

ELEKTROTOM® 390/400

Service-Manual (E)



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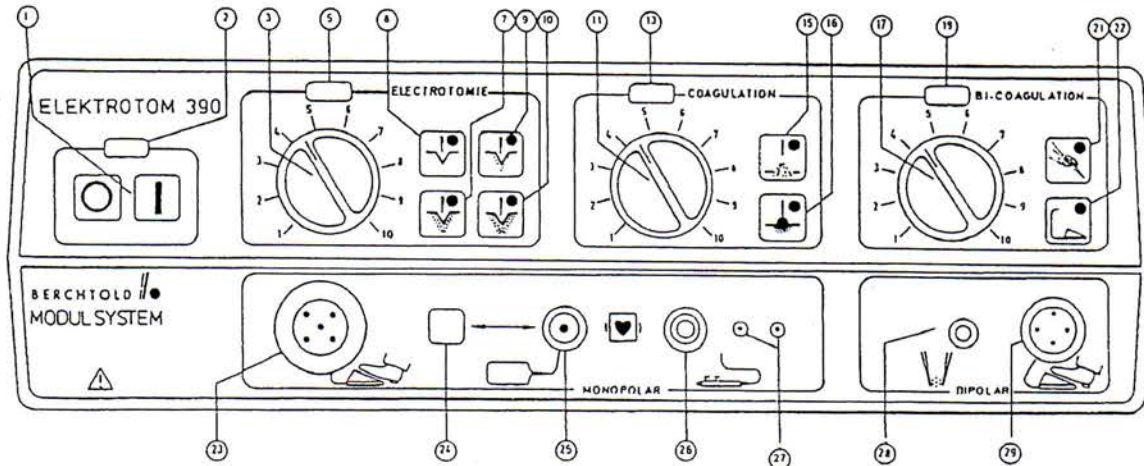


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1. FUNCTION OF OPERATING ELEMENTS AND SIGNAL LAMPS

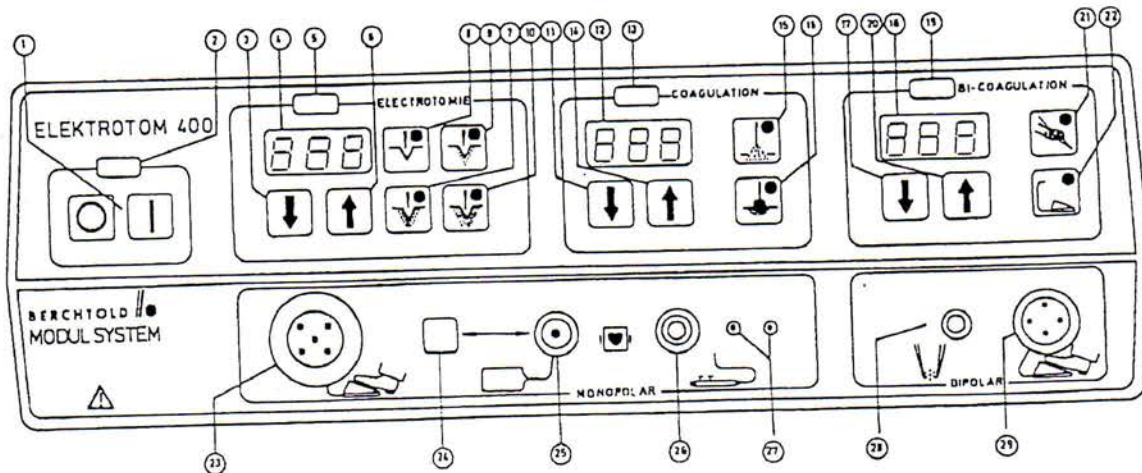
1.1 Front ELEKTROTOM 390



- 1 Mains switch ON/OFF
- 2 Mains signal lamp, green
- 3 Regulator RF-power PURE CUT / BLEND
- 5 Signal lamp PURE CUT / BLEND
- 7 Button BLEND II
- 8 Button PURECUT
- 9 Button BLEND I
- 10 Button BLEND III
- 11 Regulator RF-power COAGULATION
- 13 Signal lamp COAGULATION
- 15 Button SPRAY-COAGULATION
- 16 Button CONTACT-COAGULATION
- 17 Regulator for RF-power BI-COAGULATION
- 19 Signal lamp BI-COAGULATION
- 21 Switch Berchtold-BI-CO-MATIC
- 22 Footswitch ON/OF
- 23 Connection socket for double-pedal footswitch
- 24 Signal lamp for safety circuit
- 25 Connection socket for neutral electrode
- 26 Connection socket for active electrode
- 27 Additional socket for disposable handle
- 28 Connection socket for instruments for BI-Coagulation
- 29 Connection socket for single-pedal footswitch (BI-Coagulation)

Front ELEKTROTOM 400

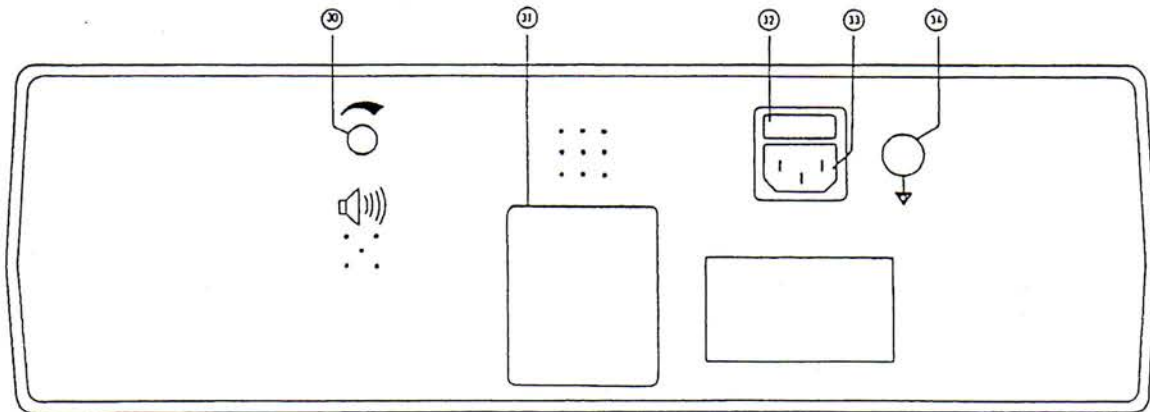
15 Όταν δεν δουλεύει γυρίζουμε το ποτιστικό-
τρο R11



- 1 Mains switch ON/OFF
- 2 Mains signal lamp, green
- 3 Switch RF-power PURE CUT / BLEND - LOWER
- 4 LED display monitor for CUTTING
- 5 Signal lamp PURE CUT / BLEND
- 6 Switch RF-power PURE CUT / BLEND - HIGHER
- 7 Button BLENDII
- 8 Button PURECUT
- 9 Button BLEND I
- 10 Button BLEND III
- 11 Switch RF-power COAGULATION LOWER
- 12 LED display monitor for COAGULATION
- 13 Signal lamp COAGULATION
- 14 Switch RF-power COAGULATION HIGHER
- 15 Button SPRAY-COAGULATION
- 16 Button CONTACT-COAGULATION
- 17 Switch for RF-power BI-COAGULATION LOWER
- 18 LED display monitor for BI-COAGULATION
- 19 Signal lamp BI-COAGULATION
- 20 Switch RF-power for BI-COAGULATION HIGHER
- 21 Switch Berchtold-BI-CO-MATIC
- 22 Footswitch ON/OFF
- 23 Connection socket for double-pedal footswitch
- 24 Signal lamp for safety circuit
- 25 Connection socket for neutral electrode
- 26 Connection socket for active electrode
- 27 Additional socket for disposable handle
- 28 Connection socket for instruments for BI-Coagulation
- 29 Connection socket for single-pedal footswitch (BI-Coagulation)



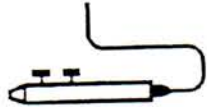
1.2 Back ELEKTROTOM 390 / 400



- 30 Volume control
- 31 Type label
- 32 Mains fuses in plug-in module
- 33 Connection socket for mains plug
- 34 Protective earth conductor



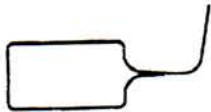
1.3 Explanation of the symbols printed on the operation board



Connection for electrode handle with double fingerswitch for cutting or coagulation.



Connection for footswitch (double-pedal footswitch / single-pedal footswitch).



Connection for the neutral electrode.



Switching-on button for Berchtold BI-CO- MATIC circuit. When button lights, the RF-power for BI-Coagulation is automatically switched on after the forceps' tip has touched the tissue.



Connection for bipolar coagulation.



Symbol for classification of the unit in class CF. The output of the unit is DEFIBRILLATOR PROOF and FLOATING OUTPUT.



Attention! Read instructions!



1.4 The different current types

The unit produces unmodulated or different modulated RF-currents. The different current selection buttons are described subsequent.



PURE CUT

Unmodulated RF-current with high effective power at a low voltage.

This current produces a sharp cut, without or with very little spark formation and, therefore, without additional scab formation on the cutting surface.



BLEND I

Little modulated RF- current to cut with little scab formation.



BLEND II

Middle modulated RF-current to cut with middle scab formation.



BLEND III

Strong modulated RF-current to cut with strong scab formation.



CONTACT-COAGULATION

Modulated RF-current with high effective power for contact-coagulation with ball or plate electrodes or with forceps.



SPRAY-COAGULATION

Very strong modulated RF-current with very high voltage for spray-coagulation or fulguration.



2. TECHNICAL DATA

Power requirement	110 / 220 V AC \pm 20 % reconnectable
Current consumption	max. 880 VA
Classification	I
Type	CF
Nominal frequency	500 kc/s
Impulse frequency of modulation	33 kc/s
Observe duty cycles	10 / 30 *)

14.1.1 CREST-FACTOR **)

Current type SPRAY-COAGULATION	8.0
Current type CONTACT-COAGULATION	5.4
Current type PURE CUT	1.6
Current type BLEND I	2.2
Current type BLEND II	3.0
Current type BLEND III	4.3
Current type BIPOLAR COAGULATION	1.8

14.1.2 HF-OUTPUT

Current type SPRAY-COAGULATION	100 Watts \pm 20 % on 500 Ω
Current type CONTACT-COAGULATION	250 Watts \pm 20 % on 300 Ω
Current type PURE CUT	350 Watts \pm 20 % on 500 Ω
Current type BLEND I	300 Watts \pm 20 % on 500 Ω
Current type BLEND II	300 Watts \pm 20 % on 500 Ω
Current type BLEND III	300 Watts \pm 20 % on 500 Ω
Current type BIPOLAR COAGULATION	50 Watts \pm 20 % on 100 Ω

ΠΥΘΜΙΣΗ ΜΕ R11

Weight	9.5 kg
Dimensions	130 mm height 400 mm width 380 mm depth
Construction	All functional units assembled in modular construction, easily exchangeable.
Constructed	according to IEC 601.
Leakage currents HF and LF	acc. to IEC 601-1 and 601-2-2

*) Allow as much "ON" time to every "OFF" time

**) Crest factor describes the peak voltage in proportion to the nominal voltage

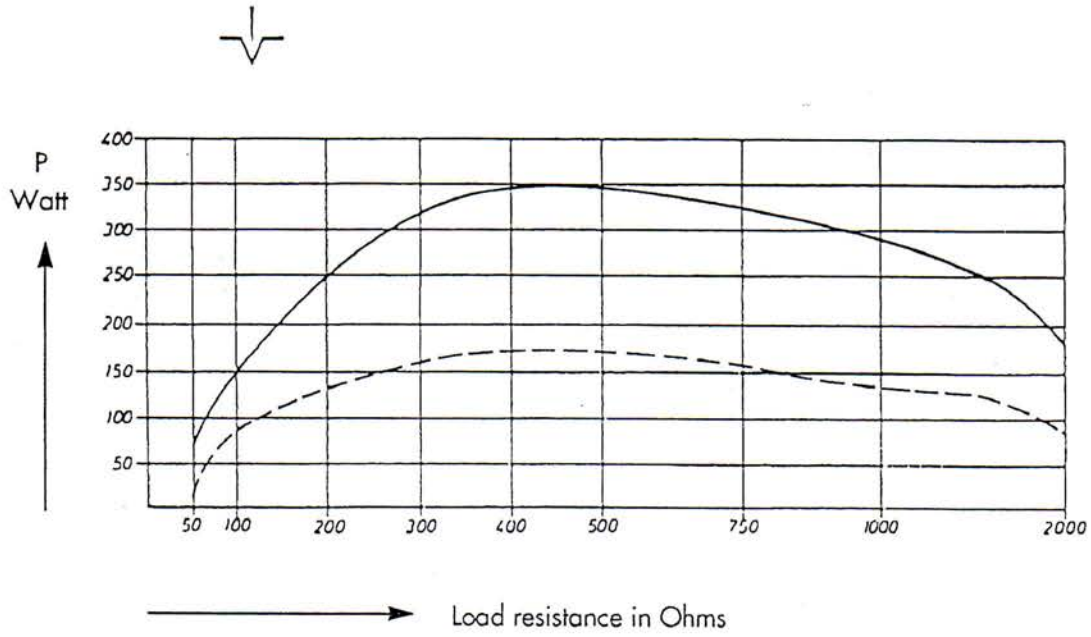


3. Power diagrams

3.1 Output as function of load resistance (Power characteristic)

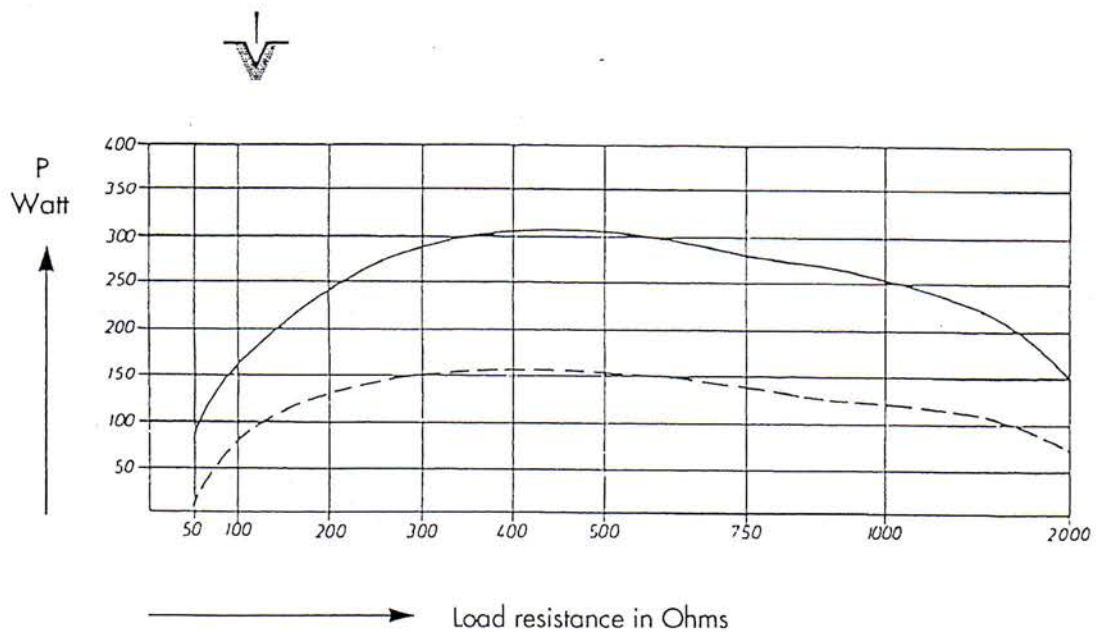
3.1.1 Current type: PURE CUT

—— full power (step 10)
 - - - - half power (step 5)



3.1.2 Current type: BLEND III

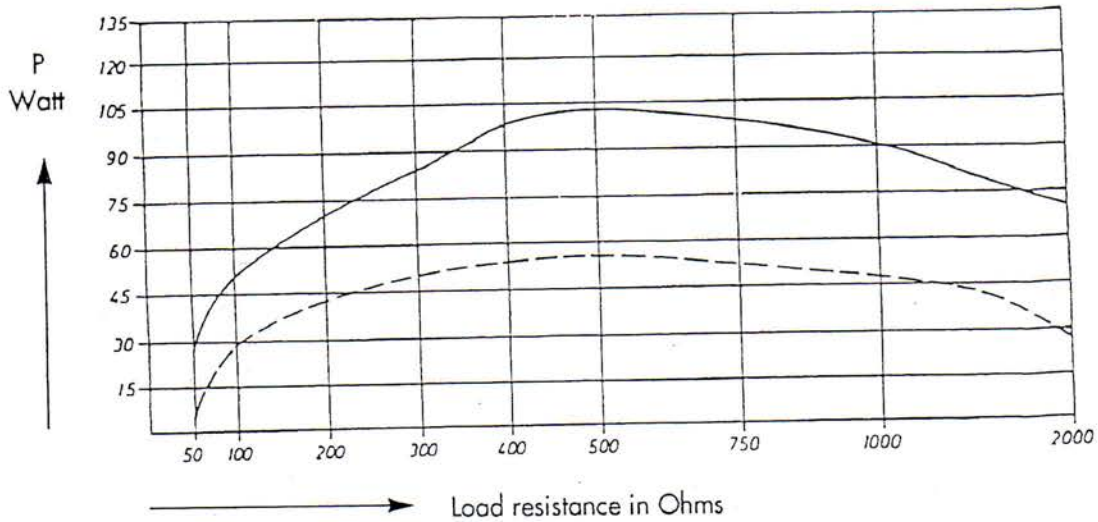
—— full power (step 10)
 - - - - half power (step 5)





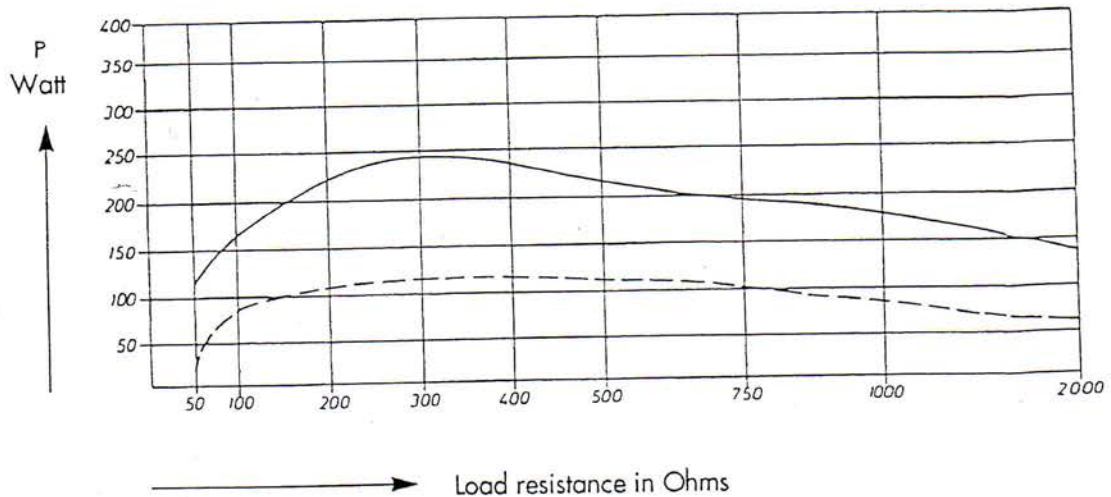
3.1.3 Current type: SPRAY-COAGULATION

— full power (step 10)
 - - - - - half power (step 5)



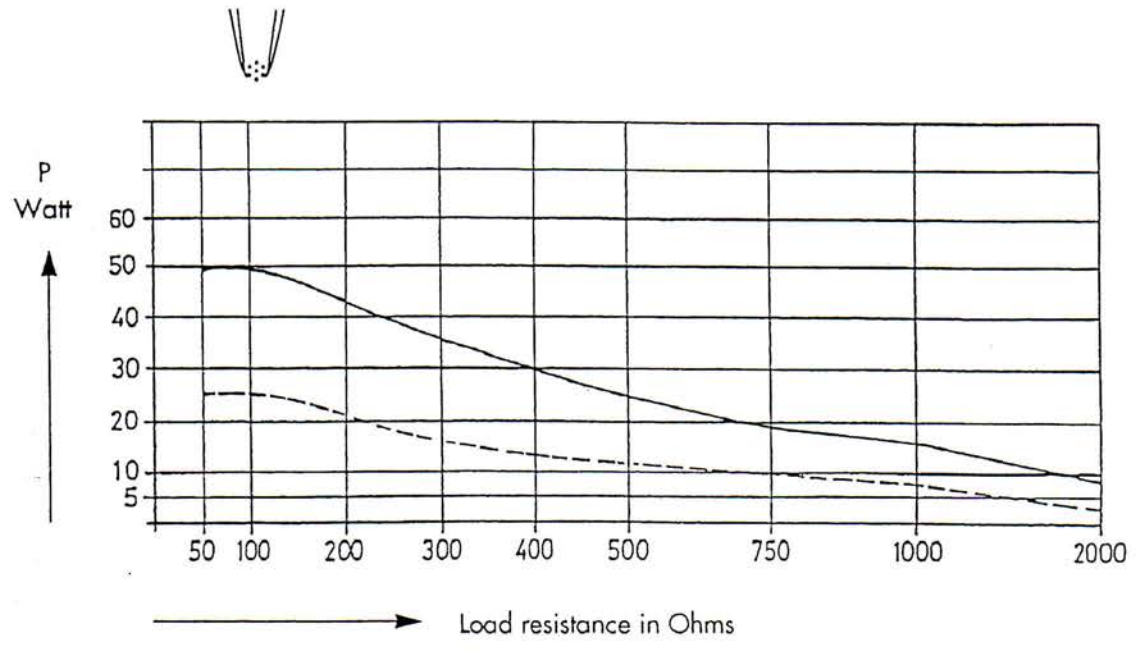
3.1.4 Current type: CONTACT-COAGULATION

— full power (step 10)
 - - - - - half power (step 5)



3.1.5 Current type: BI-COAGULATION

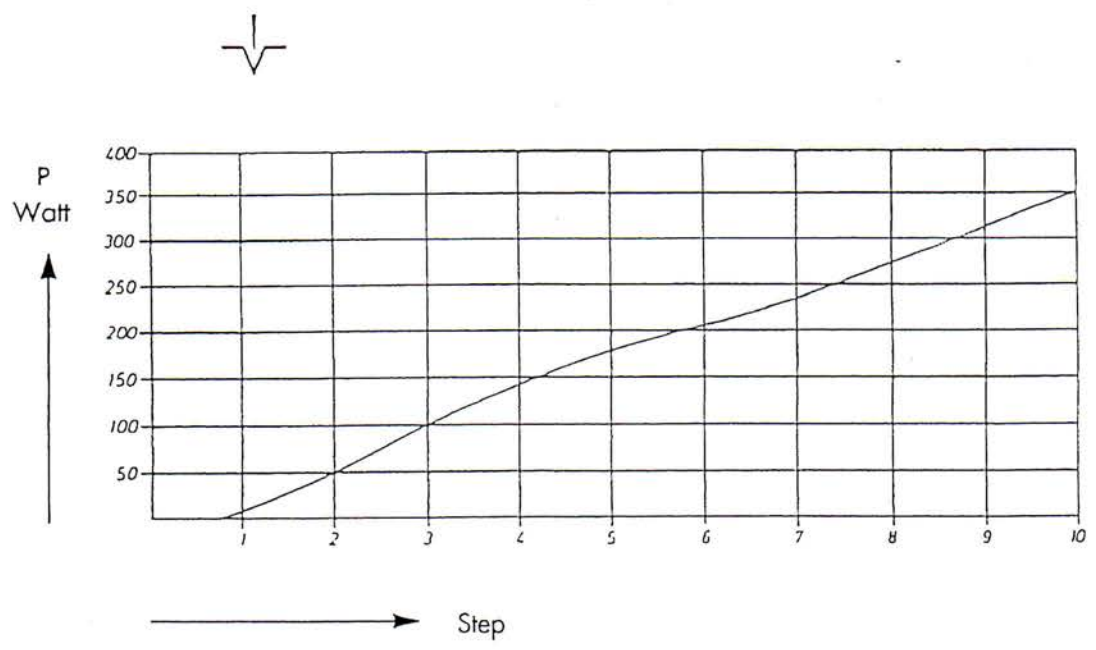
—— full power (step 10)
 - - - - half power (step 5)



3.2 Output as function of power control

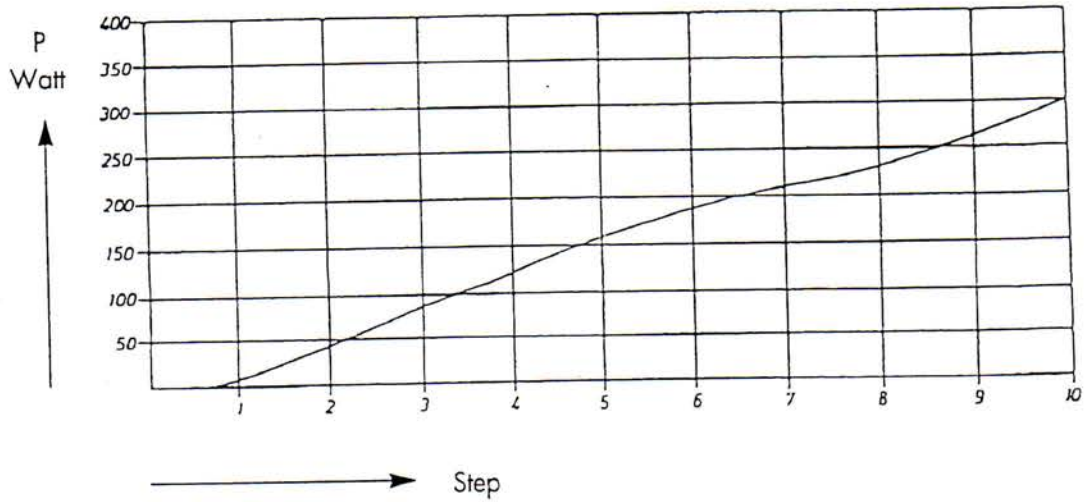
3.2.1 Current type: PURE CUT

Load resistance: 500 Ω



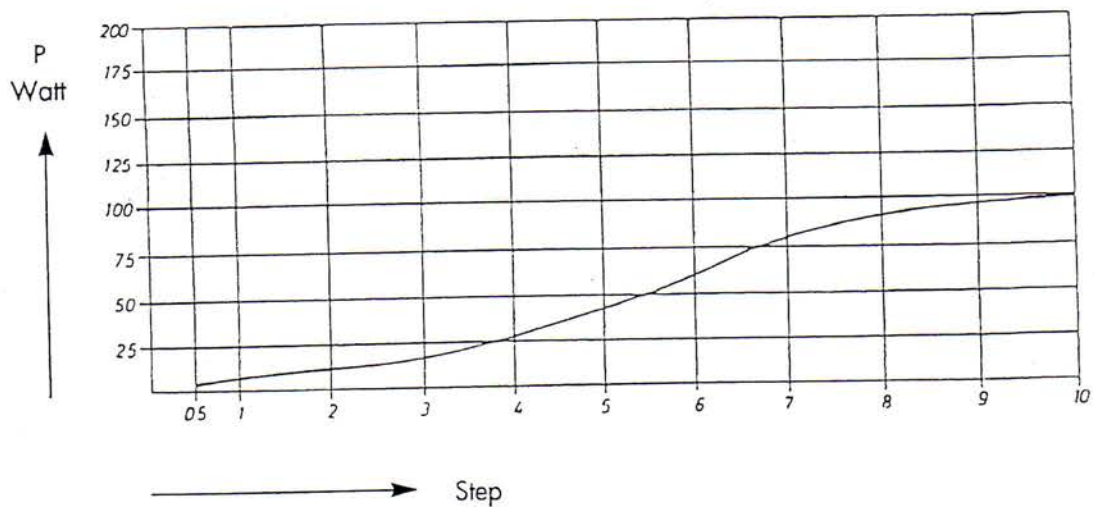
3.2.2 Current type: BLEND III

Load resistance: 500 Ω

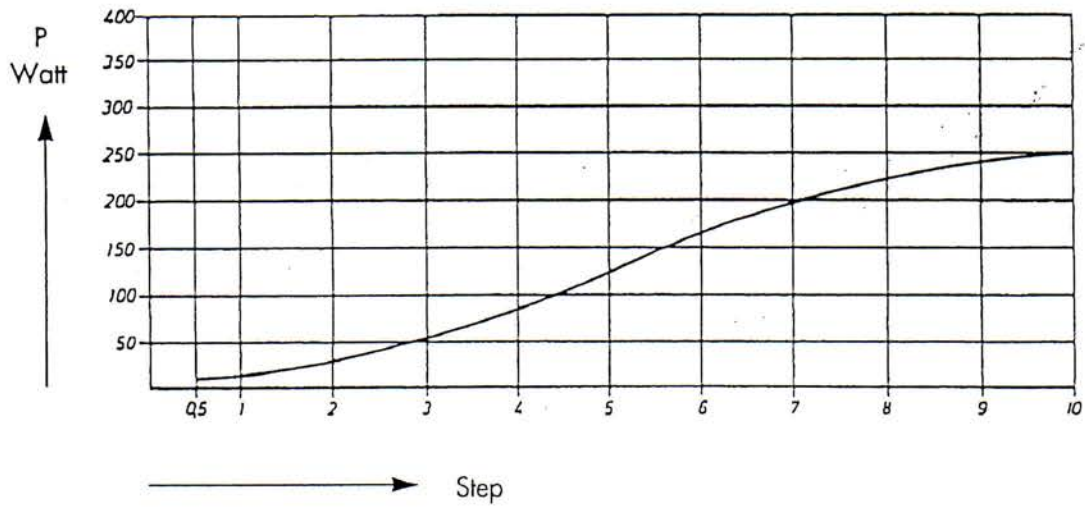


3.2.3 Current type: SPRAY-COAGULATION

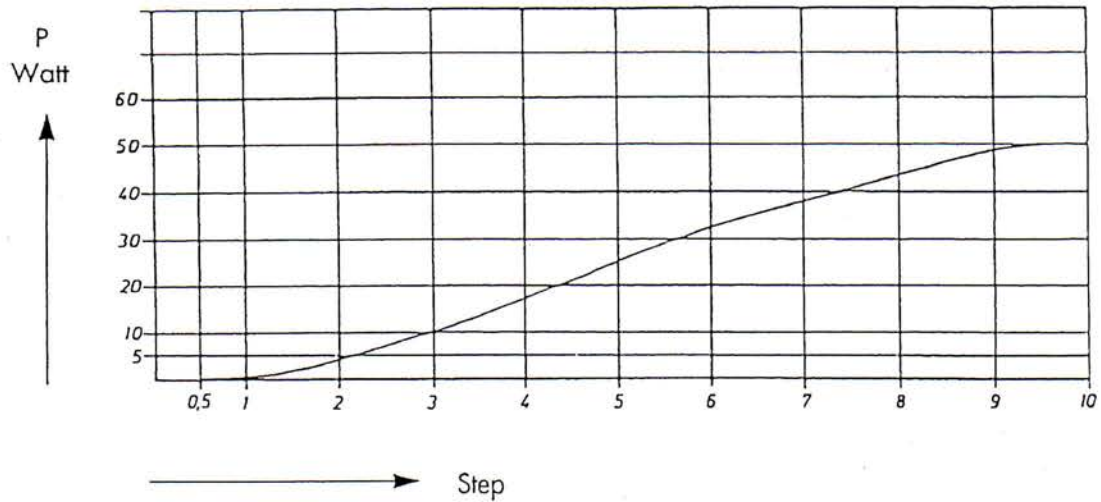
Load resistance: 500 Ω



3.2.4 Current type: CONTACT-COAGULATION Load resistance: 300 Ω



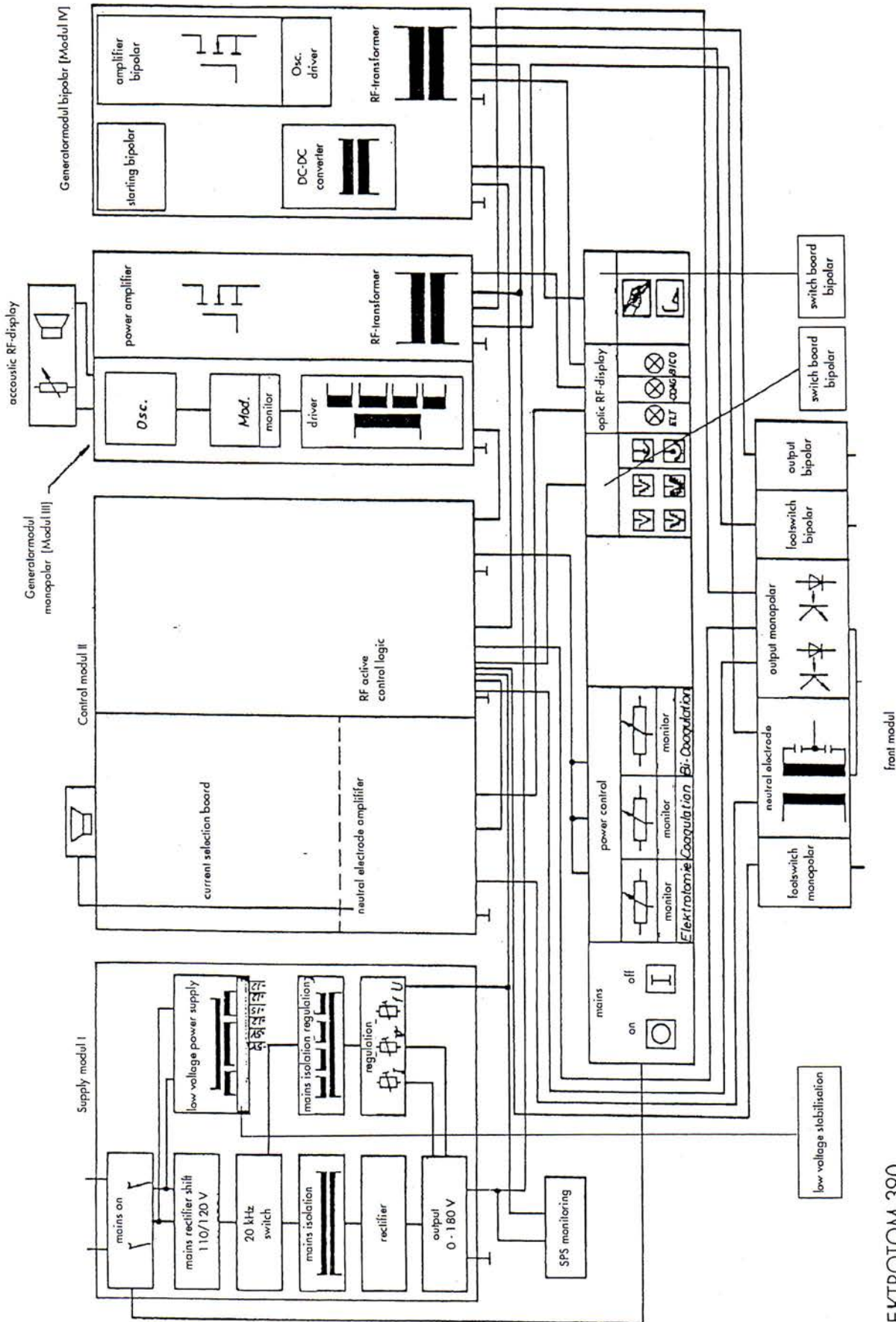
3.2.5 Current type: BI-COAGULATION Load resistance: 100 Ω



