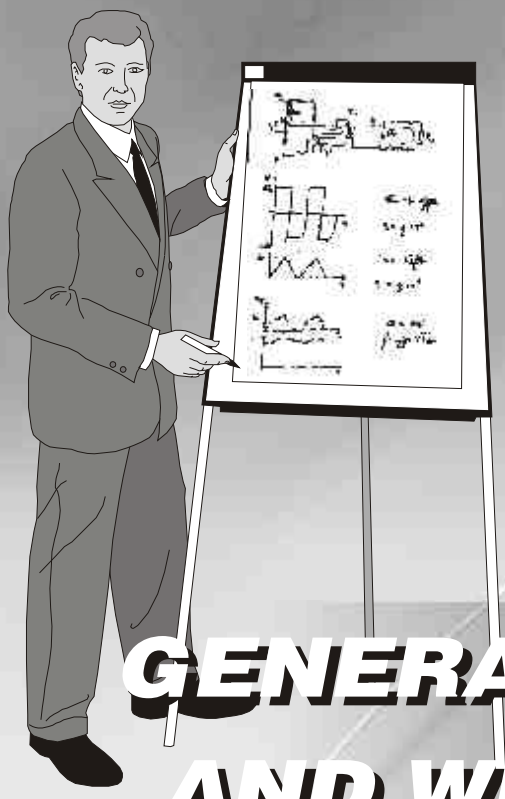
cod. 988241

TELWIN TECHNOLOGY TIG 145-165-200

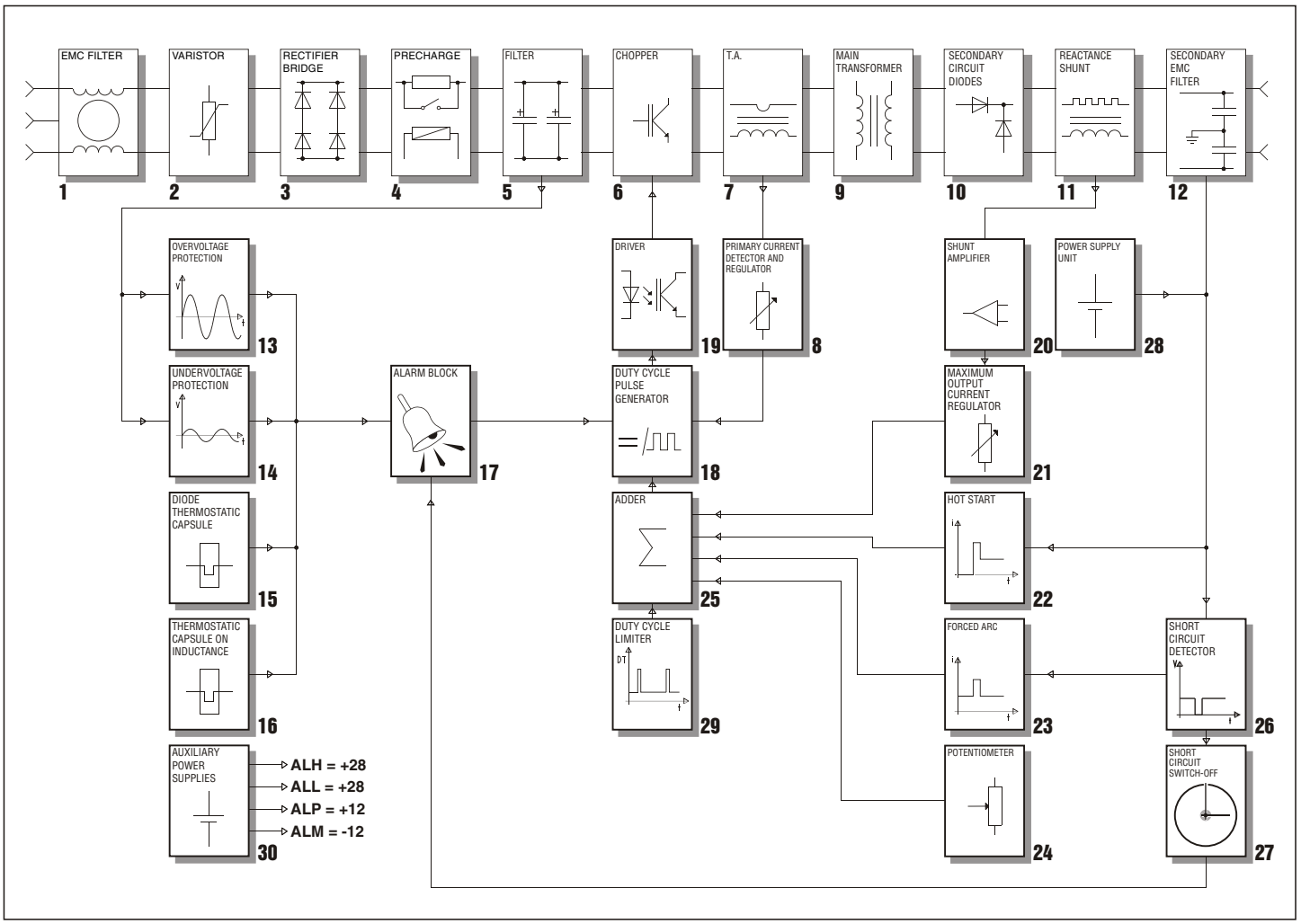
inverter



GENERATOR OPERATION AND WIRING DIAGRAMS

"trouble - free repair"

Block diagram



The components between () belong to the controle module SMD

Block 1

EMC filter

Consists of C32, C39, C40, L1, R50.
Prevents the disturbances from the inverter spreading through the line and viceversa.

