is still present after it has been replaced correctly, check the other machine components. Unless specifically required by the procedure, never alter the board trimmers.

7.1 Removing the control board (fig. 1A)

If the fault is in the control board remove it from the machine structure as follows:
- with the machine disconnected from the main power supply disconnect all the wiring from the control board;
- cut any bands restricting the board;
- undo the 4 screws fastening the control board to the structure;

N.B. for assembly proceed in the reverse order.
If the fault is in the control board we strongly advise replacing it without further intervention.

7.2 Removing the primary board (fig. 3)

If the fault is in the primary board remove it from the machine structure as follows:
- with the machine disconnected from the main power supply and after removing the control board, disconnect all the wiring from the primary board;
- cut any bands restricting the board (e.g. on the power supply cable and primary connections);
- undo the screws fastening the presspan insulator to the sides of the machine structure;
- undo the 2 screws connecting the power transformer to the primary board;
- undo the 6 screws fastening the primary board to the machine structure (3 screws per side on the dissipator);
- undo the 4 screws fastening the primary board to the plastic spacers.
- remove the primary board by lifting it upwards.

N.B. for assembly proceed in the reverse order.

Please read the procedure for replacing the IGBT's carefully:
The 4 IGBT's are attached to 2 different dissipators and whenever a replacement is required, both IGBT's should be replaced.
- unscrew the four (4) nuts that fix the dissipator onto the card;
- unscrew the screws that fix the IGBT onto the dissipator;
- unscrew the screws that fix the diode bridges onto the dissipator;

- remove the IGBT and the diode bridges by unwelding the reophores, then remove tin from the printed plates;
- remove dissipator from card.

Before making the replacement make sure the components piloting the IGBT's are not also damaged:
- with the multimeter set in **ohm** mode make sure there is no short circuit on the PCB between the 1st and 3rd bump contacts (between gate and emitter) corresponding to each component;
- alternatively, resistors R33, R35, R41, R42, R43, R44, R45, R46, R47, R48 could have burst and/or diodes D28, D29, D26, D27 may be unable to function at the correct Zener voltage (this should have shown up in the preliminary tests);
- clean any irregularity or dirt from the dissipators. If the IGBT's have burst the dissipators may have been irreversibly damaged: in this case they should be replaced;
- apply thermo-conductive grease following the general instructions.
- Prepare the components for replacement. For the IGBT's, bend the rheofores at 90° (never bend and/or place the parts under tension near the case).
- Position the components on the dissipator with the fastening screws, but do not tighten the screws completely.
- Join the dissipator/component assembly to the printed board, inserting all the rheofores in the bump contacts and the threaded spacers on the 4 attachment holes.
- Attach the dissipators with the nuts and lock them once and for all in the following order:
  - the nuts fastening the dissipators to the printed circuit with a torque wrench setting of 2 Nm ±20%;
  - the screws fastening the rectifiers to the dissipators with a torque wrench setting of 2 Nm ±20%;
  - the screws fastening the IGBT's to the dissipators with a torque wrench setting of 1 Nm ±20%.
- Solder the terminals taking care not to let the solder run along them.
- On the component side cut away the protruding part of the rheofores and check they are not shorted (especially the gate and emitter).

NOTE. The IGBT's should belong to the same selection kit supplied by Telwin.

7.3 Removing the secondary board (fig. 4)

If the fault is in the secondary board, it should be specified that to remove it is necessary to separate the base from the machine structure as follows:
- with the machine disconnected from the main power supply separate the base from the machine structure by undoing the 4 screws;
- disconnect all wiring connected to the secondary board;
- undo the 6 screws fastening the dissipator to the machine structure (3 screws per side on the dissipator);
- undo the 4 screws fastening the IGBT module;
- undo the screws fastening the power transformer OUT terminals with the copper connections
- extract the secondary board from the machine structure;

N.B. for assembly proceed in the reverse order.

Take special note of the procedure for replacing the secondary diodes:

The secondary DIODES are attached to the dissipator and to reach them it is necessary to remove the top and bottom boards, and whenever one diode is replaced, they should all be replaced.
- undo the 5 screws attaching the secondary board to the dissipator;
- disconnect the fastons connected to the IGBTmodule;
- remove the secondary board from the dissipator;
- undo the screws fastening the copper connections to the diodes;
- undo the 4 nuts fastening the secondary board to the dissipator;
- undo the screws attaching the diodes to the dissipator;
- remove the diodes;
- clean any irregularities or dirt from the dissipator. If the diodes have blown the dissipator may be irreparably damaged: in such a case it should be replaced;
- apply thermoconductive paste following the general instructions; place the diodes on the dissipator and fasten them with the screws (torque wrench setting 1.5 Nm ±20%); **N.B.** the torque wrench setting for the screws fastening the copper connections onto the diodes is 1.5 Nm±20%;

N.B. make sure that snubber capacitors C2, C3, C21, C22 and resistors R2 R3, R4, R5 work properly and are mounted correctly on the copper connections for the Superior Tig 242 or on the secondary board for the Superior Tig 362.

Please take careful note of the procedure for replacing the IGBT module:

The IGBT module is attached to the dissipator and to reach it, it is necessary to remove the secondary board:
- undo the screws fastening the IGBT module to the secondary dissipator;
- remove the IGBT module;
- clean any irregularities or dirt from the dissipator. If the IGBT module has blown the dissipator may be irreparably damaged: in such a case it should be replaced;
- apply thermoconductive paste following the general instructions;
- place the new IGBT module on the dissipator and fasten it with the screws (torque wrench setting 2.5 Nm ±20%); **N.B.** the torque wrench setting for the screws fastening the secondary board together with the transformer cables to the module is 2 Nm ±20%;

N.B. make sure that resistors R1, R6, R26, R27, R29, R31 (R29 and R31 on the Superior Tig 362 only), diodes D2, D9 and capacitors C1, C5 on the snubber are working properly and are soldered correctly to the secondary board.

TESTING THE MACHINE

Tests should be carried out on the assembled machine before closing it with the top cover. During tests with the machine in operation never commute the selectors or activate the ohmic load contactor.

WARNING! Before proceeding to test the machine, we should remind you that during these tests the power source is powered and therefore the operator is exposed to the danger of electric shock.

The tests given below are used to verify power source operation under load.

1.1 Preparation for testing

A) Do not connect the gas mixture source.

B) Connect the machine to the static load generator (code 802110) using cables fitted with the appropriate dinse connectors.

N.B. it is necessary to use two static load generators connected in parallel.

C) Set up the dual trace oscilloscope with voltage probe CH1x100 connected between bush CBASSO (probe) and the rheofore of C39 towards CBASSO (earth) on the primary board (**fig. 4**).

D) Pass the current probe of the Hall effect transducer along the cable connecting the power transformer to bush CBASSO with the reference arrow pointing into CBASSO.

E) Lastly, connect the Hall Probe and the current probe to the oscilloscope.

F) Set up a multimeter in DC volt mode and connect the prods to the OUT+ and OUT- dinse terminals.

G) Keep connector J13 disconnected from the control board (**figs. 4** and **5**).

WARNING! the high frequency voltage will permanently damage any instrument connected to the generator.

Before proceeding make very sure that the fastons listed above are disconnected and completely isolated from one another.

H) Connect the power supply cable to the main 400Vac power supply.

WARNING! during testing do not allow contact with the metal part of the torch because of the presence of high voltages that are hazardous to the operator.

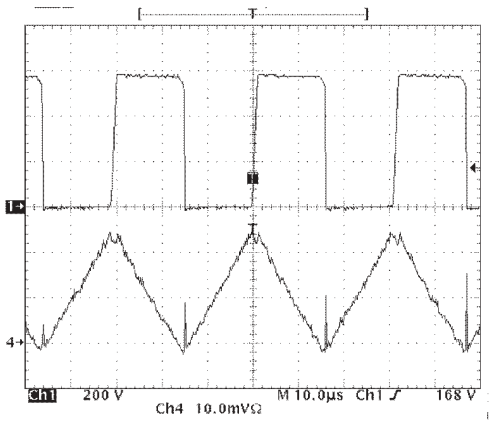
1.2 Scheduled tests

A) Loadless test:

Switch on the machine at 400Vac, set MMA mode on the front panel and make sure that:

- the pre-charge relays on the primary board close;
- the fan starts operating correctly;
- the power supply green LED lights up;
- the waveform displayed on the oscilloscope resembles **Fig.G** and the frequency is equal to +32.5KHz ±5%; if the frequency reading on the oscilloscope is not 32.5KHz ±5%, adjust the frequency using trimmer FREQ R106 for the control board, 1st version, or R97 on the control board, 2nd version (**fig. 5**).
- the output voltage over dinse + and dinse should be equal to 115Vdc ±15%.

