



BROADCAST EQUIPMENT COMPANY

USE AND MAINTENANCE MANUAL

E3T
E4T



TECHNICAL ANNEX



Via G. Amendola 9 - 44028 Poggio Renatico (FE) - Italy
Tel. +39 0532 829 965 - Fax +39 0532 829 177
E-Mail: info@elenos.com
Web : www.elenos.com

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Dear Client,

First of all, thank you for having chosen an **ELENOS** product.

ELENOS product line comprises 20 W to 30 kW maximum output power transmitters using solid state or thermionic tube technology.

Designing of protection circuitry in our apparatuses has been done with the utmost care for their better interfacing with other firms devices. Anyway the best performances of our products are obtained when they work together with other **ELENOS** devices.

Our products have been designed to grant invariable performances in time without requiring particular maintenance operations. Upkeeping of our apparatuses, in fact, consists substantially in controlling periodically the correct working of ventilating elements.

Using our devices is very simple and intuitive; however, we recommend you to read carefully this manual and its annexes before undertaking any action.

The Management

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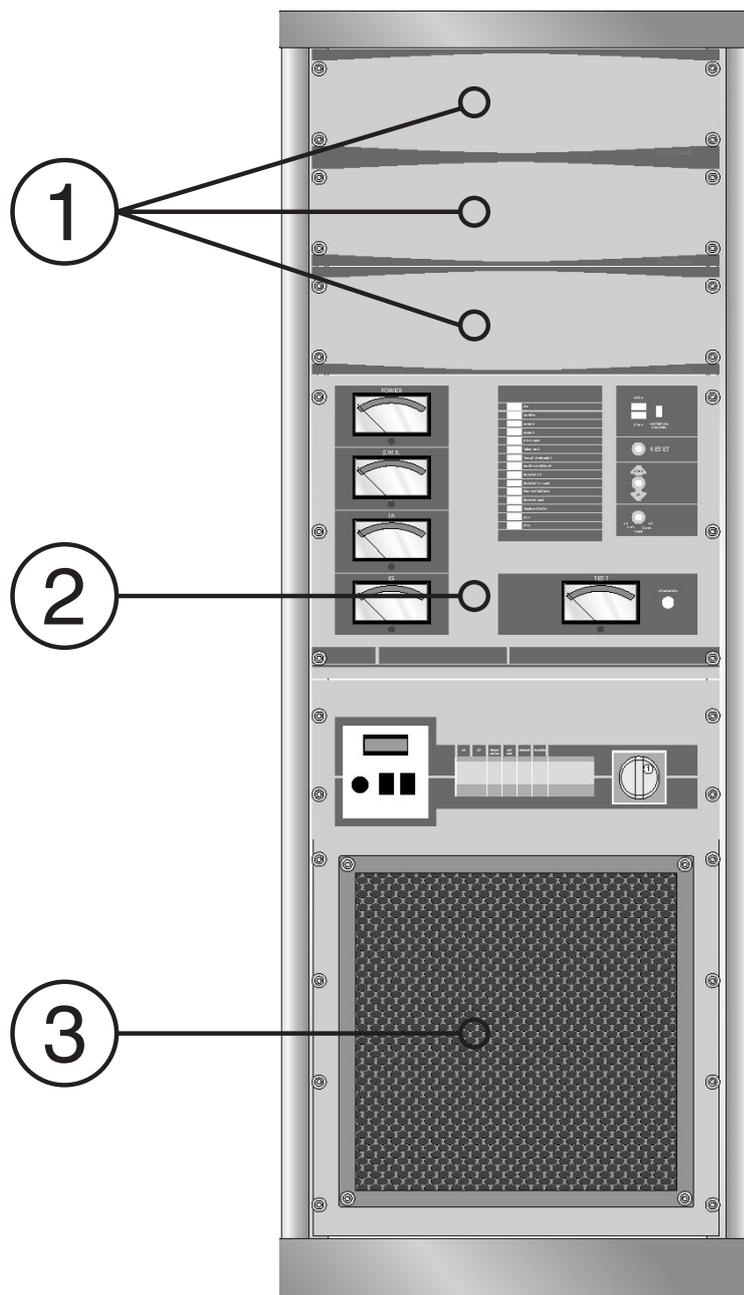
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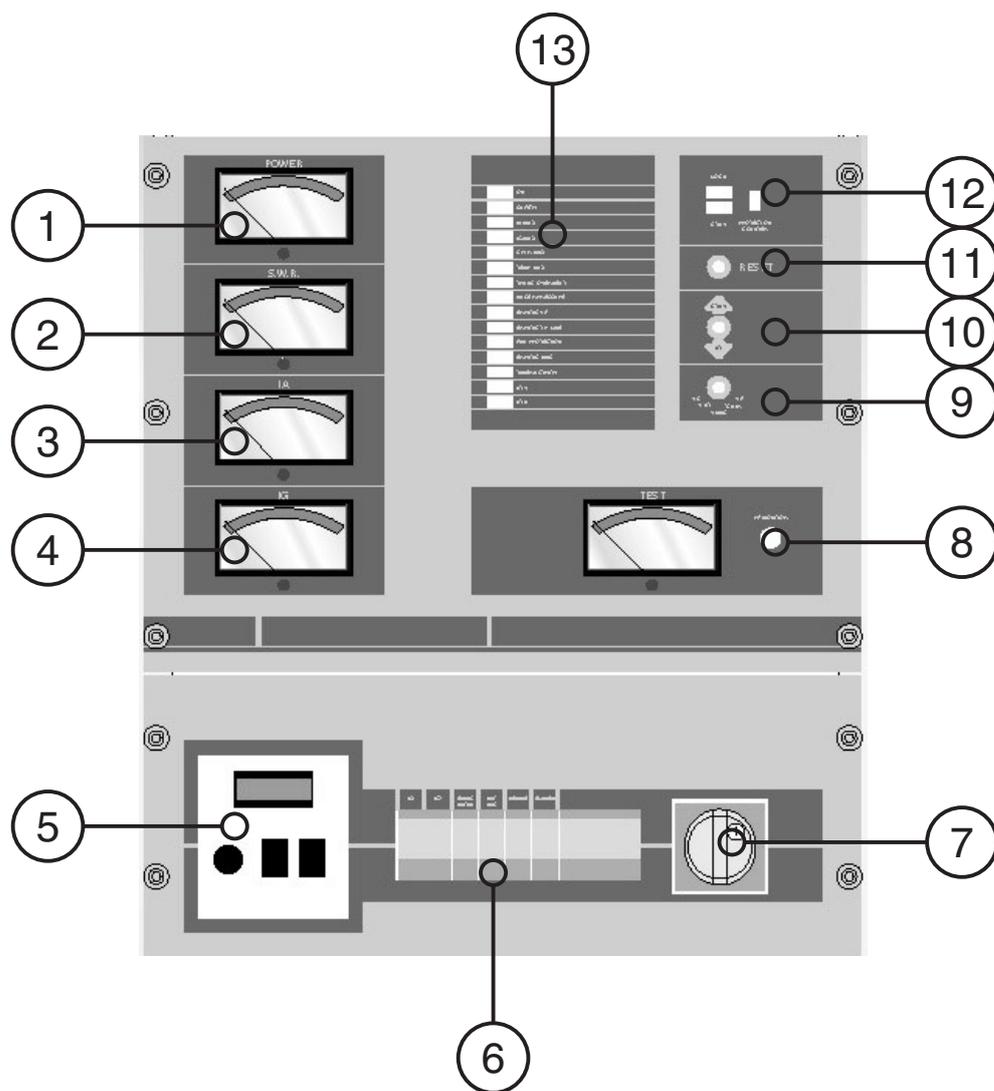


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1.1.
Fron view

- 1** Other devices hosting slot
(modulators, secondary amplifiers, telemetry)
- 2** Control panel
- 3** Cooling air intaking grid

1.1.1.
Control panel



REF. DESCRIPTION

- | | |
|-----|-----------------------------------|
| 1) | Forward power meter |
| 2) | Reflected power meter |
| 3) | Anode current meter |
| 4) | Grid current meter |
| 5) | Tuning engine control and counter |
| 6) | Fuses |
| 7) | Main switch |
| 8) | Test meter |
| 9) | Test switch |
| 10) | High voltage stand-by |
| 11) | Reset |
| 12) | Protections counter |
| 13) | Protections control |

- 1.1.2. Meters
- ☞ POWER measures the output radiofrequency power; its full scale value is 10 or 25KW.
 - ☞ S.W.R. measures the reflected radiofrequency power on the antenna connector; its full scale value is 1KW.
 - ☞ ANODE measures the thermionic tube's anode current; its full scale value is 2 or 5A.
 - ☞ GRID measures the thermionic tube's grid current (g2); its full scale value is 100mA.
 - ☞ TEST, measures different subjects depending on the rotating selector position:
 - a) when selector is positioned on V. HT the instrument measures the anode supplying voltage; its full scale value is 10KV;
 - b) when it is positioned on V. BIAS, the meter measures the bias voltage between cathode and grid (g1); its full scale value is 200 Vdc ;
 - c) on C. AIR position it measures the temperature of the air coming out of the RF unit; the full scale value is 100 °C;
 - d) when selector is positioned on V.F. the meter measures the filament voltage; its full scale value is 10Vac.
 - e) V.C. position is used to calibrate all the instruments provided with a pointer; all meters must be set on their maximum value by means of semifixed regulation trimmers which are on E20131 board; E20131 is located in the internal side of the front panel (see electrical schemes); this operation is useful when substituting a broken meter.

It is moreover possible to observe the spectrum of the radio-frequency signal delivered through the RF MONITOR connector, directly reproducing the output signal, properly attenuated (-60 dB).

- 1.1.3. Alarms
- The SAFETY flasher indicates that the apparatus does not have the safety conditions to operate with high voltages, and therefore under "protection status". This may happen when some panel has been opened or some particularly important internal connector was not fixed correctly.

The protection status involves the interruption of the supply of anode voltage and of the thermionic tube protection grid (working with high voltage) as well as the interruption of the power supply of the modulator, like the stand-by status imposed by the operator. Remember that the control grid bias will be present as soon as the main supply isolator is closed.

In case the value of any supervised variable (reflected power, anode current, screen grid current and temperature of the hot air leaving the amplifying cavity) exceeds a certain limit, the control system suspends the apparatus from functioning. Yet, it attempts restoration and keeps traces of the event, increasing the counter of the alphanumeric display PROTECTION COUNTER located on the front panel. Regarding those variables which is not possible to check when the apparatus is not functioning, the above mentioned attempts are usually carried out every three seconds. Also the automatic attempts of functioning restoration increase the counter, even if malfunctioning causes are different.

After 8 automatic restoration attempts the apparatus stops. This status is reported on the front panel by the pilot light LOCK.

The RESET button cancels the automatic stop of the transmitter.

1.1.3. Alarms The pilot lights IA MAX, IG MAX, S.W.R. MAX, TEMP. MAX, TRANS. OVERHEAT, UNDER PRESSURE, ERRATIC V.F., ERRATIC T.P. LINE, FAN PROTECTION, ERRATIC BIAS, indicate irregular events provoking the respective protections.

✎ IA MAX indicates that the maximum limit of anode current has been exceeded. This may be due to excessive output power (in this case reduce the excitation power) or by an incorrect tuning of the anode circuit: in such case proceed to a correct tuning of the circuit (see Tuning).

In case of relevant variations of input power, it is necessary to regulate the power of the system so that network fluctuations would not provoke anode current increases that may require the intervention of the protection. If the thermionic tube is exhausted, an irregular increase of anode current may be possible; the protection may intervene even in case of internal "flash" within the tube or for loss of insulation in the high voltage circuit.

✎ IG MAX indicates that the maximum limit of grid current has been exceeded (g2). This may be caused by excessive input power (in this case reduce the excitation power) or by an incorrect tuning of the anode circuit: in such case proceed to a correct tuning of the circuit (see Tuning).

In case of relevant variations of input power, it is necessary to regulate the power of the system so that network fluctuations would not provoke grid current increases that may require the intervention of the protection. If the thermionic tube is exhausted, an irregular increase of anode current may be possible; the protection may intervene even in case of internal "flash" within the tube or for loss of insulation in the high voltage circuit or the grid power supply circuit.

✎ SWR MAX indicates that the maximum limit of reflected current in the radio frequency output connector has been exceeded. This happens in case of mismatch of the radiating system impedance.

✎ TEMP. MAX indicates that the maximum limit of the temperature of hot air leaving the amplifying cavity has been exceeded. The protection system attempts restoration when it registers again regular values and increases the restorations counter. This may be a consequence of excessive room temperature, dirty filtering elements, incorrect tuning of the anode circuit (low efficiency, see Tuning).

✎ TRANS. OVERHEAT indicates that the anode power supply transformer is overheated. The protection system restores functioning once the sensor of the transformer registers again a regular temperature value. This may be due to excessive room temperature, dirty filtering elements.

✎ UNDER PRESSURE indicates that the pressure of cooling air inside the amplifying cavity is not enough. The protection system restores functioning once the pressure sensor registers that the values of pressure are once again sufficient. When the protection is active the power supply of the thermionic tube filament is disconnected (ERRATIC VF. pilot light turned on).

This may be due to a stoppage inside the filtering elements, or to malfunctioning of the cooling turbine.

✎ ERRATIC VF indicates that the tension of the filament at the base of the thermionic tube is not correct. The protection system restores functioning only when the value returns within a 5% tolerance.

Upon turning the apparatus on, it is normal that this indication remains active for about ten seconds. This is due to the fact that the feeder of the filament is connected only after the pressure of cooling air has reached a satisfactory value; then the filament voltage is gradually supplied (in order to avoid stress to the filament

1.1.3. Alarms

itself and to the connections of the thermionic tube base) until reaching the pre-set nominal value. At this point the pre-heating cycle is turned on, indicated by the TIMER ACTIVITY pilot light, and lasts about 5 minutes. At the end of such cycle, the anode power supply, screen grid supply and exciter devices supply are gradually connected in sequence.

In case of short failure in the power supply network, or of the cooling air pressure (less than one second) during regular functioning, the control system skips the pre-heating cycle in order to optimise time saving.

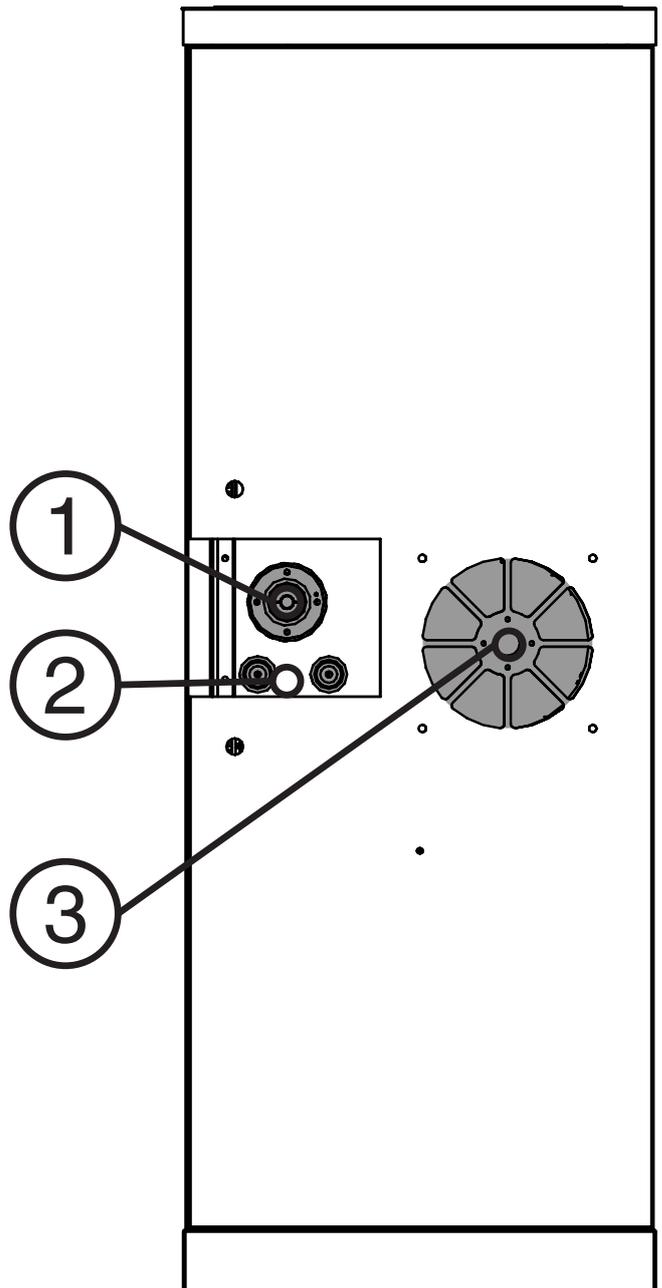
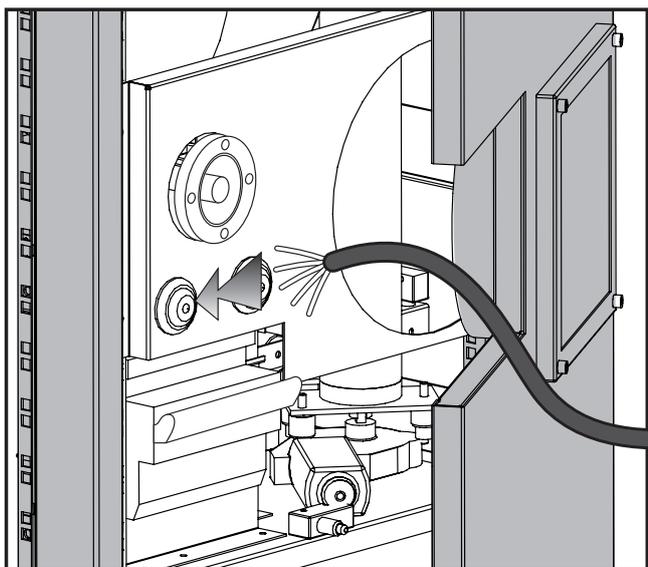
- ✎ ERRATIC T.P. LINE (lack of phase) indicates the intervention of protection over phases supervision. The protection system automatically restores functioning as soon as the irregular event stops (recovery of missing phase). The lack of phase is usually due to a failure in the electrical system, or to a failure in the distribution line or to the transformation box of the supplier. Warning: check the input fuses of the apparatus (at the back) and other eventual fuses on the power supply line.
- ✎ FAN PROTECTION indicates the intervention of the safety protection connected to the engine of the main cooling turbine of the amplifying cavity. The protection system does not restore functioning automatically, the intervention of an operator is required. The main cause for this irregular event is a too high or unbalanced tension (if three-phase) in the network.
- ✎ ERRATIC BIAS indicates that the control grid bias tension is not regular. The protection system does not restore functioning automatically, the intervention of an operator is required: the only way of cancelling the indication and its effects is to turn off the electrical power of the apparatus for at least three seconds. The main cause of this irregular event is due to short-circuits, permanent or not permanent, towards the chassis or any other electric junction of the control grid supply circuits, often indicates exhausted or damaged thermionic tube.

1.1.4. Tuning control

The two buttons with two stages (high) and (low) regulate the tuning of the apparatus (see also the next chapter "Tuning") :

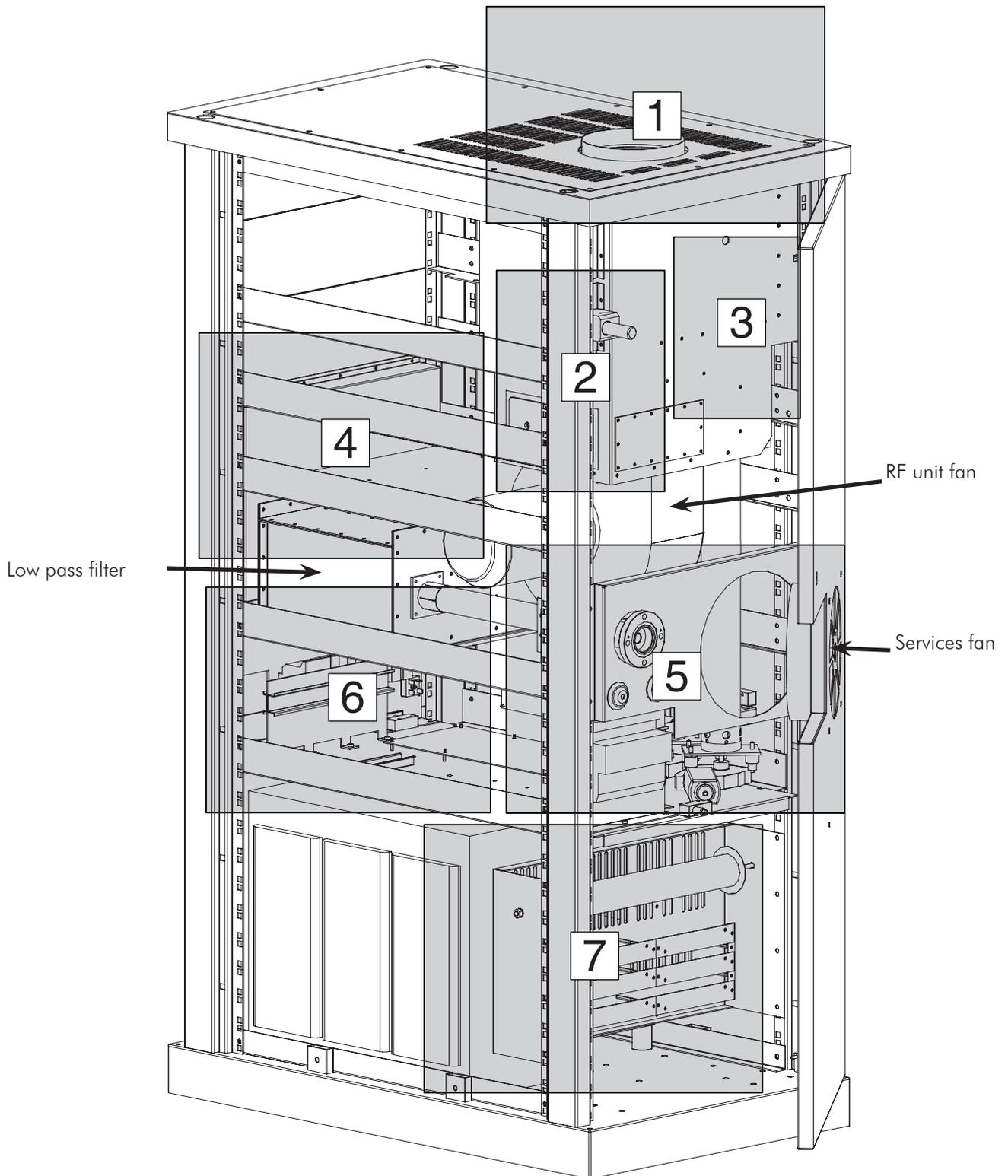
ANODE IMPEDANCE (upper left). Regulates the impedance match value between the thermionic tube anode and the radiating system. If turned upwards it raises anode impedance and vice versa.

