

Mounting instructions

UROMAT 2000

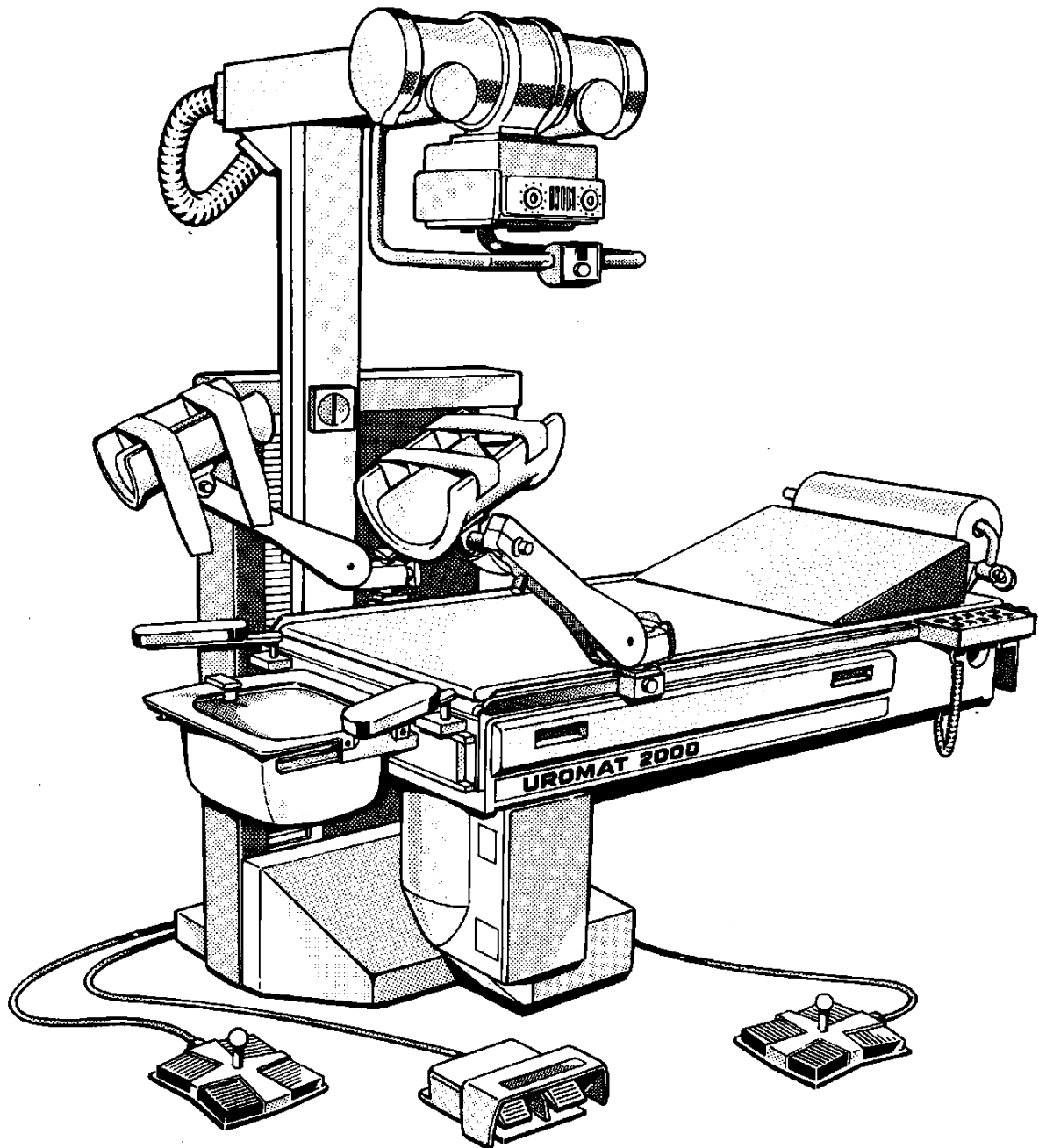


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1. Technical Specifications

1.1 General Safety Notes

In the Federal Republic of Germany, the electrical installation of rooms for medical purposes must conform to the provisions of VDE Standard 0107. In all other countries the respective local regulations have to be considered. Check installation layout plan.

During installation it is important that all protective ground wire connections provided by the manufacturer are properly made before the equipment is started up.

The protective ground wires between the individual system components and the power supply are connected as shown in the wiring diagram.

Regulations of professional associations concerning safety and accident prevention must be observed. This prohibition is not relevant for measure and adjustment work. But please be careful during the work.

No work may be performed on parts carrying a voltage higher than 42 V.

The prohibition does not apply for measuring and adjustment procedures. But special care should be taken!

If it is necessary to turn on the power for execution of movements of the equipment in the course of installation procedure, it must be shut down immediately after completion of these movements.

1.2 Weights of Components

Mounting base	approx. 234 Kg
Table assembly	approx. 260 Kg
Tube support arm	approx. 38 Kg
Footswitch	approx. 5 Kg
Total weight of X-ray tube, collimator Bucky and I.I.	approx. 620 Kg

Mounting base	65 cm x 80 cm x 130 cm
Table assembly	155 cm x 92 cm x 40 (64) cm *
Tube support arm	70 cm x 15 cm x 80 cm
Footswitch	27 cm x 23 cm x 12 cm

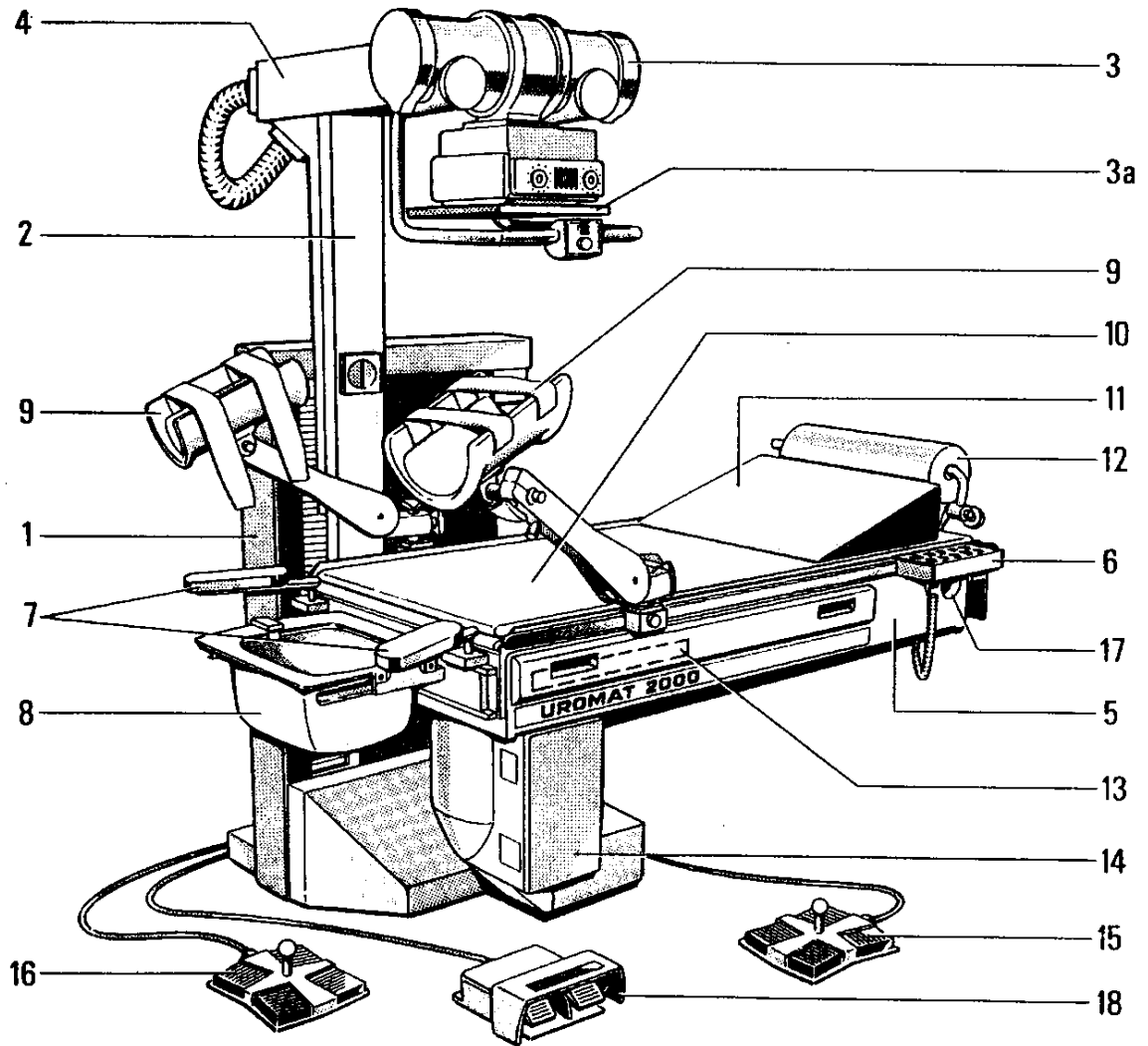
1.4 Shipping Dimensions and Gross Weights

Mounting Base	120 cm x 80 cm x 150 cm	approx. 310 Kg
Table assembly	163 cm x 97 cm x 85 cm	approx. 390 Kg
Accessories	120 cm x 80 cm x 95 cm	approx. 70 Kg**

* with shipping pallet

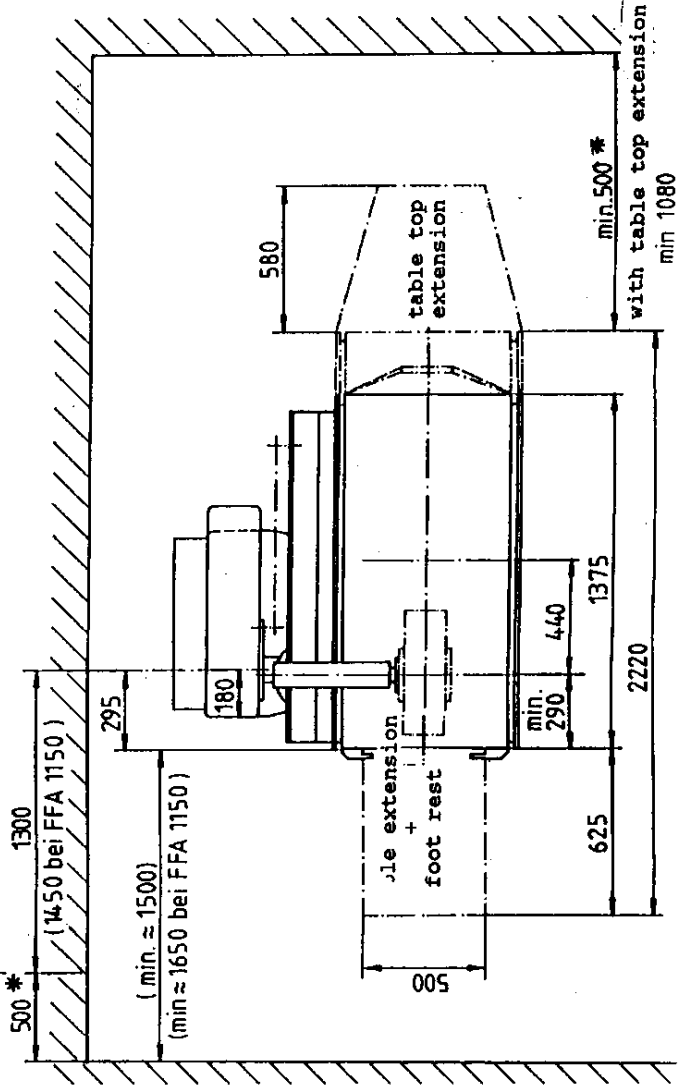
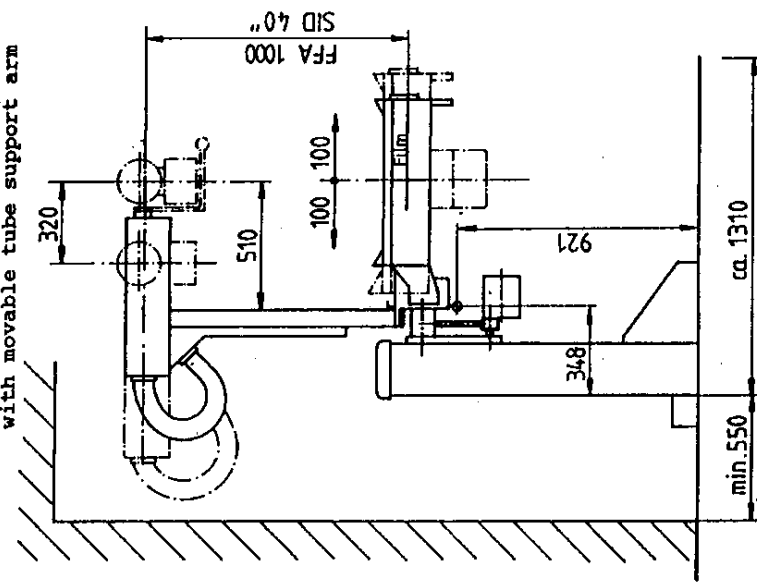
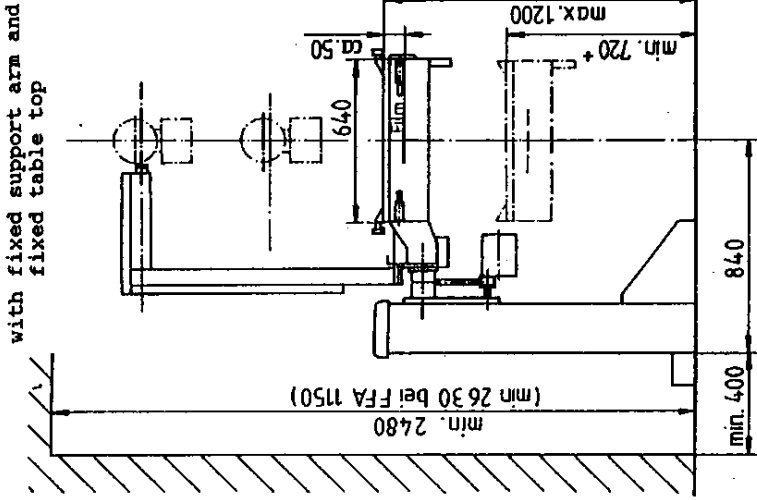
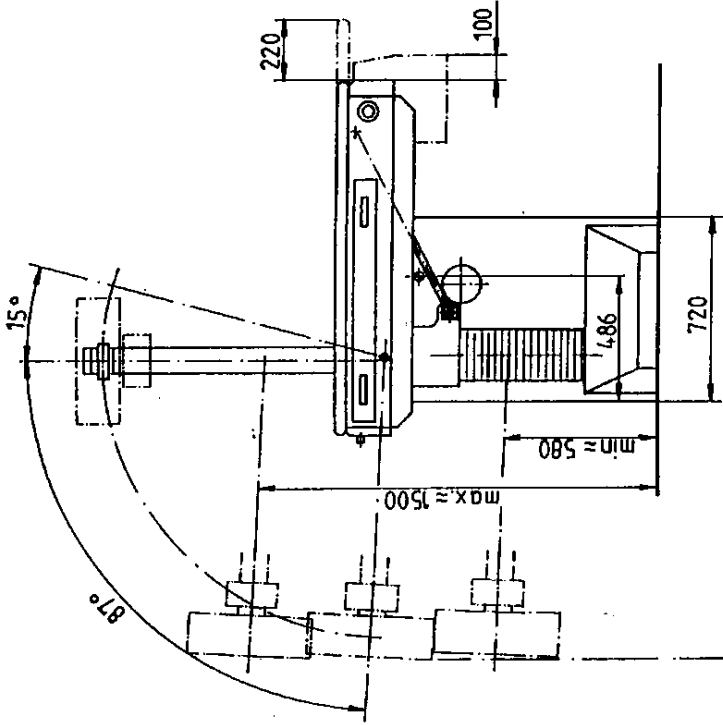
** special option

1.5 Component Designations



- 1 Mounting Base
- 2 Column
- 3 X-Ray Tube/Collimator
- 3a Pinhole Plate (only if no automatic collimation)
- 4 Movable Tube Support Arm
- 5 Table Assembly
- 6 Control Box (detachable)
- 7 Elbow Supports
- 8 Drain Pan
- 9 Special Leg Supports
- 10 Table Mattress
- 11 Head Pillow
- 12 Paper Towel Holder
- 13 Cassette Tray
- 14 Image Intensifier
- 15 Foot Switch, Table Tilt / up / down
- 16 Foot Switch, Table Top Movement
- 17 Emergency Off Switch
- 18 Foot Switch Fluoroscopy

1.6 Dimensional Drawing right version



+ depending on I.I. used
* lt. DIN 31000 according

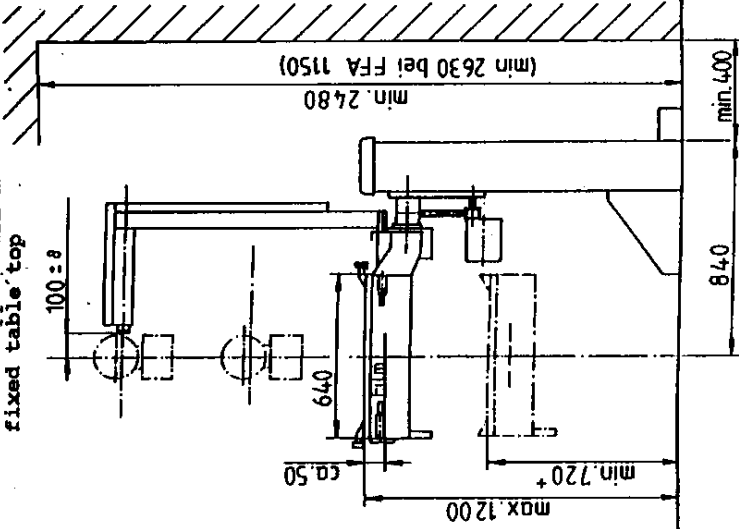
mm	inch	mm	inch
50	1,968	840	33,070
100	3,937	921	36,260
180	7,086	1080	39,370
220	8,661	1080	42,519
290	11,417	1150	45,276
295	11,614	1200	47,244
320	12,598	1300	51,181
348	13,701	1310	51,574
400	15,748	1375	54,133
440	17,322	1450	57,087
486	19,134	1500	59,055
500	19,685	2220	87,401
510	20,078	2480	97,637
550	21,653	2630	103,543
580	22,834		
625	24,606		
640	25,196		
700	27,559		
720	28,346		

with Monitor table

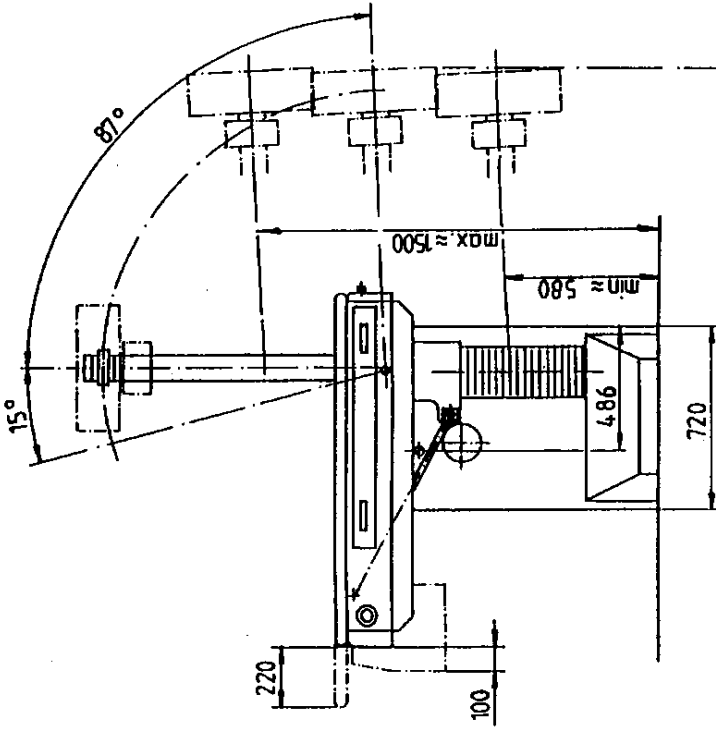
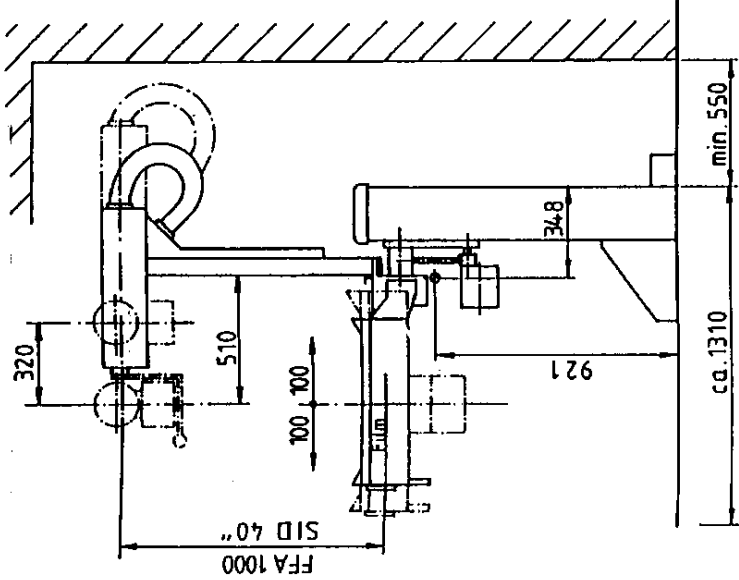
min. 700