FIGURE G



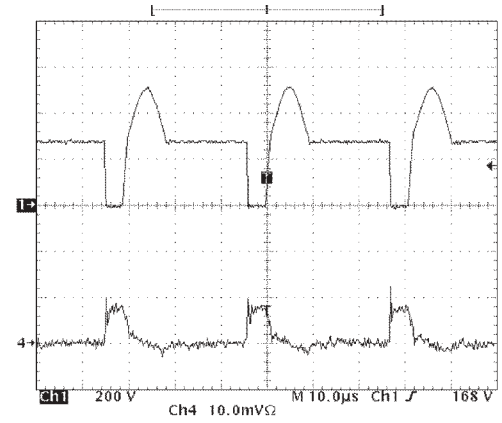
SETTINGS:
- PROBE CH1 x100;
- 200 V/Div;
- PROBE CH4 = 5A;
- 10mV/Div;
- 10 µsec/Div.

VERIFY THAT
- THE FREQUENCY IS 32.5KHz ±5%;
- AMPLITUDE CH1 IS 550V ±10%;

B) Rated load test:

- set up the ohmic load with the switch settings as in the table in **fig. H**;
- on the front panel use the encoder to position the current at 15A;
- switch on the main switch;
- start up on the ohmic load and make sure that:
  - the waveforms displayed on the oscilloscope resemble those in **Fig. H**;
  - the output current is equal to +15Adc±20% and the output voltage is equal to +15Vdc±20%.
- switch off the ohmic load and switch off the main switch.

FIGURA H



SETTINGS:
- PROBE CH1 x100;
- 200 V/Div;
- PROBE CH4 = 5A;
- 10mV/Div;
- 10 µsec/Div.

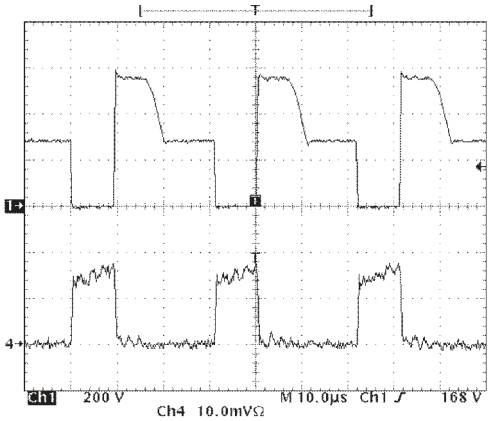
VERIFY THAT
- THE FREQUENCY IS 32.5KHz ±5%;
- AMPLITUDE CH1 IS 550V ±10%;
- AMPLITUDE CH4 IS 5A ±20%;

1	2	3	4	5	6	Number switch	
1	1	0	0	0	0	Position switch	LOAD 1
0	0	0	0	0	0	Position switch	LOAD 2

C)Intermediate load test:

- set up the ohmic load with the switch settings as in the table in **fig. I**;
- on the front panel position with the encoder the current at 150A;
- start up the ohmic load and make sure that:
  - the waveforms displayed on the oscillscope resemble those in **Fig. I**;
  - the output current is equal to +150Adc ±10% and the output voltage is equal to +26Vdc ±10%.
- switch off the ohmic load and switch off the main switch.

FIGURE I



SETTINGS:
- PROBE CH1 x100;
- 200 V/Div;
- PROBE CH4 = 20A;
- 10mV/Div;
- 10 µsec/Div.

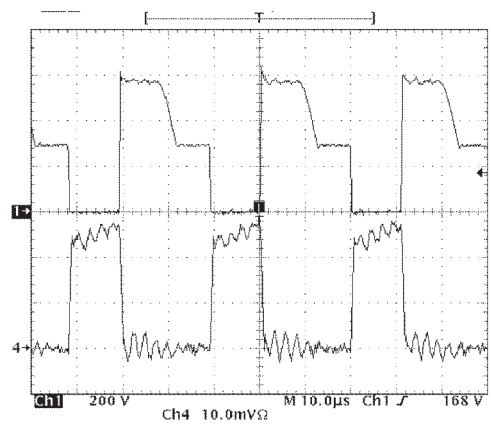
VERIFY THAT
- THE FREQUENCY IS 32.5KHz ±5%;
- AMPLITUDE CH1 IS 550V ±10%;
- AMPLITUDE CH4 IS 35A ±20%.

1	2	3	4	5	6	Number switch	
3	3	3	3	2	2	Position switch	LOAD 1
0	0	0	0	0	0	Position switch	LOAD 2

D) Rated load test for Superior Tig 242:

- set up the ohmic load with the switch settings as in the table in **fig. J**;
- on the front panel position with the encoder the current at 250A;
- start up on the ohmic load and make sure that:
  - the waveforms displayed on the oscilloscope resemble those in **Fig. J**;
  - the output current is equal to +250Adc±5% and the output voltage is equal to +30Vdc ±5%; if the output current reading is not 250A ±3%, adjust the current using trimmer IMAX R92 on the control board (**fig. 5**).
- switch off the ohmic load and switch off the main switch.

FIGURE J



SETTINGS:
- PROBE CH1 x100;
- 200 V/Div;
- PROBE CH4 = 20A;
- 10mV/Div;
- 10 µsec/Div.

VERIFY THAT
- THE FREQUENCY IS 32.5KHz ±5%;
- AMPLITUDE CH1 IS 550V ±10%;
- AMPLITUDE CH4 IS 52A ±10%;

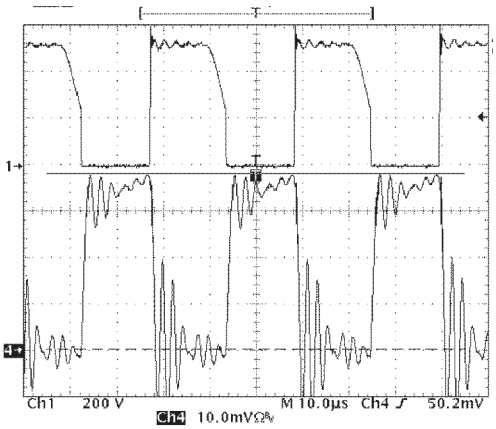
1	2	3	4	5	6	Number switch	
3	2	2	2	2	2	Position switch	LOAD 1
3	2	2	2	2	2	Position switch	LOAD 2

E) Rated load test for Superior Tig 362:

- set up the ohmic load with the switch settings as in the table in **fig. K**;
- on the front panel position with the encoder the current at 350A;
- start up on the ohmic load and make sure that:
  - the waveforms displayed on the oscilloscope resemble those in **Fig. K**;

- the output current is equal to +350Adc±5% and the output voltage is equal to +34Vdc ±5%; if the output current reading is not 350A ±3%, adjust the current using trimmer IMAX R92 on the control board (**fig. 5**).
- switch off the ohmic load and switch off the main switch.

FIGURE K



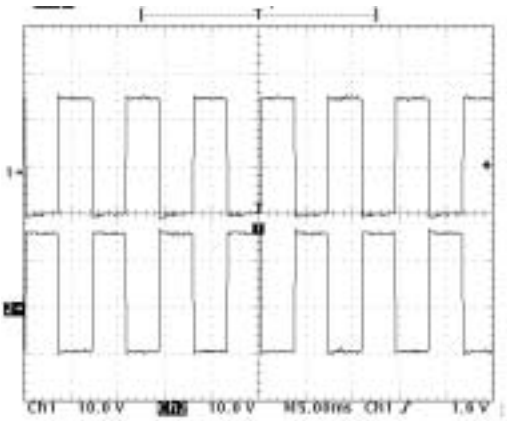
SETTINGS:
- PROBE CH1 x100;
- 200 V/Div;
- PROBE CH4 = 20A;
- 10mV/Div;
- 10 µsec/Div.