ANODE TUNING (upper right). Regulates the anode output tuning frequency. If turned upwards it tunes high frequencies and vice versa.

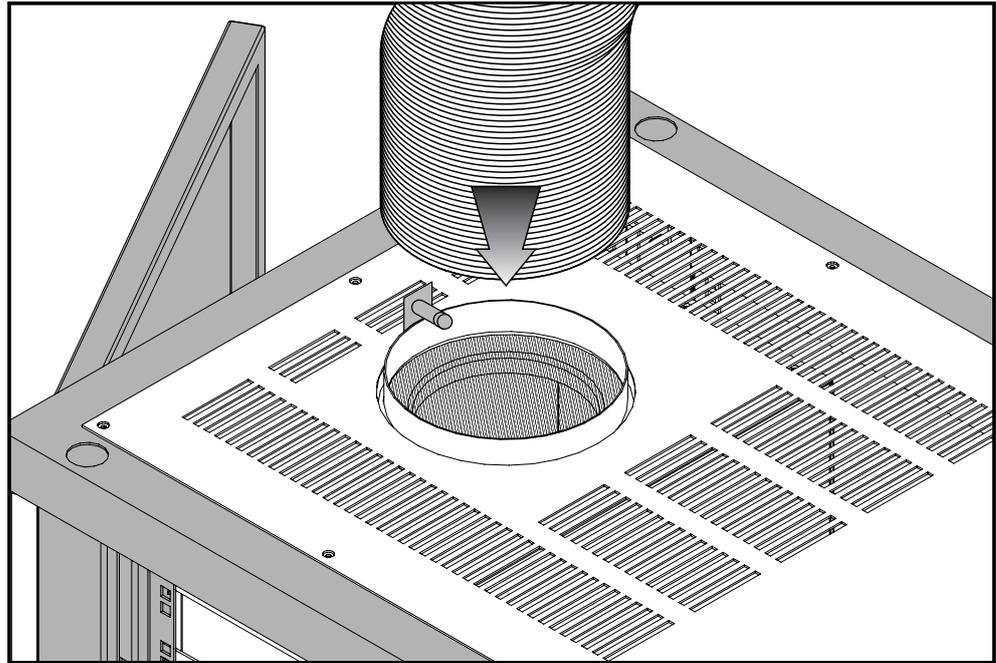
1.2.
Rear view

- 1** RF output power connector
- 2** Power supply input
- 3** Fan

- 1.3. Internal view
- 1 ➔ Exhausted air thermal probe
 - 2 ➔ High voltage discharging device
 - 3 ➔ RF unit
 - 4 ➔ Grids power supply (Tetrode only)
 - 5 ➔ RF output and line connector
 - 6 ➔ Services
 - 7 ➔ Anode's power supply



1.3.1.
Exhausted air thermal
probe



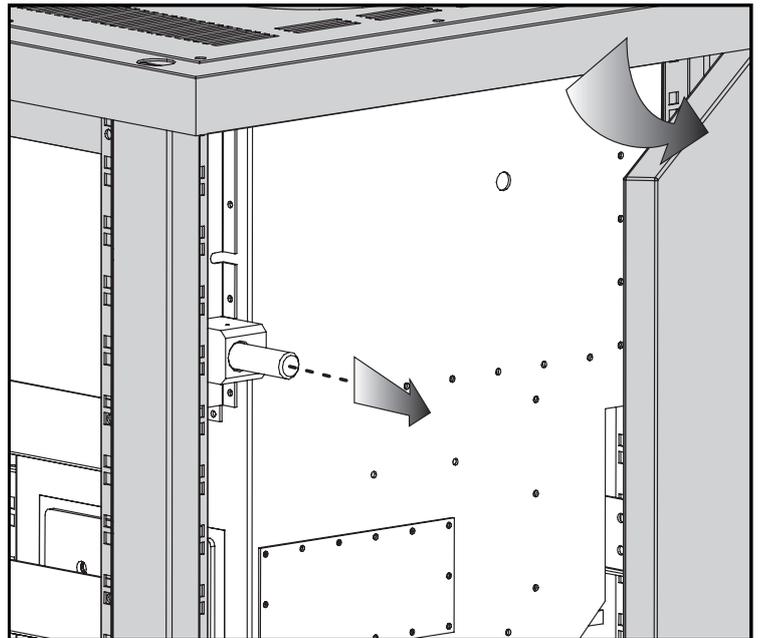
The thermal probe is the metal cylinder mounted on a sheet metal (evidenced in grey color in the figure above)

To canalize exhausted air remove the sheet metal fixing screw and insert the wrinkled tube in the flange from which air exits (diameter 160mm); fix the tube with a proper clamp if necessary.

Make a proper hole in the wrinkled tube, insert the thermal probe in it and tighten the screw.

The thermal probe must be fixed with the proper screw to ensure its electrical contact with the case.

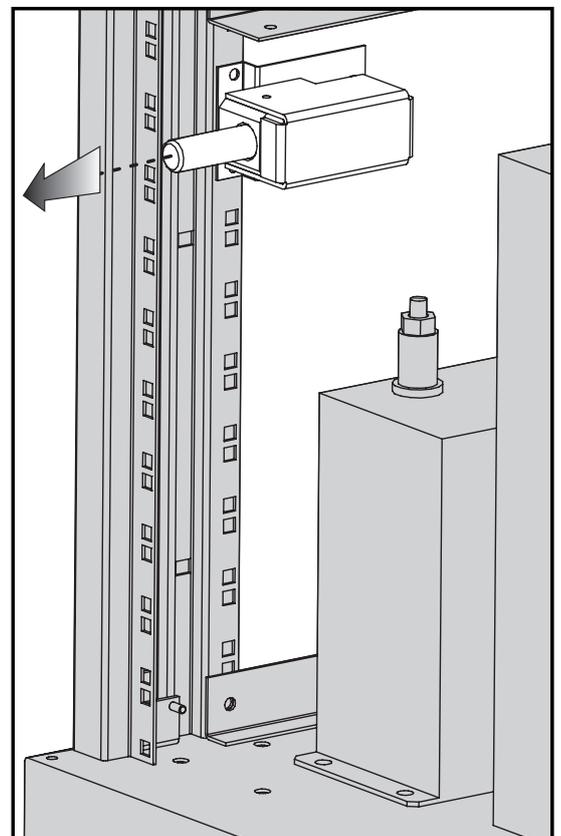
1.3.2.
High voltage
discharging device



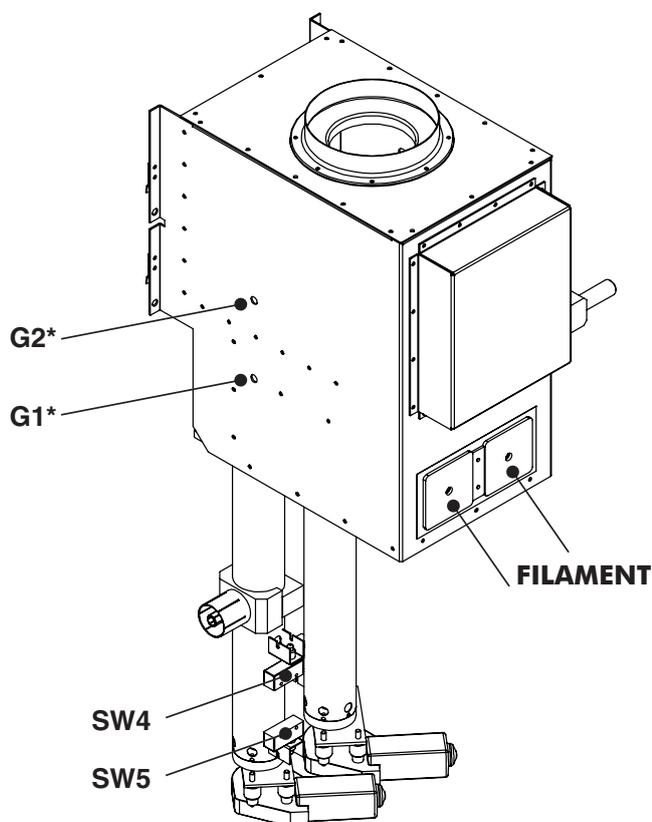
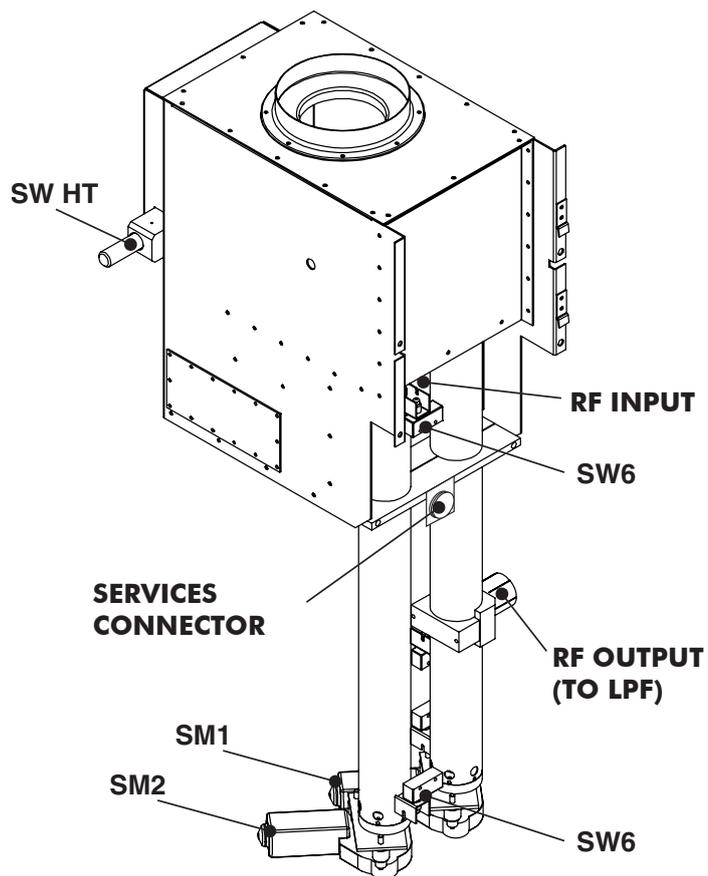
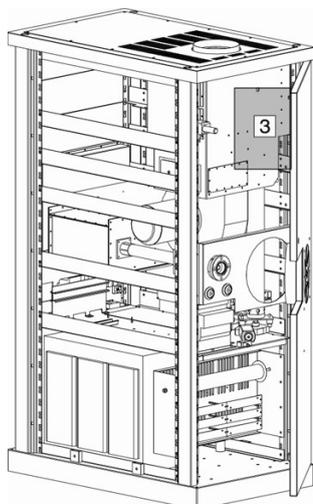
In the figure above is pointed out the anode supplying short circuit device that starts up when the back door is opened; this device is inserted in the RF unit.

The figure below shows the anode supplying short circuit device that starts up when the front panel of the anode supplier is removed.

Both the opening of the back door and the removal of the front panel cause the interruption of the anode's supplying by means of microswitches located on the services level (see SW2 and SW3 in the main electrical scheme):

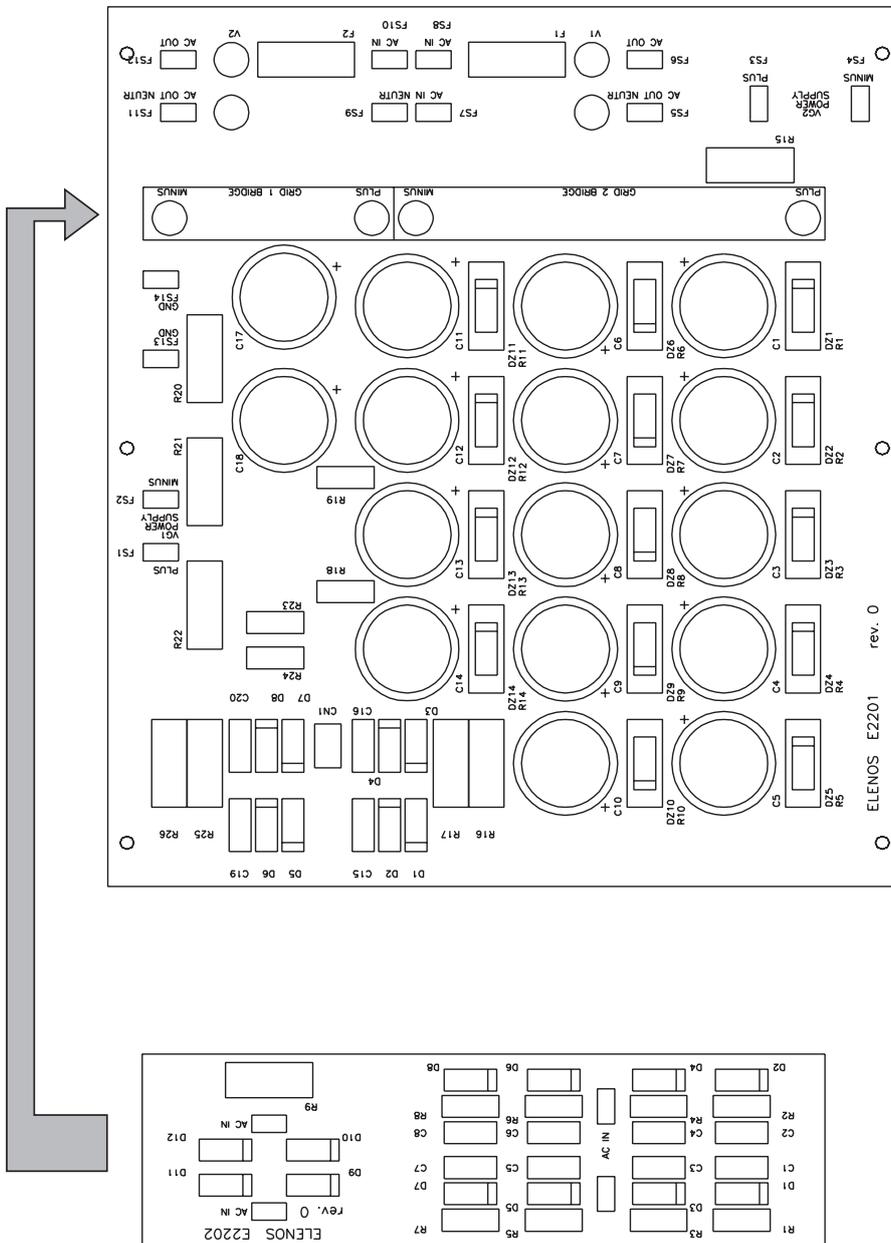
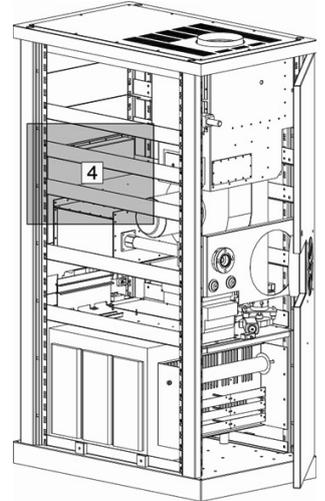
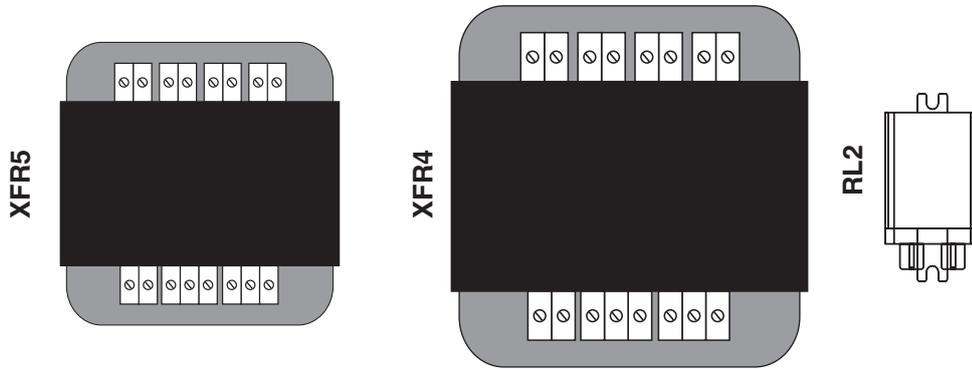


1.3.3.
RF unit

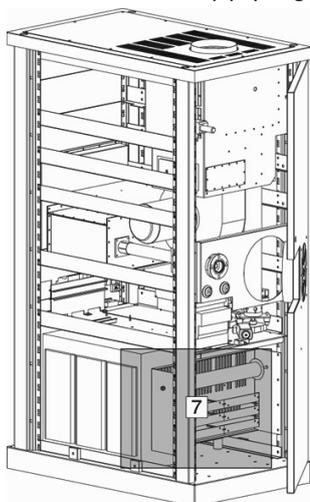


*: TETHRODE ONLY

1.3.4.
Grids power supply
(Tetrode only)



1.3.5.
Anode power
supplying

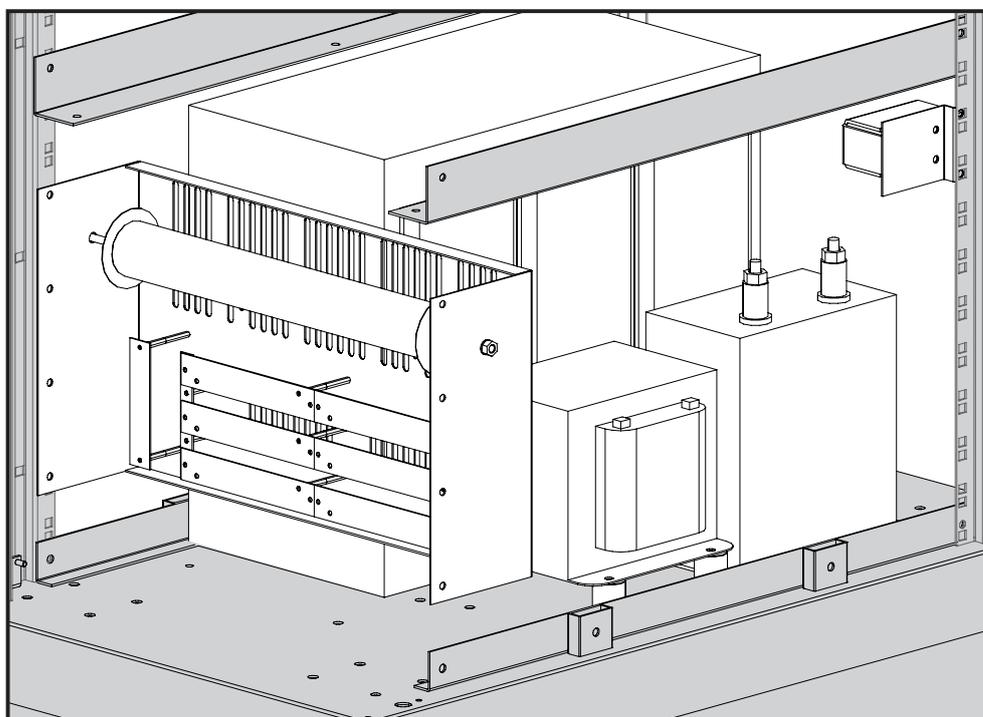


WARNING

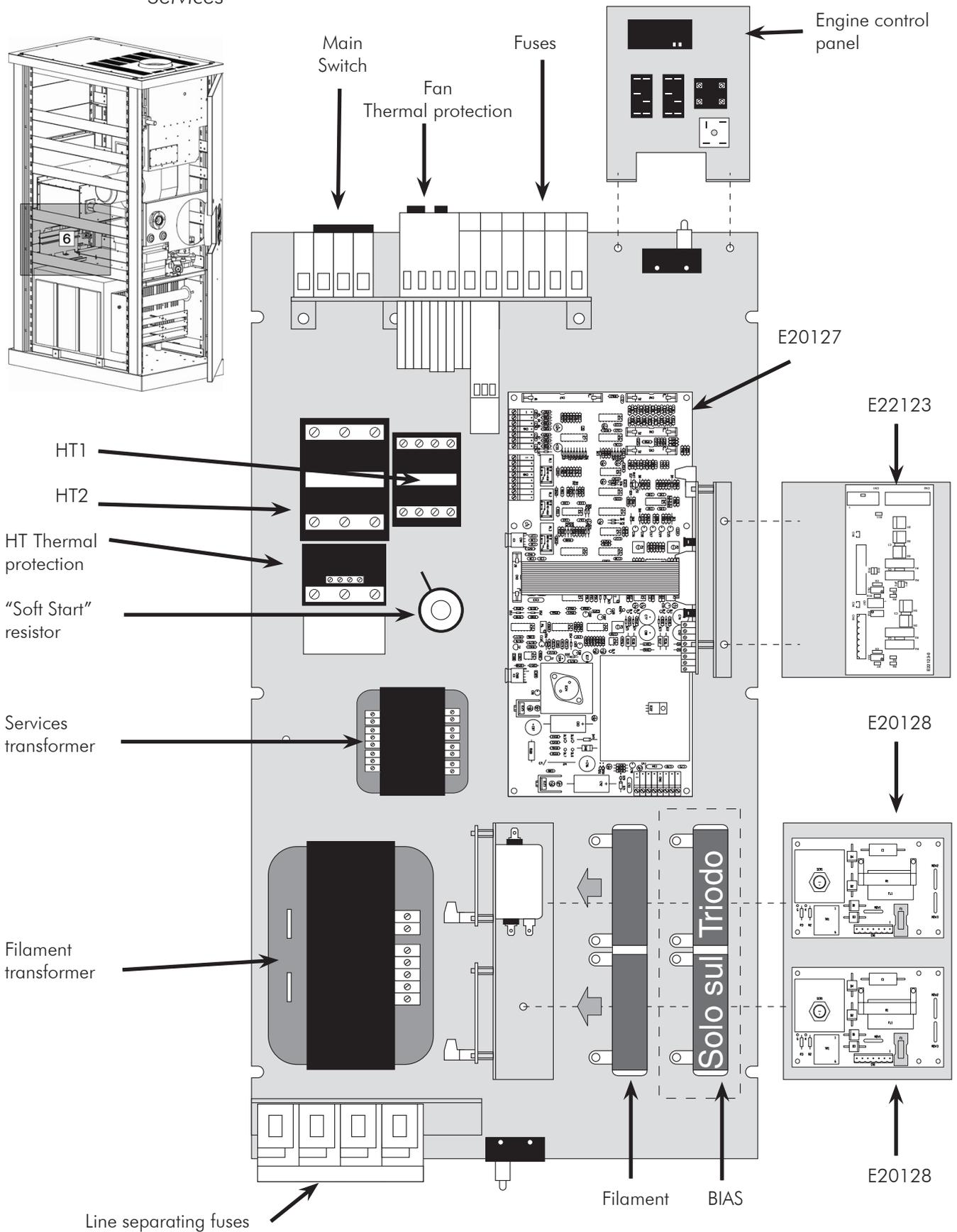


CAUTION WHEN WORKING IN THIS PART OF THE DEVICE!!!

