Service Manual
English

MULTIMAT® C

DENTSPLY
DETREY

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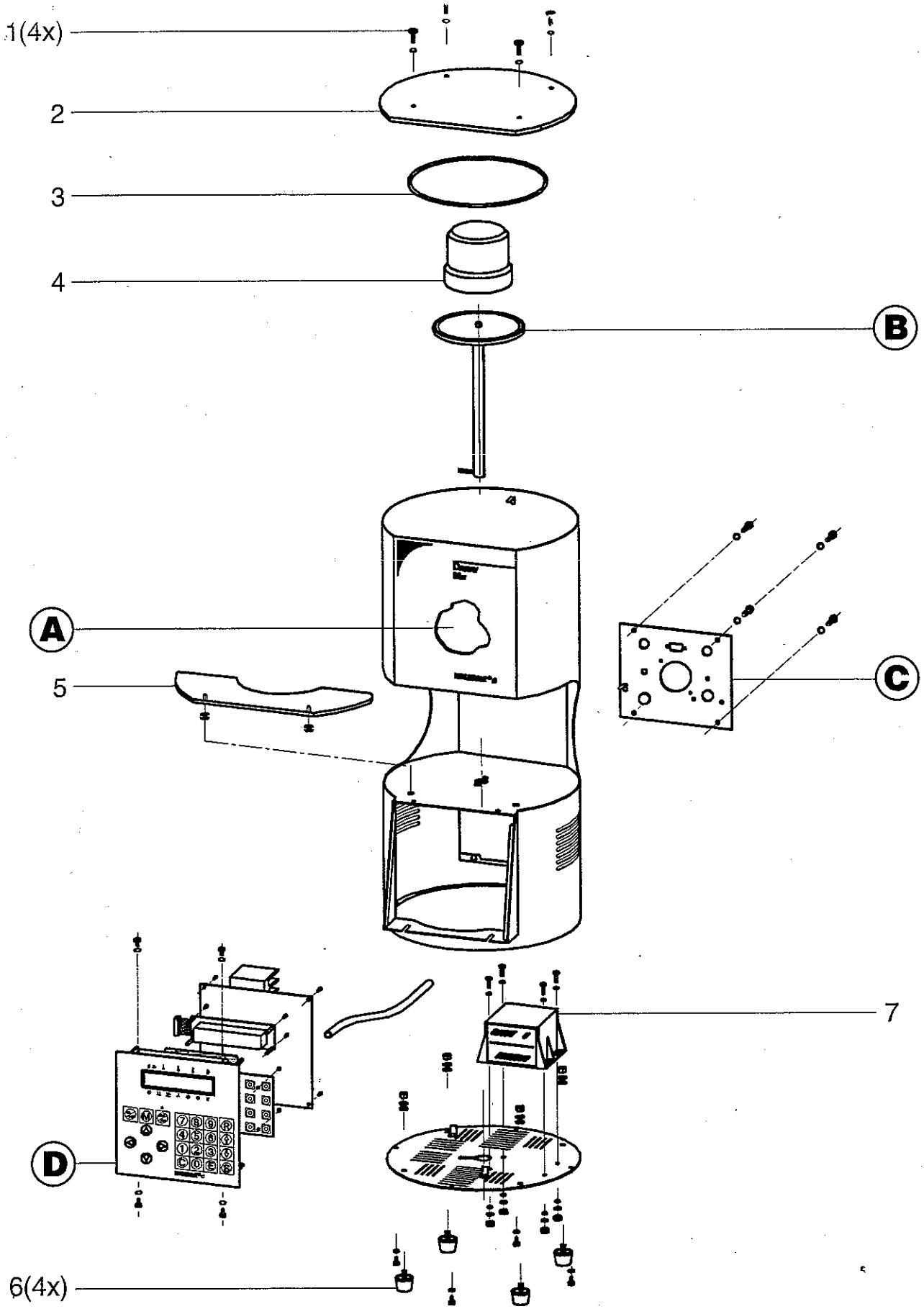
Multimat® C

Pos.	Description
1	Screw for cover
2	Cover
3	O-ring for cover (190 mm)
4	Firing platform base
5	Heat sink
6	Rubber foot
7	Transformer
8	Barlan disk 170 x 2
9	Thermocouple, complete
10	Top terminal insulation
11	Firing muffle
12	Insulation insert
13	Screw V2A
14	Nut, brass
15 A	Washer, brass
15 B	Cog
16	Screw, brass
17	Washer, brass
18	Disk, frequenta
19	Silicone seal, 5 mm
20	Socket, frequenta
21	Terminal stud
22	Nut, brass M 10 x 1
23	Silicone seal 3 mm
24	Vacuum connection block
25	Terminal bolts
26	Mounting flange
27	Alu vessel
28	Screw (alu vessel)
28 A	Tooth lock washer
29	Screw for lift plate
30	O-ring
31	Firing platform support
32	Firing platform support seal
33	Screws for lift (2 x) 4 x 10
34	Screws for micro switch
35	Micro switch
36	Isulation plate
37	Capacitor 10 µF (50 Hz) / 6,8 µF (60 Hz)
38	Screws (gear motor)
39	Gear motor, complete
40	Cap for fuse garter
41	Fuse 315 mA/250 V
	Fuse 800 mA/250 V
42	Fuse garter
43	Radio interference capacitor
44	Screws (back, 4 x)
45	Socket, vacuum pump
46	Fuse 10 A/250 V
	Fuse 15 A/250 V
47	Elasto buffer (3 x)
48	Solenoid valve block, complete
49	Solenoid coil 140 Ohm 2/2 way valve
49 A	Solenoid coil 100 Ohm 3/2 way valve
50	Screws (Microprocessor control system)
51	Front foil
52	Microprocessor control system, complete


1(4x)
2
3
4
B
A
5
C
D
7
6(4x)