Block 2

Varistor

Consists of RV1
Prevents spikes from the line with amplitude over 400V entering the inverter.

Block 3

Rectifier bridge

Consists of D19, D22.
Converts the alternating mains voltage into direct pulsating voltage.

Block 4

Precharge

Consists of K1, K2, R34.
When the inverter is switched on, the relays K1 and K2 are de-energised and the capacitors C33-C37 are charged via R37. When the capacitors are charged, the relays are energised.
This block prevents the formation of high transient currents which could damage the mains switch, the rectifier bridges and the electrolytic capacitors.

Block 5

Filter

Consists of C33, C34, C35, C36, C37.
Converts the pulsating voltage from the rectifying bridge into direct voltage.

Block 6

Chopper

Consists of Q6, Q7, Q8, Q9.
Converts the direct voltage from the filter into a square wave at high frequency (32 khz) for driving the transformer.

Block 7

T.A.

Consists of T1.
This current transformer measures the primary current and transmits the information to Block 18 (duty cycle pulse generator).

Block 8

Primary current detector and regulator

Consists of:
(D1, R2, R55, R56, R57), R44.
Detects and limits in amplitude the signal from Block 7; via R44 the maximum permitted primary current is regulated.

Block 9

Main transformer

Consists of (tr1).
Reduces the mains voltage, via chopper block, from 320V to 100V and galvanically separates the primary from the secondary circuit.

Block 10

Secondary circuit diodes

Consists of D1 - 2 - 3 - 4 - 5
D1 - 2: eliminate the negative part of the secondary circuit voltage.
D3 - 4 - 5: during the IGBT non-conduction period, these diodes recirculate the output inductance current.

Block 11

Reactance, shunt

Consists of L R2.
The reactance levels the secondary diodes output current making it a direct current; the shunt reads this current which is then processed by the adder block.

Block 12

Secondary EMC filter

Consists of CA, CB .
Prevents the disturbances from the inverter spreading in the welding cables and viceversa.

Block 13

Overvoltage protection

Consists of: U5 A, R31, R33.
If the supply voltage exceeds 265 Vac, the chopper is switched off.

Block 14

Undervoltage protection

Consists of U5B, R30, R32.
If the supply voltage is below 110V, the chopper is switched off.

Block 15

Diode thermostatic capsule

Consists of: Capsule S1.
If the temperature on the diodes exceeds 70 degrees, the chopper is switched off.

Block 16

Thermostatic capsule on inductance

Consists of: capsule S2.
If the temperature of the inductance exceeds 130 degrees, the inverter is switched off.

Block 17

Alarm block

Consists of: Q10, R48, D26, (D12, D13,Q1).
Sends a lock signal to Block 18 (switches the inverter off) and indicates that an alarm has cut in via the yellow led D26 on the front panel.
This led comes on when:

1. The thermostatic capsule has cut in on the diodes.
2. The thermostatic capsule has cut in on the inductance.
3. Undervoltage at output
4. Overvoltage at output
5. Short circuit at output for more than 1.5 seconds (Antistiking function).

Block 18

Duty cycle pulse generator

Consists of: (U2 = UC 3842).
Processes the information produced by Block 25 (adder), by Block 7, 8 (measurement of primary current), by Block 17 (alarms) and produces a square wave at the output with variable duty cycle (from 0 to 47%).

Block 19

Driver

Consists of: Iso 4, Iso 5, Q1, Q2, Q3, Q4.
Galvanically separates and amplifies in current the square wave produced by Block 18.

Block 20

Shunt amplifier

Consists of: (U4).
Amplifies the signal from the shunt.

Block 21

Maximum output current regulator

Consists of: R 42.
Permits reduction or increase in amplification of Block 20.

Block 22

Hot start

Consists of: (Q2, Q3, C9).
When the electrode touches the piece for the first time (beginning of welding), this block increases the current set by the potentiometer in order to prepare the welding pool.

Block 23

Forced arc

Consists of: (Q6, Q7, C14).
If the arc voltage drops below 10V, this stage produces a temporary increase in the output current.

Block 24

Potentiometer

Consists of: R48.
By turning the potentiometer clockwise, the voltage on the cursor varies from 0 to 5V which corresponds proportionally to the inverter output current.

Block 25

Adder

Consists of: (U1A, U1B).
Processes the information from Blocks 20-21-22-23-24 and sends it to the duty cycle pulse generator (Block 17).

Block 26

Short circuit detector

Consists of (U3B).
If the welding voltage is below 10V, this circuit causes the forced arc to cut in (Block 22).

Block 27

Short circuit switch-off

Consists of: (U3A).

When the output short circuit persists for more than 2 seconds, this circuit switches the inverter off via Block 16.

Block 28

12V power supply unit

Consists of R45, D15.

Provides an output voltage of 12V which is present even when the inverter is not working (e.g. cut-in of thermostatic capsule) and enables Block 25 to detect whether there is a short circuit at the output or if the inverter has locked out (e.g. due to over or undervoltage, antistiking, thermostatic capsule).

Block 29

Duty cycle limiter

Limits the machine duty cycle during no-load operation.