VERIFY THAT
- THE FREQUENCY IS 32.5KHz ±5%;
- AMPLITUDE CH1 IS 550V ±10%;
- AMPLITUDE CH4 IS 72A ±10%;

1	2	3	4	5	6	Number switch	
3	3	3	2	2	2	Position switch	LOAD 1
3	3	2	2	2	2	Position switch	LOAD 2

F) Testing operation of SCR module
- on the front panel set TIG/2T/AC mode.
- connect the TIG torch to the machine.
- for the Superior Tig 242:
  - on the secondary board disconnect the 4 cables (G1, E1, G2, E2) for piloting the IGBT module and keep them completely isolated from one another;
  - set up the dual trace oscilloscope, connecting probe CH1 x10 to faston G1 and the earth to faston E1; probe CH2 x10 to faston G2 and the earth to faston E2 (**fig. 4**).
- for the Superior Tig 362:
  - on the secondary board disconnect the 8 cables (G1A, G1B, G1C, G1D, G2A, G2B, G2C, G2D, E1, E2) for piloting the IGBT modules and keep them completely isolated from one another;
  - set up the dual trace oscilloscope, connecting probe CH1 x10 to faston G1 and the earth to faston E1; probe CH2 x10 to faston G2 and the earth to faston E2 (**fig. 4**).
- press the torch button and make sure the waveforms displayed on the oscilloscope resemble those in **Fig. L**.
- switch off the main switch and reconnect the cables to the secondary board.

FIGURE L



SETTINGS:
- PROBE CH1 x10;
- 10V/Div;
- PROBE CH2 = 10A;
- 10mV/Div;
- 5 µsec/Div.

VERIFY THAT
- THE FREQUENCY ON CH1 AND CH2 IS 140Hz ±10%;
- POSITIVE AMPLITUDE ON CH1 AND CH2 IS 17V ±10%;
- NEGATIVE AMPLITUDE ON CH1 AND CH2 IS -10V ±10%;

Note: in case one of the two signals is not present or different from usual, the circuit driver of the IGBT module could be faulty. (ISO1, ISO2, Q2,Q4,Q5,Q5,R15,R21 - see **fig. 4**). On the contrary, if the machine does not deliver AC current and the signal is present on the driver circuit it is necessary to check the functioning of the SCR module.

1.3 Operational tests

A) Checking torch button operation

Set on the front panel the mode TIG/2T DC/LIFT. Connect the TIG torch and press the button to verify that on the secondary board the relay K2 closes **(fig. 4)**; if not check :
- operation of the torch button;
- operation of relay K2;

In the worst case the fault could be on the control card.

B) Checking solenoid valve operation

After checking operation of point 1.3 A, press the button and check that the solenoid valve closes **(fig. 3);** if not check whether:
- the voltage over the female fastons is equal to 230Vac +/- 10%. If voltage is present this means the solenoid valve is faulty, otherwise check that the voltage on the secondary of the auxiliar transformer T2 is equal to 230Vac +/- 10% **(fig. 3)** and that the relay K4 on the control board closes **(fig. 6).** On the contrary, check the functioning of K4,Q15 and R63 on the control board **(fig. 5).**

C) Checking HF generator operation

Set on the front panel the mode TIG/2T AC. Only now reconnect on the control board the J13 connector from the HF board **(fig. 3 and 5).**

WARNING! The high frequency voltage will permanently damage any instrument connected to the generator.

Check the operation of point 1.3B and press the torch button, check whether:
- the HF generator board starts to hum for about 2 seconds (high frequency in torch); otherwise make sure the voltage over female fastons J1 and J3 (**fig.4**), disconnected from the HF board, is equal to 230VAC +/-10%. If voltage is present the HF board is faulty; if not check the operation of K2, Q14 and R62 on the control board. **(fig. 5).**

D) Running time test and closing the machine

On the front panel set mode MMA and the welding current to maximum. Under the load conditions shown in **fig. J**, for model Superior Tig 242 or **fig. K** for Superior Tig 362, switch on the machine and leave it in operation until the thermostatic capsules trigger (machine in alarm). After making sure the internal wiring is positioned correctly re-assemble the machine once and for all.

E) Welding test

MMA: with the machine set up according to the instructions in the handbook make a test weld with an electrode diam. 2.5 and the current setting at 80A. Monitor the dynamic behaviour of the power source, also checking for the presence of the Arc Force.

TIG/DC: with the machine set up according to the instructions in the handbook make a test weld with a grey electrode diam. 1.6 and an argon gas bottle (gas flow at 4.5 litres/minute). Make a weld on iron or steel with a current setting of 80A, monitor the start and arc stability and make sure the piece melts properly. Also check all the main properties of the machine that can be set from the digital panel (see TAB.1).

TIG/AC: with the machine set up according to the instructions in the handbook make a test weld with a green electrode, diam. 1.6mm, and the argon gas bottle (gas flow at 10 litres/minute). Make a weld on aluminium with a current setting of 40A and Duty Cycle 80%, monitor the start and arc stability and make sure the piece melts properly. Also check all the main properties of the machine that can be set from the digital panel (see TAB.1).