**MAKE SURE THAT THE DEVICE IS DISCONNECTED FROM THE LINE AND
THE DISCHARGING DEVICES HAVE BEEN ACTIVATED ON THE OPENING
OF THE PANELS**



1.3.6.
Services



1.4.
Tube's warranty

Eimac products are guaranteed for any kind of defect exclusively due to materials damage and to the forwarding agent.

The warranty is based both on the time elapsed since the purchase and the period the filament has been working, especially on the time elapsed since the shipment of the product from Eimac, the time since its shipment from the retailer to the Customer and its working time.

Warranties are determined by the code indicated in the following table:

	CONSIGNMENT	CONSIGNMENT	TUBE'S LIFE
CODE	From EIMAC	To Client	Filament
T	24 MONTHS	24 MONTHS	10.000 HOURS
R	24 MONTHS	12 MONTHS	5.000 HOURS
P	24 MONTHS	12 MONTHS	4.000 HOURS
N	24 MONTHS	12 MONTHS	3.000 HOURS
K	24 MONTHS	12 MONTHS	1.000 HOURS
L	DURATION TESTED BY THE MANUFACTURER		
12	24 MONTHS	12 MONTHS	

The last category includes hardware products or accessories which warranty is based only on the time elapsed.

The Manufacturer (OEM) or any Eimac authorised distributor may keep in store any product for twelve months, without compromising the total validity of the warranty. For example, code T is guaranteed for 36 months from the shipping date from Eimac, or 24 months, from the date of shipment to the Customer, or else 10.000 working hours of the filament, no matter what has happened before.

A faulty product (due to materials damage or to the forwarding agent responsibility) during the first 10% of the warranty period will be substituted by Eimac without charges, or the 100% of the price will be credited through an Eimac authorized Distributor or an OEM.

In case the defect turns up during the remaining period (from 10 to 100% of guaranteed time) a proportional adjustment will be calculated, from which your credit will result.

This can be carried out through the original manufacturer (OEM) or an authorised Eimac Distributor.

The proportional credit is calculated in the following way:

$$\frac{\text{Warranty (hours)} - \text{Working time (hours)}}{\text{Warranty (hours)}} = \% \text{ Credit}$$

Therefore, for Code N (3000 hours), in case the defect turns up after 600 hours and if it proves to be due to material damages or to a mistake of the forwarding agent, it will result:

$$\frac{3000-600}{3000} = 80 \%$$

Valves to be returned for a warranty request must be sent to the manufacturer (OEM) or to the Eimac authorised Distributor from which they have originally been bought.

If the valve is directly returned to Eimac, and in case there are special instructions, OEM or the Eimac authorised Distributor from which it was purchased will have to make a report.

1.4.
Tube's warranty

All products returned for a warranty request must be sent F.O.B. and accompanied by a complete copy of the service report card, always included in all products.

No warranty request will be taken into consideration without the above mentioned form duly filled out.

In order to establish the precise date and selling price, one copy to the original invoice, of the bill of sale, or of any other related document must be attached to the service report card form duly filled out.

Guaranteed products must always be returned in their packaging and with Eimac original materials.

Damages due to transport in inadequate packaging will preclude any kind of warranty, since this kind of damage usually prevents any kind of test or measurement.

Valves must not be sent by mail.

Warranty of the different valves:

Model	Months	Hours	Code
3CX800A7	12	3000	N
3CX1500A7	12	3000	N
3CX3000A7	12	5000	R
3CX15000A7	12	3000	N
4CX3500A	12	5000	R
4CX5000A	24	10000	T
4CX7500A	12	5000	R
4CX10000	24	10000	T

2.
About installation

- ☞ Remove all the elements used to transport the device paying attention not to lose accessories furnished with the apparatus.
- ☞ Unpack the anode's transformer paying attention not to damage its windings and connecting terminals.
- ☞ Check the device (internal parts too) to identify possible damages occurred during the transport; in case of damages contact ELENOS about warranty rights.
- ☞ Check the tightening of screws.
- ☞ Remove the metal bracket (red painted) that blocks the anode's supplying inductor; the inductor's covering must be insulated from earth; the bracket is needed only during the transport.
- ☞ Install the device so that it is accessible from all sides .
- ☞ The relay station must be provided with an efficient scatterer of earth
- ☞ Verify the ability of the antenna system
- ☞ Connect RF output to the antenna system
- ☞ Connect the line, paying attention to correctly insert the wires in the device's terminals; may the "UNDER PRESSURE" protection remain active after the device has been switched on, invert two phases in the main supply so that the direction of rotation of the three-phase fan is corrected.

N.B. Due to the high power of the device wires of a proper section are needed!!

In the following pages is explained how to connect the device and what to do for the starting up

3.1.
Safety norms while
using the device



To use the apparatus STRICTLY OBSERVE the following precautions and safety criteria.

ELENOS declines any responsibility whatsoever if the does not observe the necessary precautions and safety criteria, furthermore, it is not responsible for any kind of negligence during the use of the apparatus

- ➔ Always refer to specialised technicians: do not try to carry out maintenance on your own.
- ➔ Opening or removing the upper panel or other parts of the chassis, may expose you to voltages dangerous for you life
- ➔ In case of problems or malfunctioning, turn the power supply off and contact your retailer or ELENOS Customer Service.
- ➔ In case of emergency, before carrying out any operation, make sure the power supply has been disconnected.
- ➔ Currents and tensions operating in this device are dangerous, personnel must always observe safety regulations.
- ➔ Make sure that connections with the network power supply plug and with any other apparatus have been removed before opening the apparatus for internal inspections of any kind!
- ➔ Always use insulated instruments and high voltage discharge points before use.
- ➔ Do not approach the apparatus with thin and sharp metal object, nor try to insert such object through the venting grids, even if it is for cleaning purposes.
- ➔ Do not perform inside adjustments, maintenance or service operations when alone or tired.
- ➔ Some components of the apparatus contain TOXIC SUBSTANCES; in case any component should appear to be damaged, cracked or however not intact, be extremely careful towards eventual physical contact with hands or other parts of the body.
- ➔ The door on the rear side, may be unlocked only by means of tools (e.g.: padlock and key, screw and bolt).

3.2.
Before switching on

Once all connections have been carried out, perform the following checks after making sure that the external and the internal network isolators are open and the HT/ST BY deviator is in ST BY position:

1. With the back door open verify that the red metal clamp blocking the anode supply inductors has been removed; check the network connection to the clamp of the disconnectable fuse carrier, paying special attention to the correct connection of the neutral (where required) and to the ground; check the connections of the anode supply transformer, verify the proper calibration of the air pressure gauge over the amplifying chamber (30-40mBar).
2. Check that the thermionic tube has been correctly inserted, the fastening of the chimney, the position and connection of the thermic probe.
3. Verify the correct connection of the excitation devices to the network and radio frequency.
4. Verify that the switches of excitation devices are in the off position, that the frequency set is correct, that the modulator is regulated for the minimum radio frequency power.
5. Close the back door, turn the outer and inner network isolators on (on the front panel). The cooling fans and some pilot lights, among which "UNDER PRESSURE", will turn on; if such pilot light turns off within about 2-3 seconds proceed to point 6; on the contrary it indicates that the cooling fans do not produce the correct pressure because they are turning in the opposite direction than they should. In such case open the inner and outer network isolators and invert two of the three supply phases. Repeat point 5.
6. Check that pilot lights "ON", "TIMER ACTIVITY", "ST BY", "UNDER PRESSURE" turn on (for about three seconds) and "ERRATIC V.F." (for about 10 seconds). Verify that the value of bias voltage (G1) and the filament value are correct. If everything is correct the apparatus is ready to operate.

3.3.
Operational limits

The amplifier can work at maximum power with stable power supply network and load impedance, room temperature within 45 °C, humidity below 95% (not condensing), correct air conditioning, maximum altitude over sea level of 2000 metres, perfectly efficient thermionic tube.

Variations in feeding tension usually provoke radio frequency variations of about 2.5% for any unit per cent (of network tension variation); anyway, the apparatus cannot work with network tension values 15% greater or 20% lower (in regard to the inner connection nominal value). In case the feeding tension should be subject to wide fluctuations, it is opportune to adjust the apparatus under maximum tension conditions (or presumed such), maintaining a certain security margin over the power set.

The load impedance must be close to 50 Ohm and the most resistive as possible; a low value of reflected power is acceptable, as long as the impedance mismatch remains constant (stable reflected power). In case of relevant mismatch it is possible, even though not advisable, to work with a reflected power up to 500W.

If room temperature exceeds 45 °C, it is possible to operate anyway reducing the output power to radio frequency, so that the temperature of exhausted air remains below 85 °C and the anode feeding shell does not reach the temperature that causes the opening of the thermal cut-out located inside of it.

3.3. *Operational limits*

The same conditions apply to operations carried out at altitudes over 2000 metres above sea level; the maximum altitude limit (with reduced power) is of 3500 metres above sea level (for altitude we mean the equivalent atmospheric pressure, therefore if the room is ventilated through aspiration it is necessary to check its inside pressure).

The humidity level must be the lowest possible and absolutely free from condensate. It is not possible in any way to operate with humidity above 95% or in presence of condensate.

The installed thermionic tube is subject to use wear. When new it needs "running-in" (see Periodic maintenance). After one year of work the amplifier performances will surely be reduced, but not necessarily annulled. The thermionic tube must be substituted when it is impossible to reach the desired power level (-1 dB according to the regulations in force).

3.4. *Start up*

Close the outer isolator, place the lever selector of the front panel in ST BY mode, close the local isolator of the excitation devices, place the modulator in minimum power mode, close the isolator on the front panel. Pilot lights ON, TIMER ACTIVITY, ST BY, UNDER PRESSURE will turn on (for about 3 seconds) and ERRATIC V.F. (for about 10 seconds).

After about 2 minutes TIMER ACTIVITY is turned off. Place the lever selector ST BY in H.T. position, H.T.1 and H.T.2 will be activated in rapid sequence: the modulator will be turned on. Once the modulator is able to supply power, increase its value until reading anode current, then perform tuning (see Tuning).

3.5. *Instructions for use*

During a first phase the anode transformer is connected to the network through limiting series resistances for extra current, after about one second it is directly connected to the electric network and the "INTERLOCK" contact allows the modulator to work. The turning on of the HT2 pilot light indicates this second phase.

The modulator, connected through the "Driver Interlock" door, is only activated when both indications HT1, HT2 are active.

Indications HT1 and HT2 are always inactive in case of breakdown or interruption by the operator.

It is now possible to increase the power of the modulator in order to reach full rating.

3.6. **Unless otherwise agreed the apparatus is provided tuned at middle band**
Tuning **(98 MHz, see test sheet)**

Tuning regulations are motorised and carried out through button controls (UP/DOWN) located on a board in the front panel.

Two speeds are available: "FAST" and "SLOW", according to the selection made with the control key located on the front panel; the key must be kept in position when pushing buttons.

Pushing the upper button "ANODE TUNING" the tuning is shifted towards a greater frequency; the lower button operates in the opposite way; the same happens for "ANODE IMPEDANCE" (the upper button increases impedance, while the lower one decreases it).

1. Regulate the power provided by the modulator until reaching an anode current absorption (I.A.) of about 0.5/0.6 A. Select using the "FAST" key and push the button if a lower frequency must be tuned, push downwards.
Repeat the operation until reaching a relative maximum output power (POWER instruments).
2. Gradually increase the power of the modulator and retouch alternatively "ANODE TUNING" and "ANODE IMPEDANCE" until reaching relative maximum power.
3. Over 50% of the nominal power, tuning must be evaluated, it may be performed over a too high or a too low impedance.
In the first case it is impossible to reach nominal power, since the thermionic tube is working at a saturation rate: high screen grid current and low anode current highlight the situation. Lower "ANODE IMPEDANCE" and retouch "ANODE TUNING".
The second case is characterised by low screen grid current and high anode current. Increase "ANODE IMPEDANCE" and retouch "ANODE TUNING".
4. Repeat operations starting from point 2 until reaching nominal power (or the desired one). To achieve maximum efficiency it is necessary to work with minimum anode current without ever exceeding the recommended value for screen grid current; screen grid current shall be about the recommended value.



WARNING



Please remind that any regulation of (ANODE IMPEDANCE) shall be carried out through consecutive short steps and must be followed immediately by compensating regulations of (ANODE TUNING) in order to bring the output power to the relative maximum, and therefore also the electrical performance of the apparatus. These indications apply to output tuning, it is nevertheless necessary to operate optimising regulations of the input tuning as well. These must be performed during the different steps in order to maintain the value of reflected power detected on the "driver", always to the minimum.

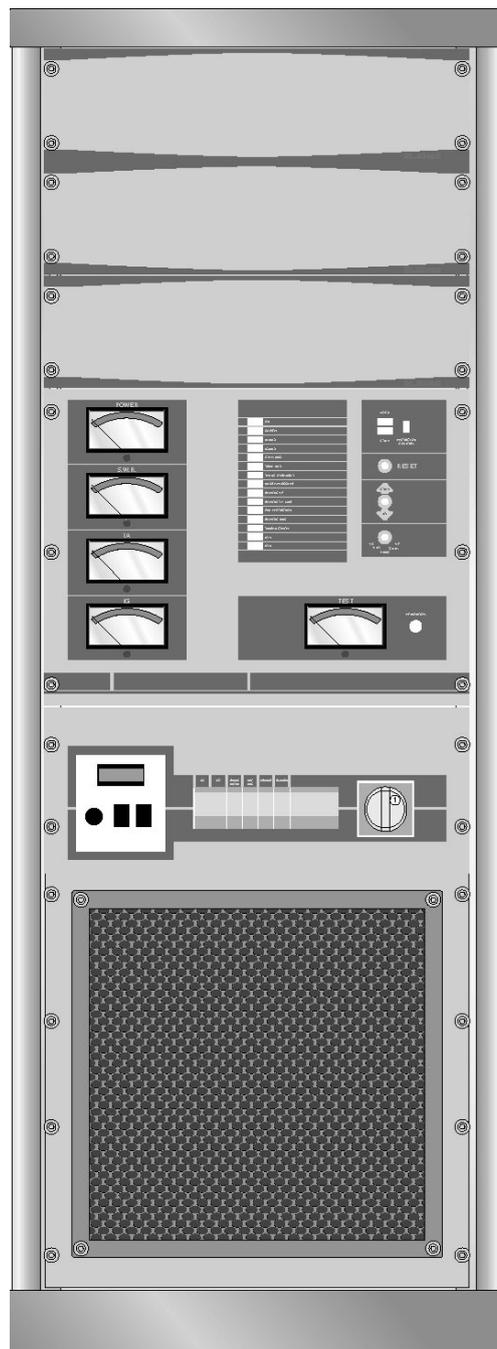
4.1. Describing the device

The apparatus composing the E4T-E3TxxK family are thermionic tube amplifiers for FM broadcasting (total deviation 150KHz - other deviations upon request), designed to operate in the band included between 87,5 and 108 MHz.

They are endowed with a wide band input band input circuit (no tuning is needed) and with an output circuit provided with a motorised tuning adjustment and adaption to load.

They are conceived as the final stage of a broadcasting system including a modulator and other possible intermediate amplifying stages located in the same mechanic structure.

Dimensions are 560 (L) x 910 (P) x 1590 (H + 100 for air outlet tube) mm.



4.2. *Amplifying circuit* Uses a thermionic tube ground-grid configured. The unput circuit is of broadband type (no tuning operation is needed) and the output circuit regulates tuning according to frequency and adaption to load.

4.3. *Low pass filter* Located inside the rack and being an integral part of the amplifier, it suppresses the harmonic component in the carrier frequency.
The filter grants and measures the characteristics of the amplifier (power, performance, spectrum purity, etc.)

4.4. *Anode's supply* It is obtained through a six-phase rectifier with an inductive input smoothing filter. The filter output is connected to the anode circuit through a resistance (with adequate power and insulation) limiting the power in case of electric arcs within the amplifying cavity or the thermionic tube itself. A protection has been included over maximum power.
The insertion of the transformer in the network implies a premagnetisation circuit (limiting power through resistances) to avoid peaks in the network and stress to rectifiers and capacitors.

4.5. *Control grid supply* It is turned on togheter with the supply of the apparatus services: the feeder is not stabilised and has low impedance. A protection has been included over maximum power.

4.6. *Shiedl grid supply* It is turned on through relay only when anodic tension exceeds a prearranged value: the feeder is not stabilised and has low impedance. A protection has been included over maximum power.

4.7. *Filament supply* Stabilised in alternating current (phase partialization regulated on true value effective) with a 1.5% accuracy. In order to avoid stress to the socket and filament of the thermionic tube, a soft start is granted by a slow progressive tension rise.
Activated only in presence of correct pressure within the RF chamber (correct functioning of the cooling system).
Protection has been included over minimum and maximum power. An adjustment point has been provided in order to optimise voltage values.

4.8. *Protections* Control circuits guarantee the functioning of the apparatus within safety parameters: where possible, they have been implemented with self-reset logic. For any detail on their functioning see the chapter "use instructions - malfunction indicators".

4.9. *Tuning* Only to be carried out for the output circuit (the input circuits is broadband) through double-speed servodrives, activated by button panel and controlled by a key-operated switch (anti-tampering).

5.1.
*Description and how
to read electrical
schemes*

The first part (5.2.) includes specific electrical diagrams, the second part (5.3.) those for triode version, while the third part (5.4.) includes the common ones.

The first diagram is the general one for the apparatus, in triode or tetrode version (specific diagrams for each version).

This diagram includes all electrical parts or assemblages with their respective interconnections.

The part list includes interconnection components and accessories, excluding those located on the electronic boards (which have their own numbering) and of the amplifying chamber, which are treated and recalled as components (even though the parts they are composed by are drawn).

The value (or size) of some components varies according to the kind of thermionic tube employed and to network voltages (three phase power supply). The part list of these components has been organised in tables for each kind of tube, for both working voltages (220 and 380V).



WARNING



The connection of the transformer secondary must be adequate to the kind of thermionic tube used!!!

Afterwards, detailed electrical diagram are included for each part (electronic boards, accessories, amplifying cavity) accompanied by the respective lists of components, illustrated in full exploded view.