1.6 Dimensional Drawing left version

with fixed support arm and fixed table top



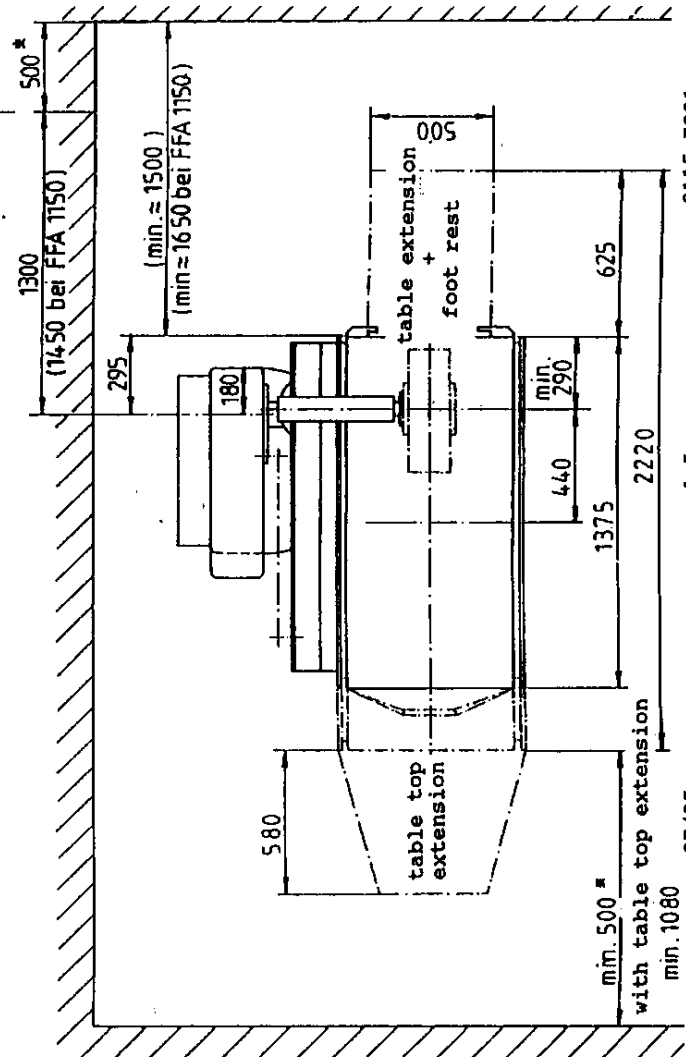
with movable tube support arm



with Monitor table

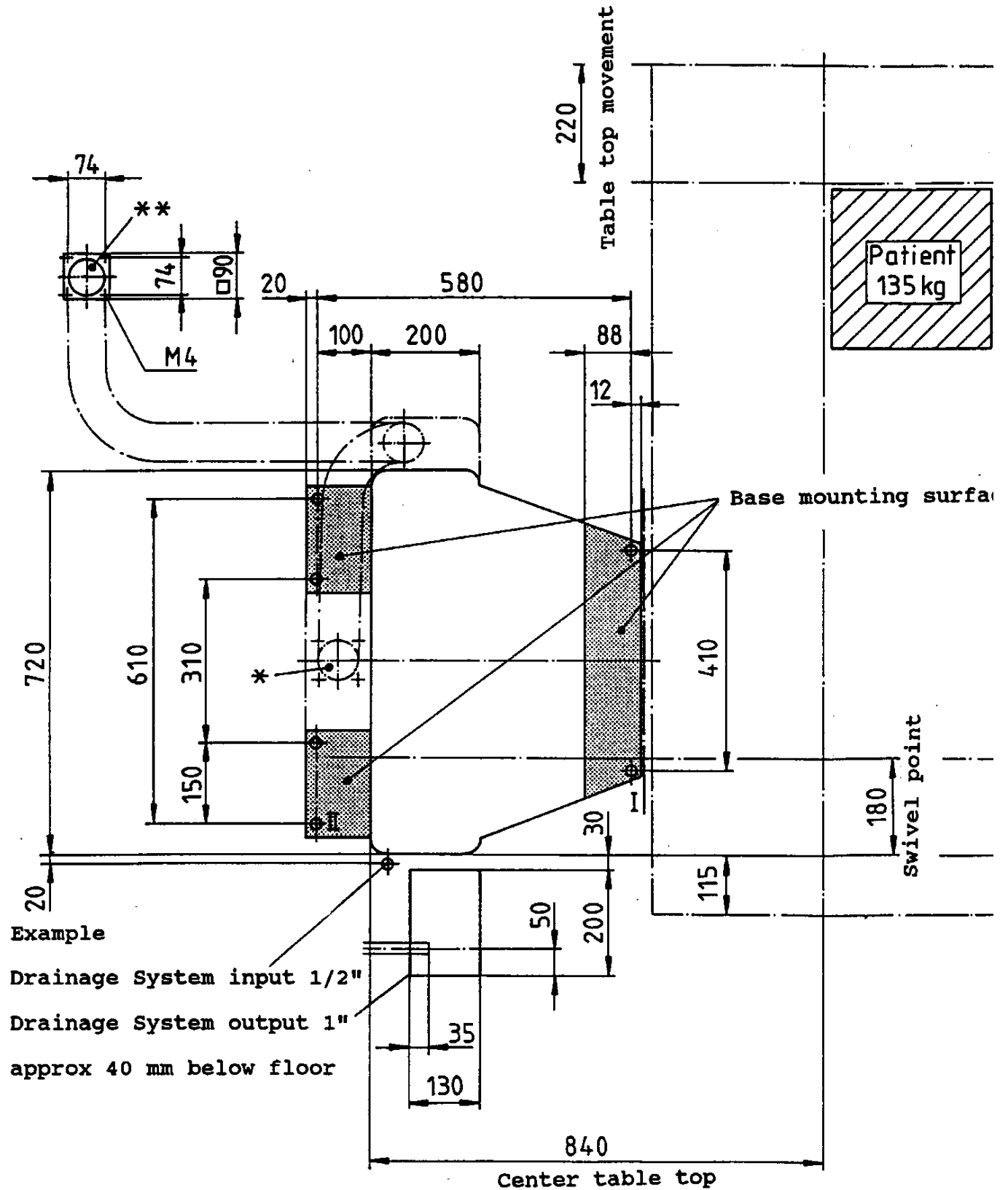
min. 700

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* depending on I.I. used
* lt. DIN 31000 according

1.6.1 Mounting Hole Layout right version



The pressure on mounting surface I equals approx. 9000 N
 Tensile strength on mounting surface II is approx. 1400 N
 * Area for cable exit race way
 ** Wall connection for flexible hose (length 1300 mm).

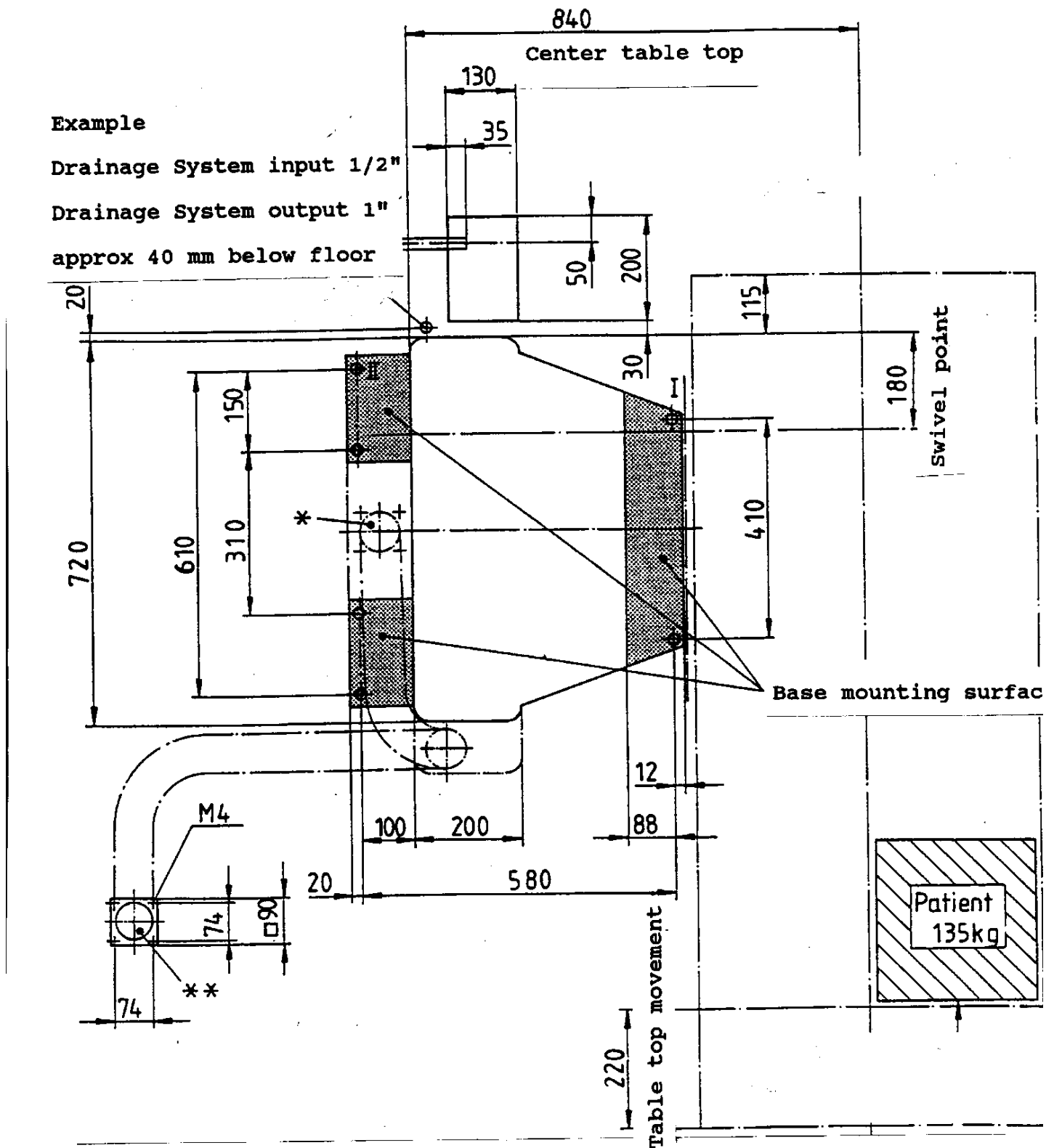
1.6.1 Mounting Hole Layout left version

Example

Drainage System input 1/2"

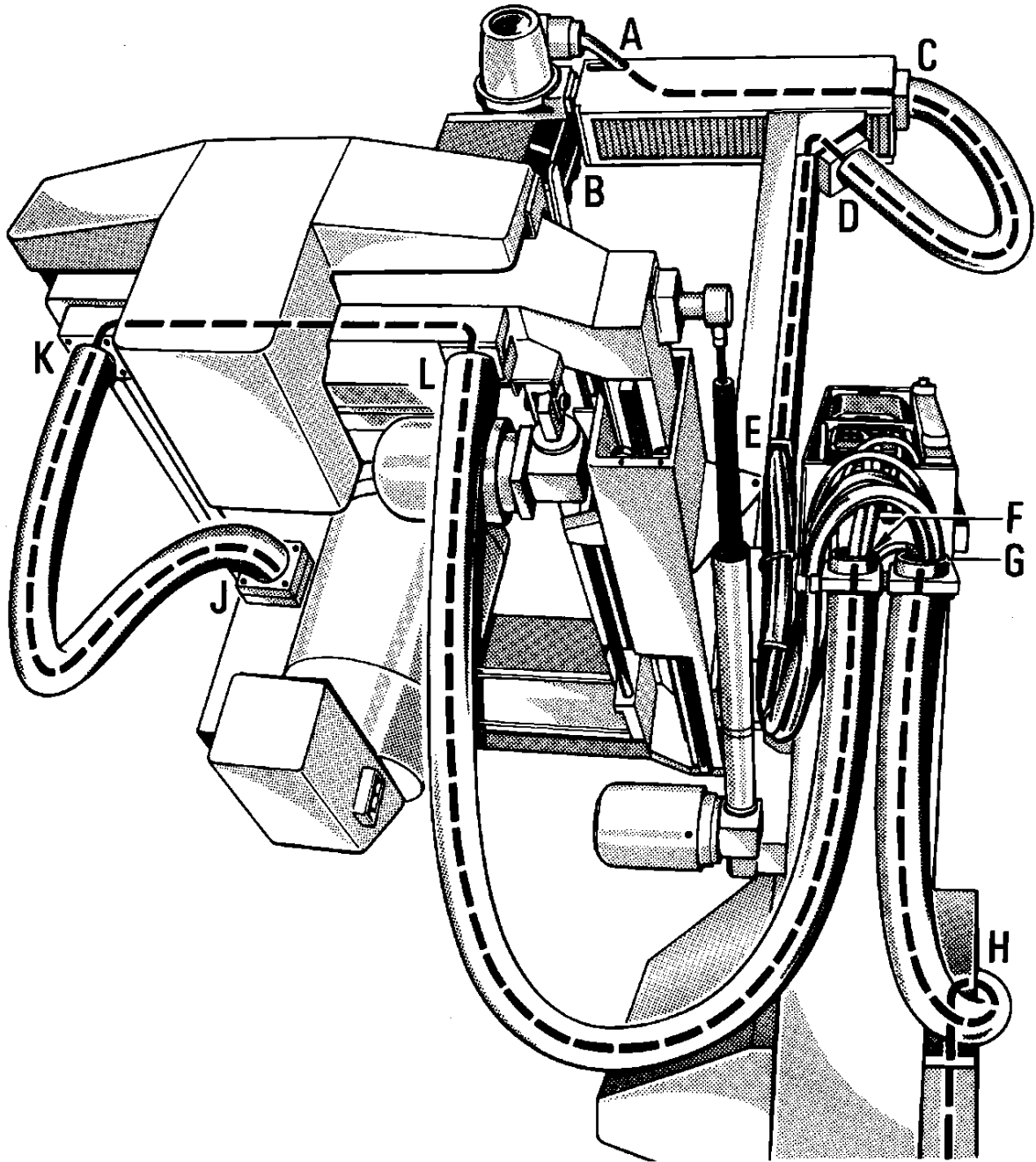
Drainage System output 1"

approx 40 mm below floor



The pressure on mounting surface I equals approx. 9000 N
 Tensile strength on mounting surface II is approx. 1400 N
 * Area for cable exit race way
 ** Wall connection for flexible hose (length 1300 mm).

1.7 Cable Length of HV-Collimator-Bucky and I.I. Cables



		SID 1000 mm	1150 mm
HV cable	cable length		
A-C-D-E-G-H	A-C approx.	650 mm	650 mm
	B-C approx.	800 mm	800 mm
Collimator cable	C-D approx.	900 mm	900 mm
B-A-C-D-E-G-H	D-E approx.	800 mm	950 mm
	E-F approx.	1100 mm	1100 mm
Bucky cable	G-H approx.	1300 mm	1300 mm
J-K-L-F-G-H	F-L approx.	2000 mm	2000 mm
	L-K approx.	500 mm	500 mm
I.I. cable	K-J approx.	1100 mm	1100 mm
J-K-L-F-G-H	K-Bucky	500 mm	500 mm

1.8 Power Connection

Requirements:

When mounting the unit it must be possible to install the power connections according to the ordering terms of voltage and frequency.

Nominal voltage:	1 N ~ 230 V	or 1 N ~ 115 V
Rated frequency:	50 Hz	60 Hz
Nominal current:	10 A	20 A
Nominal capacity:	2300 VA	2300 VA
Surrounding temperature:	140 W	140W

1.9 Special Tools Required

Torque wrench	50 Nm (5 mkp)
Masonry drill	12 mm diameter

1.10 Measuring Instruments Required

Machinist's water level
Tape measure
Volt/ohm meter
Oscilloscope

1.11 During regular work

Temperature:	10° to 40°
Humidity:	20% to 80%
Air pressure:	700 hPa to 1100 hPa

1.11.1 During transport

Temperature:	-25 to 70°
Humidity:	5% to 95%
Air pressure:	700 hPa to 1100hPa

2. Mounting

2.1 Table Site Preparation

Prepare mounting place according to the mounting hole layout drawing on page -1.5-.

The outlined minimum distance must be kept to ensure safe operation of the unit.

According to dimensional drawing on page -1.7- the floor must be capable to withstand on mounting surface I the pressure of 9000 N. The mounting points on mounting surface II must be suitable for tensile strength of 1400 N each.

For example: Liebig safety bolts B12/115 for concrete floor B 150 DIN 1045.

Vinyl or carpet floor covering should be removed around the table base mounting surface.

2.2 Unpacking

When unpacking, check the contents of each box to ensure that all items are located. Do not discard packing material, envelopes, boxes until all parts are accounted for.

2.3 Mounting of Table Base

Remove trim cover (Fig. 1, item 1) and cover item 1a from the table base item 2. Take off the left and right backwall cover (items 7+8) the plastic cap item 3 and loosen shipping screws from the pallet. Lift off table base from the shipping pallet and set it up on prepared level surface. Install 6 bolt anchors (Fig. 2, item 4) according the outlined capable strength.

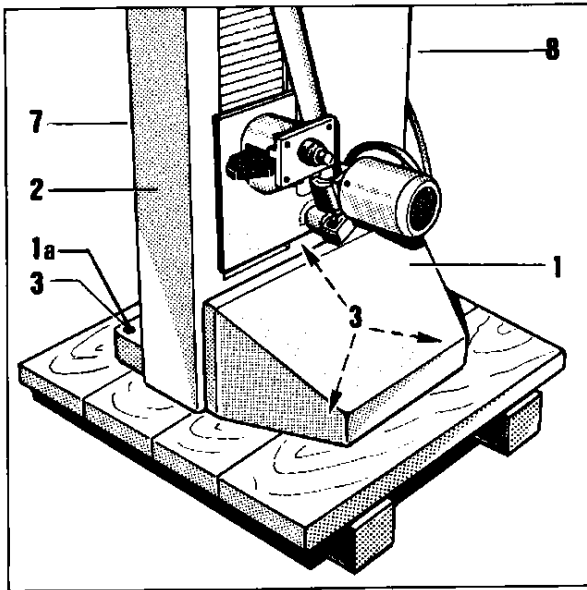


Fig.1

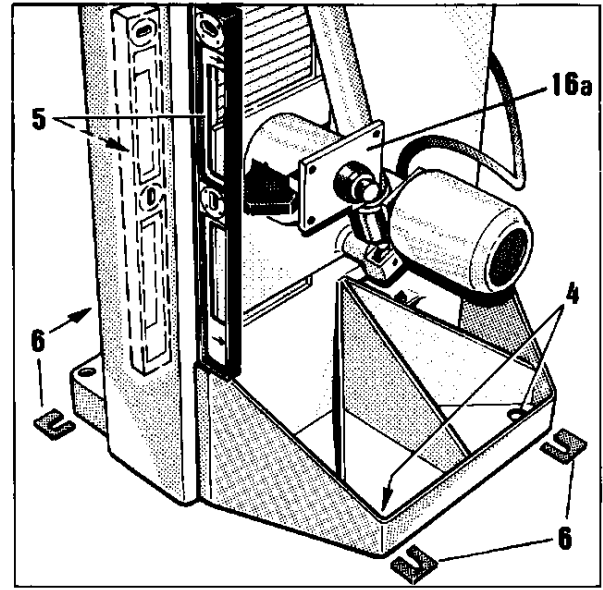


Fig.2

2.4 Leveling of Table Base

Place level on table base as shown in Fig. 2, item 5 and compensate deviation with shims item 6 (included with shipment)

Note: Do not brace table base!

2.5 Install Provisional Power Supply

Install the power supply with the provisional power cord (plug cable appropriate for mains voltage).

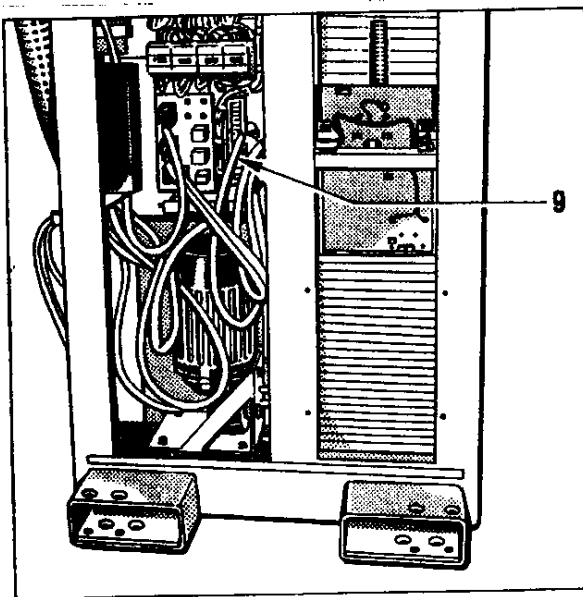


Fig.3

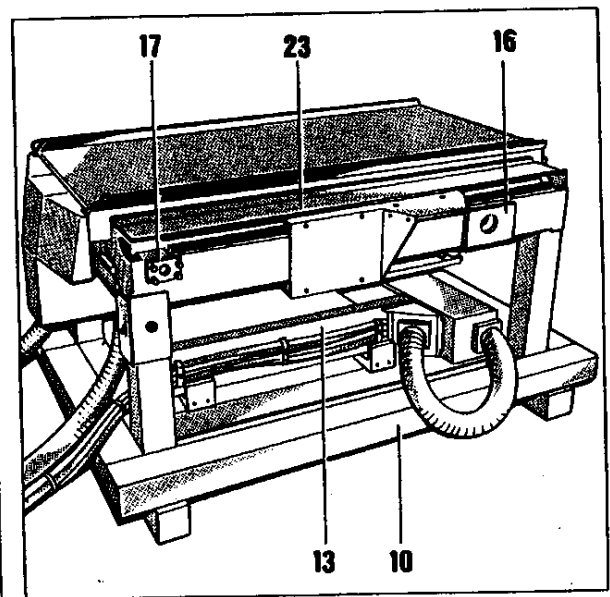


Fig.4

2.6 Mounting of the Table to the Table Base

Remove the rear log from the shipping pallet (Fig.4, item 10). Remove shipping screws (fixing the table to the transport pallet). Move the transport pallet to the table base by means of a fork lift. Perform the electrical connections (plug in connections) of the table with the table base. If necessary move the fork lift until the mounting flange (Fig.4, item 16) is on same level like the table flange (Fig.2, item 16a). Screw the mounting flange to the table frame. Make the table tilt flange (Fig.4, item 17) coincide with flange (Fig.5, item 18) and bolt them. Move the table upwards and pull out the shipping pallet.