ILLUSTRATIONS

FIG. 1A

FIG. 1B

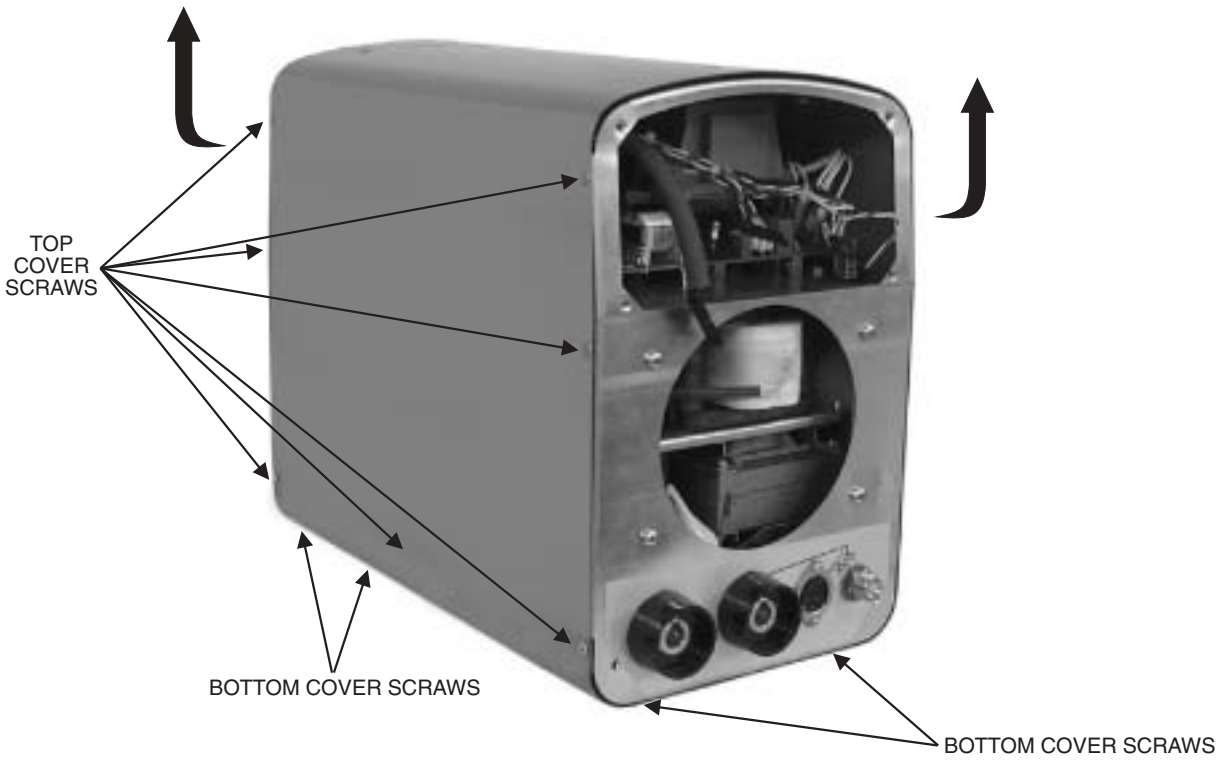


FIG. 2A

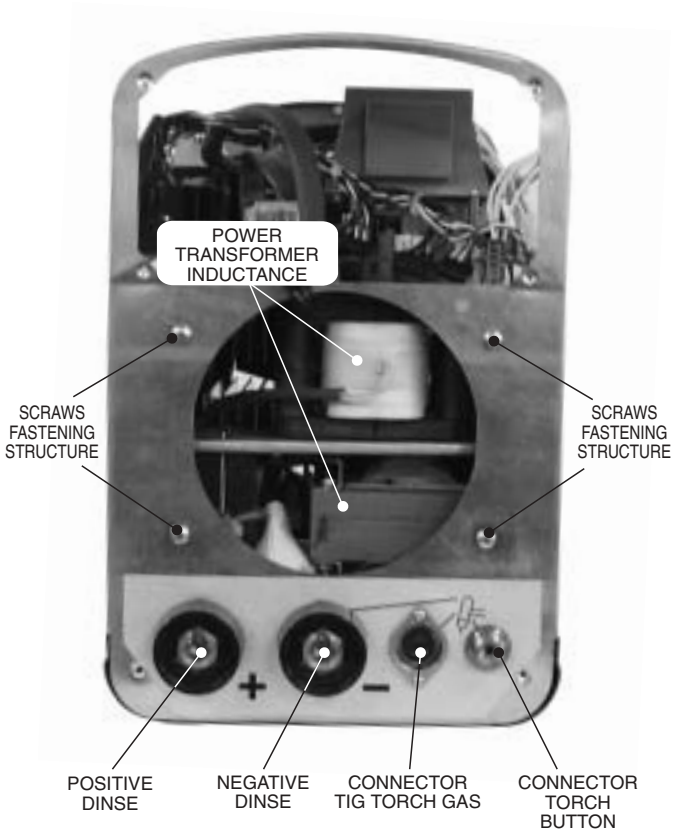


FIG. 2B

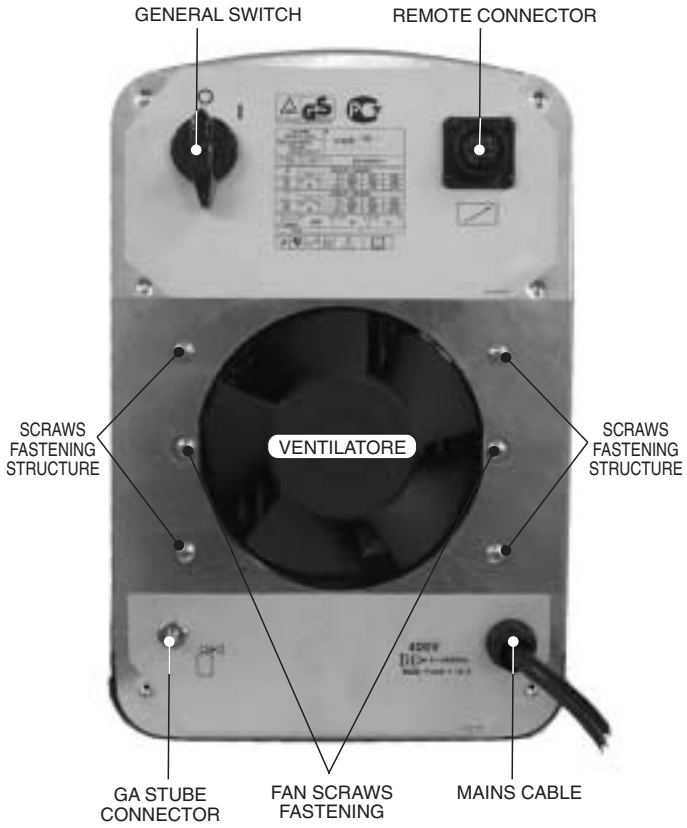


FIG. 3

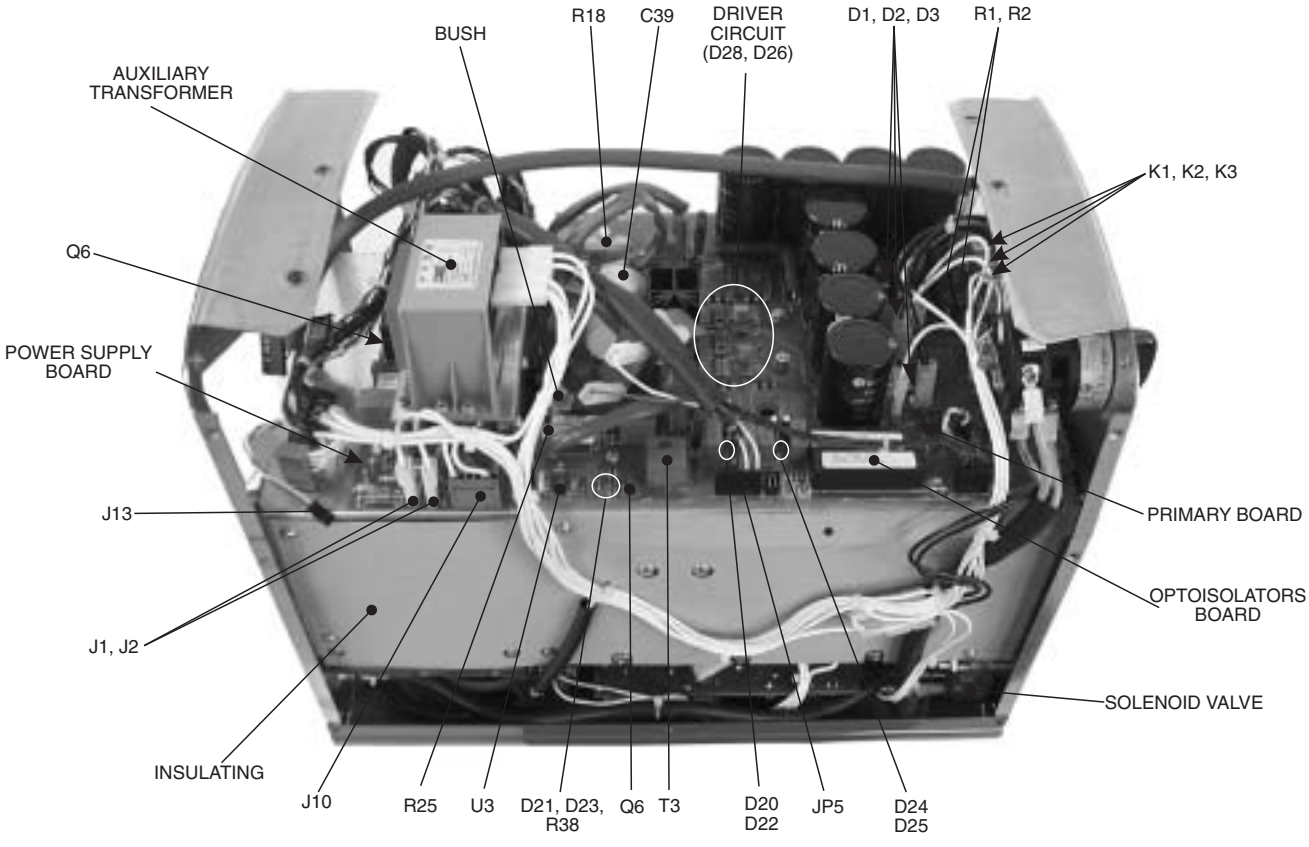
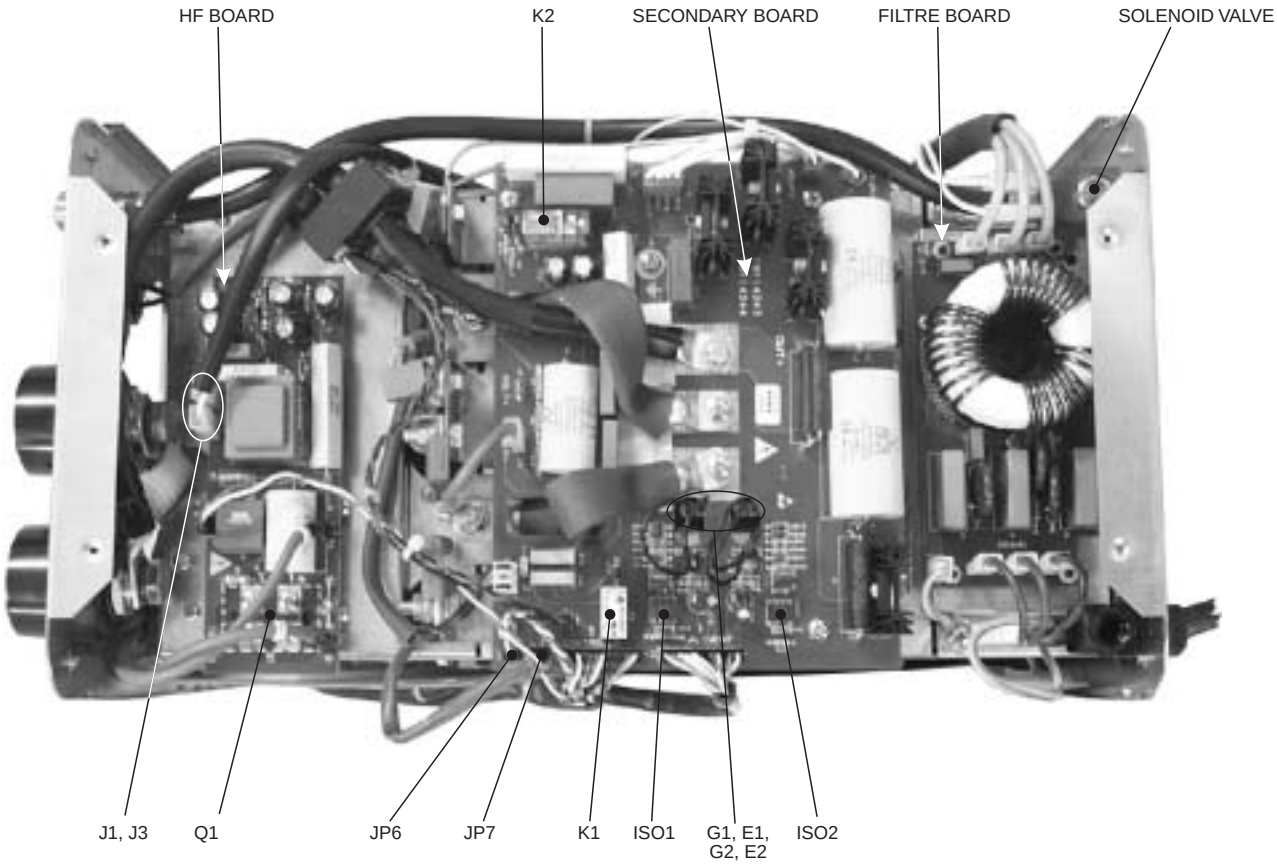


FIG. 4

SUPERIOR TIG 242



SUPERIOR TIG 362

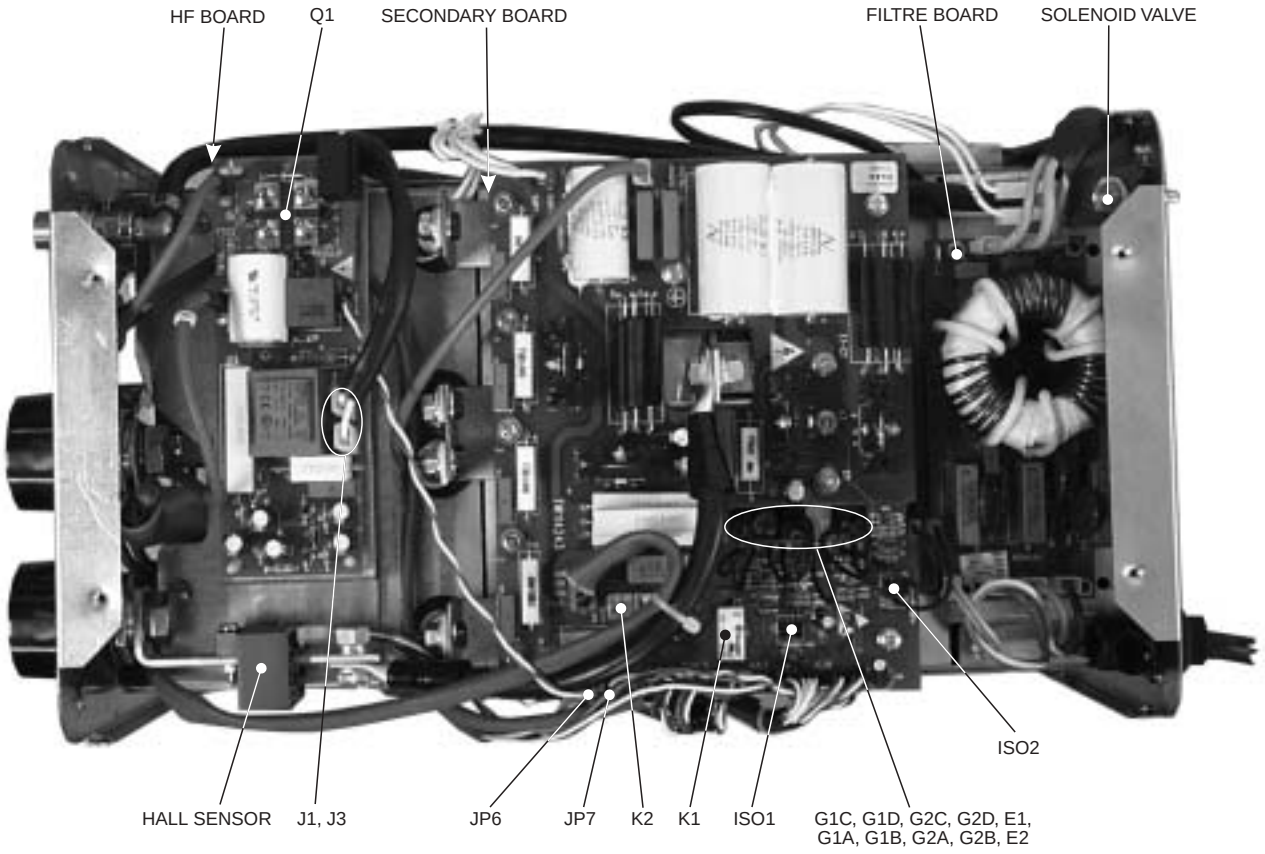
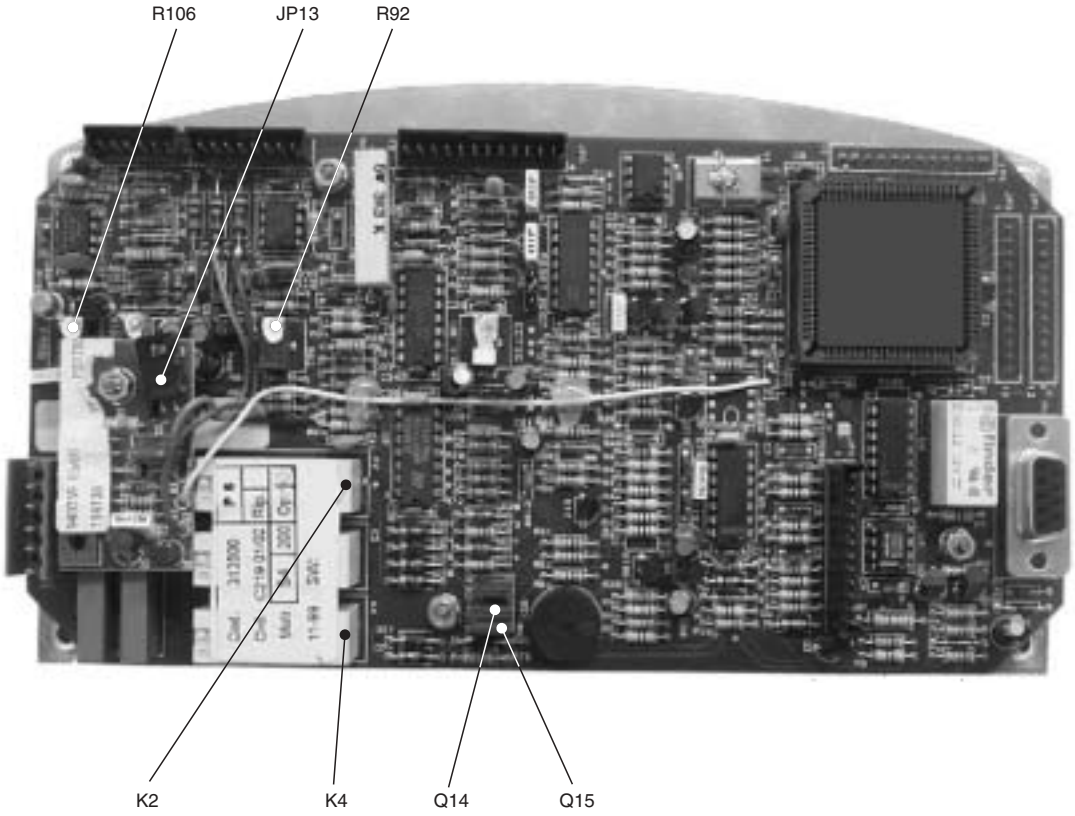
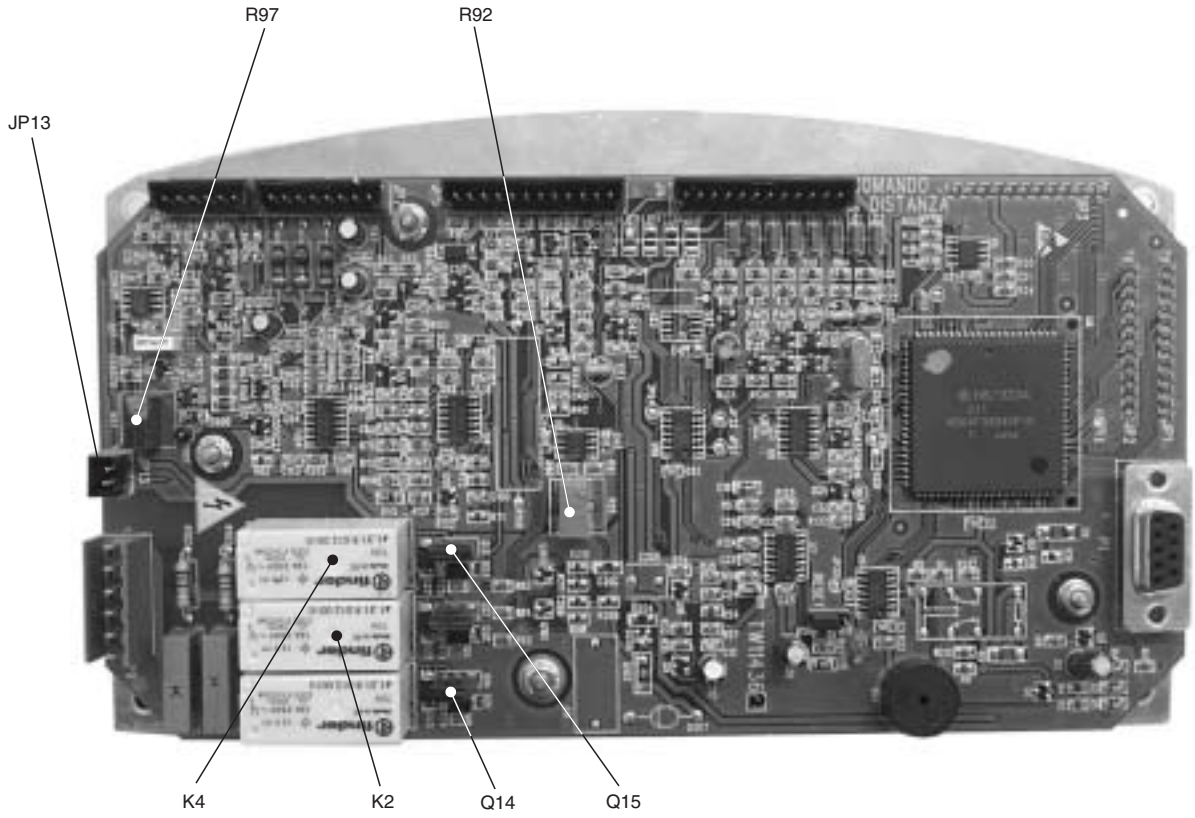