Schema elettrico principale A3

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	SEE TABLE			
2	1	CN1	VDE FEMALE				
3	2	CN2 - 30	CONN. MALE 2	MODUII	AMP		
4	6	CN3 - 13 - 14 - 21 - 29 - 37	CONN. FEMALE 2	MODUII	AMP		
5	4	CN4 - 6 - 8 - 19	CONN. FEMALE 4		AMP		
6	4	CN5 - 7 - 9 - 20	CONN. MALE 4		AMP		
7	3	CN10 - 11 - 35	CONN. FEMALE 7		WIELAND		
8	2	CN12 - 43	CONN. FEMALE 10	MODUII	AMP		
9	2	CN15 - 31	CONN. FEMALE 8		RS		
10	2	CN16 - 18	CONN. FEMALE 6		WIELAND		
11	4	CN17 - 39 - 40 - 42	CONN. FEMALE 20				
12	1	CN22	CONN. FEMALE 24		AMP		
13	1	CN23	CONN. MALE 24	SEE RF UNIT	ELENOS		
14	3	CN24 - 32 - 33	CONN. FEMALE 4	MODUII	AMP		
15	2	CN25 - 26	CONN. FEMALE 2				
16	1	CN27	CONN. FEMALE 3		AMP		
17	1	CN28	CONN. MALE 3		AMP		
18	2	CN34 - 36	CONN. FEMALE 8		WIELAND		
19	2	CN38 - 41	CONN. FEMALE 40				
20	2	CN44 - 45	CONN. FEMALE 1				
21	4	D1 - 2 - 3 - 4	DIODE RECTIFIER	SEE RF UNIT	ELENOS		
22	1	D5	DIODE BRIDGE				
23	6	DA1 - 2 - 3 - 4 - 5 - 6	RECTIFIER ASSY	E nnn	ELENOS		
24	1	E2201-0 E2202-0	GRIDS PSU ASSY		ELENOS		
25	1	E20131-0	FRONT PANEL BRD	E20131-0	ELENOS		
26	1	E20127-1	PROTECTION BOARD	E20127-1	ELENOS		
27	1	E22124-0	H. T. DETECTOR	E22124-0	ELENOS		
28	1	E22123-0	SHUNTS BOARD	E22123-0	ELENOS		
29	2	E22128-3	FILAMENT PSU B.	E22128-3	ELENOS		
30	1	E22130-0	CLAMP BOARD	E22130-0	ELENOS		
31	1	E20138-T	H.T. ATTENUATOR	E20138-T	ELENOS		
32	3	F1 - 2 - 3	FUSE (MAINS)	SEE TABLE			
33	1	F4	FUSE (NEUTRAL)				
34	1	F5	FUSE (FIL. PSU)	10x38 10A			
35	1	F6	FUSE (AUX PWR)	10x38 4A			
36	1	F7	FUSE (ECITER)	10x38 10A			
37	1	F8	FUSE (TUNING MOT.)	10x38 10A			
38	1	F9	FUSE (G1 PSU)	10x38 4A			
39	1	F10	FUSE (G2 PSU)	10x38 4A			
40	1	FAN1	RADIAL FAN BLOW.				
41	2	FAN2 - 3	AXIAL FAN BLOW.				
42	1	L1	INDUCT. IRON CORE	SEE TABLE	ELENOS		
42	1	LPF1	EMI FILTER				
44	4	M1 - 2 - 3 - 4	CONN. SCREW 4				
45	4	M5 - 6 - 7 - 8	CONN. SCREW 2				
46	1	NONE	JUMPER 3				
47	1	NONE	HEAD. CONN. SCRW				
48	1	NONE	HEAD. CONN. SCRW				
49	1	PF1	PORTAFUSE				
50	6	PF6 - 7 - 8 - 9 - 10	PORTAFUSE				

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
51	2	SM1 - 2	SERVOMOTOR	SEE RF UNIT			
52	2	R1 - 2	RESISTOR				
53	1	RA1	RESISTOR ARRAY				
54	1	RA2	RESISTOR ARRAY				
55	1	RL1	RELAIS MAINS PHASE CONTROL			CROUZET	EWS
56	1	RL2	RELAIS				
57	1	SW1	SWITCH MAINS		TE		
58	1	SW AUX1	SWICHT MAINS AUX. CONTACT			TE	
59	1	NONE	MAIN SWITCH PANEL HEADER			TE	
60	2	SW2 - 3	SWITCH LIMIT				
61	4	SW4 - 5 - 6 - 7	SWITCH LIMIT	SEE RF UNIT			
62	2	SW8 - 9	SWITCH TOGGLE				
63	1	SW10	SWITCH KEY		TE		
64	1	NONE	SWITCH KEY CONT.		TE		
65	1	SW11	SWITCH PRESSURE	SEE RF UNIT			
66	1	SWMA1	MAGNETOTHERM.	SEE TABLE	TE		
67	1	CA1	AUX. CONT. SWMA1	SEE TABLE	TE		
68	1	TL1	CONTACTOR		TE		
69	1	TL2	CONTACTOR	SEE TABLE	TE		
70	1	TR1	THERMAL PROT.	SEE TABLE	TE		
71	1	XFR1	XFORMER HT	SEE TABLE	ELENOS		
72	1	XFR2	XFORMER AUX		ELENOS		
73	1	XFR3	XFORMER FIL.		ELENOS		
74	1	XFR4	XFORMER G2		ELENOS		
75	1	XFR5	XFORMER G1		ELENOS		
76	1	RF UNIT		SEE RF UNIT	ELENOS		
77	1	MTR1	METER FWD PWR		ELENOS		
78	1	MTR2	METER REFL. PWR		ELENOS		
79	1	MTR3	METER I. A.		ELENOS		
80	1	MTR4	METER I. G.		ELENOS		
81	1	MTR5	METER MULTIMET.		ELENOS		
82	1	MTR6	METER HOUR MET.				

Part List**Componenti per tubo 4CX5000 - 380V**

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR				
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE		ELENOS		
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT		ELENOS		

XFR4: secondary 0 - 550

XFR5: secondary 0 - 120

Componenti per tubo 4CX5000 - 220V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR				
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE		ELENOS		
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT		ELENOS		

XFR4: secondary 0 - 550

XFR5: secondary 0 - 140

Componenti per tubo 4CX7500 - 380V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR				
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE		ELENOS		
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT		ELENOS		

XFR4: secondary 0 - 550

XFR5: secondary 0 - 120

Componenti per tubo 4CX7500 - 220V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR				
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE		ELENOS		
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT		ELENOS		

XFR4: secondary 0 - 550

XFR5: secondary 0 - 120

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	10	FS1, FS2, FS3, FS4, AC IN, G1-1, ACIN, G1-2, FS13, FS14, AC ING2/1, AC IN G2-2	FASTON-M	SEE TABLE			
2	1	CN1-M	CONN. MALE 8		RS		
3	14	C1.1, C1.2, C1.3, C1.4, C1.5, C1.6, C1.7, C1.8, C1.9, C1.10, C1.11, C1.12, C1.13, C1.14	CEV	1000uf 100V	AMP		
4	12	C2.1, C2.2, C2.3, C2.4, C2.5, C2.6, C2.7, C2.8, C1.15, C1.16, C1.19, C1.20	CAP. CER.	4.7nF 1KV	MURATA		
5	2	C1.17, C1.18	CEV	100uF 450V			
6	14	DZ1.1, DZ1.2, DZ1.3, DZ1.4, DZ1.5, DZ1.6, DZ1.7, DZ1.8, DZ1.9, DZ1.10, DZ1.11, DZ1.12, DZ1.13, DZ1.14	DIODE ZENER	NOT INST.			
7	20	D1.1, D1.2, D1.3, D1.4, D1.5, D1.6, D1.7, D1.8, D2.1, D2.2, D2.3, D2.4, D2.5, D2.6, D2.7, D2.8, D2.9, D2.10, D2.11, D2.12	DIODE RECTIFIER	BY255			
8	8	FS5, FS6, FS7, FS8, FS9, FS10, FS11, FS12	FASTON-M	NOT INST.			
9	2	F1.1, F1.2	FUSE	NOT INST.			
10	6	PLUS-1, MINUS-1, PLUS-2, MINUS-2, 2 GND (FRAME), 3 GND (FRAME)	CONNECT. SCREW				
11	13	R1.1, R1.2, R1.3, R1.4, R1.6, R1.7, R1.8, R1.9, R1.10, R1.11, R1.12, R1.13, R1.14	RESISTOR	1K 6W 5%			
12	1	R1.5	RESISTOR	10K 6W 5%			
13	8	R2.1, R2.2, R2.3, R2.4, R2.5, R2.6, R2.7, R2.8	RESISTOR	330K 12W 5%			
14	3	R2.9, R1.15, R1.20	RESISTOR	10R 6W 5%			
15	1	R1.16	RESISTOR	1R 6W 1%			
16	3	R1.17, R1.25, R1.26	RESISTOR	NOT INST.			
17	1	R1.18	RESISTOR	68K 3W 5%			
18	1	R1.19	RESISTOR	5K62 0.25W 1%			

Part List

19	2	R1.21, R1.22	RESISTOR	2K2 6W 5%	
20	1	R1.23	RESISTOR	33K 3W 5%	
21	1	R1.24	RESISTOR	10K 0.25W 1%	
22	2	VR1.1, VR1.2	VARISTOR	NOT INST.	
24	1	NONE	PCB	E2201-0	ELENOS
25	1	NONE	PCB	E2202-0	ELENOS

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	C7, C8	CAP. RF		ELENOS		
2	1	C9	CAP. RF		ELENOS		
3	2	C10, C11	CAP. RF		ELENOS		
4	8	C12 TO C19	CAP. COMPR. MICA	1000 pF			
5	2	C20, C21	CAP. RF		ELENOS		
6	1	C22	CAP. RF		ELENOS		
7	1	C23	CAP. COMPR. MICA	SEE TABLE			
8	1	C24	CAP. COMPR. MICA	SEE TABLE			
9	1	C25	CAP. RF		ELENOS		
10	1	C26	CAP. RF		ELENOS		
11	1	CN23	CONN. MALE 24		AMP		
12	1	CN24	CONN. FEMALE 4		AMP		
13	1	CN29	CONN. FEMALE 2		WIELAND		
14	1	CN31	CONN. FEMALE 8		RS		
15	1	CNRF6	CONN. RF (PART OF L14)		EIA UNFL. 1"5/8		ELENOS
16	1	CNRF7	CONN. RF	N FEMALE			
17	2	CNRF8, CNRF9	CONN. RF	BNC FEMALE			
18	4	D1, D2, D3, D4	DIODE RECTIFIER	P600M			
19	2	L6, L7	INDUCTOR AIR		ELENOS		
20	1	L8	INDUCTOR AIR		ELENOS		
21	1	L9	INDUCTOR AIR	SEE TABLE	ELENOS		
22	1	L10	INDUCTOR AIR	SEE TABLE	ELENOS		
23	2	L11, L12	INDUCTOR AIR, ADJ		ELENOS		
24	1	L13	INDUCTOR AIR, ADJ		ELENOS		
25	1	L14	INDUCTOR AIR, ADJ		ELENOS		
26	2	M1, M2	CONN. SCREW (PART OF C10, C11)			ELENOS	
27	2	SM1, SM2	MOTOR SERVO				
28	4	SW4, SW5, SW6, SW7	SWITCH LIMIT				
29	1	SW11	SWITCH PRESSURE				
30	1	V1	TETRODE	SEE TABLE			
31	1	NONE	SOKET V1	SEE TABLE	ELENOS		

Componenti per tubo 4CX5000

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
7	1	C23	CAP. COMPR. MICA				
8	1	C24	CAP. COMPR. MICA				
21	1	L9	INDUCTOR AIR		ELENOS		
22	1	L10	INDUCTOR AIR		ELENOS		
30	1	V1	TETRODE	4CX5000			
31	1	NONE	SOKET V1		ELENOS		

Componenti per tubo 4CX7500

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
7	1	C23	CAP. COMPR. MICA				
8	1	C24	CAP. COMPR. MICA				
21	1	L9	INDUCTOR AIR		ELENOS		
22	1	L10	INDUCTOR AIR		ELENOS		
30	1	V1	TETRODE	4CX7500			
31	1	NONE	SOKET V1		ELENOS		

Part List

Filtro passa-basso

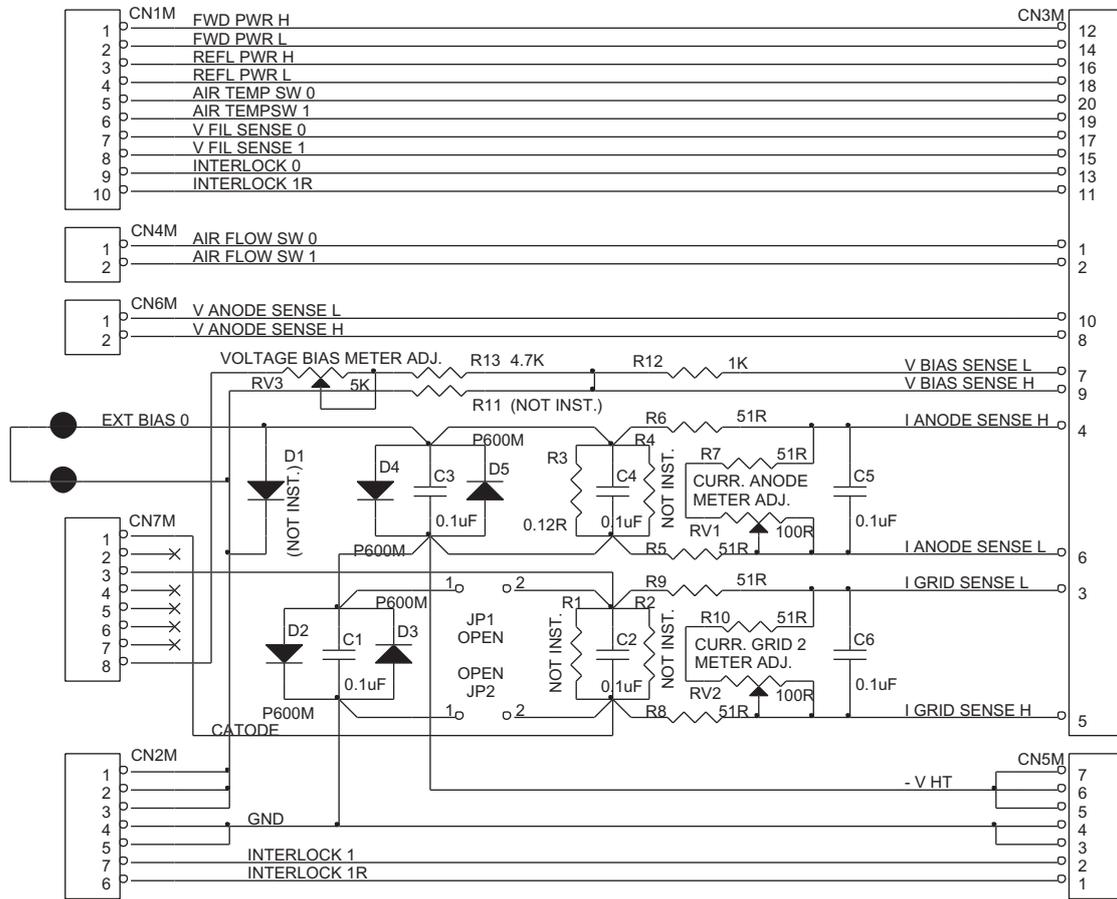
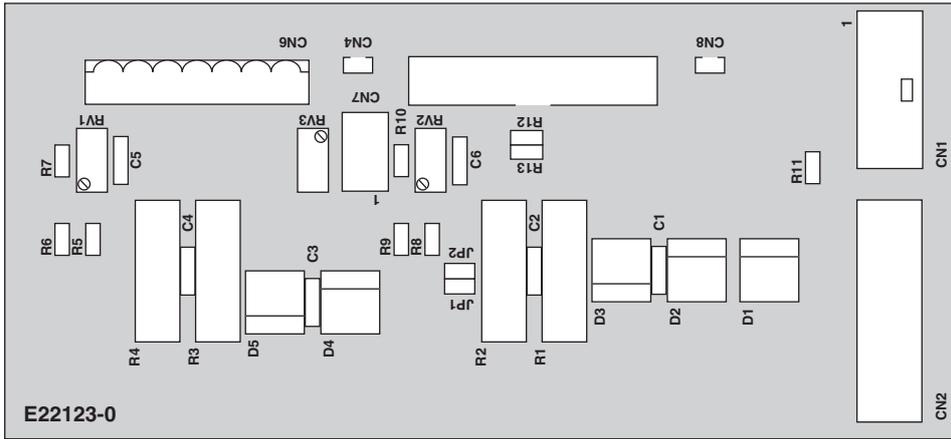
Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	C1, C6	CAP. RF		ELENOS		
2	2	C2, C5	CAP. RF		ELENOS		
3	2	C3, C4	CAP. RF		ELENOS		
4	2	L1, L5	AIR INDUCTOR		ELENOS		
5	2	L2, L4	AIR INDUCTOR		ELENOS		
6	1	L3	AIR INDUCTOR		ELENOS		
7	2	CNRF1, CNRF2	CONN. RF	EIA UNFL. 1"5/8			

Accoppiatore direzionale

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	NONE	RF SAMPLER RECT.	SEE "SONDE"	ELENOS		
2	2	CNRF3, CNRF4, CNRF5	50R LINE FOR SAMPLER WITH EIA UNFL./FLANGED + BNC	SEE "SONDE"	ELENOS		

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	CN1	CONN. MALE 2	MODUII	AMP		
2	1	CN2	CONN. FEMALE 20	HEADER			
3	2	C1	CEV	100uF 25V	AMP		
4	1	D1	DIODE	1N4148			
5	1	LED1	LED GREEN 3	GREEN 3			
6	1	Q1	TRANSISTOR	2N1711			
7	1	RV1	TRIMMER 67W	10K 67W			
8	2	R1, R5	RESISTOR	10K 0.25W 1%			
9	2	R6, R2	RESISTOR	100K 0.25W 1%			
10	1	R3	RESISTOR	10M 0.25W 1%			
11	1	R4	RESISTOR	47R 0.25W 5%			
12	1	R7	RESISTOR	4K7 0.25W 5%			
13	1	U1	I. C.	LMC6482IN	N.S.		
14	1	NONE	SOKET8				
15	1	NONE	PCB	E22124-0	ELENOS		



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Board Code: E22123-0	Model: E3T-E4T	Rev 0	
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli		
Date: Wednesday, November 15, 2000	Sheet 1	of 1	

Part List

Item	Q.ty	Reference	Component	Value	Manufact. Man. p. n. Elenos p. n.
1	1	CN1M	CONN. MALE 10	MODUII	AMP
2	1	CN2M	CONN. MALE 7	M 7 ANG.	WIELAND
3	1	CN3M	CONN. MALE 20	HEADER R	
4	2	CN4M, CN6M	CONN. MALE 2	MODUII	AMP
5	1	CN5M	CONN. MALE 7	M 7 RIG.	WIELAND
6	1	CN7M	CONN. MALE 8	DUBOX 2x4	
7	6	C1, C2, C3, C4, C5, C6	CAP, CER.	0.1uF 50V	
8	1	D1	DIODE RECTIFIER	NOT INST.	
10	2	M1, M2	CONN. SCREW	NOT INST.	
11	2	RV1, RV2	TRIMMER	100R 67W	
12	2	RV3	TRIMMER	5K 67W	
13	4	R1, R2, R4, R11	RESISTOR	NOT INSTALLED	
14	1	R3	RESISTOR	0.12R 6W 1%	
15	6	R5, R6, R7, R8, R9, R10	RESISTOR	51R 0.25W 1%	
16	1	R12	RESISTOR	1K 0.25W 1%	
17	1	R13	RESISTOR	4K7 0.25W 1%	
18	1	NONE	PCB	E22123-0	ELENOS

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	SEE TABLE			
2	1	CN1	VDE FEMALE				
3	2	CN2 - 30	CONN. MALE 2	MODUII	AMP		
4	6	CN3 - 13 - 14 - 21 - 29 - 37	CONN. FEMALE 2	MODUII	AMP		
5	4	CN4 - 6 - 8 - 19	CONN. FEMALE 4		AMP		
6	4	CN5 - 7 - 9 - 20	CONN. MALE 4		AMP		
7	3	CN10 - 11 - 35	CONN. FEMALE 7		WIELAND		
8	2	CN12 - 43	CONN. FEMALE 10	MODUII	AMP		
9	2	CN15 - 31	CONN. FEMALE 8		RS		
10	2	CN16 - 18	CONN. FEMALE 6		WIELAND		
11	4	CN17 - 39 - 40 - 42	CONN. FEMALE 20				
12	1	CN22	CONN. FEMALE 24		AMP		
13	1	CN23	CONN. MALE 24	SEE RF UNIT	ELENOS		
14	3	CN24 - 32 - 33	CONN. FEMALE 4	MODUII	AMP		
15	2	CN25 - 26	CONN. FEMALE 2				
16	1	CN27	CONN. FEMALE 3		AMP		
17	1	CN28	CONN. MALE 3		AMP		
18	2	CN34 - 36	CONN. FEMALE 8		WIELAND		
19	2	CN38 - 41	CONN. FEMALE 40				
20		NONE					
21	4	D1 - 2 - 3 - 4	DIODE RECTIFIER	SEE RF UNIT	ELENOS		
22	1	D5	DIODE BRIDGE	KBPC25 - 04			
23	6	DA1 - 2 - 3 - 4 - 5 - 6	RECTIFIER ASSY	E20144-1	ELENOS		
24		NONE					
25	1	E20131-0	FRONT PANEL BRD	E20131-0	ELENOS		
26	1	E20127-1	PROTECTION BOARD	E20127-1	ELENOS		
27	1	E22124-0	H. T. DETECTOR	E22124-0	ELENOS		
28	1	E22123-0	SHUNTS BOARD	E22123-0	ELENOS		
29	2	E22128-3	FILAMENT PSU B.	E22128-3	ELENOS		
30	1	E22130-0	CLAMP BOARD	E22130-0	ELENOS		
31	1	E20138-T	H.T. ATTENUATOR	E20138-T	ELENOS		
32	3	F1 - 2 - 3	FUSE (MAINS)	SEE TABLE			
33	1	F4	FUSE (NEUTRAL)				
34	1	F5	FUSE (FIL. PSU)	10x38 10A			
35	1	F6	FUSE (AUX PWR)	10x38 4A			
36	1	F7	FUSE (ECITER)	10x38 10A			
37	1	F8	FUSE (TUNING MOT.)	10x38 10A			
38	0	F9	FUSE (G1 PSU)	10x38 4A			
39	0	F10	FUSE (G2 PSU)	10x38 4A			
40	1	FAN1	RADIAL FAN BLOW.		CAT BLOWER V5284	1VENT014	
41	2	FAN2 - 3	AXIAL FAN BLOW.		EBM -Z. AD2D200AI1801	1VENT013	
42	1	L1	INDUCT. IRON CORE	SEE TABLE	ELENOS		
42	1	LPF1	EMI FILTER		ARCOTR.	2LC00008	
44	4	M1 - 2 - 3 - 4	CONN. SCREW 4		LEGRAND	2MM00005	
45	4	M5 - 6 - 7 - 8	CONN. SCREW 2		LEGRAND	2MM00006	
46	1	NONE	JUMPER 3				
47	1	NONE	HEAD. CONN. SCRW				
48	1	NONE	HEAD. CONN. SCRW				
49	1	PF1	PORTAFUSE		LEGRAND	2MMPF003	
50	6	PF6 - 7 - 8 - 9 - 10	PORTAFUSE		LEGRAND	2MMPF002	

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
51	2	SM1 - 2	SERVOMOTOR	SEE RF UNIT			
52	2	R1 - 2	RESISTOR	60R 400W	OFEL		2RFWW061
53	1	RA1	RESISTOR ARRAY		OFEL		2RFWW323
54	1	RA2	RESISTOR ARRAY		OFEL		2RFWWC24
55	1	RL1	RELAIS MAINS PHASE CONTROL			CROUZET	EWS 84892290 2RL00012
56		NONE					
57	1	SW1	SWITCH MAINS		TE		1SZ00020
58	1	SW AUX1	SWICHT MAINS AUX. CONTACT			TE	1SZ00021
59	1	NONE	MAIN SWITCH PANEL HEADER			TE	1SZ00022
60	2	SW2 - 3	SWITCH LIMIT				2SW000001
61	4	SW4 - 5 - 6 - 7	SWITCH LIMIT	SEE RF UNIT			
62	2	SW8 - 9	SWITCH TOGGLE				2SWT0007
63	1	SW10	SWITCH KEY		TE		1SWL0001
64	1	NONE	SWITCH KEY CONT.		TE		1SWL0003
65	1	SW11	SWITCH PRESSURE	SEE RF UNIT			
66	1	SWMA1	MAGNETOTHERM.	SEE TABLE	TE		
67	1	CA1	AUX. CONT. SWMA1	SEE TABLE	TE		
68	1	TL1	CONTACTOR		TE		1TLCA003
69	1	TL2	CONTACTOR	SEE TABLE	TE		
70	1	TR1	THERMAL PROT.	SEE TABLE	TE		
71	1	XFR1	XFORMER HT	SEE TABLE	ELENOS		
72	1	XFR2	XFORMER AUX		ELENOS		2XFR0012
73	1	XFR3	XFORMER FIL.		ELENOS		2XFR0077
74		NONE					
75		NONE					
76	1	RF UNIT		SEE RF UNIT	ELENOS		
77	1	MTR1	METER FWD PWR		ELENOS		9PA00018
78	1	MTR2	METER REFL. PWR		ELENOS		9PA00031
79	1	MTR3	METER I. A.		ELENOS		9PA00027
80	1	MTR4	METER I. G.		ELENOS		9PA00019
81	1	MTR5	METER MULTIMET.		ELENOS		9PA00030
82	1	MTR6	METER HOUR MET.				1CTH0004
82	1	MTR6	METER HOUR MET.				1CTH0004
83	1	R3	RESISTOR	SEE TABLE			

Part List

Componenti per tubo 3CX3000 - 380V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	4uF 6KV	ICAR	SP35-B-4-600	2CFO0015
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE	5H 2A	ELENOS		2L000014
66	1	SWMA1	MAGNETOTHERM.		TE		1SZ00018
67	1	CA1	AUX. CONT. SWMA1		TE		1SZ00013
69	1	TL2	CONTACTOR		TE		1TLCA003
70	1	TR1	THERMAL PROT.		TE		1SZ00008
71	1	XFR1	XFORMER HT	10KVA 4.3KV	ELENOS		2XFR0080
83	1		RESISTOR	10R 100W			

Componenti per tubo 3CX3000 - 220V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	4uF 6KV	ICAR	SP35-B-4-600	2CFO0015
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE		ELENOS		2L000014
66	1	SWMA1	MAGNETOTHERM.		TE		1SZ00018
67	1	CA1	AUX. CONT. SWMA1		TE		1SZ00013
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT		ELENOS		2XFR0080
83	1		RESISTOR	10R 100W			

Componenti per tubo YU148 - 380V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	3uF 7.5KV	SIRACO		2CFO0007
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE	1H 5A	ELENOS		2L000019
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT	18KVA 5.5KV	ELENOS		2XFR0045
83	1		RESISTOR	10R 100W			

Componenti per tubo YU148 - 220V

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	C1	FILM OIL CAPACITOR	3uF 7.5KV	SIRACO		2CFO0007
32	3	F1 - 2 - 3	FUSE (MAINS)				
42	1	L1	INDUCT. IRON CORE	1H 5A	ELENOS		2L000019
66	1	SWMA1	MAGNETOTHERM.		TE		
67	1	CA1	AUX. CONT. SWMA1		TE		
69	1	TL2	CONTACTOR		TE		
70	1	TR1	THERMAL PROT.		TE		
71	1	XFR1	XFORMER HT	18KVA 5.5KV	ELENOS		2XFR0045
83	1		RESISTOR	10R 100W			

Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	C7, C8	CAP. RF		ELENOS		
2	1	C9	CAP. RF		ELENOS		
3	2	C10, C11	CAP. RF		ELENOS		
4	8	C12, C13	CAP. COMPR. MICA	1000 pF			
5	2	C20	CAP. COMPR. MICA		ELENOS		
6		NONE					
7	1	C23	CAP. COMPR. MICA	SEE TABLE			
8	1	C24	CAP. COMPR. MICA	SEE TABLE			
9	1	C25	CAP. RF		ELENOS		
10	1	C26	CAP. RF		ELENOS		
11	1	CN23	CONN. MALE 24		AMP		
12	1	CN24	CONN. FEMALE 4		AMP		
13	1	CN29	CONN. FEMALE 2		WIELAND		
14	1	CN31	CONN. FEMALE 8		RS		
15	1	CNRF6	CONN. RF (PART OF L14)		EIA UNFL. 1"5/8		ELENOS
16	1	CNRF7	CONN. RF	N FEMALE			
17		NONE					
18	4	D1, D2, D3, D4	DIODE RECTIFIER	P600M			
19	2	L6, L7	INDUCTOR AIR		ELENOS		
20	1	L8	INDUCTOR AIR		ELENOS		
21	1	L9	INDUCTOR AIR	SEE TABLE	ELENOS		
22	1	L10	INDUCTOR AIR	SEE TABLE	ELENOS		
23		NONE					
24	1	L13	INDUCTOR AIR, ADJ		ELENOS		
25	1	L14	INDUCTOR AIR, ADJ		ELENOS		
26	2	M1, M2	CONN. SCREW (PART OF C10, C11)			ELENOS	
27	2	SM1, SM2	MOTOR SERVO				
28	4	SW4, SW5, SW6, SW7	SWITCH LIMIT				
29	1	SW11	SWITCH PRESSURE				
30	1	V1	TRIODE	SEE TABLE			
31	1	NONE	SOKET V1	SEE TABLE	ELENOS		

Componenti per tubo 3CX3000

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
7	1	C23	CAP. COMPR. MICA				
8	1	C24	CAP. COMPR. MICA				
21	1	L9	INDUCTOR AIR		ELENOS		
22	1	L10	INDUCTOR AIR		ELENOS		
30	1	V1	TRIODE	3CX3000			
31	1	NONE	SOKET V1		ELENOS		

Componenti per tubo YU148

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
7	1	C23	CAP. COMPR. MICA				
8	1	C24	CAP. COMPR. MICA				
21	1	L9	INDUCTOR AIR		ELENOS		
22	1	L10	INDUCTOR AIR		ELENOS		
30	1	V1	TRIODE	YU148			
31	1	NONE	SOKET V1		ELENOS		

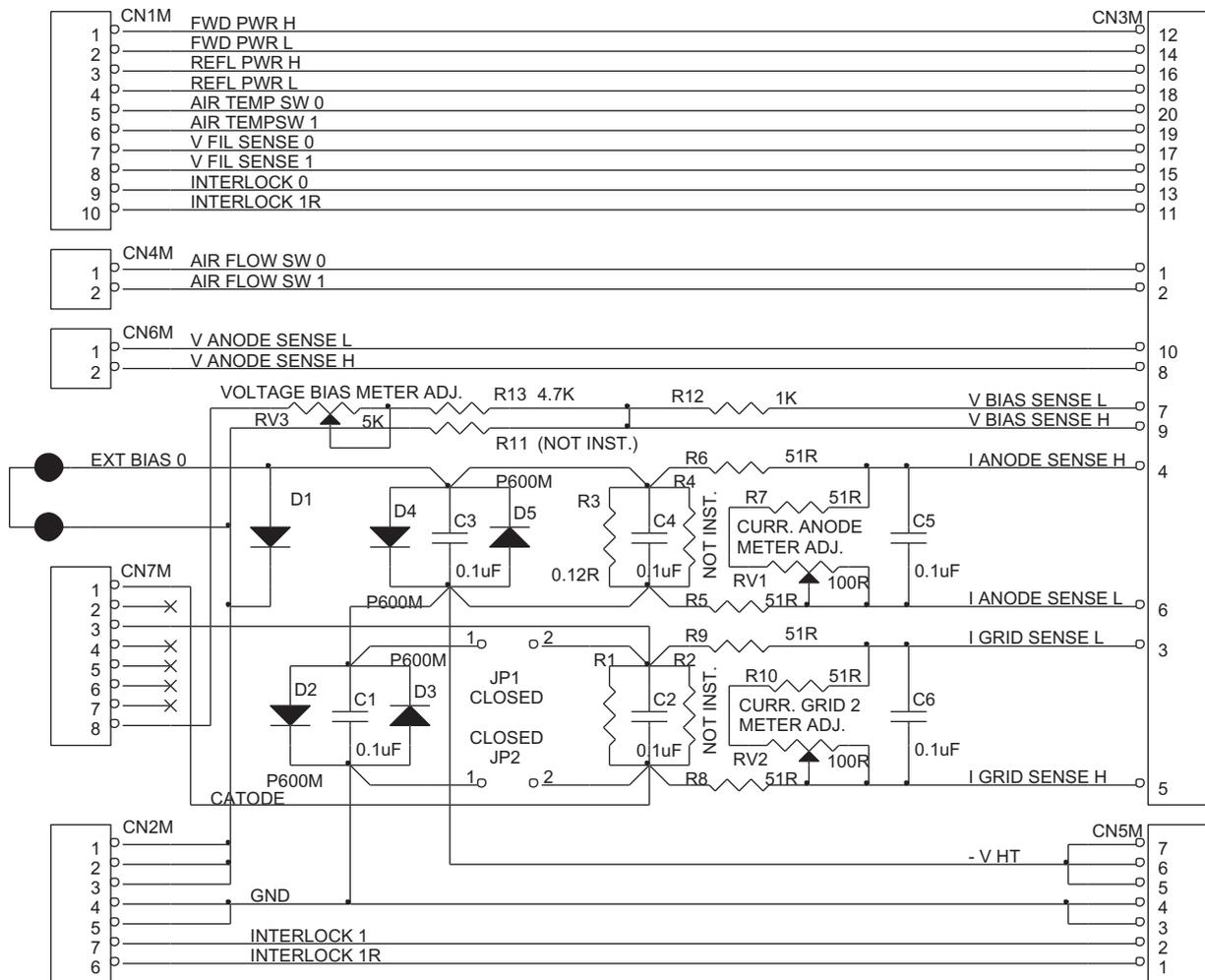
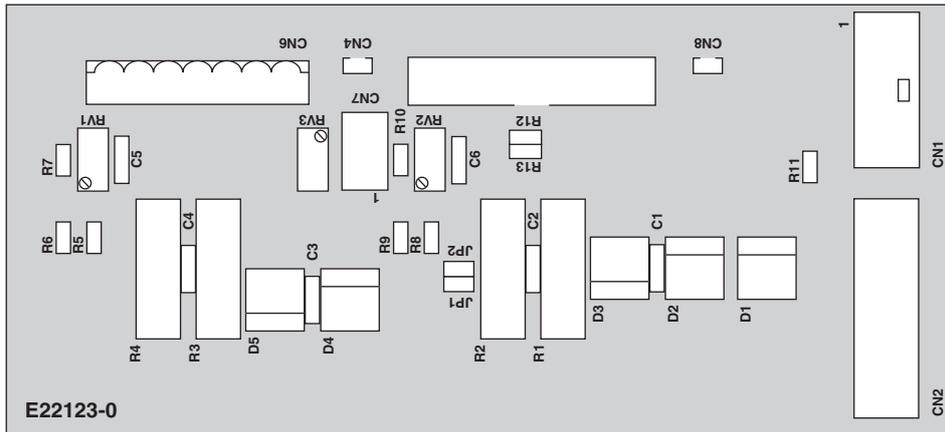
Part List

Filtro passa-basso

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	C1, C6	CAP. RF		ELENOS		
2	2	C2, C5	CAP. RF		ELENOS		
3	2	C3, C4	CAP. RF		ELENOS		
4	2	L1, L5	AIR INDUCTOR		ELENOS		
5	2	L2, L4	AIR INDUCTOR		ELENOS		
6	1	L3	AIR INDUCTOR		ELENOS		
7	2	CNRF1, CNRF2	CONN. RF	EIA UNFL. 1"5/8			

Accoppiatore direzionale

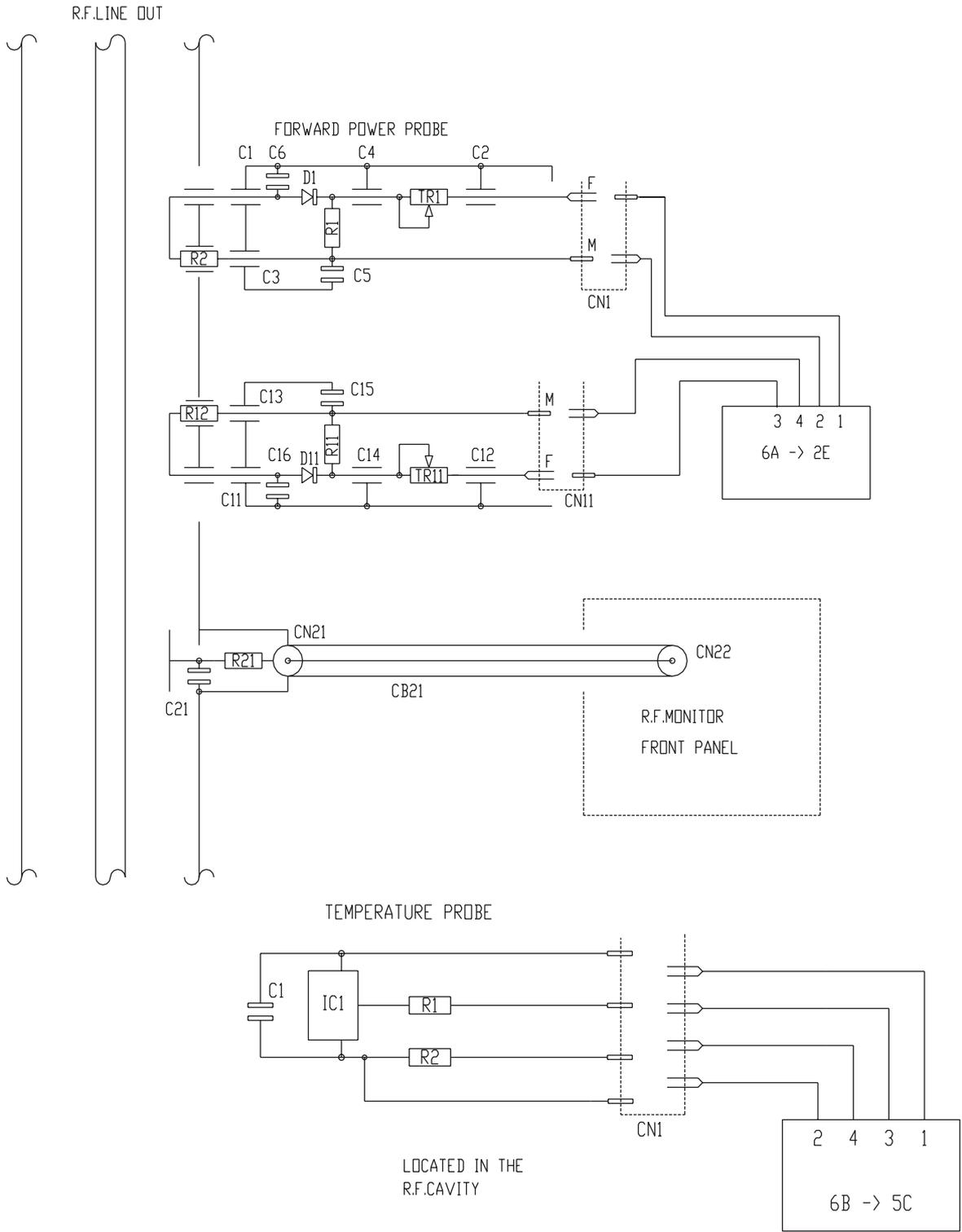
Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	2	NONE	RF SAMPLER RECT.	SEE "SONDE"	ELENOS		
2	2	CNRF3, CNRF4, CNRF5	50R LINE FOR SAMPLER WITH EIA UNFL./FLANGED + BNC	SEE "SONDE"	ELENOS		



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Part List

Item	Q.ty	Reference	Component	Value	Manufact.	Man. p. n.	Elenos p. n.
1	1	CN1M	CONN. MALE 10	MODUII	AMP		
2	1	CN2M	CONN. MALE 7	M 7 ANG.	WIELAND		
3	1	CN3M	CONN. MALE 20	HEADER R			
4	2	CN4M, CN6M	CONN. MALE 2	MODUII	AMP		
5	1	CN5M	CONN. MALE 7	M 7 RIG.	WIELAND		
6	1	CN7M	CONN. MALE 8	DUBOX 2x4			
7	6	C1, C2, C3, C4, C5, C6	CAP, CER.	0.1uF 50V			
8	1	D1	DIODE RECTIFIER	NOT INST.			
10	2	M1, M2	CONN. SCREW	NOT INST.			
11	2	RV1, RV2	TRIMMER	100R 67W			
12	2	RV3	TRIMMER	5K 67W			
13	4	R1, R2, R4, R11	RESISTOR	NOT INSTALLED			
14	1	R3	RESISTOR	0.12R 6W 1%			
15	6	R5, R6, R7, R8, R9, R10	RESISTOR	51R 0.25W 1%			
16	1	R12	RESISTOR	1K 0.25W 1%			
17	1	R13	RESISTOR	4K7 0.25W 1%			
18	1	NONE	PCB	E22123-0	ELENOS		



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Date: Wednesday, November 15, 2000	Sheet	1	of 1

Part List

5.4.1.2. Componenti testina di lettura potenza diretta

Rif.	Description	Value	Remarks
C1	Ceramic F.P. Capacitor	3,3 pF	
C2, C3, C4	Ceramic F.P. Capacitor	1000pF	
C5	Ceramic Capacitor	4700 pF	
C6	Ceramic Capacitor	22 pF	
D1	Diode type AA118		
R1	Resistor	2,7 KOhm	0.25W 1%
R2	Resistor	180 Ohm	0.25W 1%
TR1	Trimmer type 89P	200 KOhm	
CN1	Twin/BNC connector 31-223		

5.4.1.3 Componenti testina di lettura potenza riflessa

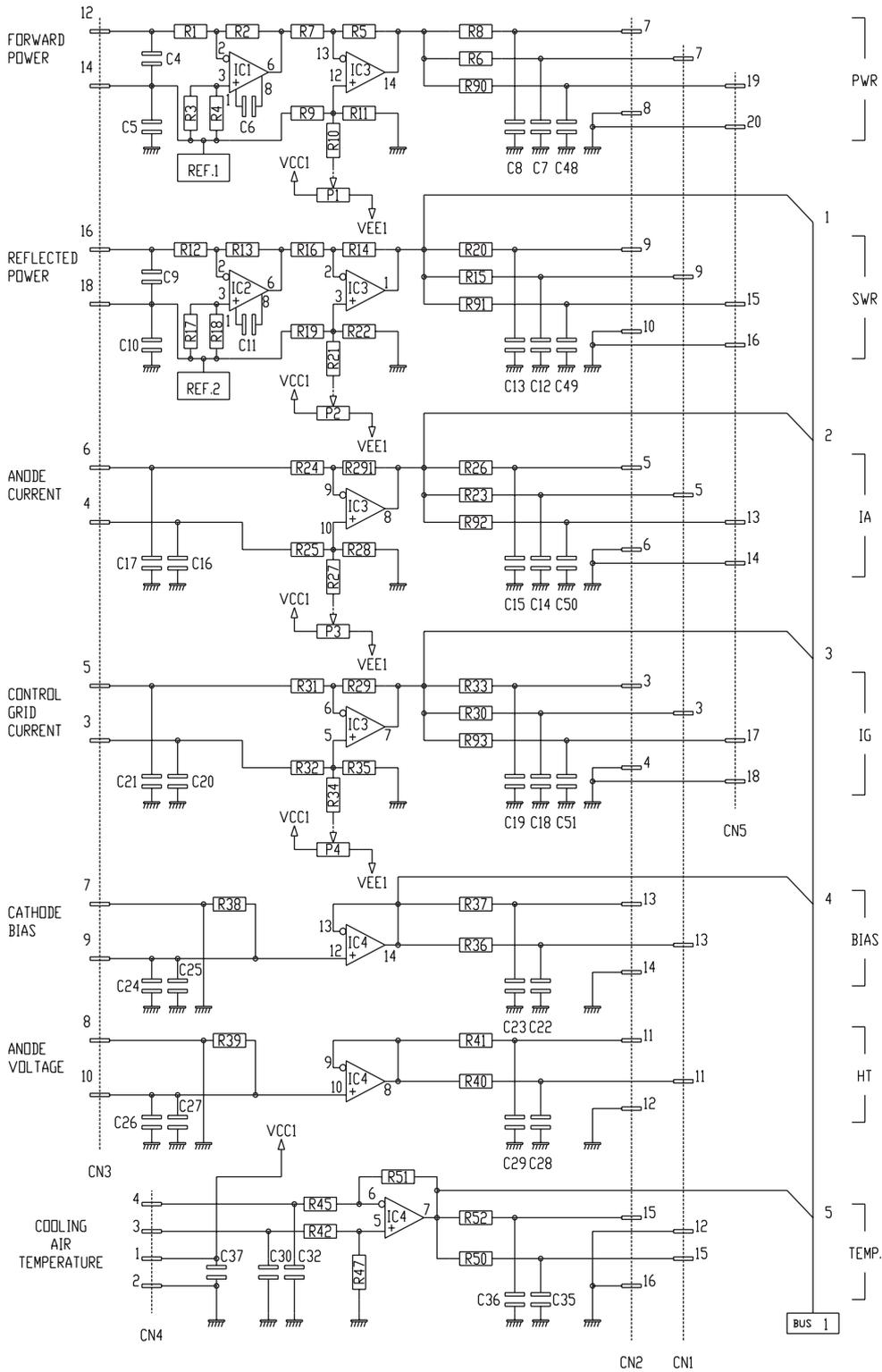
Rif.	Description	Value	Remarks
C11	Ceramic F.P. Capacitor	3,3 pF	
C12, C13, C14	Ceramic F.P. Capacitor	1000pF	
C15	Ceramic Capacitor	4700 pF	
C16	Ceramic Capacitor	22 pF	
D11	Diode type AA118		
R11	Resistor	18 KOhm	0.25W 1%
R12	Resistor	180 Ohm	0.25W 1%
TR11	Trimmer type 89P	20 KOhm	
CN11	Twin/BNC connector 31-223		

5.4.1.4. Componenti prelievo RF

Rif.	Description	Value	Remarks
C21	Ceramic Capacitor	22 pF	
R21	Resistor	49.9 Ohm	0.25W 1%
CB21	Coax. Cable type RG58	2,15 mt.	
CN21, CN22	Coax. Connector type BNC		

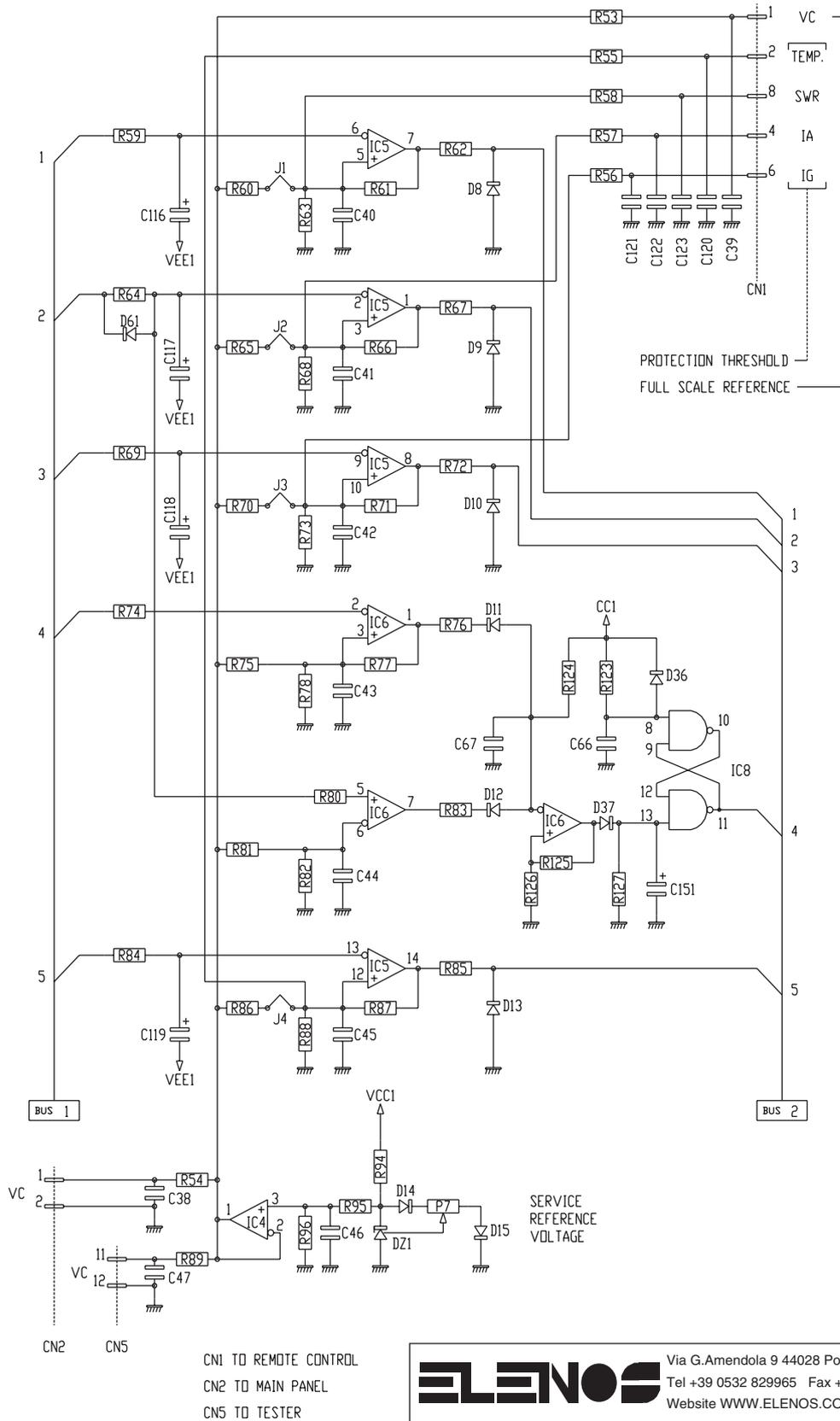
5.4.1.5. Componenti sonda di temperatura

Rif.	Description	Value	Remarks
R1, R2	Resistor	6980	0.25W 1%
C1	Ceramic Capacitor	4700 pF	
IC1	Sensor type LM35DH		
CN1	AMP MODU connector 280.371-1		

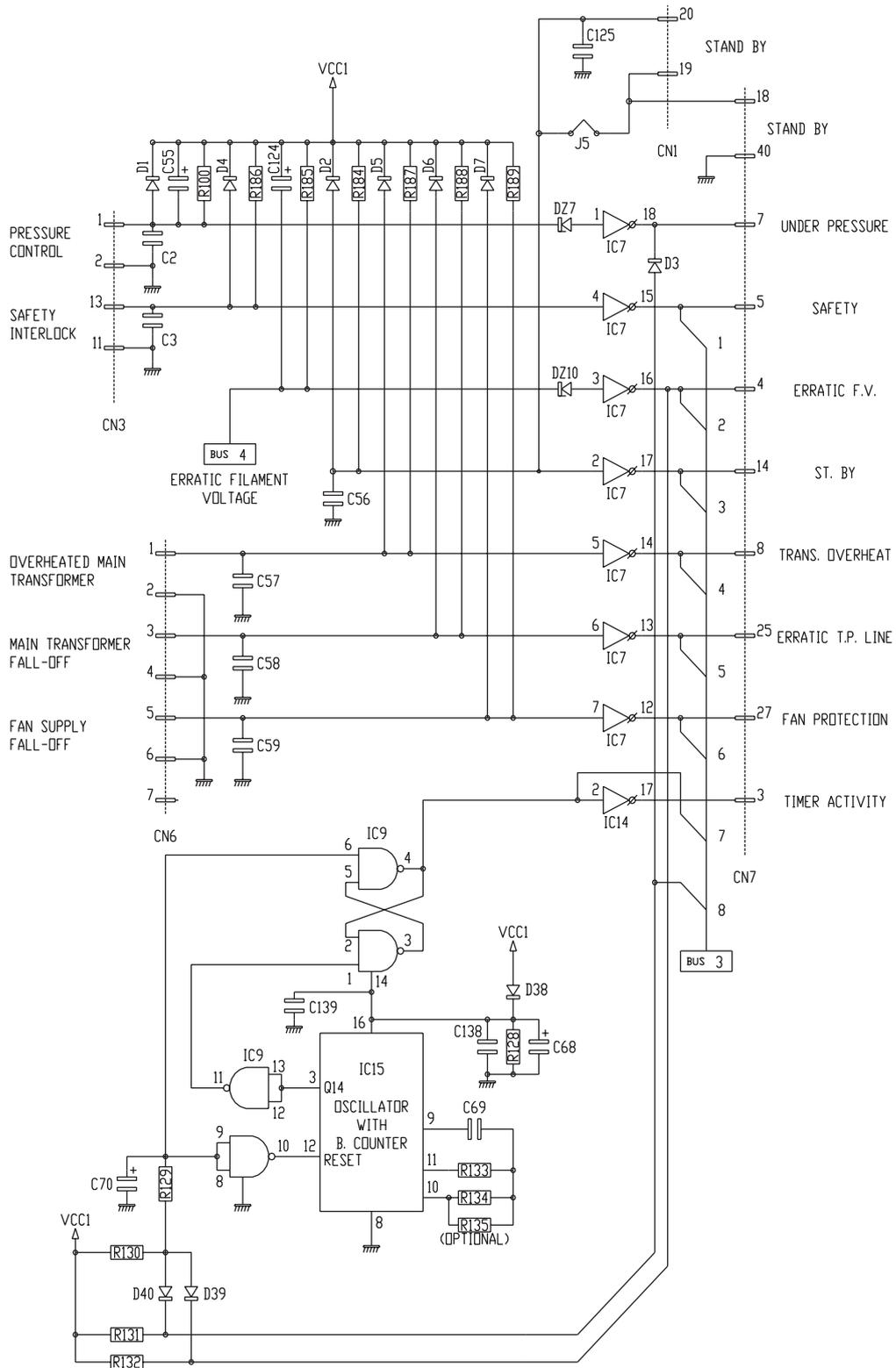


CN1 TO REMOTE CONTROL CN4 FROM THERMAL PROBE
CN2 TO MAIN PANEL CN5 TO TESTER
CN3 FROM MEASUREMENT

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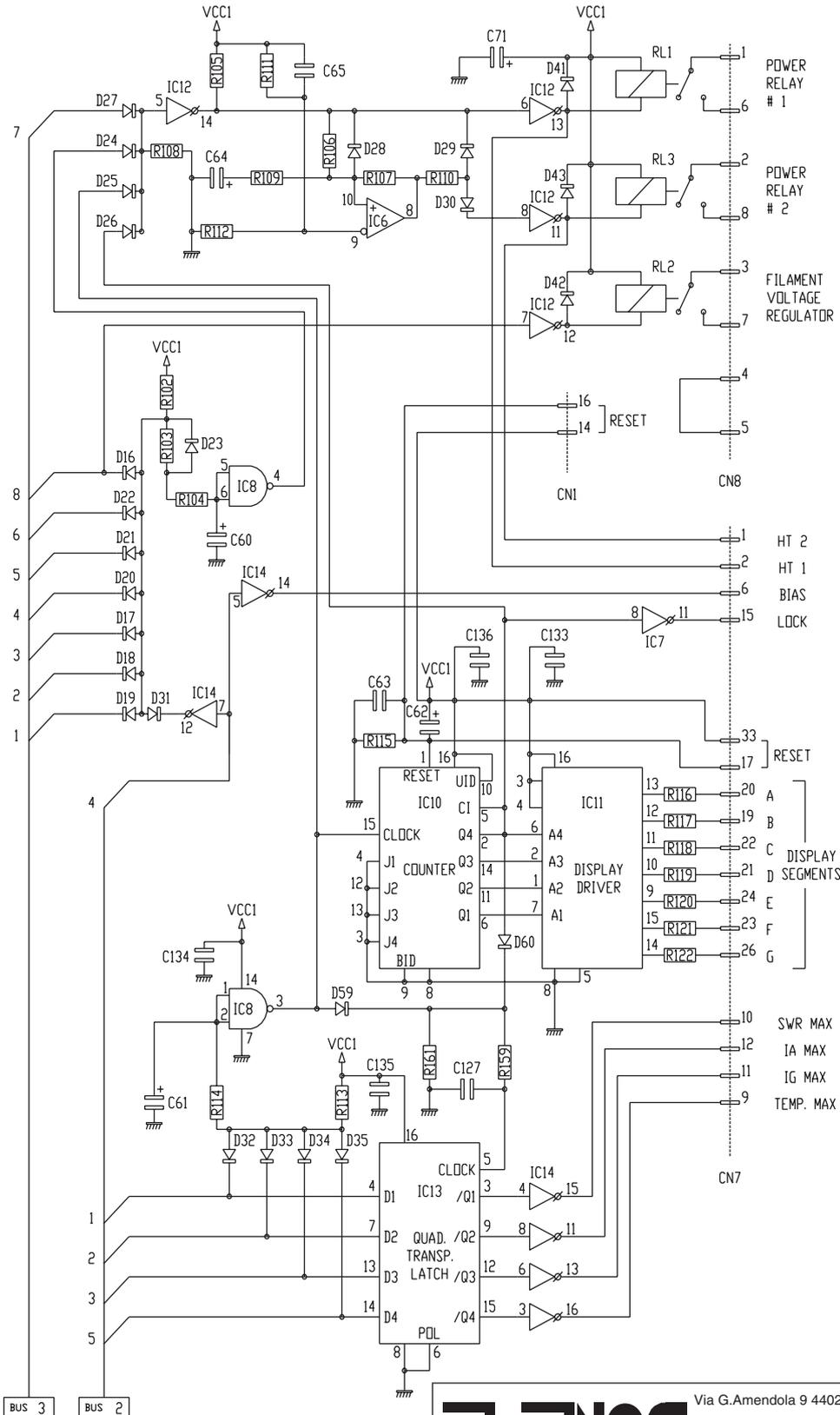


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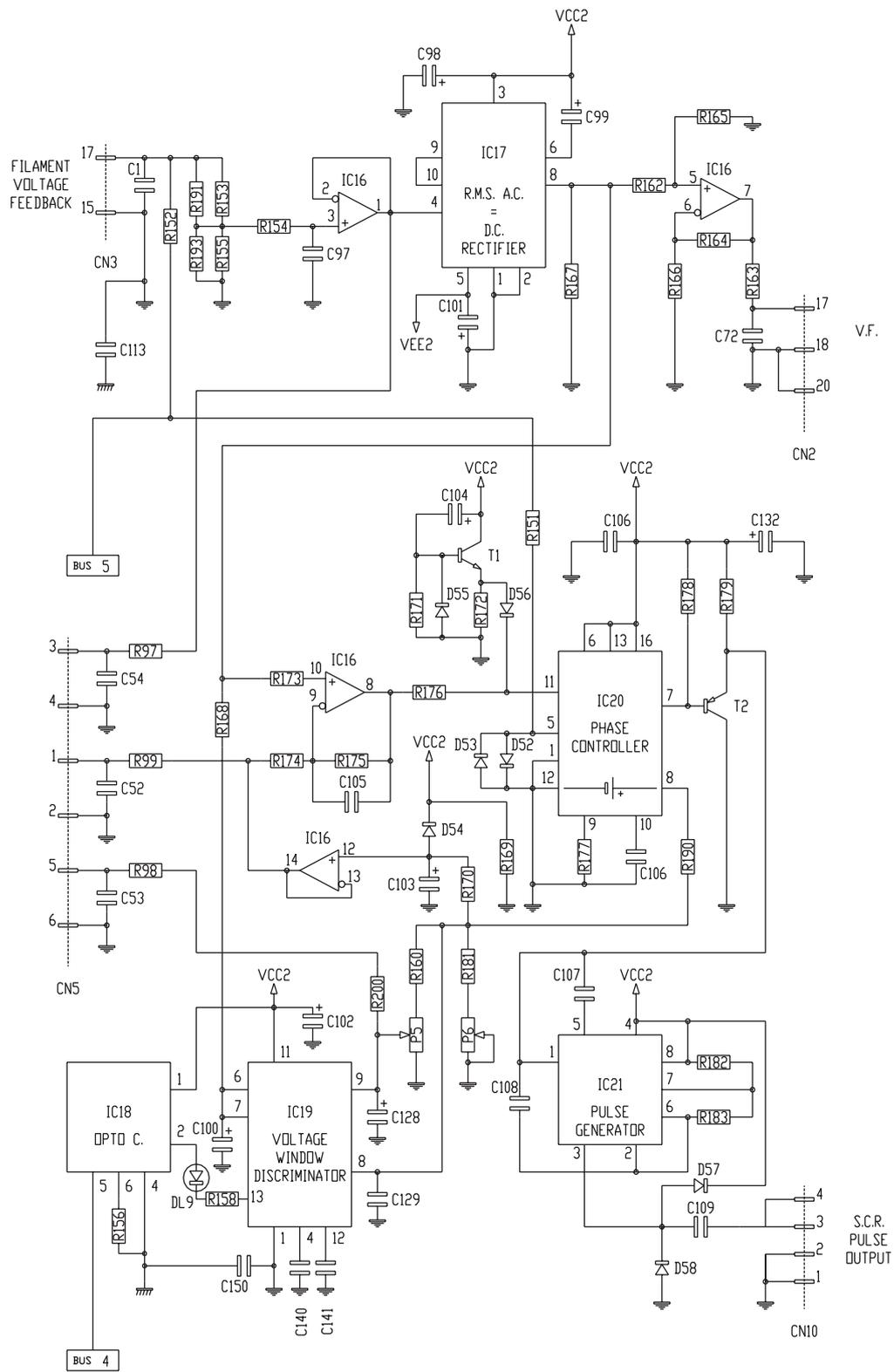
CN1 TO REMOTE CONTROL CN7 TO MAIN PANEL AND REMOTE CONTROL
CN3 FROM MEASUREMENT
CN6 FROM MEASUREMENT

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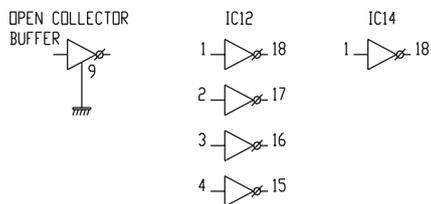
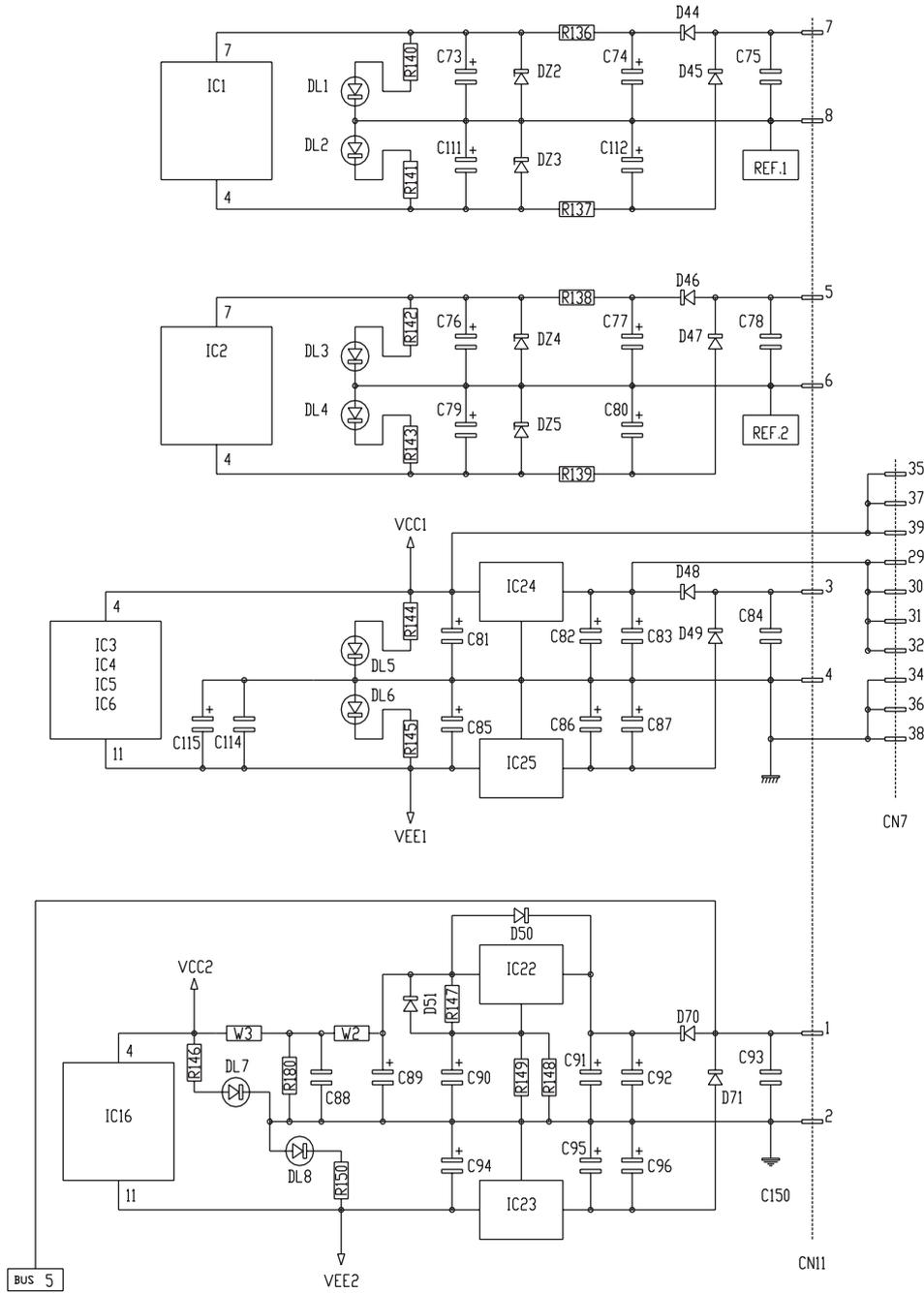
CN1 TO REMOTE CONTROL
 CN7 TO MAIN PANEL AND REMOTE CONTROL
 CN8 TO POWER RELAYS AND FILAMENT REGULATOR SUPPLY

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 RACK-JOINT
 CATHODE-JOINT
 CN2 TO MAIN PANEL
 CN3 FROM MEASUREMENT
 CN5 TO TESTER
 CN10 TO SWITCHING PHASE S.C.R.

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		Website WWW.ELENOS.COM	
Title: GENERAL CONTROL BOARD			
Board Code: E20127	Model: E3T-E4T	Rev 0	
Proj. Engr. : A.Tomassini		Approved : A.Giovanelli	
Date: Wednesday, November 15, 2000		Sheet 5 of 6	



CN7 TO MAIN PANEL AND REMOTE CONTROL
 CN11 FROM A.C. SUPPLY
 CN12 TO OTHER CIRCUITS (OPTIONAL)

		Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM	
Title: GENERAL CONTROL BOARD			
Board Code: E20127		Model: E3T-E4T	Rev 0
Proj. Engr. : A.Tomassini		Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000		Sheet 6 of 6	

Part List

Rif.	Description	Value	Remarks
R1	Resistor	1,3K	0.25 W 1%
R2	Resistor	2K	0.25 W 1%
R3	Resistor	1,3K	0.25 W 1%
R4	Resistor	2K	0.25 W 1%
R5	Resistor	34 K	0.25 W 1%
R6	Resistor	100	0.25 W 1%
R7	Resistor	1,02K	0.25 W 1%
R8	Resistor	100	0.25 W 1%
R9	Resistor	1,02K	0.25 W 1%
R10	Resistor	1 M	0.25 W 1%
R11	Resistor	34 K	0.25 W 1%
R12	Resistor	1,3K	0.25 W 1%
R13	Resistor	2K	0.25 W 1%
R14	Resistor	34 K	0.25 W 1%
R15	Resistor	100	0.25 W 1%
R16	Resistor	1,02K	0.25 W 1%
R17	Resistor	1,3K	0.25 W 1%
R18	Resistor	2K	0.25 W 1%
R19	Resistor	1,02K	0.25 W 1%
R20	Resistor	100	0.25 W 1%
R21	Resistor	1 M	0.25 W 1%
R22	Resistor	34 K	0.25 W 1%
R23	Resistor	100	0.25 W 1%
R24, R25	Resistor	1,02K	0.25 W 1%
R26	Resistor	100	0.25 W 1%
R27	Resistor	1 M	0.25 W 1%
R28, R29	Resistor	34 K	0.25 W 1%
R30	Resistor	100	0.25 W 1%
R31, R32	Resistor	1,02K	0.25 W 1%
R33	Resistor	100	0.25 W 1%
R34	Resistor	1 M	0.25 W 1%
R35	Resistor	34 K	0.25 W 1%
R36,R37	Resistor	100	0.25 W 1%
R38, R39	Resistor	34 K	0.25 W 1%
R40, R41	Resistor	100	0.25 W 1%
R42	Resistor	10K	0.25 W 1%
R43		none	
R45	Resistor	10K	0.25 W 1%
R46		none	
R47	Resistor	34K	0.25 W 1%
R50	Resistor	100	0.25 W 1%
R51	Resistor	34 K	0.25 W 1%
R52, R53	Resistor	100	0.25 W 1%
R54	Resistor	27	0.25 W 1%
R55, R56, R57, R58	Resistor	100	0.25 W 1%
R59	Resistor	10K	0.25 W 1%
R60	Resistor	15K	0.25 W 1%
R61	Resistor	10 M	0.25 W 1%
R62, R63	Resistor	10K	0.25 W 1%
R65	Resistor	3,3K	0.25 W 1%
R66	Resistor	10 M	0.25 W 1%
R67	Resistor	10K	0.25 W 1%
R68	Resistor	1 K	0.25 W 1%
R69	Resistor	100 K	0.25 W 1%
R70	Resistor	10K	0.25 W 1%
R71	Resistor	10 M	0.25 W 1%
R72, R73, R74	Resistor	10K	0.25 W 1%
R75	Resistor	100K	0.25 W 1%
R76	Resistor	10 K	0.25 W 1%

Part List

Rif.	Description	Value	Remarks
R77	Resistor	10 M	0.25 W 1%
R78	Resistor	10 K	0.25 W 1%
R80	Resistor	1 K	0.25 W 1%
R81	Resistor	4,75K	0.25 W 1%
R82, R83,R84,R85	Resistor	10 K	0.25 W 1%
R86	Resistor	1.8 K	0.25 W 5%
R87	Resistor	10 M	0.25 W 1%
R88	Resistor	10 K	0.25 W 1%
R89, R90	Resistor	100	0.25 W 1%
R91, R92, R93	Resistor	100	0.25 W 1%
R94	Resistor	6810	0.25 W 1%
R95	Resistor	34 K	0.25 W 1%
R96	Resistor	137 K	0.25 W 1%
R97, R98, R99	Resistor	100	0.25 W 1%
R100	Resistor	10 K	0.25 W 1%
R102	Resistor	1K	0.25 W 1%
R103	Resistor	100 K	0.25 W 1%
R104, R105	Resistor	10 K	0.25 W 1%
R106	Resistor	100 K	0.25 W 1%
R107	Resistor	10 M	0.25 W 1%
R108	Resistor	10 K	0.25 W 1%
R109	Resistor	100	0.25 W 1%
R110, R111, R112	Resistor	10 K	0.25 W 1%
R113	Resistor	100 K	0.25 W 1%
R114	Resistor	100	0.25 W 1%
R115	Resistor	10 K	0.25 W 1%
R116, R117,R118, R119, R120, R121, R122	Resistor	1K	0.25 W 1%
R123, R124	Resistor	100 K	0.25 W 1%
R125	Resistor	10 M	0.25 W 1%
R126	Resistor	10 K	0.25 W 1%
R127	Resistor	4750	0.25 W 1%
R128	Resistor	1 K	0.25 W 1%
R129	Resistor	100 K	0.25 W 1%
R130, R131, R132	Resistor	10 K	0.25 W 1%
R133	Resistor	475 K	0.25 W 1%
R134	Resistor	150 K	0.25 W 1%
R136 - R139	Resistor	150	0.5 W 5%
R140 - R143	Resistor	100	0.25 W 1%
R144 -R147	Resistor	1 K	0.25 W 1%
R148	Resistor	15 K	0.25 W 1%
R149	Resistor	22 K	0.25 W 1%
R150	Resistor	1 K	0.25 W 1%
R151	Resistor	15 K	0.25 W 1%
R152	Resistor	2,2K	0.25 W 1%
R153	Resistor	2,87K	0.25 W 1%
R154	Resistor	10 K	0.25 W 1%
R155	Resistor	1 K	0.25 W 1%
R156	Resistor	150 K	0.25 W 1%
R158	Resistor	1 K	0.25 W 1%
R159, R160, R161	Resistor	100 K	0.25 W 1%
R162	Resistor	10 K	0.25 W 1%
R163	Resistor	100	0.25 W 1%
R164, R165	Resistor	15 K	0.25 W 1%
R166 - R169	Resistor	10 K	0.25 W 1%
R170, R171, R172	Resistor	475 K	0.25 W 1%
R173	Resistor	6810	0.25 W 1%
R174	Resistor	1 K	0.25 W 1%
R175	Resistor	475 K	0.25 W 1%
R176	Resistor	2.2 K	0.25 W 5%
R177	Resistor	82 K	0.25 W 5%

Part List

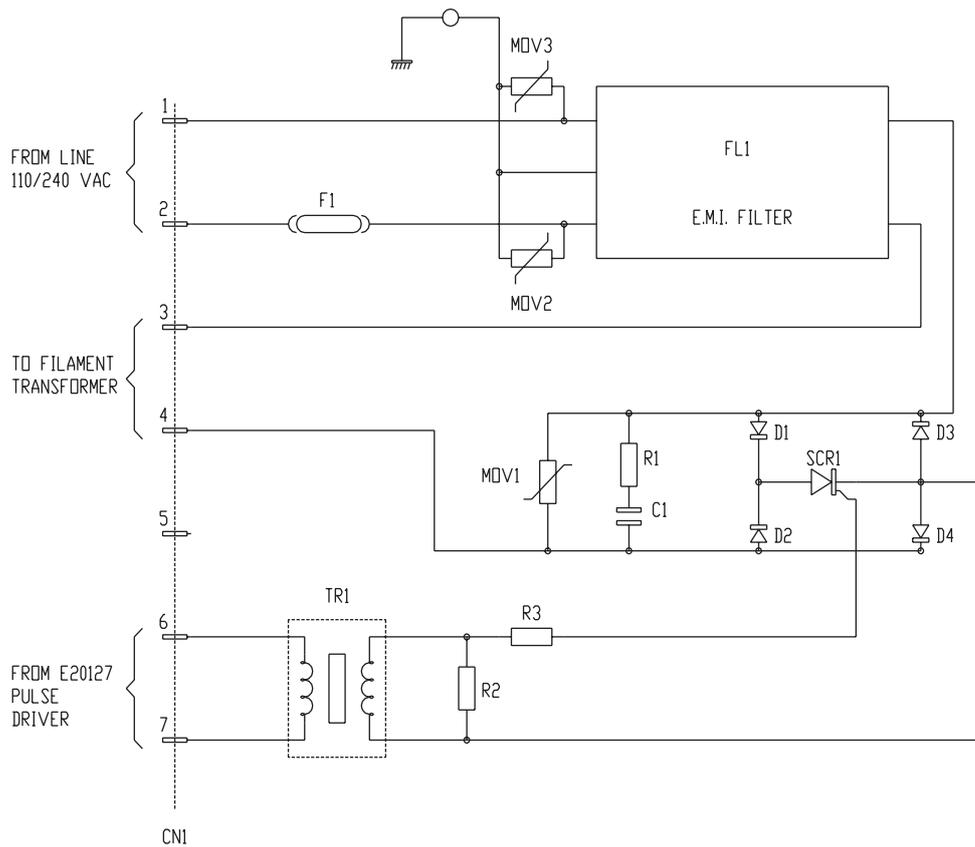
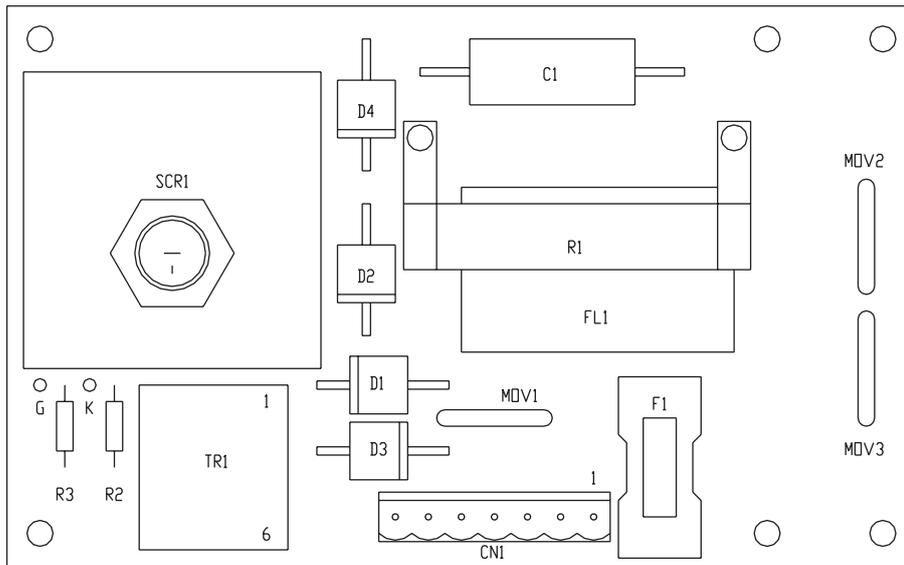
Rif.	Description	Value	Remarks
R178, R179	Resistor	10 K	0.25 W 1%
R180	Resistor	270	2 W 5%
R181	Resistor	10 K	0.25 W 1%
R182, R183	Resistor	6810	0.25 W 1%
R184 - R189	Resistor	10 K	0.25 W 1%
R190	Resistor	6,81K	0.25 W 1%
R191	Resistor	10K	0.25 W 1%
R193		none	
R200	Resistor	1 K	0.25 W 1%
R291	Resistor	34 K	0.25 W 1%
P1 - P4	Trimmer type 72P	100K	
P5	Trimmer type 72P	10K	
P6, P7	Trimmer type 67W	10K	
C1 - C5	Ceramic Capacitor	4.7 nF	50V
C6	Ceramic Capacitor	33 pF	50V
C7 - C10	Ceramic Capacitor	4.7 nF	50V
C11	Ceramic Capacitor	33 pF	50V
C12 -C25	Ceramic Capacitor	4.7 nF	50V
C26	Mylar Capacitor	220 nF	63V
C27	Mylar Capacitor	100 nF	63V
C28, C29	Ceramic Capacitor	4.7 nF	50V
C30	Ceramic Capacitor	4.7 nF	50V
C31		none	
C32	Ceramic Capacitor	4.7 nF	50V
C33		none	
C35, C36, C37	Ceramic Capacitor	4.7 nF	50V
C38, C39	Ceramic Capacitor	4.7 nF	50V
C40 - C46	Ceramic Capacitor	100 nF	63V
C47 - C54	Ceramic Capacitor	4.7 nF	50V
C55	Electrolytic Vert. Capacitor	100 uF	35V
C56 - C59	Ceramic Capacitor	4.7 nF	50V
C60 - C62	Electrolytic. Vert. Capacitor	10 uF	35V
C63	Ceramic Capacitor	4.7 nF	50V
C64	Electrolytic. Vert. Capacitor	10 uF	35V
C65	Ceramic Capacitor	100 nF	63V
C66	Electrolytic. Vert. Capacitor	10 uF	35V
C67	Ceramic Capacitor	100 nF	63V
C68	Electrolytic. Vert. Capacitor	1000 uF	40V
C69	Mylar Capacitor	100 nF	63V
C70	Electrolytic. Vert. Capacitor	10 uF	35V
C71	Electrolytic. Vert. Capacitor	100 uF	35V
C72	Ceramic Capacitor	4.7 nF	50V
C73	Electrolytic. Vert. Capacitor	10 uF	35V
C74	Electrolytic. Vert. Capacitor	470 uF	40V
C75	Ceramic Capacitor	4.7 nF	50V
C76	Electrolytic. Vert. Capacitor	10 uF	35V
C77	Electrolytic. Vert. Capacitor	470 uF	40V
C78	Ceramic Capacitor	4.7 nF	50V
C79	Electrolytic. Vert. Capacitor	10 uF	35V
C80	Electrolytic. Vert. Capacitor	470 uF	40V
C81, C82	Electrolytic. Vert. Capacitor	10 uF	35V
C83	Electrolytic. Axial Capacitor	2200 uF	63V
C84	Ceramic Capacitor	4.7 nF	2KV
C85, C86	Electrolytic. Vert. Capacitor	10 uF	35V
C87	Electrolytic. Vert. Capacitor	1000 uF	40V
C88	Ceramic Capacitor	4.7 nF	50V
C89, C90, C91	Electrolytic. Vert. Capacitor	10 uF	35V
C92	Electrolytic. Axial Capacitor	2200 uF	63V
C93	Ceramic Capacitor	4.7 nF	2KV
C94, C95	Electrolytic. Vert. Capacitor	10 uF	35V
C96	Electrolytic. Vert. Capacitor	1000 uF	40V

Part List

Rif.	Description	Value	Remarks
C97	Ceramic Capacitor	4.7 nF	50V
C98 - C102	Electrolytic Vert. Capacitor	10 uF	35V
C103	Tantalum Capacitor	10 uF	35V
C104	Electrolytic. Vert. Capacitor	47 uF	35V
C105	Mylar Capacitor	470 nF	63V
C106	Mylar Capacitor	47 nF	63V
C107	Mylar Capacitor	10 nF	63V
C108	Mylar Capacitor	4.7 nF	63V
C109	Mylar Capacitor	470 nF	63V
C111	Electrolytic. Vert. Capacitor	10 uF	35V
C112	Electrolytic. Vert. Capacitor	470 uF	40V
C113	Ceramic Capacitor	4.7 nF	2KV
C114	Ceramic Capacitor	100 nF	63V
C115 - C119	Electrolytic. Vert. Capacitor	10 uF	35V
C120 - C123	Ceramic Capacitor	4.7 nF	50V
C124	Electrolytic. Vert. Capacitor	100 uF	35V
C125	Ceramic Capacitor	4.7 nF	50V
C127	Mylar Capacitor	100 nF	63V
C128	Electrolytic. Vert. Capacitor	10 uF	35V
C129	Mylar Capacitor	470 nF	63V
C132	Electrolytic. Vert. Capacitor	10 uF	35V
C133 - C138	Ceramic Capacitor	100 nF	63V
C140, C141	Ceramic Capacitor	100 nF	63V
C150	Ceramic Capacitor	4.7 nF	2KV
C151	Electrolytic. Vert. Capacitor	10 uF	35V
D1 - D37	Diode type 1N4148		
D38	Diode type 1N4007		
D39, D40	Diode type 1N4148		
D41 - D47	Diode type 1N4007		
D48	Diode type BY255		
D49, D50, D51	Diode type 1N4007		
D52 - D56	Diode type 1N4148		
D57, D58	Diode type 1N4007		
D59, D60, D61	Diode type 1N4148		
D70, D71	Diode type 1N4007		
DL1 - DL9	Led red 3 mm.		
DZ1	I.C. type LM336	2.5 V	
DZ2 - DZ5	Zener Diode	9.1 V	0.5 W
DZ7, DZ10	Zener Diode	5.1 V	0.5 W
T1	Transistor type BC337		
T2	Transistor type 2N2905		
IC1, IC2	I.C. type LM308 + Socket 8 pin		
IC3, IC4, IC5, IC6	I.C. type TL074 + Socket 14 pin		
IC7	I.C. type ULN2804 + Socket 18 pin		
IC8, IC9	I.C. type CD4093 + Socket 14 pin		
IC10	I.C. type CD4029 + Socket 16 pin		
IC11	I.C. type CD4511 + Socket 16 pin		
IC12	I.C. type ULN2804 + Socket 18 pin		
IC13	I.C. type CD4042 + Socket 16 pin		
IC14	I.C. type ULN2804 + Socket 18 pin		
IC15	I.C. type CD4060 + Socket 16 pin		
IC16	I.C. type TL074 + Socket 14 pin		

Part List

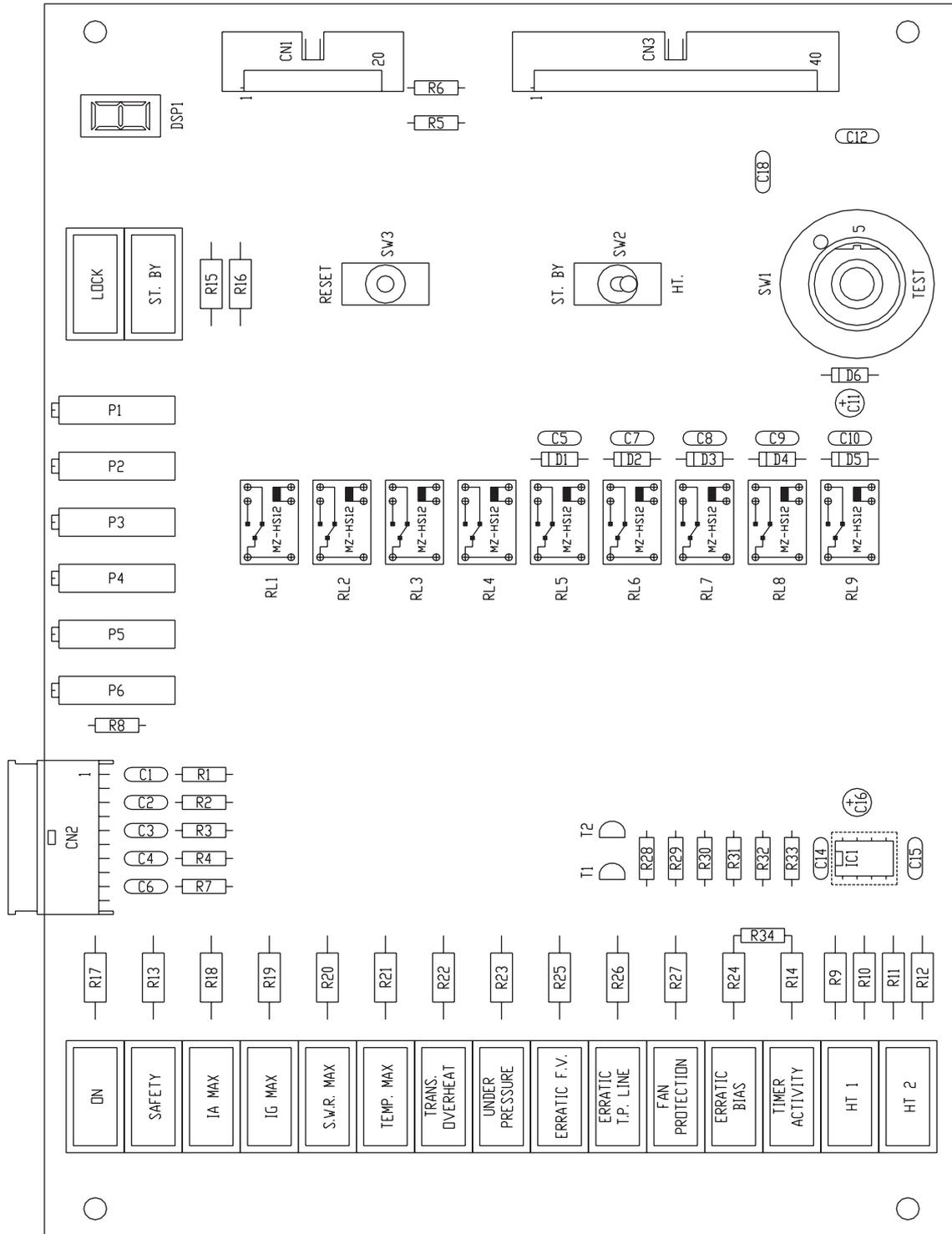
Rif.	Description	Value	Remarks
IC17	I.C. type AD536		
IC18	Opto I.C. type 4N35 + Socket 6 pin		
IC19	I.C. type TCA965 + Socket 14 pin		
IC20	I.C. type TCA785 + Socket 16 pin		
IC21	I.C. type NE555 + Socket 8 pin		
IC22	I.C. type LM317		
IC23	I.C. type LM7912 case TO220 + Heat-sink 21C / W		
IC24	I.C. type LM7812 case TO3 + Heat-sink 7.7 C / W		
IC25	I.C. type LM7912 case TO220 + Heat-sink 21C / W		
J1 -J5	Jumper 2 pin		
W1, W2, W3	Wire		
RL1, RL2, RL3	Relay		
CN1, CN2, CN3	ANSLEY connector 2x10 pin		
CN4	AMP connector 4 pin 90 deg.		
CN5	ANSLEY connector 2x10 pin		
CN6	PHOENIX connector 7 pin 90 deg.		
CN7	ANSLEY connector 2x20 pin		
CN8	PHOENIX connector 8 pin 90 deg.		
CN10	AMP connector 4 pin 90 deg.		
CN11	PHOENIX connector 8 pin 90 deg.		



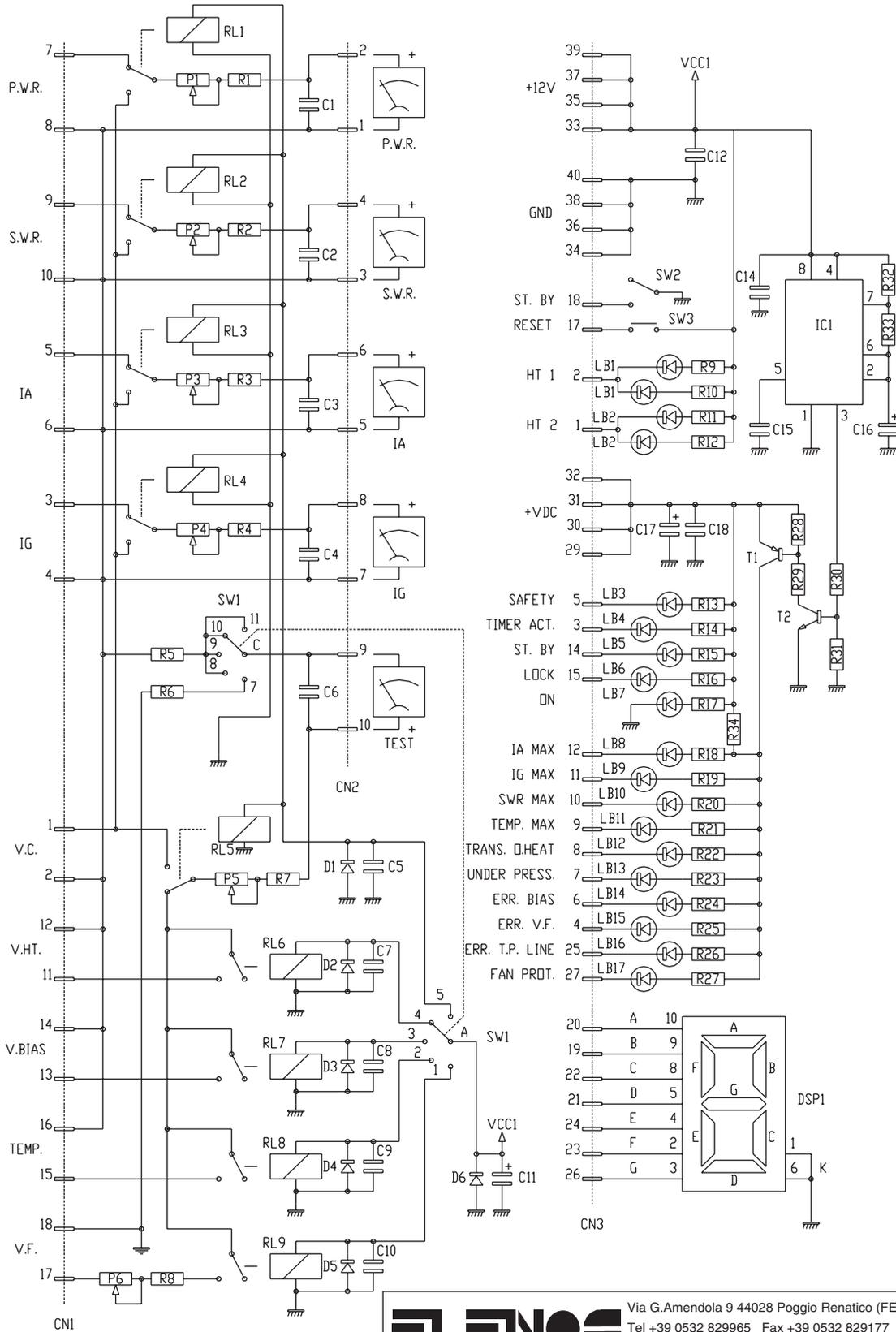
ELENOS		Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM	
Title: FILAMENT SUPPLY			
Board Code: E20128	Model: E3T-E4T	Rev 0	
Proj. Engr. : A.Tomassini		Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000		Sheet 1 of 1	

Part List

Rif.	Description	Value	Remarks
PCB	Board code 2PCB0162		
R1	Resistor 10 x 64	50	5%
R2	Resistor	1 K	0.25 W 1%
R3	Resistor	49.9	0.25 W 1%
C1	Axial Electr. Capacitor	0.1 uF	1 KV 5%
MOV1 - MOV3	MOV type S20K-275		
D1 - D4	Diode type P600G		
SCR1	SCR type R16RIA120 + Heat-sink 7.7 C / W		
TR1	Transformer type TI 153		
F1	Fuse + fuse holder	10 A	250V
FL1	Arcotronics filter type FAH. AV.3100.ZF		
CN1	PHOENIX connector 7 pin		



			Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: FRONT PANEL DISPLAY					
Board Code: E20131			Model: E3T-E4T		Rev 0
Proj. Engr. : A.Tomassini			Approved : A.Giovannelli		
Date: Wednesday, November 15, 2000			Sheet 1 of 1		

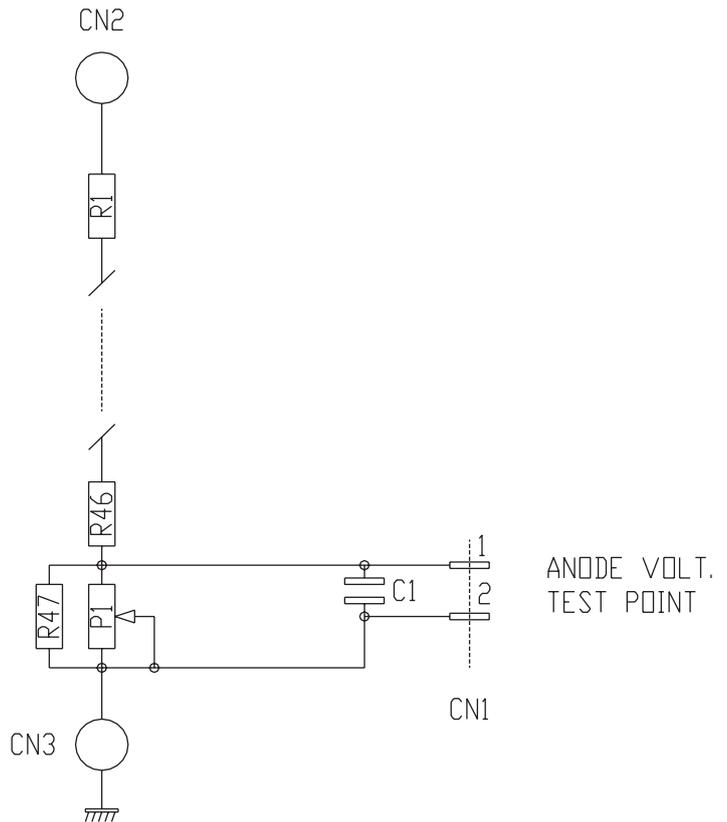
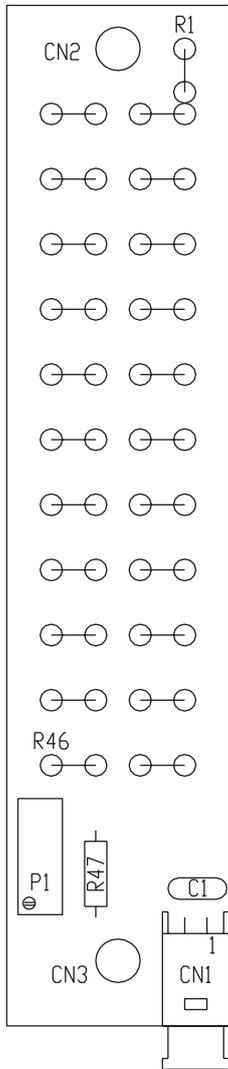


CN1 FROM E20127
 CN2 TO METERS
 CN3 FROM E20127

ELENOS		Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM	
Title: FRONT PANEL DISPLAY			
Board Code: E20131	Model: E3T-E4T	Rev 0	
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli		
Date: Wednesday, November 15, 2000	Sheet	1 of 1	

Part List

Rif.	Description	Value	Remarks
PCB	Print Board code 2PCB0168		
R1 - R4	Resistor	15K	0.25W 1%
R5, R6	Resistor	10K	0.25W 1%
R7	Resistor	6,8K	0.25W 1%
R8	Resistor	10K	0.25W 1%
R9 -R12	Resistor	150	0.5W 5%
R13 - R27	Resistor	330	0.5W 5%
R28 - R31	Resistor	10K	0.25W 1%
R32	Resistor	2,2K	0.25W 5%
R33, R34	Resistor	47K	0.25W 5%
P1 - P6	Trimmer type 89P	10K	
C1 - C4	Ceramic Capacitor	4,7nF	63V
C5	Ceramic Capacitor	100nF	63V
C6	Ceramic Capacitor	4,7nF	63V
C7 - C10	Ceramic Capacitor	100nF	63V
C11	Vert. Electr. Capacitor	10uF	63V
C12	Ceramic Capacitor	4,7nF	63V
C14 - C15	Ceramic Capacitor	100nF	63V
C16	Vert. Electr. Capacitor	10uF	63V
C18	Ceramic Capacitor	4,7nF	63V
D1 -D6	Diode type 1N4007		
DSP1	Display type HDSP-7303		
LB1 - LB17	Led type HLMP-2685		
RL1 - RL9	Relay Siemens V23101-D0106-B201		
SW1	2-way 6-pos. rotate switch		
SW2	2-pos switch 25A-250 VAC		
SW3	Push-button		
T1	Transistor type BC327		
T2	Transistor type BC337		
IC1	I.C. type ST91D540		
CN1	ANSLEY connector 2x10 pin		
CN2	AMP connector MODU male 10 pin angled		
CN3	ANSLEY connector 2x20 pin		

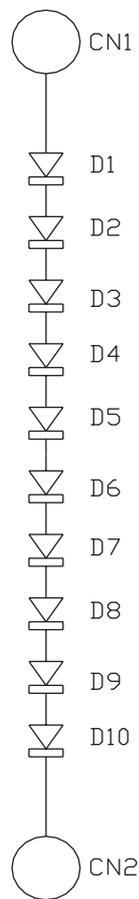
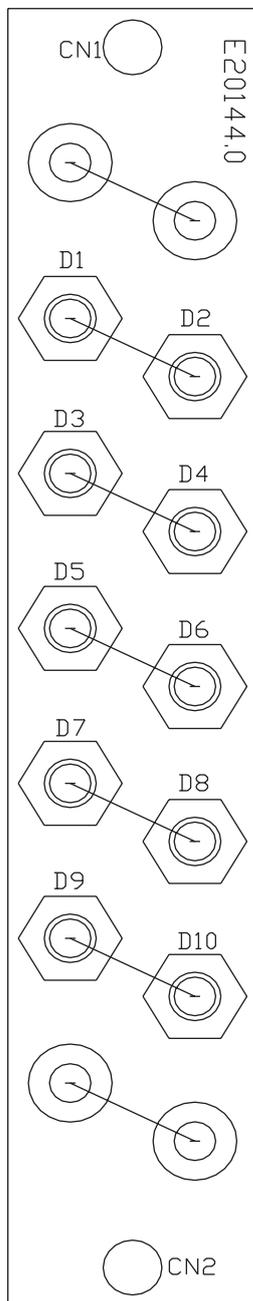


ANODE VOLT.
TEST POINT

ELENOS		Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM	
Title: VOLTAGE DIVIDER			
Board Code: E20138	Model: E3T-E4T	Rev 0	
Proj. Engr. : A.Tomassini	Approved : A.Giovanelli		
Date: Wednesday, November 15, 2000	Sheet	1	of 1

Part List

Rif.	Description	Value	Remarks
PCB	Board Code 2PCB0176		
R1 - R46	Resistor	1 M	0.25 W 5%
R47	Resistor	100 K	0.25 W 1%
P1	Trimmer type 67W	200K	
C1	Ceramic Capacitor	100 nF	63V
CN1	AMP connector 2 pin 90 deg.		
CN2, CN3	Fixing Stud		



 Via G.Amendola 9 44028 Poggio Renatico (FE) Italy Tel +39 0532 829965 Fax +39 0532 829177 Website WWW.ELENOS.COM		
Title: RECTIFIER UNIT		
Board Code: E20144	Model: E3T-E4T	Rev 0
Proj. Engr. : A.Tomassini	Approved : A.Giovannelli	
Date: Wednesday, November 15, 2000	Sheet	1 of 1

Part List

Rif.	Description	Value	Remarks
PCB	Board code 2PCB0182		
D1, D3, D5, D7, D9	Diode Type A12F120		
D2, D4, D6, D8, D10	Diode Type A12FR120		

TROUBLE SHOOTING

Malfunction	Cause	Solution
<ul style="list-style-type: none"> ✓ The device doesn't switch on correctly 	<ul style="list-style-type: none"> ✓ Network isolator fuses are broken ✓ Service fuses (front panel) are broken ✓ Front switch is faulty 	<ul style="list-style-type: none"> ✓ Substitute fuses ✓ Substitute fuses ✓ Substitute the front switch
<ul style="list-style-type: none"> ✓ The device switches on but ERRATIC T.P. LINE protection remains on and/or the cooling fans turn in the wrong direction 	<ul style="list-style-type: none"> ✓ Two of the supply phases are inverted ✓ The controlling phase relay is faulty (2RL00012) 	<ul style="list-style-type: none"> ✓ Invert two phases in the supply connector (switch off the general electrical board) ✓ Substitute the controlling phase relay
<ul style="list-style-type: none"> ✓ SAFETY protection remains on 	<ul style="list-style-type: none"> ✓ One of the device's panels is not correctly closed ✓ One of the microswitches is faulty 	<ul style="list-style-type: none"> ✓ Correctly close the opened panel ✓ Substitute the microswitch
<ul style="list-style-type: none"> ✓ The warning lights on the front panel flash in an anomalous way 	<ul style="list-style-type: none"> ✓ Some flat-cables may be disconnected because of the transport 	<ul style="list-style-type: none"> ✓ Verify the flat-cables are correctly connected
<ul style="list-style-type: none"> ✓ Filament voltage protection (ERRATIC V.F.) doesn't switch off 	<ul style="list-style-type: none"> ✓ "FILAMENT" fuse on the front panel is broken ✓ Fuses on SCR boards are broken ✓ Filament supplying network filter is faulty 	<ul style="list-style-type: none"> ✓ Substitute the fuse in the front panel ✓ Substitute fuses on SCR boards ✓ Substitute the network filter
<ul style="list-style-type: none"> ✓ "ERRATIC BIAS" protection remains on (tetrode version only) 	<ul style="list-style-type: none"> ✓ Vg1 voltage is too low (160 V Typ.) ✓ Ig1 fuse in the front panel is broken ✓ BNC connector is not correctly inserted in the RF unit 	<ul style="list-style-type: none"> ✓ Contact ELENOS ✓ Substitute the fuse in the front panel ✓ Correctly insert BNC connector
<ul style="list-style-type: none"> ✓ The device doesn't reach the high voltage status 	<ul style="list-style-type: none"> ✓ One or more protections is on 	<ul style="list-style-type: none"> ✓ Search for the problem corresponding with the switched on protection
<ul style="list-style-type: none"> ✓ The device doesn't distribute RF power 	<ul style="list-style-type: none"> ✓ RF INPUT connector is not correctly connected ✓ The driver doesn't turn on ✓ One of the devices before the final amplifier doesn't work correctly 	<ul style="list-style-type: none"> ✓ Correctly connect RF INPUT ✓ Check and/or substitute the "OUT AUX" fuse in the front panel ✓ Check the driving devices one by one and in case of their correct working, contact ELENOS
<ul style="list-style-type: none"> ✓ The high voltage value isn't correct 	<ul style="list-style-type: none"> ✓ Wrong connection of anode transformer ✓ Rectifier is faulty 	<ul style="list-style-type: none"> ✓ Correctly connect the anode transformer ✓ Substitute the rectifier
<ul style="list-style-type: none"> ✓ The device reaches the high voltage but there is not anode current absorbing (Tetrode only) 	<ul style="list-style-type: none"> ✓ G2 driving board is faulty ✓ G2 supplying relay is broken ✓ The high voltage value isn't correct 	<ul style="list-style-type: none"> ✓ Substitute the G2 driving board ✓ Substitute the relay in the front panel ✓ See the above described point

	Meas. Unit	Value	Specific E4T-5K	Specific E4T-10K	Specific E4T-15K	Specific E3T-3K	Specific E3T-5K	Specific E3T-10K
Thermionic tube	-	-	4CX5000A	4CX7500	4CX7500	3CX3000A7	3CX3000A7	YU148
Operating band	MHz	-	87,5/108	87,5/108	87,5/108	87,5/108	87,5/108	87,5/108
Output power	KW	Max	5	10	15	3	5	10
Reflected power	KW	Max	0,6	0,6	0,6	0,6	0,6	0,6
Input power	W	Typ	150	300	700	220	400	500
Input impedance	Ohm	Typ	50					
Output impedance	Ohm	Typ	50					
Operating class			C	C	C	B	B	B
Gain	dB	Typ	16	16	13	11	12	
Harmonic and spurious attenuation	mW	Max	1	1	1			
Anode voltage	V	Typ	5600	6600	7500			
Anode current	A	Typ	1,25	2	2,5			
Anode efficiency	%	Typ	72	72	73	62	62	34
Polarization voltage (Vg1)	V	Typ	-200	-160	-200	-20	-25	-35
Control grid current (I _{g1})	mA	Typ	0	0	0	250	250	400
Screen grid voltage (Vg2)	V	Typ	750	750	750	-	-	-
Screen grid current (I _{g2})	mA	Typ	30	50	120	-	-	-
Filament voltage	V (AC)	Typ	7,5	7	7	7,5	7,5	7,5
Filament current	I (AC)	Max				50	50	50
Exhausted air temperature	C (Cels.)		85					
Operating temperature	C (Cels.)	Max	-10/+50					
Maximum service altitude	m.s.l.m.	Max	3000					
Maximum relative humidity	%		95 not condensing					
Cooling			forced ventilation					
Air outlet tube (diameter)	mm		180					
Input connector			Type "N" female					
Output connector		Typ	EIA flang. 1+5/8"					
Star voltage supply	V (AC)	Typ	3 x 380 - 415 + neutral(+/- 15%, 50/60 Hz)					
Star current supply	I (AC)	Typ						
Triangle voltage supply	V (AC)	Typ	3 x 220 (+/-15%)					
Triangle current supply	I (AC)	Typ						
Power consumption	KVA	Typ	11	18	20	8	11	16
Power factor	Cos ϕ	Max	0,9					
Rack size	mm		560 x 910 x 1590 (+100) -19" 32U					
Weight	Kg		300	400	450		300	400

Technical data are indicative and may vary without previous notice

Limitation on cable length

Supplying cable

length lesser than 3 m.



BROADCAST EQUIPMENT COMPANY

Via G. Amendola 9 - 44028 Poggio Renatico (FE) - Italy

Tel. +39 0532 829 965 - Fax +39 0532 829 177

E-Mail: info@elenos.com

Web: www.elenos.com