

"MASTER"



Transtig AC/DC 200

Technical Notes

Issue 2 (March 86)

SPECIFICATION

OUTPUT

Open circuit voltage	AC 59v; DC 52v
Current range	5-200 amps AC/DC
Rated 100% duty cycle	95 amps
60% duty cycle	145 amps
35% duty cycle	200 amps
Post-flow	0.5-30 secs
Crater fill	0.5-10 secs
Start current time	0.5-10 secs

INPUT

Nominal voltage	200/380/415/440v
Phase	Single
Frequency	50/60Hz

OTHER RELEVANT DATA

Rating specification	ISO700, BS638. 1979
Insulation class	H (180°)

WEIGHT

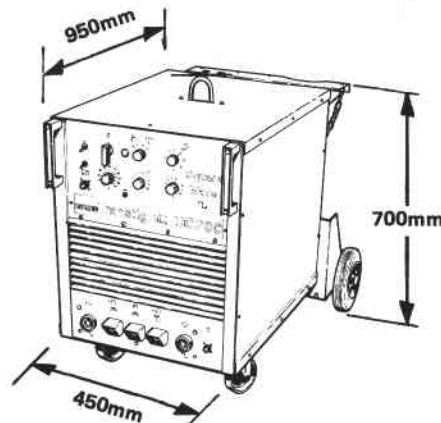
135Kg

INPUT 15KVA

CURRENT 35A AT 420V

FUSE RATING 50AMP

DIMENSIONS



Due to variations which can occur in manufactured products, claimed performance, voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, application, maintenance and service.



FAULT FINDING

- Equipment**
- Multimeter, 20kohm/v, or better
 - Unless otherwise specified, all voltages are measured from the electronic zero (negative welding current terminal)
- Check**
- That the unit is connected for the correct supply voltage
 - That the mains supply is 'live'.
 - That all welding current cable connections and terminals are undamaged
 - That all controls on the front panel are correctly set, for MMA/TIG and with or without remote control device (local/remote control)

GENERAL

Possible Faults

Item	Sympton	Probable Cause	Remedy
1.	Indicating lamp LP1 does not light and/or fan F does not start	<ul style="list-style-type: none"> a. Fuse FS1 (2A) has blown b. Mains failure c. Main transformer T1 faulty d. Indicating lamp LP1 is faulty 	<p>Replace fuse. If the fuse blows again, see Item 2.</p> <p>Check mains fuses, all connections and terminals</p> <p>Remove the connections from secondary terminal block TB2. Measure the voltage between the upper and lower secondary connections: this should be 120v AC. If this voltage is not found, replace the transformer.</p> <p>Measure the voltage between the conductors connected to LP1 (048 and 049) this should be 42v AC. If this voltage is present, replace the lamp</p>
2.	Fuse FS1 (2A) blows repeatedly	<ul style="list-style-type: none"> a. Fan F faulty b. Electronic equipment power supply transformer T2 faulty c. A fault on a circuit board d. Relays RL1, RL2 and/or RL3 are faulty e. Cooling unit faulty 	<p>Remove connection 008 from the electronic equipment power supply transformer terminal block TB3, terminal 5, and insulate the wire. If fuse FS1 blows, fan is faulty. Measure the resistance of the motor windings, which should be 135 ohm. If the resistance differs appreciably from this, replace the fan. Reconnect wire 008</p> <p>Measure the voltages at the transformer terminal block. They should be: 220v on TB3 terminals 3 and 5. 135v on TB3 terminals 10 and 11. 10v on TB4 terminals 13–14, 16–17 and 19–20. 21v on TB4 terminals 22–23 and 23–24. If these voltages are not present, replace the transformer.</p> <p>Replace circuit board.</p> <p>Replace the faulty relay.</p> <p>Check the cooling unit and replace if necessary.</p>
3.	Mains fuse blows when switch S1 (On/Off) is turned on	<ul style="list-style-type: none"> a. Faulty diode(s) or thyristor(s) 	<p>Check thyristors and/or diodes as described under Maintenance.</p>

TIG WELDING

- Check**
- That switch S2 is in the TIG AC or TIG DC positions
 - That the correct shielding gas is being used, and at the correct flow rate.
 - That the gas supply hose is undamaged
 - That the TIG torch, welding cable, gas hose and control cable are undamaged
 - That the HF is set to Position 1 (Position 0 for scratch start)
 - That a correctly-shaped thorium-alloy tungsten electrode is used for DC welding
 - That a rounded zirconium-alloy tungsten wire is used for AC welding
 - That the TIG torch is connected to the correct terminal
 - That the return cable is undamaged and connected to the workpiece