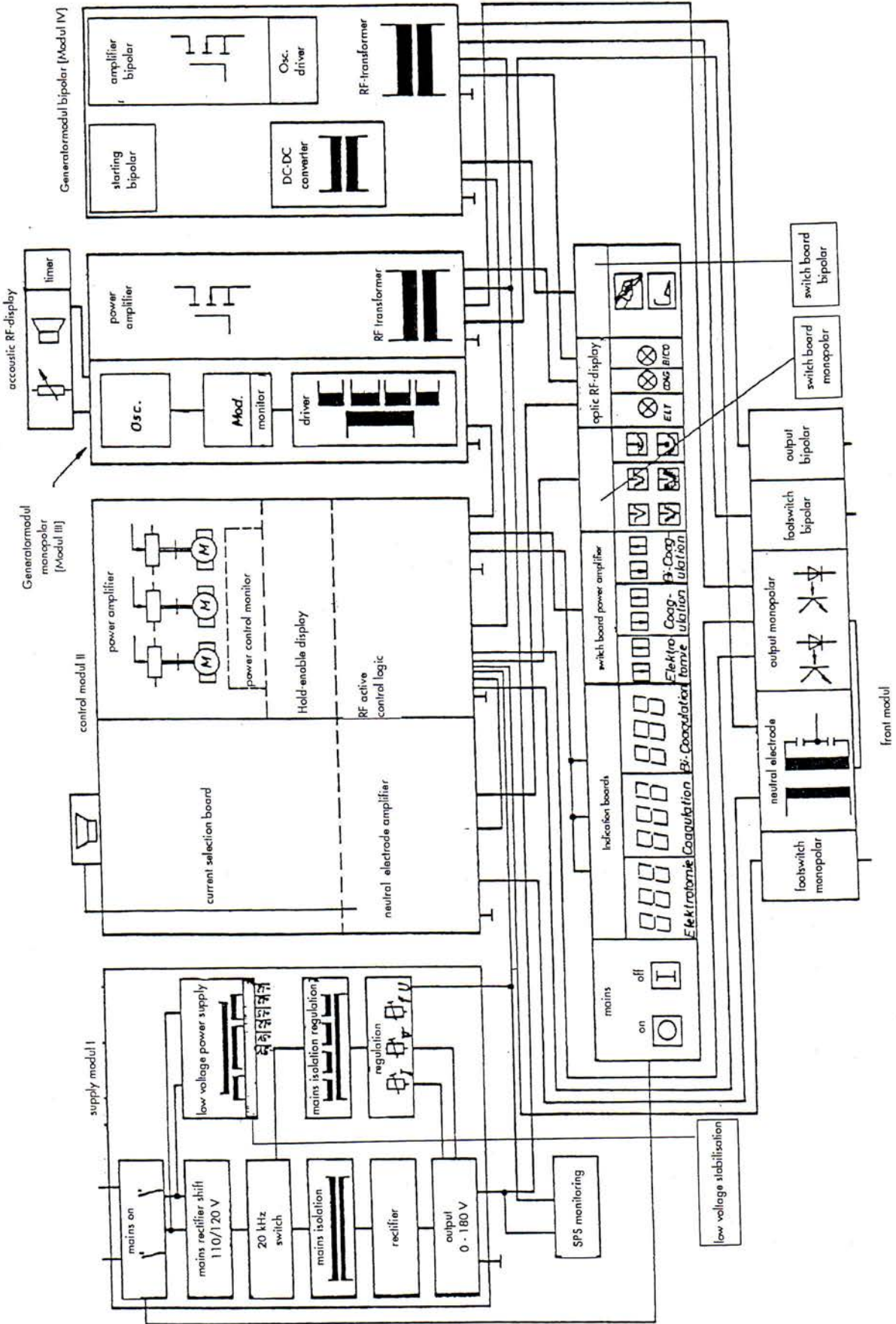


4. GENERAL CIRCUIT DIAGRAMS

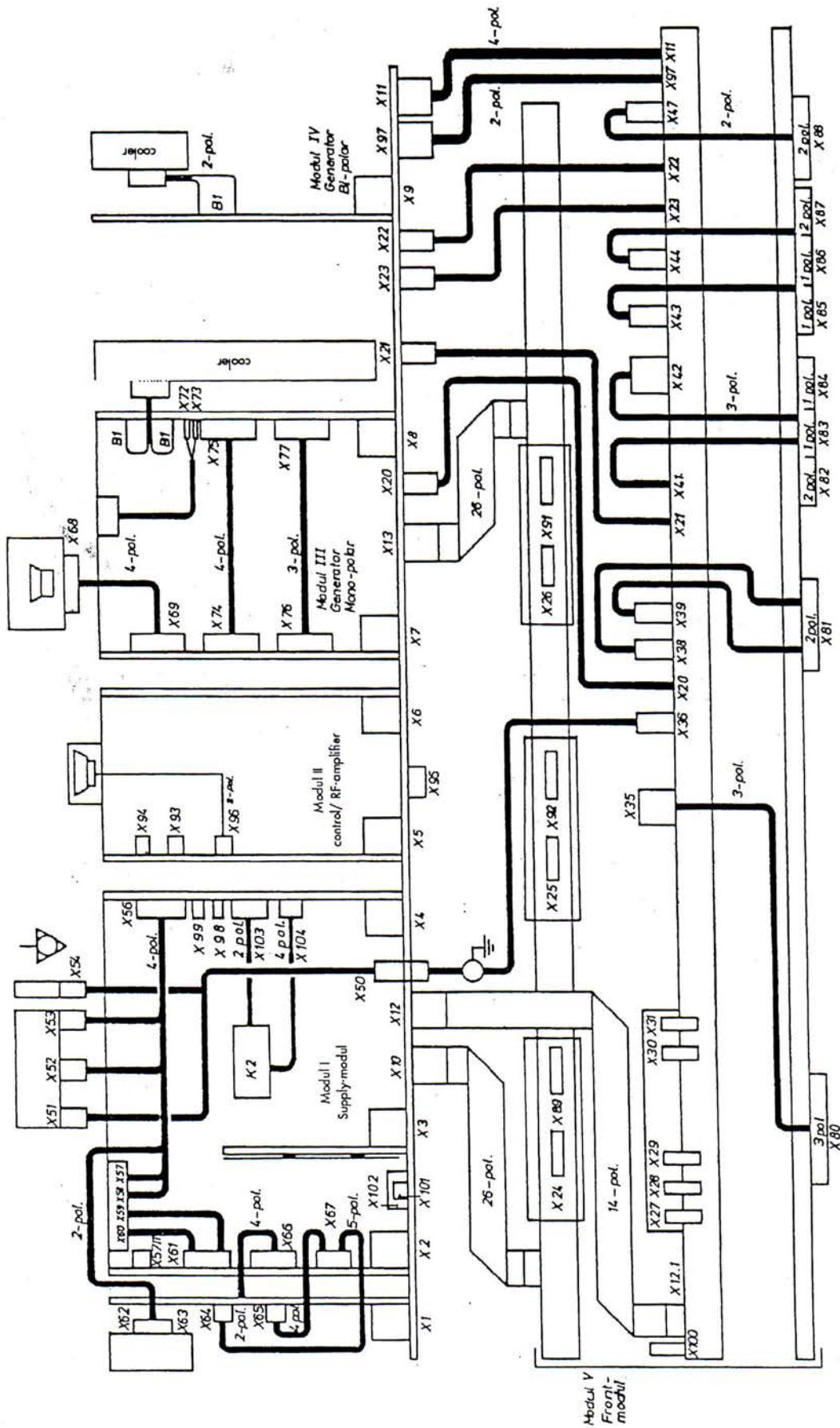
ELEKTROTOM 390/400



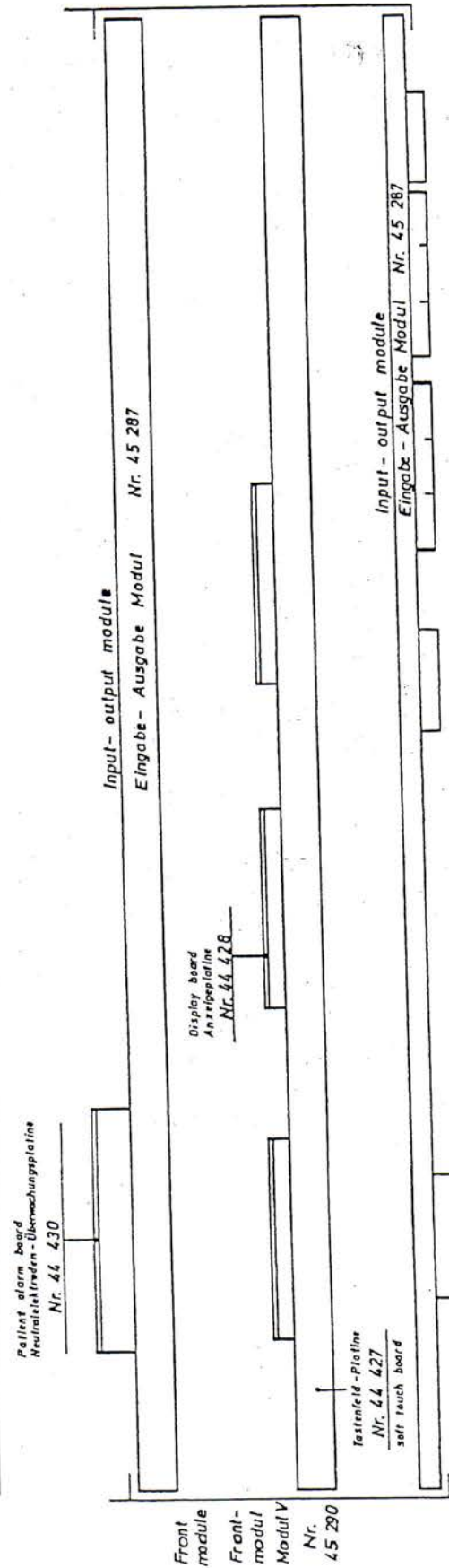
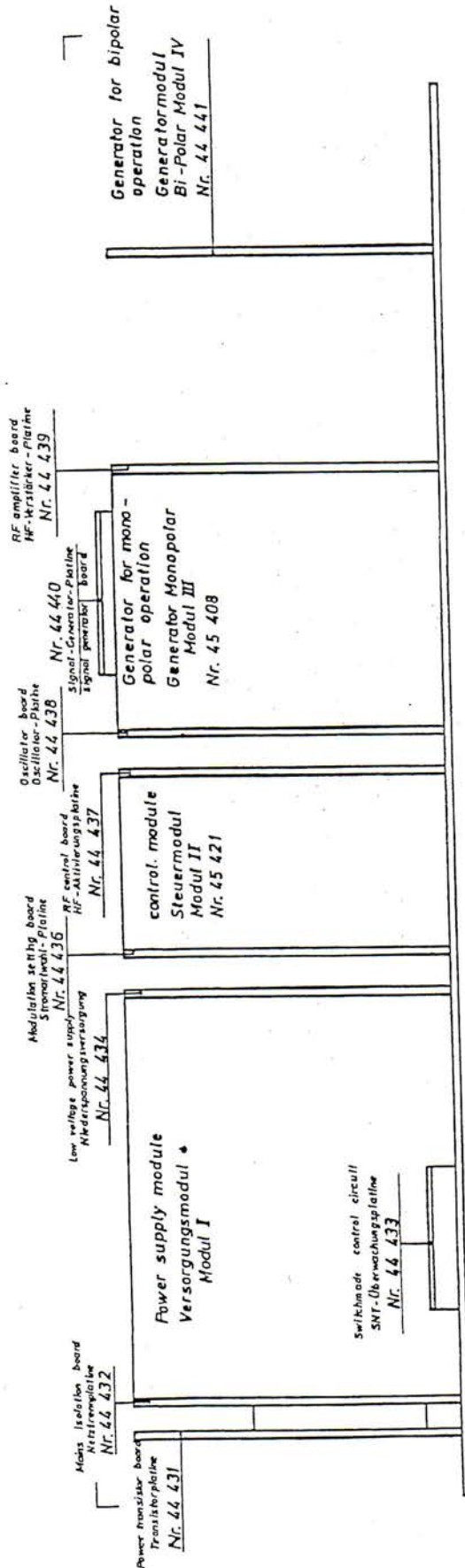
ELEKTROTOM 390
Block-Schaltbild
Block diagram



ELEKTROTOM 400
Block-Schaltbild
Block diagram

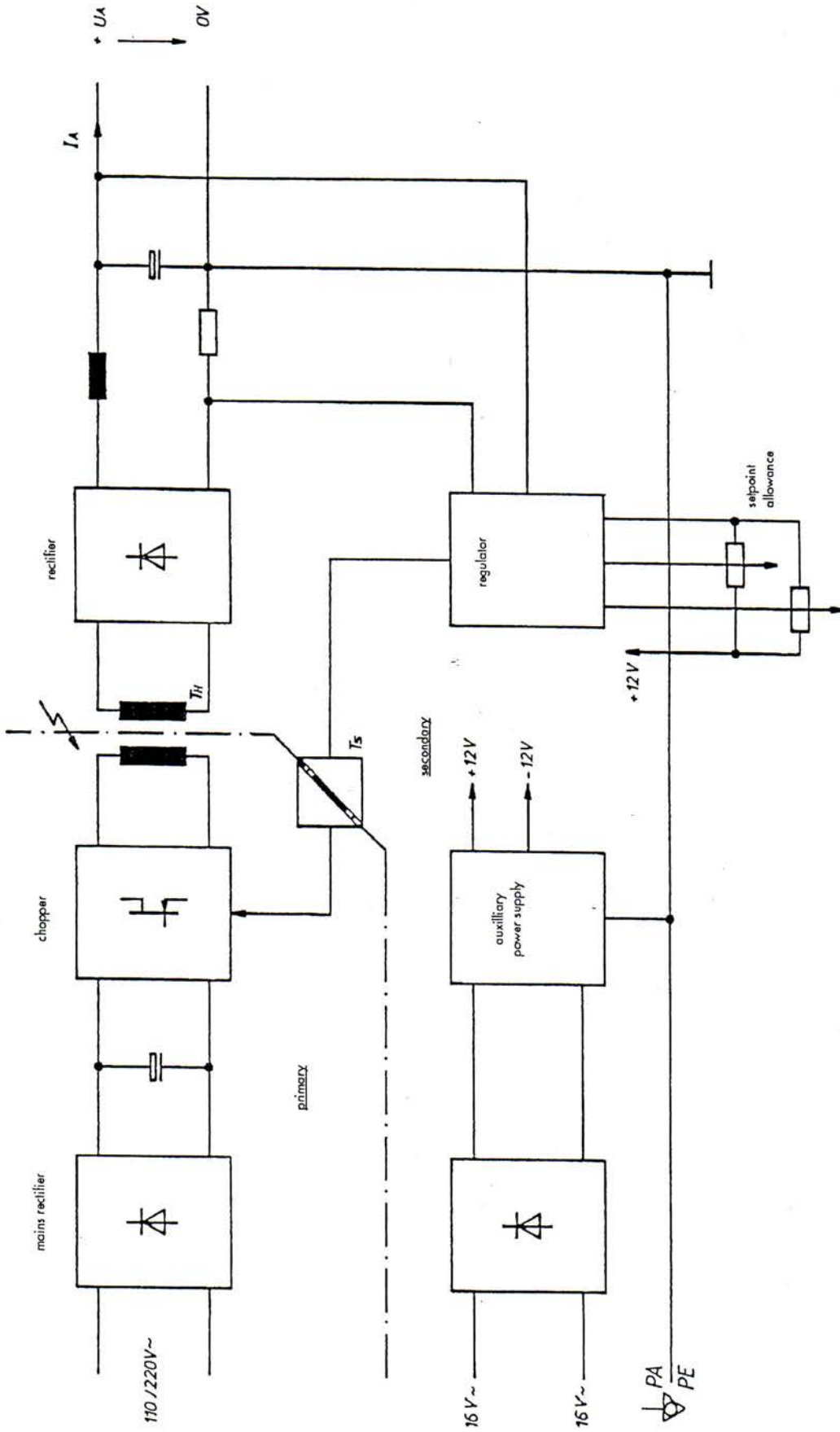


Verdrahtung und Steckverbinderplan
Wiring and plug-and socket connector
diagram

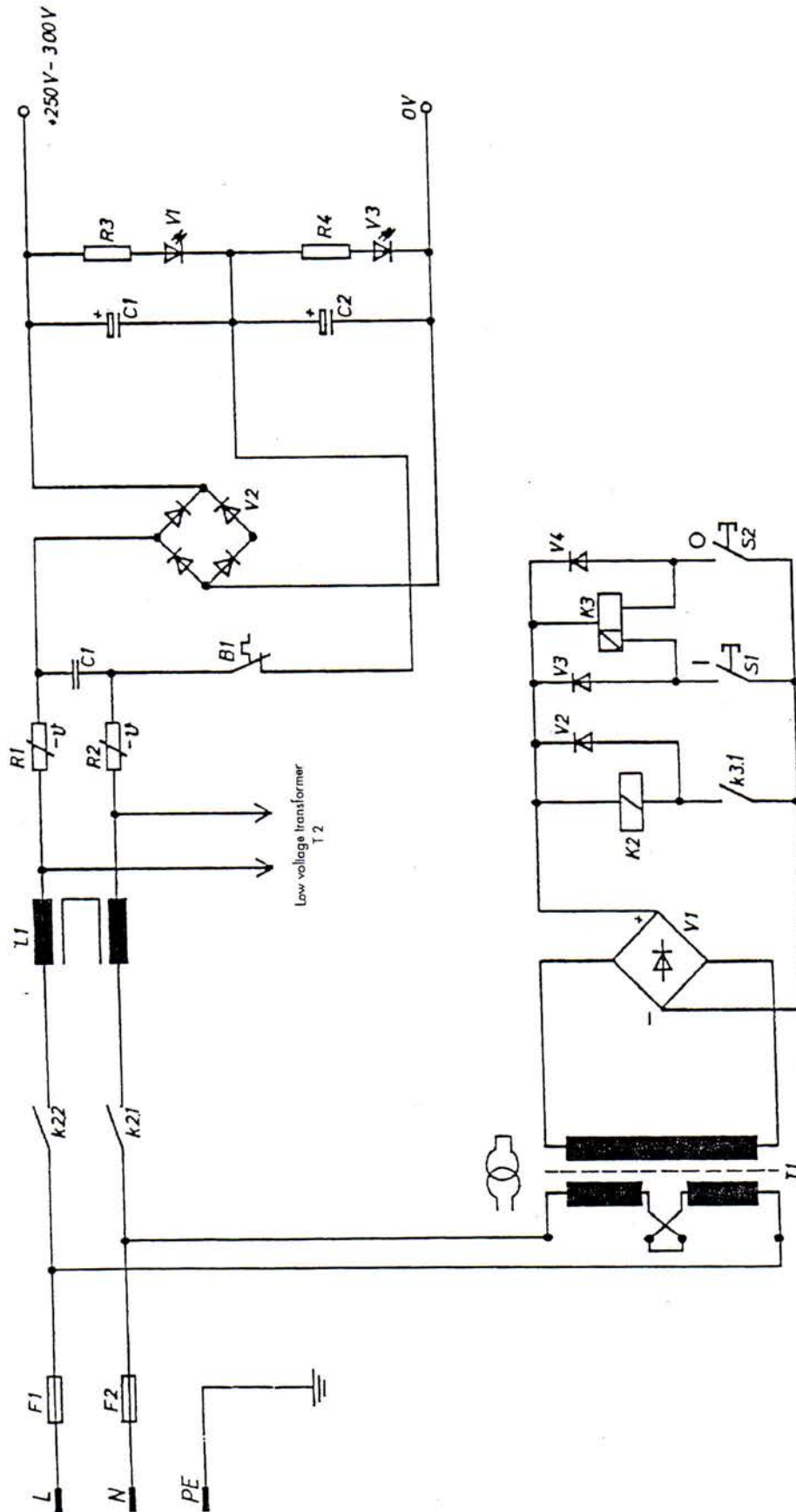


- Power supply module I
Versorgungsmodul Modul I
Nr. 45 417 200 - 240V
Nr. 45 585 100 - 120V
Nr. 47 042 24.0 - 260V
- Low voltage power supply
Niederspannungsversorgung
Nr. 44 434 200 - 240V
Nr. 45 584 100 - 120V
Nr. 47 041 24.0 - 260V

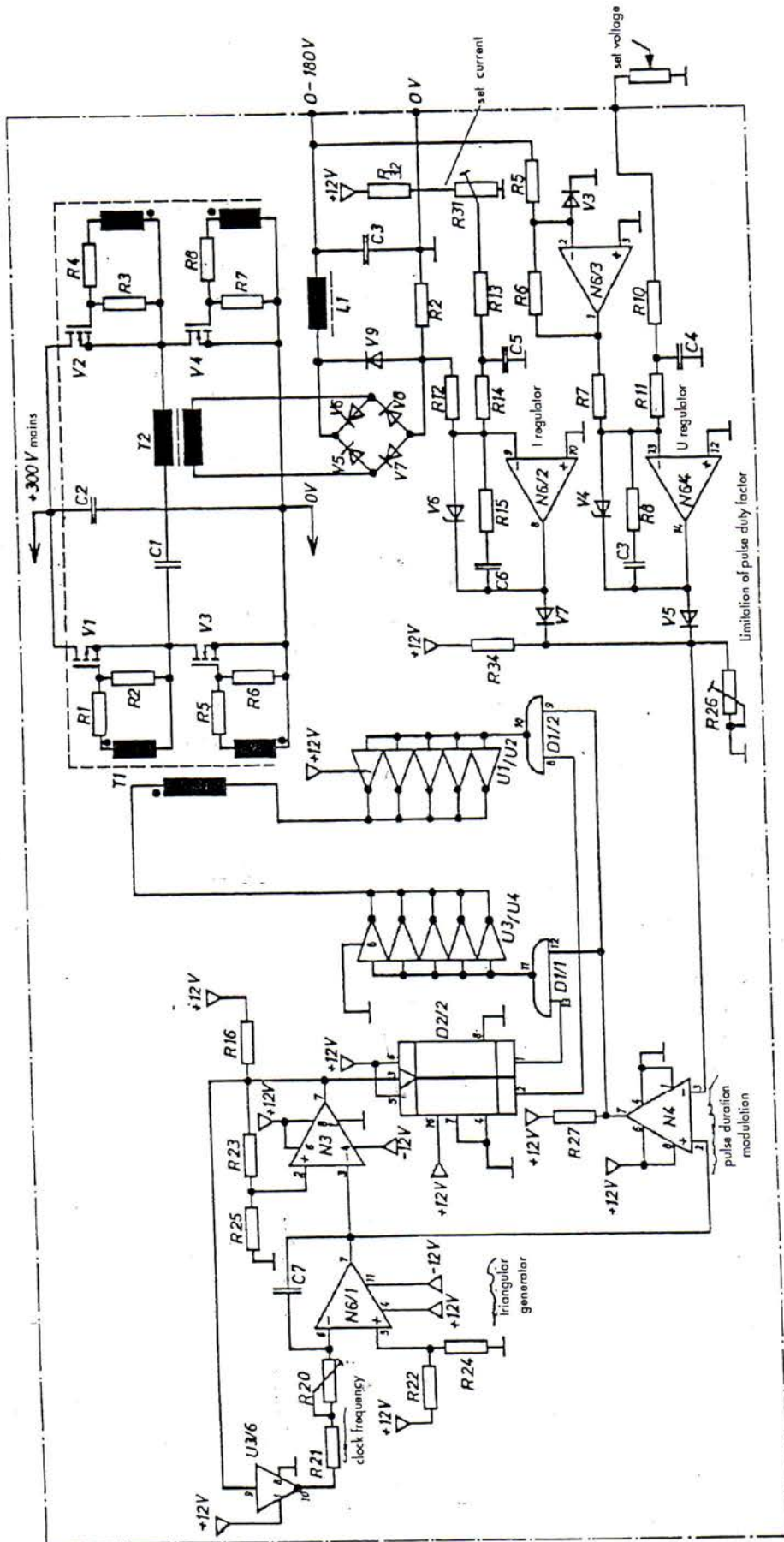
Anordnung und Bezeichnung der Platinen
Location and marking of circuits



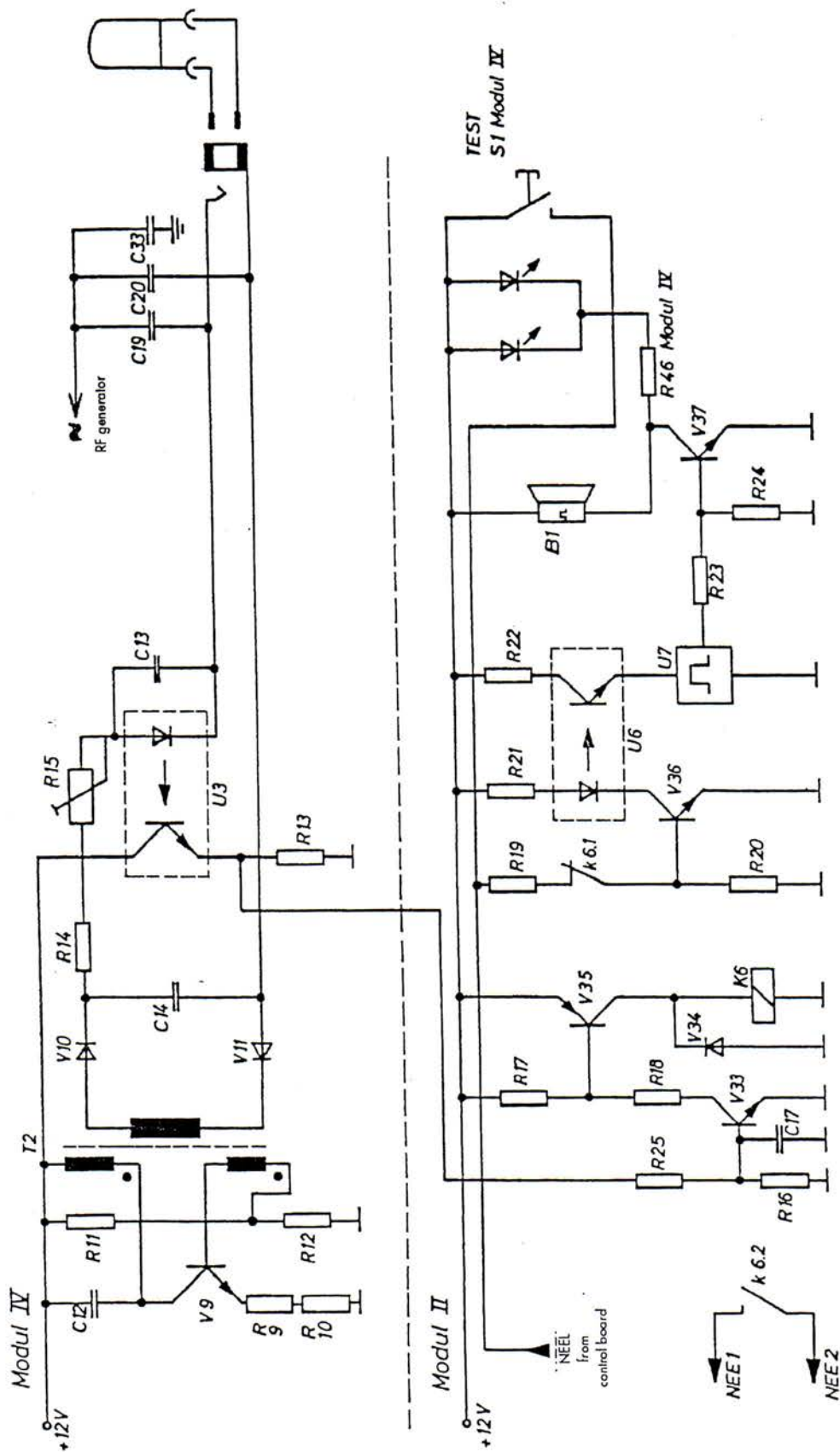
Block diagram of potential proportions



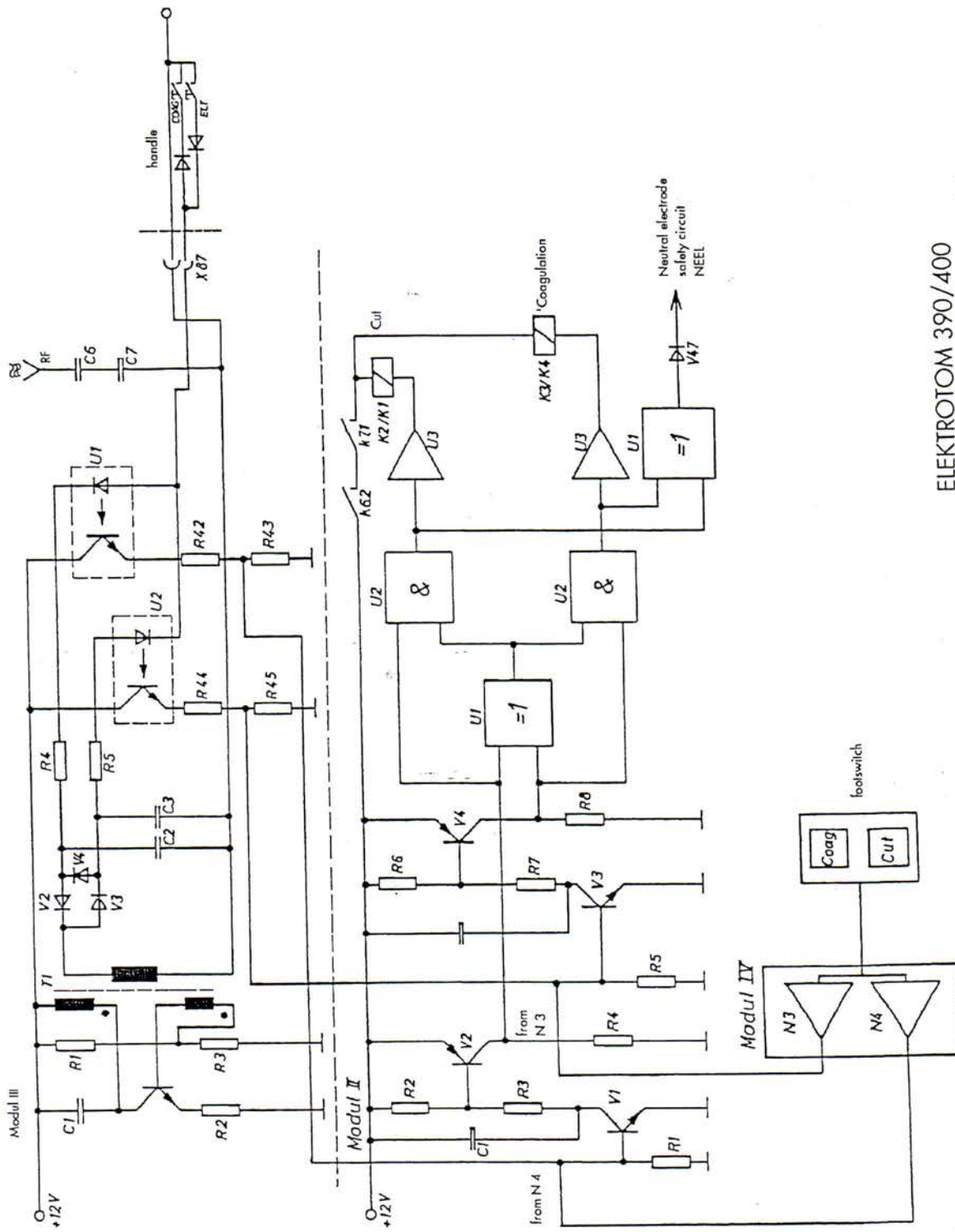
ELEKTROTOM 390/400
 Netz-Versorgung Stromlaufplan 200-240V (240-260V)
 Main supply circuit diagram