2.7 Mounting of Column

Take column (Fig.4, item 13) from pallet. Remove gutter 23 and place column (item 13) to the horizontal carriage (Fig.5, item 22). Bolt down column with screws (Fig.6, item 21 and 21a) and reinstall cover (Fig.4/item 23).

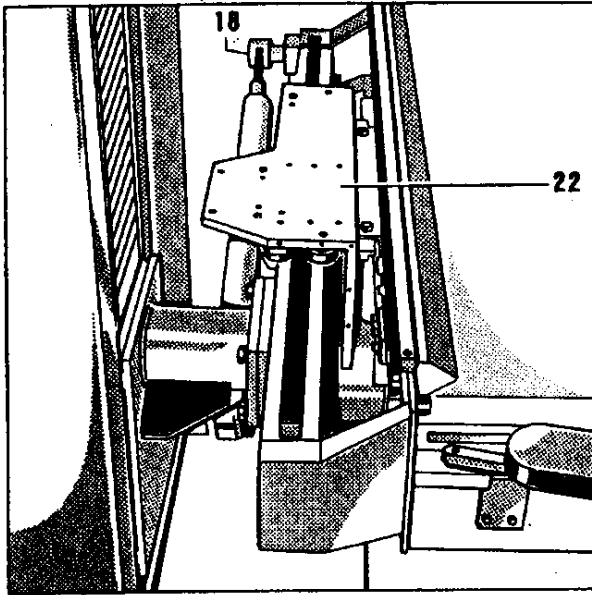


Fig.5

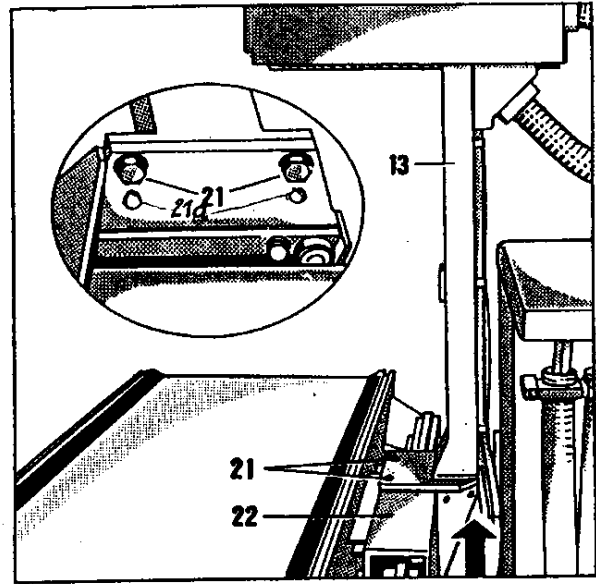


Fig.6

2.8 Preassembly of X-Ray Tube/Collimator

Mount X-ray tube/collimator combination according to the manufacturers instructions. Remove mounting flange (Fig.7, item 24) from column (Fig.6/item 13) and bolt the flange to the X-ray tube housing. In case of telescopic tube support arm, assemble operator handle (Fig.8, item 31) between mounting bracket (Fig.7/item 24) and tube housing. In case of telescopic tube support arm assemble operator handle (Fig. 8/Pos. 31) between mounting bracket (item 24) and tube housing.

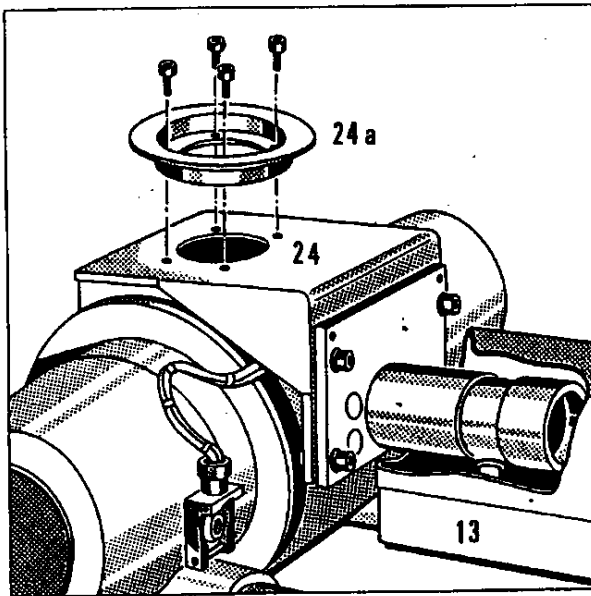


Fig.6a

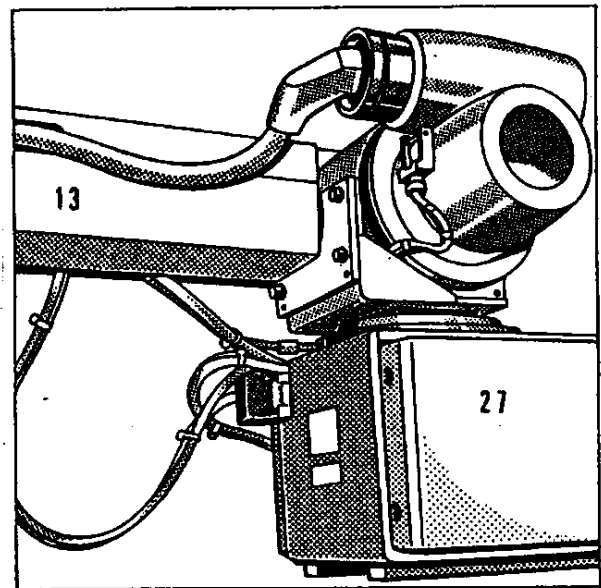


Fig.6b

2.8.1 X-Ray Tube/Collimator - Assembly with angle of flange

Remove angle of flange (Fig.6a /Pos.24) from the column (Fig.6a /Pos.13). Keep the X-Ray on the opposite side of the X-Ray output window and assemble the angle of flange with the tube / Collimator-intermediate ring (Pos.24a). In case of telescopic tube support arm, assemble operator handle (Fig. 8/Pos. 31) between mounting bracket (Pos. 24) and tube housing.

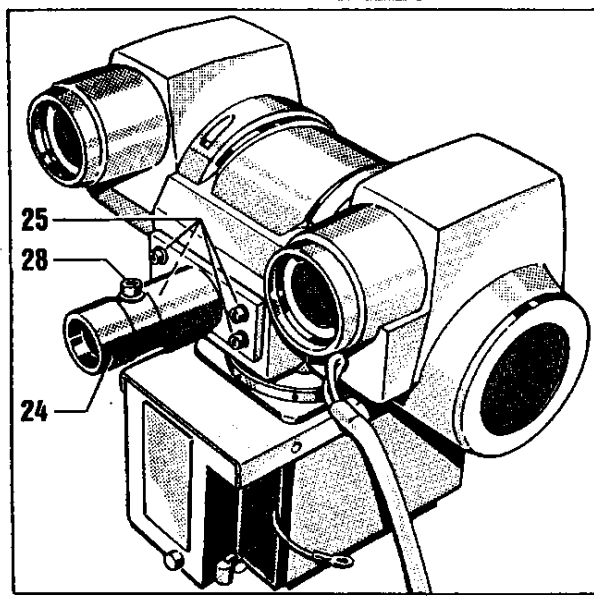


Fig.7

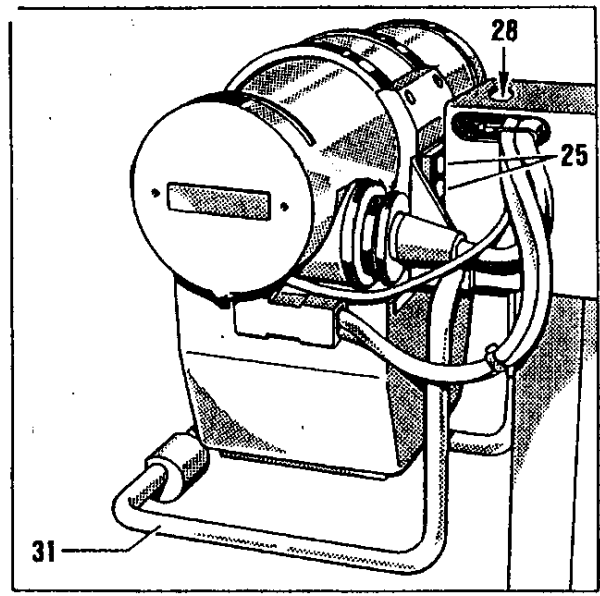


Fig.8

2.9 Mounting of X-Ray Tube Unit

Insert preassembled X-ray tube unit with pin to tube support arm and tighten with screw (Fig.8, item 28).

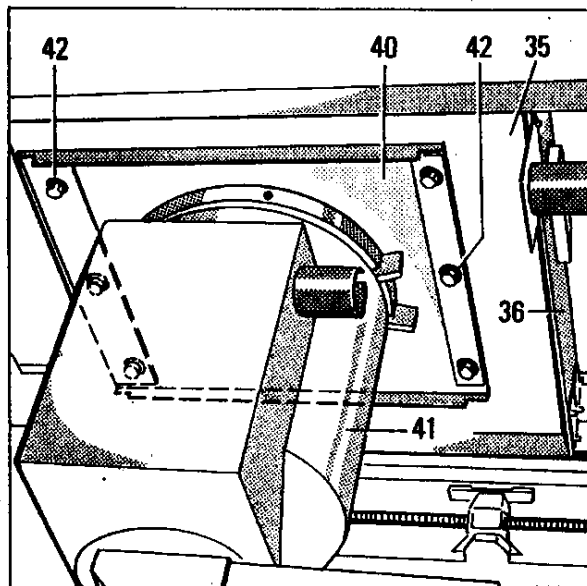


Fig.9

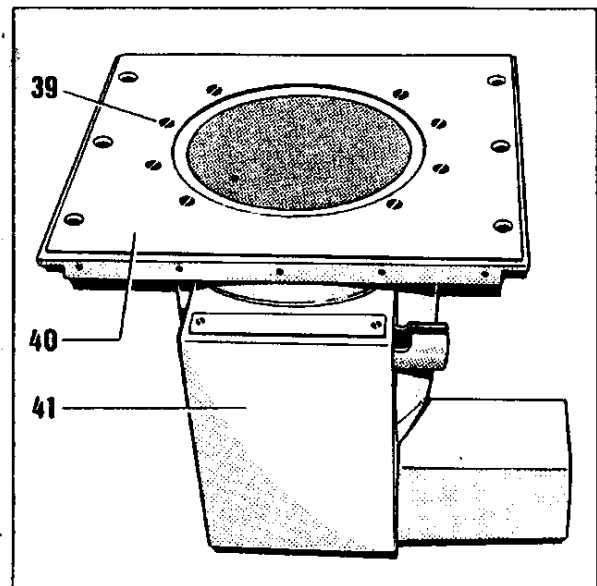


Fig.10

2.10 Mounting of Bucky

Note:

Bucky units made by various manufacturers can be used. The unit has been prepared according to the order. The installation material required is included with the shipment.

Drive Bucky carriage (Fig.9,item 35) to the foot end. Remove mounting bracket. Place mounting the Bucky (item 36) from the head direction to the foot direction on the Bucky carriage. Cassette opening must face to the front and the motor drive must face to the head end. Fasten Bucky with screws on both sides.

2.11 Mounting of Image Intensifier

Mount I.I. flange plate (Fig.10, item 40) to I.I. housing (item 41) with screw (item 39) and assemble on the back of the Bucky carriage (Fig.9, item 35) with screws (item 42) collars (washers) and srews Max. starting torque 20 Nm

2.12 Cabling

Remove the mounting brackets of the flexible hose (Fig.11, items 47,48,53,54). Take off the trim cover item 55 and dismount the bracket item 52. Remove cover item 46. Route the HV cables, the collimator/stator cables, Bucky and I.I. cables thru the flexible hoses to their designation. Connect cables to the components and ty wrap with no interference between cables and table mechanics.

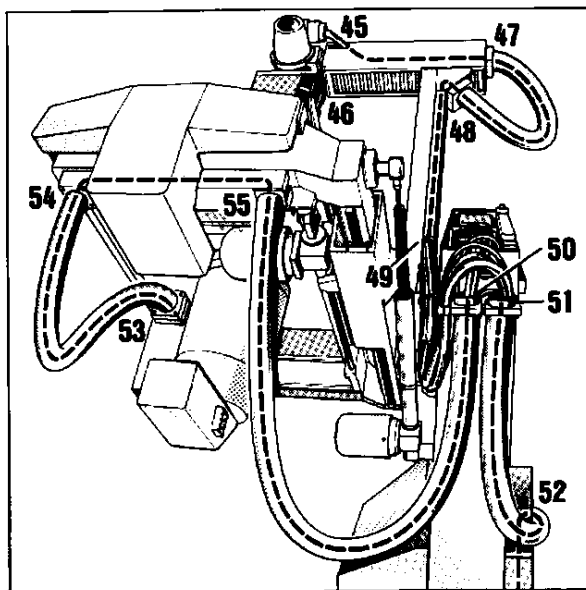


Fig.11

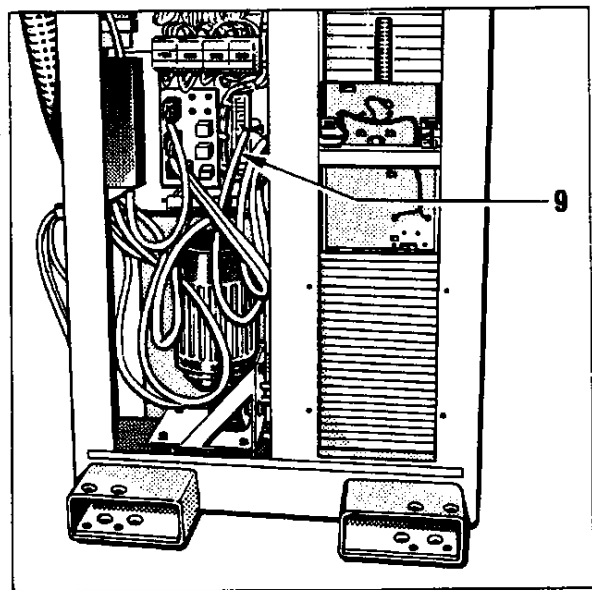


Fig.12

2.13 Connect Mains via Generator

Make electrical connections between interface (Fig.12, item 9) of table base via generator and the filter of radio shielding . Reinstall all covers.

3. Adjustments

3.1 Column Adjustment

Check column (Fig.14, item 13) with level and adjust if necessary by loosening nut item 24 and screws item 21. Correct variations with screw 24a. Tighten nut and screws again.

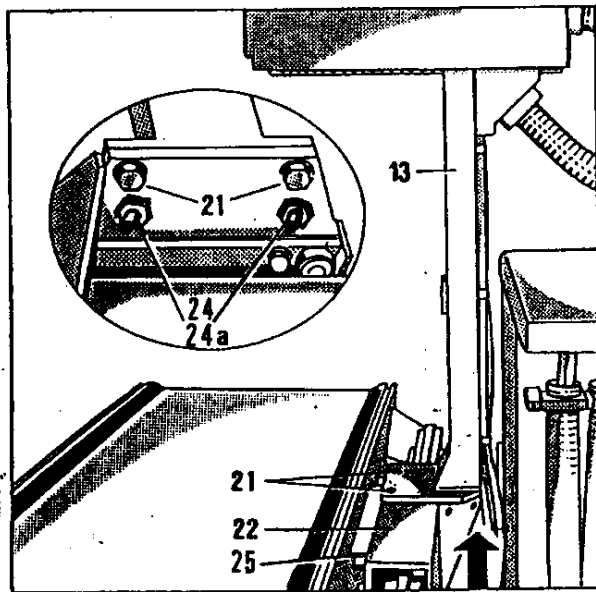


Fig.14

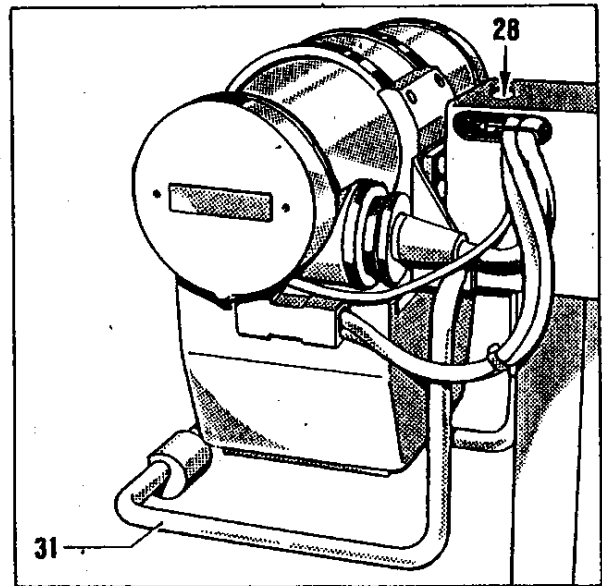


Fig.15

3.2 Centering of X-Ray Tube to Bucky and I.I.

Detect field light deviation and adjust by: deviation of lateral table top: open screw (Fig.15, item 28) and adjust in direction needed and tighten screw item 28. Deviation of longitudinal table top: open screw (Fig.14, item 25) and adjust in direction needed and tighten screw. Accessible after removing the cover (Fig. 4 item 23).

3.3 Limit Switches Vertical

Open rear trim cover of table base.

Note: Fig.17 shows the trip cam for the switches after removal of the circuit board = AU.

Trip cam item 71 for limit switch raise height of table

Trip cam item 72 for limit switch lower height of table

Trip cam item 73 for limit switch lower height of I.I.

Trip cam item 74 for safety limit switch lowest position of I.I.

Trip cam item 75 limiting I.I. in lowest position -1° to -15°

Trip cam item 76 limit for table top extension

= AU -S20 limit switch for table upward

= AU -S21 limit switch for I.I. down

= AU -S22 limit switch for table down

= AU -S23 limit switch for I.I. -1° to -15°

= AU -S24 limit switch when table top extension is used

= AU -S56 safety limit switch for table upward (35° - 87°)

= AU -S57 safety limit switch for I.I. down

= AU -S58 safety limit switch for table down

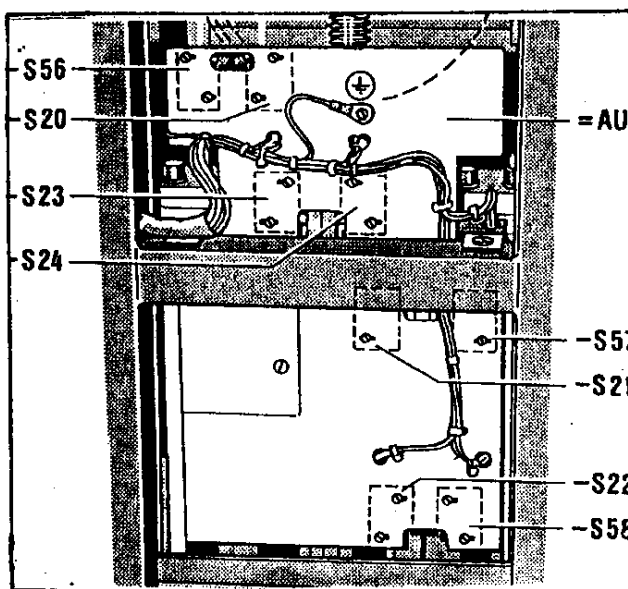


Fig.16

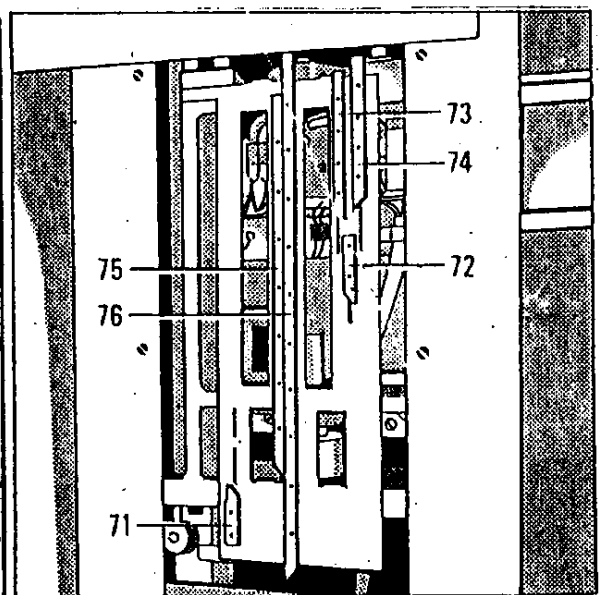


Fig.17

3.4 Electronic Adjustment Parameter

Frequency Converter:

Requirement:

Turn off power and disconnect plug = AU-X25 (the motor circuit is now interrupted). Switch on power.