Multimat® C

Illustration 2

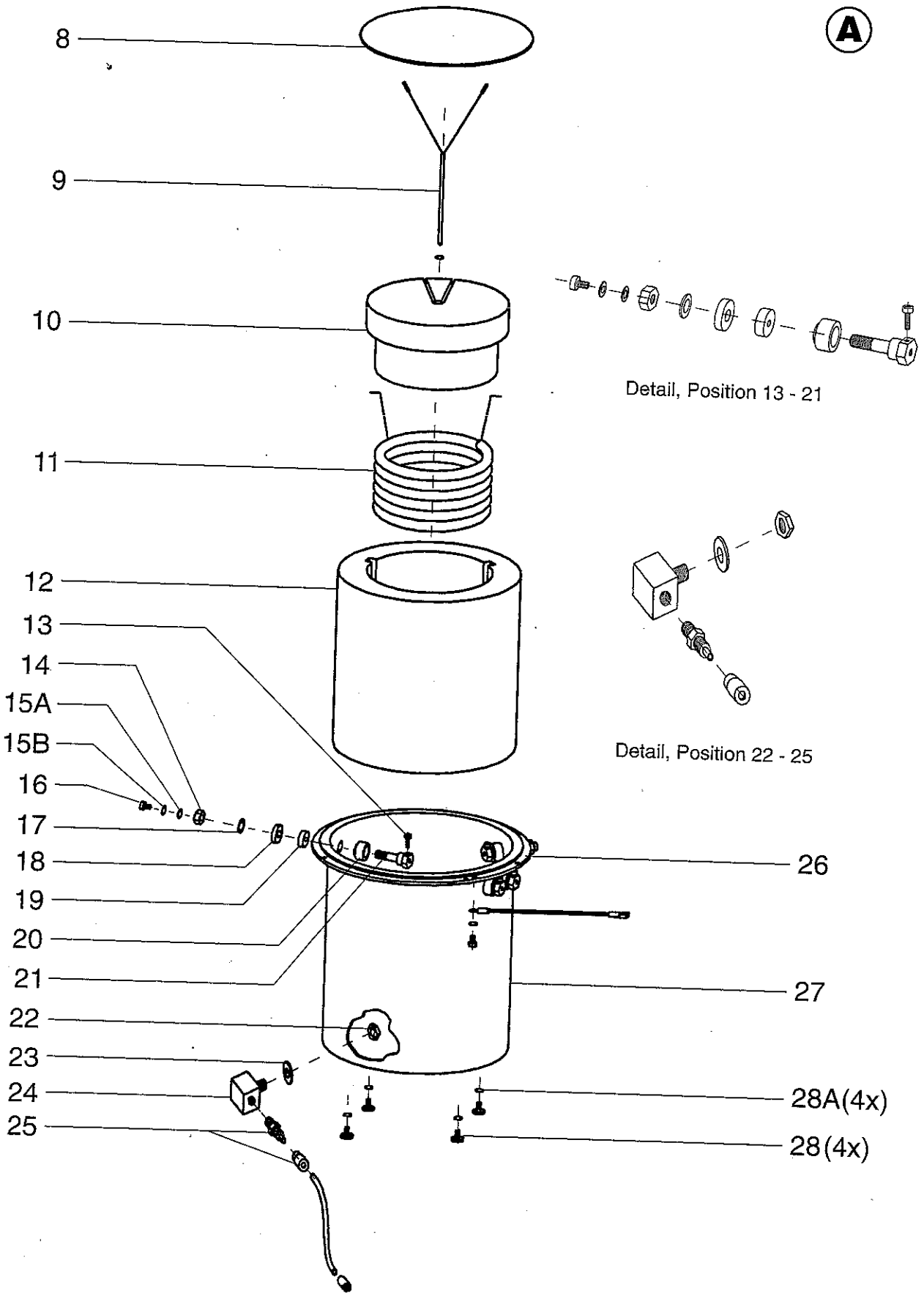
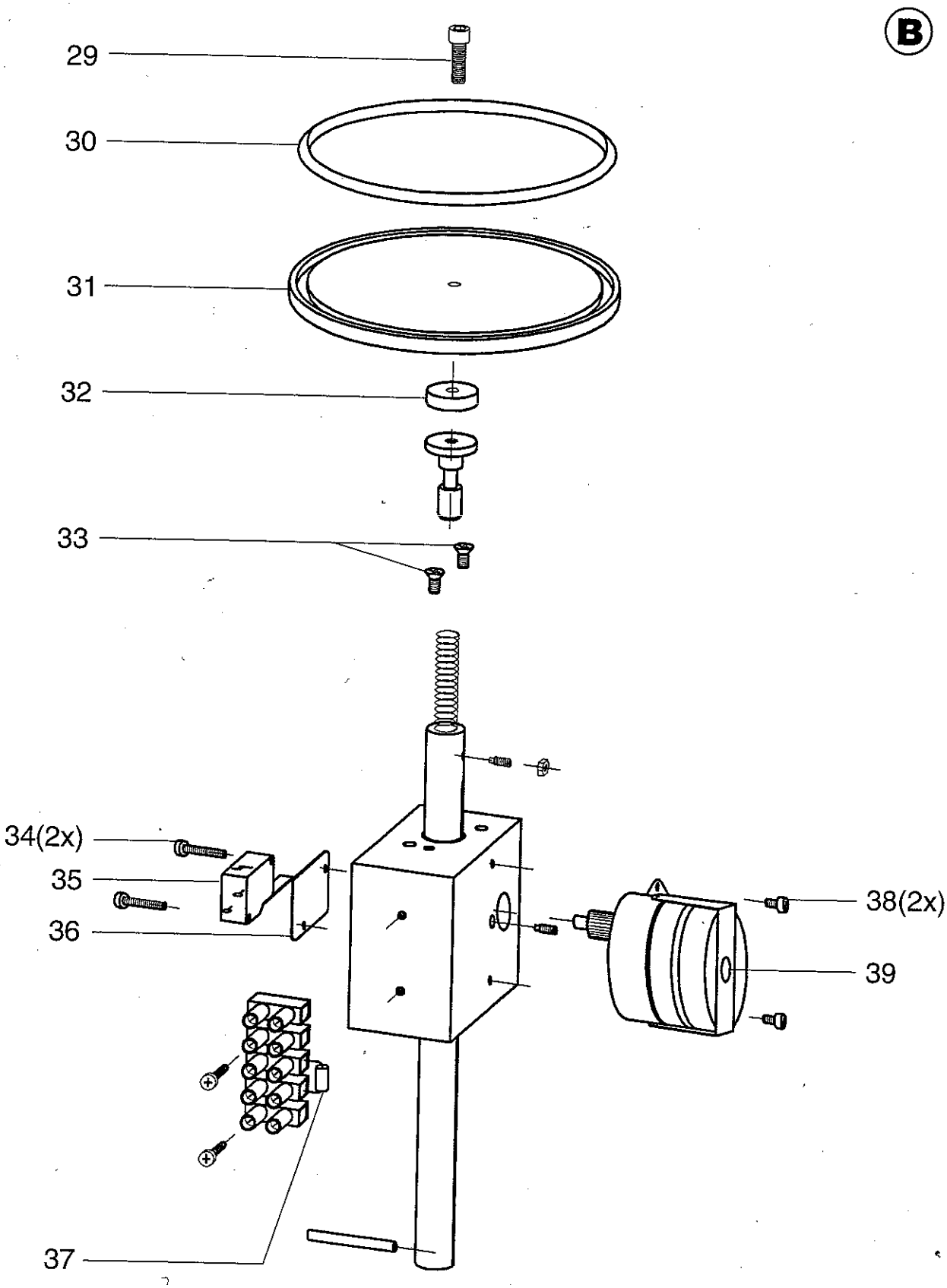
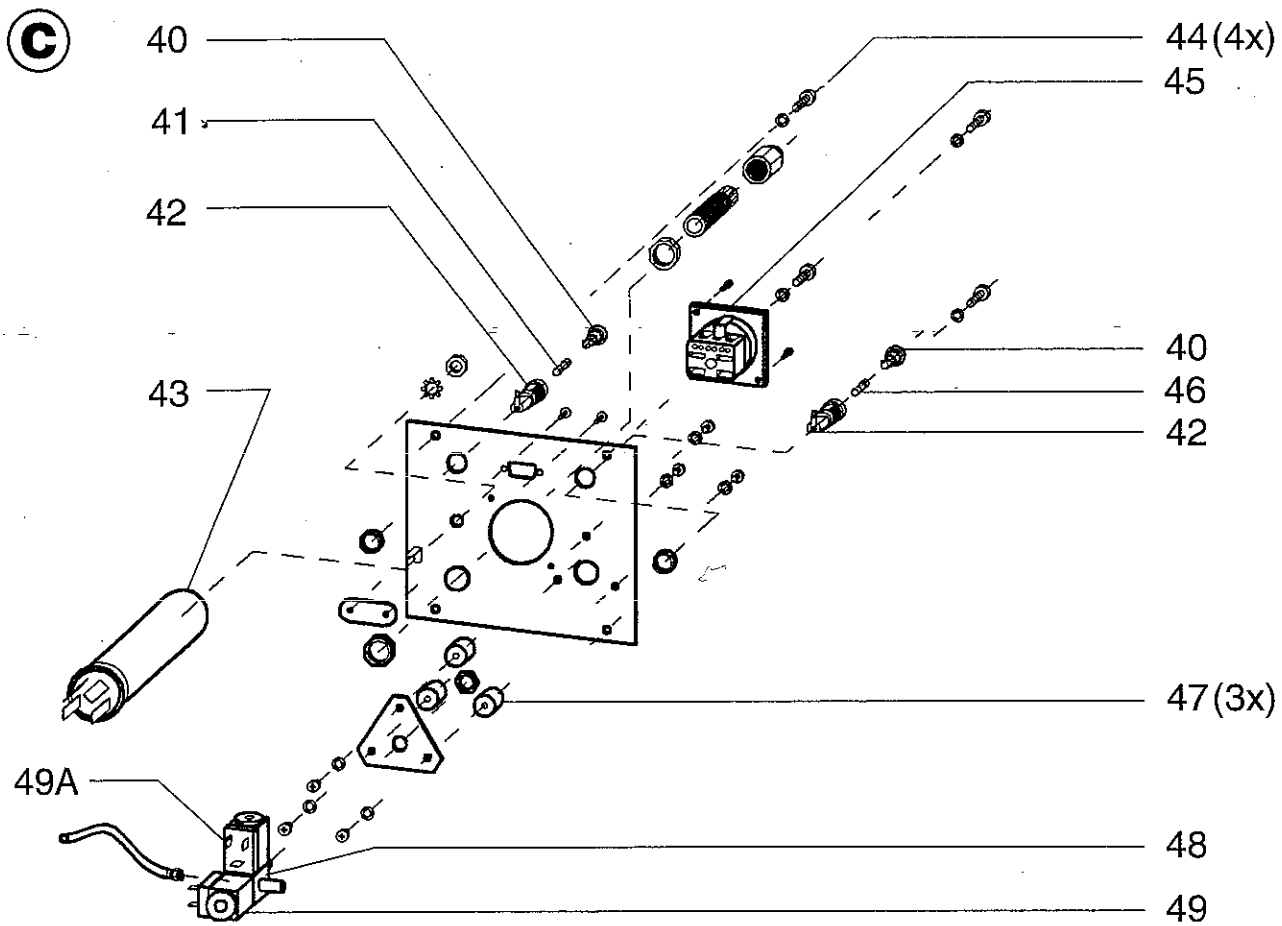


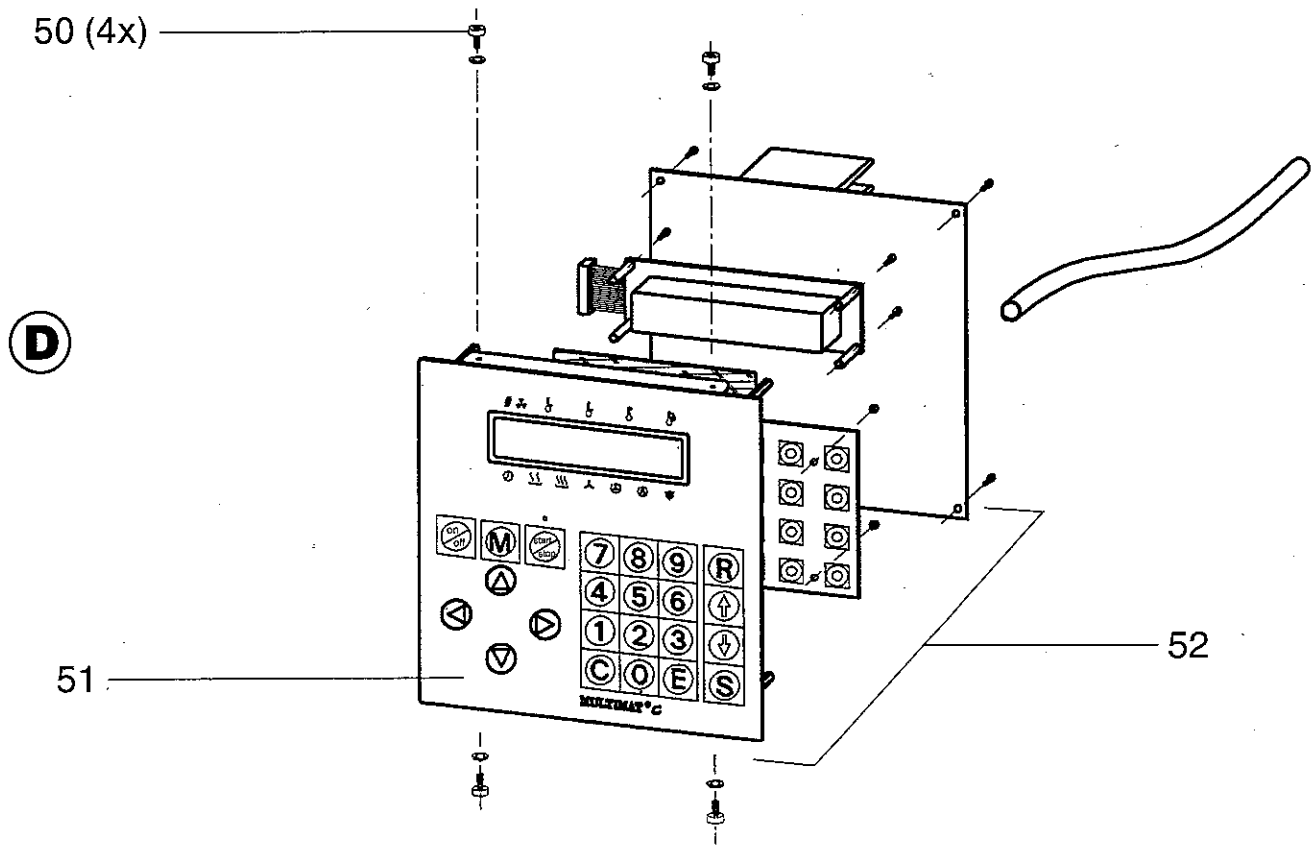
Illustration 3



Multimat® C

Illustration 4





Replacement of the microprocessor control

Removal:

1. Remove the workpiece storage plate (Item 5)
2. Remove 4 x mounting screws (Item 50 – 4 x) of the control unit. (2 above – 2 below)
3. Withdraw the control unit (Item 52).
4. Pull of
   power plug (green)
   connector (15-pin)
   vacuum hose
5. Disconnect the thermoelement leads (red-white).
6. Disconnect the protective conductor (groundwire on hose plate)

Installation:

Install the new control unit in the reverse order.

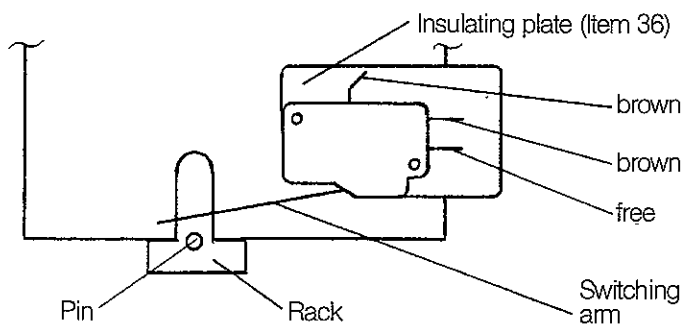
Please observe the polarity of the thermoelement leads without fail!

Replacement of the microswitch

Removal:

1. Remove control unit (see microprocessor replacement).
2. Loosen and remove 2 mounting screws (Item 33). Hold the lift with your hand in this case.
3. Turn the lift in the lower part so that the microswitch (red) is placed to the front towards the opening.
4. Unsolder the connecting wire (2 x brown lead).
5. Remove 2 mounting screws from the microswitch (Item 34).
6. Withdraw microswitch (Item 35) with the insulating plate (Item 36).

Sketch:



Installation:

1. Install new microswitch with insulating plate so that the switching arm is located above the pin of the rack.
2. Further installation in the reverse order (see removal).
3. After complete installation, the switching arm of the microswitch must be adjusted so that with the lift closed, the switching arm is pressed (contact is open).

Replacement of insulating insert

Important: First ventilate upper part!
Protection against dust exposure as described in the DFU.

Removal:

1. Pull out the power plug.
2. Loosen and remove 2 cover screws (Item 1).
3. Raise cover (should the cover stick strongly, please raise with a screwdriver under the cover).
4. Remove the insulating disk (Item 8).
5. Loosen the thermoelement connections, withdraw the wires and withdraw the complete thermoelement (Item 9) with two-hole rod upwards.
6. Withdraw the terminal insulation (Item 10) upwards.
7. Loosen the firing muffle connections, withdraw the wires, withdraw the firing muffle (Item 11) carefully upwards.
8. Remove the terminal bolts 4 x (Item 13-21).

a) Unscrew the connecting wires (Item 16) (outside the vessel).
b) Remove mounting screws for thermoelement and firing muffle (Item 13) (M3x10).
c) Unscrew brass nuts (Item 14) (SW 12 mm), brass washer (Item 17) and ceramic bush (Item 18). Remove silicone gasket (Item 19).
d) Pull to the inside and remove the terminal bolts (Item 20 + 21).

Information: The vacuum connection (Item 22 – 25) is located in the lower part of the aluminium vessel (Item 27) and is not removed for replacing the insulating insert.

9. The insulating insert (Item 12) is now withdrawn upwards out from the aluminium vessel.

Installation:

1. Align the new insulating insert accurately for installation, the recesses for the firing muffle must be located exactly at the position at which the holes for the terminal bolts are in the aluminium vessel.
2. For installing one requires ceramic fiber strips between aluminium vessel and insulating insert for locking according to tolerance difference for fastening or compensating.
3. Press the insulating insert down up to the stop.
4. Installation of all parts in the reverse order.

Important Note:

Observe the polarity without fail when installing the thermoelement (plus/minus).

Replacement of solenoid coils

Removal:

1. Remove 4 x mounting screws (Item 44) for the back part (drawing 4 / C).
2. Withdraw the back part and pull off or unscrew the vacuum hoses.
3. Remove all connectors by pressing the bolt together.
4. Pull off the electrical connections of the solenoid valves (Item 48). (Possibly mark wires, control valve orange/white, ventilating valve orange/yellow).
5. Replace defective valve block or solenoid coil.

Installation:

Fit the valve block or solenoid coil in the reverse order.

Caution:

The solenoid coils have different ohmic values:

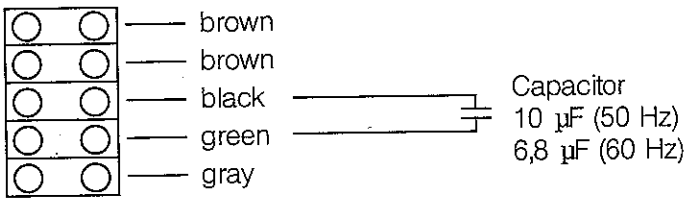
Item No. 49 = 140 ohms 2/2 way valve.
Item No. 49 A = 100 ohms 3/2 way valve.

Replacement of lift gear with motor, complete

Removal:

1. Remove the control unit (see microprocessor replacement).
2. Loosen the brass nut (SW 5.5) on the upper part of the rack and screw out with the associated screw.
3. Hold the lift plate (Item 31) with one hand and push the rack down with the other.
4. Remove the lift plate.
5. Loosen the screw connections of the terminals:

Colour of the connection leads:



6. Loosen and remove 2 mounting screws (Item 33) holding the lift by hand.
7. Lower the rack completely downwards and remove it from the opening of the control section.
8. Remove pressure spring inside the rack.

Installation:

In reverse order.

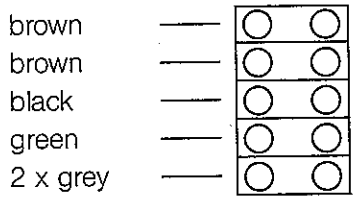
Position the rack during installation so that the rack is in the centre of the drilled hole.

Supplement:

Replacement of the motor with gear (Item 39).

Removal:

1. With the lift removed, loosen the leads of the motor at the terminals and remove.



2. Unscrew 2 screws (Item 38), remove motor with gear.

Installation:

Install the new geared motor in reverse order.

Important Note:

Spray or grease the lift rod every 14 days with a silicone spray or heat-resistant lubricant.

Clean the rack with a cloth before doing this.

CONTROL UNIT MULTIMAT C

The control unit of the Multimat C consists of the following function groups:

1. Power supply.
2. Power section (muffle, pump, solenoid valves).
3. Digital section (processor, memory, input – output ports).
4. Analog section (measuring amplifier, multiplexer, A/D converter).
5. Keyboard.

Functional description of the individual function groups

a) Power supply (circuit diagram p. 3 / Doc. No. SCIINT.SCH

The alternating voltages of the mains transformer are conducted to the power supply through the 15-pin extra low voltage connector P1. The mains transformer has three floating secondary windings: Main winding 9V (9VAC0 / 9VAC1), main winding 24 V with centre tap (0VAC / 12VAC / 24VAC), auxiliary winding 9V (9V241 / 9VAC0).

NOTE: The auxiliary winding is not used in the Multimat C.

Power supply of the digital section:

The main winding 9V is connected with the bridge rectifier D4. The rectified voltage is smoothed with C17, C20, C21 and then conducted to the 5V longitudinal controller U13 (on heat sink K4). The stabilized direct voltage VCC for supplying the digital section is available at pin 3 of the controller. Any tendency to oscillate is suppressed with C24 and C30. The LED lighting of the LCD screen is supplied through the closed jumpers J2 and J3, as well as the jumper at transistor Q3 (not mounted). The current is limited with R56.

Power supply of the analog section:

The main winding 24V is connected with the rectifier bridge D5. The centre tap becomes the analog ground in this case. The rectified voltages +/- 12V are smoothed with C29, C19, C22 (+12V) and C16, C18, C23 (-12V) and conducted to the longitudinal controllers U12 (+5V) as well as U11 (-5). The outputs of the controllers are filtered with C25, C28 (+5V) and C26, C27 (-5V). D6 and D7 prevent that the analog ground potential can jump briefly above +5V or below -5V in the case of strong asymmetrical loading (e.g. in the case of a fault).

For operating the solenoid valves, the approx. 28V of the solenoid valves is generated from the unstabilized +/-12V voltages by series connection ('0V' and '+24VU').

NOTE: The reference potential of the solenoid voltages is therefore not ground (GND) but the negative output of D5.

(circuit diagram p. 2 (Doc. No. SCIIO.SCH).

The digital output signals IO0 – IO5 (TTL level) are used for operating the lift motor, the firing muffle, the vacuum pump and the solenoid valves.

Lift motor:

The lift motor is operated with the signals IO0 and IO1. The lift motor used is a 24Vac synchronous rotor with motor capacitor. (Refer to the furnace wiring documentation for the connection of the motor through plug P1). The power triacs Q3 ('up') or Q4 ('down') are fired by means of the optotriacs U9 and U8. In this way the 24VAC voltage is switched in each case to the corresponding motor winding.

Firing muffle:

The firing muffle is switched with the signal IO2. The power triac Q5 is fired through the optotriac U7. Capacitor RC2 and varistor R20 protect the triac against voltage peaks from the mains. The power triac Q5 is connected with the firing muffle in series to the mains voltage (see wiring plan of the furnace chassis). The function of the firing circuit is monitored by the control unit as follows: The small transformer T1 is connected in parallel to the power triac with its primary winding.

In the secondary circuit of T1, the optocoupler U10D is actuated through the current limiting resistors R28 and R29. If Q5 switches off and if the muffle winding is connected, mains-synchronous TTL pulses, which are evaluated by the processor, appear at the output of the optocoupler. The muffle error message, as well as firing circuit error messages are generated from this signal.

Vacuum pump:

The power triac Q6 is switched through the optotriac U8 with signal IO3. Q6 closes the circuit to the mains plug on the back of the furnace (see wiring plan of the furnace chassis). The circuit is identical with the muffle control.

Solenoid valves:

The vacuum control of the Multimat C is performed with 2 solenoid valves. The signals IO4 and IO5 switch the Darlington transistors Q2 and Q7 on through the optocoupler U10B and U10A. These transistors connect the circuit of the solenoid valves to 0V.

Limit switch:

In closed condition, the position of the fired product plate is reported to the processor through P1 and U10C with a microswitch in the furnace mechanism.

The microswitch switches P1 pin 14 to ground.

c) Digital section

The microcontroller U16 with address register U17 and memories U27 (Eprom with operating system data), U26

(write – read memory) form the processor unit of the Multimat Compact. The keyboard and the LCD display are operated with the port 1 of U16. The address management of the data and address bus is performed by the GAL U24. The select signals for enabling the individual bus subscribers are available at the outputs F0-F7. The select signal of the write – read memory (U26) is switched off with Q8 in the case of a power failure. The charged capacitor C71 still supplies the memory for approx. 20 sec. with energy, so that the stored firing program status information is retained in the case of short power failures (mains failure fuse). In this case the memory is kept in standby with R50. Increasing C71 increases the buffer time in the case of power failures.

The supply voltage and the proper running of the operating system are checked continuously with the monitoring circuit U22. If the unstabilized direct voltage divided with R48 / R62 in the power supply drops below 2.5V at pin 1 of U22, then a reset pulse is triggered immediately. U22 must also be supplied continuously with trigger pulses at pin 2. If these pulses do not arrive (e.g. in a conceivable system crash), then a reset is also triggered. With a reset triggered, the CPU is stopped, the RAM U26 locked and the output register (U19) to the power section cut off. The power section is actuated by means of U19. The analog multiplexer channel is selected with the bits MUX1/MUX2. The status messages of the furnace, as well as the return lines of the keyboard matrix (C0...C3) are read with the input block U25. The trigger pulse for the monitoring circuit (TWD), the keying signal for the acoustic signal generator (SOUND) and an auxiliary signal for address coding are output with register U28. The outputs Q1-Q4 generate with the resistance dividers R51, R52, R54, R54 and R57 the contrast voltage for the LCD screen. The firing programs, as well as various configuration data are filed non-volatilely in the EEPROM U23. This memory is operated by means of I2C bus (SCL, SCA). The acoustic signal generator BZ1 is actuated by the oscillator built up with U4 (Doc. No. SCII.SCH). The oscillator is cycled with U4 pin 4 from U28 pin 12. The volume can be influenced by changing R7 (R7 min = 10R).

d) Analog section

Temperature measurement

The thermal voltage fed to X3 is amplified in the temperature measuring amplifier (15) and conducted to the input Y0 of the analog multiplexer (U20). The gain factor is permanently set. The temperature measuring circuit is calibrated by software (see 'CALIBRATION' chapter).

Pressure measurement:

The measuring amplifier for vacuum measurement (Doc. No. SCIIDRUCK.SCH / page 5) is constructed as two-stage bridge amplifier. The output voltage POUT proportional to the pressure at the sensor (Z1) is fed to the input Y2 of the analog multiplexer U20. The gain factor of the stages is permanently set. The vacuum system is calibrated by software (see 'CALIBRATION' chapter).

Terminal compensation

For compensation of the thermoelement terminal (X3), the temperature of the PC board is measured with U21 and the voltage proportional to the temperature (10mV/degree C) is conducted to the input Y1 of the analog multiplexer U20.

The actual compensation of the input terminal voltage is by software.

Analog multiplexer

The analog input selected with the signals MUX1 and MUX2 at U20 is converted into a 12-bit digital value in the A/C converter. The reference voltage (at U18 pin 39 to pin 26) is permanently set.

The converter is calibrated by software (see 'CALIBRATION' chapter).

e) Keyboard

(Doc. No. SCIITAST.SCH page 1).

The 23 keys are arranged in a matrix structure. The row signals output by the processor (RO0...RO5) are switched through to the corresponding column signals (C0...C3) with the keys released. These signals are read and evaluated by the processor through U25. The 'PROGSTART' LED is switched on by U28 pin 16.

'CALIBRATION' chapter of the analog section

The following aids are required for calibration of the analog section:

1. Room temperature compensated millivolt meter for thermal voltages at platinum / rhodium 10 thermoelements (type S).
2. Digital multimeter for AC and DC voltages (Fluke 77 or similar).
3. Room temperature compensated millivolt generator for thermoelements type S.
4. Absolute pressure meter (vacuum tester) with measuring range 0-1000 hPa.

NOTE: WE URGENTLY ADVISE AGAINST ATTEMPTING CALIBRATION WITHOUT THESE AIDS!

Before a new calibration of the control unit is performed, it should be determined by checking the measured values whether the assumed measuring error arises at all in the control unit.

Procedure:

Connect the millivolt meter for thermoelements type S with thermal voltage-free connection cable parallel to the furnace thermoelement at terminal X3 (pay attention to the correct polarity in this case).

Connect the absolute pressure meter by means of T piece and suitable hose in front of the pressure sensor of the control unit.

Switch on the control unit and let the temperature settle down to 650° C with furnace closed. Set the inputtable temperature offset to ZERO in the 'Unit parameters' menu. After the furnace has settled down, compare the temperature value in the furnace display and on the millivolt meter. Open the furnace and expose the control unit

plays anew after approx. 15 min. With proper function of the terminal compensation, the two measured value pairs should differ only insignificantly. Start the firing program with 650° C base temperature and 1100° C firing temperature with vacuum. Once the furnace has settled down to 1100° C, compare the temperature indications anew.

Once the vacuum is reached (v indication in the display), the vacuum in the furnace chamber should be 50hPA (+/-8). Read off the absolute pressure meter which is also running for this purpose.

If a temperature error is determined in this check, this can be corrected with the temperature offset function. For this purpose enter the corresponding value. If no temperature measuring error is determined in the check and if the firing result of the furnace is nevertheless unsatisfactory, then the error is not in the control unit but in the thermoelement circuit (thermoelement defective or contaminated, cabling of the thermoelement lead etc.).

If the control unit despite correct vacuum measurement (let the absolute pressure meter run as well) occasionally breaks off a firing program with the message 'Vacuum not reached', then the error must be found in the furnace (vacuum line untight, moisture, insufficient pump output etc.). The message 'Vacuum not reached' comes if the target vacuum of 50hPA is not reached within 5 minutes.

CALIBRATION

If a calibration error is determined according to the above described test, then the control unit must be recalibrated.

In this case proceed as follows:

Pull out the mains plug. Disconnect the thermoelement, connect millivolt generator to X3 with the correct polarity and enter 50 degrees C. Connect pin 8 and P15 at the connector P1. Connect the vacuum meter by means of T piece and suitable hose directly to the pressure sensor.

Plug in the mains plug.

The service menu appears in the display.

Call up menu 1 = KKAL with the numeric key '1'.

With a digital multimeter measure the voltage at U20 pin 14 (+) to U20 pin 8 (-). The read off voltage corresponds to 10mV/degree C.

Enter the temperature so assigned with the numerical keys without comma (example: 230 mV –> 23.0 degrees –> enter numeric string 230).

The entered value is taken over with the 'S' key. The entry can be deleted again with 'C'. The stored terminal factor is now displayed as a check and this must be taken over with 'S'. Now switch back into the basic calibration menu with 'R'.

Select menu 2 = VKAL with the numeric key '2'.

Read off the vacuum meter. It shows the momentary atmospheric pressure (e.g. 1000hPA). Enter the read off atmospheric pressure with the numeric keys 0-9 (correct entry errors with 'C'). Acknowledge value with 'S'. The pump now starts. Pull the pump hose off from the further and the value displayed in the ADW field no longer changes (i.e. max. vacuum e.g. 10hPA). Read the vacuum meter and enter the value with the numeric keys.

Confirm with the 'S' key. Call up the basic calibration menu again with the 'R' key and pull off the vacuum hose of the pump again.

Select menu 3 = TKAL with the numeric key '3'.

Set millivolt generator for thermoelements type S to 50 degrees C. Wait until the value displayed after ADW no longer changes.

Take over the value with the 'S' key. Now give 1200 degrees C with the millivolt generator. Wait until the value after ADW no longer changes. Take over the value with 'S'. Call up the calibration basic menu again with the 'R' key. Exit the service menu by opening the jumper from P1 pin 8 to P1 pin 15. Plug in the mains plug, connect the thermoelement again, restore the vacuum connections for normal operation. Calibration is completed.

Select the firing program and test the control unit for correct measured values.

Refer to the publication 'Instruction for calibrating the Multimat C' (Doc. No. S\Dentsply\Mach1lc\Eichen.doc) for further details of the service menu.

Problems during calibration

Since the calibration is performed by software without adjustment controller (potentiometer), calculated scaling is allowed during the calibration process only within permissible tolerances. If (e.g. due to a defect in the measuring amplifier) these limits are exceeded, then an error message is output during calibration. If this is the case, the following measurements should be performed:

Error message in all 4 calibration menus

Possible cause: A/C converter and environment.

Measurement: U18 pin 39 to U18 pin 36 setpoint = 527mV +/- 10mV.

Pulses must be present at U18 pin 2 (status) and at U18 pin 26 (run/hold). Test 3MHz timing signal at U18 pin 25 (Osc out).

Measure all supply voltages.

Analog multiplexer defective or is not switched over.

Error messages in the individual calibration menus

Measure all supply voltages.

Possible causes:

Test temperature measuring amplifier.

Give 1200 degrees C with millivolt generator.

Measure output voltage at U15 pin 6. Setpoint 960mV ± 15 mV.

Analog multiplexer defective or is not switched over.

Test pressure measuring amplifier:

With atmospheric pressure at the sensor (e.g. 990hPA) measure output voltage at U29 pin 7.

Setpoint 834 mV, tolerance – ± 40 mV.

nstructions for calibrating the Multimat C

. Switch on calibration state:

pin 8 is connected with pin 15 on the 15-pin Cannon connector, the following mask appears at „Mains On" or n the basic state:

1 = KKAL	2 = VKAL	3 = TKAL
4 = KKAN	5 = VKAN	6 = TKAN

The two following masks can be selected with the cursor up and cursor down key.

4 = KKAN	5 = VKAN	6 = TKAN
7 = INIT	8 = PCLR	9 = FREE

7 = INIT	8 = PCLR	9 = FREE
1 = KKAL	2 = VKAL	3 = TKAL

The displayed submenus are selected with the corresponding numeric key.

2. Calibrate terminal temperature and enter terminal factor (KKAL):

A digital voltmeter must be connected to pin 2 and 3 of the LM35CZ (temperature sensor) and set to 'V='. Every 10 mV of the read voltage now correspond to 1 ° C.

ADW XXXX	Temp.= XX,X
R = Raus	S = Set

ADW displays the current converter value in Hex.

Temp. displays the terminal temperature calculated with the current alpha.

The voltage measured at LM35CZ is entered (without comma) with 0...9 at XX,X.

The entry is deleted with C and the original terminal temperature displayed again.

The new alpha is calculated with S and the system branches into the following menu.

The menu item is interrupted with R and the system branches into the basic calibration menu.

Terminal factor	= X,XX
R = Raus	S = Set

X,XX displays the current terminal factor.

The new terminal factor is entered with 0...9.

The entry is deleted with C or the current terminal temperature displayed again.

The displayed terminal factor is adopted with S and the KKAN menu is switched on.

The menu item is interrupted with R and the system branches into the basic calibration menu.

3. Calibrate vacuum (VKAL):

The power supply of the vacuum pump must be connected with the furnace. The pressure sensor of the furnace and the DVR 1 must be connected to the same vacuum hose and display atmosphere.

ADW XXXX	Vacuum = XXXX
R = Raus	S = Set

ADW displays the current converter value in Hex.

The current atmospheric pressure at XXXX is entered in hPa with 0...9.

The entry is deleted with C.

The value is adopted with S, the pump switched on and the next menu displayed.

The menu item is interrupted with R and the system branches into the basic calibration menu.

The pump must now be connected with the hose of the pressure sensor.

Wait
R = Raus

This menu remains displayed until the measured value has dropped below 200 hPa, then the following menu appears.

The menu item is interrupted with R and the system branches into the basic calibration menu.

ADW XXXX	Vacuum = XXXX
R = Raus	S = Set

ADW displays the current converter value in Hex.

The actual vacuum at XXXX is entered in hPa with 0...9 (between 0...10 hPa).

The entry is deleted with C.

The value is adopted with S, the pump switched on, alpha and delta calculated and the system branches into the VKAN menu.

The menu item is interrupted with R and the system branches into the basic calibration menu.

4. Calibrate temperature (TKAL):

A millivolt generator must be connected to the thermoelement input of the furnace.

ADW XXXX	Generator = 50 ° C
R = Raus	S = Set

ADW displays the current converter value in Hex.

The generator must output the voltage for 50 ° C.

The measured value is adopted with S and the system branches into the following menu.

The menu item is interrupted with R and the system branches into the basic calibration menu.

R = Raus

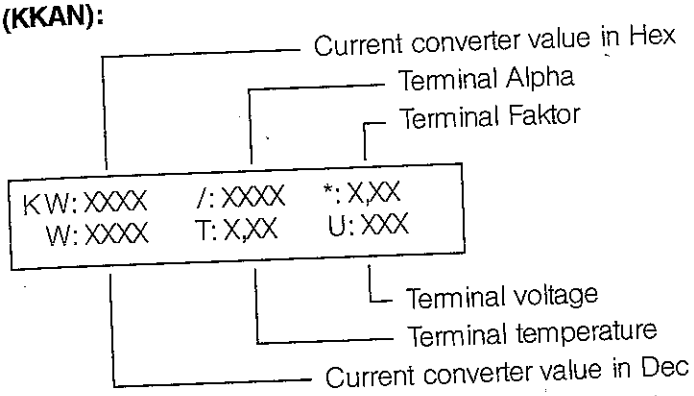
ADW displays the current converter value in Hex.

The generator must output the voltage for 1200° C.

The measured value is adopted with S, alpha and delta are calculated and the system branches into the TKAN menu.

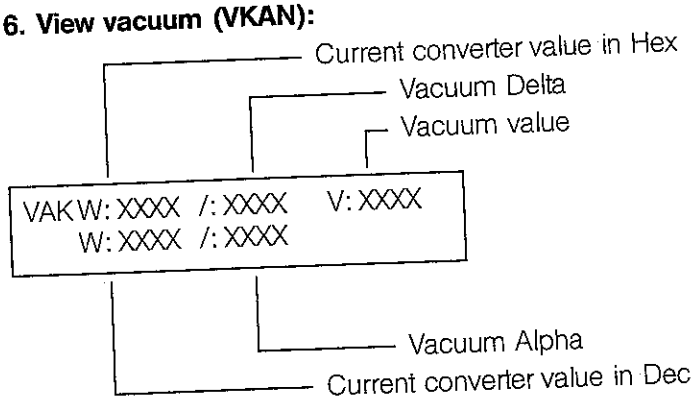
The menu item is interrupted with R and the system branches into the basic calibration menu.

5. View terminal temperature and terminal factor (KKAN):



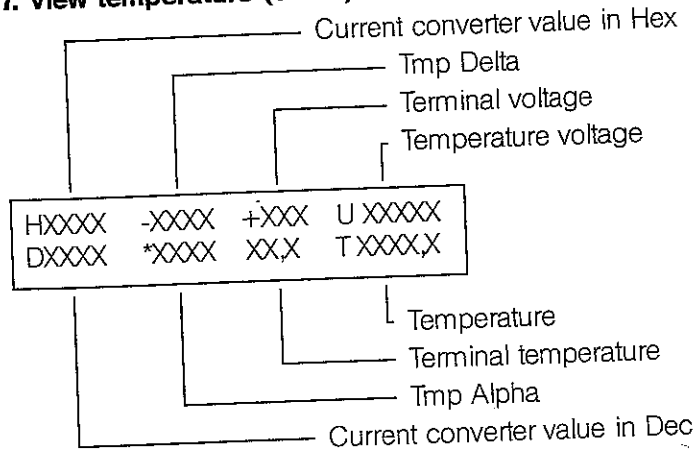
The menu is exited with R and the system returns to the basic calibration menu.

6. View vacuum (VKAN):



The menu is exited with R and the system returns to the basic calibration menu.

7. View temperature (TKAN):



The menu is exited with R and the system returns to the basic calibration menu.

parameters are set to their default item, i.e.:

Program number	= 1
Language	= German
Temperature unit	= °C
Horn	= on
Fast cooling	= off
Standby	= off
Contrast	= 8 (middle)
Printing	= off
Calibration offset	= 0
Muffle hours	= 0
Pump hours	= 0
Evacuation time	= 45 sec.
Max. ramp	= 180° C/min.
Cooling ramp	= 55° C/min.

The following display can be seen:

```
Factory-Init
Delete No.: XX
```

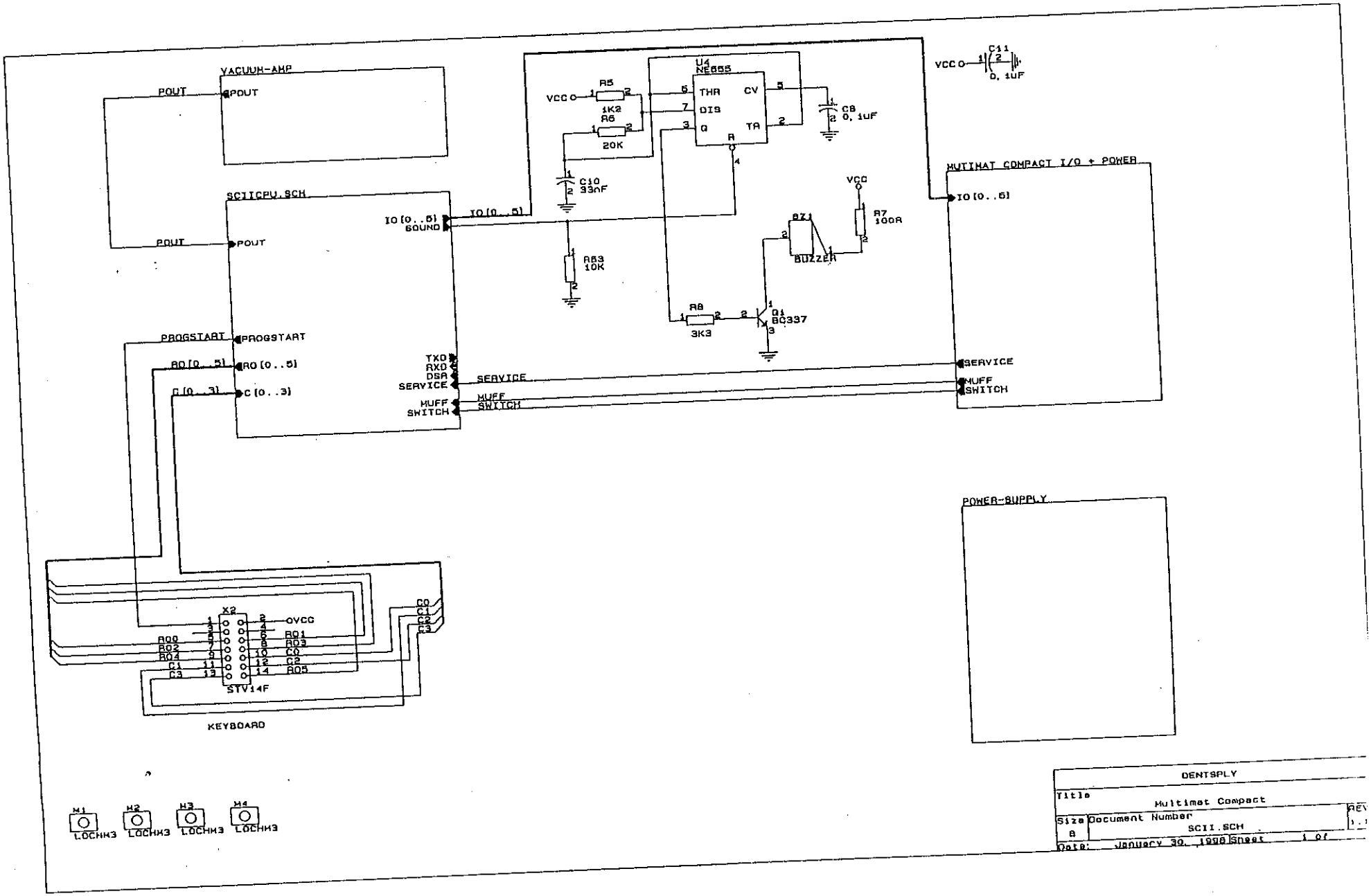
After ending the system automatically branches into the basic calibration menu.

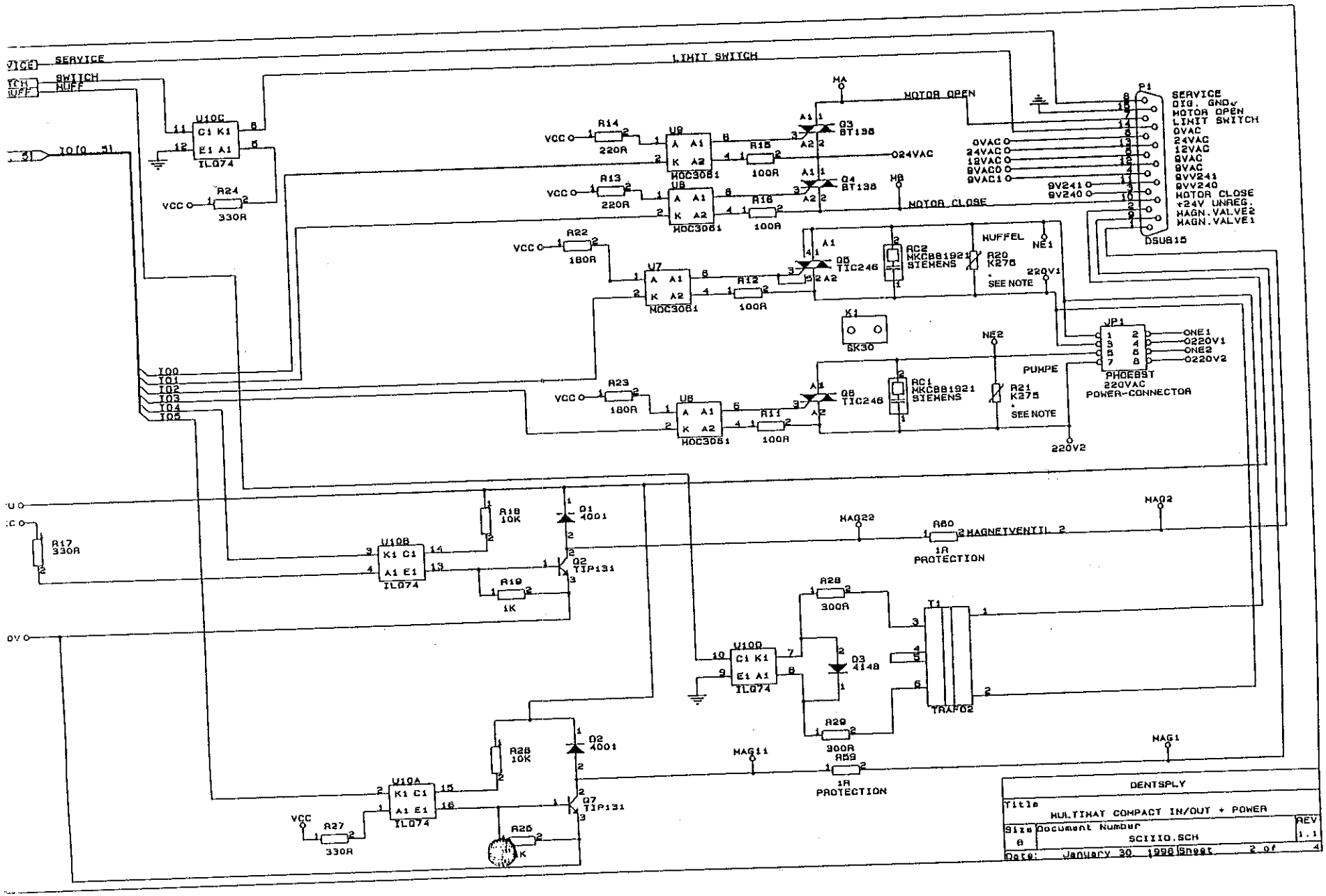
9. Delete program buffer (PCLR):

The entire program memory is deleted in this menu item. The following display can be seen:

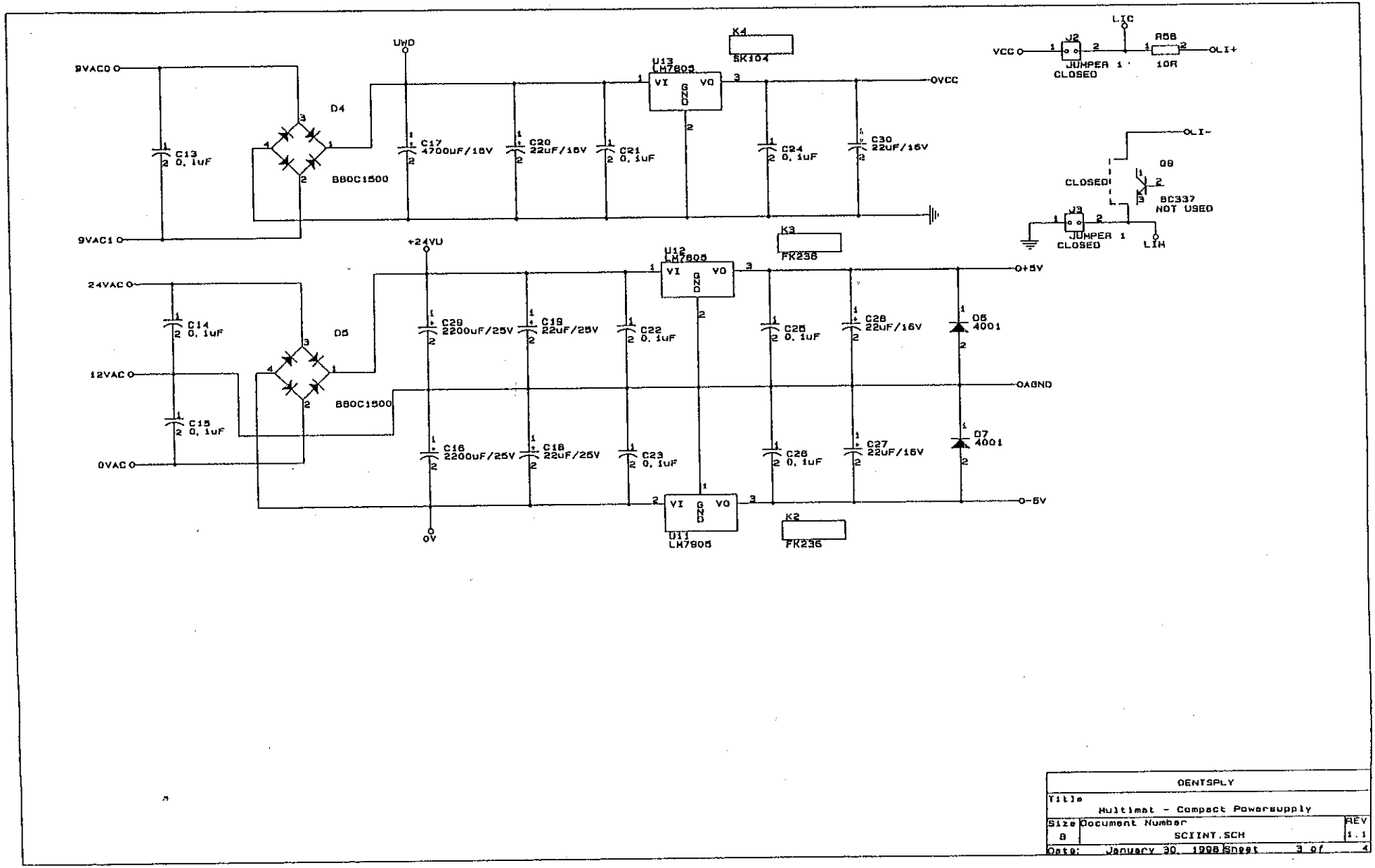
```
Program buffer Init
Delete No.: XX
```

After ending the system automatically branches into the basic calibration menu.

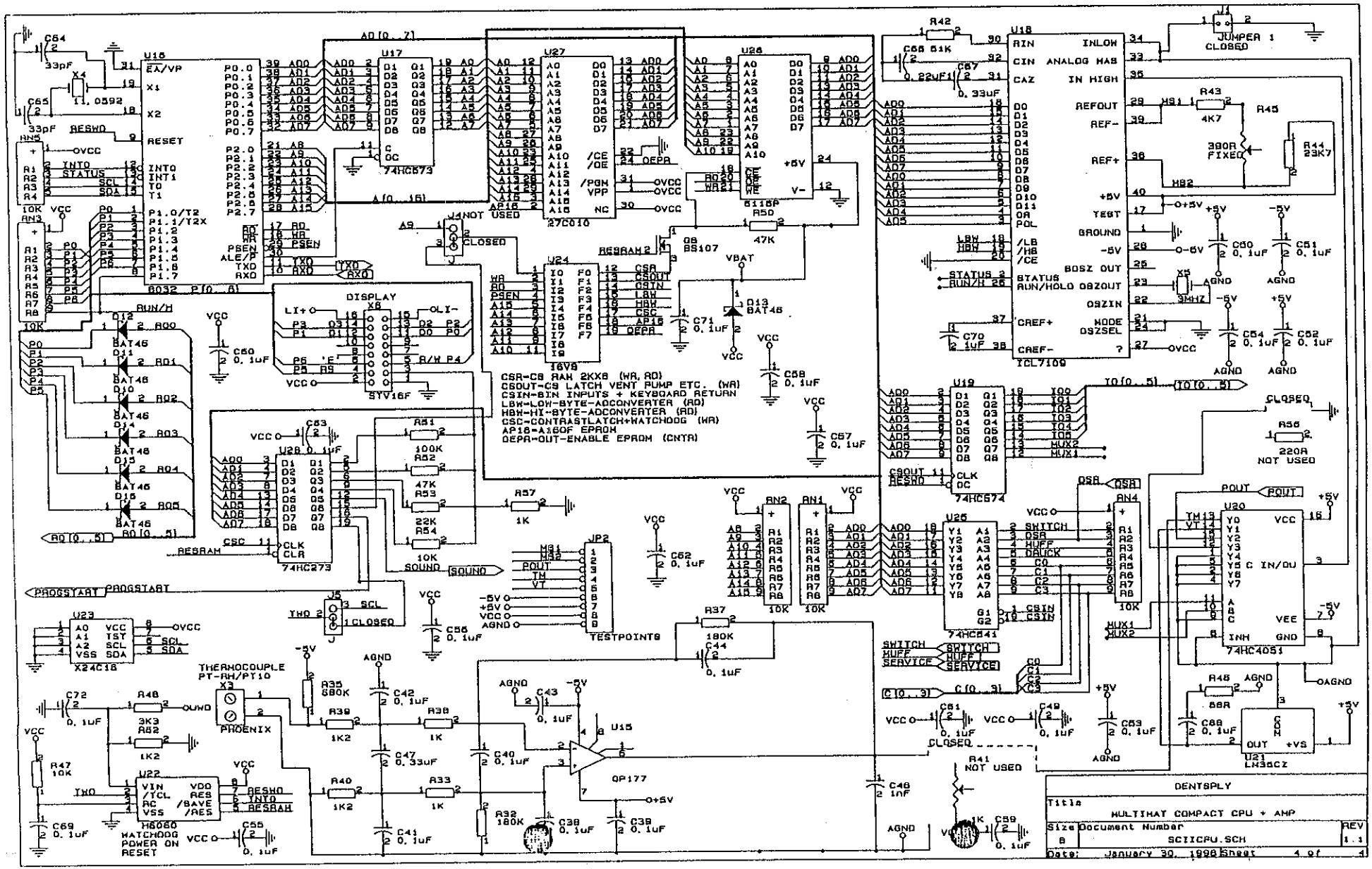

VACUUM-AMP
POUT
POUT
SCIICPU.SCH
POUT
POUT
PROGSTART
PROGSTART
RO[0..5]
RO[0..5]
C[0..3]
C[0..3]
IO[0..5]
GOUND
IO[0..5]
TXD
RXD
DSR
SERVICE
SERVICE
MUFF
SWITCH
MUFF
SWITCH
U4
NE555
THR
CV
DIS
Q
TA
R
R5
1K2
R6
20K
C10
33nF
C8
0,1uF
C11
0,1uF
VCC
R83
10K
R8
3K3
Q1
BC337
BZ1
BUZZER
R7
100R
MULTIMAT COMPACT I/O + POWER
IO[0..6]
SERVICE
MUFF
SWITCH
POWER-SUPPLY
X2
STV14F
KEYBOARD
M1
M2
M3
M4
LOCHH3
LOCHH3
LOCHH3
LOCHH3
DENTSPLY
Title
Multimat Compact
Size
A
Document Number
SCII.SCH
Date:
January 30, 1998
Sheet
1 of

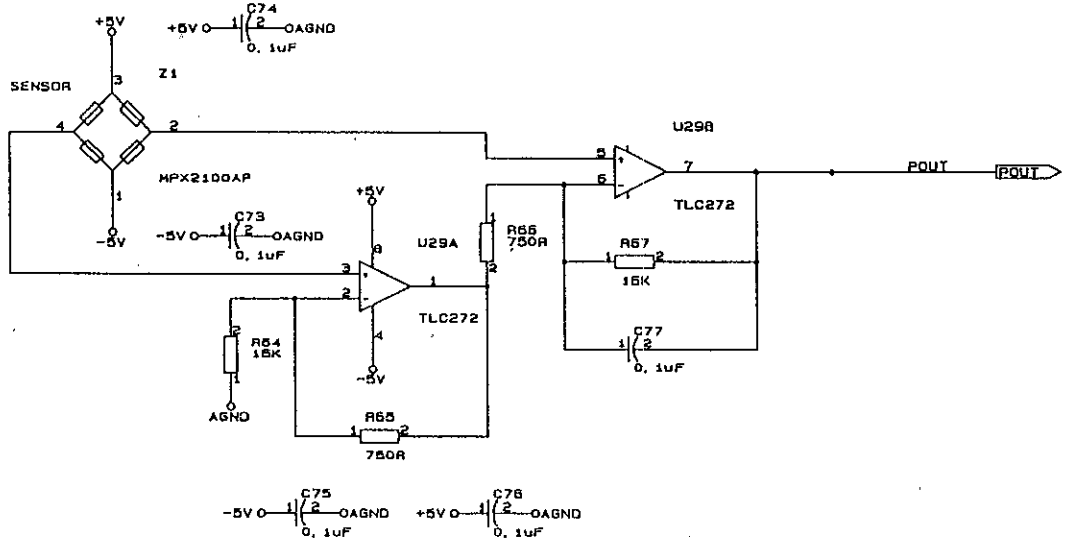


Note: R20/R21 not used when RC1 and RC2 = 68nF

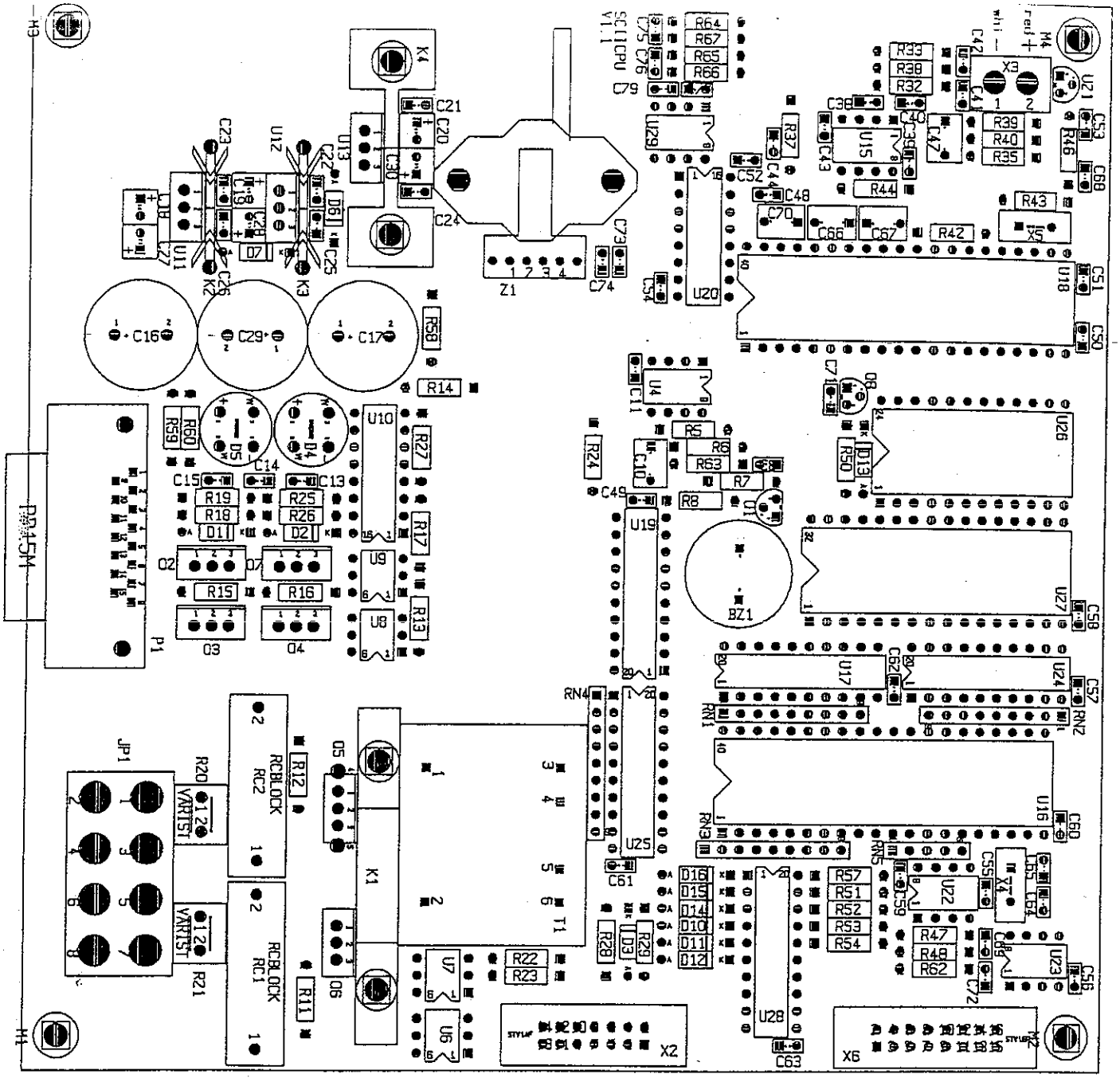


DENTSPLY		
Title: Multimat - Compact Powersupply		
Size: B	Document Number: SCIINT.SCH	REV: 1.1
Date: January 30, 1998	Sheet 3 of 4	


CSR=CS RAM 2KX8 (WR, RD)
CSOUT=CS LATCH VENT PUMP ETC. (WR)
CSIN=BIN INPUTS + KEYBOARD RETURN
LBW=LOW-BYTE-ADCONVERTER (RD)
HBW=HI-BYTE-ADCONVERTER (RD)
CSC=CONTRASTLATCH+WATCHDOG (WR)
AP16=A16OF EPROM
OEPR=OUT-ENABLE EPROM (CNTR)
DENTSPLY
Title
MULTIMAT COMPACT CPU + AMP
Size B
Document Number SCIICPU.SCH
REV 1.1
Date: January 30, 1998
Sheet 1 of 1



DENTSPLY		
Title: MULTIMAT COMPACT VAKUUMAMP + SENSOR		
Size: B	Document Number:	REV: 1.1
Date: January 30, 1998	Sheet 5 of 5	


SCIICPU V1.1
RJ45M
P1
JP1
RCBLOCK RC2
RCBLOCK RC1
VARIST
K1
T1
Z1
BZ1
X1
X2
X3
X4
X5
X6
U1
U2
U3
U4
U5
U6
U7
U8
U9
U10
U11
U12
U13
U15
U16
U17
U18
U19
U20
U21
U22
U23
U24
U25
U26
U27
U28
U29
RN1
RN2
RN3
RN4
RN5
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
Q1
Q2
Q3
Q4
Q5
Q6
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
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C64
C65
C66
C67
C68
C69
C70
C71
C72
C73
C74
C75
C76
C79
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
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R37
R38
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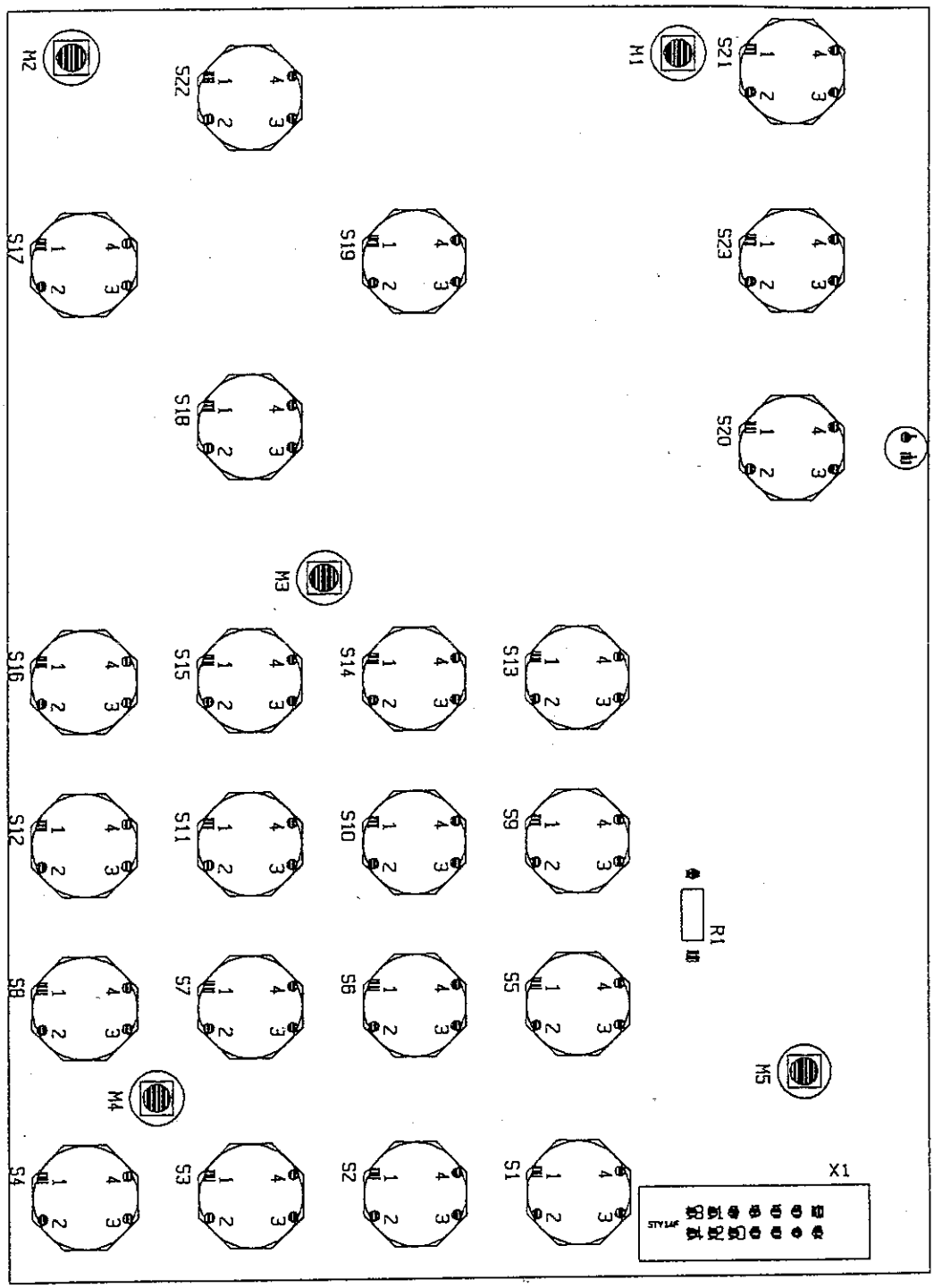
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R62
R63
R64
R65
R66
R67
M1
M2
M3
M4


S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
S23
M1
M2
M3
M4
M5
D1
R1
X1

Spare Parts List

Pos.	Art.-Nr.	Description
1	03 233 4X16 NI	Screw for cover
2	03 201 110	Cover
3	03 203 060	O-ring for cover (190 mm)
4	03 532 159	Firing platform base
5	03 201 118	Heat sink
6	03 250 050	Rubber foot
7	without nr	Transformer
8	03 203 023	Barlan disk 170 x 2
9	03 533 370	Thermocouple, complete
10	03 222 326 033	Top terminal insulation
11	03 002 C 230 V	Firing muffle
12	03 222 325 000	Insulation insert
13	03 233 3X10 V2A	Screw V2A
14	03 223 07 MS	Nut, brass
15 A	03 242 402	Washer, brass
15 B	03 243 4,3 ZN	Cog
16	03 233 4X6	Screw, brass
17	03 242 7,4 MS	Washer, brass
18	03 222 005	Disk, frequenta
19	03 400 236 131	Silicone seal, 5 mm
20	03 222 041	Socket, frequenta
21	03 201 126	Terminal stud
22	03 223 10x1 MS	Nut, brass M 10 x 1
23	03 400 239 131	Silicone seal 3 mm
24	03 201 117	Vacuum connection block
25	03 208 008	Terminal bolts
26	03 201 025	Mounting flange
27	03 222 332	Alu vessel
28	03 233 4X10	Screw (alu vessel)
28 A	03 243 4,3 ZN	Tooth lock washer
29	03 231 5X16 A2	Screw for lift plate
30	03 203 004	O-ring } Komplett
31	03 201 500 91	Firing platform support } 03 400 224
32	03 521 351	Firing platform support seal
33	03 237 4X10	Screws for lift (2 x) 4 x 10
34	03 233 3X16 MS	Screws for micro switch
35	03 400 229 1215	Micro switch
36	03 203 017	Isulation plate
37	03 209 022	Capacitor 10 µF (50 Hz) / 6,8 µF (60 Hz)
38	03 233 3X6	Screws (gear motor)
39	03 420 361	Gear motor, complete
40	03 213 205	Cap for fuse garter
41	03 213 150 315A	Fuse 315 mA/250 V
	03 213 150 800A	Fuse 800 mA/250 V
42	03 213 204	Fuse garter
43	03 205 F11126	Radio interference capacitor
44	03 233 4X8 NI	Screws (back, 4 x)
45	03 216 100	Socket, vacuum pump
46	03 213 100 10A	Fuse 10 A/250 V
	03 213 120 15A	Fuse 15 A/250 V
47	without nr	Elasto buffer (3 x)
48	03 521 801	Solenoid valve block, complete
49	03 501 801	Solenoid coil 140 Ohm 2/2 way valve
49 A	03 501 802	Solenoid coil 100 Ohm 3/2 way valve
50	03 233 4X8 NI	Screws (Microprocessor control system)
51	03 241 040	Front foil
52	03 521 800	Microprocessor control system, complete