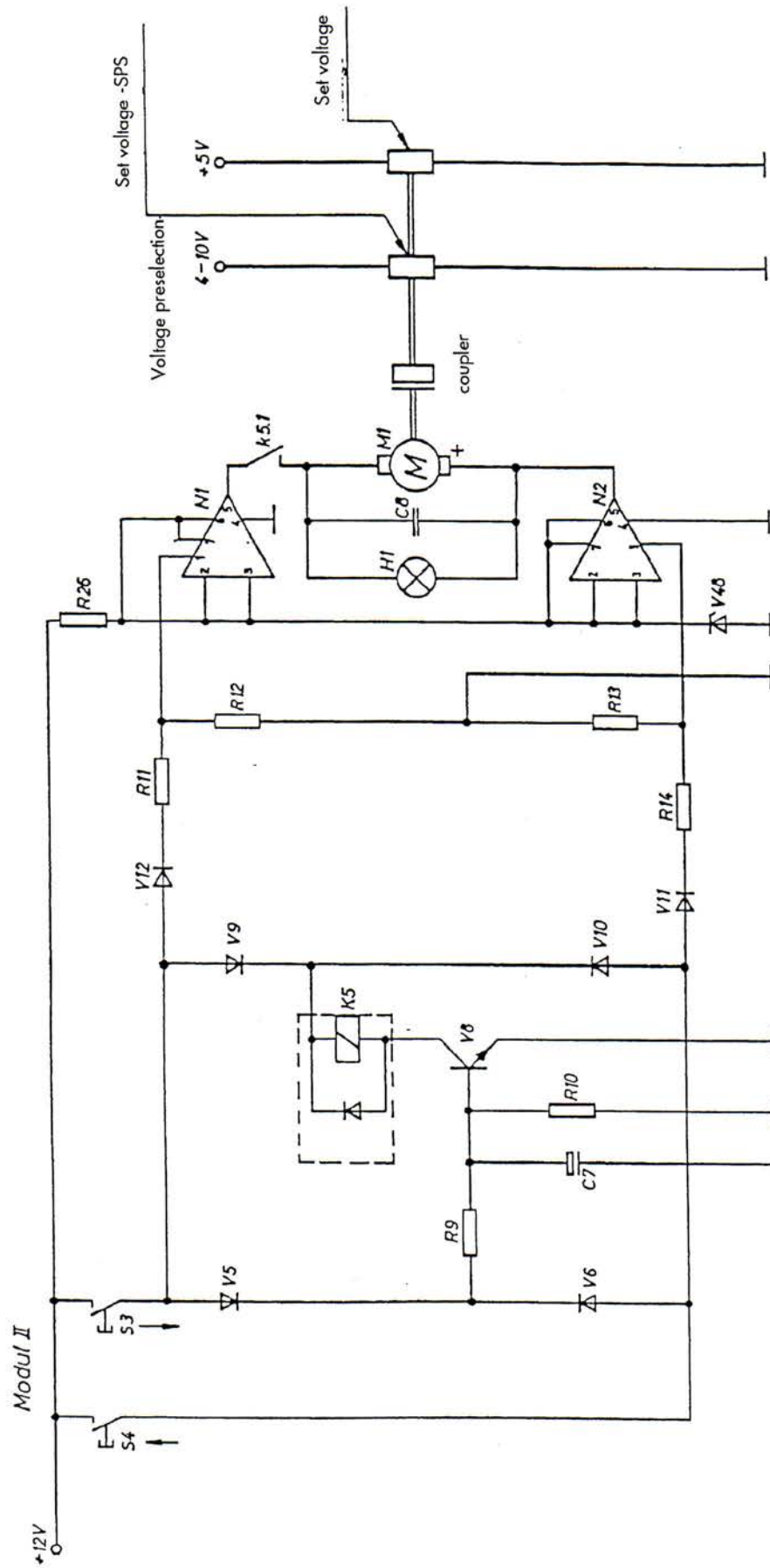
SNT-Stromlaufplan
SPS-Circuit diagram



ELEKTROTOM 390/400
 Stromlaufplan Neutralektroden Sicherheitsschaltung
 Circuit diagram neutral electrode safety circuit



ELEKTROTOM 390/400
 Handfernsteuerung Stromlaufplan
 Manual remote control circuit diagram



ELEKTROTOM 400
 Stromlaufplan Leistungssteller
 Power control circuit diagram



DESCRIPTION OF SIGNALS AND FUNCTIONS

Signal	Function
BIBU 1	Connection Bi-Coagulation socket hand operation
BIBU 2	Connection Bi-Coagulation socket hand operation
BIBUX22	Connection Bi-Coagulation socket RF-power
BIBUX23	Connection Bi-Coagulation socket RF-power
BICO (+)	Switch Bi-Coagulation increasing power
BICO (-)	Switch Bi-Coagulation decreasing power
BICOA	Signal line Bi-Coagulation step display
BICOA1	Signal line Bi-Coagulation acoustic sign
BICOA2	Signal line Bi-Coagulation acoustic sign
BICOFU	Switch signal Bi-Coagulation footswitch
BICOHFO	Signal line Bi-Coagulation RF-optic display
BICHOH	Signal line Bi-Coagulation display Hold
BICOL	Adjustable voltage for Bi-Coagulation-power regulator
BICOMA	Switch signal Bi-Co-Matic
BICOUSO	Setpoint voltage Bi-Coagulation-power regulator
BIFE	Signal Bi-Coagulation footswitch enable
BIFO	Signal optic display footswitch push button
BIHO	Signal optic display Bi-Co-Matic push button
COAG (+)	Switch Coagulation increasing power
COAG (-)	Switch Coagulation decreasing power
COAG1	Switch signal Spray-Coagulation
COAG2	Switch signal Contact-Coagulation
COAGA	Signal line Coagulation step-display
COAGAE	Coagulation - acoustic enable signal
COAGCE	Coagulation - enable signal
COAGE	Coagulation - relay enable signal
COAGFE	Coagulation - signal footswitch enable
COAGHE	Coagulation - signal hand enable
COAGHO	Coagulation - signal display hold
COAGL	Adjustable voltage for Coagulation-power regulator
COAGO1	Signal optic display Spray-Coagulation
COAGO2	Signal optic display Contact-Coagulation



Signal	Function
COAGOE	Signal line Coagulation RF-optic display
COAGOFR	Signal line Coagulation RF-optic display connected
COAGRE	Signal line Contact-Coagulation enable
ELT (+)	Switch electrotomy increasing power
ELT (-)	Switch electrotomy decreasing power
ELT1	Switch - signal electrotomy electro-desiccation degree 1
ELT2	Switch - signal electrotomy electro-desiccation degree 2
ELT3	Switch - signal electrotomy electro-desiccation degree 3
ELTA	Signal line electrotomy step display
ELTAE	Electrotomy - acoustic enable signal
ELTCOAGUSO	Electrotomy - Coagulation setpoint enable signal
ELTE1	Electrotomy electrodesiccation degree enable 1
ELTE2	Electrotomy electrodesiccation degree enable 2
ELTE3	Electrotomy electrodesiccation degree enable 3
ELTFE	Electrotomy - signal footswitch enable
ELTHE	Electrotomy - signal hand enable
ELTHO	Signal line electrotomy display Hold
ELTL	Adjustable voltage for electrotomy power regulator
ELTO1	Signal for optic display electrodesiccation degree 1 in corresponding switch
ELTO2	Signal for optic display electrodesiccation degree 2 in corresponding switch
ELTO3	Signal for optic display electrodesiccation degree 3 in corresponding switch
ELTOE	Signal line electrotomy RF-optic display
ELTOFR	Signal line electrotomy RF-optic display connected
ELTOP	Signal line optic display cut switch
ELTP	Switch signal electrotomy cut
ELTRE	Signal line electrotomy enable
LIST	Actual quantity current/SNT
NAU	Signal mains-off
NEE	Signal neutral electrode enable
NEEL	Signal neutral electrode test-enable
NEE1	Relay enable electrotomy/Coagulation
NEE2	Relay enable electrotomy/Coagulation



Signal	Function
NEI	Signal mains on
OPSN	Alert optic neutral electrde
PNUS1	Mains transformer connection 1
PNUS2	Mains trnasformer connection 2
PWM1	Pulse with transformer primary connection 1
PWM2	Pulse with transformer primary connection2
SCHN	Signal line mains on-off common
UIST	Voltage setpoint power regulator
USO	Voltage setpoint power control
HFGENX20	Connection monopolar - output RF-power
HFGENX21	Connection monopolar - outpur RF-power
COAGAO1	Switch-over Spray-/Contact Coagulation
COAGAO2	Seitch-over Spray-/Contact Coagulation
ELTPO	Potentiometer middle-level electrotony
COAGPO	Potentiometer middle-level Coagulation
BICOPO	Potentiometer middle-level Bi-Coagulation
ELTLA	Electrotomy power regulator output
ELENFR1	Relay activation electrotony/endomatic
ELENFR2	Relay activation electrotony/endomatic





5. Supply Module (Module I)

No. 45417 for mains connection 200 - 240 V
No. 47042 for mains connection 240 - 260 V
No. 45585 for mains connection 100 - 120 V

The power supply module consists primarily of the switched-mode power supply unit for mains disconnection and to supply the appliance with power. It is protected by F 1 and F 2 fuses, and it is plugged into a socket outlet for non-heating appliances.

The plug-in connector X 4 accommodates the p. c. board no. 44434 (for 200 - 240 V), no 45584 (for 100 - 120 V) or no. 47041 (for 240 - 260 V). The interference suppression coil 1, the interference suppression capacitor C 1, and the making-current limiters R 1 and R 2 are also accommodated on the p. c. board.

The 300 to 350 V direct voltage for the switched-mode power supply unit is generated from the alternating voltage by the rectifier V 2 mounted on the connecting board. System transfer results in voltage doubling when the module is connected to 110 to 120 V.

The ON and OFF keys control the bistable K 3 which switched through the mains voltage via a switching relay K 2 with 3 mm contact gap.

Power closing is supplied by the short-circuit-proof transformer T 1 which is directly and permanently connected to the mains voltage.

The low voltage is generated by the transformer T 2. A non-stabilized direct voltage is generated by the rectifier V 5 from the 15 V winding of this transformer via the fuse F 3. It is stabilized to a direct voltage of 12 V on the p. c. board for type of current selection no. 44437, the p. c. board RF-input/output no. 45589, and the keyboard p. c. board no. 44443.

The 18 V winding of the transformer T 2 supplies a non-stabilized voltage via the fuse F 4 and the rectifier V 6. It is stabilized as a 15 V direct voltage via the control board no. 47737.

The + 12 V and - 12 V voltage potentials for the control p. c. board 44433 are generated from the second 16 V winding of the transformer T 2 via the fuse F 6 and the rectifiers V 8, V 11 and V 12. This connected to the plug-in connection X 3.

The signals that control the pulse with modulator N 4 are generated from the desired voltage, the actual voltage and from the actual current. The pulse with modulator N 4, in turn, controls the drive transformers U 1 to U 4 for the output stage. The voltage regulators N3 - N5 are supplied by the +12 voltage potential.

N 6/1 and N 3 from the 40 Kc/s oscillator. Its frequency is adjusted with R 20. The 20 kc/s push-pull signals to drive the output stage are generated by D 2/2.

N 6/2 is the current controller. N 6/4 is the voltage controller. The remaining blocks serve the purpose of summation and frequency response matching.

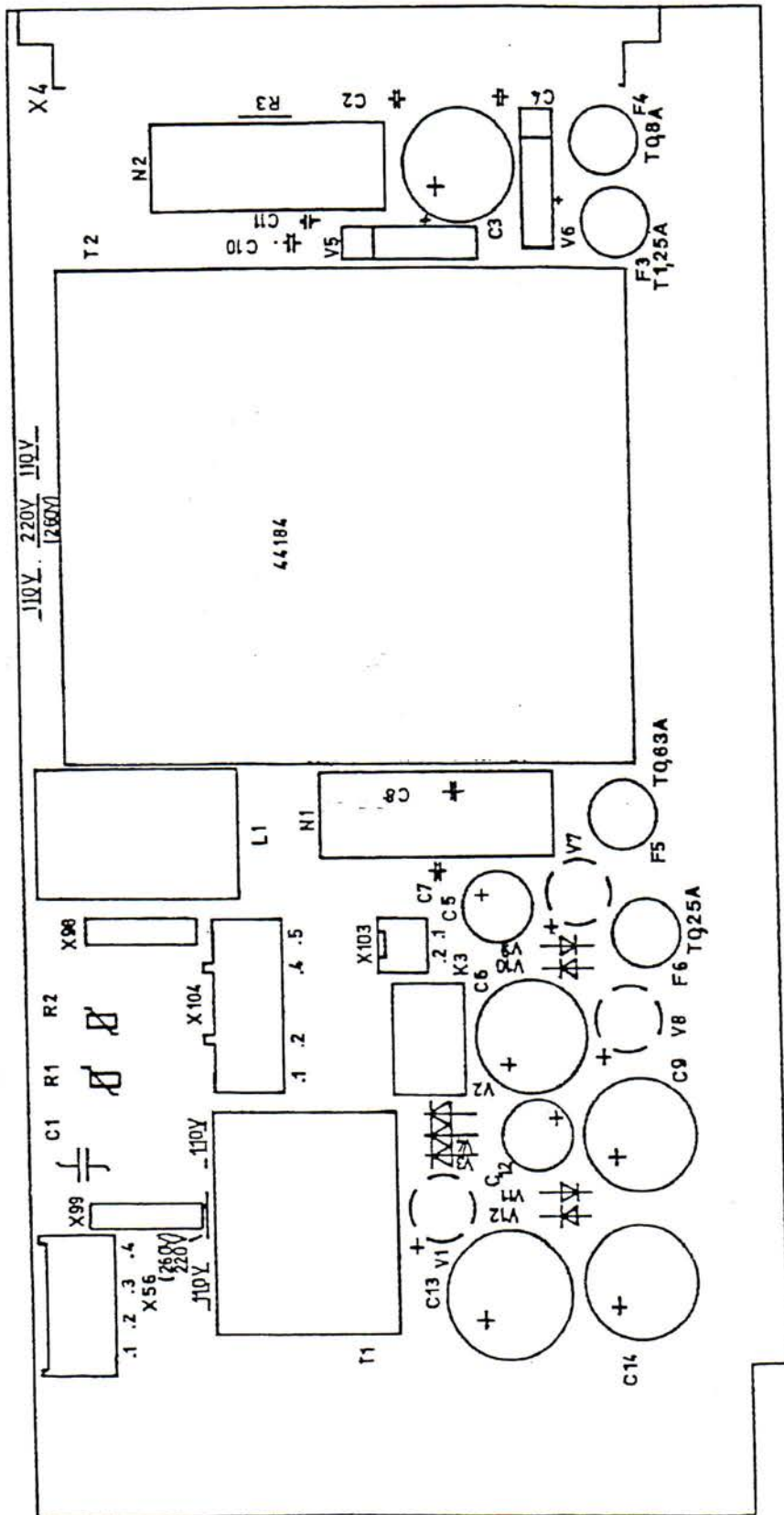
The p. c. board 44431 with the power field-effect transistors V 1 to V 4 as well as the rectifier bridge with the fast diodes V 5 to V 9, are connected to the plug-in connector X 1.

The mains disconnection p. c. board no. 44432 with the driver transformer for T 1 and the power transformer T 2, is connected to the plug-in connection X 2. The output voltage of 0 to 180 V is filtered by the storage choke L 1 and the capacitor C 3, and is switched through to the generators via the distributor p. c. boards.

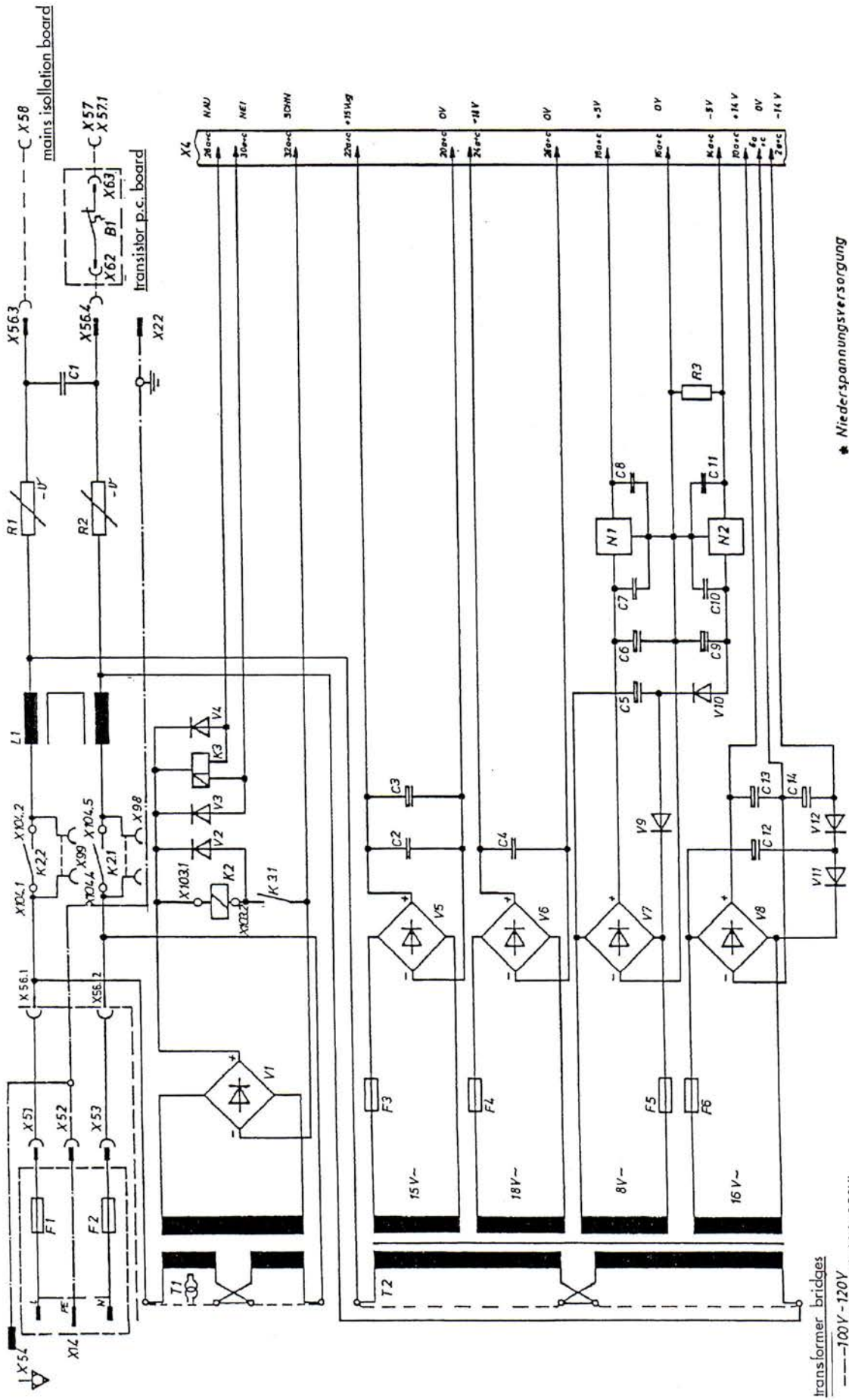


The voltage drop at the resistor R 2 is the actual current value.

The power components are adequately dimensioned and mounted on the large heat sink. The temperature of a transistor heat sink is additionally monitored by a thermostatic switch that turns off the supply voltage at 80 °C.



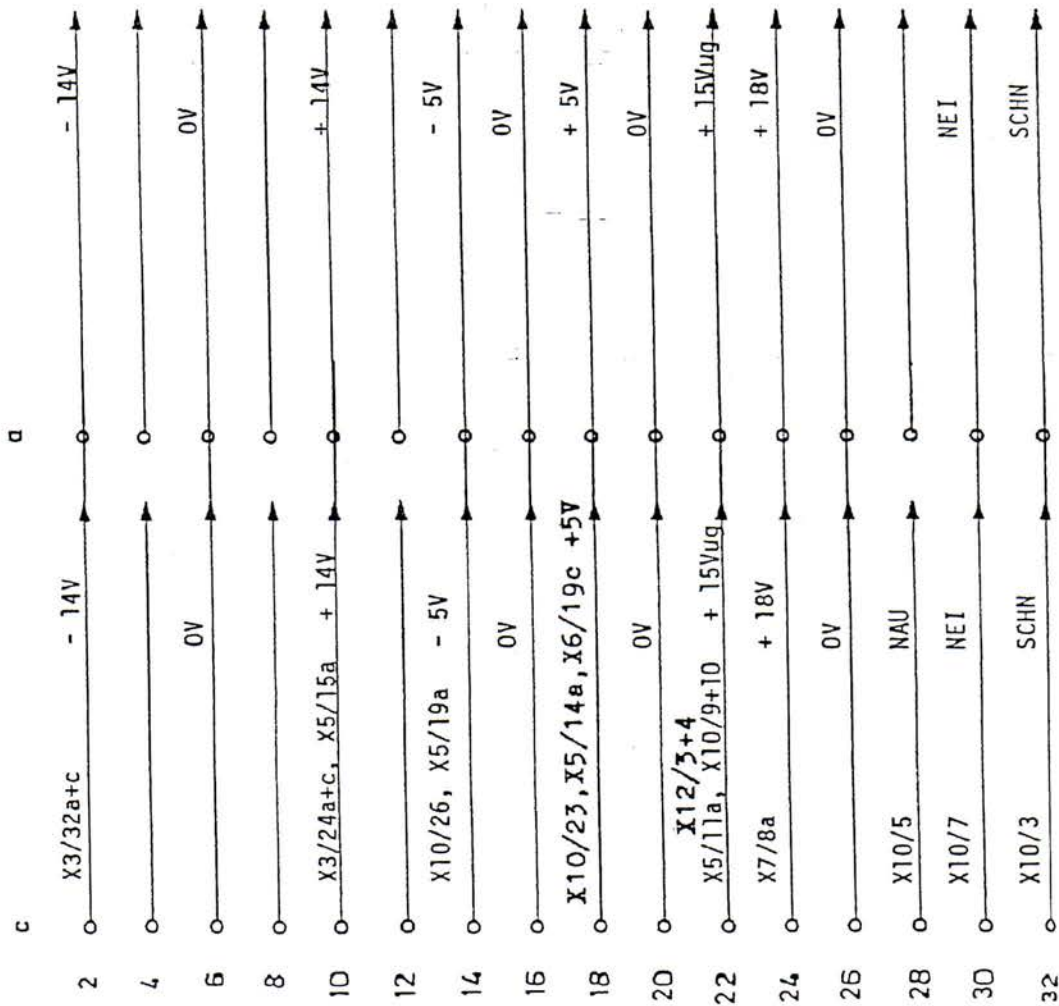
Niederspannungsversorgung Bestell-Nr.: 44434 220 - 240 V
 Low voltage power supply Order No.: 45584 100 - 120 V
 47041 240 - 260 V



Niederspannungsversorgung Bestell-Nr.: 44434 220 - 240 V
 Low voltage power supply Order No.: 45584 100 - 120 V
 47041 240 - 260 V



Signalname Function



NAU Signal mains off
 NEI Signal mains on
 SCHN Signal line on - off

Plug connection
 Low voltage power supply



ELEKTROTOM 390/400	100/120 V	45584
LOW VOLTAGE POWER SUPPLY	220/240 V	44438
	240/260 V	47041

Reference Designation	Description	Part No.
-----------------------	-------------	----------

Capacitors

C 1	Ceramic capacitor CDE	4,7 nF / 400 V	41675
C 2	Chip capacitor	100 nF / 100 V	1052
C 3	Capacitor, electro	2200 μ F / 25 V	44314
C 4	Chip capacitor	100 nF / 100 V	1052
C 5	Capacitor, electro	220 μ F / 40 V	44503
C 6	Capacitor, electro	2200 μ F / 25 V	44314
C 7	Chip capacitor	100 nF / 50 V	11344
C 8	Chip capacitor	1 μ F / 50 V	9904
C 9	Capacitor, electro	100 μ F / 40 V	44126
C 10	Chip capacitor	100 nF / 50 V	11344
C 11	Chip capacitor	1 μ F / 50 V	9904
C 12	Capacitor, electro	220 μ F / 40 V	44503
C 13	Capacitor, electro	2200 μ F / 40 V	45539
C 14	Capacitor, electro	1000 μ F / 40 V	44126

Resistors

R 1	Current limiter	8 A	44501
R 2	Current limiter	8 A	44501
R 3	Metal film resistor	1 KOhm/0,6 W	1126

Coils

L 1	Choke, current compensated	VDE 250 V / 6 A	44500
-----	----------------------------	-----------------	-------

Transformers

T 1	Mains transformer, short circuit proof	100 / 220 V	44498
T 1	Mains transformer, short circuit proof	260 V	45770
T 2	Mains transformer, short circuit proof	110 / 220 V	44499
T 2	Mains transformer, short circuit proof	260 V	45769

Relay

K 3	Relay, bistable	12 V / 1 x u	44495
-----	-----------------	--------------	-------

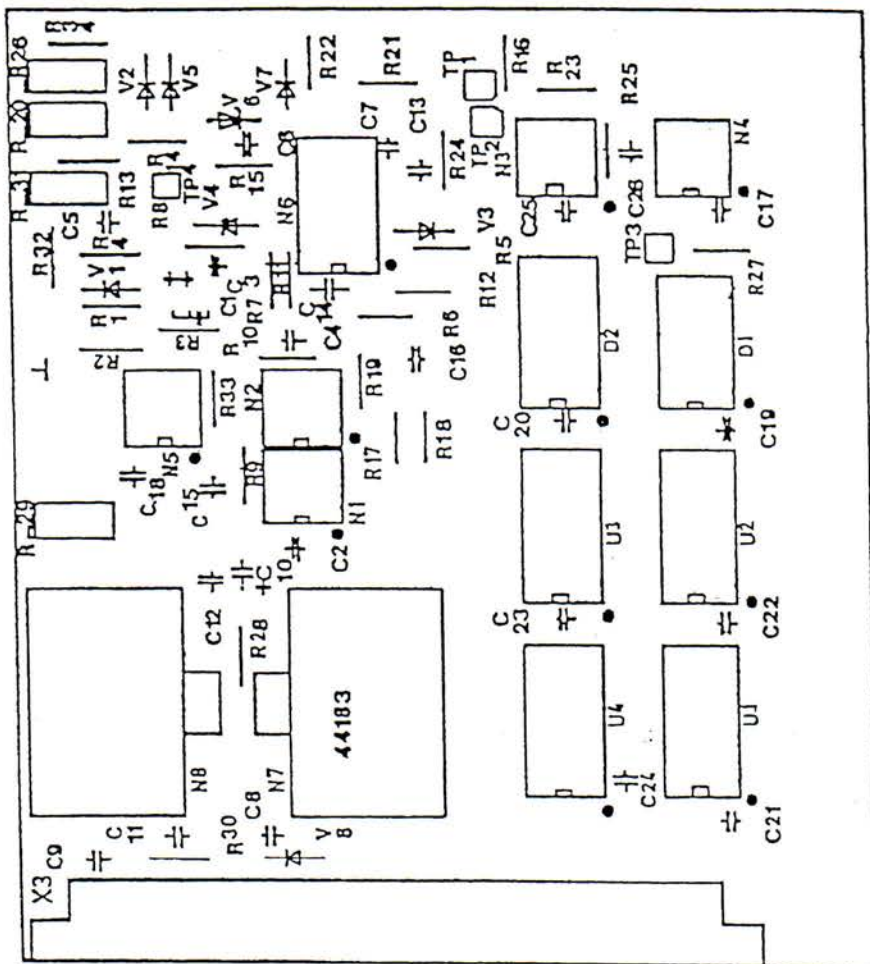
Diodes

V 1	Bridge connected rectifier	B 80 C 1500	10089
V 2	Bridge connected rectifier	1N4007	10076
V 3	Bridge connected rectifier	1N4148	10080
V 4	Bridge connected rectifier	1N4148	10080
V 5	Bridge connected rectifier	B 80 C 2000	44504
V 6	Bridge connected rectifier	B 80 C 2000	44504
V 7	Bridge connected rectifier	B 80 C 1500	10089
V 8	Bridge connected rectifier	B 80 C 1500	10089
V 9	Diode	1N4007	10076