Parameter basic settings:

P009	Parameter protection	setting	off	3
P002	Ramp up time	setting	off	0,9
P003	Ramp down time	setting	off	0,6
P006	Frequency setpoint type sele.	setting	off	1
P007	Front panel operating	setting	off	0 disable
P013	Max. motor frequency Hz	setting	off	65,0
P022	Max. analogue frequency	setting	off	65,0
P052	selection DIN2	setting	off	3
P053	selection DIN3	setting	off	0
P054	selection DIN4	setting	off	0
P055	selection DIN5	setting	off	0

Procedure for Changing Parameter Values:

Important: Parameter above P009 cannot be adjusted unless setting is made to 002 or 003.

1. Press P-button, Display changes to 000.
2. Select the parameter to change.
3. Check the value of the parameter currently selected.
4. Do you wish to change the value? If not, go to 6.
5. Increase or decrease the value of the parameter.
6. Store the new value into memory (if changed) and return to the parameter display.
7. Do other parameters need changing? If so, return to 2.
8. Scroll up or down until P944 or P000 is displayed. If you scroll upwards, the display stops automatically at P944. Pressing the up-button again causes the display change to P000.
9. Exit from the procedure and to the return to the normal operating display.

Important: All frequency adjustments should be read directly from the frequency converter display.

Adjustment of the movement axis:

- Release the **longitudinal** movement of the table; adjust on the board +A2 with poti R1 30 Hz.
- Release **system** movement and adjust on the board +A2 with poti R2 51 Hz.
- Release **tilting** movement and adjust the board +A2 with poti R3 60 Hz.

Shut off power and reconnect plug -X25. Reinstall covers.

Automatic table edge compensation:

With the switches +A1-S1 and -S2 in "ON" position means that during table tilt motion also the vertical motion is activated and the edge of the table top remains at the same level.

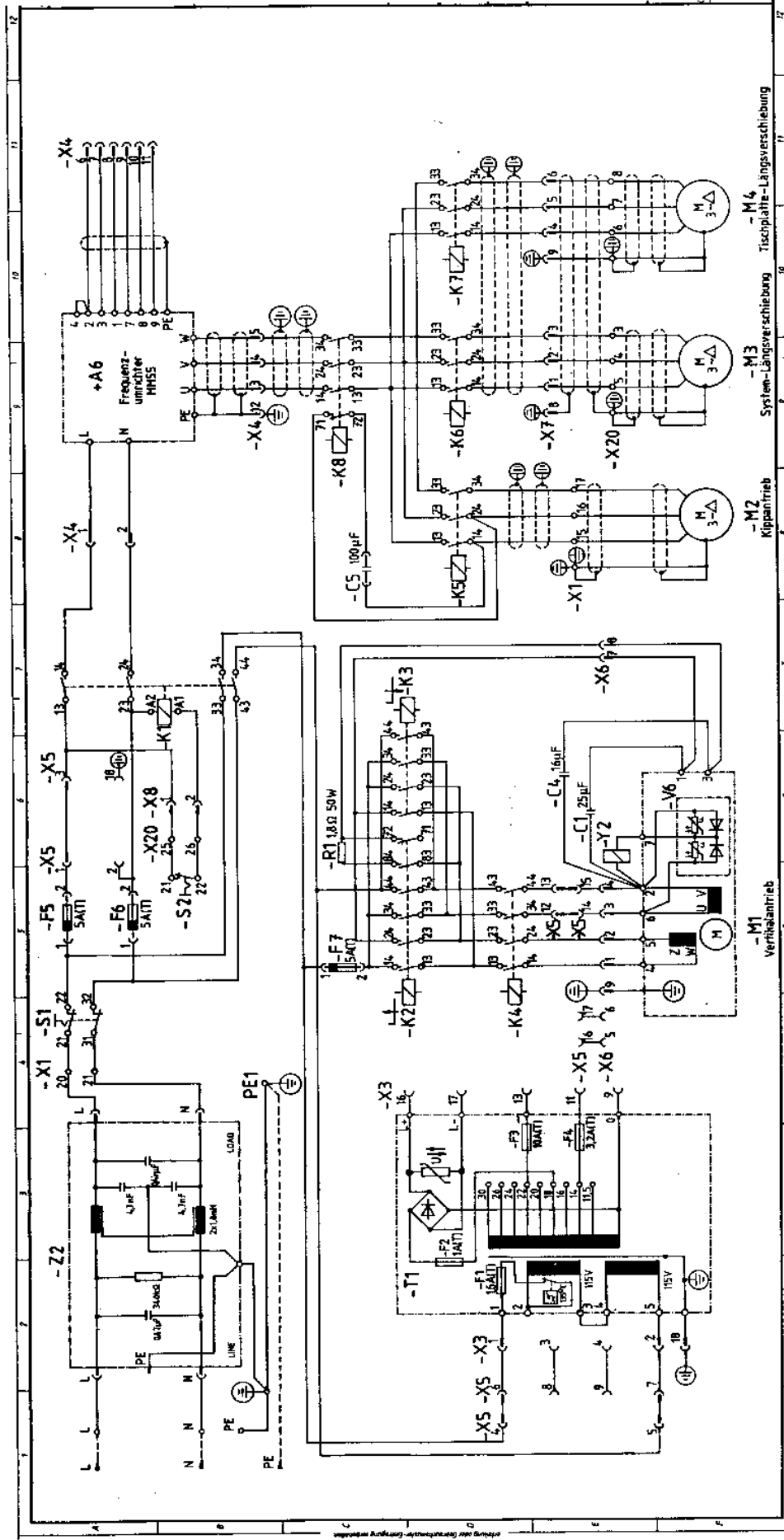
Decrement of the Safety Limit Distance:

With the switches +A1-S3 and -S4 in "ON" position it is possible on your own responsibility to decrease the safety limit distance by activating at the same time the control box and the foot switch.

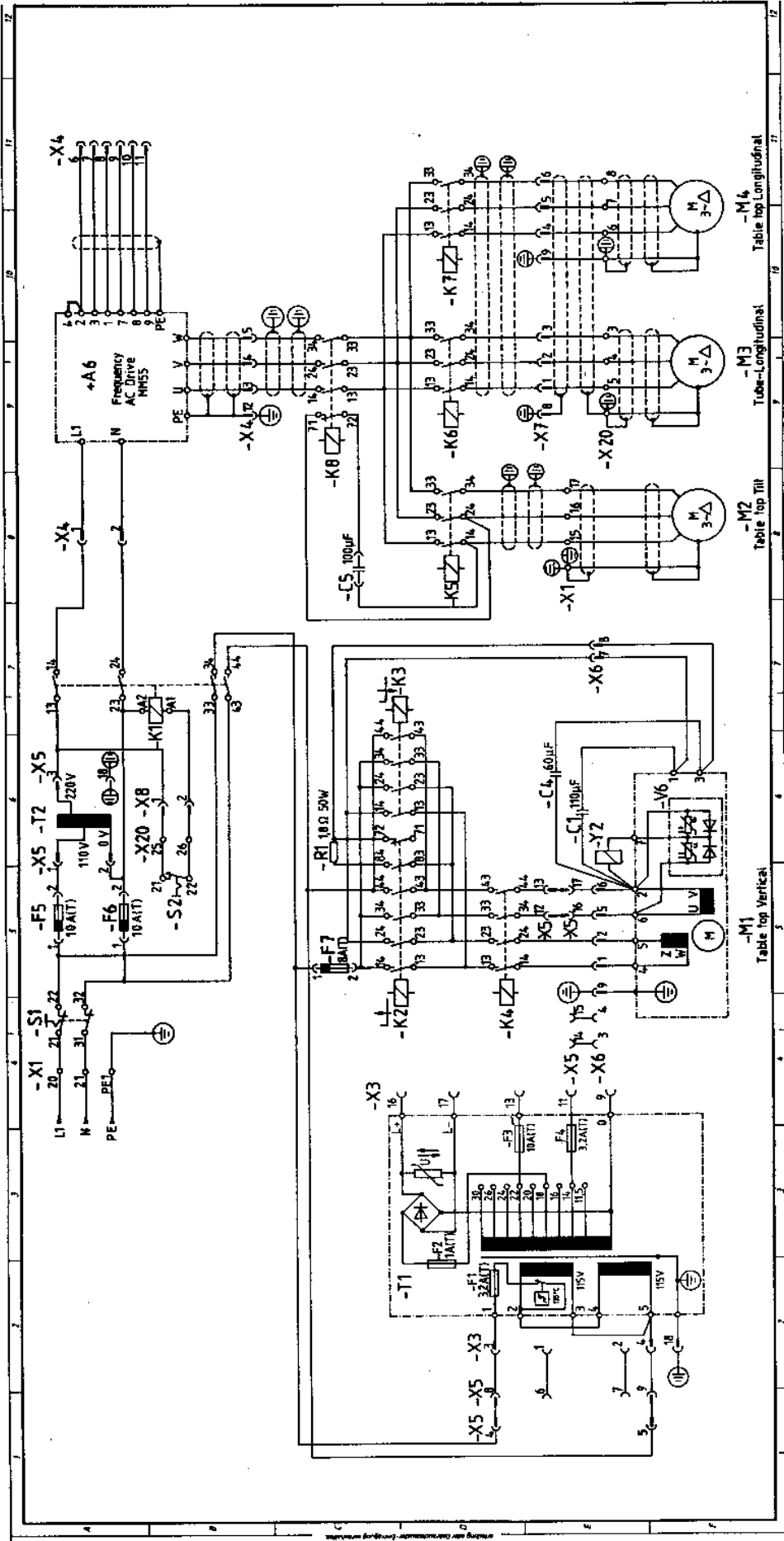
For Lateral Drive Motor:

Switch +A5-S1 in position "w" soft slow down
in position "h" hard slow down
Potentiometer +A5-R1 ramp time up
+A5-R2 ramp time down

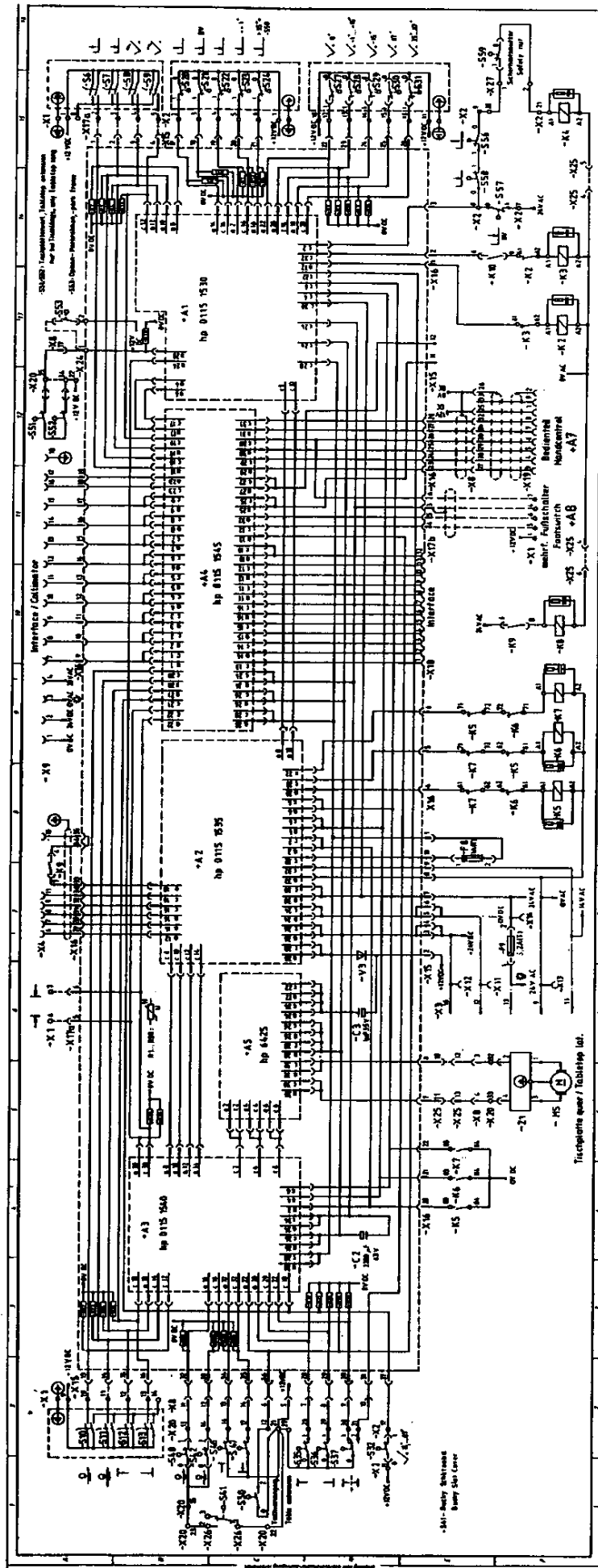
4.1 Schematics 230 V 50 Hz



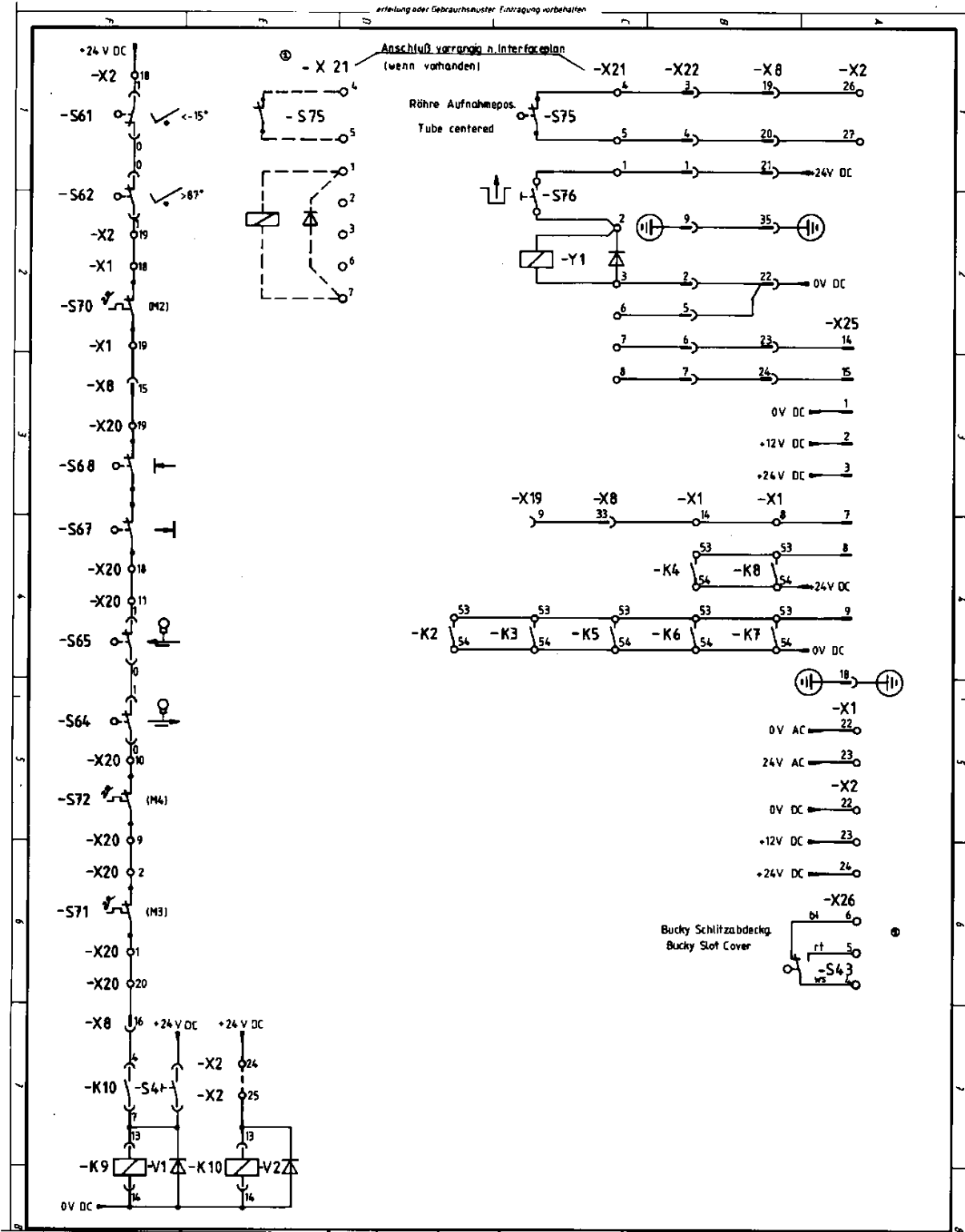
4.1.1.1 Schematics 115 V 60 Hz



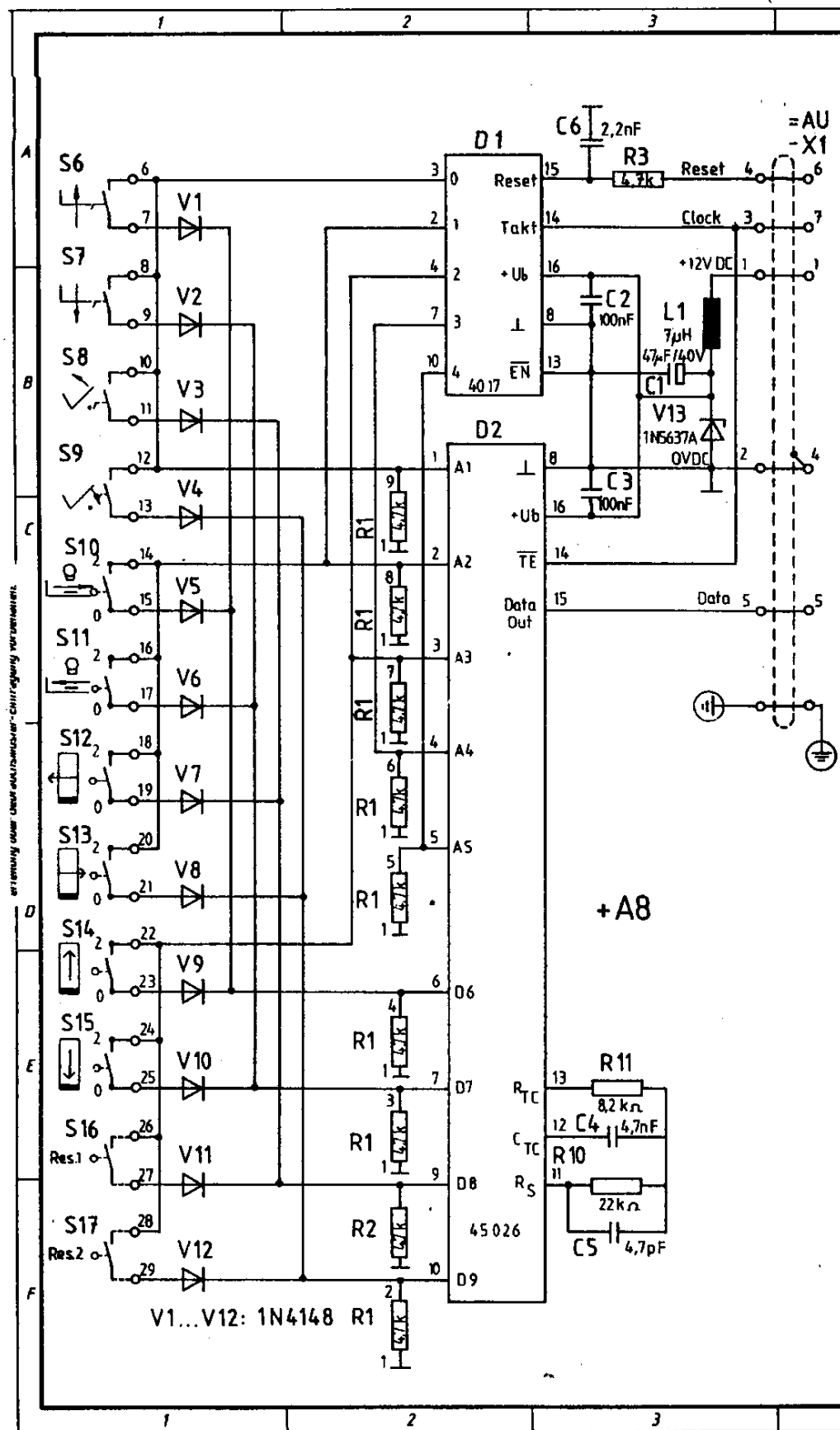
4.1.1.2 Schematic System Drive



4.1.3 Schematics Safety Circuit



4.1.5 Schematics Multiple Foot Switch



4.1.6 Schematic System Indication

+A1-V1 gr Exit signal-enable for tilt motion
-V2 ye Exit signal-change from cw to ccw for tilt motion
-V3 rd Limits-vertical down and tilt in connection with
table extension and table top extension
-V4 rd Limits-vertical down and table top tilt
-15°with I.I.
-V5 rd Vertical motion- when driving at the table
safety limits
-V6 gr Exit signal-vertical down
-V7 gr Exit signal-vertical up
-R1 Speed set point table longitudinal
-R2 Speed set point signal-column movement
-R3 Speed set point tilt motion
-