FIG. 5

Control board - 1st version

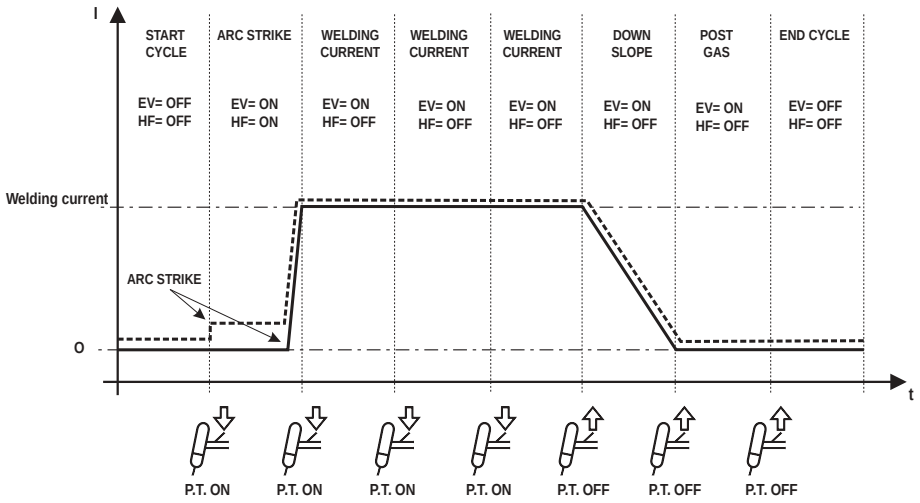


Control board - 2st version

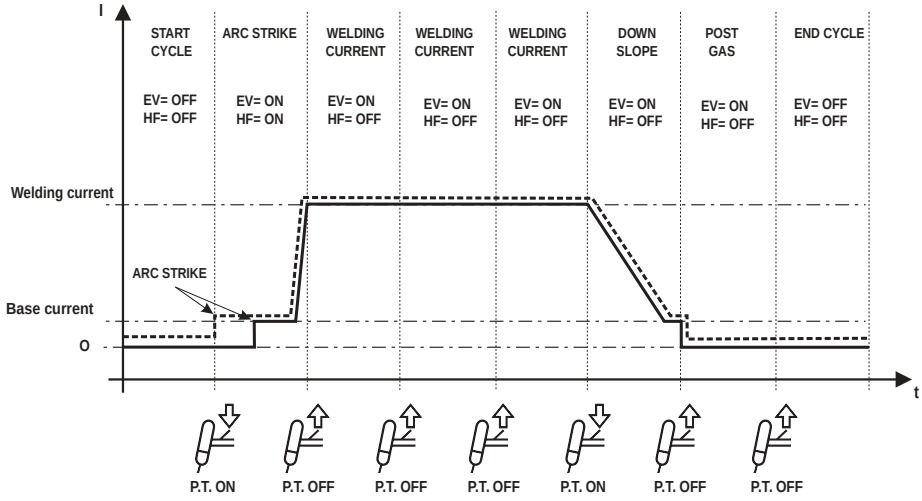


TAB. 1

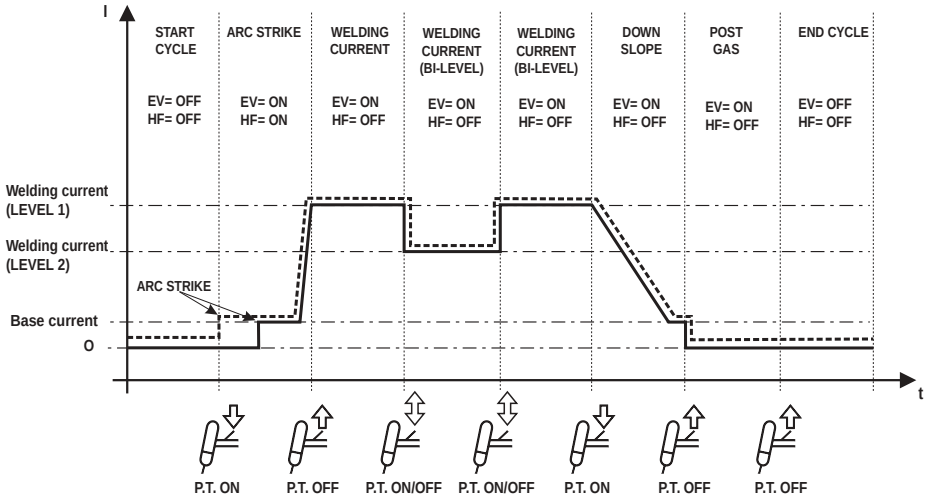
MACHINE CYCLE 2T WITH HF (──) - LIFT (---·)



MACHINE CYCLE 4T WITH HF (──) - LIFT (---·)



MACHINE CYCLE BI-LEVEL 4T WITH HF (──) - LIFT (---·)

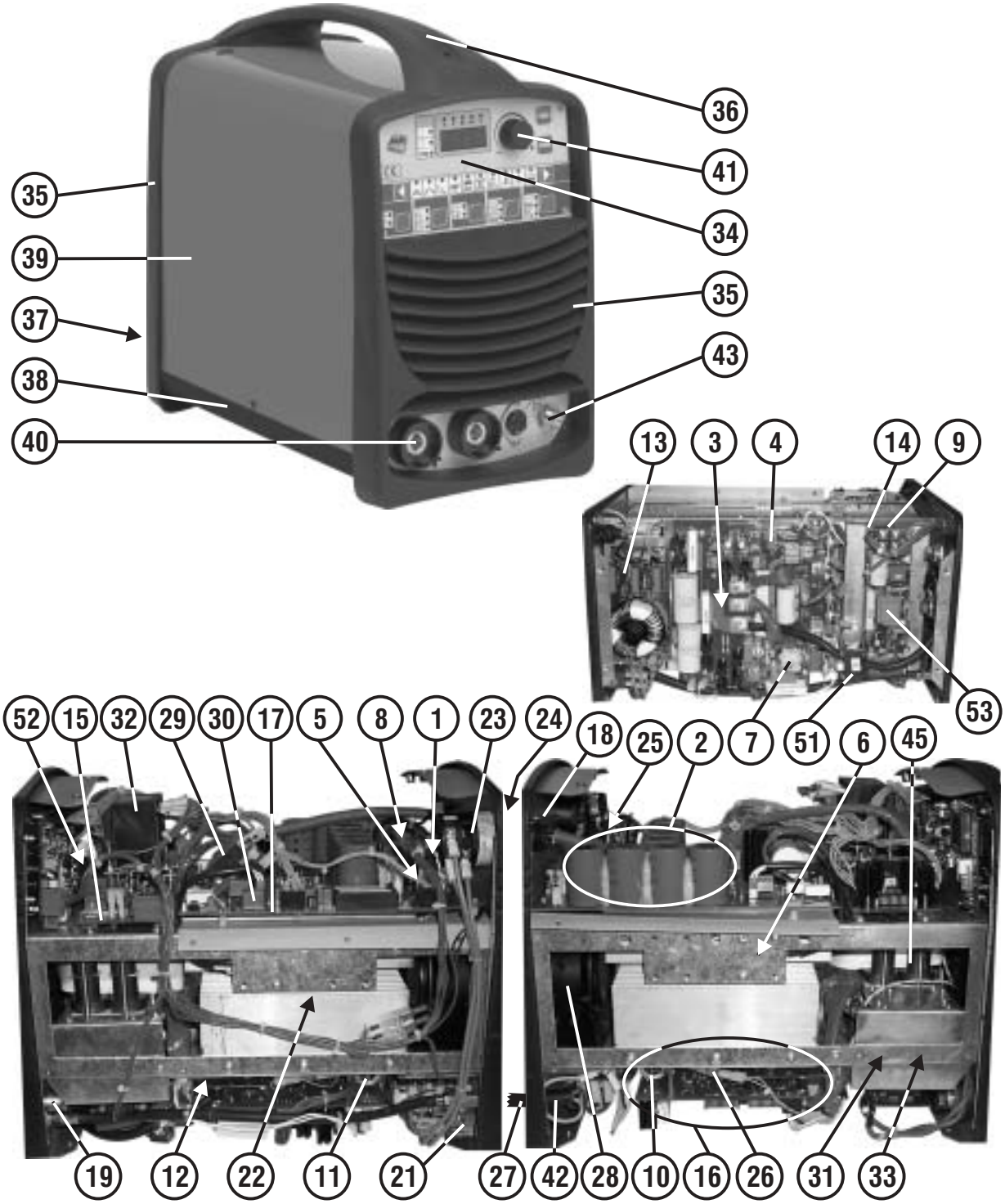


LEGENDA:	EV = Solenoid valve	HF = High Frequency (if active)
	I = Welding current	PT = Torch button

SUPERIOR TIG 242

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

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



Per richiedere i pezzi di ricambio senza codice precisare: codice del modello; 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 di riferimento de lista; numero di matricula

SUPERIOR TIG 242-362 AC/DC

TELWIN

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
1	Rele' Relais Relais Relais Relais
2	Condensatore Condensateur Capacitor Kondensator Capacitor
3	Igbt Igbt Igbt Igbt Igbt
4	Rele' Relais Relais Relais Relais
5	Raddrizzatore Redresseur Rectifier Gleichrichter Rectificador
6	Resistenza Resistance Resistor Wiederstand Resistencia
7	Rele' Relais Relais Relais Relais
8	Resistenza Resistance Resistor Widerstand Resistencia
9	Scr Scr Scr Scr Scr
10	Resistenza Resistance Resistor Widerstand Resistencia

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
11	Resistenza Resistance Resistor Widerstand Resistencia
12	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo
13	Scheda Filtro Platine Filtre Filter Card Filterkarte Tarjeta Filtro
14	Scheda H.f. Platine H.f. H.f. Card H.f. Karte Tarjeta H.f.
15	Scheda Alimentatore Platine Alimentation Power Supply Unit Card Karte Tarjeta Alimentador
16	Kit Scheda Secondario Kit Fiche Secondaire Kit Secundary Pcb Kit Sekund□rtrafokarte Kit Tarjeta Secundario
17	Kit Scheda Primario Kit Fiche Primaire Kit Primary Pcb Kit Primaertrafokarte Kit Tarjeta Primario
18	Cablaggio Controllo Cable De Controle Control Cable Kontrolkabel Cable De Control
19	Cablaggio Secondario Cable Secondaire Secondary Cable Sekund□rkabel Cable Secundario
21	Elettrovalvola Electrovanne Electrovalve Elektroventil Electrovalvula

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
23	Commutatore Commutateur Switch Schalter Conmutador
24	Manopola Per Commutatore Poignee Pour Commutateur Switch Knob Schaltergriff Manija Por Conmutador
25	Fusibile Fusible Fuse Sicherung Fusible
26	Termostato Thermostat Thermal Switch Thermostat Termostato
27	Cavo Alim. Cable Alim. Mains Cable Netzkabel Cable Alim.
28	Ventilatore Ventilateur Fan Ventilator Ventilador
29	Trasformatore Di Corrente Ta Transformateur De Courant Ta Current Transformer Ta Stromwandler Ta Transformador De Corriente Ta
30	Trasformatore Impulsi Trasformateur Pulsee Pulse Transformer Pulse Transformator Transformador Pulsado
31	Induttanza Inductance Inductance Drossel Induccion
32	Autotrasformatore Autotransformateur Autotransformer Autotransformator Autotransformador

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
33	Trasformatore Hf Transformateur Hf Hf Transformer Hf Transformator Transformador Hf
34	Kit Scheda Pannello Kit Platine Frontal Kit Front Panel Card Kit Geraetefrontskarte Kit Tarjeta Frontal
35	Cornice Cadre Frame Rahmen Marco
36	Maniglia Poignee Handle Handgriff Manija
37	Raccordo Acqua Raccord Eau Pipe Fitting Wasseranschluss Racor Agua
38	Fondo Chassis Bottom Bodenteil Base
39	Mantello Capot Cover Deckel Panel De Cobertura
40	Presa Dinse Prise Dix Dinse Socket Dinse Steckdose Enchufe Dinse
41	Kit Manopola Kit Poignee Knob Kit Griff Kit Kit Manija
42	Kit Pressacavo + Ghiera Kit Presse Cable + Embout Kit Cable Bushing + Ring Nut Kit Kabelhalter + Nutmutter Kit Prensa Cable + Virola