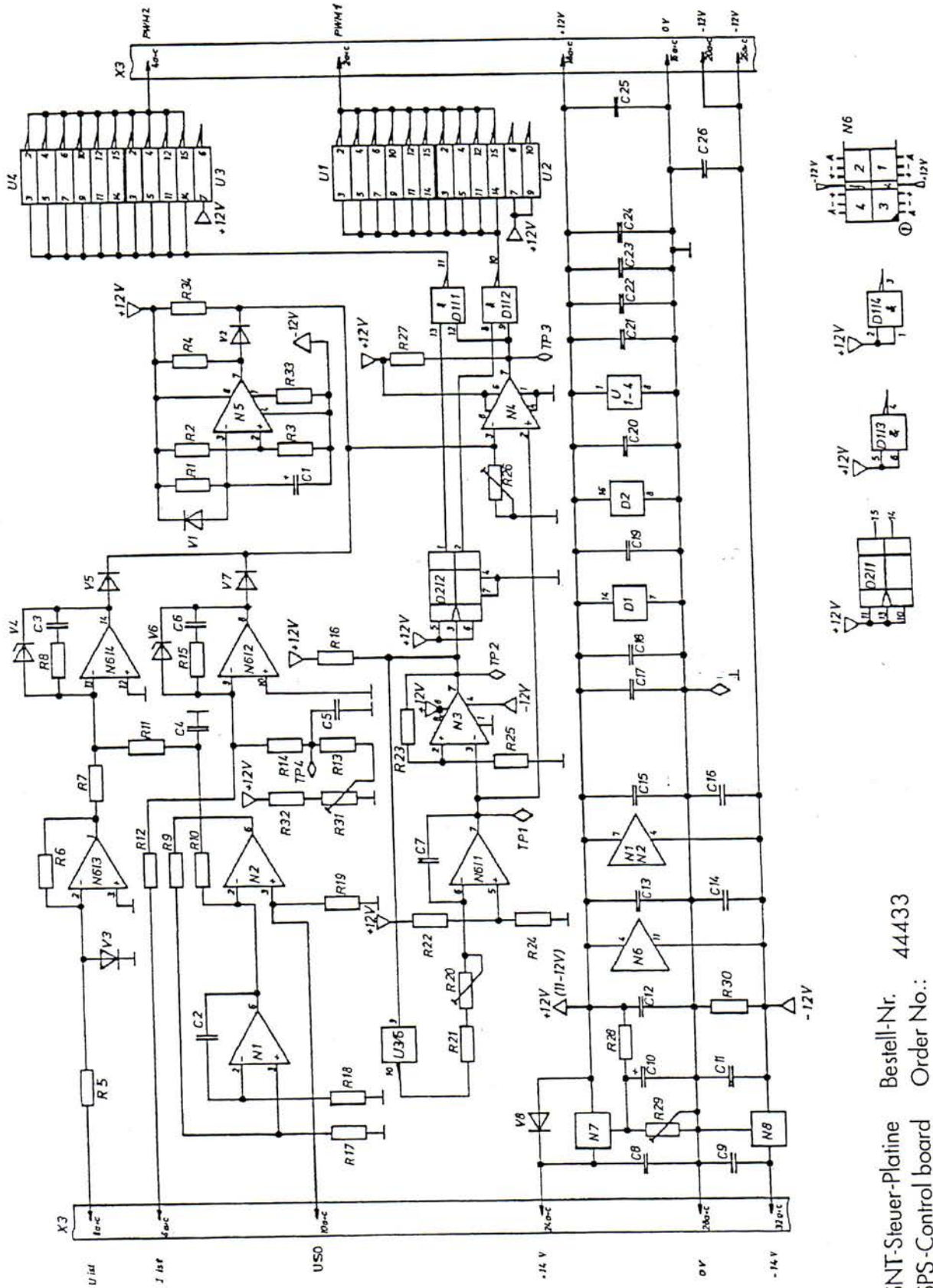


ELEKTROTOM 390/400	100/120 V	45584
LOW VOLTAGE POWER SUPPLY	220/240 V	44438
	240/260 V	47041

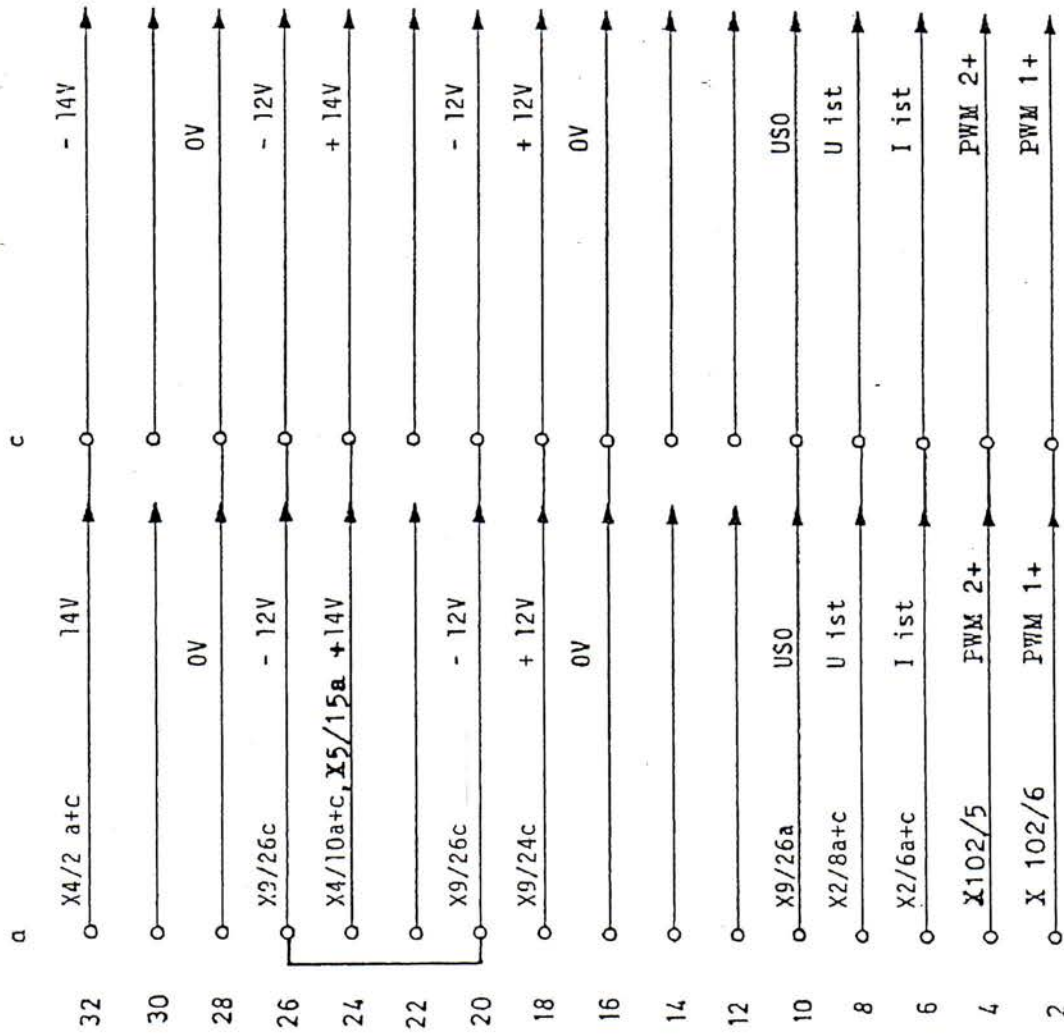
Reference Designation	Description	Part No.
Diodes		
V 10	Diode	1N4007 10076
V 11	Diode	1N4007 10076
V 12	Diode	1N4007 10076
Integrated circuits		
N 1	Voltage regulator	+ 5 V 9932
N 2	Voltage regulator	- 5 V 44505
Fuses		
F 3	Fuse	type TR 5 T 1,25 A 44493
F 4	Fuse	type TR 5 T 1,0 A 49940
F 5	Fuse	type TR 5 T 0,63 A 44492
F 6	Fuse	type TR 5 T 0,25 A 44490
Plug and socket connector bridges		
X 4	Pin assembly	DIN 41612 32-poles 40841
X 56	Plug and socket connector	4-poles 44496
X 98	Test socket	2-poles 44497
X 39	Test socket	2-poles 44497
	Wire connection for switch over of mains transformers T 1/T2, insulated	37223
X 103	Connector male	2-poles 41561
X 104	Plug and socket connector	5-poles 47093
External components		
X 14	Appliance inlet without drawer VDE	44524
	For mains voltage 200-240 V (240-260 V)	
F 1	Fuse	DIN 41571-3 T 4,0 A 1745
F 2	Fuse	DIN 41571-3 T 4,0 A 1745
	Fuse drawer printed	T 4,0 A 45580
	For mains voltage 100-120 V	
F 1	Fuse	DIN 41571-3 T 6,3 A 1747
F 2	Fuse	DIN 41571-3 T 6,3 A 1747
	Fuse drawer printed	T 6,3 A 45581
K 2	Mains insulation relay	12 V/2 x a VDE 45549
X 54	PA-plug	1439



SNT-Steuer-Platine Bestell-Nr. 44433
 SPS-Control board Order No.:



SNT-Steuer-Platine Bestell-Nr. 44433
 SPS-Control board Order No.:



Plug connection
SPS-control board

**Trimpotetiometer - Setting - Function**

Module	Plug in pos.	Designation	Setting	Test point IC pin	Multipoint connector	Function
I	X 3	R 20	25 Us	1		Periode SPS*)
I	X 3	R 26	2,5 US		X 3 4-5 a+c	deadtime approach
I	X 3	R 29	10,0 V		X 3 18 a+c	voltage SPS*)
I	X 3	R 31	5 V 4			set-point I _{max} SPS*)

*) SPS - switching power supply



ELEKTROTOM 390/400
SWITCHING POWER SUPPLY-CONTROL BOARD

cpl. 44733

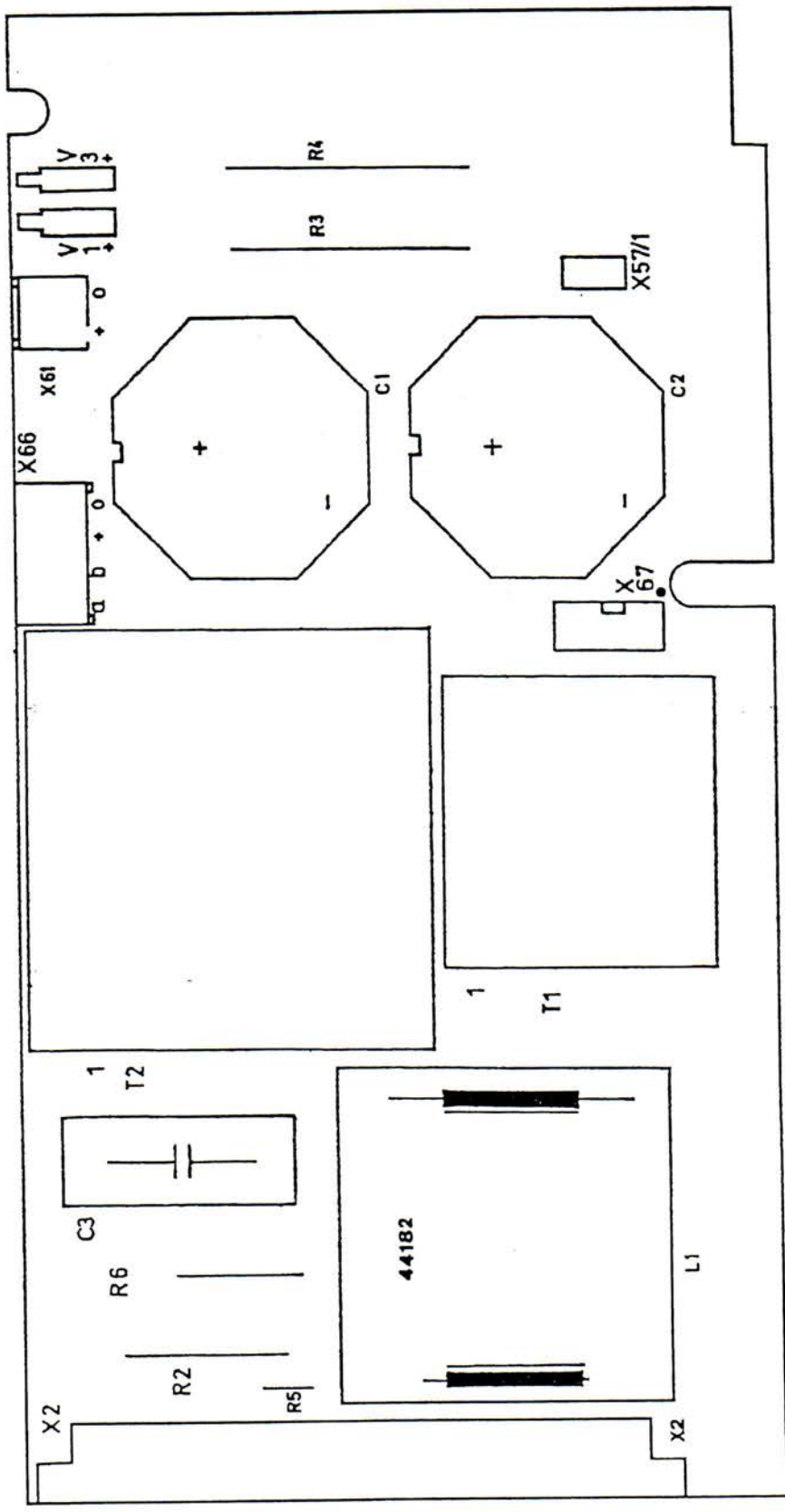
Reference Designation	Description		Part No.
Capacitors			
C 1	Capacitor, electro	22 μ F / 25 V	37850
C 2	Foil Capacitor	0,15 μ F / 63 V	44510
C 3	Chip Capacitor	330 nF / 50 V	11358
C 4	Foil capacitor	10 nF / 63 V	44308
C 5	Foil capacitor	10 nF / 63 V	44308
C 6	Foil capacitor	47 nF / 63 V	44310
C 7	Foil capacitor	1 nF / 100V	45826
C 8	Chip capacitor	100 nF / 100V	1052
C 9	Chip capacitor	100 nF / 100V	1052
C 10	Capacitor, electro	10 μ F / 25 V	44455
C 11	Chip capacitor	1 μ F / 50 V	9904
C 12	Chip capacitor	1 μ F / 50 V	9904
C 13	Chip capacitor	100 nF / 50 V	11344
C 14	Chip capacitor	100 nF / 50 V	11344
C 15	Chip capacitor	100 nF / 50 V	11344
C 16	Chip capacitor	100 nF / 50 V	11344
C 17	Chip capacitor	100 nF / 50 V	11344
C 18	Chip capacitor	100 nF / 50 V	11344
C 19	Chip capacitor	100 nF / 50 V	11344
C 20	Chip capacitor	100 nF / 50 V	11344
C 21	Chip capacitor	100 nF / 50 V	11344
C 22	Chip capacitor	100 nF / 50 V	11344
C 23	Chip capacitor	100 nF / 50 V	11344
C 24	Chip capacitor	100 nF / 50 V	11344
C 25	Chip capacitor	100 nF / 50 V	11344
Resistors			
R 1	Metal film resistor	68 k Ω / 0,6 W	39244
R 2	Metal film resistor	47 k Ω / 0,6 W	1144
R 3	Metal film resistor	47 k Ω / 0,6 W	1144
R 4	Metal film resistor	1 k Ω / 0,6 W	1126
R 5	Metal film resistor	100 k Ω / 0,6 W	1354
R 6	Metal film resistor	10 k Ω / 0,6 W	1137
R 7	Metal film resistor	18 k Ω / 0,6 W	1208
R 8	Metal film resistor	56 k Ω / 0,6 W	15386
R 9	Metal film resistor	10 k Ω / 0,6 W	1137
R 10	Metal film resistor	10 k Ω / 0,6 W	1137
R 11	Metal film resistor	12 k Ω / 0,6 W	1139
R 12	Metal film resistor	560 Ω / 0,6 W	1124
R 13	metal film resistor	10 k Ω / 0,6 W	1137
R 14	Metal film resistor	12 k Ω / 0,6 W	1139
R 15	Metal film resistor	10 k Ω / 0,6 W	1137
R 16	Metal film resistor	4,7 k Ω / 0,6 W	1133
R 17	Metal film resistor	499 Ω / 0,6 W	44512
R 18	Metal film resistor	100 k Ω / 0,6 W	1354
R 19	Metal film resistor	100 k Ω / 0,6 W	1354
R 20	Trimmer resistor	10 k Ω / 0,5 W	44470



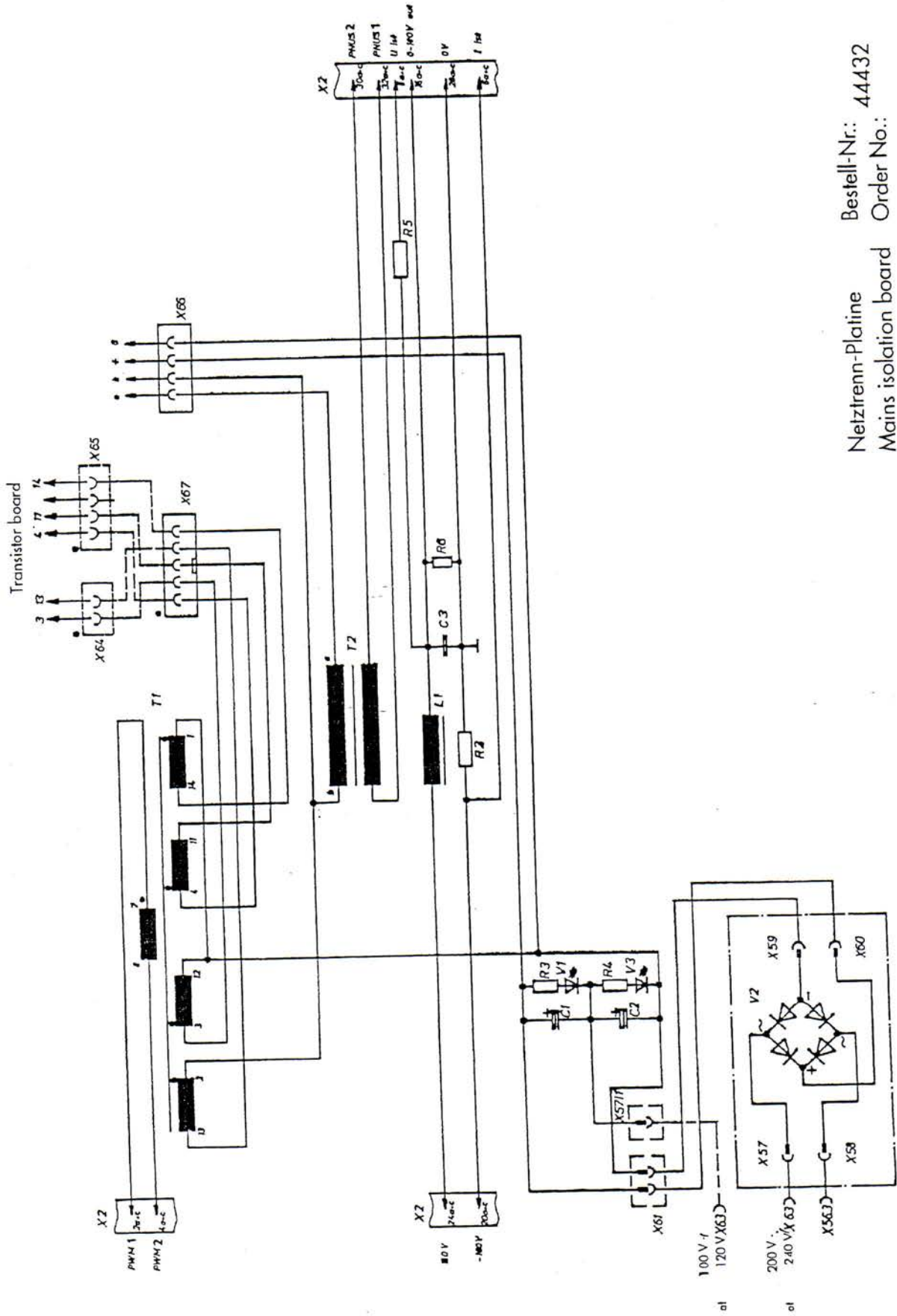
ELEKTROTOM 390/400
SWITCHING POWER SUPPLY-CONTROL BOARD

cpl. 44733

Reference Designation	Description	Part No.
Resistors		
R 21	Metal film resistor	4,7 k Ω / 0,6 W 1133
R 22	Metal film resistor	47 k Ω / 0,6 W 1144
R 23	Metal film resistor	4,7 k Ω / 0,6 W 1133
R 24	Metal film resistor	47 k Ω / 0,6 W 1144
R 25	Metal film resistor	47 k Ω / 0,6 W 1144
R 26	Trimmer resistor	10 k Ω / 0,5 W 44470
R 27	Metal film resistor	10 k Ω / 0,6 W 1137
R 28	Metal film resistor	270 Ω / 0,6 W 1121
R 29	Trimmer resistor	10 k Ω / 0,5 W 44470
R 30	Metal film resistor	2,2 k Ω / 0,6 W 1129
R 31	Trimmer resistor	1 k Ω / 0,5 W 44514
R 32	Metal film resistor	100 Ω / 0,6 W 1119
R 33	Metal film resistor	200 Ω / 0,6 W 44513
R 34	Metal film resistor	82 k Ω / 0,6 W 1980
Diodes		
V 1	Diode	1N4148 10080
V 2	Diode	1N4148 10080
V 3	Diode	1N4148 10080
V 4	Zener diode	10 V 44509
V 5	Diode	1N4148 10080
V 6	Zener diode	10 V 44509
V 7	Diode	1N4148 10080
V 8	Diode	1N4007 10076
Integrated circuits		
D 1	CMos-IC	4011 44466
D 2	CMos-IC	4027 44465
N 1	Operational amplifier	CA741 10098
N 2	Operational amplifier	CA741 10098
N 3	Operational amplifier	LM211 44508
N 4	Operational amplifier	LM211 44508
N 5	Operational amplifier	LM211 44508
N 6	Operational amplifier	TL084 44506
N 7	Voltage regulator adjustable	42904
N 8	Voltage regulator adjustable	44507
U 1	CMOS-IC	4049 44461
U 2	CMOS-IC	4049 44461
U 3	CMOS-IC	4049 44461
U 4	CMOS-IC	4049 44461
Plug and socket connector		
X 3	Pin assembly	DIN 41612 32-poles 40841



Netzirenn-Platine Bestell-Nr.: 44432
 Mains isolation board Order No.:

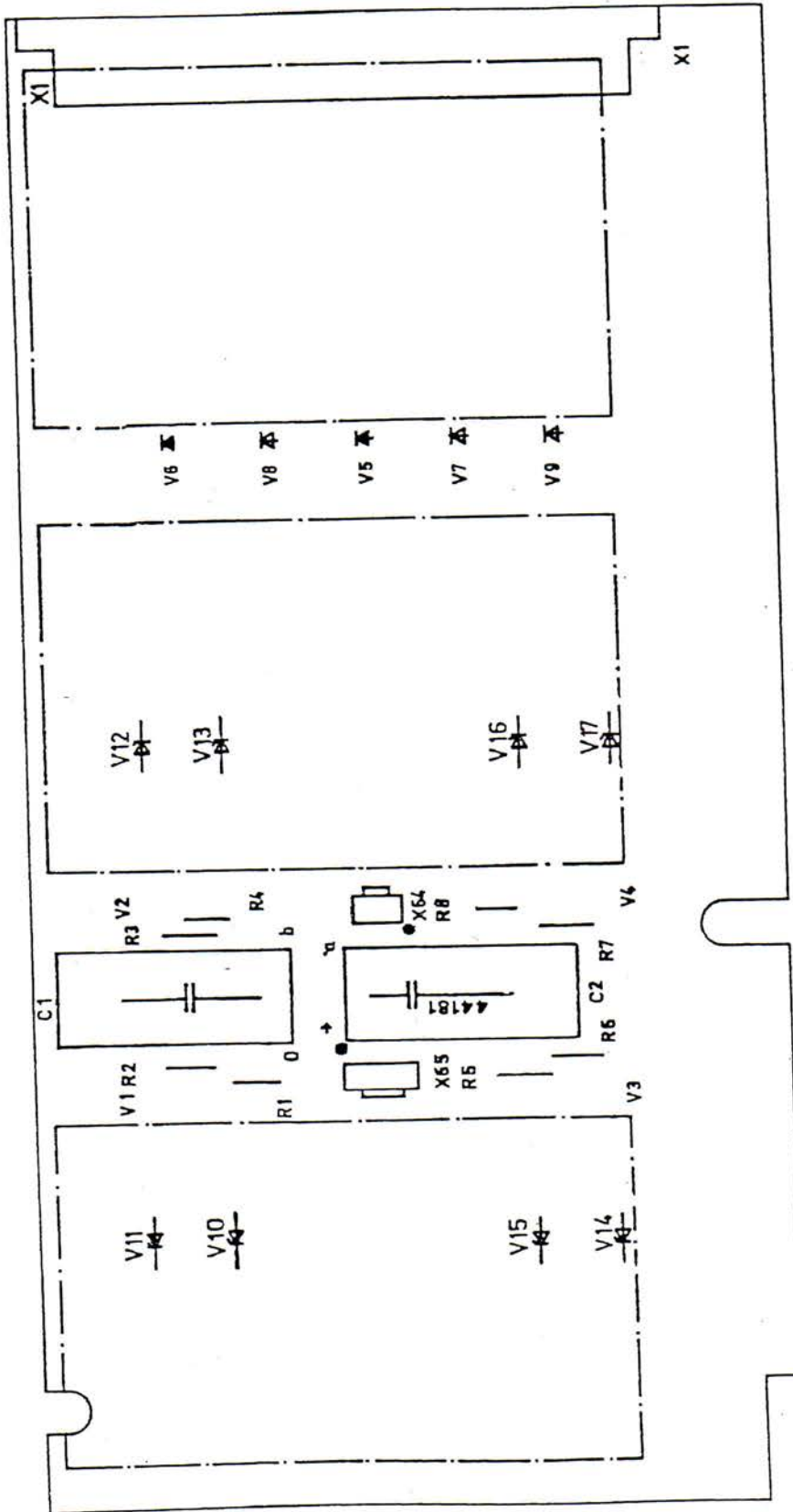




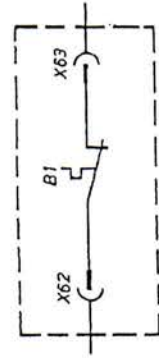
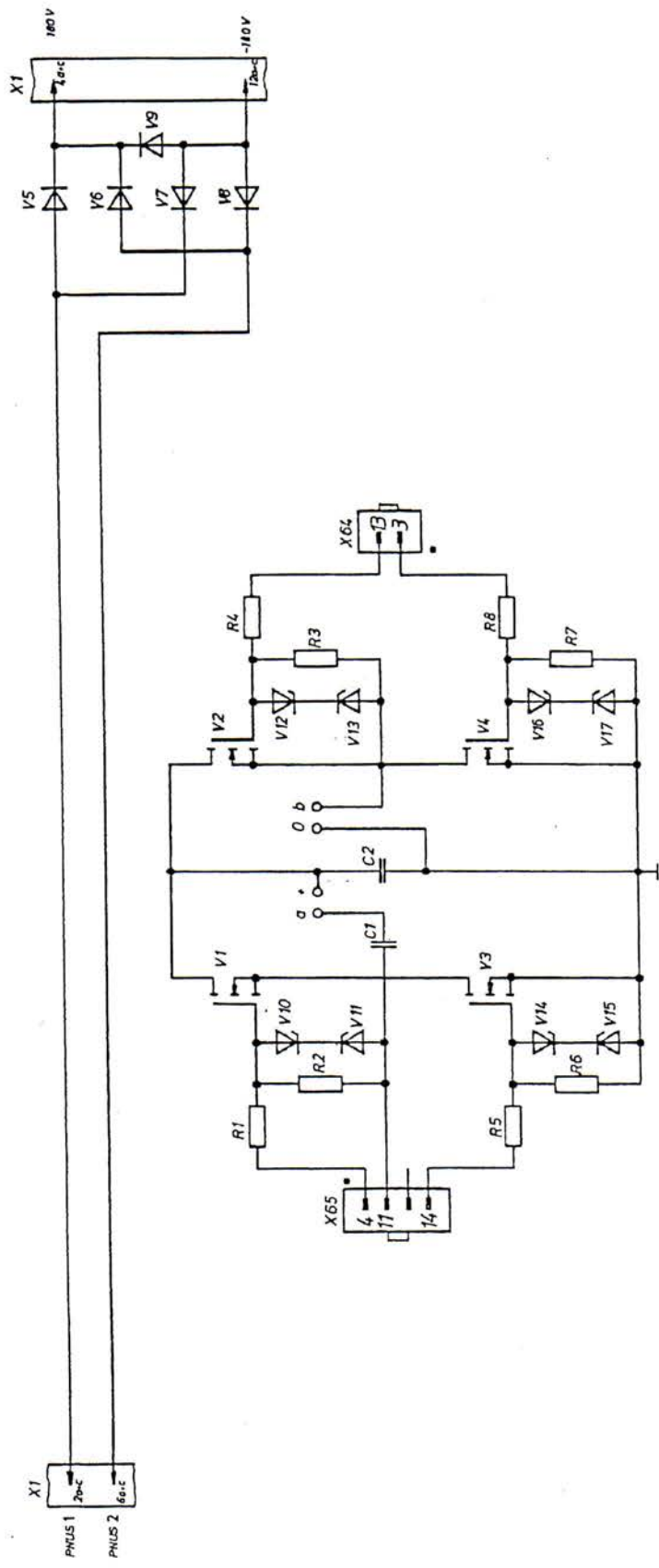
ELEKTROTOM 390/400
MAINS ISOLATION BOARD

cpl. 44432

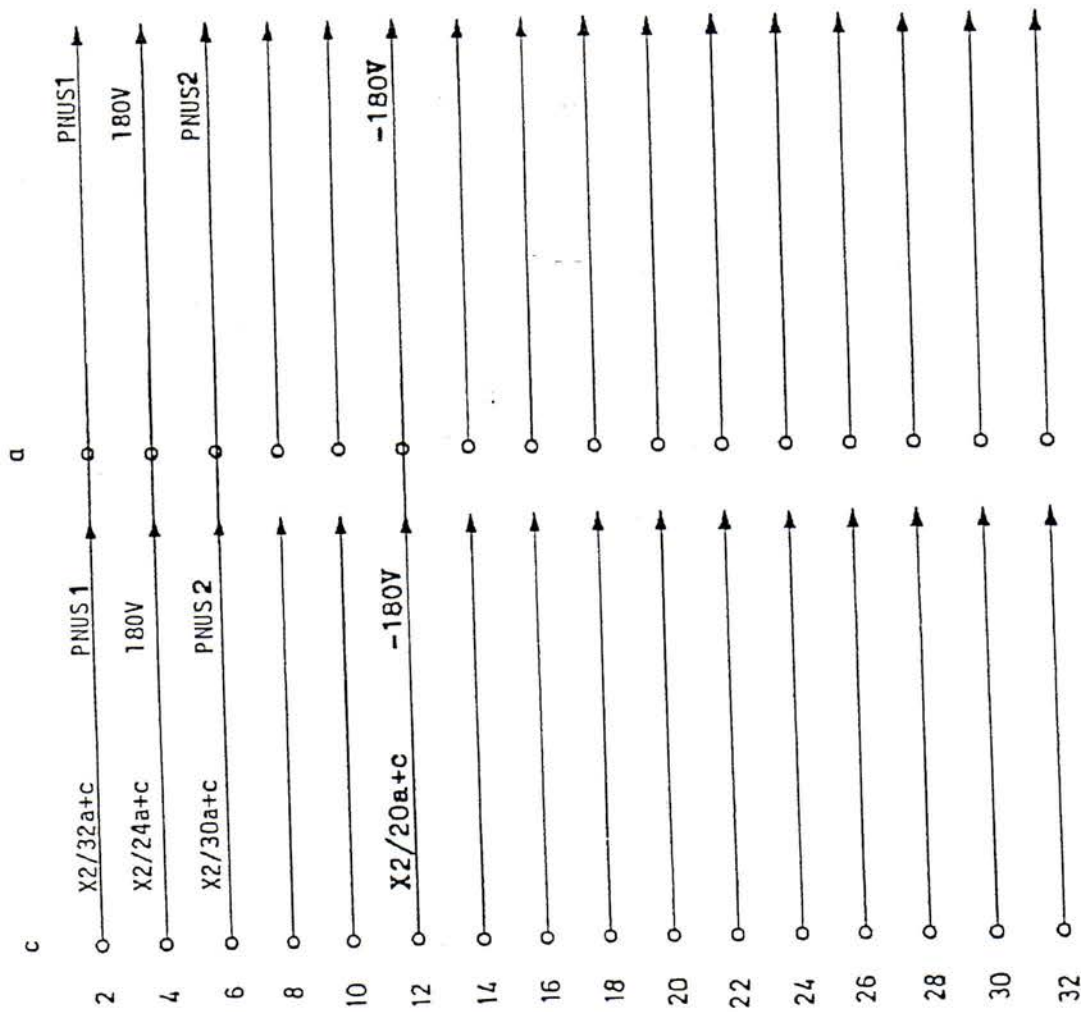
Reference Designation	Description	Part No.
Capacitors		
C 1	Capacitors, electro	1000 μ F / 200 V 44517
C 2	Capacitors, electro	1000 μ F / 200 V 44517
C 3	Foil capacitor	1 μ F / 250 V 44526
Resistors		
R 2	Precision resistor	0,042 Ω / 5 W 44520
R 3	Glazed wire-wound resistor	18 k Ω / 8 W 44521
R 4	Glazed wire-wound resistor	18 k Ω / 8 W 44521
R 5	Metal film resistor	120 k Ω / 0,6 W 44356
R 6	Metal film resistor	16 k Ω / 4,5 W 47070
Coils		
L 1	Choke	44522
Transformers		
T 1	Driver transformer	45413
T 2	Main transformer	45414
Visual monitors		
V 1	Light-emitting diode red	44459
V 3	Light-emitting diode red	44459
Plug-and socket connectors		
X 2	Pin assembly	DIN 41612 32-poles 40841
X 57/1	Plug	1-pole 10237
X 61	Plug-in position	2-poles 44523
X 66	Plug-in position	4-poles 44496
X 67	Connector male	5-poles 15371
External components		
V 2	Bridge connected rectifier	44537



Transistor-Platine Bestell-Nr.: 44437
 Transistor board Order No.:



Transistor-Platine Bestell-Nr.: 44432
 Transistor board Order No.:



Plug connection X 1 SPS
Transistor board



ELEKTROTOM 390/400
TRANSISTOR P. C. BOARD

44431

Reference Designation	Description	Part No.
Capacitors		
C 1	Foil capacitor 1 μF / 250 V	44526
C 2	Foil capacitor 0,22 μF / 630 V	44530
Resistors		
R 1	Metal film resistor 100 Ω / 0,6 W	1119
R 2	Metal film resistor 4,7 k Ω / 0,6 W	1133
R 3	Metal film resistor 4,7 k Ω / 0,6 W	1133
R 4	Metal film resistor 100 Ω / 0,6 W	1119
R 5	Metal film resistor 100 Ω / 0,6 W	1119
R 6	Metal film resistor 4,7 k Ω / 0,6 W	1133
R 7	Metal film resistor 4,7 k Ω / 0,6 W	1133
R 8	Metal film resistor 100 Ω / 0,6 W	1119
Switch		
B 1	Thermal switch 80° C opener	44529
Diodes		
V 5	Power diode BY 233/600 (BYT12P/1000)	44527
V 6	Power diode BY 233/600 (BYT12P/1000)	44527
V 7	Power diode BY 233/600 (BYT12P/1000)	44527
V 8	Power diode BY 233/600 (BYT12P/1000)	44527
V 9	Power diode BY 233/600 (BYT12P/1000)	44527
V 10	Zener diode 15 V	44528
V 11	Zener diode 15 V	44528
V 12	Zener diode 15 V	44528
V 13	Zener diode 15 V	44528
V 14	Zener diode 15 V	44528
V 15	Zener diode 15 V	44528
V 16	Zener diode 15 V	44528
V 17	Zener diode 15 V	44528
Transistor		
V 1	Mos-Power FET BUZ 385	44591
V 2	Mos-Power FET BUZ 385	44591
V 3	Mos-Power FET BUZ 385	44591
V 4	Mos-Power FET BUZ 385	44591
Plug- and socket-connector		
X 1	Pin assembly DIN 41612 32-poles	40841
X 64	Connector male 2-poles	41561
X 65	Connector male 4-poles	11624



Switching Power Supply Monitoring

Description of the appliance switch-off circuit in the event of instrument related faulty dosing pursuant of 3 MedGV (Medical Appliance Regulation)

1. Switching power supply monitor no. 44446 compares the desired voltage X 3 10 a + c with the actual voltage at X 3 8 a+c.