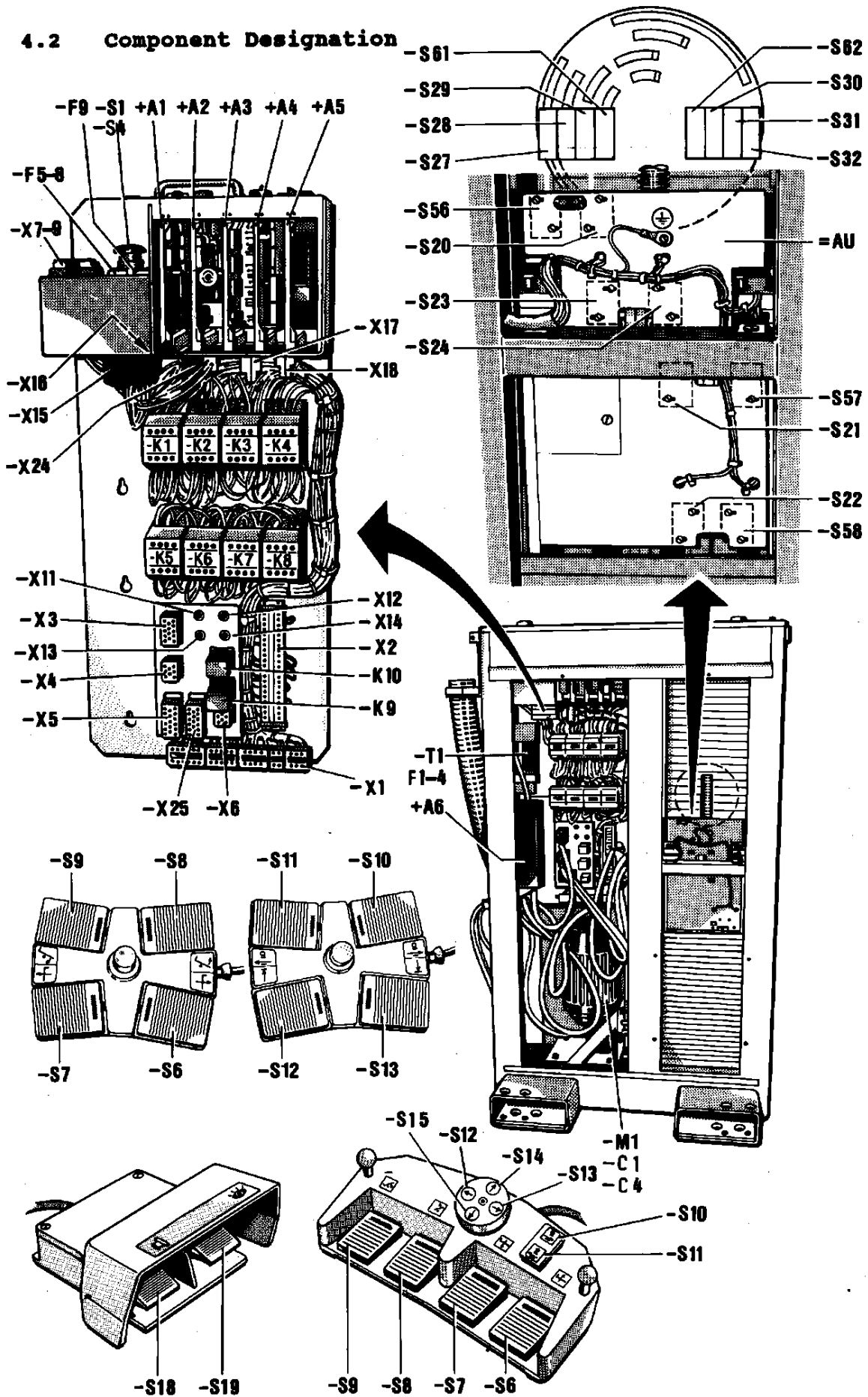
+A2-V1 gr Exit signal-table top longitudinal
-V2 gr Exit signal-column movement
-V3 gr Exit signal-tilt motion
-V4 gr Exit signal-enable for Frequency drive
-V5 ye Exit signal-change from cw. to ccw.
-V6 rd Exit signal-break on ramp down
-V7 gr Indication -Voltage +12 VDC

+A3-V1 gr Exit signal-adjustment release table long. motion
-V2 ye Exit signal-change of table top drive direction
footwards
-V3 gr Exit signal-adjustment release for column motion
-V4 ye Exit signal-change of drive direction column to
footwards
-V5 ye Exit signal-table top lateral to patients right
-V6 gr Exit signal-table top lateral to patients left

+A4-V19 rd Failure multiple foot switch
-V20 rd Failure Interrupt control box

+A5-D1 rd Exit signal-table top lateral

4.2 Component Designation



4.3 Identification of Component Numbers

= AU + A1	PC board (control vertical and tilt)
+ A2	PC board (power supply 12 VDC, control +A6)
+ A3	PC board (control system table top lateral)
+ A4	PC board (control panel decoder)
+ A5	PC board (motor control for -M5)
+ A6	frequency converter (for -M2, -M3, -M4)
+ A7	control panel (all motor movements)
+ A8	multiple foot switch
+ A9	extra board for II-crash protection
+ A10	PC board (dual safety circuitry option)
- C1	start capacitor (for -M1)
- C2	electrolyte capacitor (condenser for +24VDC)
- C3	electrolyte capacitor (condenser for +12VDC)
- C4	
- C5	
- F1	fuse (T1 prim.)
- F2	fuse (T1 sec.DC)
- F3	fuse (T1 sec.AC)
- F4	
- F5	fuse (+A6)
- F6	fuse (+A6)
- F7	fuse (-M1)
- F8	fuse (+12VDC)
- F9	fuse (24VAC)
- K1	contactor (emergency off)
- K2	contactor motor (vertical up)
- K3	contactor (vertical down)
- K4	safety contactor (vertical)
- K5	contactor motor (tilt)
- K6	contactor motor (column drive)
- K7	contactor motor (table top longitudinal)
- K8	safety contactor (tilt, column drive, table top longitudinal)
- K9	safety relay (-K8, +A6)
- K10	safety relay (I.I. crash cover)
- M1	vertical motor drive
- M2	tilt motor
- M3	column drive motor
- M4	motor table top longitudinal
- M5	motor table top lateral
- R1	High-load resistance
- T1	control transformer
- T2	power supply (for 115 V)
- V1	extinction diode (-K9)
- V2	extinction diode (-K10)
- V3	diode (decoupling +12V)
- V4	
- V5	LED (double safety circuitry)
- Y1	De-locking solenoid (for movable tube arm)

4.3.1 Identification of Component Numbers

- S1 emergency off switch
- S2 emergency off switch
- S3
- S4 service switch (decoupling -K8)
- S5
- S6 foot switch raise table top
- S7 foot switch lower table top
- S8 foot switch tilts head end of table upward
- S9 foot switch tilts head end of table downward
- S10 foot switch moves tube column toward head end
- S11 foot switch moves tube column toward foot end
- S12 foot switch moves table top to patient's left side
- S13 foot switch moves table top to patient's right side
- S14
- S15
- S16
- S17
- S18 foot switch exposure
- S19 foot switch fluoroscopy
- S20 limit switch raise table top
- S21 limit switch lower table top with I.I.
- S22 limit switch lower table top
- S23 limit switch vertical travel -1° - -15° (I.I.)
- S24 limit switch vertical travel $+35^{\circ}$ - $+87^{\circ}$ with table extension
- S25
- S26
- S27 limit switch tilt 0° degrees
- S28 limit switch tilt -1° to -15° degrees
- S29 limit switch tilt -15° degrees
- S30 limit switch tilt $+87^{\circ}$ degrees
- S31 limit switch tilt $+35^{\circ}$ - $+87^{\circ}$ degrees
- S32 limit switch tilt $+15^{\circ}$ - $+87^{\circ}$ degrees
- S33
- S34
- S35 limit switch table top to patient's left side
- S36 limit switch table top to patient's right side
- S37 limit switch table top at center position
- S38
- S39
- S40 limit switch tube to head end of table
- S41 switch Bucky door lock
- S42 limit switch tube to foot end of table
- S43 switch Bucky door interface
- S44
- S45
- S46 limit switch table top to head end
- S47 limit switch table top to foot end
- S48
- S49
- S50 limit switch table extension

4.3.2 Identification of Component Numbers

- S51 limit switch table top extension
- S52 limit switch table top extension
- S53 limit switch table top extension
- S54
- S55
- S56 limit safety switch table top upward
- S57 limit safety switch table down I.I.
- S58 limit safety switch table top down
- S59 limit safety switch spindle nut
- S60
- S61 limit safety switch tilt -15° degrees
- S62 limit safety switch tilt +87° degrees
- S63
- S64 limit safety switch tube to head end
- S65 limit safety switch tube to foot end
- S66
- S67 limit safety switch table top head end
- S68 limit safety switch table top foot end
- S69
- S70 temperature switch tilt motor
- S71 temperature switch column drive motor
- S72 temperature switch table top motor
- S73
- S74
- S75 limit switch tube in exposure position
- S76 push button tube movement
- S77 test push button for dual safety circuitry

- Z1 interference filter for table top motor

- X1 terminal strip foot switch -M2, power
- X2 terminal strip switch board
- X3 connector power supply
- X4 connector frequency converter
- X5 connector jumper plug -T2
- X6 connector vertical motor
- X7 connector table connection -M3.-M4
- X8 connector table connection control signal
- X9 connector collimator
- X10 check point ground (PE)
- X11 check point + 24 VDC (red)
- X12 check point 0 VDC (black)
- X13 check point 24 VAC (green)
- X14 check point 0 VAC (yellow)
- X15 connector wiring board
- X16 connector wiring board
- X17a connector PC board 4 way foot switch
- X17b connector PC board multible foot switch
- X18 connector PC board interface
- X19 connector control panel
- X20 terminal strip in terminal box
- X21 terminal strip tube movement
- X22 connector tube support arm
- X23 connector operator handle
- X24 terminal strip limit switch table top ext.

4.3.3 Identification of Component Numbers

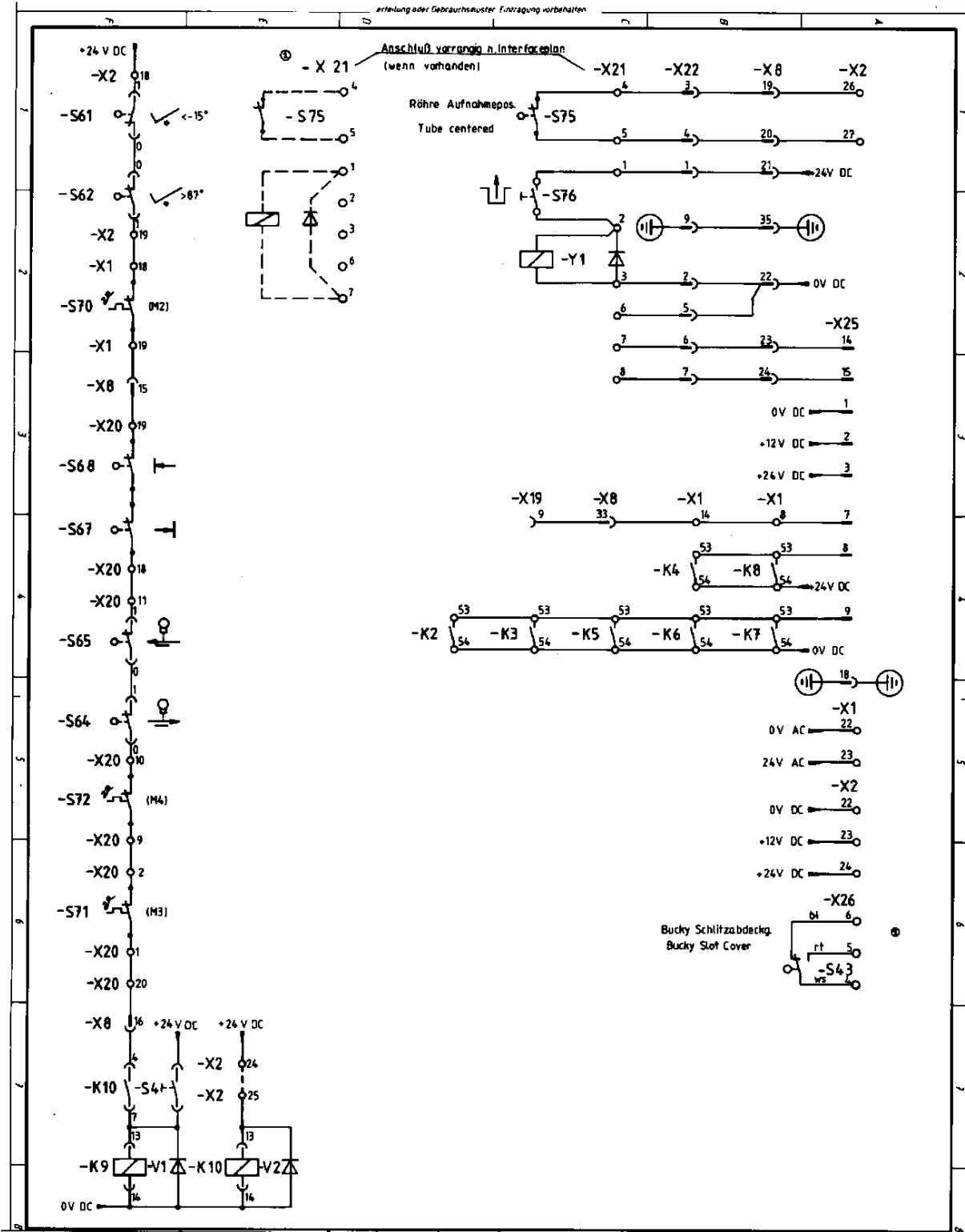
- X25 connector jumper plug PC board dual circuit
- X26 terminal strip switch Bucky door lock
- X27 terminal strip safety switch spindle nut
- X28 terminal strip for mask holder
- X29 terminal strip for tube/collimator
- X30 terminal strip for interface
- X40 main grounding point
- Z2 line filter
- Y2 motor break

- +A7 - S1 push button switch raise table top
- S2 push button switch lower table top
- S3 push button switch raise head end of table
- S4 push button switch raise foot end of table
- S5 push button switch drive tube to head end
- S6 push button switch drive tube to foot end
- S7 push button switch drive table top to patient's right
- S8 push button switch drive table top to patient's left
- S9 push button switch table top to head end
- S10 push button switch table top to foot end
- S11 not used
- S12
- S13 push button switch close field light
- S14 push button switch open field light
- S15 push button switch close field light
- S16 push button switch open field light
- S17 not used
- S18 not used
- S19 not used
- S20 not used

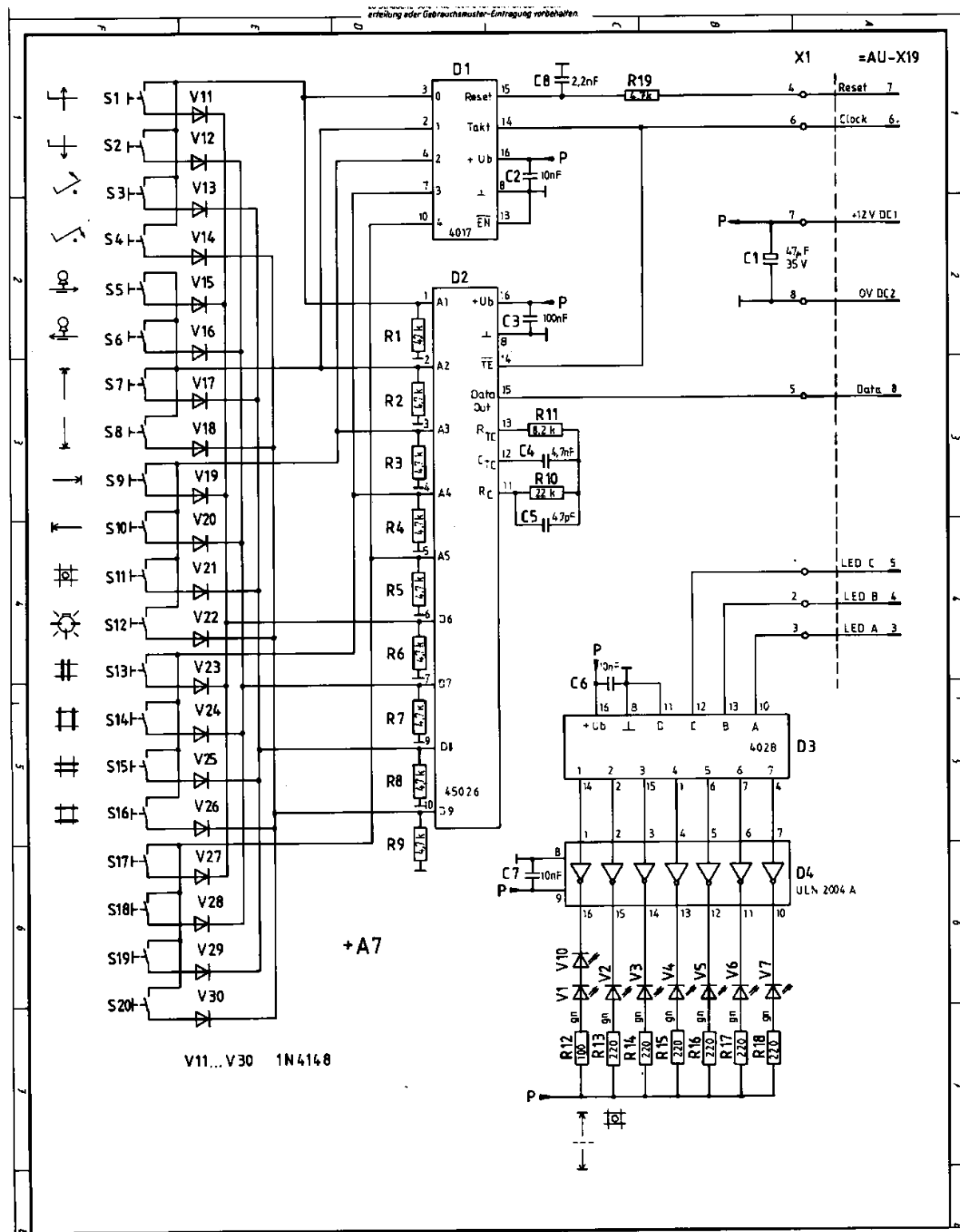
- V1, -V10 table top center position lateral
- V2 not used
- V3 not used
- V4 not used
- V5 not used
- V6 not used
- V7 not used
- V8 not used

- +A8 - S6 foot switch raise table top
- S7 foot switch lower table top
- S8 foot switch raise head end of table top
- S9 foot switch raise foot end of table top
- S10 foot switch drive tube to head end
- S11 foot switch drive tube to foot end
- S12 foot switch drive table top to patient's right
- S13 foot switch drive table top to patient's left
- S14 foot switch drive table top to head end
- S15 foot switch drive table top to foot end
- S16 not used
- S17 not used

4.1.3 Schematics Safety Circuit



4.1.4 Schematics Control Panel



4.1.6 Schematic System Indication

+A1-V1 gr Exit signal-enable for tilt motion
-V2 ye Exit signal-change from cw to ccw for tilt motion
-V3 rd Limits-vertical down and tilt in connection with
table extension and table top extension
-V4 rd Limits-vertical down and table top tilt
-15°with I.I.
-V5 rd Vertical motion- when driving at the table
safety limits
-V6 gr Exit signal-vertical down
-V7 gr Exit signal-vertical up
-R1 Speed set point table longitudinal
-R2 Speed set point signal-column movement
-R3 Speed set point tilt motion
-

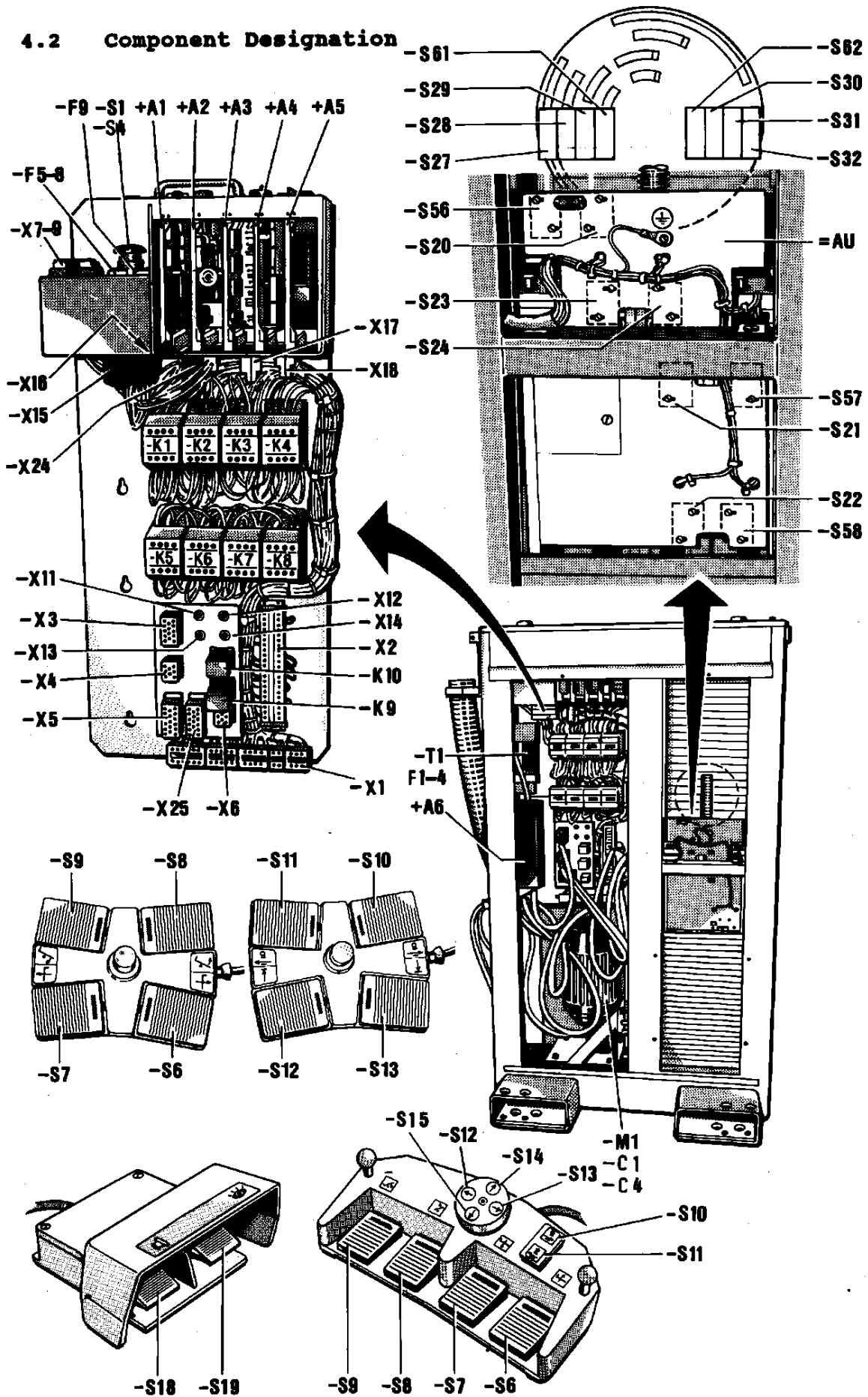
+A2-V1 gr Exit signal-table top longitudinal
-V2 gr Exit signal-column movement
-V3 gr Exit signal-tilt motion
-V4 gr Exit signal-enable for Frequency drive
-V5 ye Exit signal-change from cw. to ccw.
-V6 rd Exit signal-break on ramp down
-V7 gr Indication -Voltage +12 VDC

+A3-V1 gr Exit signal-adjustment release table long. motion
-V2 ye Exit signal-change of table top drive direction
footwards
-V3 gr Exit signal-adjustment release for column motion
-V4 ye Exit signal-change of drive direction column to
footwards
-V5 ye Exit signal-table top lateral to patients right
-V6 gr Exit signal-table top lateral to patients left

+A4-V19 rd Failure multiple foot switch
-V20 rd Failure Interrupt control box

+A5-D1 rd Exit signal-table top lateral

4.2 Component Designation



4.3 Identification of Component Numbers

= AU + A1	PC board (control vertical and tilt)
+ A2	PC board (power supply 12 VDC, control +A6)
+ A3	PC board (control system table top lateral)
+ A4	PC board (control panel decoder)
+ A5	PC board (motor control for -M5)
+ A6	frequency converter (for -M2, -M3, -M4)
+ A7	control panel (all motor movements)
+ A8	multiple foot switch
+ A9	extra board for II-crash protection
+ A10	PC board (dual safety circuitry option)
- C1	start capacitor (for -M1)
- C2	electrolyte capacitor (condenser for +24VDC)
- C3	electrolyte capacitor (condenser for +12VDC)
- C4	
- C5	
- F1	fuse (T1 prim.)
- F2	fuse (T1 sec.DC)
- F3	fuse (T1 sec.AC)
- F4	
- F5	fuse (+A6)
- F6	fuse (+A6)
- F7	fuse (-M1)
- F8	fuse (+12VDC)
- F9	fuse (24VAC)
- K1	contactor (emergency off)
- K2	contactor motor (vertical up)
- K3	contactor (vertical down)
- K4	safety contactor (vertical)
- K5	contactor motor (tilt)
- K6	contactor motor (column drive)
- K7	contactor motor (table top longitudinal)
- K8	safety contactor (tilt, column drive, table top longitudinal)
- K9	safety relay (-K8, +A6)
- K10	safety relay (I.I. crash cover)
- M1	vertical motor drive
- M2	tilt motor
- M3	column drive motor
- M4	motor table top longitudinal
- M5	motor table top lateral
- R1	High-load resistance
- T1	control transformer
- T2	power supply (for 115 V)
- V1	extinction diode (-K9)
- V2	extinction diode (-K10)
- V3	diode (decoupling +12V)
- V4	
- V5	LED (double safety circuitry)
- Y1	De-locking solenoid (for movable tube arm)

4.3.1 Identification of Component Numbers

- S1 emergency off switch
- S2 emergency off switch
- S3
- S4 service switch (decoupling -K8)
- S5
- S6 foot switch raise table top
- S7 foot switch lower table top
- S8 foot switch tilts head end of table upward
- S9 foot switch tilts head end of table downward
- S10 foot switch moves tube column toward head end
- S11 foot switch moves tube column toward foot end
- S12 foot switch moves table top to patient's left side
- S13 foot switch moves table top to patient's right side
- S14
- S15
- S16
- S17
- S18 foot switch exposure
- S19 foot switch fluoroscopy
- S20 limit switch raise table top
- S21 limit switch lower table top with I.I.
- S22 limit switch lower table top
- S23 limit switch vertical travel -1° - -15° (I.I.)
- S24 limit switch vertical travel $+35^{\circ}$ - $+87^{\circ}$ with table extension
- S25
- S26
- S27 limit switch tilt 0° degrees
- S28 limit switch tilt -1° to -15° degrees
- S29 limit switch tilt -15° degrees
- S30 limit switch tilt $+87^{\circ}$ degrees
- S31 limit switch tilt $+35^{\circ}$ - $+87^{\circ}$ degrees
- S32 limit switch tilt $+15^{\circ}$ - $+87^{\circ}$ degrees
- S33
- S34
- S35 limit switch table top to patient's left side
- S36 limit switch table top to patient's right side
- S37 limit switch table top at center position
- S38
- S39
- S40 limit switch tube to head end of table
- S41 switch Bucky door lock
- S42 limit switch tube to foot end of table
- S43 switch Bucky door interface
- S44
- S45
- S46 limit switch table top to head end
- S47 limit switch table top to foot end
- S48
- S49
- S50 limit switch table extension

4.3.2 Identification of Component Numbers

- S51 limit switch table top extension
- S52 limit switch table top extension
- S53 limit switch table top extension
- S54
- S55
- S56 limit safety switch table top upward
- S57 limit safety switch table down I.I.
- S58 limit safety switch table top down
- S59 limit safety switch spindle nut
- S60
- S61 limit safety switch tilt -15° degrees
- S62 limit safety switch tilt +87° degrees
- S63
- S64 limit safety switch tube to head end
- S65 limit safety switch tube to foot end
- S66
- S67 limit safety switch table top head end
- S68 limit safety switch table top foot end
- S69
- S70 temperature switch tilt motor
- S71 temperature switch column drive motor
- S72 temperature switch table top motor
- S73
- S74
- S75 limit switch tube in exposure position
- S76 push button tube movement
- S77 test push button for dual safety circuitry

- Z1 interference filter for table top motor

- X1 terminal strip foot switch -M2, power
- X2 terminal strip switch board
- X3 connector power supply
- X4 connector frequency converter
- X5 connector jumper plug -T2
- X6 connector vertical motor
- X7 connector table connection -M3.-M4
- X8 connector table connection control signal
- X9 connector collimator
- X10 check point ground (PE)
- X11 check point + 24 VDC (red)
- X12 check point 0 VDC (black)
- X13 check point 24 VAC (green)
- X14 check point 0 VAC (yellow)
- X15 connector wiring board
- X16 connector wiring board
- X17a connector PC board 4 way foot switch
- X17b connector PC board multible foot switch
- X18 connector PC board interface
- X19 connector control panel
- X20 terminal strip in terminal box
- X21 terminal strip tube movement
- X22 connector tube support arm
- X23 connector operator handle
- X24 terminal strip limit switch table top ext.

4.3.3 Identification of Component Numbers

- X25 connector jumper plug PC board dual circuit
- X26 terminal strip switch Bucky door lock
- X27 terminal strip safety switch spindle nut
- X28 terminal strip for mask holder
- X29 terminal strip for tube/collimator
- X30 terminal strip for interface
- X40 main grounding point
- Z2 line filter
- Y2 motor break

- +A7 - S1 push button switch raise table top
- S2 push button switch lower table top
- S3 push button switch raise head end of table
- S4 push button switch raise foot end of table
- S5 push button switch drive tube to head end
- S6 push button switch drive tube to foot end
- S7 push button switch drive table top to patient's right
- S8 push button switch drive table top to patient's left
- S9 push button switch table top to head end
- S10 push button switch table top to foot end
- S11 not used
- S12
- S13 push button switch close field light
- S14 push button switch open field light
- S15 push button switch close field light
- S16 push button switch open field light
- S17 not used
- S18 not used
- S19 not used
- S20 not used

- V1, -V10 table top center position lateral
- V2 not used
- V3 not used
- V4 not used
- V5 not used
- V6 not used
- V7 not used
- V8 not used

- +A8 - S6 foot switch raise table top
- S7 foot switch lower table top
- S8 foot switch raise head end of table top
- S9 foot switch raise foot end of table top
- S10 foot switch drive tube to head end
- S11 foot switch drive tube to foot end
- S12 foot switch drive table top to patient's right
- S13 foot switch drive table top to patient's left
- S14 foot switch drive table top to head end
- S15 foot switch drive table top to foot end
- S16 not used
- S17 not used

5. Maintenance Procedure

Note:

The maintenance schedule described below is to be accomplished at 12-month intervals. If functional tests require power, turn off immediately afterwards. Defective parts must be replaced by genuine spare parts according to the spare parts list. Use only noacid grease for maintenance. Do not grease or oil ball bearings with sealed washers.

5.1 Physical and Electrical Checks

Preparations

- drive table all the way to its upper position
- turn off power (mains)
- remove left and right table base rear trim cover, the table base cover cap and the bottom trim cover
- remove foot rest, table extension, table top extension, leg support, head pillow and table mattress.

Floor mounting:

- check floor mounting bolts for proper fit tighten if necessary with a torque wrench 25 Nm (2,5 Kpm)
- check table base with water level in both directions. Compensate with shims under table base mounting points and tighten mounting bolts.

Tilting mechanism:

- turn on power -move thru the entire tilting range and check for steady motion.
- clean and grease spindle cover pipe. unhook both springs on the rear part of the table base for the upper and lower roll shutters.
- unhinge the upper roll shutter in upward direction.

Note:

Do not move the table up or down because the roll shutter might get damaged.

- remount the limit switch plate =AU (Fig.16) and switch plate (Fig.17).
- check firmness of all screws.
- check cable for tilting motor +M2 and cable for limit switch plate on damage.
- drive table in trendelenburg position and check limit switch -S29. Adjust cam (Fig.20, item 80) if necessary.

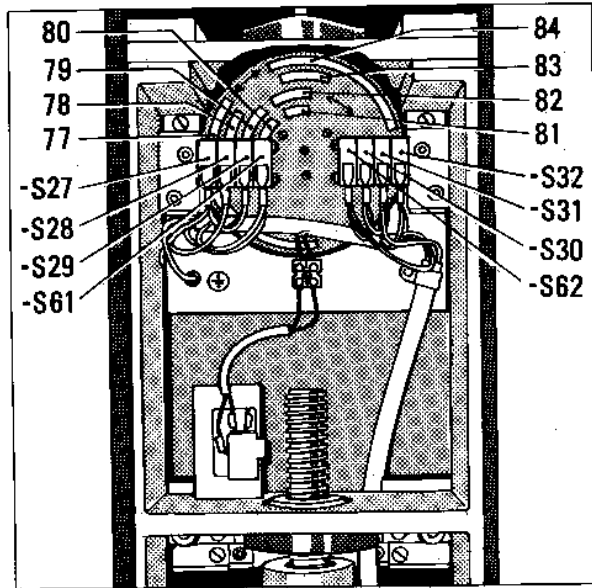


Fig.20

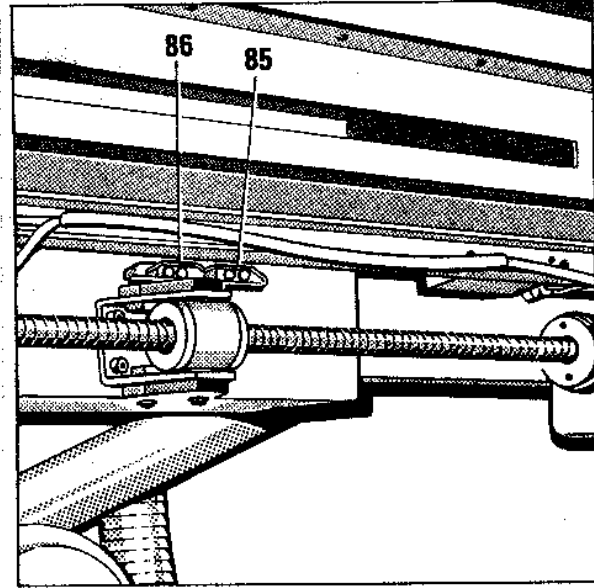


Fig.21

- drive table in horizontal position from both directions and check the horizontal position with water level. If necessary adjust switch cam (Fig.20, item 81).
- drive table in vertical position and check limit switch -S30. If necessary adjust cam (Fig. 20, item 82).

Safety limit switch:

- check switch -S61 by setting a jamper at terminal strip -X2:10 and -X2:14. Driving the table in opposite direction is now possible when contactor -K8 is actuated.
- check switch -S62 by setting a jamper at terminal strip -X2:11 and -X2:15. Driving the table in opposite direction is now possible when contactor -K8 is actuated.

Vertical drive:

- clean the running tracks for the rollers and guide rails.
- clean lift spindle and spindle nut and check for traces of wear. Distance between safety nut and strut should be ca. 4 mm.
- check rollers for traces of wear and adjust eccentric bearings.
- check all screws for proper fit.
- install limit switch plate and cam plate =AU.
- install upper roll shutter and hook up the springs.
- check safety switch -S59 on the safety nut.
- drive thru entire travel range of the vertical movement and check for steady motion.
- replace tooth head belt or sprockets if worn out.

- check belt tension and tighten if necessary.
- drive thru the entire travel range of vertical motion and check for steady motion.
- drive table in horizontal position all the way down and check limit end switch -S21. Adjust switch cam (Fig.17, item 73) if necessary.
- drive table in vertical position all the way down and check limit end switch -S22. Adjust switch cam (Fig.17, item 72) if necessary.
- drive table all the way up and check limit end switch -S20. Adjust switch cam (Fig.17, item 71) if necessary.

Safety limit switch:

- check switch (upwards) -S56 by setting a jamper between terminal strip -X2:1 and -X2:2. Driving the table in opposite direction is now possible when contactor -K4 is actuated.
- check switch (I.I. down) -S57 by setting a jamper between terminal strip -X2:1 and -X2:3. Driving in the opposite direction is now possible when contactor -K4 is actuated.
- check switch -S58 (down) by setting a jamper between terminal strip -X2:1 and -X2:4. Driving in the opposite direction is now possible when contactor -K4 is actuated.

Column motion longitudinal drive:

- drive column motion thru entire travel range and check for steady motion.
- clean and lubricate guide rails, rollers and spindle.
- check rollers for traces of wear and adjust eccentric bearings if necessary.
- check all screws for tight fit.
- check all cable connections for tight fit and damage
- drive column motion to the head end and check limit switch -S40. Adjust switch cam if necessary (Fig.21, item 85).
- drive column motion to the foot end and check limit switch -S42. Adjust switch cam if necessary (Fig.21, item 86).

Safety limit switch:

- check switch -S65 (column motion to foot end) by setting a jamper between terminal strip -X20:15 and -X20:13. Driving the column motion to the head end is now possible when contactor -K8 is actuated.
- check switch -S64 (column motion to the head end) by setting a jamper between terminal strip -X20:15 and -X20:13. Driving the column motion to the foot end is now possible when contactor -K8 is actuated

Longitudinal Table top motion:

- drive table top thru entire travel of longitudinal movement and check for steady motion.
- remove motor cover.
- clean and grease guide rails.
- check all screws for proper fit.

- check clutch between gearmotor and sprocket for traces of wear. Replace if necessary.
- check cable routing for integrity and proper fit.
- drive table top to the head end and check switch -S46. adjust switch cam (on the bottom part of the table) if necessary.
- drive table top to the foot end side and check switch -S47.

Safety limit switch:

- jumper switch -S68 (on the foot end side) at terminal strip -X20:21 and -X20:17. If contactor -K8 is actuated the table top can be moved to the head end side.
- jumper switch -S67 at the terminal strip -X20:21 and -X20:16. If contactor -K8 is actuated the table top can be moved to the foot end side of the table.

Table top lateral movement:

- drive table top thru entire travel range of lateral movement and check for steady motion.
- check deflector rollers for the wire rope and the rope itself. Adjust tension for the wire rope with the adjusting screw.
- check gear motor and tooth head racks and adjust the racks (there should be no slack).
- check cable routing and cables for integrity and proper fit.
- check limit switches -S35 and -S36 and the middle switch -S37. Adjust the trip cams if necessary.

Tube support arm, movable:

- remove cover.
- actuate switch -S76 and move the tube support arm over entire travel range. Check for steady motion.
- clean guide tracks and rollers.
- adjust slack free all eccentric rollers.
- check cable routing and cables for integrity and proper fit.
- check function and decoupling of the lock bolt.

Hand control box:

- check cable routing and cable for integrity and proper fit.
- check the function of all switches.
- check the attachment to the accessory rail. Adjust for proper fit if necessary.

Component panel:

- turn off power.
- check all cable routings and cables for integrity and proper fit. Replace damaged cables if necessary.
- tighten all pipe connections.
- tighten all mounting screws of components.
- check all PC boards for tight fit.
- check all strain reliefs and ground conductors for proper fit.

Foot switch:

- check all cable routings for integrity and proper fit if necessary replace broken cables.
- clean the gaps between the single foot switches.
- check all switch functions.

Electronics:

- check electronic adjustment parameters acc. to chapter 3.4 on page -3.2-.

Accessories:

- check all accessories items present at location.
- insert table top extension. The tilting movement of the table should only be possible in the range of ± 15 degrees.
- insert table extension and check the factory preset safety travel of 12 cm. Adjust if necessary actuator bar (Fig.17, item 76).
- check secure fit of the leg supports in the accessory rails.
- check secure fit of the head pillow.
- check table mattress upon damage.
- check drain pan for proper function and damage.

General:

- reinstall all trim covers and cover caps.
- clean the unit.
- turn on power.
- go thru functional routine as described under 5.2
- adjust center of field light to center of Bucky acc. to chapter 3.2

5.2 Functional Check

Vertical drive:

turn on power. Drive unit over its entire travel range.

- steady motion ?
- automatic stop at lower and upper end position?
- proper functioning of the foot switch?
- proper functioning of the hand control box?
- no selftending break off?

Tilting drive:

- steady motion?
- smooth start up and slow down movement ?
- automatic stop in vertical, horizontal and trendelenburg position ?
- proper functioning of the foot switch?
- proper functioning of the hand control box?

Column drive:

- steady movement?
- smooth start up and slow down speed?
- automatic stop at head and foot position?
- no movement possible with Bucky latch door open?
- proper latching of the Bucky latch door?
- proper functioning of the foot switch?
- proper functioning of the hand control box?

Table top longitudinal drive:

- steady motion?
- smooth start up and slow down motion?
- automatic stop in its end position?
- proper functioning of the foot switch?
- proper functioning of the hand control box?

Table top lateral drive:

- steady motion?
- smooth start up and slow down motion?
- automatic stop in table top center position and in end position?
- proper functioning of the foot switch?
- proper functioning of the hand control box?

Tube support arm movable:

- easy decoupling in exposure and park position?
- steady motion ?

Table top extension:

- does the table top extension fit tight at foot end or head end?
- automatic shut off of the tilting motion out of the ± 15 degrees range?

Table extension:

- secure fit of the table extension when hooked up to the table frame?
- easy take off of the table extension?

Footrest:

- easy and save hook up of the foot rest in all positions?

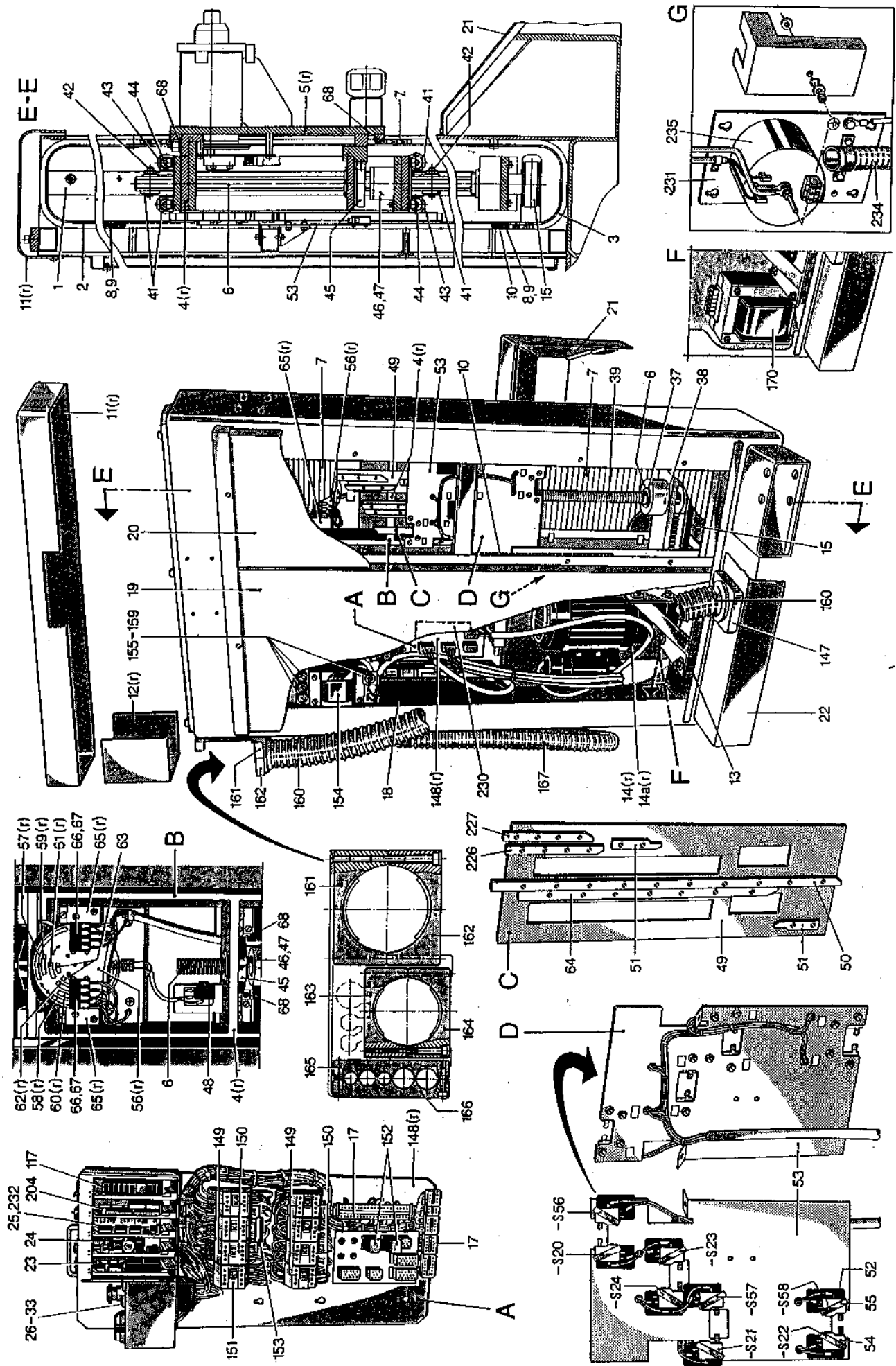
Accessories:

- all accessories functioning properly?

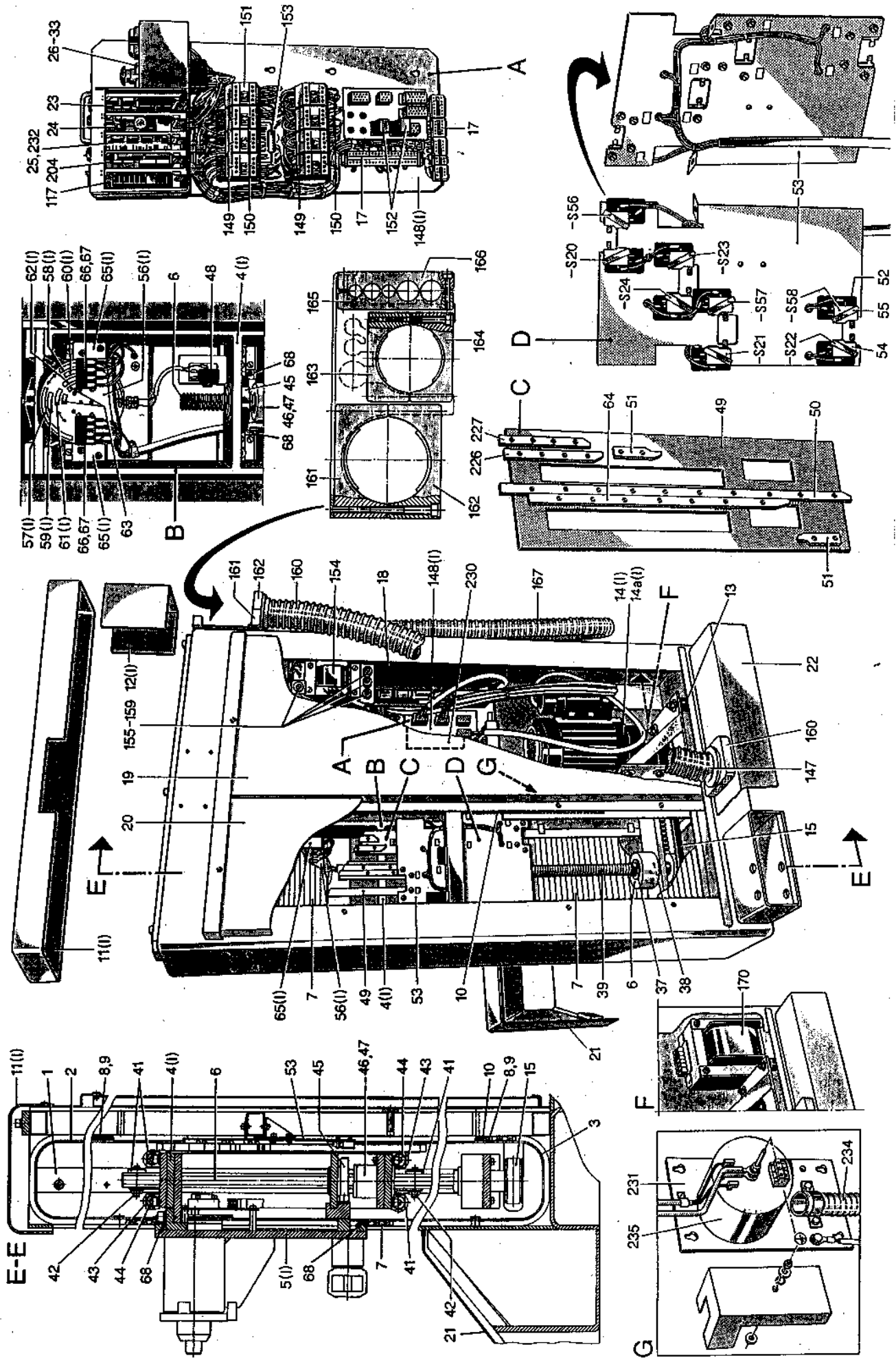
General:

- proper alignment of X-ray tube to Bucky?

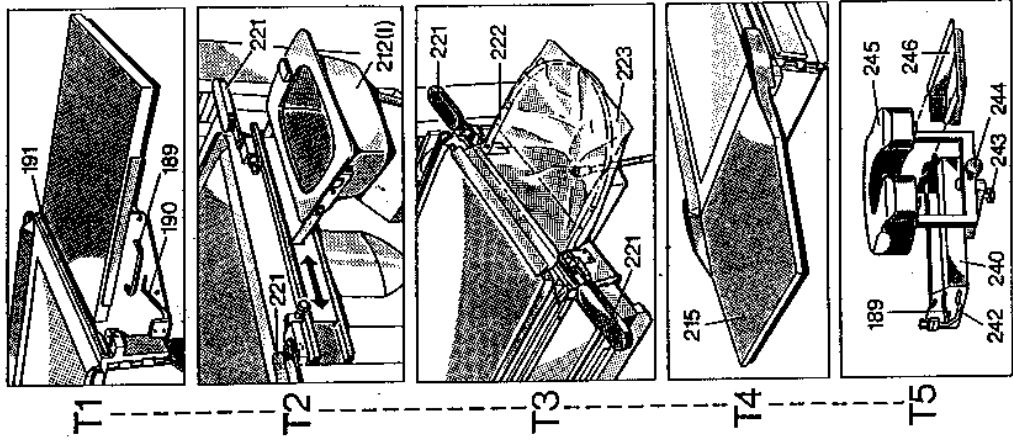
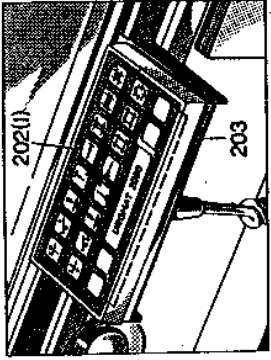
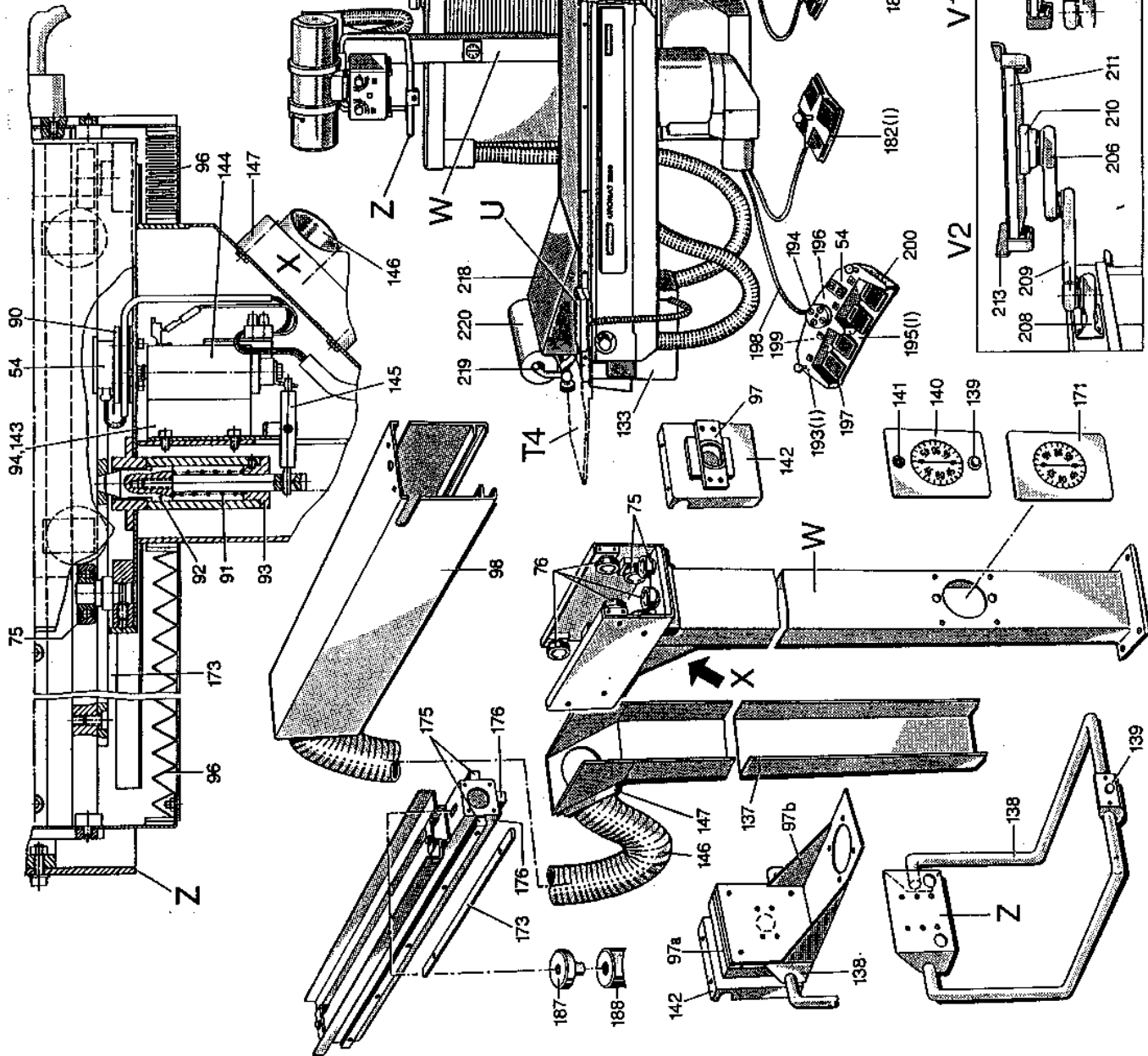
5.3 Spare Parts - Table Parts right version



5.3.1 Spare Parts - Table Parts left version



5.5.1 Spare Parts - Column -Accessories left version



5.6. Spare Parts List

Part Names / Ordering Numbers

Note: Failed spare parts may only be replaced with original parts listed below. When ordering parts always indicate serial number of unit and complete number of part. The exchange of parts or components may only be carried out by ourselves or by qualified personnel being authorized to do so. See also chapter: "Safety Notes".

Note: Item No. + r for right version
Item No. + l for left version

Item	Designation	Order No.
1	Guide rail	0115 0160
2	Side guide rail compl.	0115 0170a
3	Side guide rail compl.	0115 0170b
4 r	Vertical carriage compl.	0115 0200
4 l	Vertical carriage compl.	0115 0200b
5 r	Connecting plate	0115 0260
5 l	Connecting plate	0115 0230
6	Vertical spindle compl.	0115 0180
7	Round bar	0115 176a
8	Round bar	0115 0176b
9	Bar	0115 0285
10	Spring	0115 0286
11 r	Cover cap	0115 0165
11 l	Cover cap	0115 0165b
12	Cover	0115 1619a
13	Bumper	0005 0235o
13a	Taber Lock	0005 0242d
14 r	Spur gear motor	0115 0144a
14 l	Spur gear motor	0115 0149
14a r	Spur gear motor 60 Hz	0115 0148
14a l	Spur gear motor 60 Hz	0115 0148b
15	Tooth belt	0005 0243a
16	Motor Cable	0115 1566
17	Terminal strip	0006 0173
18	Frequency converter	0115 1150
19	Back wall	0115 0135a
20	Back wall	0115 0135b
21	Base trim cover	0115 0145
22	Cable race way	0115 0161
23	PC board +A1	0115 1530
24	PC board +A2	0115 1535
25	PC board +A3	0115 1540
26	Fuse 6,3 x 32 5A (T)	0006 0308c
27	Fuse 6,3 x 32 10A (T)	0006 0308k
28	Fuse 6,3 x 32 1A (T)	0006 0308d
29	Fuse 6,3 x 32 8A (T)	0006 0308m
30	Fuse 3,2A (T)	0006 0308g
31		
32	Cap 6,3 x 32	0006 0152b
33	Cap 5 x 20	0006 0152a
34	Switch	0006 0375
35	Motor Connecting plate	0115 0177
36 r	Tilt unit	0115 0195
36 l	Tilt unit	0115 0195b

Item	Designation	Ordering No.
37	Bearing 25 x 62 x 17	2400 0042
38	Bearing 25 x 47 x 15	2400 0043
39	Spindle	0115 0883
40		
41	Guide roller	0005 0200
42	Shaft	0115 0214
43	Bearing 10 x 30 x 9	2400 0036
44	Eccentric bushing	0115 0215
45	Flange nut	0115 0227
46	Spindle nut compl.	0115 0220
47	Spindle nut	0005 0210h
48	Switch	0006 0184
49	Bracket	0115 0191
50	Trip cam	0115 0190a
51	Actuator	0115 0192
52	Insulating plate	0006 0257a
53	Switch bracket compl.	0115 0235
54	Switch	0006 0480
55	Nut plate	0660 0755
56 r	Cam plate compl.	0115 0240
56 l	Cam plate compl.	0115 0245
57 r	Trip cam	0115 0252
57 l	Trip cam	0115 0252b
58 r	Trip cam	0115 0253
58 l	Trip cam	0115 0253b
59 r	Trip cam	0115 0257
59 l	Trip cam	0115 0257b
60 r	Trip cam	0115 0256
60 l	Trip cam	0115 0256b
61 r	Trip cam	0115 0249
61 l	Trip cam	0115 0249b
62 r	Trip cam	0115 0248
62 l	Trip cam	0115 0248b
63	Trip cam	0115 0246
64	Switch bracket	0115 0190d
65 r	Trip cam plate compl.	0115 0270
65 l	Trip cam plate compl.	0115 0270b
66	Switch	0006 0079b
67	Additional cam	0006 0487
68	Clamp	0115 0283
69		
70	Eccentric bushing	0115 0377
71	Roller	0005 0161d
72	Roller bracket	0115 1631
73	Spindle	0006 0482
73	Spindle	0006 0483
74	Terminal box compl.	0115 1525
75	Eccentric busching with roller	0115 0395
76	Bushing with roller	0115 0397
77	Roller 12 x 35 x 10	0005 0161b
78	Guide rail	0115 0365a
79	Guide rail	0115 0365b
80	Solenoid permanent	0005 0094
81	Reed switch solenoid	0006 0549b
82	Slot cover	0115 0420
83	Spindle nut	0115 0434
84	Trip cam	0115 0899
85	Trip cam	0115 0898a
86	Trip cam	0115 0898b

Item	Designation	Ordering No.
87	Support front	0115 0515
88	Support rear	0115 0530
89	Reed switch sensor	0006 0549a
90	Switch bracket	0115 0455
91	Spring	0005 0042w
92	Bolt	0115 0486
93	Flange	0115 0487
94	Solenoid bracket compl.	0115 0875
95	Bumper	0115 0404
96	Bellows	0007 0058
96a		
97	Tube shaft	0115 0410
97a		0115 1015
97b		0115 1017
98	Cable cover	0115 1625
99	Bushing	0115 0557
100	Table guide	0115 0524
101	Table cover	0115 0525
102 r	Ledge compl.	0115 0540
102 l	Ledge compl.	0115 0540b
103	Strip	0115 0523a
104 r	Frame	0115 0520
104 l	Frame	0115 0520b
105	Drain gutter	0115 0371a
106 r	Drain gutter	0115 0374
106 l	Drain gutter	0115 0374b
107	Deflector pulley	0366 0121b
108	Sprocket	0115 0586
109	Tooth head rack	0005 0204a
110	Lateral guide	0115 0595
111a	Shaft 20 x 635	0005 0145c
111b	Shaft 20 x 645	0005 0145d
112	Pedestal	0115 0574
113	Linear bearing	0005 0191a
114	Guide rail	0115 0599
115	Support rail	0115 0598
116	Lateral motor	0115 0690
117	PC board	0006 0425
118 r	Frame	0115 0560
118 l	Frame	0115 0560b
119 r	Gear motor	0006 0567
119 l	Gear motor	0006 0584
120	Chain	2300 0014
121	Hook	0115 0642a
122	Chain	2300 0015
123	Catch	0115 0644
124	Pedestal	0115 0645
125	Trip cam	0115 0607
126 r	Fame	0115 0630
126 l	Fame	0115 0630b
127	Table guide	0115 0635a
128	Glide surface	0115 0631
129	Clutch	0005 0229c
130 r	Carriage	0115 0660a
130 l	Carriage	0115 0660b
131	Pedestal compl.	0115 0680
132	Lateral carrier	0115 0675
133	Cover	0115 0810
134	Stabilizer	0115 0700
135	Sprocket short	0115 0624

Item	Designation	Ordering No.
136	Sprocket long	0115 0629
137	Cover	0115 0497
138	Operator handle	0115 0800
139	Push button	0006 0084a
140	Angle indicator	0115 0855b
141	LED	0006 0540
142	Cover	0115 0305
143	Solenoid with bracket compl.	0115 0875
144	Solenoid	0115 0495
145	Shaft	0115 0489
146	Flexible hose	0115 0897a
147	Hose holder	0007 0071a
148 r	Electrical component board	0115 1500
148 l	Electrical component board	0115 1500b
149	Contactora	0006 0186b
150	RC-cube	0006 0267b
151	Contactora	0006 0255
152	Relay	0006 0286b
152a	Retaining Clip	0006 0386
153	Resistor R1	0115 1509
154	Power supply	0006 0449
155	Cap 6,3 x 32	0006 0152b
156	Fuse 1A(T)	0006 0308d
157	Fuse 1,6A(T)	0006 0308b
158	Fuse 3,2A(T)	0006 0308g
159	Fuse 10A(T)	0006 0308k
160	Flexible hose	0115 0897b
161	Clamp 62 mm	0115 1595a
162	Clamp 62 mm	0115 1595b
163	Clamp 53 mm	0115 1593a
164	Clamp 53 mm	0115 1593b
165	Strain relief	0115 1618a
166	Strain relief	0115 1618b
167	Flexible hose	0007 0072a
168 r	Limit switch board compl.	0115 1610
168 l	Limit switch board compl.	0115 1610b
169	Switch	0006 0453
170	Power supply	0115 1556
171	Angle indicator	0115 0855a
172 r	Sweep compl.	0115 1630
172 l	Sweep compl.	0115 1630b
173	Detent strip	0115 0479
174		
175	Guide rail	0115 0478a
176	Guide rail	0115 0478b
177 r	Cover	0115 0305
177 l	Cover	0115 0305b
178	Spacer	0115 0638
179	Switch reworked	0115 1659a
180	Switch reworked	0115 1659b
181	Movable tube	0115 0470
182 r	Foot switch	0900 0010
182 l	Foot switch	0900 0010b
183	Foot switch	0900 0011
184	Foot switch fluoroscopy and I.I.	0900 0250
185	Foot rest	0900 0030
186	Pedal plate	0900 0031
187		
188		
189	Hook grip	0005 0188b

Item	Designation	Ordering No.
190	Lever	0900 0057
191	Bar	0115 0707
192		
193 r	Multiple foot switch	0900 0100
193 l	Multiple foot switch	0900 0100b
194	Foot lever	0900 0110
195 r	Base plate	0900 0108
195 l	Base plate	0900 0108b
196	Switch	0006 0079a
197	Foot switch	0006 0550
198	Foot switch cable	0900 0121
199	PC board +A8	0900 0180
200	Bumper	0005 0164g
201		
202	Control box compl.	0900 0200
203	Console	0900 0225
204	PC board +A4	0115 1545
205	Ball Knob grey	0005 0011d
206	Monitor support arm	0900 0950
207	Support arm for additional acces.	0900 0980
208	Wall mounting support arm	0005 0216a
209	Double hinge arm	0005 0216b
210	Table pedestal	0005 0216c
211	Table top	0005 0216d
212 r	Drain pan	0900 0850
212 l	Drain pan	0900 0850b
213	Monitor plate	0900 0970a
214	Table extension	0900 0050
215	Table top extension	0900 0800
216	Table mattress	0900 0070
217		
218	Head pillow	7157 0001
219	Paper towel holder	0900 0080
220	Paper towel 2 pc	7150 0002
221	Elbow supports pair	0900 0480
222	Drain bag attachment	0900 0300
223	Drain bags 40 pc	0900 0310
224		
225		
226	Switch bracket	0115 0190g
227	Switch bracket	0115 0190d
228	Emergency stop	0006 0260
229	Switch contact	0006 0261a
230	Cover	0115 1585
231	Print plate A10 PMS	0115 1660
232	Additional board II. collision	0115 1650
233	Power filder compl.	0115 1140
234	Flexible metal protedion tube	0115 1137a
235	Power filter	0006 0698a
236		
237		
238		
239		
240	Micturation seat compl.	0900 1100
241		
242	Lever	0900 1129
243	Hand wheel	0900 1137
244	Hand wheel	0900 1135
245	Seat pad	0900 1131
246	Drip plan	0900 1133

5.7 Troubleshooting

If no proper operation.

- D 1 -S1 and -S2 (emergency stop switch) unlocked ? n ↓
y → D3
- D 2 Proper operation ? n ↓ y → N1
- D 3 -K1 closed ? n ↓ y → D7
- D 4 Mains connection between -K1:A1 and -K1:A2 ? y ↓ n → D6
- D 5 Exchange -K1. Proper operation ? n → D3 y → N1
- D 6 Check mains connection between -X1:20 and -X1:21,
fuses -F5 and -F6, check wiring according to
schematic. Proper operation ? n → D3 y → N1
- D 7 24 V DC between -X11 and -X12 and 24 V DC between
-X13 and -X14 ? n ↓ y → D9
- D 8 Check input voltage at -T1.
Fuses -F1, -F2, -F3, -F9 o.k. ? n ↓
Check wiring according to schematic, proper
operation ? n ↓ y → N1
- D 9 12 V DC present ? LED and +A2-V7 flashing ? n ↓
y → D11
- D 10 14 V AC present between +A2:c32 and a32 ?
-F8 o.k. ?
Check wiring according to schematic.
Eventually exchange PC board +A2.
Proper function ? n ↓ y → N1
- D 11 Continue troubleshooting per following instructions:
- | | |
|------------------------------|------|
| Vertical drive | → J1 |
| Tilt drive | → G1 |
| Longitudinal drive of system | → H1 |
| Longitudinal table top drive | → F1 |
| Lateral table top drive | → E1 |
| Operating field | → M1 |
| Multiple foot switch | → L1 |

Failure in Lateral Table Top Drive.

- E 1 +A3-V5 resp. -V6 flashing when movement is activated?
n ↓ y → E3

- E 2a Input signal (moving to table base) +A3:c2 and c6 must be present, +A3-V5 flashing and +A3:-U1 must have contact. With foot switch activated (-S12, +A7-S12) is +12V DC present at +A3:a18 ?
With control panel activated (+A7-S7) is +12V DC present at +A3:a18 ?
Is +12V DC from foot switch (-S35) present at +A3:a20 ?
+12V DC must not be present at +A3:c18 !
- E 2b Input signal (driving from table base) +A3:c2 and c3 must be present, +A3-V6 flashing and +A3-V2 must have contact.
With foot switch activated (-S13, +A8-S13) is +12V DC present at +A3:c18 ?
With switch panel activated (+A8-S8) is +12V DC present at +A3:c18 ?
Is +12V DC from end switch (-S36) present at +A3:c20? +12V DC must not be present at +A3:a18 !
If +A3-V5 or -V6 are not flashing in spite of present +12V DC signals then exchange PC board +A3.
Proper function ? n ↓ y → N1
- E 3 +A5-D1 flashing when movement is activated and is 24V DC present between +A5:a30 and a32 ? n ↓ y → E5
- E 4 Eventually exchange PC board. Proper function ? n ↓ y → N1
- E 5 Is 24V DC present at motor when movement is activated ? n ↓ y → N1
- E 6 Check wiring to motor +A5.
Check radio shielding filter -Z1.
Proper function ? n ↓ y → N1
- E 7 Exchange motor +M5.

Failure in Longitudinal Table Drive:

- F 1 Troubleshooting frequency converter general → K1
- F 2 Proper function ? n ↓ y → N1
- F 3a Is +A3-V1 flashing when movement is activated in direction to head end and is +12V DC present at +A3:a12 ? n ↓
With foot switch activated (+A8-S14) is +12V DC present at +A3:a30 ?
With control panel activated (+A7-S9) is +12V DC present at +A3:a30 ?
Is +12V DC from end switch (-S46) present at +A3:a32?
With table extension in place (-S50) is +12 V DC present at +A3:22 ?
Is +12V DC present at +A3:c10 during tilting between 15° and 87° (-S32) ?
+12V DC must not be present at +A3:c30 !
-K5 and -K6 must not be activated (+A3:a2 and a4).

- F 3b +A3-V1 and -V2 flashing when movement is activated in direction to foot end and is +12V DC present at +A3:a12 resp. 0V DC at +A3:a14 ? n ↓
 With foot switch activated (+A8-S15) is +12V DC present at +A3:c30 ?
 With control panel activated (+A7-S10) is +12V DC present at +A3:c30 ?
 Is +12V DC from end switch (-S47) present at +A3:c32?
 Is +12V DC present at +A3:c10 during tilting between 15° and 87° (-S32) ?
 +12V DC must not be present at +A3:c30 !
 -K5 and -K6 must not be activated (+A3:a2 and a4)
 If +A3-V1 and -V2 are not flashing in spite of 12V signals present then exchange PC board +A3.
 Proper function ? n ↓ y → N1
- F 4 -K7 closing when movement is activated ? n ↓
 Is +A2-V1 flashing and is +24V AC present at +A:a22 ?
 Exchange PC board +A2.
 Check wiring and -K7.
 -K5 and -K6 must not be activated.
 Eventually exchange -K7.
 Proper function ? n ↓ y → N1
- F 5 Ccheck control signals at frequency converter.
 Pins 7 and 8: setpoint, +A2-V1 must flash.
 Pins 16 and 17: release of control, +A2-V4 must flash
 Pins 16 and 34: changing over sense of direction, +A2-V5 must flash.
 -V1 and -V4 flashing ? n ↓
 then exchange PC board +A2.
 Proper function ? n ↓ y → N1
- F 6 When movement is activated is there motor voltage present at frequency converter+A6:U,V,W ? n ↓ y → F8
- F 7 Exchange frequency converter.
 Proper function ? n ↓ y → N1
- F 8 When movement is activated is there motor voltage present at -X20:6,7,8 ? n ↓ y → F10
- F 9 -K8 and -K7 must be closed.
 Check wiring from +A6:U,V,W to -X20:6,7,8.
 Proper function ? n ↓ y → N1
- F 10 Eventually exchange motor +M4. → N1

Failure in Tilting Drive.

- G 1 Troubleshooting frequency converter general. → K1
- G 2 Proper function ? n ↓ y → N1
- G 3a Is +A1-V1 flashing when upright movement is activated and is +12V DC present at +A1:c8 ? n ↓
 +A1-V3 must not flash !

Is +12V DC present at +A1:c22 when table extension (-S50) is in place ?
 Is +12V DC present at +A1:c20 during tilting between 35° and 87° (-S31) ?
 Is +12V DC present at +A1:a16 when table is lowered (-S24) ?
 Is +12V DC present at +A1:a28 when table top extension is in place (-S51,52,53) and at +A1:a24 during table tilting (-S32) between 15° and 87° ?
 Is +12V DC present at +A1:a12 when control panel is activated (-S8, +A7-S3) ?
 Is +12V DC present at +A1:a12 when foot switch is activated (+A8-S8) ?
 -K6 and -K7 must not be activated (+A1:c4 and c6).

- G 3b +A1-V1 and -V2 flashing when tilting movement is activated and is +12V DC present at +A1:c8 resp. 0V DC at +A1:c10 ? n ↓
 +A1-V4 must not flash!
 With I.I. limitation and table tilting (-S28) from -1° and -15° is +12V DC present at +A1:a20 ?
 With i.i. limitation and table lowering (-S23) < -1° is +12V DC present at +A1:c16 ?
 Is +12V DC present at +A1:c12 when foot switch is activated (-S9, +A8-S9) ?
 Is +12V DC present at +A1:c12 when control panel is activated (+A7-S4) ?
 Is +12V DC from end switch (-S29) present at +A1:c18? +12V DC must not be present at +A1:a12 !
 -K6 and -K7 must not be activated (+A1:c4 and c6).
- G 3c If +A1-V1 resp. +A1-V1 and +A1-V2 are not flashing then eventually exchange PC board.
 Proper function ? n ↓ y → N1
- G 4 Is -K5 closed when movement is activated ? n ↓
 Is +A2-V3 flashing and is 24 V AC present at +A2:a20? Eventually exchange PC board +A2.
 Check wiring and -K5.
 -K6 and -K7 must not be activated.
 Eventually exchange -K5.
 Proper function ? n ↓ y → N1
- G 5 Check control signals at frequency converter.
 Pins 7 and 8: setpoint, +A2-V3 must flash.
 Pins 16 and 17: release of control, +A2-V4 must flash
 Pins 16 and 34: changing over of sense of direction, +A2-V5 must flash.
 If +A-V1 and -V4 are not flashing then exchange PC board +A2.
 Proper function ? n ↓ y → N1
- G 6 Is motor voltage present at +A6,U,V,W when movement is activated ? n ↓ y → G8
- G 7 Exchange frequency converter.
 Proper function ? n ↓ y → N1
- G 8 Is motor voltage present at -X1:15,16,17 when movement is activated ? n ↓ y → G10

- G 9 -K8 and -K5 must be tightened.
Check wiring from +A6:U,V,W to -X1:16,17,18.
Proper function ? n ↓ y → N1
- G 10 Eventually exchange motor +M2.
Proper function ? y → N1

Failure in Longitudinal Drive of System:

- H 1 Troubleshooting frequency converter general → K1
- H 2 Proper function ? n ↓ y → N1
- H 3 Is +A3-V3 flashing when movement to foot end side is activated and is +12V DC present at +A3:a8 ?
Is +12V DC present at +A3:c12 when foot switch is activated (-S10, +A8-S10) ?
Is +12V DC present at +A3:c12 when control panel is activated (+A7-S5) ?
Is +12V DC from end switch and Bucky latch cover closed (-S40,-S41) present at +A3:a16 ?
+12V DC must not be present at +A3:c14 !
-K5 and -K7 must not be activated !
- H 3a Are +A3-V3 and -V4 flashing when movement to head end side is activated and is +12V DC present +A3:a8 resp. 0V DC at +A3:a10 ? n ↓
Is +12V DC present at +A3:c14 when foot switch is activated (-S11, +A8-S11) ?
Is +12V DC present at +A3:c14 when control panel is activated (+A7-S6) ?
Is +12V DC from end switch and Bucky latch cover closed (-S41,-S42) present at +A3:c16 ?
+12V DC must not be present at +A3:c12 !
-K5 and -K7 must not be activated !
If +A3-V3 resp. +A3-V3 and -V4 are not flashing in spite of +12V DC signal then exchange PC board +A3.
Proper function ? n ↓ y → N1
- H 4 Is -K6 closed when movement is activated ? n
Is +A2-V2 flashing and is 24V AC present at +A:c20? n
Exchange PC board +A2.
Check wiring and -K6.
-K5 and -K7 must not be activated !
Eventually exchange -K6.
Proper function ? n ↓ y → N1
- H 5 Is motor voltage present at frequency converter and at +A6,U,V,W when movement is activated ? n ↓ y → H8
- H 6 Exchange frequency converter.
Proper function ? n ↓ y → N1
- H 8 Is motor voltage present at -X20:3,4,5 when movement is activated ? n ↓ y → H10

- H 9 -K8 and -K6 must be closed.
Check wiring from +A6 to -X20.
Proper function ? n ↓ y → N1
- H 10 Check motor power cord.
Eventually exchange motor +M3. → N1

Failure in Vertical Drive:

- J 1 Safety relay -K4 closed ? n ↓ y → J5
- J 2 Is 24 V AC present between -K4:A1 and -K4:A2 ? y↓ n→
- J 3 Exchange -K4.
Proper function ? n → J1 y → N1
- J 4 Safety end switches -S56, -S57, -S58 and spindle nut switch -S59 must not be activated.
Check wiring according to schematic.
Proper function ? y ↓ n → N1
- J 5 -K2 closing upon activation ? y ↓ n → J5
-K3 closing upon activation ? y ↓ n → J13
- J 6 Check fuse -F7.
Check wiring to motor.
Proper function ? n ↓ y → N1
- J 7 Change motor -M1. y → N1
- J 8 +12V DC present at +A1:a8 when foot switch is activated (-S6, +A8-S6) ?
Is +12V DC present at +A1:a14 when control panel is activated (+A7-S1) ?
Is +12V DC from end switch (-S20) present at +A1:a14?
+12V DC must not be present at +A1:a10 and +A1:a6.
Is 24V AC present between +A1:c32 and -X13 ?
Is +A1-V7 flashing ? n ↓
Eventually exchange PC board +A1.
-K2 closing during vertical movement in upward direction. n y J12
- J 9 Is 24V AC present between -K2:A1 and -K2:A2 when movement is activated ? y n J11
- J 10 Exchange -K2. y J12
- J 11 -K3 must not be activated.
Check wiring according to schematic.
- J 12 Proper function ? n J5 y N1
- J 13 Is +A1:-V6 flashing when movement is activated and is 24 V AC present between +A1:c32 and -X13 ? n
+A1-V3 must not flash when table top extension is in place.
Is +12V DC present at +A1:c22 when table extension is used (-S50) ?
Is +12V DC present at +A1:c20 during tilting between 35° and 87° (-S31) ?
Is +12V DC present at +A1:a16 during table lowering (-S24) >35° ?
+A1-V4 must not flash during I.I. operation.

Is +12V DC present at +A1:a20 during tilting (-S28)
 from -1° to -15° ?
 Is +12V DC present at +A1:c16 during table raising
 (-S23) <-1° ?
 Is +12V DC from foot switch (-S7) present at +A1:a10?
 Is +12V DC present at +A1:a6 when control panel is
 activated ?
 Is +12V DC from end switch (-S22) present at +A:a2 ?
 Is +12V DC from end switch I.I. (-S21) present at
 +A1:c14 ?
 No signal must be present at +A1:a8 and a4.
 Eventually exchange PC board +A1.
 Is -K3 closing when movement is activated ? n↓ y→ J12

J 14 Is 24 V AC present between -K3:A1 and -K3:A2 when
 movement is activated ? y ↓ n → J16

J 15 Exchange -K3. → J12

J 16 -K2 must not be activated.
 -K10 must have contact.
 Check wiring according to schematic.
 Proper function ? → J12

Failure in Frequency Converter:

K 1 -K8 closed ? n ↓ y → K5

K 2 -K9 closed ? n ↓ y → K4

K 3 Safety switches -S61, -S62, -S64, -S65, -S67, -S68
 must not be activated.
 Thermo switches -S70, -S71, -S72 activated ?
 Motion possible with activated safety or thermo
 switch with -S4 ?
 -K10 closed ?
 Check wiring according to schematic.
 Proper function ? n → K1 y → N1

K 4 Is 24V AC present between -K8:A1 and A2 ?
 Check wiring according to schematic.
 Exchange -K8.
 Proper function ? n → K1 y → N1

K 5 LED green flashing ? n ↓ y → K7

K 6 Mains voltage present at +A6:L1 and N ?
 Exchange frequency converter.
 Proper function ? n → K5 y → N1

K 7 LED red flashing ? y↓ n → K

K 8 Switch off unit and turn on again after approx. 20sec
 n → K5 y → N1

Failure of Foot Switch:

- L 1 Is +A4:V19 flashing ? n ↓ y → L4
- L 2 Is +12V DC present +A8-X1:1 ?
0V DC present at +A8-X1:2 ?
Reset signal present at +A8-X1:4 ?
Is cycle signal present at +A8-X1:3 ?
Check wire connections from +A4 to +A8.
If signals are missing exchange PC board +A4.
Proper function ? n ↓ y → N1
- L 3 Data signal +A4:c32 present ?
Check wire connections from +A4 to +A8.
If signals are missing exchange PC board +A8.
If +A4-V19 is not flashing with signal present then
exchange PC board +A4.
Proper function ? n ↓ y → N1
- L 4 Contact signals present at PC board +A8 ?
Proper function ? n ↓ y → N1
- L 5 Eventually exchange PC board +A8. → N1

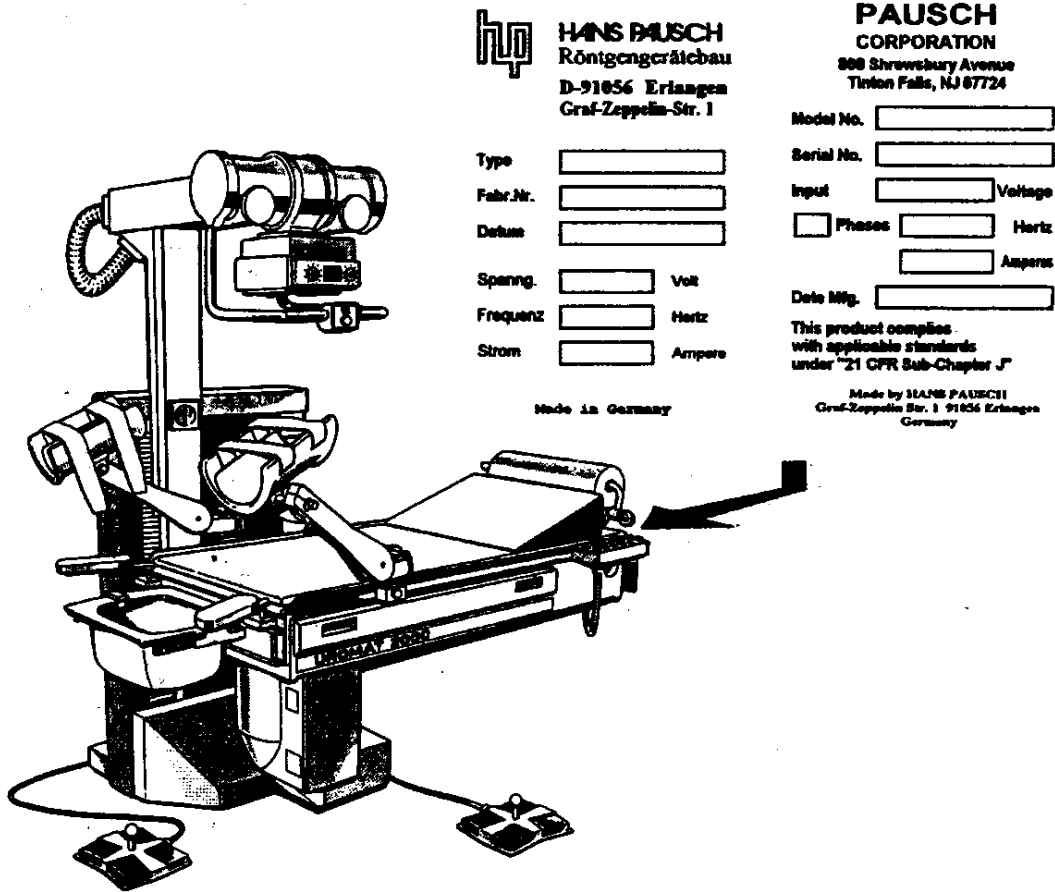
Failure of Control Panel

- M 1 Is +A4-V20 flashing ? n ↓ y → M4
- M 2 Is +12V DC present at +A7-X1:7 ?
0V DC present at +A7-X1:8 ?
Reset signal present at +A7-X1:4 ?
Cycle signal present at +A7-X1:6 ?
Wire connections present from +A4 to +A8 ?
Eventually exchange PC board +A4.
Proper function ? n ↓ y → N1
- M 3 Data signal present at +A4:c31 ?
Wire connections present from +A7 to +A4 ?
If +A4-V20 is not flashing then eventually exchange
PC board +A4.
Proper function ?= n ↓ y → N1
- M 4 Exchange control panel +A7 or PC board +A4.

Error Eliminated

- N 1 Write service report.

5.9 Name Plate Location



Subject to technical alterations

TV/Ru

Hans Pausch Röntgengerätebau D-91056 Erlangen Germany