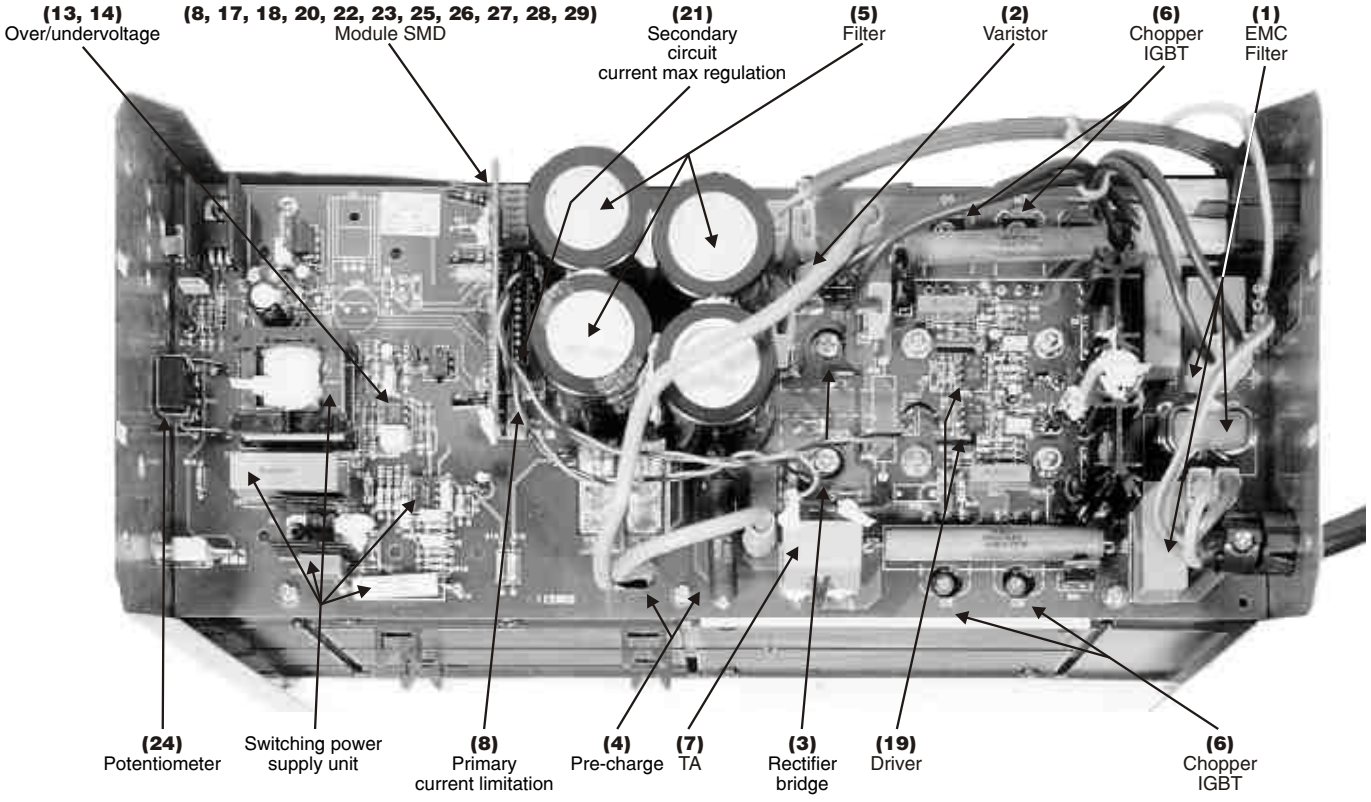
Block 30

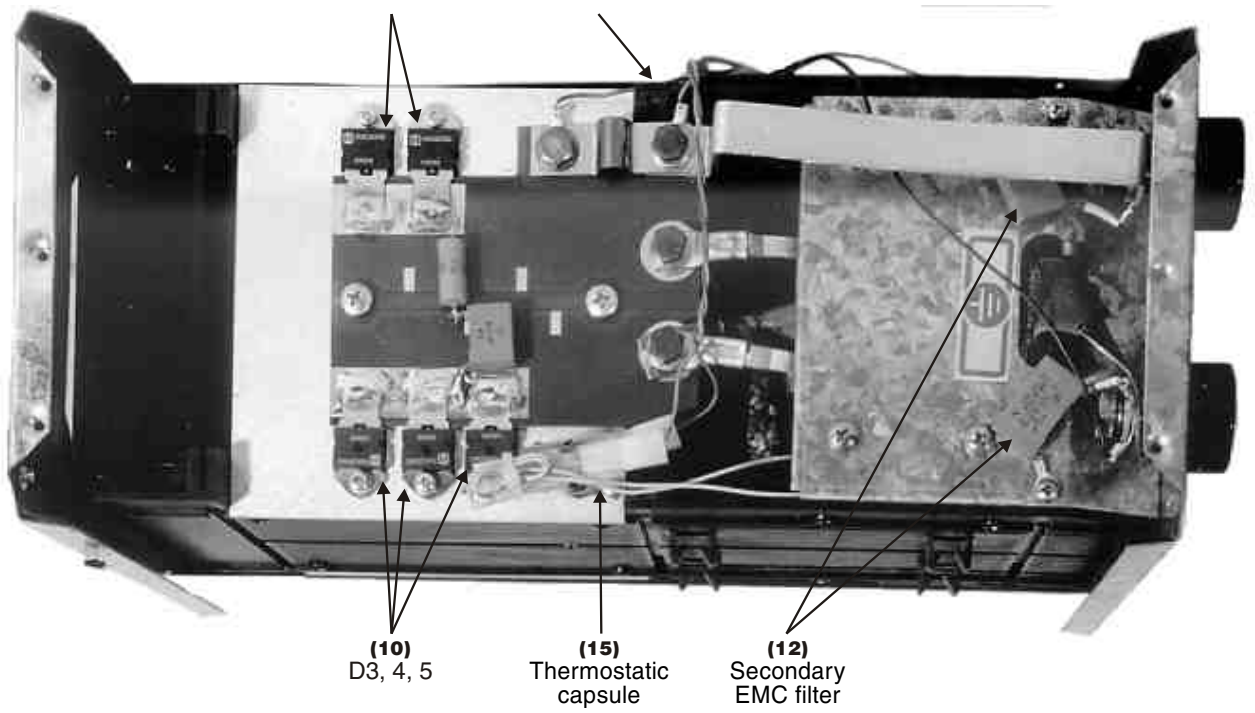
Auxiliary power supplies

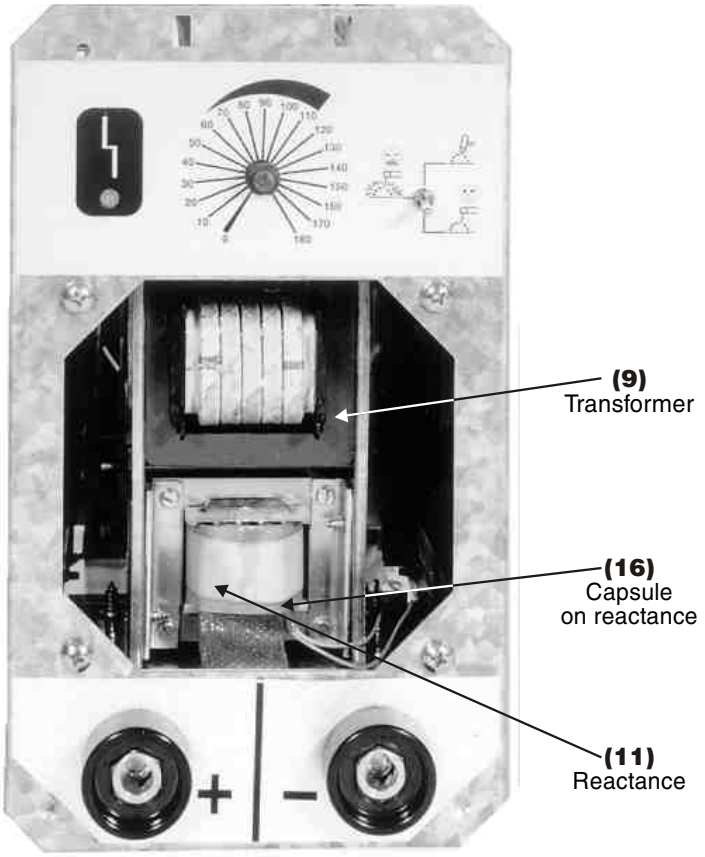
In order to reduce the dimensions and weight of the inverter, a switching power supply unit has been used with an operating principle similar to that of the chopper.

The voltages that can be measured at its outputs are the following:

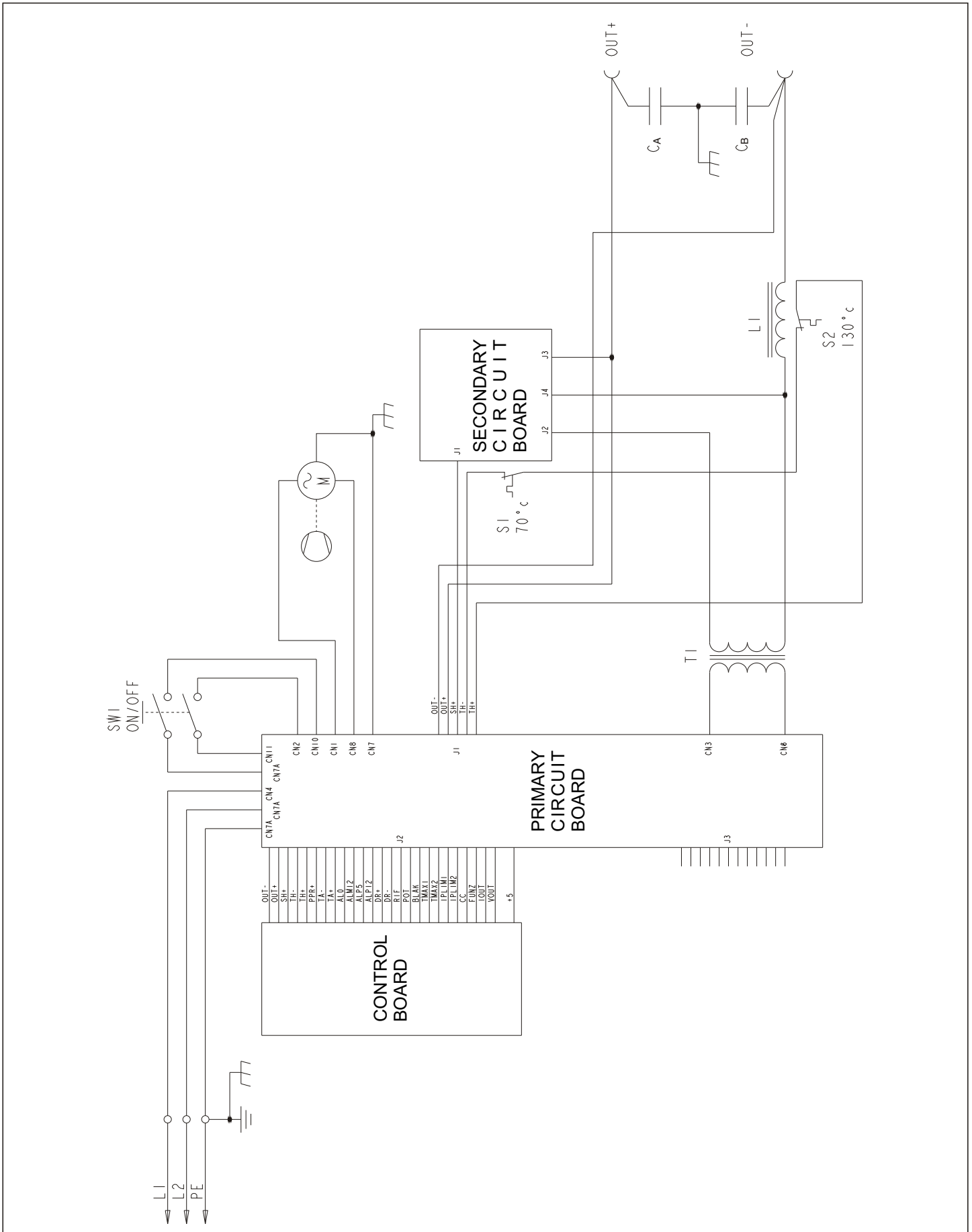
Illustrated references



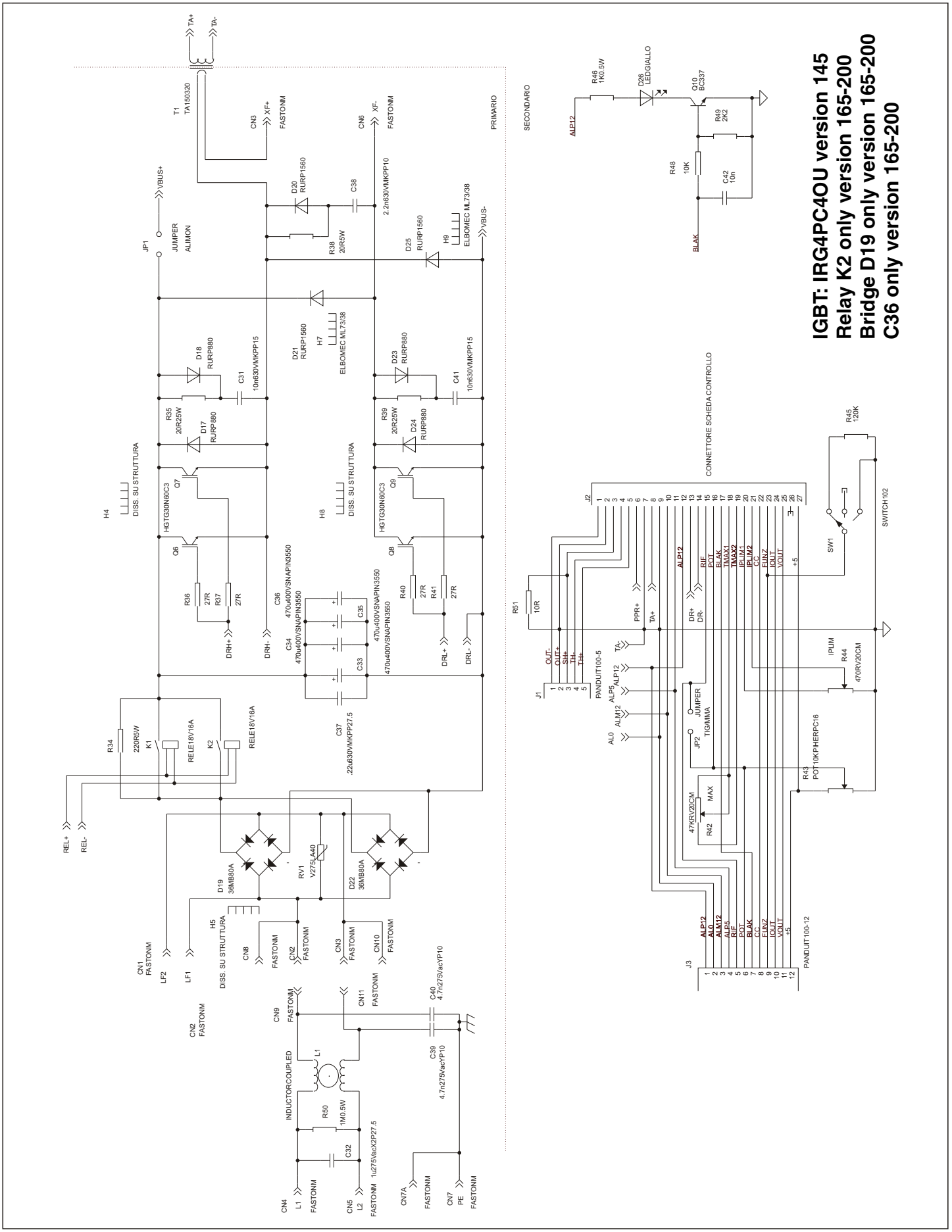

(10)
Secondary circuit diodes
(11)
Shunt
(10)
D3, 4, 5
(15)
Thermostatic capsule
(12)
Secondary EMC filter