A corresponding signal switches the remanence relay K 2. Its contacts disconnect the signal lines PWM1 and PWM2, thereby interrupting the driver signal. The S 1 key is used to reset the remanence relay K2 after the fault has been corrected.

2. Potentiometer monitoring no. 44442.

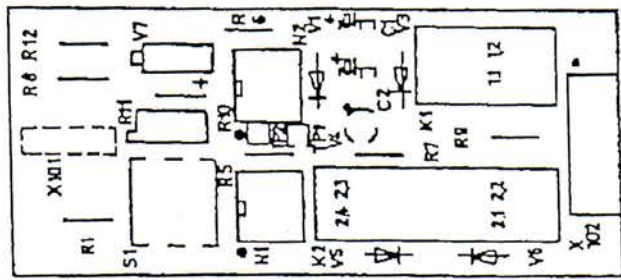
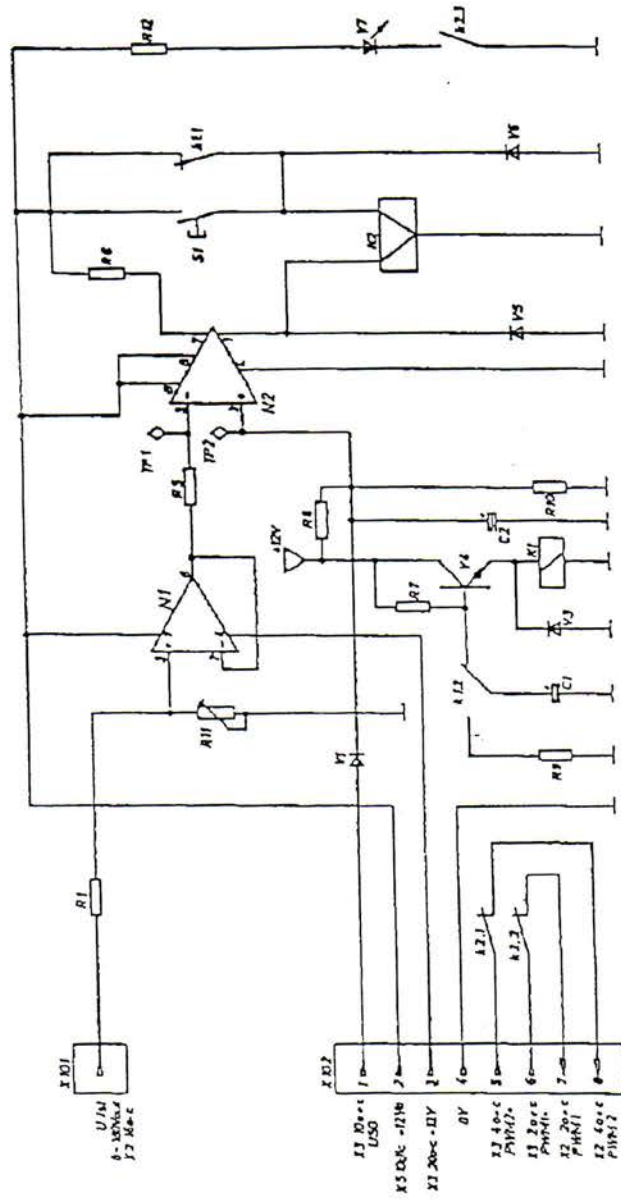
The power controller R 4 for electrotony is compared with a reference voltage and is processed by the comparator N 1. The 8-fold inverter transfers the comparator's output signal to the relay K1. In the presence of a corresponding signal the change-over contact k 1 switches the desired voltage to 0 Volt via the resistor R 12.

Power controller coagulation = same circuit arrangements as electrotony

Power controller Bi-coagulation = same circuit arrangements as electrotony

3. The plug-in location X 5 accommodates the modulation monitor. The circuit consists of the components R 40, C 31 and N 6. The Components R 40 and C 31 form an integrator. The integrated signal is compared with a reference voltage by the comparator N 6, the output of the comparator N 6 blocks the flip-flop U 5/3 in the presence of a corresponding signal.

4. The volume of the audio warning signal is increased in the event of a defective handle or foot switch (continuous RF activation). For this purpose the volume control is bridged by the trimmer on the signal generator p.c.-board no. 44440.



SNT-Überwachungsplatine Bestell-Nr.: 44446
 SPS monitoring board Order No.:

**Trimpotentiometer - Setting - Function**

Module	Plug in pos.	Designation	Setting	Test point IC pin	Multipoint connector	Function
V	X 102 distribution board	R 11	Can only be done by manufac- turer	TP 1		voltage division setting



ELEKTOTOM 390/400
SWITCHING POWER SUPPLY MONITORING BOARD

cpl. 44446

Reference Designation	Description	Part No.
Capacitors		
C 1	Capacitor, electro	22 μ F / 25 V 37850
C 2	Capacitor, electro	22 μ F / 25 V 37850
Resistors		
R 1	Metal-film resistor	180 k Ω / 0,6 W 44357
R 5	Metal-film resistor	18 k Ω / 0,6 W 1208
R 6	Metal-film resistor	100 Ω / 0,6 W 1119
R 7	Metal-film resistor	47 k Ω / 0,6 W 1144
R 8	Metal-film resistor	100 k Ω / 0,6 W 1354
R 9	Metal-film resistor	39 Ω / 0,6 W 44353
R 10	Metal-film resistors	47 k Ω / 0,6 W 1144
R 11	Trimmer resistor	10 k Ω / 0,5 W 44470
R 12	Metal-film resistor	2,2 k Ω / 0,6 W 1129
Relays		
K 1	Relay	12 V/2 x u 44317
K 2	Relay, bistable	12 V/4 x u 44468
Switch		
S 1	Switch	37897
Visual monitors		
V 7	Light-emitting diode	red 44459
Diodes		
V 1	Diode	1N4148 10080
V 3	Diode	1N4148 10080
V 5	Diode	1N4148 10080
V 6	Diode	1N4148 10080
Transistors		
V 4	Transistor	BC 517 11356
Integrated circuits		
N 1	Operational amplifier	LF 355 47069
N 2	Comparator	LM 211 44508
Plug- and socket-connectors		
X 101	Socket	1-pole 47067
X 102	Pin assembly	8-poles 47066



6. Control Modul (Modul II)

ELEKTROTOM 390 Part no. 45420
ELEKTROTOM 400 Part no. 45421

Control Modul (Modul II)

ELEKTROTOM 390 Part no. 45420

The pc-board for type-of-current selection no 44436 is connected to the plug connector X5. The bi-stable relays K1 to K5 switch the different operating modes; they are controlled by the keyboard field in the front module. The voltage controllers U1 to U5 generate the respective desired voltages for power compensation. Furthermore, the switching amplifier, and the clock generator for tone generation of neutral electrode monitoring, are mounted on this pc-board.

The power-controller pc-board no. 44437 is connected to the plung-in connector X 6. The set-point for cutting is adjusted with the motor potentiometer R15a, the set-point for coagulation with R31a, and the set-point for bipolar coagulation with R46a.

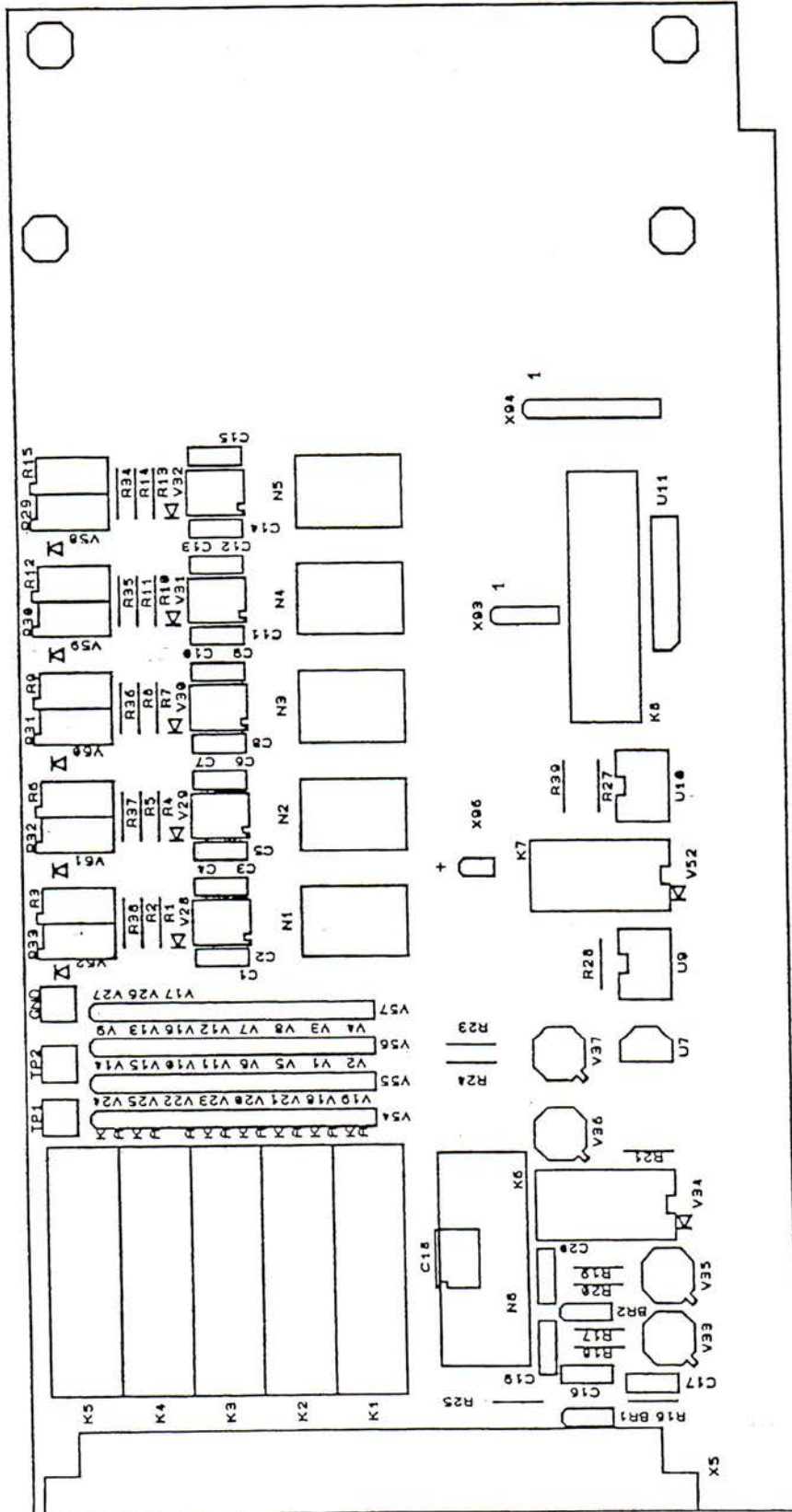
Control Modul (Modul II)

ELEKTROTOM 400 Part no. 45421

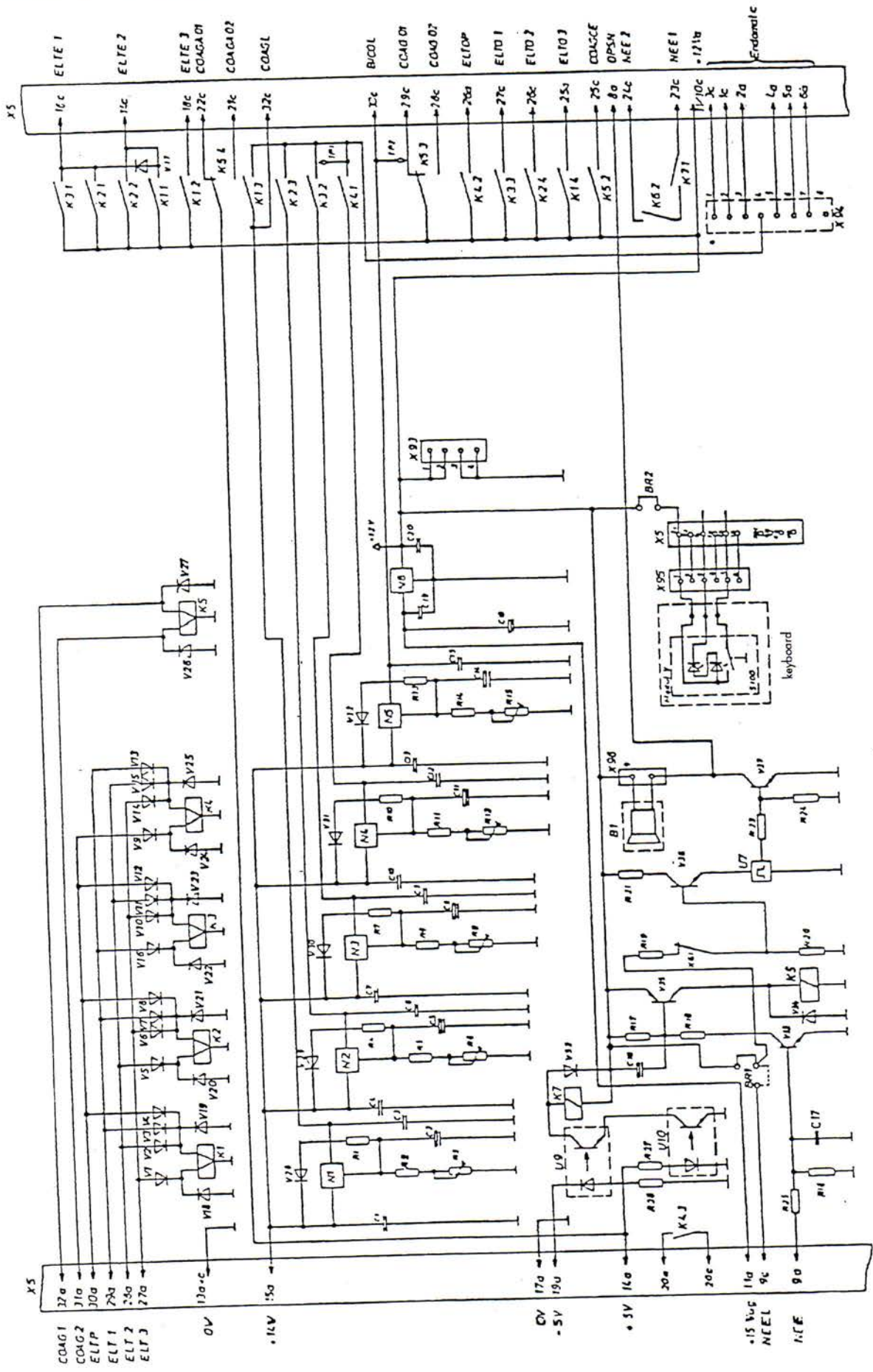
The pc-board for type-of-current selection no 44436 is connected to the plug connector X5. The bi-stable relays K1 to K5 switch the different operating modes; they are controlled by the keyboard field in the front module. The voltage controllers U1 to U5 generate the respective desired voltages for power compensation. Furthermore, the switching amplifier, and the clock generator for tone generation of neutral electrode monitoring, are mounted on this pc-board.

The keys "HIGHER" and "LOWER", together with the amplifiers N1 to N6, control the motor potentiometer. The relays K5.1 and K7.1 have been incorporated for added safety. The contacts are series-connected in relation to the motors so that a motor is not controlled in the event that an amplifier is defective. In such a case both keys are mutually blocked.

The switch amplifiers for electrotomy are formed by V1 and V2, and for coagulation by V3 and V4. They supply the relays K1, K2, K3 and K4. The logic, consisting of U1 and U2, is combined in such a manner that electrotomy and coagulation cannot be simultaneously activated. The logic also activates neutral electrode monitoring when the neutral electrode is not connected; it receives a signal for this purpose from the handle switches or the foot switch.



Siromartwahl-Platine Bestell-Nr.: 44436
 Current selection board Order No.:



Siromwahl-Platine Bestell-Nr.: 44436
 Current selection board Order No.:

**Trimpotentiometer - Setting - Function**

Modul	Plug-in pos.	Designation	Setting	Test point	IC-Pin	Multi Point connector	Function
II	X 5	R 3	5,6 - 10,4 V	1			Voltage level Blend IV
II	X 5	R 6	5,6 - 10,4 V	1			Voltage level Blend III
II	X 5	R 9	5,6 - 10,4 V	1			Voltage level Blend II
II	X 5	R 12	5,6 - 10,4 V	1			Voltage level Blend I
II	X 5	R 15	2,1 - 6,7 V	1			Voltage level Bi-Coagulation



ELEKTROTOM 390/400
CURRENT SELECTION BOARD

44436

Reference Designation	Description		Part no.
Capacitors			
C 1	Ceramic capacitor	100 nF / 50 V	11344
C 2	Capacitor, electro	10 μ F / 25 V	44455
C 3	Ceramic capacitor	100 nF / 50 V	11344
C 4	Ceramic capacitor	100 nF / 50 V	11344
C 5	Capacitor, electro	10 μ F / 25 V	44455
C 6	Ceramic capacitor	100 nF / 50 V	11344
C 7	Ceramic capacitor	100 nF / 50 V	11344
C 8	Capacitor, electro	10 μ F / 25 V	44455
C 9	Ceramic capacitor	100 nF / 50 V	11344
C 10	Ceramic capacitor	100 nF / 50 V	11344
C 11	Capacitor, electro	10 μ F / 25 V	44455
C 12	Ceramic capacitor	100 nF / 50 V	11344
C 13	Ceramic capacitor	100 nF / 50 V	11344
C 14	Capacitor, electro	10 μ F / 25 V	44455
C 15	Ceramic capacitor	100 nF / 50 V	11344
C 16	Capacitor, electro	1,5 μ F / 25 V	45429
C 17	Ceramic capacitor	100 nF / 50 V	11344
C 18	Capacitor, electro	10 nF / 25 V	44455
C 19	Ceramic capacitor	100 nF / 50 V	11344
C 20	Ceramic capacitor	1 μ F / 50 V	9904
Resistors			
R 1	Metal film resistor	250 Ω / 0,6W	1121
R 2	Metal film resistor	1,5 k Ω / 0,6W	1127
R 3	Trimmer resistor	1 k Ω / 0,5W	44514
R 4	Metal film resistor	270 Ω / 0,6W	1121
R 5	Metal film resistor	1,2 k Ω / 0,6W	40801
R 6	Trimmer resistor	1 k Ω / 0,5W	44514
R 7	Metal film resistor	270 Ω / 0,6W	1121
R 8	Metal film resistor	820 Ω / 0,6W	36443
R 9	Trimmer resistor	1 k Ω / 0,5W	44514
R 10	Metal film resistor	270 Ω / 0,6W	1121
R 11	Metal film resistor	820 Ω / 0,6W	36443
R 12	Trimmer resistor	1 k Ω / 0,5W	44514
R 13	Metal film resistor	270 Ω / 0,6W	1121
R 14	Metal film resistor	330 Ω / 0,6W	1122
R 15	Trimmer resistor	1 k Ω / 0,5W	44514
R 16	Metal film resistor	2,2 k Ω / 0,6W	1129
R 17	Metal film resistor	5,6 k Ω / 0,6W	1134
R 18	Metal film resistor	3,3 k Ω / 0,6W	1131
R 19	Metal film resistor	2,2 k Ω / 0,6W	1129
R 20	Metal film resistor	3,3 k Ω / 0,6W	1131
R 21	Metal film resistor	680 Ω / 0,6W	1125
R 23	Metal film resistor	5,8 k Ω / 0,6W	1134



ELEKTROTOM 390/400
CURRENT SELECTION BOARD

44436

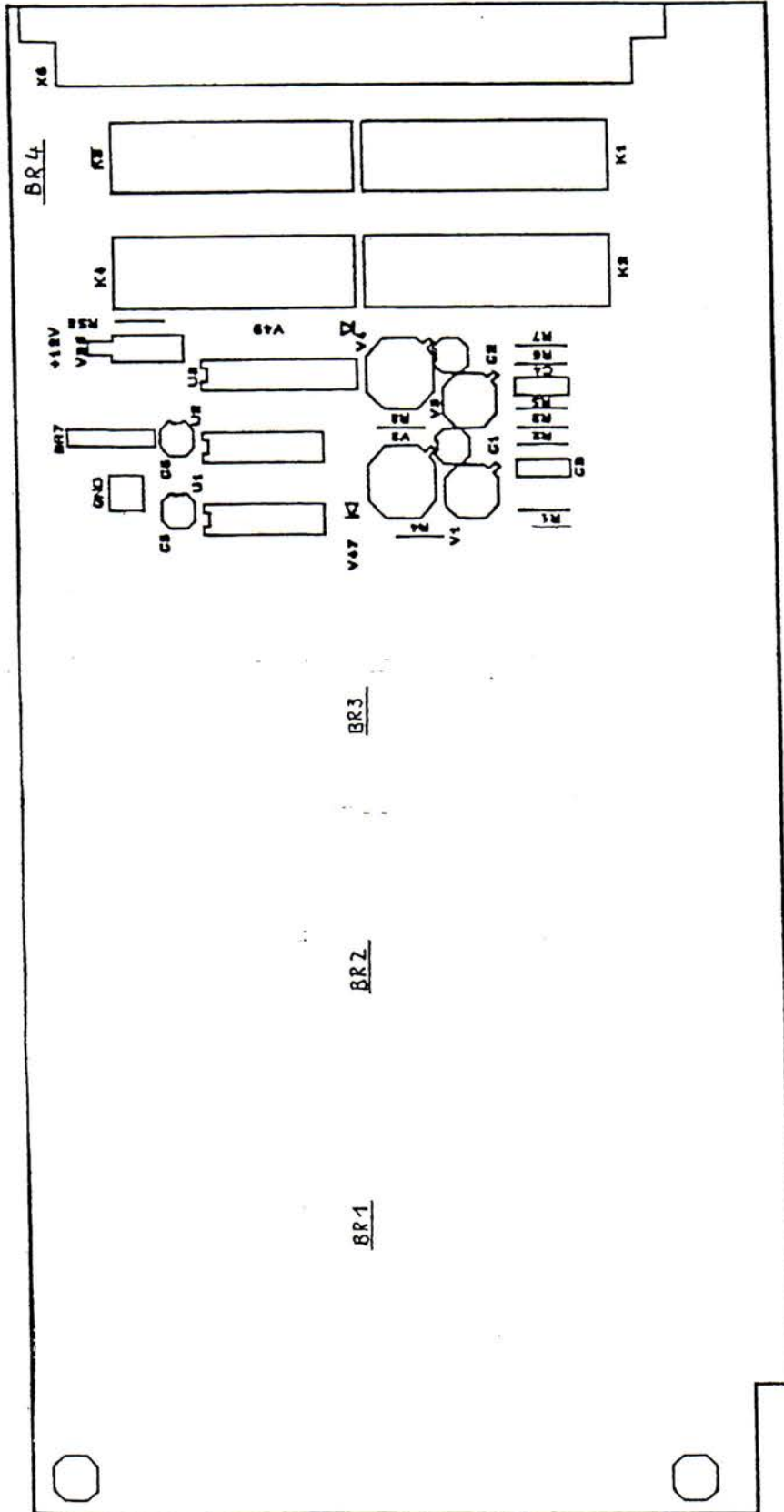
Reference Designation	Description		Part no.
Resistors			
C 24	Metal film resistor	3,3 k Ω / 0,6W	1131
C 25	Metal film resistor	10 k Ω / 0,6W	1137
C 27	Metal film resistor	470 Ω / 0,6W	1123
C 28	Metal film resistor	470 Ω / 0,6W	1123
Relays			
K 1 - K 5	Relay bistable	12 V / 4 x U	44468
K 6, K 7	Relay	12 V / 2 x U	44317
Diodes			
V 1(V55)	Diode (Diodenarray V55)	1N4148	10080
V 2(V55)	Diode (Diodenarray V55)	1N4148	10080
V 3(V56)	Diode (Diodenarray V56)	1N4148	10080
V 4(V56)	Diode (Diodenarray V56)	1N4148	10080
V 5(V55)	Diode (Diodenarray V55)	1N4148	10080
V 6(V55)	Diode (Diodenarray V55)	1N4148	10080
V 7(V56)	Diode (Diodenarray V56)	1N4148	10080
V 8(V56)	Diode (Diodenarray V56)	1N4148	10080
V 9(V56)	Diode (Diodenarray V56)	1N4148	10080
V 10(V55)	Diode (Diodenarray V55)	1N4148	10080
V 11(V55)	Diode (Diodenarray V55)	1N4148	10080
V 12(V56)	Diode (Diodenarray V56)	1N4148	10080
V 13(V56)	Diode (Diodenarray V56)	1N4148	10080
V 14(V55)	Diode (Diodenarray V55)	1N4148	10080
V 15(V55)	Diode (Diodenarray V55)	1N4148	10080
V 16(V56)	Diode (Diodenarray V56)	1N4148	10080
V 17(V57)	Diode (Diodenarray V57)	1N4148	10080
V 18(V54)	Diode (Diodenarray V54)	1N4148	10080
V 19(V54)	Diode (Diodenarray V54)	1N4148	10080
V 20(V54)	Diode (Diodenarray V54)	1N4148	10080
V 21(V54)	Diode (Diodenarray V54)	1N4148	10080
V 22(V54)	Diode (Diodenarray V54)	1N4148	10080
V 23(V54)	Diode (Diodenarray V54)	1N4148	10080
V 24(V54)	Diode (Diodenarray V54)	1N4148	10080
V 25(V54)	Diode (Diodenarray V54)	1N4148	10080
V 26(V57)	Diode (Diodenarray V57)	1N4148	10080
V 27(V57)	Diode (Diodenarray V57)	1N4148	10080
V 28	Diode	1N4148	10080
V 29	Diode	1N4148	10080



ELEKTROTOM 390 / 400
CURRENT SELECTION BOARD

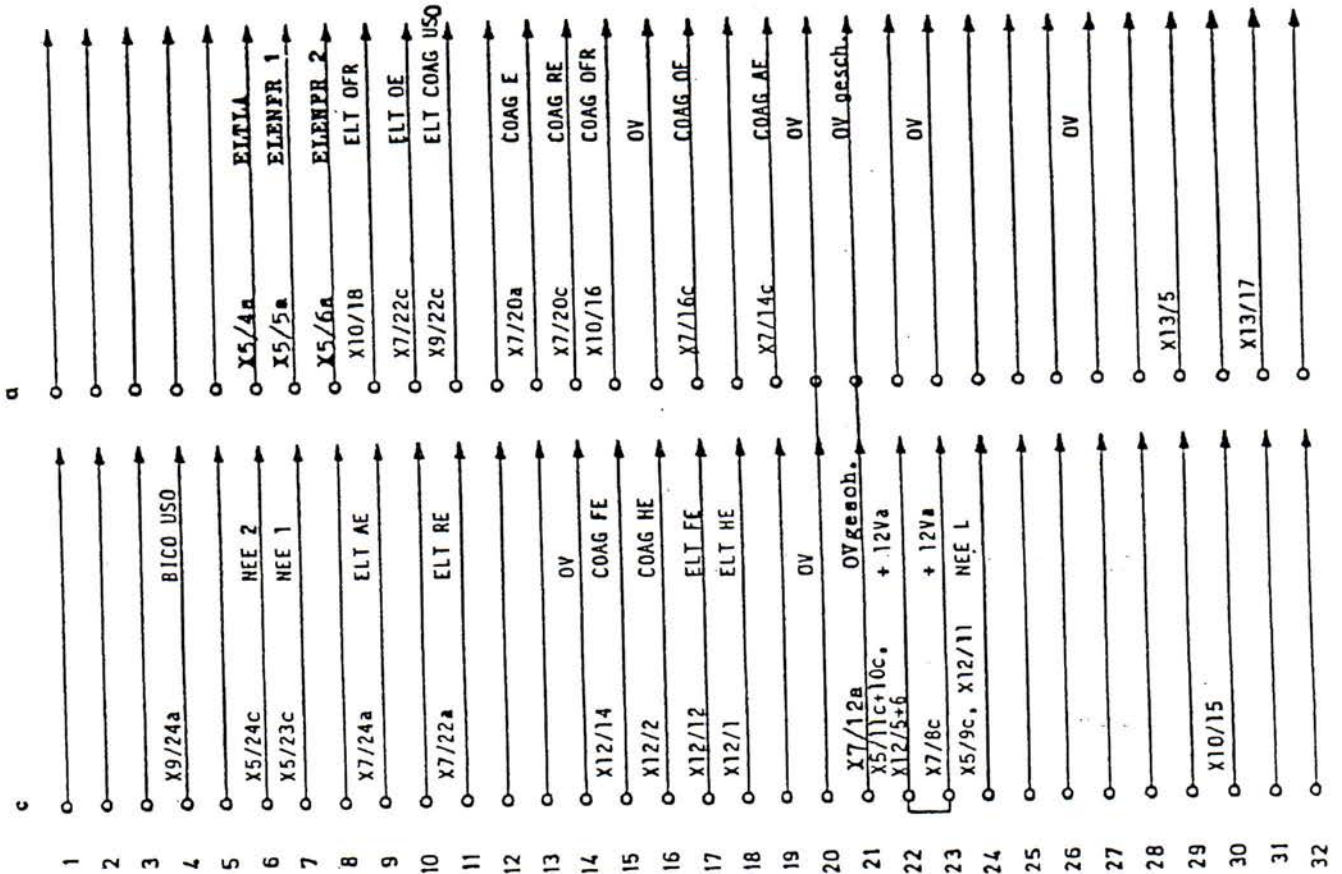
44436

Reference Designation	Description	Part no.
Diodes		
V 30	Diode	1N4148 10080
V 31	Diode	1N4148 10080
V 32	Diode	1N4148 10080
V 34	Diode	1N4148 10080
V 52	Diode	1N4148 10080
V 54	Diodenarray	8 x 1N4148 45430
V 55	Diodenarray	8 x 1N4148 45430
V 56	Diodenarray	8 x 1N4148 45430
V 57	Diodenarray	8 x 1N4148 45430
Transistors		
V 33	NPN-Transistor	2N2222A 10062
V 35	PNP-Transistor	2N2907A 10065
V 36	NPN-Transistor	2N2222A 10062
V 37	dito	2N2222A 10062
Integrated circuits		
N 1 - N 5	Voltage regulator	adjustable 42904
N 8	Voltage regulator	+ 12 V 10100
U 7	Clock generator	U 175 M 9910
U 9	Optocoupler	TIL 119 37863
U 10	Optocoupler	TIL 119 37863
Plug-and-socket connector		
X 5	Pin assembly	DIN 41612 64-poles 40839
X 93	Pin assembly	4-poles 37800
X 94	Pin assembly	8-poles 37829
X 96	Connector male	2-poles 41561
External components		
B 1	Audio oscillator	45411