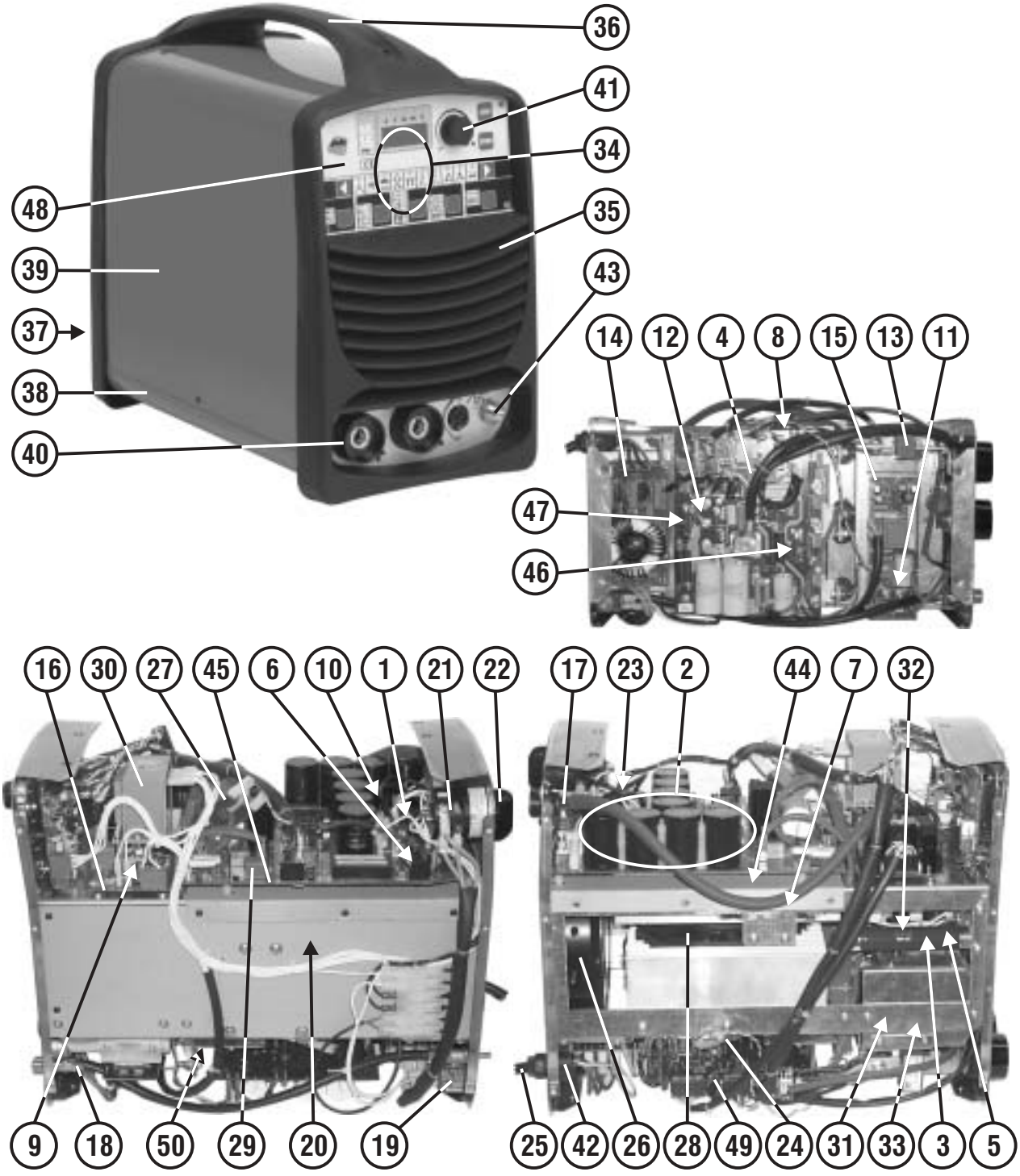
REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
43	Kit Raccordo Entrata Gas Kit Raccord Entree Gaz Gas Pipe Connector Kit Gaseintrittkit Kit Racor Entrada Gas
44	Kit Igbt Kit Igbt Kit Igbt Kit Igbt Kit Igbt
45	Trasformatore Potenza Trasformateur Puissance Power Transformer Leistungstransformator Transformador De Potencia
46	Pannello Frontale Panneau Partie Frontal Front Panel Geraetefront Panel Frontal
49	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo
50	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo
51	Sensore Hall Capteur Hall Sensor Hall Messfuhler Hall Sensor Hall
52	Igbt Igbt Igbt Igbt Igbt
53	Trasformatore Ausiliario Transformateur Auxiliaire Auxiliary Transformer Hilfstransformator Transformador Auxiliar

SUPERIOR TIG 362

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

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

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



Per richiedere i pezzi di ricambio senza codice precisare: codice del modello; 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 di riferimento de lista; numero di matricula

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
1	Rele' Relais Relais Relais Relais
2	Condensatore Condensateur Capacitor Kondensator Capacitor
3	Resistenza Resistance Resistor Wiederstand Resistencia
4	Rele' Relais Relais Relais Relais
5	Resistenza Resistance Resistor Wiederstand Resistencia
6	Raddrizzatore Redresseur Rectifier Gleichrichter Rectificador
7	Resistenza Resistance Resistor Wiederstand Resistencia
8	Rele' Relais Relais Relais Relais
9	Igbt Igbt Igbt Igbt Igbt
10	Resistenza Resistance Resistor Widerstand Resistencia

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
11	Scr Scr Scr Scr Scr
12	Igbt Igbt Igbt Igbt Igbt
13	Sensore Hall Capteur Hall Sensor Hall Messfuhler Hall Sensor Hall
14	Scheda Filtro Platine Filtre Filter Card Filterkarte Tarjeta Filtro
15	Scheda H.f. Platine H.f. H.f. Card H.f. Karte Tarjeta H.f.
16	Scheda Alimentatore Platine Alimentation Power Supply Unit Card Karte Tarjeta Alimentador
17	Cablaggio Controllo Cable De Controle Control Cable Kontrolkabel Cable De Control
18	Cablaggio Secondario Cable Secondaire Secondary Cable Sekund□rkabel Cable Secundario
19	Elettrovalvola Electrovanne Electrovalve Elektroventil Electrovalvula
20	Termostato Thermostat Thermostat Thermostat Termostato

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
21	Commutatore Commutateur Switch Schalter Conmutador
22	Manopola Per Commutatore Poignee Pour Commutateur Switch Knob Schaltergriff Manija Por Conmutador
23	Fusibile Fusible Fuse Sicherung Fusible
24	Termostato Thermostat Thermal Switch Thermostat Termostato
25	Cavo Alim. Cable Alim. Mains Cable Netzkabel Cable Alim.
26	Ventilatore Ventilateur Fan Ventilator Ventilador
27	Trasformatore Di Corrente Ta Transformateur De Courant Ta Current Transformer Ta Stromwandler Ta Transformador De Corriente Ta
28	Ventilatore Ventilateur Fan Ventilator Ventilador
29	Trasformatore Impulsi Trasformateur Pulsee Pulse Transformer Pulse Transformator Transformador Pulsado
30	Autotrasformatore Autotransformateur Autotransformer Autotransformator Autotransformador

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
31	Induttanza Inductance Inductance Drossel Induccion
32	Trasformatore Potenza Transformateur Puissance Power Transformer Leistungstransformator Transformador De Potencia
33	Trasformatore Hf Transformateur Hf Hf Transformer Hf Transformator Transformador Hf
34	Pannello Frontale Panneau Partie Frontal Front Panel Geraetefront Panel Frontal
35	Cornice Cadre Frame Rahmen Marco
36	Maniglia Poignee Handle Handgriff Manija
37	Raccordo Acqua Raccord Eau Pipe Fitting Wasseranschluss Racor Agua
38	Fondo Chassis Bottom Bodenteil Base
39	Mantello Capot Cover Deckel Panel De Cobertura
40	Presa Dinse Prise Dix Dinse Socket Dinse Steckdose Enchufe Dinse

REF.	ELENCO PEZZI DI RICAMBIO PIECES DETACHEES SPARE PARTS LIST ERSATZTEILLISTE PIEZAS DE REPUESTO
41	Kit Manopola Kit Poignee Knob Kit Griff Kit Kit Manija
42	Kit Pressacavo + Ghiera Kit Presse Cable + Embout Kit Cable Bushing + Ring Nut Kit Kabelhalter + Nutmutter Kit Prensa Cable + Virola
43	Kit Raccordo Entrata Gas Kit Raccord Entree Gaz Gas Pipe Connector Kit Gaseintrittkit Kit Racor Entrada Gas
44	Kit Igbt Kit Igbt Kit Igbt Kit Igbt Kit Igbt
45	Kit Scheda Primario Kit Fiche Primaire Kit Primary Pcb Kit Primaertrafokarte Kit Tarjeta Primario
46	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo
47	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo
48	Kit Scheda Frontale Kit Fiche Partie Frontal Kit Front Panel Board Kit Geraetefrontkarte Kit Tarjeta Frontal
49	Kit Scheda Secondario Kit Fiche Secondaire Kit Secundary Pcb Kit Sekund□rtrafokarte Kit Tarjeta Secundario
50	Kit Diodo Kit Diode Kit Diode Kit Diode Kit Diodo

TECHNICAL REPAIR CARD.

In order to improve the service, each servicing centre is requested to fill in the technical card on the following page at the end of every repair job. Please fill in this sheet as accurately as possible and send it to Telwin. Thank you in advance for your co-operation!

Official servicing centers Repairing sheet

Date: _____

Inverter model: _____

Serial number: _____

Company: _____

Technician: _____

In which place has the inverter been used?

☐ *Building yard*

☐ *Workshop*

☐ *Others:* _____

Supply:

☐ *Power supply*

☐ *From mains without extension*

☐ *From mains with extension m:* _____

Mechanichal stresses the machine has undergone to

Description: _____

_____

Dirty grade

Dirty inside the machine

Description: _____

Kind of failure	Component ref.
Rectifier bridge	
Electrolytic capacitors	
Relais	
In-rush limiter resistance	
IGBT	
Snubber	
Secondary diodes	
Potentiometer	
Others	

Substitution of primary circuit board: *yes* ☐ *no* ☐

Substitution of primary control board: *yes* ☐ *no* ☐

Troubles evinced during repair :

_____

_____

_____

_____

_____

_____

_____

TELWIN S.p.A. - Via della Tecnica, 3
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E-mail: telwin@telwin.com http://www.telwin.com

CERTIFIED QUALITY SYSTEM
UNI EN ISO 9001:2000