Item	Symptom	Probable Cause	Remedy
4.	No HF spark for ignition of TIG welding	a. Open circuit in the HF circuit	<p>Check connections to coil L2, capacitors C1 and C2 and HF cable to spark gap SG</p> <p>WARNING: This is HIGH-VOLTAGE equipment, and must be checked only in the unpowered state. Discharge the capacitors by short-circuiting them with a screwdriver or discharge stick before working on the equipment</p> <p>Short-circuit terminals a & b on SK3 for the torch contact. If the HF unit operates, replace the torch switch. Check that the voltage at terminal SK3 is 15vDC.</p> <p>Replace the circuit board.</p>
		b. A fault in the torch contact	
		c. Circuit board PCB2 is faulty	
5.	No gas	a. Relay RL3 is faulty	<p>Measure the voltage across RL3 (between wires 011-012). If this is 42v AC, replace the relay.</p> <p>Purge the hoses and torch with compressed air at reduced pressure. Check that the hoses are undamaged and not kinked.</p> <p>Remove circuit board plug PL4 and measure the resistance between wire 037, and OV (connected to terminal D10). Turning the potentiometer must vary this resistance between 0 and about 1 Mohm. If this is not possible, replace the potentiometer.</p> <p>NB: When measuring from terminal sleeve contacts, the test probe must not be pressed down so far that a bad contact may be caused.</p> <p>Replace circuit board.</p>
		b. Hoses or hose connections blocked.	
		c. Gas control potentiometer RV2 faulty	
		d. Circuit board PCB 2 is faulty	
6.	No slope-up, or incorrect time	a. Potentiometer RV4 for slope-up setting is faulty	<p>Remove circuit board plug PL4 and measure the resistance between wires 034 and 036, (connected to terminals D1 and D6 respectively). Turning potentiometer RV4 must vary the resistance between 0 ohm and about 5 Kohm. If this is not possible, replace the potentiometer.</p> <p>Replace circuit board.</p>
		b. Circuit board PCB2 is faulty	
7.	No slope-down, or incorrect time	a. Potentiometer RV3 for slope-down adjustment is faulty	<p>Remove circuit board plug PL4 and measure the resistance between wires 034 and 035, (connected to terminals D1 and D5). Turning potentiometer RV3 must vary the resistance between 0 ohm and about 5 Kohm. If this is not possible, replace the potentiometer.</p> <p>Replace circuit board.</p>
		b. Circuit board PCB2 is faulty	
8.	No welding current with gas-cooled torch	a. Interruption in the gas flow	<p>See item 5.</p> <p>Check that there is a circuit between wires 042 and 084 (on terminal block TB7 on the thyristor bridge).</p> <p>Check the thyristors as described under Maintenance.</p> <p>Set S2 to MMA and S3 to Local. Remove circuit board contact PL1 and check that there is a circuit between wires 029 and 042, (connected to terminals A1 and A4 respectively) It must be possible to vary the resistance between 0 ohm and about 2.2 Kohm by means of potentiometer RV1.</p>
		b. Thermostat TH1 (on the thyristor bridge) and/or TH2 (on the inductor) has tripped, due either to high temperature or to a fault in the thermostat itself.	
		c. A thyristor is faulty.	
		d. Potentiometer RV1 for current setting is faulty.	



Item	Symptom	Probable Cause	Remedy
Para. 8 Continued		e. Circuit board PCB1 and/or PCB2 faulty f. Oxidized electrode	Remove circuit board PCB2 and make a trial weld with a coated electrode (MMA). If the power source works, replace circuit board PCB2. If the fault persists, replace circuit board PCB1. Prepare and clean the electrode see page 7 of the operating manual.
9.	No welding current with water-cooled torch and OCD1 cooling unit	a. Water supply pump fuse faulty b. Water pump and/or relay RL2 for the pump is/are faulty c. Cooling water hoses and/or connections blocked	Replace the fuse. Check the electrical connections to the pump. Measure the resistance of the pump motor, which should be about 380 ohm. Measure the voltage on wires 095 and 096, connected to terminals 13 and 14 respectively of relay RL2. This voltage should be 24v DC. If the voltage is present the relay is faulty and should be replaced. Check that the hoses are undamaged and not kinked. Check to see whether there is a blockage in the torch. If the fault remains, see Item 8, 8b and 8f.
10	Welding current is too low	a. Thyristor(s) faulty b. Circuit board(s) PCB1 and/or PCB2 faulty	Check thyristors as described under Maintenance. As item 8e.
11.	Welding current is too high	a. Thyristor(s) faulty b. Open circuit in the shunt connections c. Potentiometer RV1 for current setting is faulty.	Check thyristors as described under Maintenance. Remove circuit board plug PL1 and check that there is no break in wires 072 or 073, (connected to terminals 2 and 3 respectively). As item 8d.
12.	No base current (i.e. difficulty in maintaining the arc and poor welding characteristics with low AC welding currents)	a. Relay RL1 for base current is faulty b. Resistor R1 for base current is faulty	Set switch S2 to the MMA, AC position. Measure the voltage between wires 087 and 088 connected to terminals A1 and A2 respectively of relay RL1. This should be 24v DC. If the affirmative replace the relay. Measure the resistance, which should be 25ohm. If not, replace the resistor.
13.	HF spark is not interrupted when welding with DC. (The arc is unstable, and welding current deviates from the set value)	a. Diode(s) D1/D2 for base current is/are faulty	Check the diodes as described under Maintenance.
14.	Irregular or missing HF—spark	a. Deposits on spark plug SG	Clean spark plug, with wire brush. Should problem remain, replace spark plug.

METAL ARC WELDING

- Check
- That switch S2 is in the MMA, AC or DC positions
 - That welding cables and electrode holder are undamaged
 - That the return cable is undamaged and connected to the workpiece

Item	Symptom	Probable Cause	Remedy
15.	No welding current	a. Thermostat TH1 (on the thyristor bridge) and/or TH2 (on the inductor) has tripped, due either to high temperature or to a fault in the thermostat itself.	As item 8b.
		b. A thyristor is faulty	Check the thyristors as described under Maintenance.
		c. Potentiometer RV1 for current setting is faulty.	As item 8d.
		d. Circuit board PCB1 and/or PCB2 faulty.	As item 8e.
16.	Welding current is too low	a. Thyristor(s) faulty	Check thyristors as described under Maintenance.
		b. Circuit board(s) PCB1 and/or PCB2 faulty.	As item 8e.
17	Welding current is too high	a. Thyristor(s) faulty	Check thyristors as described under Maintenance.
		b. Open circuit in the shunt connections.	As item 11b.
		c. Potentiometer RV1 for current setting is faulty.	As item 8d.

MAINTENANCE

Insulation and Continuity Test Yearly (or After a Long Period of Storage)

Carry out an insulation resistance and continuity test as follows:—

1. Switch off and isolate the main supply.
2. Using an insulation/resistance tester (e.g. Megger) set on the ohms range, check for earth continuity between the mains lead earth terminal and all earthed components. A reading of zero ohms should be obtained. A simple bulb and battery may be used if a megger or similar is not available. The bulb should glow brightly if continuity is satisfactory.
3. Remove the two pcb's from circuit by disconnecting PL1,2,3 & 4. (The four pcb plugs).
4. Wire together 'R' and 'S' ('U' & 'V'), mains input terminals (or the cable ends), to form a common junction.
5. Turn the ON/OFF switch to the 'ON' position.
6. Wire together the (-) and (+) output sockets.
7. Using a 500V insulation tester (e.g. megger) check for an insu-

lation resistance of at least 2M ohms between:

- a. The input terminals 'common junction' and the output terminals (paras. 4 & 6 above).
 - b. The input terminals and each of the 10V, 21V-0-21V and 135V ac outputs of TR4.
8. Refit p.c.b. connectors, reconnect to the mains supply and test the equipment before use.

Overload Protection

The overload protection thermostat's are mounted on the thyristor bridge and choke and will interrupt the welding current when the rectifier is overloaded. The current will automatically be reset when the unit is adequately cooled down.

If the output is shut off, keep the mains switched on leaving the fan running to minimize the cooling time.

Schedule Maintenance Daily

1. Check all welding and electrical cables for signs of cracking or general deterioration.
2. Check that all electrical con-

nections are in good physical condition.

3. Check the electrode holder for damage. Replace any suspect part(s).

ALWAYS CHECK THE WELDING AREA DAILY FOR POSSIBLE SAFETY HAZARDS IF IN DOUBT CONSULT YOUR SAFETY OFFICER.