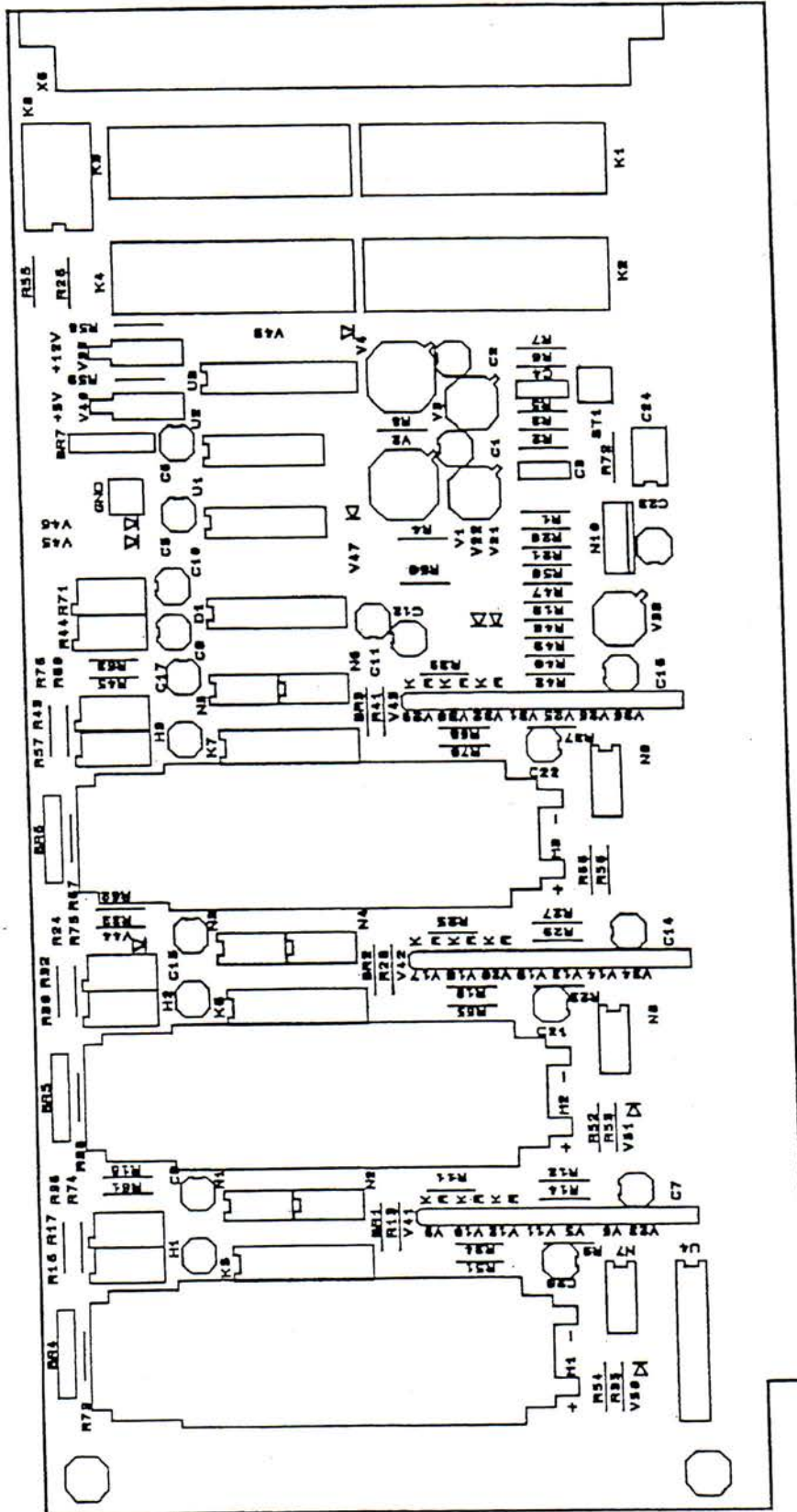


ELEKTROTOM 390
 HF-Aktivierungs-Platine
 RF-Activating control board

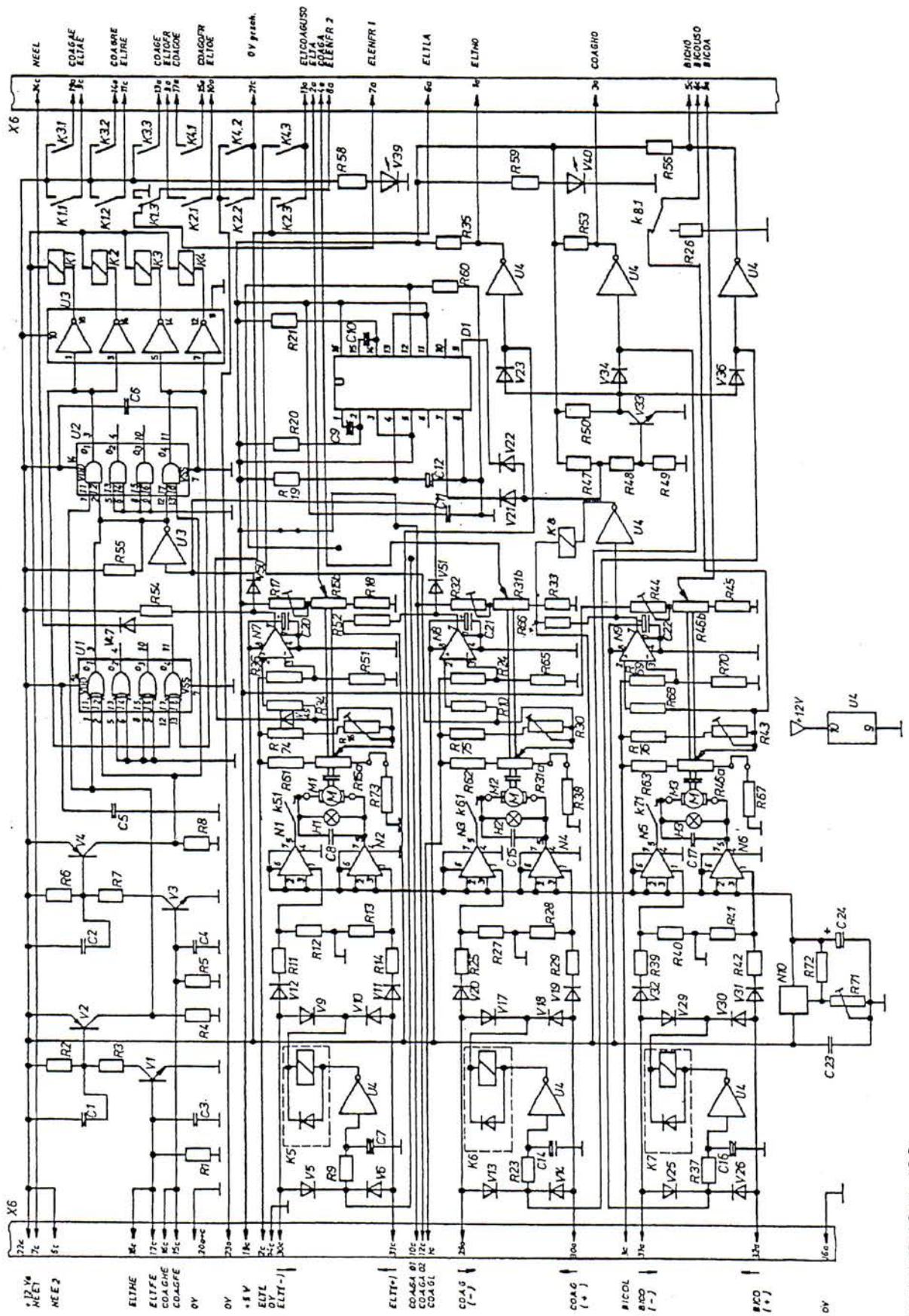
Bestell-Nr.: 44445
 Order No.:



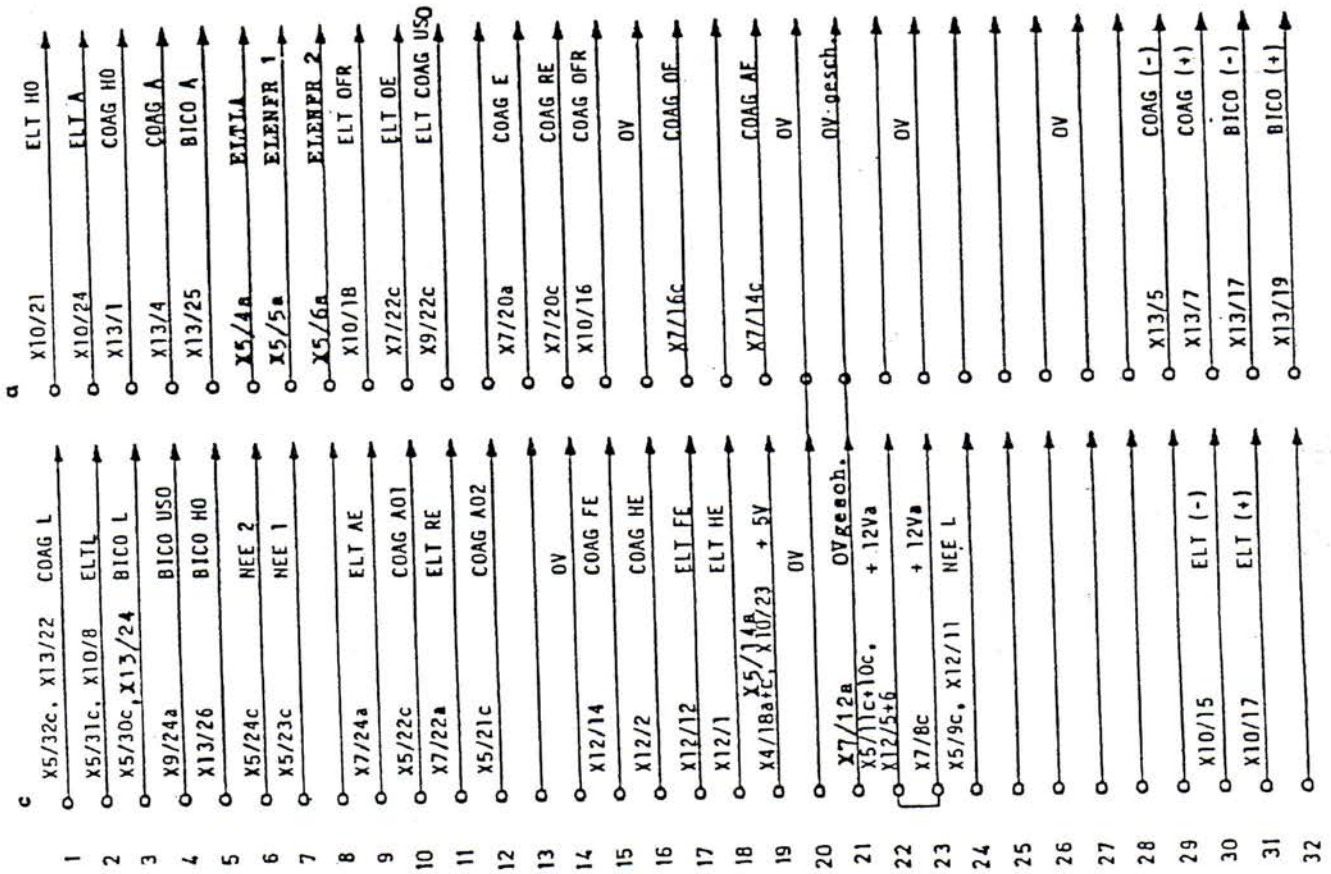
ELEKTROTOM 390
 Plug connection
 RF Activating Control Board



ELEKTROTOM 400
 HF-Aktivierungs-Leistungsteiler-Platine Bestell-Nr.: 44437
 RF-Activating control board Order No.:



ELEKTROTOM 400
 HF-Aktivierungs-Leistungssteller-Platine Bestell-Nr.: 44437
 RF-Activating control board Order No.:



ELEKTROTOM 400
 RF Activating Power Control Board
 HF-Aktivierungs-Leistungssteller-Platine



Trimpotentiometer - Setting - Function

Modul	Plug-in pos.	Designation	Setting	Test	IC-Pin	Multipoint connector	Function
II	X 6	R 17	Display 10.0	-	-	-	accumulated value display indication Electrotomy
II	X 6	R 32	Display 10.0	-	-	-	accumulated value display indication
II	X 6	R 57	-	-	-	-	Coagulation is required
II	X 6	R 44	Display 10.0	-	-	-	accumulated value display
II	X 6	R 16	Display 5.0 half RF-output power	-	-	RF-ouput socket	Linearity Electrotomy
II	X 6	R 30	Display 5.0 half RF-output power	-	-	RF-output socket	Linearity Coagulation
II	X 6	R 43	Display 5.0 half RF-output power	-	-	RF-output socket	Linearity Bi-Coagulation
II	X 6	R 71	8 V	-	6/N5	-	Motor supply voltage



ELEKTROTOM 400
RF-ACTIVATING-POWER CONTROL BOARD

44437

Reference Designation	Description		Part No.
Capactors			
C 1	Foil capacitor	100 nF / 63 V	44311
C 2	Foil capacitor	100 nF / 63 V	44311
C 3 - C 6	Ceramic capacitor	0,1 μ F / 50 V	11344
C 7	Capacitor, electro	1,5 μ F / 25 V	45429
C 8	Ceramic capacitor	470 pF / 200 V	37851
C 9	Capacitor, electro	4,7 μ F / 25 V	48384
C 10	Capacitor, electro	4,7 μ F / 25 V	48384
C 11	Ceramic capacitor	0,1 μ F / 50 V	11344
C 12	Capacitor, electro	10 μ F / 25 V	44455
C 14	Capacitor, electro	1,5 μ F / 25 V	45429
C 15	Ceramic capacitor	470 pF / 200 V	37851
C 16	Capacitor, electro	1,5 μ F / 25 V	45429
C 17	Ceramic capacitor	470 pF / 200 V	37851
C 20, C 22	Capacitor, electro	10 μ F / 25 V	44455
C 23	Foil capacitor	100 nF / 63 V	44311
C 24	Capacitor, electro	1 μ F / 40 V	45475
Resistors			
R 1	Metal film resistor	10 k Ω / 0,6W	1137
R 2	Metal film resistor	5,6 k Ω / 0,6W	1134
R 3	Metal film resistor	3,3 k Ω / 0,6W	1131
R 4	Metal film resistor	1 k Ω / 0,6W	1126
R 5	Metal film resistor	10 k Ω / 0,6W	1137
R 6	Metal film resistor	5,6 k Ω / 0,6W	1134
R 7	Metal film resistor	3,3 k Ω / 0,6W	1131
R 8	Metal film resistor	1 k Ω / 0,6W	1126
R 9	Metal film resistor	8,2 k Ω / 0,6W	1136
R 10	Metal film resistor	10 k Ω / 0,6W	1137
R 11	Metal film resistor	10 k Ω / 0,6W	1137
R 12	Metal film resistor	4,7 k Ω / 0,6W	1133
R 13	Metal film resistor	4,7 k Ω / 0,6W	1133
R 14	Metal film resistor	10 k Ω / 0,6W	1137
R 15a/b	Motortandempoti	2 x 1 k Ω / 2 W	45435
R 16	Trimmer resistor	1 k Ω / 0,5W	44514
R 17	Trimmer resistor	5 k Ω / 0,5W	45540
R 18	Metal film resistor	68 Ω / 0,6W	1207
R 19	Metal film resistor	5,6 k Ω / 0,6W	1134
R 20	Metal film resistor	1 M Ω / 0,6W	1106
R 21	Metal film resistor	1 M Ω / 0,6W	1106
R 23	Metal film resistor	8,2 k Ω / 0,6W	1136
R 24	Metal film resistor	2,2 k Ω / 0,6W	1129
R 25	Metal film resistor	10 k Ω / 0,6W	1137
R 26	Metal film resistor	10 k Ω / 0,6W	1137
R 27	Metal film resistor	4,7 k Ω / 0,6W	1133
R 28	Metal film resistor	4,7 k Ω / 0,6W	1133
R 29	Metal film resistor	10 k Ω / 0,6W	1137



ELEKTROTOM 400
RF-ACTIVATING-POWER CONTROL BOARD

44437

Reference Designation	Description	Part No.
Resistors		
R 30	Trimmer resistor	44514
R 31a/b	Motortandempoti	45435
R 32	Trimmer resistor	45540
R 33	Metal film resistor	1207
R 34	Metal film resistor	1137
R 35	Metal film resistor	1126
R 36	Metal film resistor	1129
R 37	Metal film resistor	1136
R 38	Metal film resistor	44532
R 39	Metal film resistor	1137
R 40	Metal film resistor	1133
R 41	Metal film resistor	1133
R 42	Metal film resistor	1137
R 43	Trimmer resistor	44514
R 44	Trimmer resistor	45540
R 45	Metal film resistor	1207
R 46a/b	Motortandempoti	45435
R 47	Metal film resistor	1136
R 48	Metal film resistor	1126
R 49	Metal film resistor	1135
R 50	Metal film resistor	1119
R 51	Metal film resistor	15385
R 52	Metal film resistor	1134
R 53	Metal film resistor	1126
R 54	Metal film resistor	1134
R 55	Metal film resistor	1132
R 56	Metal film resistor	1126
R 58	Metal film resistor	1129
R 59	Metal film resistor	1125
R 60	Metal film resistor	1132
R 61	Metal film resistor	1119
R 62	Metal film resistor	1119
R 63	Metal film resistor	1119
R 65	Metal film resistor	15385
R 66	Metal film resistor	1134
R 67	Metal film resistor	1115
R 68	Metal film resistor	1137
R 69	Metal film resistor	1129
R 70	Metal film resistor	15385
R 71	Trimmer resistor	45540
R 72	Metal film resistor	1121
R 73	Metal film resistor	44352
R 74	Metal film resistor	1121
R 75	Metal film resistor	1121
R 76	Metal film resistor	1121



ELEKTROTOM 400
RF-ACTIVATING-POWER CONTROL BOARD

44437

Reference Designation	Description	Part No.
Relays		
K 1 - K 4	Relay	12 V / 4 x u 44540
K 5 - K 7	Relay	12 V / 1 x a 45433
K 8	Relay	12 V / 1 x u 37849
Visual monitors		
H 1	bulb	12 V 9930
H 2	bulb	12 V 9930
H 3	bulb	12 V 9930
V 39	Light-emitting diode	red 44459
V 40	Light emitting diode	red 44459
Diodes		
V 5(V41)	Diode (Diodenarray V41)	1N4148 10080
V 6(V41)	Diode (Diodenarray V41)	1N4148 10080
V 9(V41)	Diode (Diodenarray V41)	1N4148 10080
V 10(V41)	Diode (Diodenarray V41)	1N4148 10080
V 11(V41)	Diode (Diodenarray V41)	1N4148 10080
V 12(V41)	Diode (Diodenarray V41)	1N4148 10080
V 13(V42)	Diode (Diodenarray V42)	1N4148 10080
V 14(V42)	Diode (Diodenarray V42)	1N4148 10080
V 17(V42)	Diode (Diodenarray V42)	1N4148 10080
V 18(V42)	Diode (Diodenarray V42)	1N4148 10080
V 19(V42)	Diode (Diodenarray V42)	1N4148 10080
V 20(V42)	Diode (Diodenarray V42)	1N4148 10080
V 21	Schottkydiode	SD101A 42949
V 22	Schottkydiode	SD101A 42949
V 23(V41)	Diode (Diodenarray V41)	1N4148 10080
V 25(V43)	Diode (Diodenarray V43)	1N4148 10080
V 26(V43)	Diode (Diodenarray V43)	1N4148 10080
V 29(V43)	Diode (Diodenarray V43)	1N4148 10080
V 30(V43)	Diode (Diodenarray V43)	1N4148 10080
V 31(V43)	Diode (Diodenarray V43)	1N4148 10080
V 32(V43)	Diode (Diodenarray V43)	1N4148 10080
V 34(V43)	Diode (Diodenarray V43)	1N4148 10080
V 36(V43)	Diode (Diodenarray V43)	1N4148 10080
V 41	Diodenarray	8 x 1N4148 45430
V 42	Diodenarray	8 x 1N4148 45430
V 43	Diodenarray	8 x 1N4148 45430
V 47	Diodenarray	1N4148 10080
V 49	Diodenarray	1N4148 10080
V 50	Diodenarray	1N4148 10080
V 51	Diodenarray	1N4148 10080



ELEKTROTOM 400
RF-ACTIVATING-POWER CONTROL BOARD

44437

Reference Designation	Description	Part No.
Transistors		
V 1	NPN-Transistor	2N2222A 10062
V 2	PNP-Transistor	2N2905A 10066
V 3	NPN-Transistor	2N2222A 10062
V 4	PNP-Transistor	2N2905A 10066
V 33	NPN-Transistor	2N2222A 10062
Integrated circuits		
D 1	CMOS-IC	4538 44463
U 1	CMOS-IC	4070 37868
U 2	CMOS-IC	4081 37869
U 3	Driver-IC	ULN 2804 A 45426
U 4	Driver-IC	ULN 2804 A 45426
N 1	Operational amplifier	TBA 820 M 37871
N 2	Operational amplifier	TBA 820 M 37871
N 3	Operational amplifier	TBA 820 M 37871
N 4	Operational amplifier	TBA 820 M 37871
N 5	Operational amplifier	TBA 820 M 37871
N 6	Operational amplifier	TBA 820 M 37871
N 7	Comparator	LM 211 44508
N 8	Comparator	LM 211 44508
N 9	Comparator	LM 211 44508
N 10	Voltage regulator	adjustable 42904
Plug and socket connector		
X 6	pin assembly	DIN 41612 64-poles 40839

Modification: from ELEKTROTOM 390 Serial No.: 116155 Diode V 47 cancelled
from ELEKTROTOM 400 Serial No.: 116252 Diode V 47 cancelled



7. GENERATOR MODUL MONOPOLAR (Modul III)

ELEKTROTOM 390/400 Part no. 45408

The oscillator modulator pc-board 44438 is connected to the plug-in connector X7.

U1 generates the 1MHz drive frequency for the D1 block where this drive frequency is divided by 4 and switched onto the edge-triggered mono-flops D2 to D5. The pulse and rest periods of the push-pull control signals are adjusted with D2 and D5. The signals are synchronized with D6 and U2.

The pre-drivers U3 and U4 are switched via the strobe input in the presence of modulated current. The modulation is generated by the oscillator G1, and by the mon-flop D7 that is adjusted in conformity with the type of current.

Depending upon the modulation degree, the power drivers U3 to U6 are blocked with D7/1 via the strobe input. The signal of the power drivers U3 to U6 is fed by a transformer to the power bridge.

The different operating values are switched and adjusted with the relays K1 to K5 and with the trimmers R 10 to R18.

The amplifier pc-board 44439 is connected to the plug-in connector X8.

The power field-effect transistors mounted on this board are controlled in pairs by the transformer T1.

The output transformer has different matching impedances that are switched over with the relay contacts K1.1 and K1.2

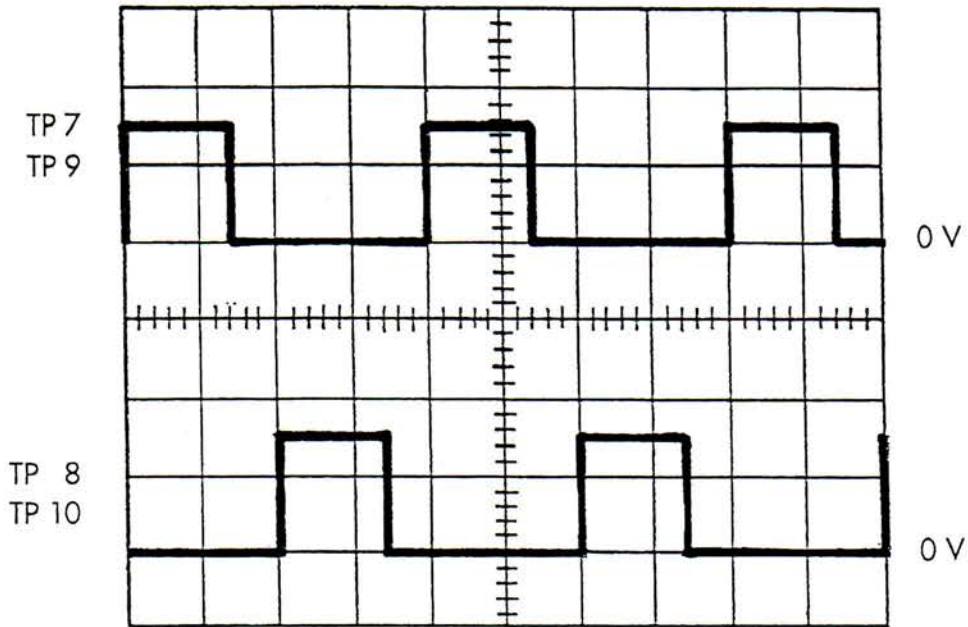
The thermostatic switch B1 is mounted on the joint heat sink of the power transistors. It interrupts the gate control of the power transistors when 80° C is exceeded.

During RF generation, a signal is produced in the circuit section V10, V11 and V12 to control the optical signals.

The signal generator pc-board no. 44440 is mounted on the rear of the appliance. This pc-board accommodates three IC's and amplifier and a signal transmitter for the acoustic signals when RF is switched on. The volume of the acoustic signal can be adjusted with R6.