(9)
Transformer
(16)
Capsule on reactance
(11)
Reactance
+
−

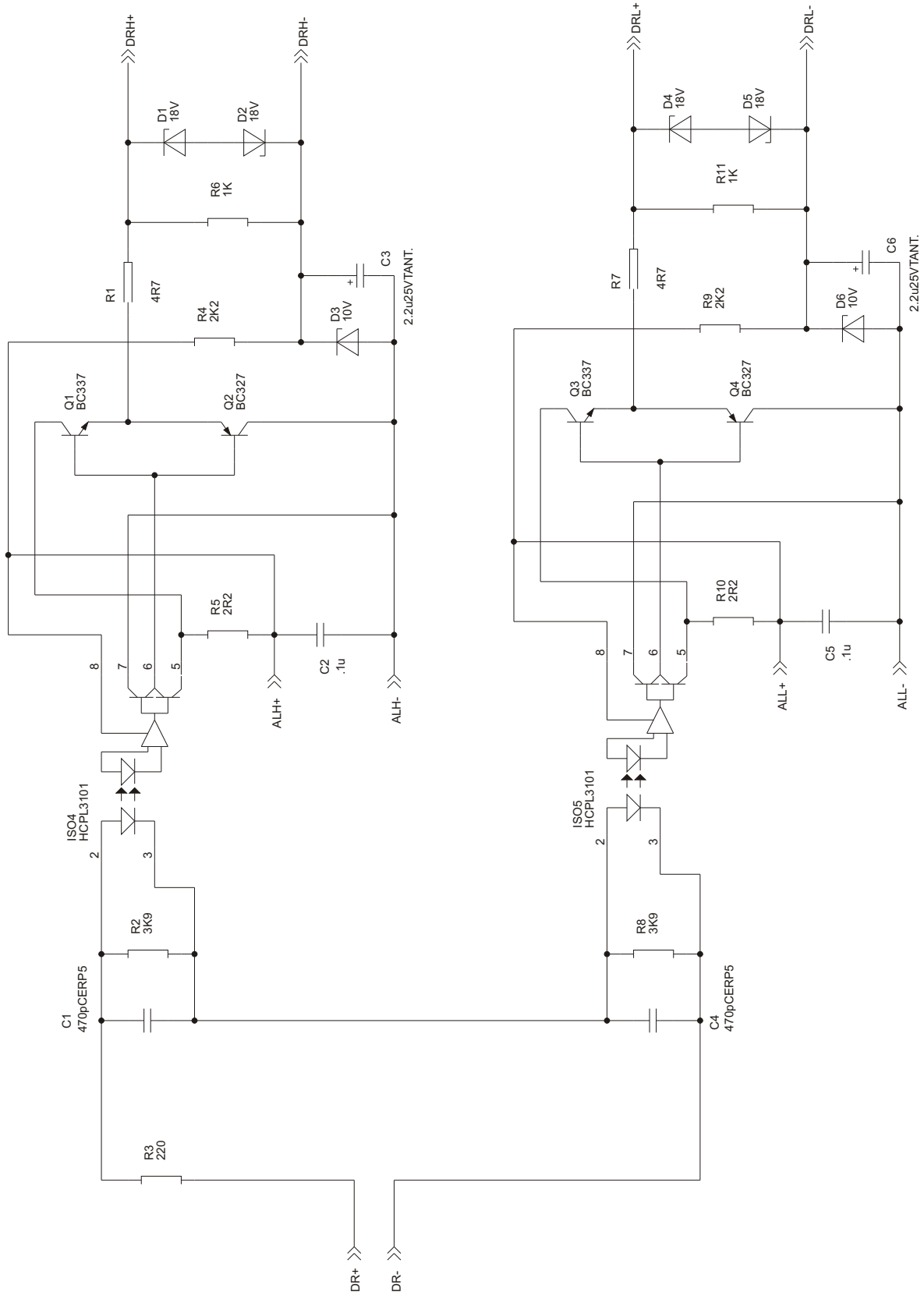
General wiring diagram



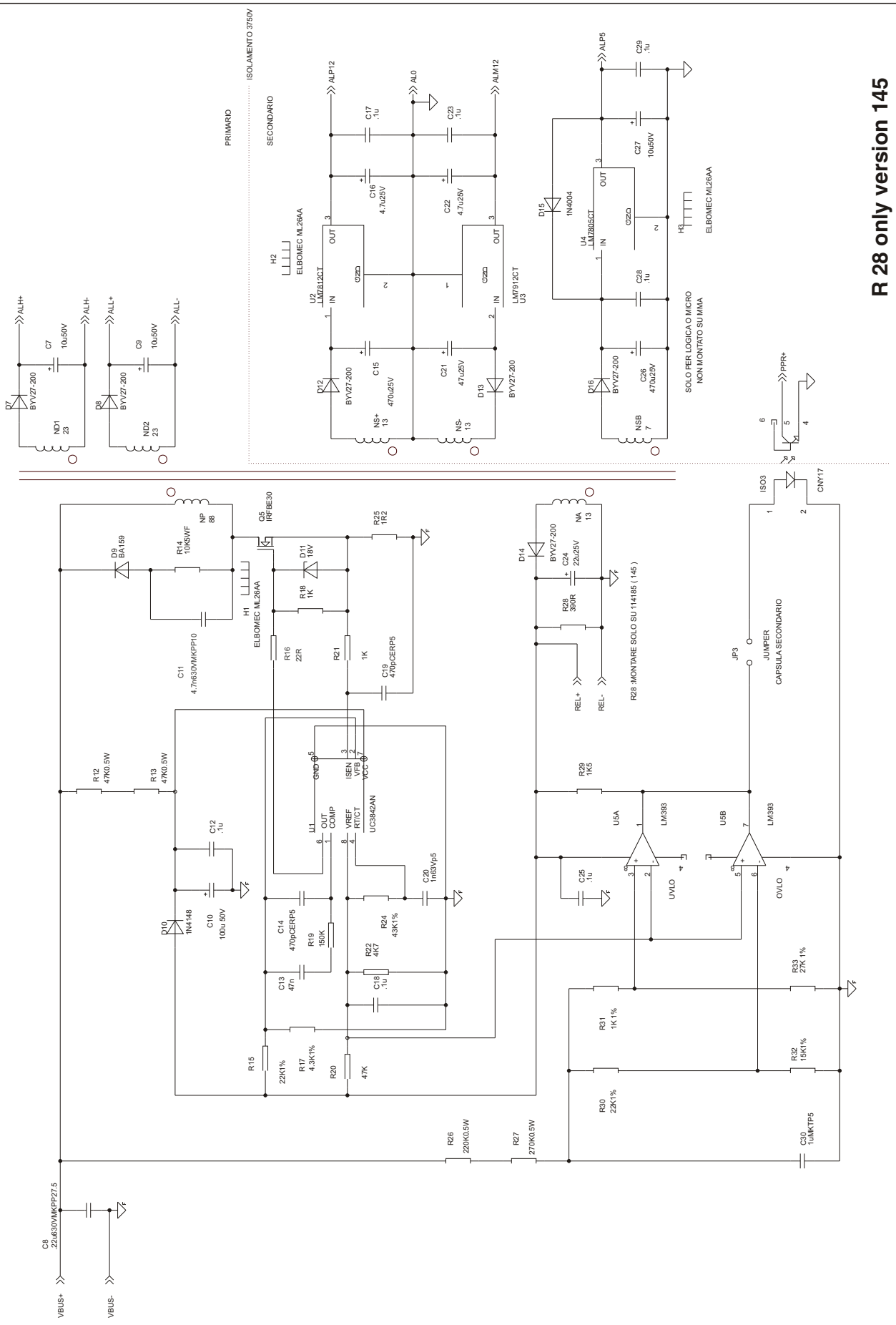
Primary circuit board wiring diagram



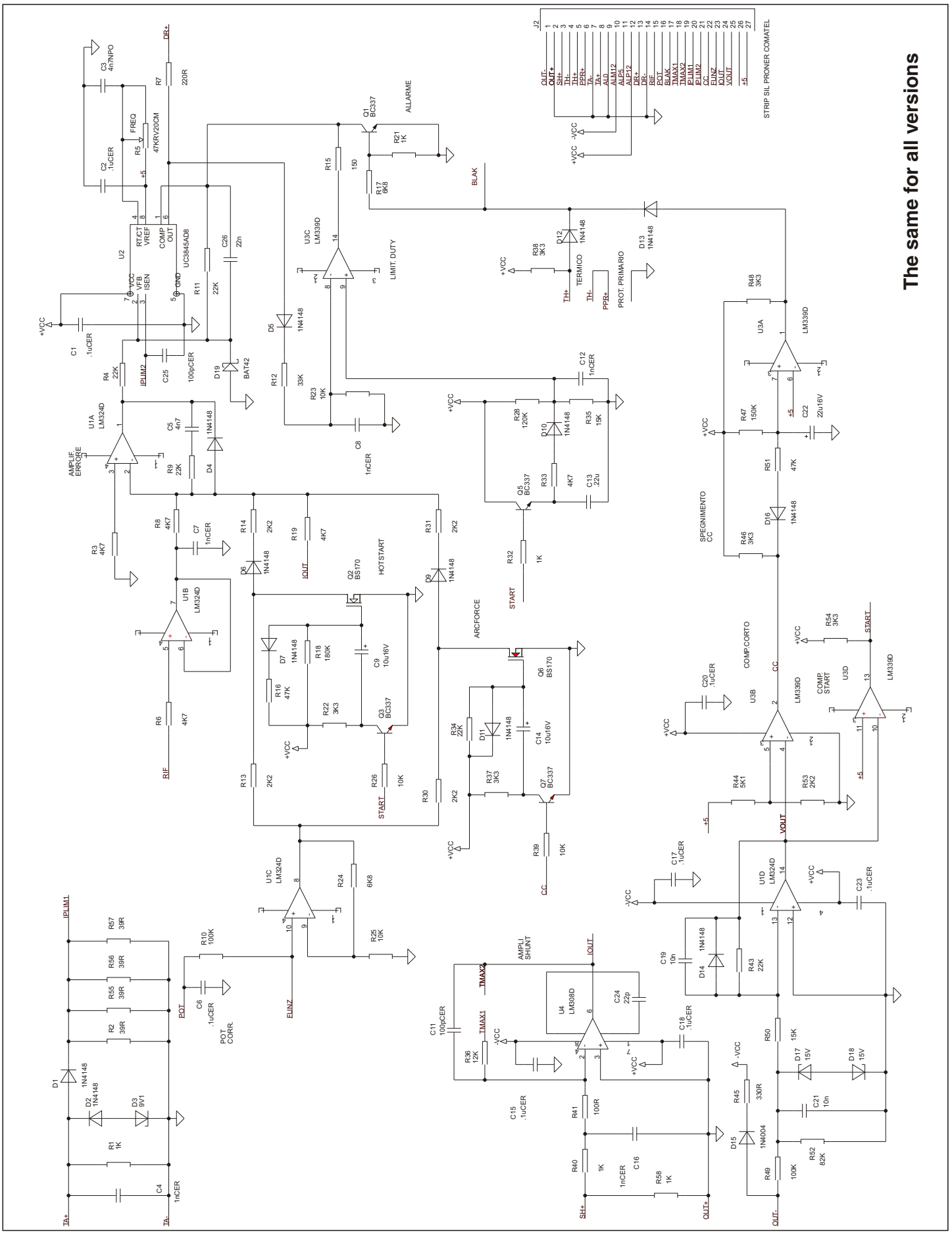
Driver wiring diagram



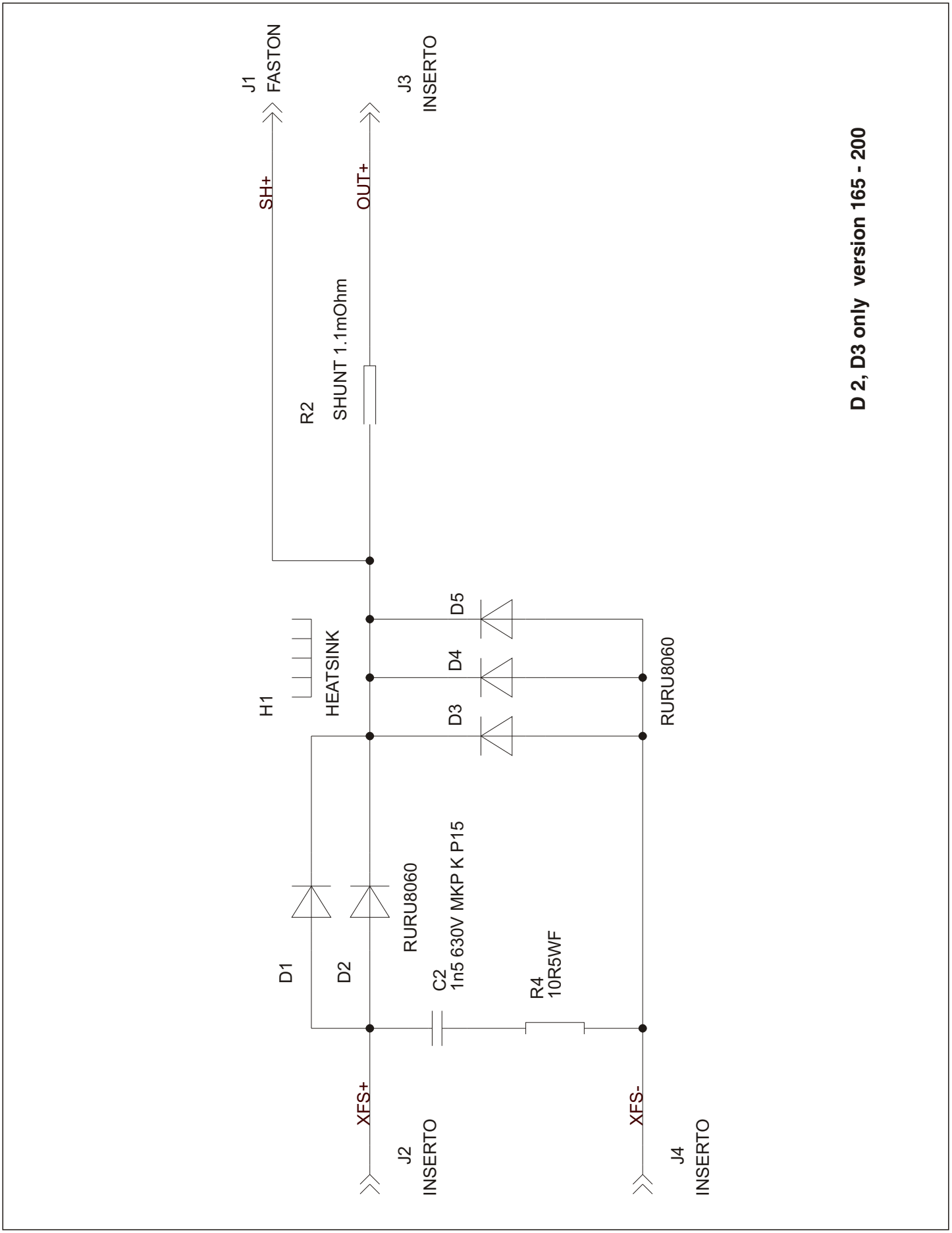
Switching auxiliary power supply unit wiring diagram



SMD module wiring diagram



Secondary circuit board wiring diagram



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