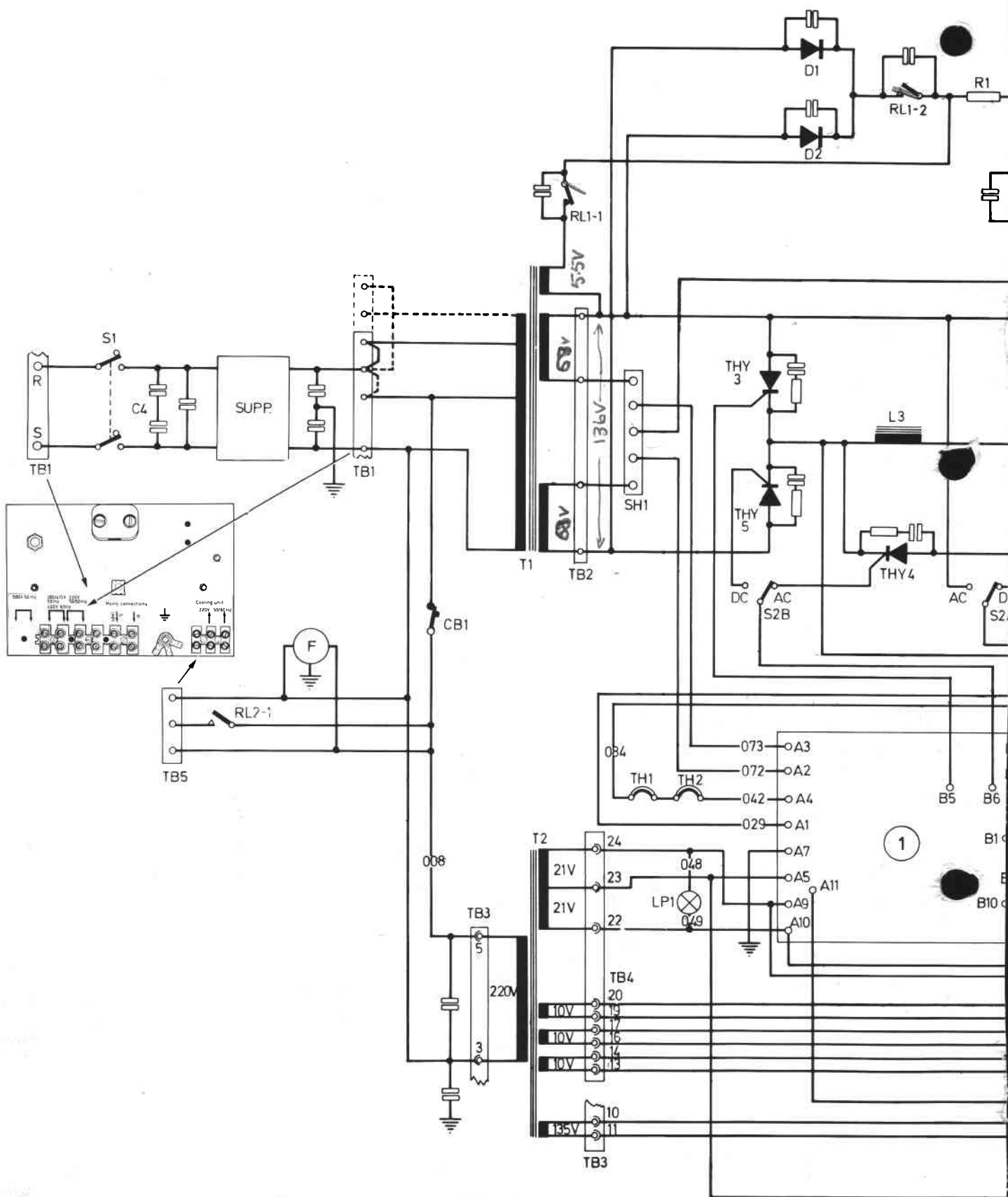
Six-Monthly

1. Switch off the unit and **disconnect from the mains electrical supply.**
2. Remove the top cover (retain the fixing screws).
3. Using a soft brush, remove any dust or dirt from the interior of the unit. If compressed air is used to clean the unit the pressure must not exceed 2kg/cm² (30lb/in²), and the air must be dry.

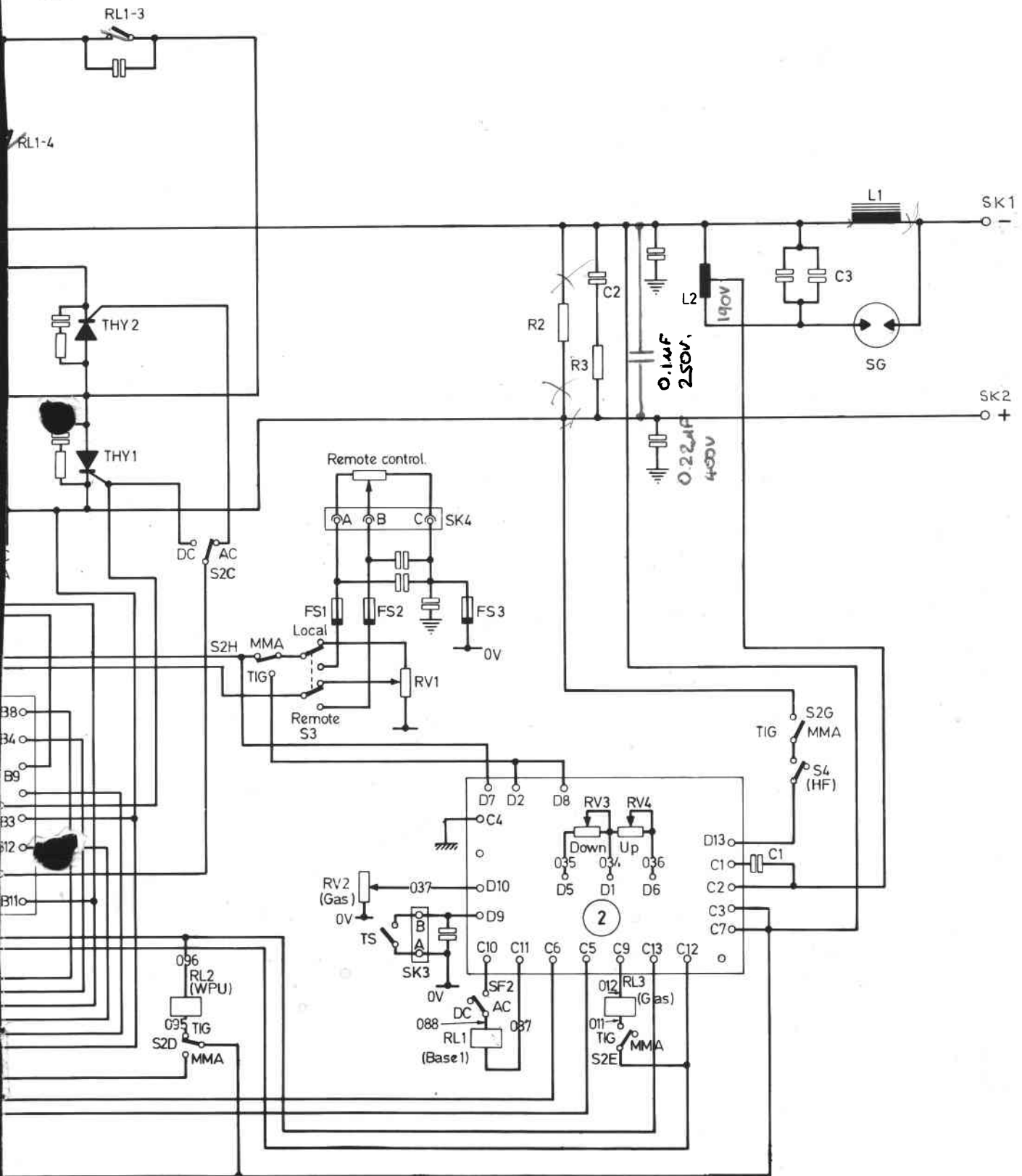
CAUTION:

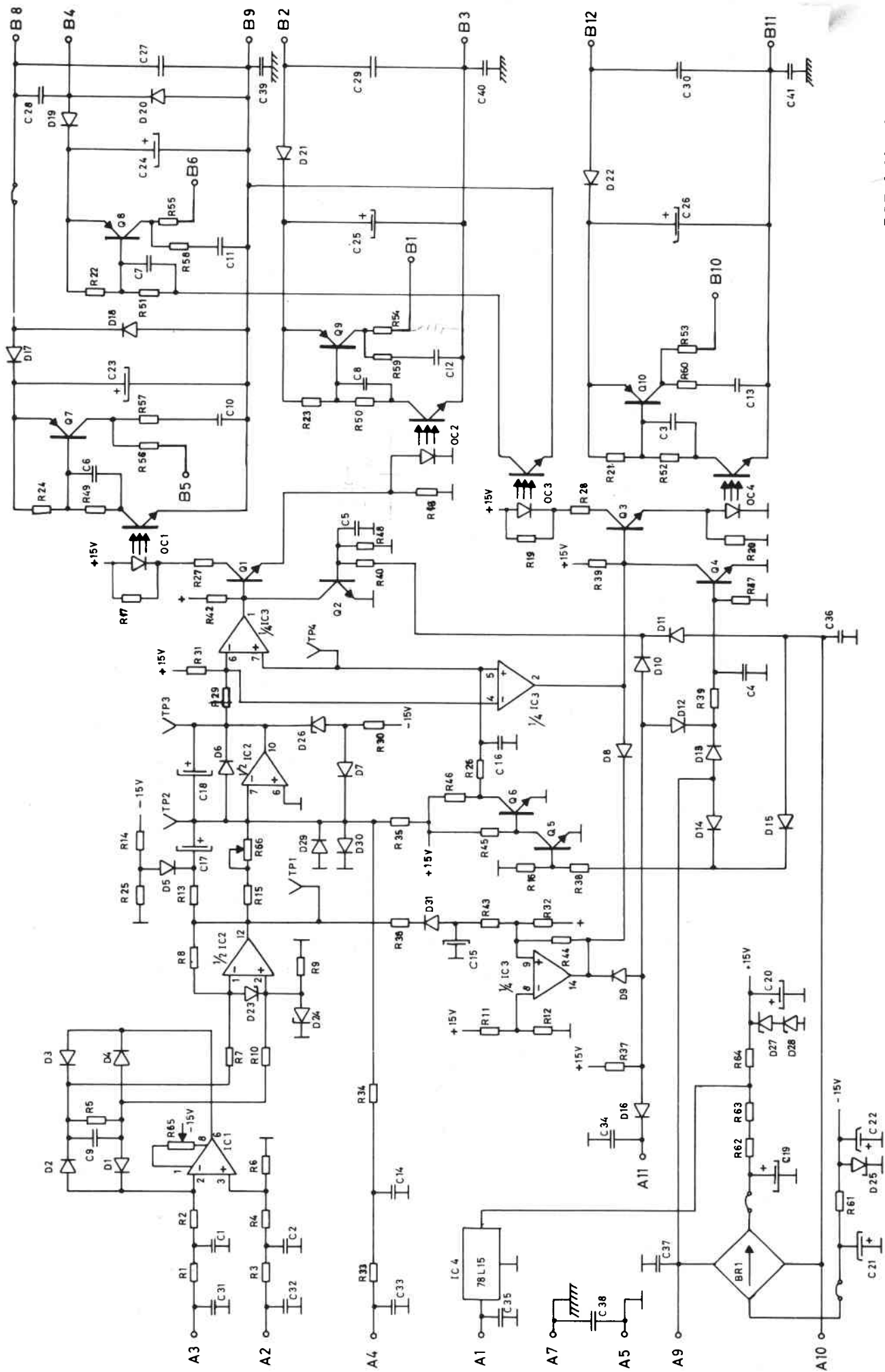
Suitable eye and mouth protection should be worn.

4. Check the security of all components and connections.
5. Carry out an insulation and continuity test as detailed above.
6. Refit the covers.

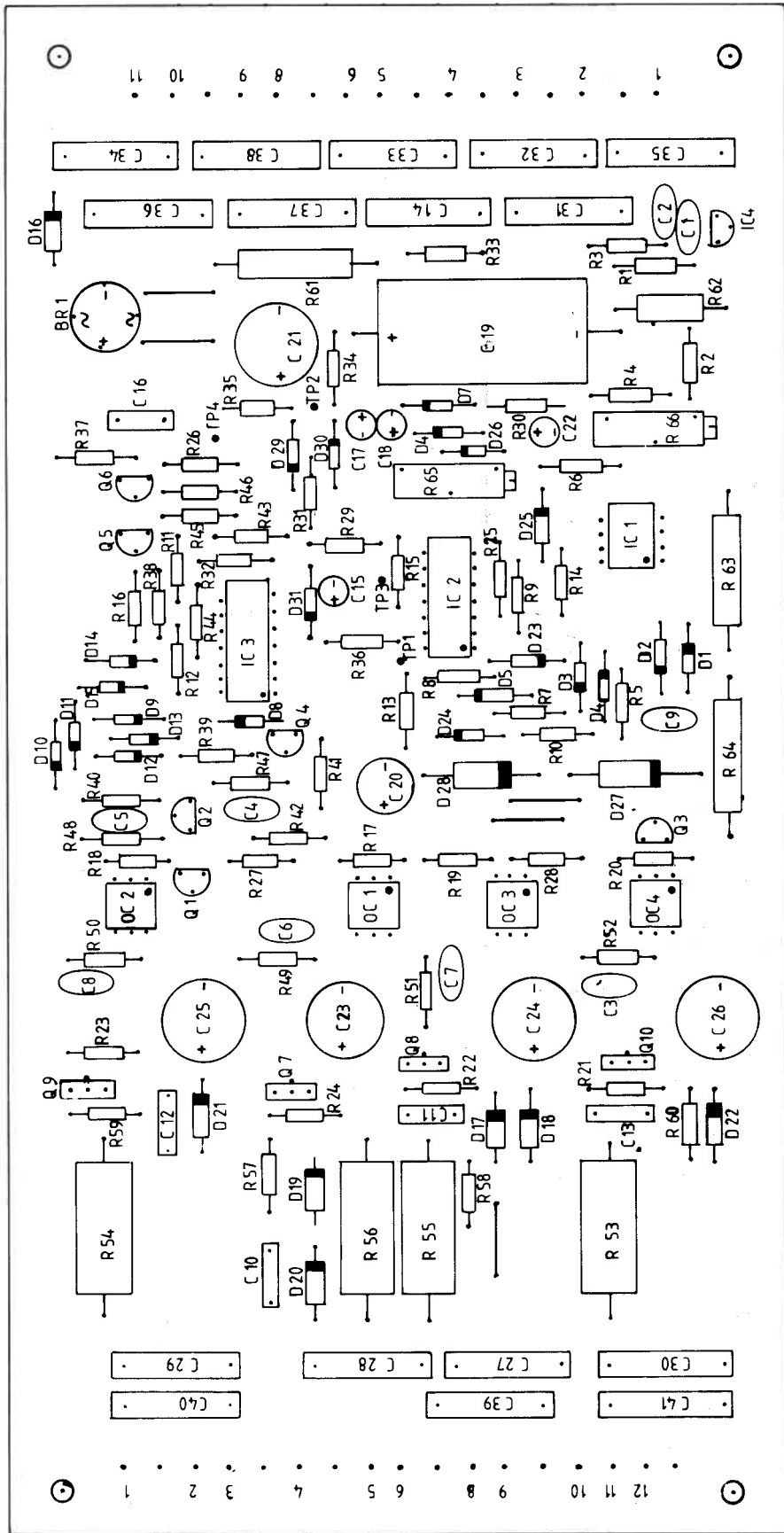


— DC POSITION
 — AC POSITION

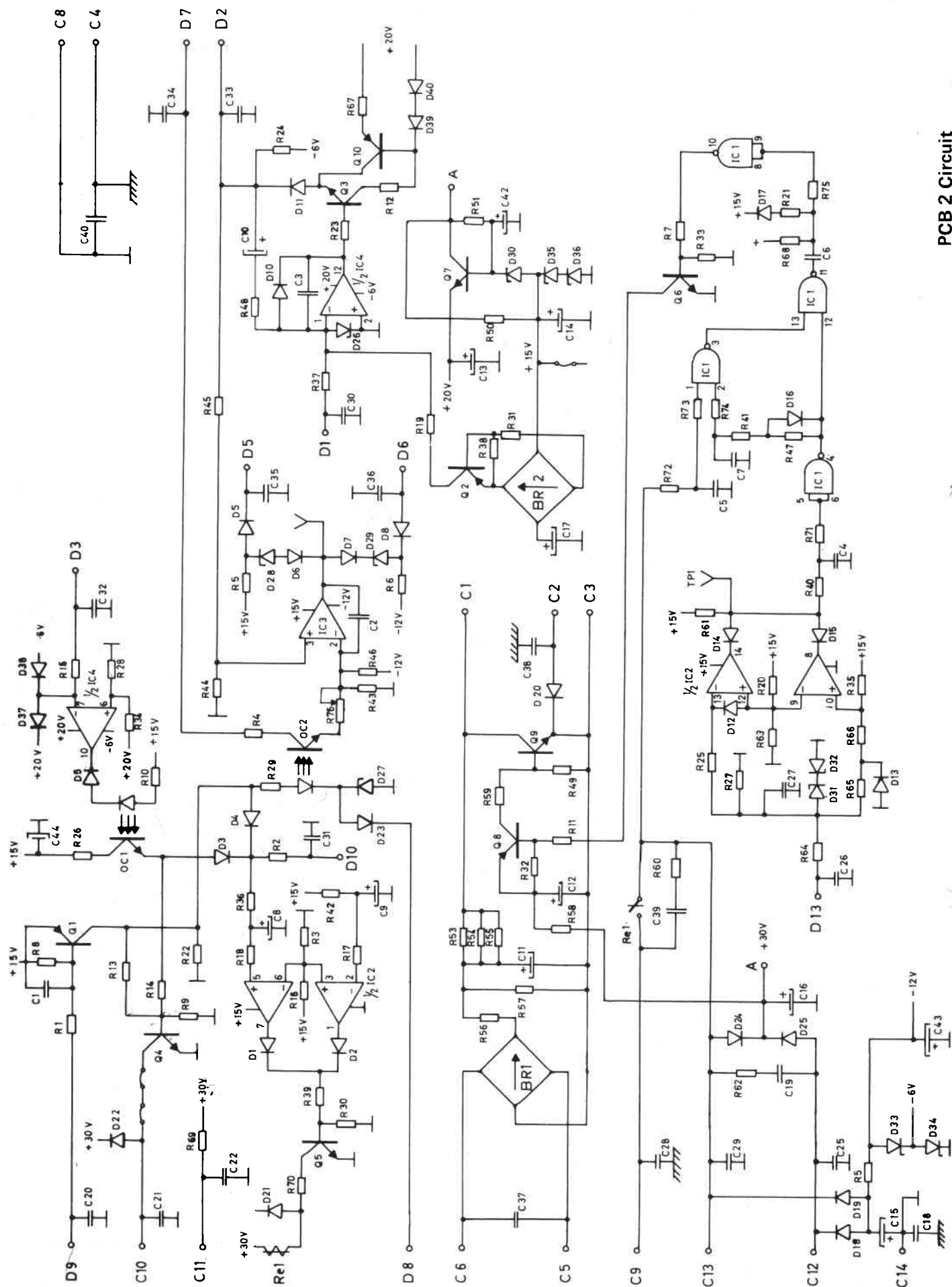




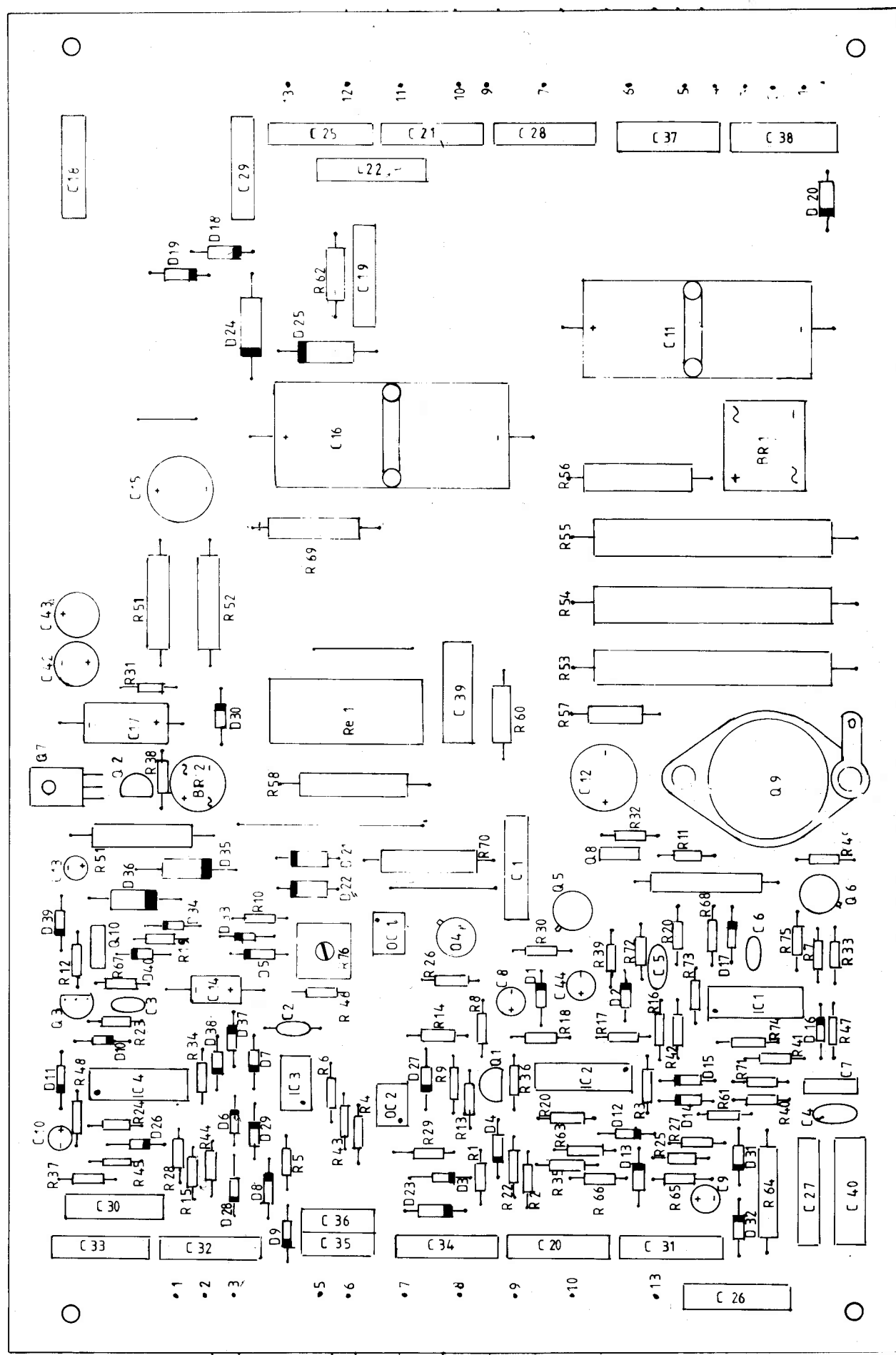
PCB 1 Circuit

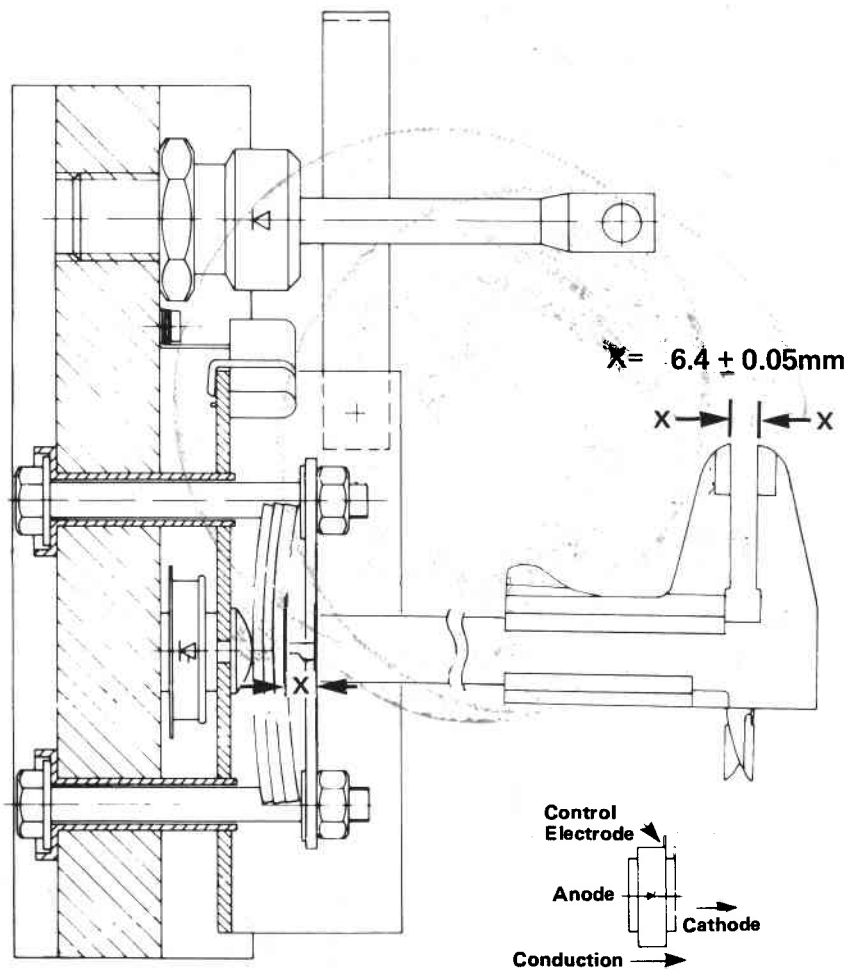


PCB 1 Board Layout



PCB 2 Circuit





Thyristor Fitting Instructions

Replacing the thyristors

When fitting a thyristor it is most important that the correct torque force be applied, and that the mating surface of the heat sink and the thyristor is absolutely clean and free from sharp edges. Smear the connecting surface of the heat sink with a very thin coating of heatsink compound or silicon grease.

Fit the thyristor with the rectifier symbol on the thyristor facing in the direction shown opposite. The thyristor is centered by means of a guide pin. First, tighten the nuts by hand, making sure that there is no play between washers and nuts. Then, using a vernier caliper, measure the distance from the plate to the spring as shown. Finally, tighten the nuts alternatively with a wrench until the measurement is $6.4 \pm 0.05\text{mm}$