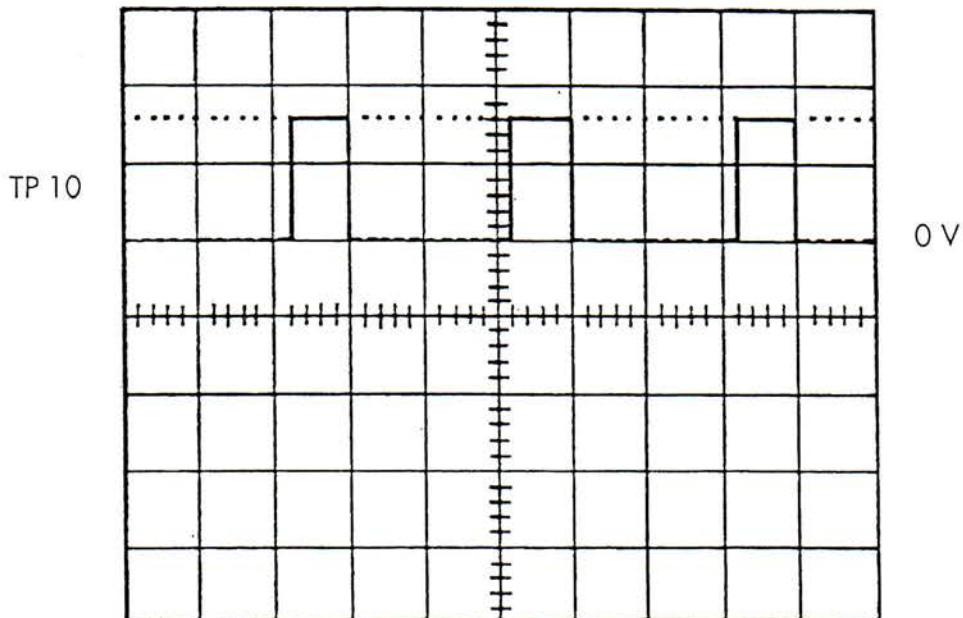
Oscillogramm No. 5



Time / cm : 0,5 μ s

Volt / cm : CH 1 = 10 V
CH 2 = 10 V

Oscillogramm No. 6
BLEND I

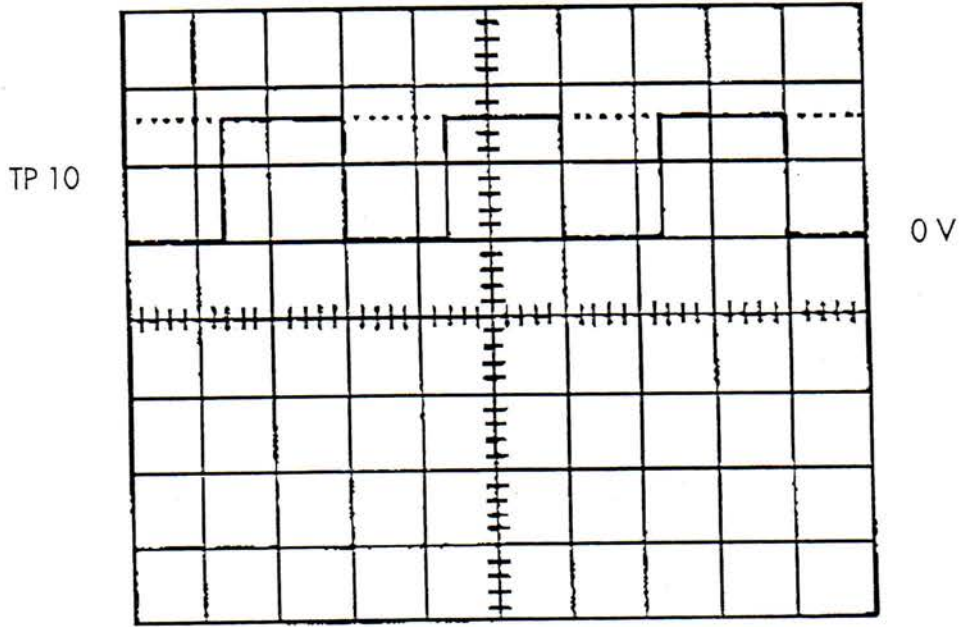


Time / cm : 10 μ s

Volt / cm : CH 1 = 1 V

TK 10 : 1

Oscillogramm No. 7
BLEND II

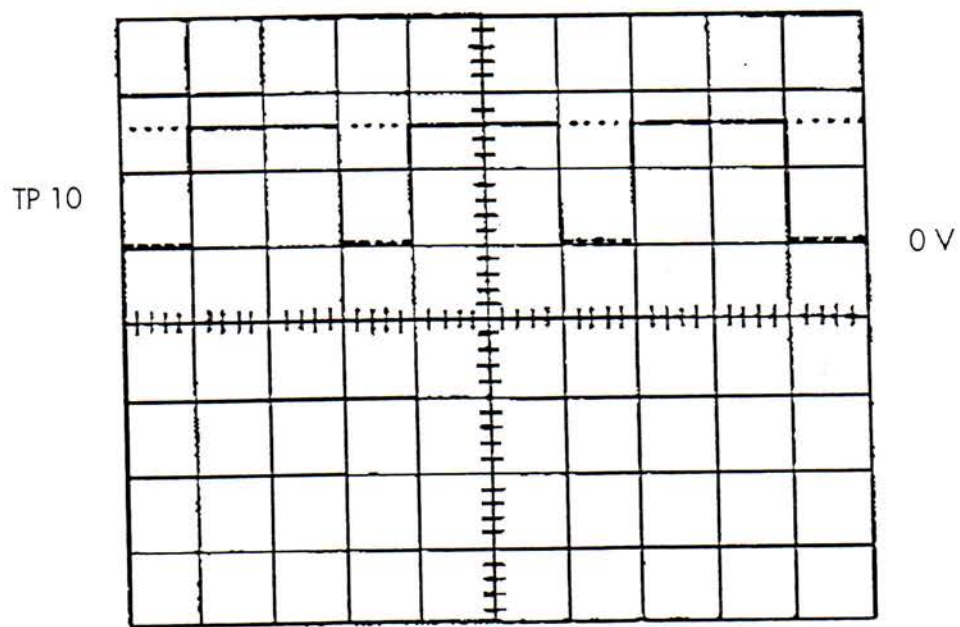


Time / cm : 10 μ s

Volt / cm : CH 1 = 1 V

TK 10 : 1

Oscillogramm No. 8
BLEND III



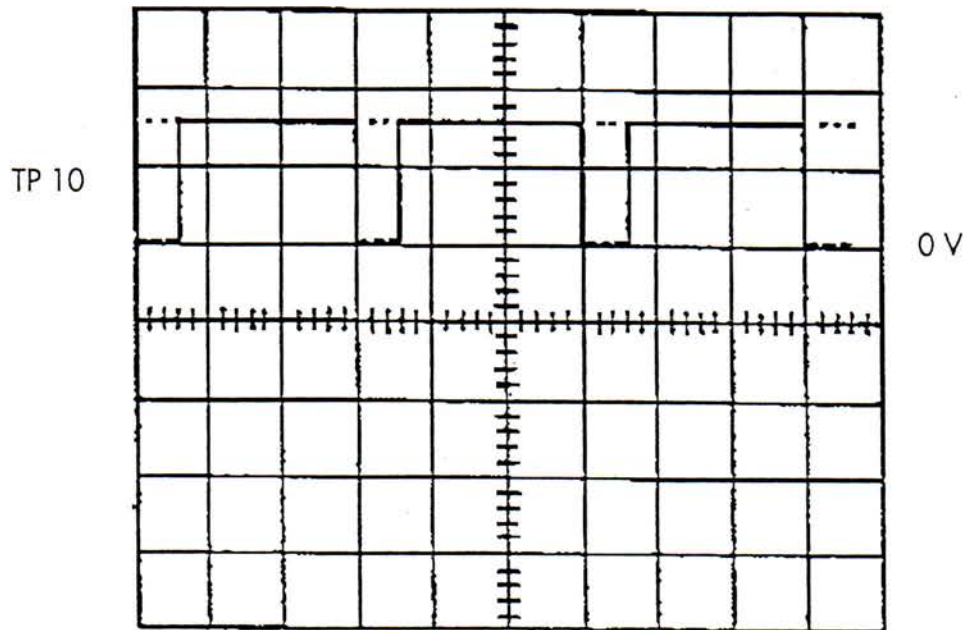
Time / cm : 10 μ s

Volt / cm : CH 1 = 1 V

TK 10 : 1



Oscillogramm No. 9
CONTACT-COAGULATION

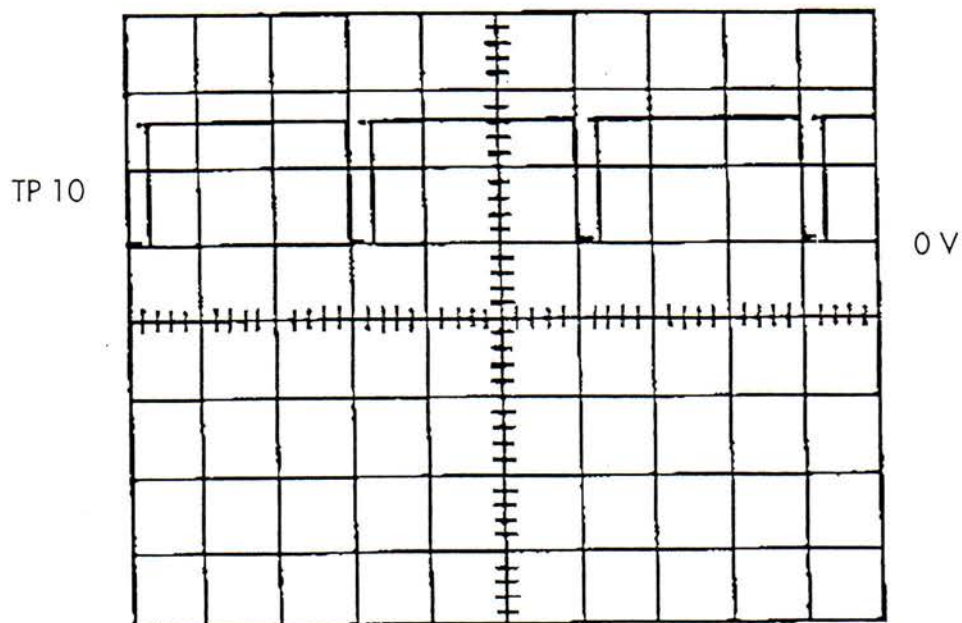


Time / cm : 10 μ s

Volt / cm : CH 1 = 1 V

TK 10 : 1

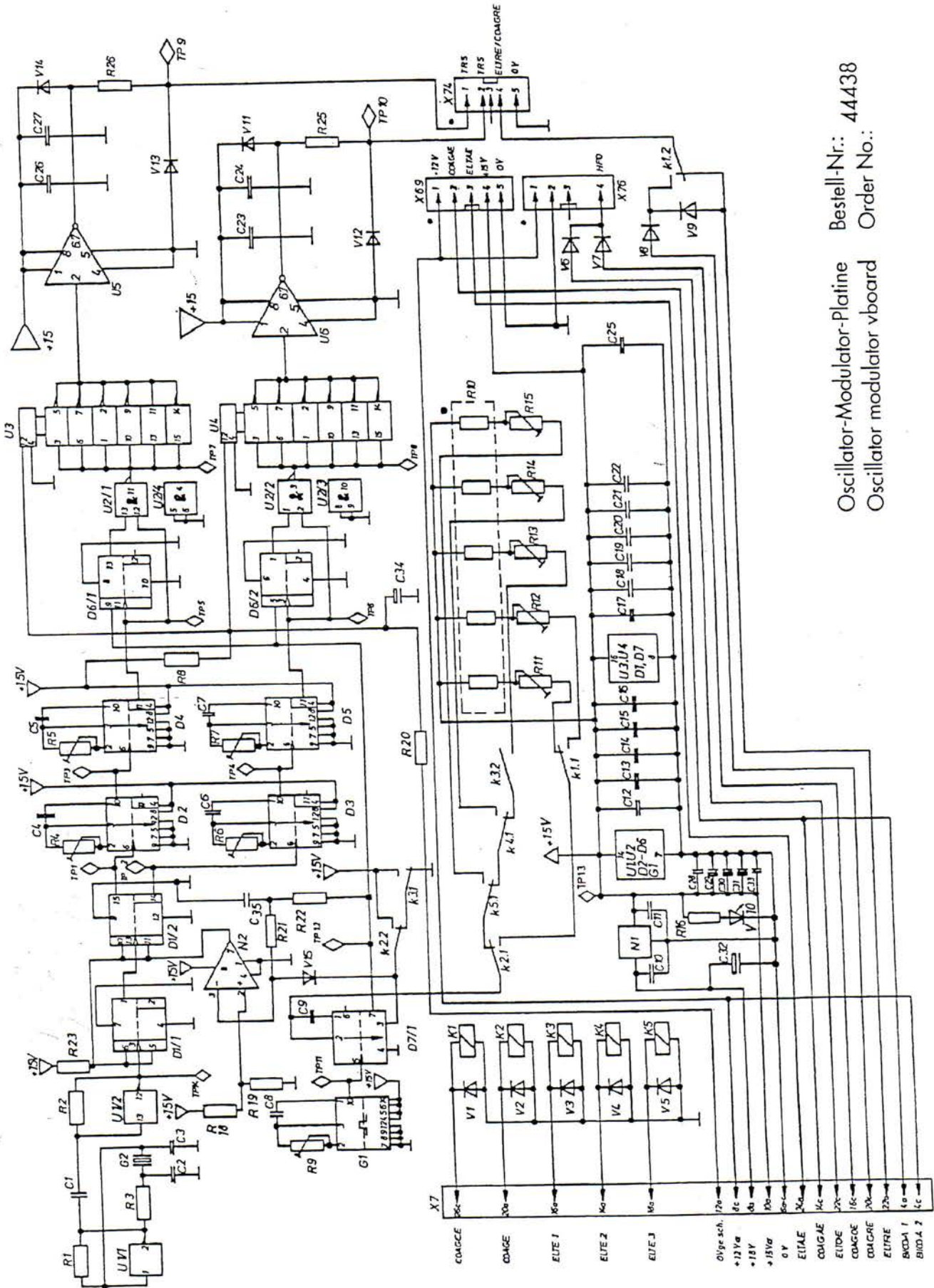
Oscillogramm No. 10
SPRAY-COAGULATION



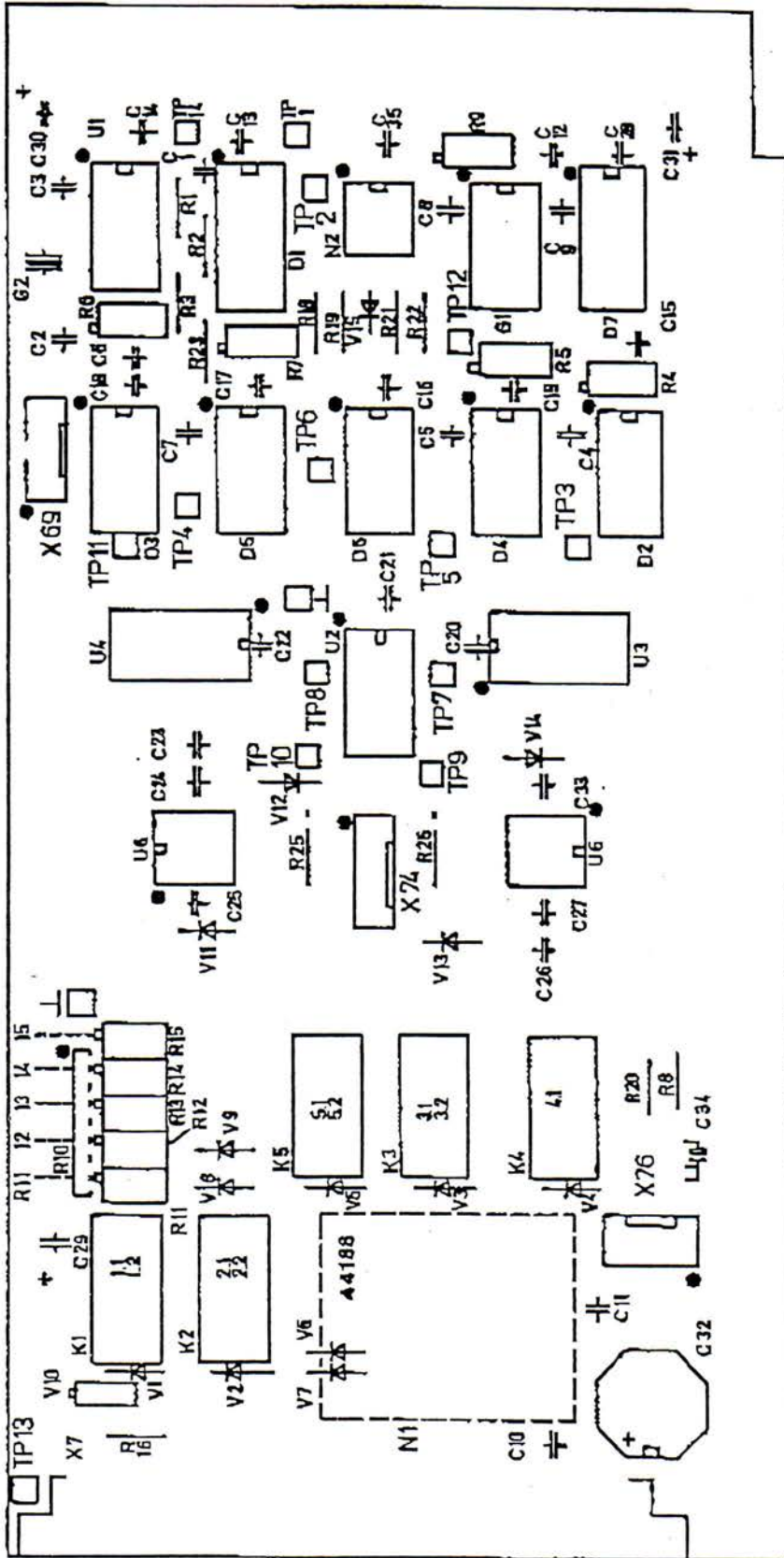
Time / cm : 10 μ s

Volt / cm : CH 1 = 1 V

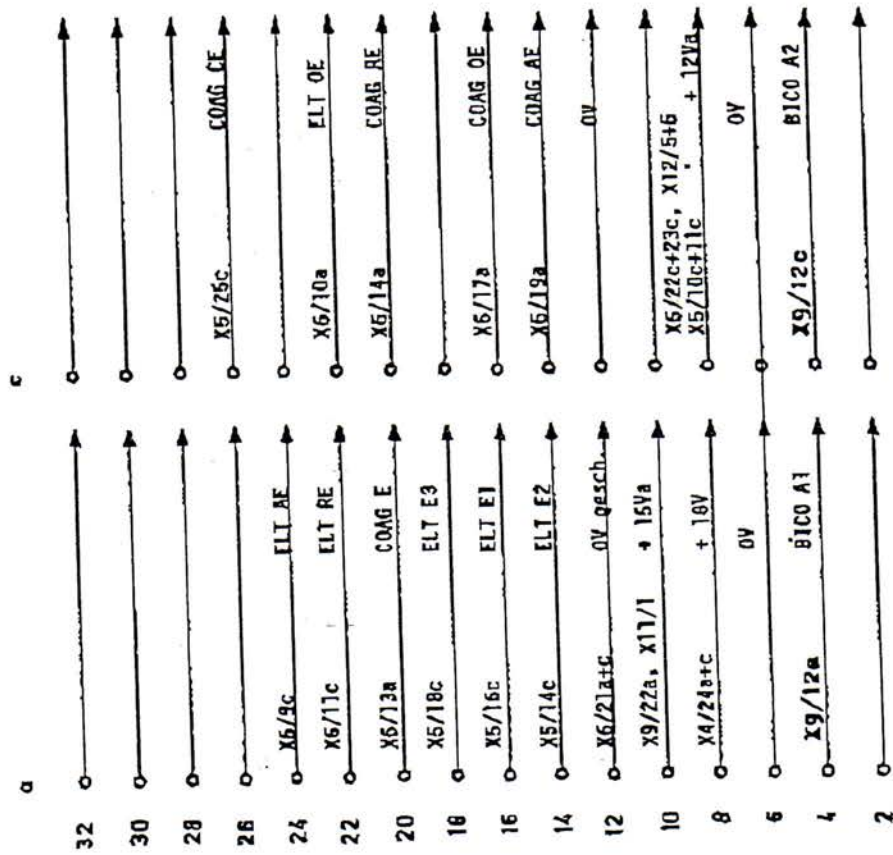
TK 10 : 1



Oscillator-Modulator-Platine Bestell-Nr.: 44438
 Oscillator modulator vboard Order No.:



Oscillator-Modulator-Platine Bestell-Nr.: 44438
 Oscillator modulator vboard Order No.:



Plug connection
Oscillator-Modulator-Board



Trimpotentiometer - Setting - Function

Modul	Plug-in pos.	Designation	Setting	Test point	IC-Pin	Multipoint connector	Function
III	X 7	R 4	see Oscillogramm no. 2	3 + 4	-	-	Pulse duration
III	X 7	R 5	see Oscillogramm no. 3	5 + 6	-	-	Pulse duration
III	X 7	R 4	see Oscillogramm no. 2	3 + 4	-	-	Pulse duration
III	X 7	R 5	see Oscillogramm no. 3	5 + 6	-	-	Pulse duration
III	X 7	R 11	see Oscillogramm no. 9	10	-	-	Pulse duration Spray Coag.
III	X 7	R 12	see Oscillogramm no. 8	10	-	-	Pulse duration Contact Coag.
III	X 7	R 11	see Oscillogramm no. 7	10	-	-	Pulse duration Mixed current
III	X 7	R 12	see Oscillogramm no. 6	10	-	-	Pulse duration Mixed current
III	X 7	R 11	see Oscillogramm no. 5	10	-	-	Pulsdauer Mixed current



ELEKTROTOM 390/400
OSCILLATOR MODULATOR BOARD

44438

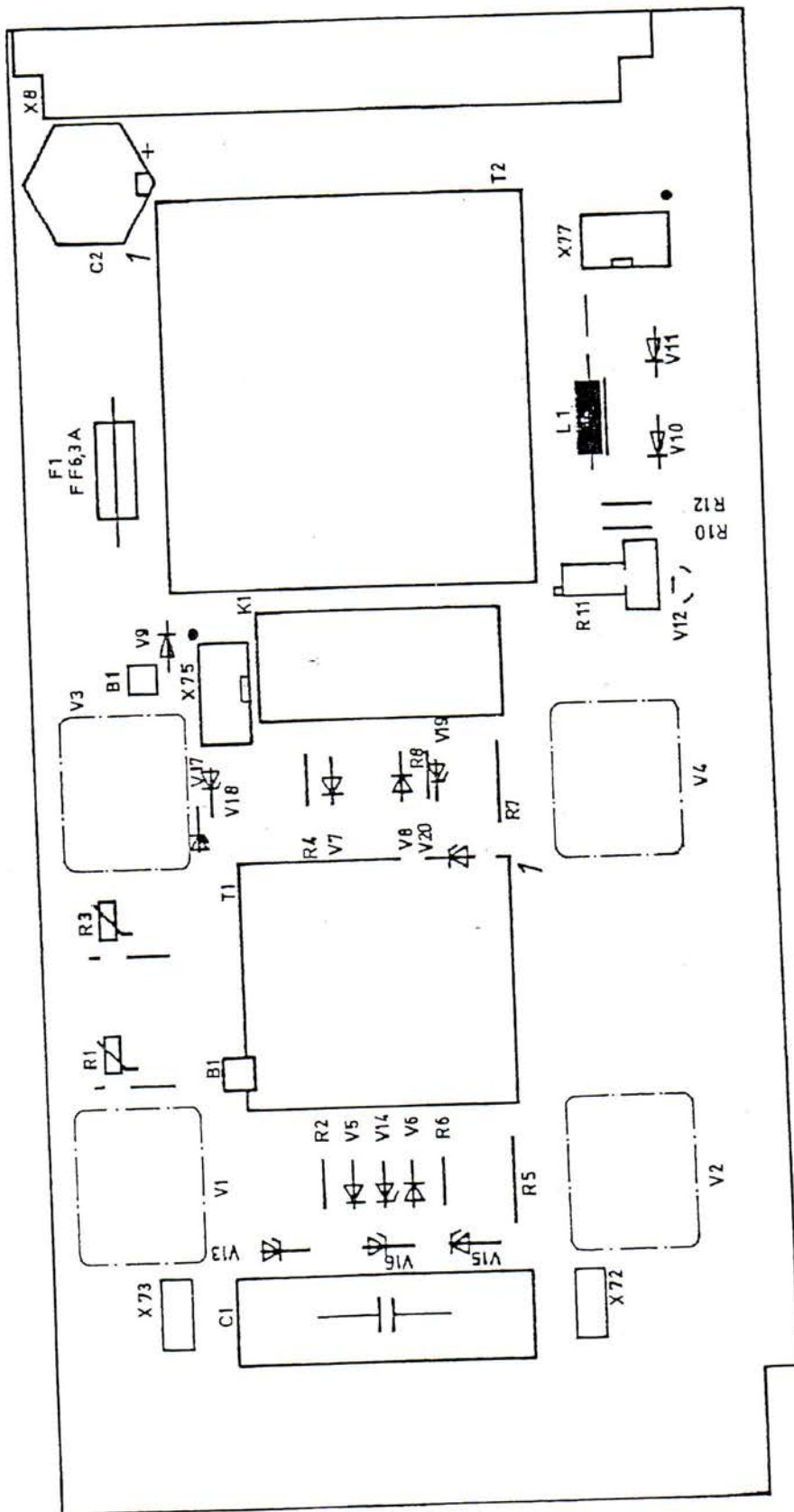
Reference Designation	Description		Part no.
Capacitors			
C 1, C 4	Ceramic capacitor	22 pF / 63V	44457
C 5	Foil capacitor	100 pF / 100V	44456
C 6	Ceramic capacitor	22 pF / 63V	44457
C 7	Foil capacitor	100 pF / 100V	44456
C 8	Foil capacitor	100 pF / 100V	44456
C 9	Foil capacitor	100 pF / 100V	44456
C 10	Ceramic capacitor	0,1 μ F / 100V	1052
C 11	Ceramic capacitor	1 μ F / 50V	9904
C 23	Foil capacitor	470 nF / 63V	44313
C 24	Foil capacitor	470 nF / 63V	44313
C 25	Ceramic capacitor	0,1 μ F / 50V	11344
C 26	Foil capacitor	470 nF / 63V	44313
C 27	Foil capacitor	470 nF / 63V	44313
C 28	Ceramic capacitor	0,1 μ F / 50V	11344
C 29 - C 31	Capacitor, electro	10 μ F / 25V	44455
C 32	Capacitor, electro	2200 μ F / 40V	45539
C 33	Ceramic capacitor	0,1 μ F / 50V	11344
C 34	Capacitor, electro	2,2 μ F / 25V	44315
C 35	Foil capacitor	220 nF / 63V	44312
Resistors			
R 1	Metal film resistor	1 M Ω / 0,6W	1106
R 2	Metal film resistor	1 M Ω / 0,6W	1106
R 3	Metal film resistor	22 k Ω / 0,6W	1141
R 4 - R 7	Trimmer resistor	10 k Ω / 0,5W	44470
R 8	Metal film resistor	3,3 k Ω / 0,6W	1131
R 9	Trimmer resistor	100 k Ω / 0,5W	44454
R 10	Resistor mains	6 x 3,3 k Ω / 0,18 W	37864
R 11 - R 15	Trimmer resistor	500 k Ω / 0,5W	44453
R 16	Metal film resistor	2,7 k Ω / 0,6W	1130
R 18	Metal film resistor	10 k Ω / 0,6W	1137
R 19	Metal film resistor	39 k Ω / 0,6W	36445
R 20	Metal film resistor	270 Ω / 0,6W	1121
R 21	Metal film resistor	120 k Ω / 0,6W	44356
R 22	Metal film resistor	100 k Ω / 0,6W	1354
R 23	Metal film resistor	3,3 k Ω / 0,6W	1131
R 25	Metal film resistor	2,2 Ω / 0,6W	47065
R 26	Metal film resistor	2,2 Ω / 0,6W	47065
Quarz			
G 2	Quarz	2 MHz	44458
Relays			
K 1 - K 5	Relay	12 V / 2 x U	44317



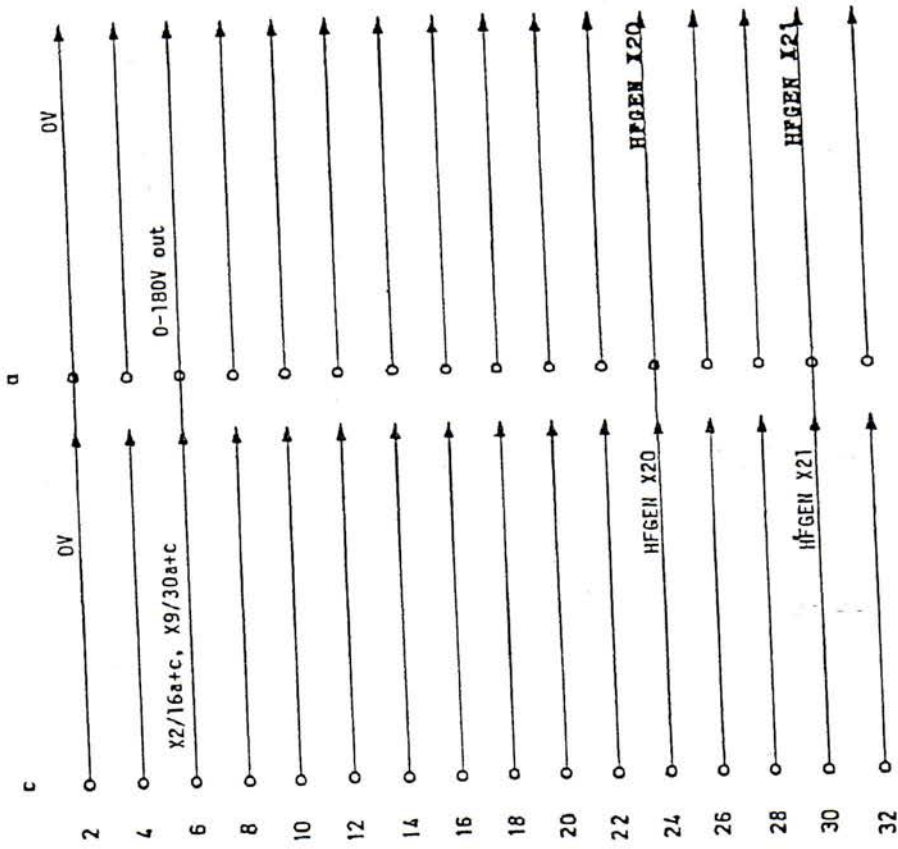
ELEKTROTOM 390/400
OSCILLATOR MODULATOR BOARD

44438

Reference Designation	Description		Part no.	
Visual monitors				
V 10	Light-emitting diode	red	44459	
Diodes				
V 1 - V 9	Diode	1N4148	10080	
V 11 - V 14	Schottky Diode	BYS 21-45	47053	
V 15	Diode	1N4148	10080	
Integrated circuits				
N 1	Voltage regulator	+ 15 V	10099	
N 2	Operational amplifier	LM 211	44508	
D 1 - D 5*)	CMOS-IC	4027	44465	
D 6	CMOS-IC	4013	44462	
D 7	CMOS-IC	4538	44463	
G 1	CMOS-IC	4047	44464	
U 1	CMOS-IC	4069	37870	
U 2	CMOS-IC	4011	44466	
U 3*)	CMOS-IC	4502	44460	
U 4*)	CMOS-IC	4502	44460	
U 5	Power MOS driver	TSC 429	47052	
U 6	Power MOS driver	TSC 429	47052	
*) must be same manufacturer				
Plug- and-socket connector				
X 7	Pin assembly	DIN 41612	32-polig	40841
X 69	Connector male		5-polig	15371
X 74	Connector male		5-polig	15371
X 76	Connector male		5-polig	11624



HF-Verstärker-Platine Bestell-Nr.: 44439
 RF-Power amplifier board Order No.:



Plug connection
RF-Power amplifier board



Trimpotentiometer - Setting - Function

Modul	Plug-in pos.	Bezeichnung	Designation	Test point	IC-Pin	Multipoint connector	Function
III	X 8	R 11	-	-	-	-	Sensitivity opt. RF-indication Elektrotomy/Coagulation



ELEKTROTOM 390/400
RF-AMPLIFIER BOARD

44439

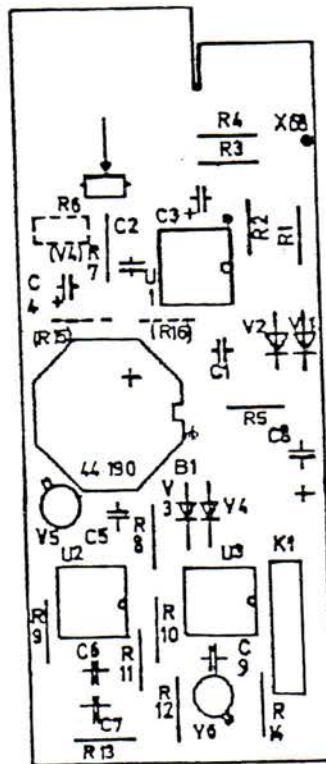
Reference Designation	Description	Part no.
Capacitors		
C 1	Foil capacitor	0,22 μ F / 630 V 44530
C 2	Capacitor, electro	47 μ F / 250 V 44475
Resistors		
R 1	Metal film resistor	15 Ω / 1 W 44473
R 2	Metal film resistor	4,7 k Ω / 0,6W 1133
R 3	Metal film resistor	15 Ω / 1 W 44473
R 4	Metal film resistor	4,7 k Ω / 0,6W 1133
R 5	Metal film resistor	15 Ω / 1 W 44473
R 6	Metal film resistor	4,7 k Ω / 0,6W 1133
R 7	Metal film resistor	15 Ω / 1 W 44473
R 8	Metal film resistor	4,7 k Ω / 0,6W 1133
R 10	Metal film resistor	10 k Ω / 0,6W 1137
R 11	Trimmer resistor	100 k Ω / 0,5W 44454
R 12	Metal film resistor	100 k Ω / 0,6W 1354
Cois		
L 1	Chocke	37822
Transformers		
T 1	Driver transformer	45401
T 2	RF-output transformers	45400
Relays		
K 1	Relay	12 V / 2 x U 45400
Switch		
B 1	Thermal switch	80° C / opener 44471
Diodes		
V 5 - V 8	Diode (only for IRFP 450/BUZ67)	BYV96E 10079
V 10	dito	1N4148 10080
V 11	Diode	1N4147 10080
V 13	Zenerdiode (Option)	15 V 44528



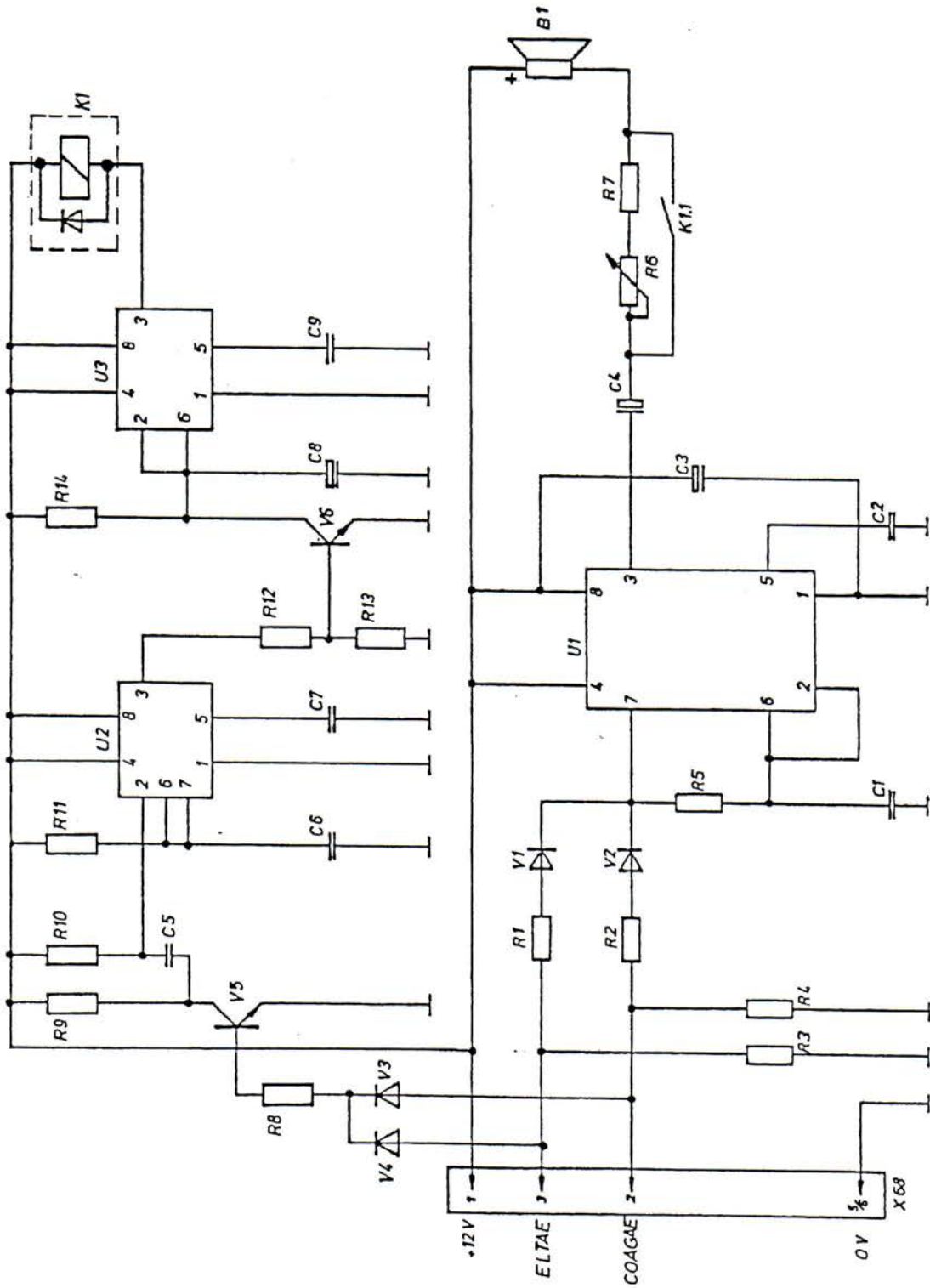
ELEKTROTOM 390/400
RF-AMPLIFIER BOARD

44439

Reference Designation	Description	Part no.
Transistors		
V 1 - V 4	MOS-Leistungstransistor	BUZ 385
V 12	NPN-Transistor	BC 517 11356
Fuses		
F 1	Fuse	FF 6,3 A
Plug- and-socket connector		
X 8	Pin assembly	DIN 41612 32-poles
X 72	Plug	1 pole
X 73	Plug	1 pole
X 75	connector male	5 poles
X 77	connector male	4 poles
External components		
R 9	Wire-wound resistor	250 Ω / 50 W



Signal-Generator-Platine Bestell-Nr.: 44440
 Signal generator board Order No.:



Signal-Generator-Platine Bestell-Nr.: 44440
 Signal generator board Order No.:


 ELEKTROTOM 390/400
 SIGNAL GENERATOR BOARD

44440

Reference Designation	Description	Part no.
Capacitors		
C 1	Foil capacitor	0,1 μ F / 63 V 44311
C 2	Foil capacitor	10 nF / 63 V 44308
C 3	Capacitor, electro	10 μ F / 25 V 44455
C 4	Capacitor, electro	10 μ F / 25 V 44455
C 5	Foil Capacitor	220 nF / 63 V 44312
C 6	Foil Capacitor	220 nF / 63 V 44312
C 7	Foil Capacitor	10 nF / 63 V 44308
C 8	Capacitor, electro	10 nF / 25 V 44455
C 9	Foil Capacitor	0,1 μ F / 63 V 44311
Resistors		
R 1	Metal film resistor	6,8 k Ω / 0,6W 1135
R 2	Metal film resistor	2,7 k Ω / 0,6W 1130
R 3 - R 5	Metal film resistor	10 k Ω / 0,6W 1137
R 6	Potentiometer	100 Ω / 1 W 44485
R 7	Metal film resistor	15 Ω / 1 W 44473
R 8 - R 12	Metal film resistor	10 k Ω / 0,6W 1137
R 13	Metal film resistor	1 k Ω / 0,6W 1126
R 14	Metal film resistor	1 k Ω / 0,6W 1106
Acoustic monitors		
B 1	Loudspeaker	11353
Diodes		
V 1 - V 4	Diode	1N4148 10080
Transistors		
V 5	NPN-Transistor	2N2222A 10062
V 6	dito	2N2222A 10062
Integrated circuits		
U 1 - U 3	Timer-IC	NE 555 10101
Relay		
K 1	Relay	12 V / 1 x a 45433





8. GENERATORMODUL BI-POLAR (MODUL IV)

ELEKTROTOM 390/400 part no. 44441

The pc-board no. 44441 is connected to the plug-in connector X9. The complete generator for bipolar coagulation is wired on this pc-board.

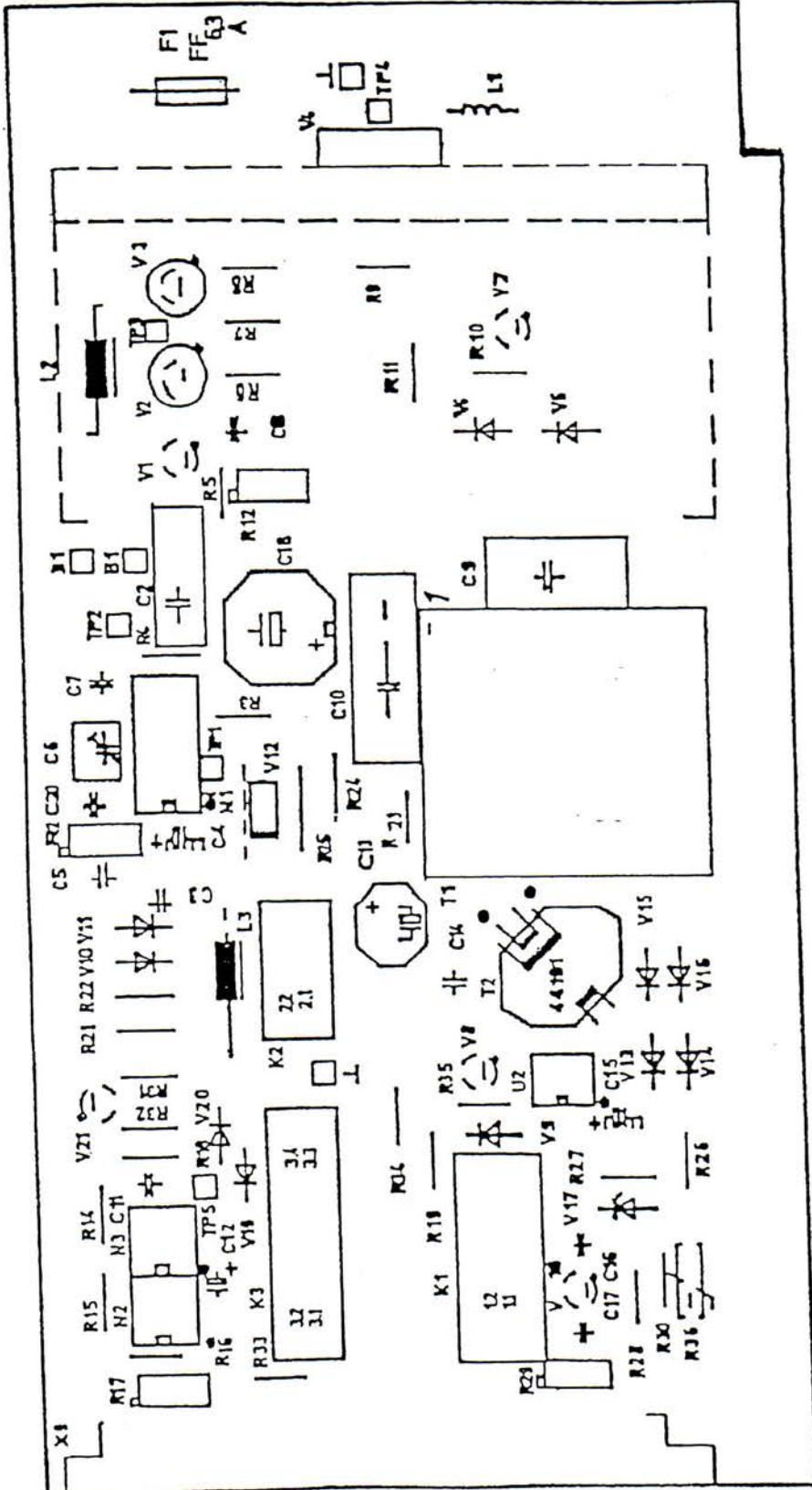
The integrated circuit IC N1 generates the control pulses for the single-ended output stage with the field effect power transistor V4.

The high-frequency signal is tapped via the output transformer T1.

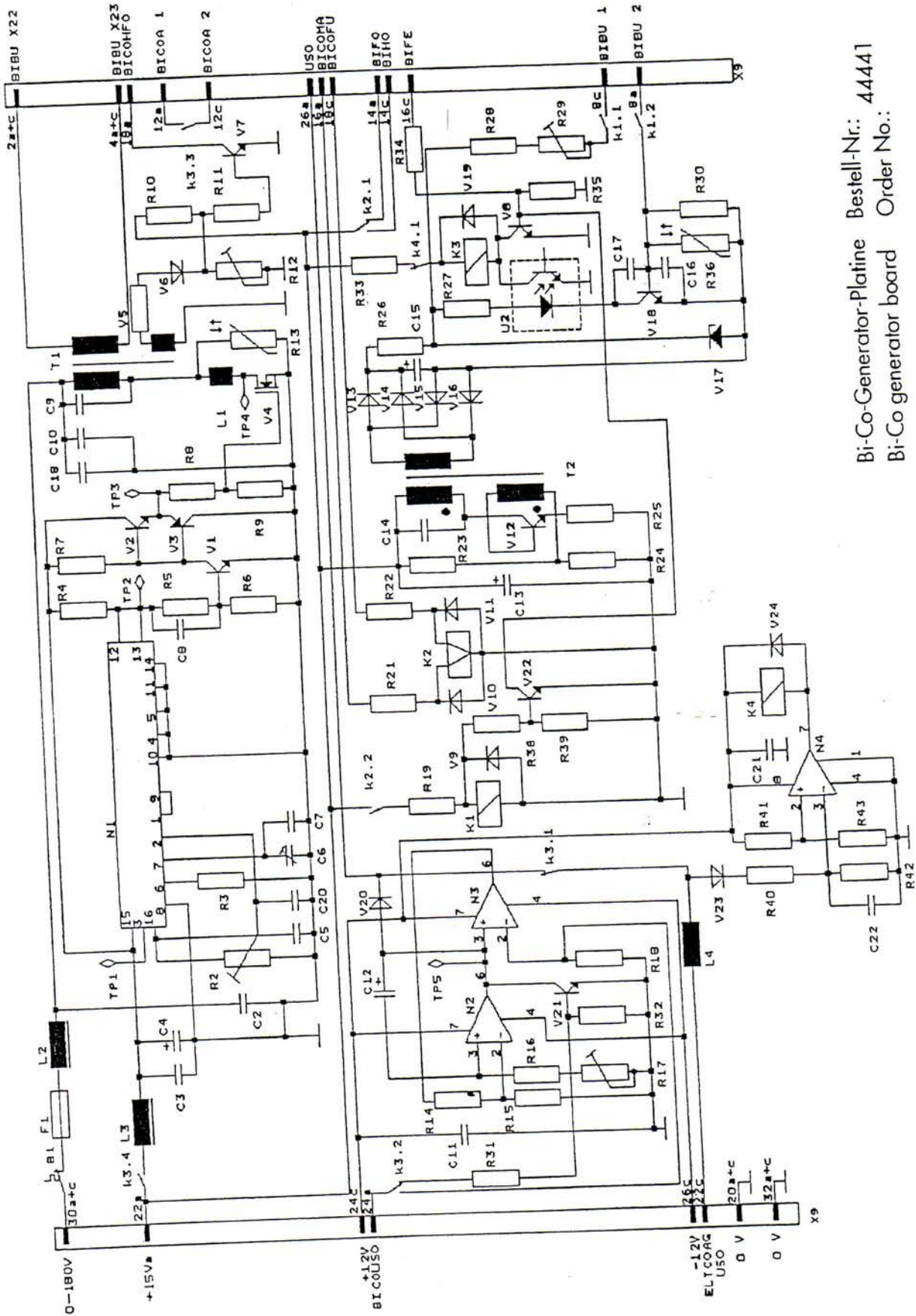
The circuit section V5, V6 and V7 generates the signal for optical display of high-frequency generation.

The rise time of the RF amplitude is adjusted with N2 and N3. The circuit section around V18 (Bi-Co-Matic) generates a signal when the two poles of the bipolar coagulation instrument are in contact with the tissue. The current that then starts to flow is evaluated by a detector circuit, while the RF generator is switched on in the operating mode "manual switching".

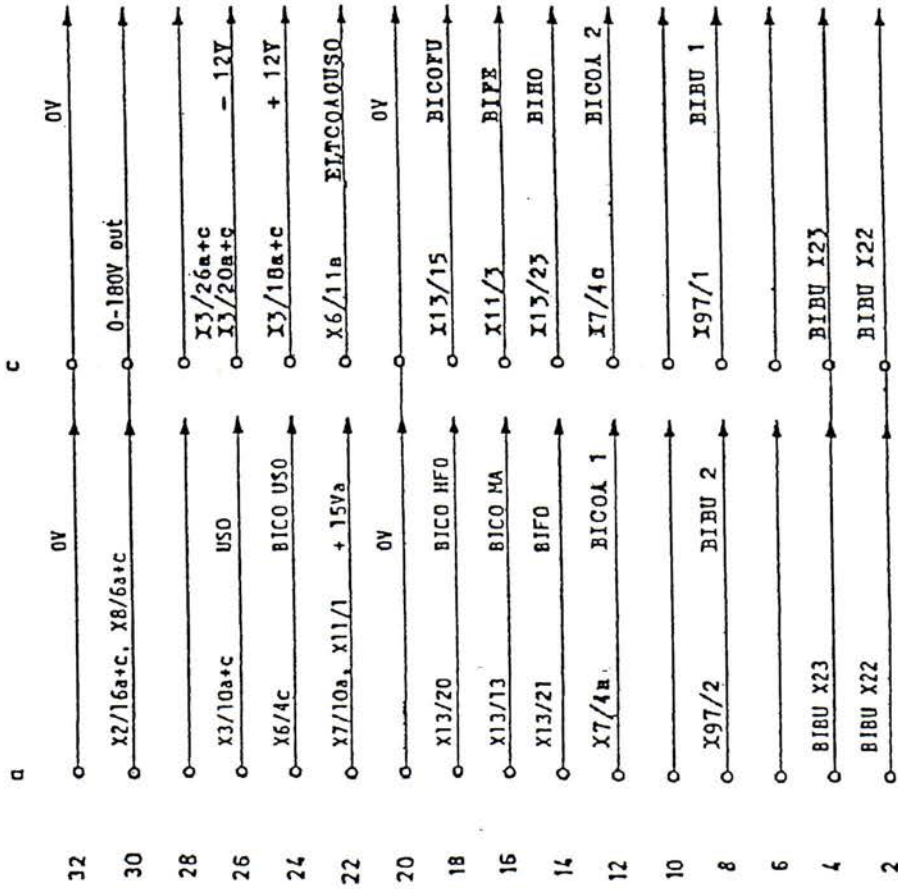
Potential separation in the patient's circuit is through the transformer T2 and the optocoupler U2.



Bi-Co-Generator-Platine Bestell-Nr.: 44441
 Bi-Co generator board Order No.:



Bi-Co-Generator-Platine Bestell-Nr.: 44441
 Bi-Co generator board Order No.:



Plug connection
Bi-Co-generator-board



Trimpotentiometer - Setting - Function

Modul	Plug-in pos.	Designation	Setting	Test point	IC-Pin	Multipoint connector	Function
IV	X 9	R 2	3 μ s	2			Control signal
IV	X 9	R 17	1 s starting	5			Building-up time
IV	X 9	R 29	Relay K 3 must drop out if < 35 k Ω . The 35 k Ω resistor must be adapted to bipolar output sockets.				Sensitivity circuit detector Bi-coagulation.

ELEKTROTOM 390 / 400
BI-CO-GENERATOR MODUL

Reference Designation	Description		Part no.
Capacitors			
C 2	Foil capacitor	4,7 nF / 250 V	9588
C 3	Ceramic capacitor	100 nF / 50 V	11344
C 4	Capacitor, electro	10 μ F / 35 V	42159
C 5	Ceramic capacitor	100 nF / 50 V	11344
C 6	Trimmer resistor	120 pF / 50 V	15384
C 7	Foil capacitor	470 pF / 100 V	44149
C 8	Foil capacitor	10 nF / 63 V	44308
C 9	Disk capacitor	10 nF / 400 V	45456
C 10	Foil capacitor	220 nF / 250 V	44544
C 11	Ceramic capacitor	1 μ F / 50 V	9904
C 12	Capacitor, electro	1 μ F / 40 V	45755
C 13	Capacitor, electro	220 μ F / 40 V	44503
C 14	Foil capacitor	0,1 μ F / 63 V	44545
C 15	Capacitor, electro	10 μ F / 35 V	42159
C 16	Foil capacitor	10 nF / 63 V	44308
C 17	Foil capacitor	10 nF / 63 V	44308
C 18	Capacitor, electro	47 μ F / 250 V	44475
C 20	Ceramic capacitor	100 nF / 50 V	11344
Resistors			
R 2	Trimmer resistor	10 k Ω / 0,5 W	44470
R 3	Metal film resistor	4,7 k Ω / 0,6 W	1133
R 4	Metal film resistor	2,2 k Ω / 0,6 W	1129
R 5	Metal film resistor	3,3 k Ω / 0,6 W	1131
R 6	Metal film resistor	1 k Ω / 0,6 W	1126
R 7	Metal film resistor	1 k Ω / 0,6 W	1126
R 8	Metal film resistor	18 Ω / 0,6 W	44114
R 9	Metal film resistor	4,7 k Ω / 0,6 W	1133
R 10	Metal film resistor	100 k Ω / 0,6 W	1354
R 11	Metal film resistor	100 k Ω / 0,6 W	1354
R 12	Trimmer resistor	25 k Ω / 0,5 W	44543
R 13	Varistor	150 V	49741
R 14	Metal film resistor	10 k Ω / 0,6 W	1137
R 15	Metal film resistor	470 Ω / 0,6 W	1123
R 16	Metal film resistor	10 k Ω / 0,6 W	1137
R 17	Trimmer resistor	250 k Ω / 0,5 W	44542
R 18	Metal film resistor	100 k Ω / 0,6 W	1354
R 19 - R 22	Metal film resistor	82 Ω / 0,6 W	1118
R 23	Metal film resistor	2,2 k Ω / 0,6 W	1129
R 24	Metal film resistor	680 Ω / 0,6 W	1125
R 25	Wire-wound resistor, glazed	22 Ω / 4 W	40805
R 26	Metal film resistor	220 Ω / 0,6 W	1120
R 27	Metal film resistor	270 Ω / 0,6 W	1121
R 28	Metal film resistor	4,7 k Ω / 0,6 W	1133



ELEKTROTOM 390 / 400
BI-CO-GENERATOR MODUL

44441

Reference Designation	Description	Part no.
Resistors		
R 29	Trimmer resistor	45434
R 30	Metal film resistor	1137
R 31	Metal film resistor	1131
R 32	Metal film resistor	1135
R 33	Metal film resistor	1118
R 34	Metal film resistor	1131
R 35	Metal film resistor	1126
R 36	Varistor	37718
Coils		
L 1	Air-core coil	42955
L 2	Choke	44541
L 3	Choke	10130
Transformers		
T 1	RF-Output transformer	45419
T 2	Oscillator transformer	45418
Relais		
K 1	Relays	44316
K 2	Relais bistable	44539
K 3	Relays	44540
Switch		
B 1	Thermal switch	44471
Diodes		
V 5	Metal film resistor	1137
V 6	Diode	10080
V 9	Diode	10076
V 10 - V 16	Diode	10080
V 17	Zenerdiode	44546
V 19	Diode	10080
V 20	Diode	10076



ELEKTROTOM 390 / 400
BI-CO-GENERATOR MODUL

44441

Reference Designation	Description		Part no.
Transistors			
V 1	NPN-Transistor	2N2222A	10062
V 2	NPN-Transistor	2N2219A	9900
V 3	PNP-Transistor	2N2905A	10066
V 4	MOS-power transistor	BUZ 385	44591
V 7	NPN-Transistor	BC 517	11356
V 8	NPN-Transistor	2N2222A	10062
V 12	NPN-Transistor	MJE 15028	10069
V 18	NPN-Transistor	2N2222A	10062
V 21	NPN-Transistor	2N2222A	10062
Integrated circuits			
N 1	PWM circuit	UC 3524	42917
N 2	Operational amplifier	CA 741	10098
N 3	Operational amplifier	CA 741	10098
U 2	Optocoupler	TIL 119	37863
Fuses			
F 1	Fuse	FF 6,3 A	44547
Plug- and socket connector			
X 9	Pin assembly	DIN 41612 32-polig	40841

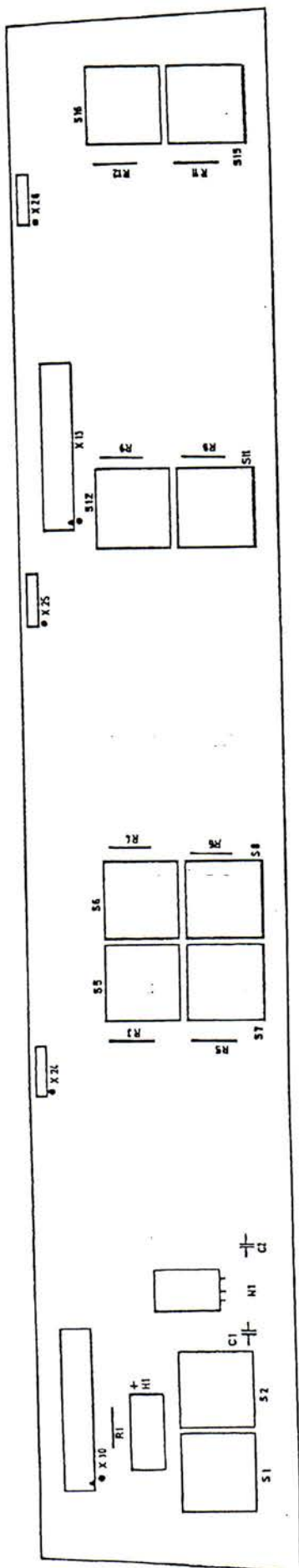


9. Frontmodul Elektrotom 390 Modul V

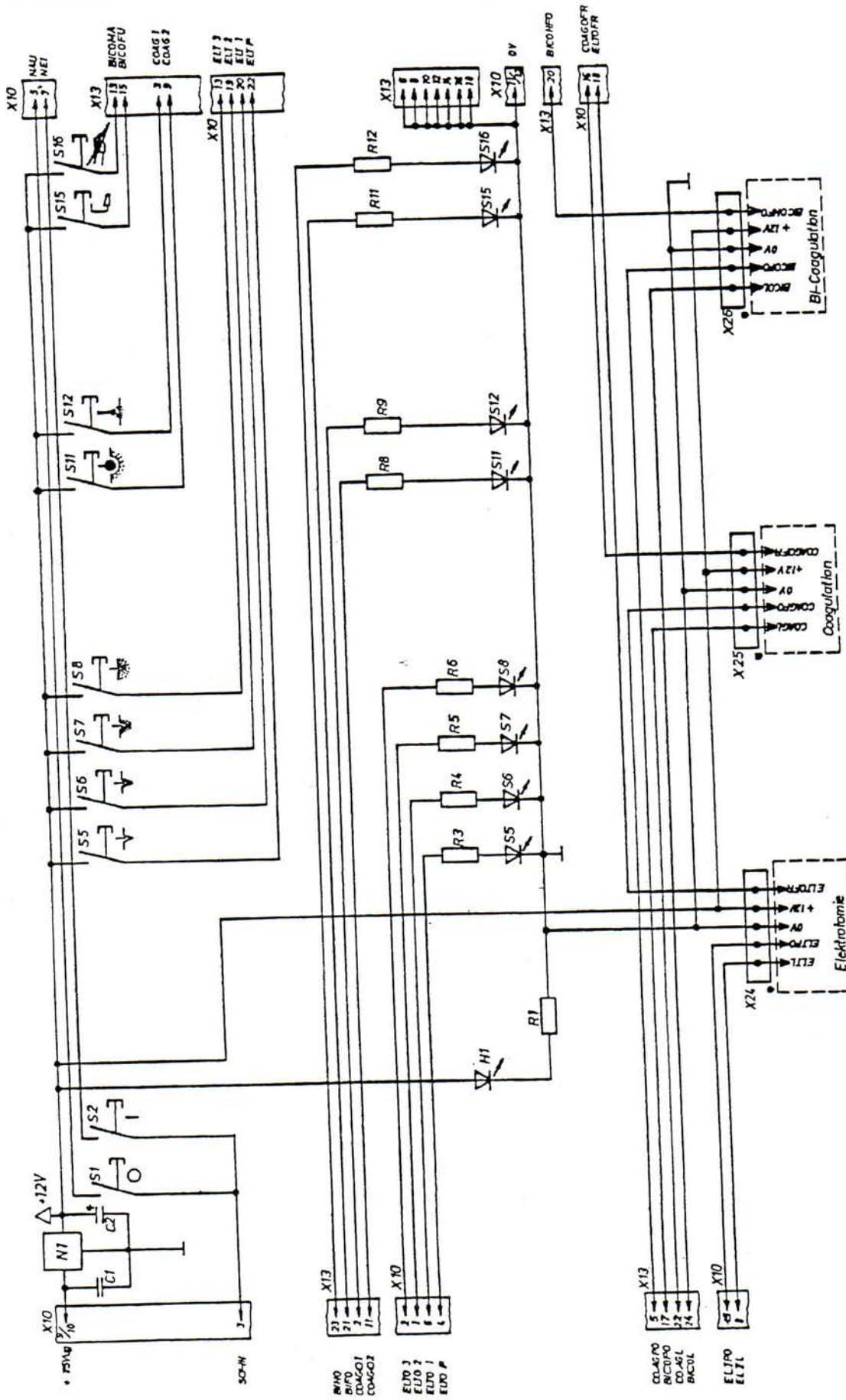
Frontmodul Elektrotom 390 part no. 45289

Placed behind the upper half of the Frontplate is the Keyboard-Circuitboard no. 44443
Placed behind the lower half, is the In-and Output Board no. 45287. On this assembly are all the In-and Output sockets. An intrinsically safe evaluating circuit has been integrated in the foot switch circuit; potential separation has been provided for the signals of the two-finger electrode handles.

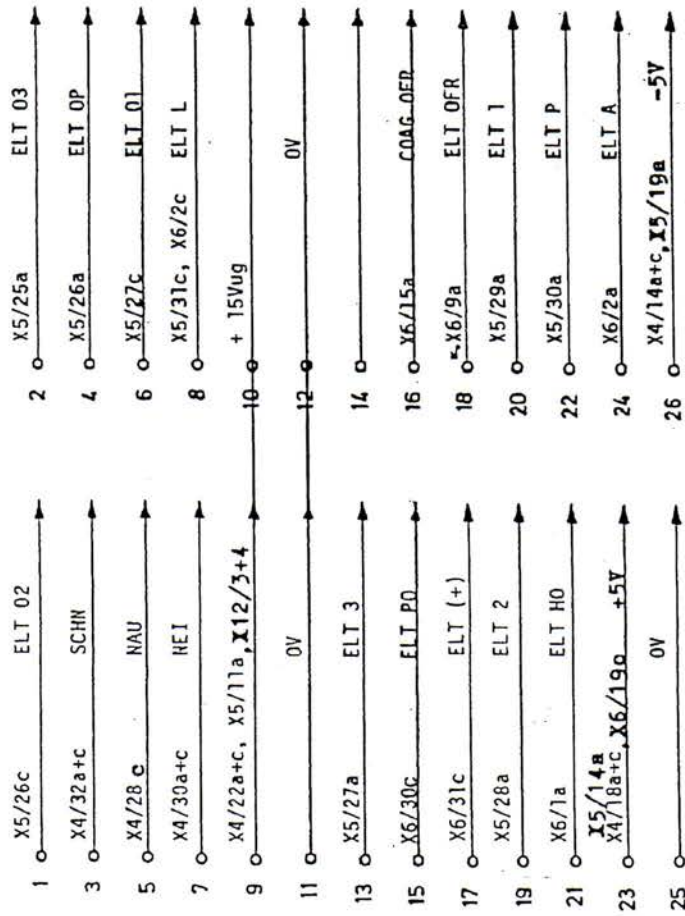
Assembly T2 serves the purpose of potential separation on the pc-board no. 44430 which monitors the connection of the neutral electrode. The monitoring measuring current has a frequency of 25 KHz, and a voltage of 7 V at less than 10 mA.



ELEKTROTOM 390
 Tastenfeldplatine Bestell-Nr.: 44443
 Main key board Order No.:



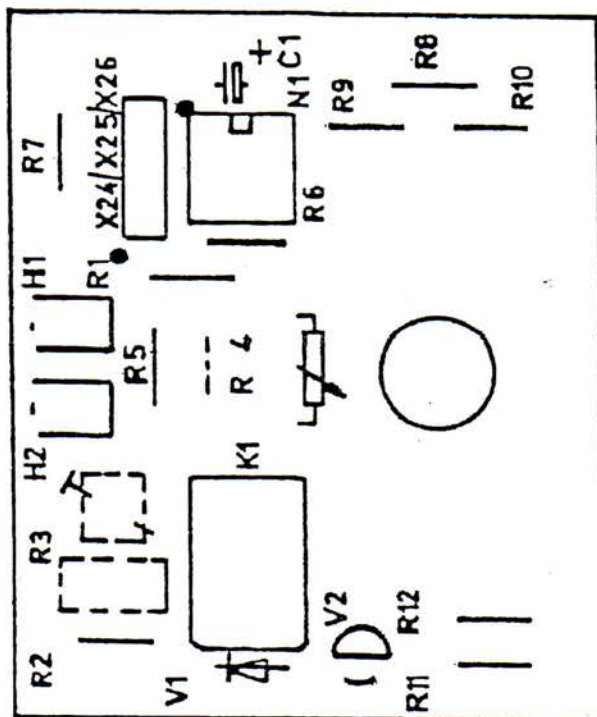
ELEKTROTOM 390
 Tastenfeldplatine Bestell-Nr.: 44443
 Main key board Order No.:



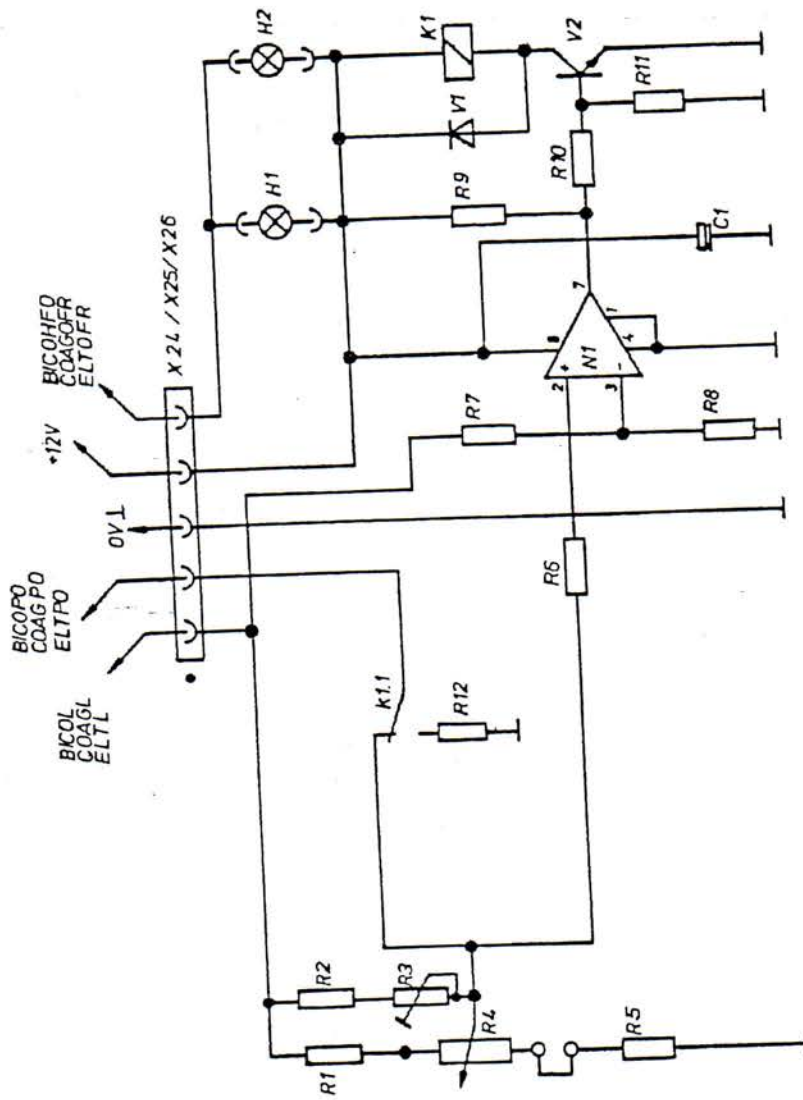
ELEKTROTOM 390
 Plug connector
 Mainn key board

ELEKTROTOM 390
SOFT TOUCH BOARD

Reference Designation	Description	Part no.
Capacitors		
C 1	Ceramic capacitor	100 nF / 50 V 11344
C 2	Capacitor, electro	1 μ F / 50 V 47073
Resistors		
R 1	Metal film resistor	390 Ω / 0,6 W 40803
R 3 - R 12	Metal film resistor	680 Ω / 0,6 W 1125
Switches		
S 1	Switch	45446
S 2	Switch	45446
S 5 - S 8	Switch with point illumination	yellow 45447
S 11	Switch with point illumination	yellow 45447
S 12	Switch with point illumination	yellow 45447
S 15	Switch with point illumination	yellow 45447
S 16	Switch with point illumination	yellow 45447
Visual monitors		
H 1	Luminous field	green 45448
Integated circuits		
N 1	Voltage regulator	+ 12 V 10100
Plug- and socket connectors		
X 10	Flat cable with plug	26-poles 45424
X 13	Flat cable with plug	26-poles 45425
X 24 X 26	Flex-Strip-Connector	5-poes 45445



ELEKTROTOM 390
 Potentiometer-Platine Bestell-Nr.: 44442
 Potentiometer board Order No.:



ELEKTROTOM 390
 Potentiometer-Platine
 Potentiometer board
 Bestell-Nr.: 44442
 Order No.: