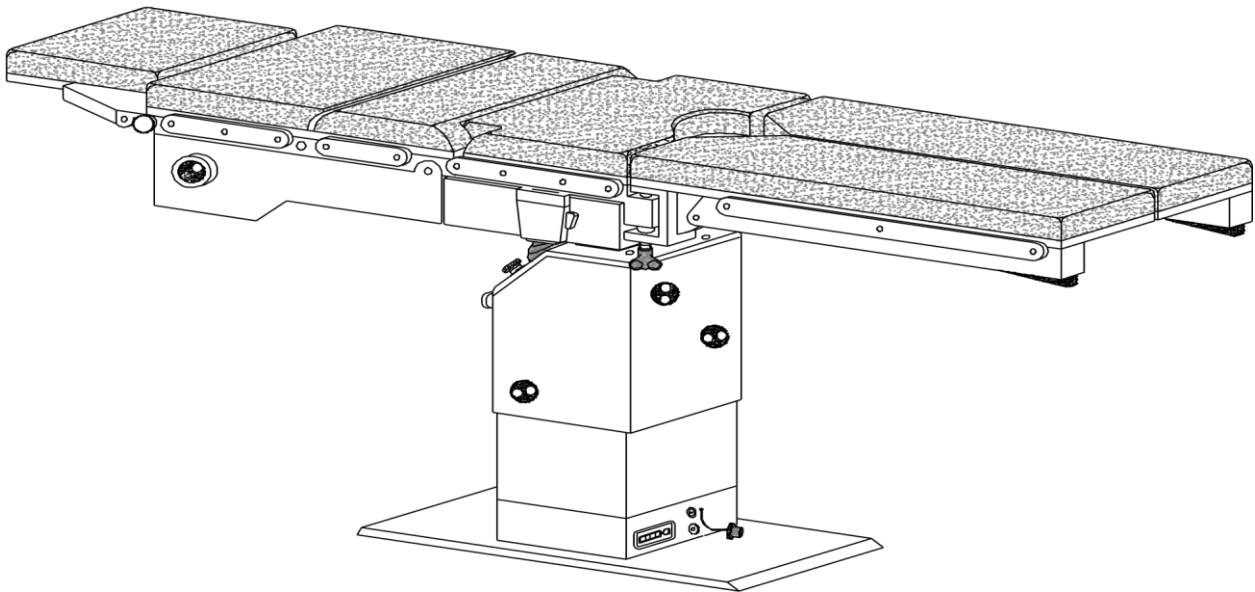




TECHNICAL MAINTENANCE MANUAL

Vektor 5



Content

1	Introduction	5
1.1	Notes	5
1.2	Safety.....	5
1.3	Table cleaning	6
1.4	Legal matters	6
1.5	Data records.....	6
1.5.1	Device and customer data records.	6
1.5.2	Configuration record	6
1.5.3	Documentation	6
1.5.4	Technical updates	6
1.5.5	Additional information.....	6
1.6	General information	6
1.7	Features	6
1.7.1	Electromechanical movements.....	6
1.7.2	Mechanical movements	7
1.7.3	Emergency movement (crank).....	7
1.7.4	Transport trolley (transfer system)	7
1.7.5	Miscellaneous	7
2	Technical data.....	7
2.1	Table	7
2.2	Battery-charger.....	8
2.3	Table and battery-charger connection	8
2.4	Storage	9
2.5	Shipping	9
3	Installation	9
3.1	General.....	9
3.2	Power supply.....	9
3.3	Battery status and recharging	9
3.3.1	Recharging the batteries	10
3.3.2	After recharging	10
3.4	Battery-replacement	10
3.5	Movements	11
3.6	Special conditions	11
3.7	Emergency movements.....	12
3.8	Table Top withdrawal	12
3.9	Table-top connection	13
3.10	Storing of preferred movements	13
3.10.1	Position storing	13



3.10.2	Recall of stored positions	13
4	Maintenance, checks and services	14
4.1	General.....	14
4.2	Column.....	14
4.3	Operating table top.....	14
4.4	Transport-trolley	14
4.5	Electronic boards.....	14
4.6	Maintenance of the table system	15
4.7	Service on the logical board 130.....	15
4.8	Service on motors drive board 110	15
4.9	Board 130 replacement	15
4.10	Board 110 replacement	16
4.11	Replacement of board 110 (motor 5)	16
4.12	Replacement of Board 110 (motor 6)	16
5	Storing of an end-stroke	16
5.1	Stage 1: preparation of the system	17
5.2	Stage 2: storing of end-strokes.....	17
5.2.1	Storage of motor 1 (up / down)	17
5.2.2	Storage of motor 2 (Trendelenburg and reverse Trendelenburg)	17
5.2.3	Storage of motor 3 (lateral right and left)	17
5.2.4	Storage of motor 4 (longitudinal shift)	18
5.2.5	Storage of motor 5 (backrest)	18
5.2.6	Storage motor 5 (backrest with thorax split).....	18
5.2.7	Storage of motor 6 (thorax).....	18
5.3	Stage 3: restoring the system to "normal use"	19
5.4	Step 4: functional check	19
5.5	Motor replacement	19
5.5.1	Removing motor 1 (up / down)	19
5.5.2	Installation of motor 1	20
5.5.3	Removing motor 2 (Trendelenburg / reverse Trendelenburg).....	20
5.5.4	Installation of motor 2.....	20
5.5.5	Removing motor 3 (lateral right / left).....	20
5.5.6	Installation of motor 3.....	21
5.5.7	Removing motor 4 (longitudinal sliding).....	21
5.5.8	Installation of motor 4.....	21
5.5.9	Removing motor 5 (backrest)	21
5.5.10	Installation of motor 5.....	21
5.5.11	Removing motor 6 (Thorax split).....	22
5.5.12	Installation of motor 6.....	22



5.6	Inspections and tests.....	22
5.6.1	Power	22
5.6.2	Batteries status (normal use)	22
5.6.3	Batteries status (charging)	22
5.6.4	Cable remote control	22
5.6.5	Infrared remote control	23
5.6.6	Battery display	23
5.6.7	Movements.....	23
5.6.8	Self-test.....	23
5.6.9	Check after movement stop	24
5.6.10	Check after immediate stop	24
5.6.11	Automatically cycle tests	25
5.6.12	Check loading cycle on the trolley.....	25
5.6.13	Top loading on table.....	25
5.6.14	Table loading / deposit (table top+ base).....	25
5.6.15	Batteries charger test	25
5.6.16	Battery-charging circuit	26
5.6.17	Regulations and controls.....	26
6	First level service	27
7	Spare parts	29
7.1	Table	29
7.2	Remote-control EM TU.....	29
7.3	Battery-charger.....	29
7.4	Infrared remote-control EM TF	30
7.5	Trolley	30
7.6	Spare parts ordering.....	30
8	Guarantee Conditions.....	30
9	Technical assistance service.....	31
9.1	Repairs.....	31
9.2	Returns	31
9.3	Updates.....	31



1 Introduction

1.1 Notes

This manual is addressed to the technicians of the operating tables. The maintenance service is supplied by the manufacturer or by authorized service assistance.

1.2 Safety

Technical experience and know-how are required to carry out the operations listed. The warnings, cautions and notes, detailed in this manual must be observed.

- **Warnings** concern the technical staff and the user's safety.
- **Cautions** are to be observed in order to avoid devices damages.
- **Notes** are mentioned to focus the attention on some topics. The information does not replace or exclude warnings and cautions mentioned in the manual.

Before using the operating table check that:

- The keypad connector is connected to the plug on the column.
- The red power button is pulled up.
- The installation conditions described in the **"Installation"** paragraph are met.

Warning: Keep your hands away from the area under the mattresses when the table is being moved by means of the keypad or automatically. Make sure that no material (e.g., sheets, anaesthetic tubes, accessories, etc.) can get in the way of the movement.

Warning: When the table is all down:

- in case of a simultaneous Trendelenburg and backrest lowering movement, the headrest could come into contact with the floor.
- if the leg rest is fully lowered at 90° it could come into contact with the column.

Warning: The patient shall be placed on the operating table so to prevent the risk of tipping or mechanical folding by suitable distributing the weight. Do not exceed the following limits:

- 230 kg in the middle of the operating table.
- 80 kg at the ends of the leg-and backrest.

Warning: When not used, hang the remote control on the columns side or on the accessory's holder.

Warning: The battery-charger is powered by network, with inside high voltages, never touch the components inside the charger.

Warning: The table is powered by batteries which can discharge high power in event of short-circuit, never remove the fuse located on the two batteries.

Warning: The table may run an automatic cycle, keep attention and prevent damages to peoples or equipment near the operating table.

Warning: Removing and connection of the transfer system tops:

Make sure that no sheets, tubes, accessories etc get in the way of the trolley and the connectors. The procedure sequences are strictly to be observed, no changes are allowed.



1.3 Table cleaning

Clean the table with a moist cloth and dry it after surgery.

Never use spray jets of water directly onto the table.

The mattresses are suitable for sterilization in an autoclave at rubber cycle (without bending)

1.4 Legal matters

This manual and the information herein are TEKNO-MEDICAL property.

TEKNO-MEDICAL denies any liability for damages to persons or things, due to:

- disregarding and in-observance of warnings and cautions;
- deviation from described procedures;
- operations non mentioned in this manual.
- Ignorance on the general precaution for handling and using electrically powered devices.

1.5 Data records

1.5.1 Device and customer data records.

The distributor and/or the manufacturer will keep an achieve with following data:

- Device: Item and serial number.
- Customer's data: delivery date, name, full address.
- Service : each service on the product.

1.5.2 Configuration record

For safety purposes there have to be held a register in which all configuration changes made on the device have to be noted. Some parts of the device are identified by a model and serial number.

The manufacturer stores the original configuration of every supplied device. The manufacturer has to be informed about all changes on the operating tables.

1.5.3 Documentation

The operating table documents includes an instruction for use and a technical manual.

The instruction for use is delivered together with the operating table.

1.5.4 Technical updates

Periodically updates on these instructions are sent to authorized distributors and can be handed over to the customer upon request.

1.5.5 Additional information

For any additional information please contact the manufacturer.

1.6 General information

The operating table is delivered in 2 possible configurations:

- Operating table: mobile base + column + operating Table top
- Transfer table top system: base and column +operating table top (removable) and transport trolley

This manual refers to both configurations.

1.7 Features

The operating tables, mobile and transfer table top system can carry out the following movements:

1.7.1 Electromechanical movements

- Up: 1030 mm / Down: mm app. 740 mm,
- Trendelenburg app. 30° / Reverse-Trendelenburg: app. 30°,
- Lateral tilting right 20° / left 20°
- Longitudinal shift 300 mm
- Back section: +85° / - 35°
- Raise of the thorax split: +40° / 0°.



1.7.2 Mechanical movements

- Leg rest tilting, spread and removing
- Headrest tilting and removing.

1.7.3 Emergency movement (crank)

- Up/down,
- Trendelenburg / Reverse-Trendelenburg,
- Lateral tilting right/left,
- Backrest tilting,
- Up/down thorax split.

1.7.4 Transport trolley (transfer system)

- Made of stainless steel provided with directional antistatic rubber wheels with brakes.
- Introduction on head or leg side.
- Trendelenburg and Reverse-Trendelenburg: 20°
- Height adjustable from 730 mm to 1030 mm.
- Trendelenburg and Reverse-Trendelenburg movement are mechanically carried out using the crank.
- The up/down movements are carried out by pedal with a closed hydraulic oil system.

1.7.5 Miscellaneous

- The electromechanical movements are driven by direct current motors with a nominal voltage of 24 V DC and positions are detected by linear potentiometers.
- The movements are controlled by means of an electronic board inside the column and driven by a computer-based keypad connected to the table.
- An optional infrared remote control is available.
- Power supply is internal and provided by two batteries housed in the column.
- Batteries charge status can be read on a display on the table column.
- The batteries are powered by a separate battery-charger.
- In emergency cases (discharged or damaged batteries) the table can be powered directly by the battery-charger.

2 Technical data

2.1 Table

Power supply	Internal, low voltage
Emergency power supply	Outside charger 27.6V DC
Inside power supply	24V DC
Batteries	2 x 12V/12Ah serial connected
Motors	24V DC/6.5A maximum
Motor current consumption (standing motor)	App. 150 mA
Motor current consumption (running motor)	3.5 maximum (not highest)
Dissipated thermal power	2 W maximum
Maximum power limit for motor stop	4 A
Maximum table top load (distributed)	App. 250 kg
Maximum load on table edges	App. 80 kg
Dimensions	App. 2000 x 500 x 850 mm
Weight	250 – 300 kg



2.2 Battery-charger

Power	220V AC (+/-10%)
Power frequency	50/60 Hz
Power consumption	2 A max
Thermal loss	80 W max
Transformer standard compliance	DIN EN 60742
Transformer insulation primary / secondary	> 1000 MΩ a 3750V
Transformer insulation between primary / secondary ground	> 1000 MΩ a 2000 V
Transformer thermal protection on primary	110 °C
Main fuses	2 x 1.6 A delayed
Inside fuses	2 x 6.3A
Output voltage	27.6V DC
Output power	5.5 A max, automatic limited
Operation and output	direct (charging) alternating (powered)
Power during switch on/off of battery-charger	< 1mA @ 27.6V DC
Safety class	I ¹ - BF ²
Power loss on output voltage ²	typical 10 A (< 100 A)
Current in 1 st -failure condition ²	typical 20 A (< 500 A)
Current in SFCA condition	typical. 0,8 mA (< 5 mA)
Power loss to casing	typical 0 A (< 100 A)
Current in 1 st -failure condition	typical 25 A (< 500 A)
Power loss to ground	typical 25 A (< 500 A)
Current in 1 st -failure condition	typical 50 A (< 1000 A)
Ground connection resistance ³	typical 80 mΩ (< 200 mΩ)
Dimension L x H x W	280 x 260 x 270mm
Weight	14kg

2.3 Table and battery-charger connection

Power loss towards table ⁵	typical 10 A (< 100 A)
Current under first failure condition ⁵	typical 20 A (< 500 A)
Current under SFCA condition	typical 1.7 mA (< 5 mA)
Power loss toward table cover	typical 0 A (< 100 A)
Current under first failure condition	typical 25 A (< 500 A)
Power loss towards ground	typical 25 A (< 500 A)
Current under first failure condition	typical 50 A (< 1000 A)
Ground connection resistance ⁶	typical 136 mΩ (< 200 mΩ)
Safety class ³	I type BF

- 1) Ground connection with wall socket.
- 2) Output voltage for battery charging is floating with ground and cover power loss according to IEC 60601-18.
- 3) Metered with power cable included.
- 4) The test is to carry out with the table insulated from the floor and simulating the most critical safety conditions without connection to the table equipotential ground note. The battery-charger ground is connected to the table ground.
- 5) Despite the fact no parts are applied, the battery-charger connected to the table is made according to BF specification so to ensure the highest safety conditions in first failure concerning power loss to the electrical parts of the table, the cover and ground (battery-charger table).
- 6) Metered between the battery-charger plug and the operating table frame.



2.4 Storage

Table and accessories are to be stored in their original packaging.

The following environmental conditions are required for long-term storage:

- Ambient temperature lower than 20°C
- Relative humidity lower than 50%
- Clean, dust-free, ventilated environment.

2.5 Shipping

Table and accessories are to be shipped in their original packaging which protection from shocks and vibrations. The temperature can vary from -40°C to +70°C for short times during shipping.

3 Installation

3.1 General

All operating tables are tested in compliance to DIN EN 60601-2-46, shipment can be only followed, if all tests are positive. No special systems are required for our operating tables as they are delivered ready for use.

The operating table needs to be connected to an equipotential wire using plug (1) located on column side (near the display).

Pull the power-button (2) up to switch the table ON.

Connect the battery-charger (delivered together with the table) to a wall socket (connection to ground, in compliance with legal standards concerning operation rooms.).

Make sure that the mains voltage corresponds to the data shown on the battery-charger label.

Unless other instructions, the standard devices are provided for running at 220 V AC (+/- 10%), 50-60Hz.

Keep liquids away from the battery-charger. Keep the battery-charger away from the operating table, if anaesthetic gases are used.

3.2 Power supply

Pull-up the power-button (2) located on the table column.

To switch off the system, press the power-button (2) down (also during surgery in case of faulty operations in order to stop the table movements immediately).

When powered up, the system runs a brief general self-test. At the end of the test, a tone will be heard from the table and the keypad if the test is OK. During the test, the warning lights on the table (battery display) and on the keypad will come on so that the user can check correct operation.

The following automatic checks are run:

- Correct power supply working.
- Correct RAM working.
- Correct EPROM parameter memory working.
- Correct keypad interface working.
- Correct idle drive governing circuit working.
- Correct position potentiometer working.

3.3 Battery status and recharging

The table is powered by two batteries inside the column. The display (3) on the base shows the status.

Charge levels:

- 25% red
- 50% green
- 100% green

If the table is being used and the charge drops below 25%, the warning light blinks and a tone will be heard app. every ten minutes.

When the battery charge drops under the acceptable level, all movements stop and LEDs are turned off.

In this case, recharge the batteries as soon as possible (after a few days the batteries lose all efficiency and are worn out).



3.3.1 Recharging the batteries

(See Picture 2.)

- Plug the male connector **(F)** on the female outlet **(D)** placed on the battery-charger
- Plug the battery-charger to the mains with outlet **(G)** on a wall outlet (ground connection);
- Remove the tape **(11)**;
- Connect the end of wire **(E)** on the outlet **(C)** and the other end wire on outlet **(12)** on the column. For a correct connection introduce the plug, turn it until it clicks;
- If the connections are correct LED **(A)** will switch on;
- Switch on the battery-charger **(B)**;
- If the table is **ON**, the level panel will show the “on” status by means of a yellow light with a plug symbol and the 25-50-75-100% LEDs will come on in sequence.

The 100% LED will light steadily only when the batteries are fully recharged.

To obtain an optimal charge, do not stop the loading-cycle. Once reached a 100% charge, extend it for further two hours.

Neither the system nor the batteries will be damaged if the batteries charger is always connected to the table and running for long periods of time.

The recharging cycle will continue also when the table is switched **OFF**, obviously without indications on the display.

By full charged batteries, the charge LED shows for few minutes the “charge” status and then the 100% status. The table can be used normally during recharging of the batteries, useful during an emergency case if the system stops because of discharged batteries.

3.3.2 After recharging

- Switch off the battery-charger **(B)**;
- Disconnect all cables
- Full battery-capacity is guaranteed for about 3 - 5 years, it depending on the recharging frequency (max 200 cycles).
- If after a fully recharging the 100% level is greatly reduced to lower level, the batteries are to be replaced.

3.4 Battery-replacement

(See Picture 4.)

For proper replacement follow these instructions:

- Both new batteries must be of the same brand, model and possibly batch.
- Both new batteries must be of the same capacity.
- Both new batteries must have the same charge status.
- Both batteries must be replaced at the same time. Never replace only one battery.

Disregarding the above points may lead to rapid batteries deterioration, it's advisable to use spare parts delivered by the manufacturer.

Move the operating table to the highest UP position, using:

- The remote control.
- The emergency cranks.



Proceed as follows, if the batteries are discharged

- Connect the battery-charger to the operating table.
- Switch the table **ON**, using the power-button **(3)** on the column.
- Move the table up.
- Switch **OFF** by pressing the power-button **(3)** on the column.
- Disconnect the battery-charger.
- Unscrew the four screws **(2)** on the sides of the fixed carter **(8)**.
- Lift the fixed carter **(8)** and slide it under the guard above **(7)**. Fasten the fixed guard with a shim **(1)**.
- Disconnect the fast-on on the fuse **(9)** connected in series between the two batteries **(A)** and **(B)**.
- Disconnect the fast-on **(3)** of the red wires **(+)** and the black wires **(-)**

Proceed as follows if the batteries are discharged or the **UP** movement is blocked:

- Switch the table **OFF**, using the power-button **(3)** on the column
- Unscrew cap **(8)**.
- Connect the crank **(12)** to the hole and turn it slowly until reaching the maximum height;

Caution: do not overload the mechanical limits (end-strokes)!!!

- Remove the crank.
- Refasten the cap **(8)** picture 1.
- Unscrew the four screws **(2)** on the sides of the fixed carter **(8)**.
- Lift the fixed carter **(8)** and slide it under the guard above **(7)**. Fasten the fixed guard with a shim **(1)**.
- Disconnect the fast-on on the fuse **(9)** connected in series between the two batteries **(A)** and **(B)**.
- Disconnect the fast-on **(3)** of the red wires **(+)** and the black wire **(-)**.

3.5 Movements

- Movements are possible through two keypads, the cable remote control, which is delivered together with the operating table and the infrared remote controller.
- The system checks, that no movements which could damage the mechanical parts can be carried out.
- Press the button corresponding to the required movement. Release it to stop the movement.
- The movement will automatically stop when it reaches the end-stroke without damaging the mechanical part.
- Keep the reset button **(15)** pressed and all movements get back to the zero position as predefined by the manufacturer.
- An acoustic signal will be emitted at the end of the resetting.
- The reset input will be ignored after few seconds if the button is not kept pressed.
- Failures of the system are indicated by a LED on the keypad, the movement will be locked, in this case call the technical service

3.6 Special conditions

- If the backrest is downwards the tilting movement stops before the backrest interferes with the column, resetting the backrest, tilting movement continues.
- If the sliding movement is made from the middle towards the leg rests, the backrest stops in zero position (i.e., horizontal position) resetting the sliding the backrest, movement continues.
- If the table top is equipped with thorax opening the following check will be made in order to prevent an excessive positive position:
 - If the thorax adjustment is not on zero position (end-stroke back) the backrest tilting stops at +40° (end-stroke forward)
 - If the back rest is at +40° or more, the thorax cannot be moved



3.7 Emergency movements

(See Picture 1.)

The tables are equipped with a special system to regain the movements (motor failure, batteries discharge, inability to use the battery-charger). This system is applied on the following movements:

- Up/Down;
- Trendelenburg / Reverse-Trendelenburg;
- Lateral tilt right / left;
- Back section tilt;
- Raising / lowering of the thorax split; follow the steps here below in order to avoid damages on the table:
 - Switch Off the table with the power-button **(3)**;
 - Remove the plug,
 - Introduce the emergency crank check its right position.
 - Move slowly clock / anticlockwise accordingly to the necessary movement.

WARNING

Never force the end-stroke by handling with the emergency crank as the motor can definitively be damaged. The operating table must always be turned **OFF**, after having positioned the patient and during the surgery. Never hold the keypad or place the keypad on the table when devices are attached to the patient (electrical blades, defibrillator, etc.). Arrange the keypad under the operating table. Never use devices applied to the patient when the table is powered by the battery-charger in order to carry out movements because of discharge of the batteries.

3.8 Table Top withdrawal

This cycle is carried out automatically when the trolley is connected.

Automatic movements require the utmost caution.

- Switch the table **ON** lifting the power-button **(3)** waiting for the acoustic signal;
- Reset the table using the reset button **(15)**;
- Place the keypad in its holder **(4)**;
- Introduce the trolley reaching the end-stroke, lock the wheels through the pedal **(A)** keep the position of the trolley until the cycle is over. (the keypad will be automatically locked);
- After some seconds the system issues 2 beeps, starting the automatic procedure, the table top will be positioned on the trolley releasing the column;
- The cycle will stop if the trolley is moved during the previous steps. In this case, unlock the wheels, draw the trolley, wait some seconds and start again from point.
- The table top raises into the zero position.
- The downwards movement starts again.
- The top will be positioned on the trolley, the end of the cycle is indicated by a beep.
- Unlock the wheels and draw the trolley.
- All movements are locked (except up/down) until connected with another top.
- Switch off the power pressing the power-button **(3)**.



3.9 Table-top connection

This cycle starts automatically by trolley connection (see Picture 5).

Automatic movements require the utmost caution.

- Switch the table **ON** lifting the power-button **(3)** and wait till the end of the self-test.
- Check that the table is on the lowest position (pressing button 2, until the column stands still and an acoustic signal confirms the lowest down position.
- Make sure to put the remote controller in its holder **(4)**;
- In case of trolleys equipped with up/down or Trendelenburg movements, the trolley's position must be at maximum height and at zero position. (indication located on the trolley)
- Introduce the trolley reaching the end-stroke, lock the wheels through the pedal **(A)**, heel pressing, keep the position of the trolley since the cycle is over. (the keypad will be automatically locked);
- After some seconds the system issues 2 beeps, starting the automatic procedure, the table top will be positioned on the trolley releasing the column;
- The system drives the upwards of the column since the top is connected
- The cycle will stop if the trolley is moved during the previous steps. In this case, unlock the wheels, draw the trolley, wait some seconds and start again.
- The column is lowered
- Upward-movement starts again
- The top will be positioned on the column, the end of the cycle is indicated by a beep.
- Unlock the wheels and draw the trolley.
- The table is now able to make all movements by the remote controller.

3.10 Storing of preferred movements

Three positions can be stored and recalled via the buttons **A, B or C (16, 17, 18)**.

3.10.1 Position storing

- Take the table drives to the required position.
- Press and hold pressed the storage button **(13)**, at the same time hold pressed one of the memory buttons **(16, 17, 18)**;
- One tone will be heard to indicate that the sequence has correctly been done.
- The memory holds one position a new storage deletes the previous one.
- Press button **(15)** for return to zero position.
- It's recommended to check the stored position as mentioned here below.

3.10.2 Recall of stored positions

- Hold button **(14)**, in the same time press the memory button on which was stored the position wanted;
- The procedure starting will be indicated by a tone and the buttons can be released.
- At the end of the cycle the system stops advising with two beeps.
- All keypads will be ignored until the end of the cycle.



4 Maintenance, checks and services

4.1 General

We recommend an annual general inspection involving the following parts:

4.2 Column

- Check and tighten all the screws and nuts situated on the column and under the seat rest
- Check, if all rubber protections of the pistons which moves Trendelenburg and up/down are in good conditions.
- Check, if the space between cylinder and pistons which makes the movements are equal or lower 1 mm. Otherwise replace them.
- Inspect also the sliding rails and if the space is equal or lower 1 mm. Otherwise replace them.

4.3 Operating table top

- Check and tighten all the screws and nuts situated on the column and under the seat rest.
- Check and tighten all the screws and nuts of the rotating pins of the table top (leg rest, backrest, headrest and thorax split).
- Check the end-stroke and zero position of the Trendelenburg and reverse Trendelenburg and right/left lateral. all asses have to correspond to the original parameters arranged by the manufacturer (see picture 7).
- Check the mattresses.
- Lubricate the lateral rails, articulation of leg rests, head rests and all other movements.

4.4 Transport-trolley

- Check the wheels and replace them if they are worn.
- Check and tighten all screws.
- Lubricate all gears and moving mechanical parts.

4.5 Electronic boards

Before starting maintenance or inspection, switch the system **OFF**.

Please take in consideration the following instructions for board-replacement:

- Do not try to repair the boards, only the fuses can be replaced.
- For maintenance or replacement, send the faulty board to the manufacturer (No electric-charts are provided because the cards cannot be repaired.).
- The chart frame and the location drawings are sufficient to ensure a full technical service.

The following instructions refer to the system boards:

Name	Description	Position
103.3	Batteries Display card	Table column
103b.3	Infrared card receiver	Table column/ basement
105	Infrared keypad card	Remote control
106	Power card	Battery-charger
110	Motor card	Table column
120	Keypad card	Remote control
130	Logic card	Table column/ basement

Check list:

- Check the wiring and the correct connections.
- Check the state of all accessories.
- Run a general functional test.
- Update the maintenance records.



4.6 Maintenance of the table system

Be very carefully with the battery-system, improper operation with connected batteries can lead to dangerous overheating. Never remove or modify the serial connection between the two batteries and the respective fuse. The fuse is the only protection against short-circuits of the power of the table.

Never work on the system, if the batteries are still connected!

Connect the batteries to the system only after repairs are over and before powering the table

4.7 Service on the logical board 130

(See Picture 7.)

The 130 board cannot be modified, repaired or calibrated. Repairs can only be carried out by the manufacturer. Never connect an instrument to the card circuits when the system is on.

The WW1 (1-6) switch located on the side of the JP6 connector is used by the manufacturer for tests and calibrations. Improper use can produce damages or fails on the mechanical system board.

Only SW1-1 of SW1 switch can be used to store the end-stroke and zero position, in case of replacement of the electronically cards of the table.

4.8 Service on motors drive board 110

(See Picture 7.)

The 110 board cannot be modified, repaired or calibrated. Repairs can only be carried out by the manufacturer. Never connect an instrument to the card circuits when the system is on.

In case of replacement of this board, it must be initialized for storing the motor number to be connected.

This is made by the manufacturer.

After replacement and initialization of the board, the end-strokes referring to the card (movements and motors driven by the replaced card) must be stored

Never use the system, before the end-strokes have been stored.

4.9 Board 130 replacement

Follow the instruction for replacement of card 130:

- Turn the table **OFF** pressing the power-button,
- Disconnect the battery-charger,
- Remove the cap.
- Connect the crank and turn it slowly clockwise until reaching the maximal height (as the motor is not powered it offers resistance to the up / down movement, if the crank is moved quickly, damages of the motor are possible).

Caution: never move over the mechanical end-stroke

- Remove the crank and replace the cap.
- Unscrew, the screws **(3)** and remove the cover **(2)**
- Disconnect in sequence (picture 9): JP7, JP1, JP2, JP4, JP8, JP5, JP6.
- Unscrew the nuts **(1)**, replace the damaged card.
- Connect again in sequence: JP6, JP5, JP8, JP4, JP2, JP1, JP7.
- After these procedures, check the cables and connections.
- Reconnect the batteries, turn on the table and follow the steps below:
 - Wait for two beeps: keypad and card will signal the correct connection.
 - Check the batteries-status LED



4.10 Board 110 replacement

- Each board 110 drives one single motor of the operating table, therefore for each electrical movement there is a board 110.
- The boards control movements as up/down, Trendelenburg / reverse Trendelenburg, lateral right/left and longitudinal sliding and are located inside the column
- The boards inside the column are precisely located, to identify the right one, refer to the topographic pattern (picture 9);
- Once the affected board is identified, replacement following the below instructions can be performed;
- After replacement of each board 110, the end-stroke must be stored.

Refer to section “**Storage of end-strokes**”.

4.11 Replacement of board 110 (motor 5)

- Turn the table **OFF**;
- Unscrew the screws of the accessory's holder rail of the backrest from the side of the motor;
- Remove the caps **(1)**, **(2)** and **(4)**, removing the screws of the top;
- Disconnect all the connectors;
- Replace the board;
- Re-connect the connectors;
- Install the caps **(1)**, **(2)** and **(4)**, connect the screws of the top;
- Connect the accessories holder rail;
- Proceed with storing of end-stroke for the movement as mentioned in the next section.

4.12 Replacement of Board 110 (motor 6)

- Turn the table **OFF**;
- Remove the caps **(1)**, **(2)** and **(4)**, removing the screws of the top;
- Disconnect all the connectors;
- Replace the card;
- Re-connect the connections;
- Install the caps **(1)**, **(2)** and **(4)**, connect the screws of the top;
- Proceed with storing of end-stroke for the movement as mentioned in the next section.

5 Storing of an end-stroke

Use the mechanical drawing for fitting all the end-stroke positions of the movements.

Warning: disconnect the power before following the instructions and all maintenances on the wire of the operating table.

Check that the power-button (3) is pushed down!!!

Pay special attention: whenever you press one of the 3 buttons “**memory storage**” (16, 17, 18) hold it for a few seconds so that the system stores the position of the end-stroke. After the beep signal, release the button.

Caution: For each storage use the following sequence:

- **Stage 1** (preparation of the system);
- **Stage 2** (end-stroke storage);
- **Stage 3** (system restoring);
- **Stage 4** (functional check).



5.1 Stage 1: preparation of the system

- Position the table at maximum height, pressing the button (1);
- A beep confirms reaching the maximal height and the movement stops;
- Turn the power **OFF**, pressing the power-button (3) down;
- Unscrew the screws (6) located laterally,
- Unscrew as by picture (C) and remove the cover (2).
- Move the switch on **SW1** to **ON**.
- Replace the cover (7) fixing the screws (3)
- Turn the power **ON**, lifting button (3).

5.2 Stage 2: storing of end-strokes

(See Picture 6.)

The end-stroke storage is to perform with the table top connected to the column!

5.2.1 Storage of motor 1 (up / down)

- Press button (2) till reaching height of 410 mm (for standard basement) or 480 mm (for ultraflat base);
- Press button C (18) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (1) until reaching the height of:
 - 530 mm for not removable tables,
 - 605 mm for not removable table tops,
 - 665 mm for the transfers tables;
- Press button B (17) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (1) until reaching the height of:
 - 685mm for standard bases;
 - 760 mm for ultra-flat bases;
- Press button A (16) hold it and press button (14);
- Release the buttons after the “beep” issued by the system

5.2.2 Storage of motor 2 (Trendelenburg and reverse Trendelenburg)

- Press button (3) until reaching an angle of +30° (inclinometer on the table top without pad)
- Press button A (16) holding it and press button (14);
- Release the button after the “beep” issued by the system;
- Press button (4) reaching angle 0°;
- Press button B (17) holding it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (4) till reaching angle of -20°;
- Press button C (18) hold and press button (14);
- Release the buttons after the “beep” issued by the system;

5.2.3 Storage of motor 3 (lateral right and left)

- Press button (5) till reaching angle of +15° (inclinometer on the table top without pad);
- Press and hold button A (16) and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (6) till reaching angle of 0°;
- Press button B (17) hold and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (6) till reaching angle of -15°;
- Press button C (18) hold and press button (14);
- Release the buttons after the “beep” issued by the system.



5.2.4 Storage of motor 4 (longitudinal shift)

- Press button (7) till reaching a length of 140 mm;
- Press button A (16) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (8) till reaching length 0;
- Press button B (17) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (8) till reaching a length of 140 mm;
- Press button C (18) hold it and press button (14);
- Release the buttons after the “beep” issued by the system.

5.2.5 Storage of motor 5 (backrest)

Only for tables without thorax split!

- Press button (9) until reached an angle of +75°;
- Press button A (16) hold it and press button (14);
- Release the buttons after the “beep” issued by the system
- Press button (10) until reached an angle of 0°;
- Press button B (17) hold it and press button (14);
- Release the buttons after the “beep” issued by the system
- Press button (10) until reached an angle of -35°;
- Press button C (18) hold it and press button (14);
- Release the buttons after the “beep” issued by the system

5.2.6 Storage motor 5 (backrest with thorax split)

Only for tables with thorax split!

- Press button (9) until reached an angle of +75°;
- Press button A (16) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (10) until reached an angle of 0°;
- Press button B (17) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (10) until reached an angle of -35°;
- Press button C (18) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (9) until reached an angle of -40°;
- Press button “recall” (14);
- Press button (10) until reached an angle of 0°.

5.2.7 Storage of motor 6 (thorax)

Only for tables with thorax split!

- Press button (11) until reached an angle of -40°;
- Press button A (16) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button (12) until reached an angle of 0°;
- Press button C (18) hold it and press button (14);
- Release the buttons after the “beep” issued by the system;
- Press button B (17) hold it and press button (14);
- Release the buttons after the “beep” issued by the system.



5.3 Stage 3: restoring the system to "normal use"

- Press and hold the button (1), until reaching the height of:
 - 680 mm for the standard bases;
 - 755 mm for the ultra-flat bases;
- Turn the power **OFF**;
- Unscrew the screws (3) and remove the cover (2)
- Set the switch **SW1** of the "logic card 130" to **OFF**;
- Replace the cover (2) and screws (3);
- Replace the caps (5) and screws (6).

5.4 Step 4: functional check

- Switch the table **ON** by lifting the power-button (3);
- Wait for the check-up of the system,
- All LEDs on the keypad must be switched **OFF**, if one or more LEDS are **ON** the storing of the corresponding motor has to be repeated. (movement indicated by red LED)
- Check the correct value of the end-stroke of every motor by pressing the corresponding button while measuring the value.
- If a movement is not restored properly, repeat the storage procedure.

The thorax split movement will not reset automatically.

If all the three positions are not fully stored (A-B-C) it will remain blocked since the storing process is not completely performed.

The storage of the end-strokes is necessary after replacement of components or maintenance on the motors.

In case a Led is still **ON** after storing, check the potentiometer, connections and the assembly.

5.5 Motor replacement

Locations of the different motors:

Name	Movement	Location
Motor 1	Up / down	See Picture 17
Motor 2	Trendelenburg / reverse Trendelenburg	See Picture 12
Motor 3	Lateral right / left	See Picture 13
Motor 4	Longitudinal sliding	See Picture 14
Motor 5	Backrest	See Picture 15
Motor 6	Thorax split	See Picture 16

5.5.1 Removing motor 1 (up / down)

- Turn the table **OFF** by pressing the power-button (3) down;
- Remove cap (8)
- Connect the crank (6) and turn it slowly clockwise until reaching the maximum height;
Warning: do not move further than the end-stroke!
- Remove the crank and replace the cap (8);
- Remove the fixed cover (2) and the mobile cover (1);
- Disconnect the connector (A);
- Unscrew the screws under the base;
- Put a spacer between bracket A and support B;
- Remove the cap (8)
- Connect the crank, turn it slowly anticlockwise until the motor is removed from the seats (4) and (5);
- Remove the pin (6) and the damaged motor.



5.5.2 Installation of motor 1

- Reconnect the pin (6);
- Reconnect the new motor in its seat (5) and fix the screw (3);
- Connect the crank and turn it slowly clockwise until the actuator fits in its seat (4), fix the screw (7);
- Remove the spacer between bracket A and support B;
- Reconnect the connector (A);
- Store the end-stroke of motor n. 1 as per section “storing of an end-stroke”;

Replace the fixed cover (2) and the mobile cover (1).

5.5.3 Removing motor 2 (Trendelenburg / reverse Trendelenburg)

- Switch the table **ON** by lifting the power-button (3);
- Move the table to maximum height;
- Turn the table **OFF** by pressing the power-button (3) down;
- Remove the covers, unscrew the screws from the column;
- Remove the caps;
- Remove the pelvic section top by removing the screws;
- Remove the x-ray rails located on the pelvic section area;
- Disconnect the connector (A);
- Remove the pins (3) and (6) by removing the screws;
- Remove the damaged motor.

5.5.4 Installation of motor 2

- Place the new motor inside the column;
- Replace the pins (3) and (6) and screws;
- Replace the connector (A);
- Store the end-stroke of motor n. 2 as per section “ storing of an end-stroke”;
- Replace the caps (4) and (5) and screws;
- Replace the fixed (2) and the mobile (1) cover and screws;
- Reconnect the x-ray rails of the pelvic section;
- Reconnect the top.

5.5.5 Removing motor 3 (lateral right / left)

- Switch the table **ON** by lifting the power-button (3);
- Move the table to maximum height;
- Turn the table **OFF** by pressing the power-button (3) down;
- Remove the covers, unscrew the screws from the column;
- Remove the caps,
- Remove the pelvic section top by removing the screws;
- Remove the x-ray rails located on the pelvic section area;
- Disconnect the connector (A);
- Remove the pins (4);
- Remove the support (10) by removing the screws
- Remove the pin (6) of the Trendelenburg actuator.
- Slide the motor, by sliding motor 2 laterally.
- Remove pin (10) removing the screws of support (8)
- Remove the damaged motor.



5.5.6 Installation of motor 3

- Reconnect the pin (10) by replacing the screws;
- Install the new motor;
- Assembly of the support by connecting the screws;
- Reconnect the pin (4);
- Reconnect the connector (A);
- Store the end-stroke of motor n. 3 as per section “storing of an end-stroke”;
- Reconnect pin (6) of the Trendelenburg actuator;
- Replace the covers (4) and (5) and the screws;
- Replace the fixed cover (2) and the mobile cover (1) by connecting the screws;
- Reconnect the x-ray rails of the pelvic section;
- Reconnect the top.

5.5.7 Removing motor 4 (longitudinal sliding)

- Turn the table **OFF** by pressing the power-button (3) down;
- Remove the pelvic section top by removing the screws;
- Remove the x-ray rails located on the pelvic section area;
- Remove covers (2) and (3) removing the screws;
- Disconnect the connector (A);
- Remove the pin (4);
- Slide the pin (5);
- Remove the cover of the motor (6) by removing the screws;
- Remove the damaged motor.

5.5.8 Installation of motor 4

- Assembly of the new motor with cover (6), screwing the screws to the panel.
- Reconnect the pin (5);
- Reconnect the pin (4);
- Reconnect the connector (A);
- Store the end-stroke of motor n. 4 as per section “storing of an end-stroke”;
- Place the covers (2) and (3) and reconnect the screws;
- Reconnect the x-ray rails of the pelvic section;
- Reconnect the top.

5.5.9 Removing motor 5 (backrest)

- Turn the table **OFF** by pressing the power-button (3) down;
- Remove covers 1, 2, 3 and 4;
- Disconnect the connector (A)
- Remove the pins (5) and (6);
- Remove the damaged motor.

5.5.10 Installation of motor 5

- Reconnect the pins (5) and (6);
- Reconnect connector (A)
- Replace the covers 1, 2, 3 and 4 and the screws;
- Store the end-stroke of motor n. 5 as per section “storing of an end-stroke”.



5.5.11 Removing motor 6 (Thorax split)

- Turn **OFF** the table by pressing the power-button (3) down;
- Remove covers **1, 2** and **3**;
- Disconnect the connector (A);
- Remove the pins (5) and (6);
- Remove the damaged motor.

5.5.12 Installation of motor 6

- Reconnect the pins (5) and (6);
- Reconnect connector (A);
- Replace covers **1, 2** and **3**;
- Store the end-stroke of motor n. 6 as per section “**storing of an end-stroke**”.

5.6 Inspections and tests

The following procedures can be used to check the correct operation of the system and to identify parts to be replaced.

When switched **ON**, the system runs a series of self-tests.

The system will not start, if there are problems concerning the electronic boards. If problems occur with the motors, the LED concerning the faulty motor lights on the terminal and an acoustic signal is issued and the movement is blocked.

5.6.1 Power

The 24V DC is powered by 2 rechargeable batteries of 12V. The two batteries are equipped with a fuse in order to avoid short-circuit. The battery charging level is shown on the display (3) on the column.

5.6.2 Batteries status (normal use)

The battery charging level is displayed after switching the table on and during use of the table. Only when all movements of the table are stopped the charge level will not be displayed to avoid measurements errors.

Displayed charging levels: 100, 75, 50 and 25 %.

The red symbol of 25% has a dual-function:

- steady red light indicates the battery-level of 25 %,
- blinking light indicates that the batteries are to be charged.

There will be an acoustic signal, if batteries are to be charged, after this, hardware and software stop all functions.

5.6.3 Batteries status (charging)

Connecting the battery-charger to the table and switching it on starts the recharging-procedure, when the system detects a voltage of 27V DC or a charging power on the batteries

The display (3) shows “**connection to the charger**” with a yellow light and the charging status through a quickly sequence of LEDs 25%, 50%, 75%, 100%.

When the charging current decreases under app. 200 mA and the charging-power is more than 27.3V, the system stops blinking of all LEDs and the display indicates 100% after approximately 10 minutes.

5.6.4 Cable remote control

Unscrew the 4 screws on the backside of the remote control, remove the cover. Check by turning the table **ON**, if all LEDs are on and an acoustic signal is issued. Also check the voltage on board 120, between pin 3 and 4 of JP2, it must be 24V.

If errors occur on any button, replace the buttons panel otherwise replace the board 120.



5.6.5 Infrared remote control

This remote control drives the table through infrared signals, charged by a 9V battery. The panel key is coded by a processor.

The IR-sensors are located in the display **(3)** on the column and on the card **103b.3**, located on the opposite side (beyond a transparent round protection). The table 130 board computer decodes the signals and carries out the command. A LED on the button panel indicates battery efficiency. Replace the battery if the LED stays off after a button is pressed.

In any case, the batteries are to be replaced if the distance for sending commands is greatly reduced.

In case of failures, check:

- Batteries voltage.
- Replace the button panel if any failures concerning the buttons are detected.

5.6.6 Battery display

The battery display **(7)** features a series of LEDs indicating the various charge levels and an infrared receiver. The connection between the display board and the 130 board is made with a flat cable with 10 wires connected to JP4 of the board 130.

All LEDs will come on for a functional test upon power up. By failures replace the card 103.3 together with the wires.

5.6.7 Movements

The movements are made by direct current motors at a nominal voltage of 24V. The position and the motor position are detected by a multiturn potentiometer of 5 kΩ, mounted on the shaft of each motor.

The motors are powered via "MOSFET" semiconductor devices providing both the polarity for the turning direction and the braking function for accurate positioning.

Drive current is monitored and limited to 4A to prevent damages.

Each motor control circuit is protected by a fuse (5A) to prevent hazardous overheating in the event of failures. Each motor control card monitors positions and currents analysing the movement and signally failures; the position of the motor is actively controlled.

Under certain conditions the movements are carried out automatically according to the type of command sent as position resetting, scheduled positions, removal or connection of the top with the trolley.

5.6.8 Self-test

When the system is switched on and all the LEDs on the keypad light up in sequence and the acoustic signal is given, then the position potentiometers are not powered. Check F1 on the 110 board (fuse board of motor drive). This fault can be caused by an overload on the connections of the potentiometers pressing one of the two commands of each movement the motor is powered and controlled simultaneously.

The following checks are carried out:

- Correct power and polarity sent to the motor.
- The output and average power must not exceed the values set by the manufacturer.
- The potentiometer must provide a variable voltage from 0V to +5 V in relation to the position and direction of movement.
- The potentiometer should increase or decrease the voltage level at a minimum speed within the limits set by the manufacturer.



5.6.9 Check after movement stop

If the movement stops (indicated by a light corresponding to the locked movement), Switch **OFF** the power wait some seconds and Switch **ON** again. Repeat this operation whenever you need to test a movement.

Control the movement and check, if the motor moves.

If this is not so, check for voltage (approximately 24V) on pins 4 and 5 of J1 of the connector related to the motor and the change of the polarity, when the direction of rotation changes.

If there is no voltage, check the fuse F1 near the motor connector. If the fuse is blown, replace it. (In most cases you will need to seek the fault which caused the fuse to blow.) The cause can be a mechanical lock, motor failure, supply system fault or damage on the circuit board.

If the fuse is intact but there is no voltage on the connector, replace the 110 board. after verifying that there is a voltage of about 24V between pins 1 and 2 of J2 or J3 (If not it may mean that the card is powered but does not transmit the command to the motor).

5.6.10 Check after immediate stop

The power between pin 3 (0V) and pin1 (+ V) of connector J1 must be 5V, if not check the fuse F1.

If the fuse is blown, it is necessary to find out the cause, taking in account that the power of each potentiometer is protected. A blown fuse can be due to a potentiometer power short-circuit or a short-circuit in other parts of the system. In these cases, disconnect all the drive connectors and search the problem in the system.

If the fuse is intact, check that during movements the voltage on the drive connectors between pin 3 (0V) and 2 (position) tends to +5V or to 0V according to the direction of movement.

If the voltage remains fixed, look at the cause which may relate to assembly mechanics (the shaft is not connected to the drive) or to a potentiometer fault.

The voltage on the potentiometer varies but the block occurs randomly, consider that during operation the system monitors that the position voltage moves naturally, that is without sudden changes towards +5V or 0V and without ever reaching these two extreme values. In the first case, the cause may be related to system interruptions, potentiometer interruptions or short-circuits. In the latter case, it may be related to an incorrect position of the potentiometer.

The position and the operation of the potentiometer is extremely important and therefore the system monitors various functional aspects.

If the potentiometer is fitted incorrectly, the possibility of reaching the mechanical end-stroke before being stopped would certainly cause damage. For this reason, the system checks that the central voltage does not exceeds the extreme values, i.e., +4.5V and 0.5V.

Operation and safety problems could occur if the potentiometer voltage does not vary when the actuator is driving the system. Causes could relate to a mechanical seizure of the motor or actuator, to a loose connection or to a failure in the mechanical connection between potentiometer and actuator.

If the change of voltage at the potentiometer is inverted reversed to the actuator movement. In this case, the connection between the ends of the potentiometer or drive connector are reversed. This event can only occur during assembly by the manufacturer or in the case of technical assistance on the system which do not respect the original connections.

If the potentiometer signal checks are OK, the cause of no working could be an excess of current drawn by the motor. Connect the multimeter (10A full scale) to a drive wire connector pin 3 and 4 in series. Check that during movement, the average power is lower than 4 A. If the power is higher, check mechanics or replace the actuator.

If all checks do not give a positive result, the board 110 needs to be replaced.

Attention: after replacing the board, all end-strokes have to be stored!



5.6.11 Automatically cycle tests

If the table is malfunctioning, check the following:

- Engage one of the two switches on the basement (trolley present) Verify that the voltage between connector JP5 pin 2 and JP5 pin 5 (GND) is +5V, when the switch is released and 0V when pressed.
- If the table top is connected make sure that the connector JP5 pin 3 or JP5 pin 4 with respect to GND is present 0V and +5 V.
- If the table top is connected make sure that the connector JP6 pin 1 respect to GND is present 0V and +5 V if the table top is not included.

5.6.12 Check loading cycle on the trolley.

- Place the remote control in its housing.
- Connect the trolley after reaching the end-stroke.
- Three beeps should be heard and the table loading cycle should start.
- All drives are taken to zero position.
- The column will start moving downwards placing the top on the trolley.
- Move the trolley back slightly to release the second limit switch.
- The Column should stop.
- Wait few seconds and connect the trolley again.
- The column will move upwards to zero position and repeat the downwards movement.
- During the downwards movement, the top will be placed on the trolley releasing the top. The cycle stops.

5.6.13 Top loading on table

- Connect the trolley after reaching the end-stroke.
- Three beeps should be heard and the table loading cycle should start
- The column will move upwards.
- Move the trolley back slightly to release the second limit switch.
- The column should stop.
- Connect the trolley after reaching the end-stroke.
- The column will move downwards to end-of-stroke and repeat the upwards movement.
- During the upwards movement to zero position, the column will load the top and release the trolley.

5.6.14 Table loading / deposit (table top+ base)

- Set the commutator (on the trolley) to pick up the table top + base.
- Connect the trolley after reaching the end-stroke
- Three beeps should be heard and the table loading cycle should start
- The column will move downwards.
- The down sliding will stop shortly after the lifting of the basement.

5.6.15 Batteries charger test

WARNING: This device is powered with 220V AC. Dangerous voltage inside, directly connected to the mains!
Take all precautions during inspections to prevent injury to the operator or damage to the device.

The following devices are inside:

- Board 106 (batterie charger board);
- Commercial series switching power supply S150 (24 Volt)

A bipolar switch with light is placed between the main voltage and the input of the power switching.

The output cable which allows the charge of table is connected to the J2 connector of the board 106.



5.6.16 Battery-charging circuit

The 27V DC voltage is supplied by the power pack and protected by fuse F1 (4A-250V).

Power limitation of the batterie charger is not related to the maximum charging of the batteries (there is an internal self-restraint) but at the maximum expected power in emergency cases in order to allow the simultaneously working of a motor of the operating table during batteries charging.

The output current is given by fuse F1 (6.3A) on 106 board

The yellow LED on the battery-charger shows the connection between power pack and operating table.

5.6.17 Regulations and controls

- Open the device by loosening the four screws under the device.

Take all the precautions required to prevent getting in touch with parts under power!

- Carefully remove the frame connected to the panel without forcing the wiring.
- Check the board fuses.
- Connect a switch (simulating the open flap switch) between pins 1- and 2- of the connector simulating the table.
- Connect a 100 Ω resistor between pins 1+ and 2+ of the connector.
- Connect the device to the mains and check:
 - The presence of voltage between the two grey wires which connects the bipolar switching power supply, if there is no power, find the reason (fuses, connections...);
 - The presence of voltage between the red and black wires around 27V DC output from the power pack, if there is no power, replace the power pack or check again the fuse
 - The Presence of 12V DC voltage between U2 pins 7 and 14. In case of no power, replace the board.
- Close the switch on the plug and check the yellow LED on the board.
- If the LED does not light up but the board relay is energized and a charging voltage (approximately 27.6V DC) is identified on the 100 Ω resistor, check the connections and the LED. If these are OK, replace the board.
- If the relay is not powered, replace the board.
- If both the LED and the relay are operative, check the output voltage on the 100 Ω resistor. It should be approximately 27V.
- If there is no voltage output, try testing the operation of the radiator, i.e., jumper PD, transistor Q1, resistance R1. Check that system connections and connectors. Finally, replace the board first and then radiator unit.
- If the output power is not app. 27,6V DC, the trimmer on the charger needs to be regulated.
- Check current limitation after the voltage calibration:
- Connect the 10 Ω 100W resistor in parallel to the 100 Ω resistor and check that the voltage does not drop under 26 V DC.
- Disconnect the 10 Ω resistor and connect the 4.7 Ω 100W resistor in its place. Check that the voltage at the resistor terminals divided by the resistor is approximately 5 to 6 A. If the current value differs from the one described, replace the card.



6 First level service

The following instructions can be used to notice and settle problems without calling the technical assistance service. A good knowledge of electronic and mechanical systems and suitable tools are required to carry out the service.

Problem	Solution
Neither the table's nor the battery's charging lights are ON.	If the charge display does not light up and no sound is heard from the keypad or the table, check the following: Correct operation of the switch. Batteries voltage needs to be higher than 22V. The fuse F15 between the batteries and fuse F1 on card 130. Perfect connection of the different connectors. Replace the 130 board or call technical assistance service.
Display lights UP but no tone is issued and / or keypad does not work correctly when the table is switched on	The keypad LEDs should all light UP for approximately one second Check that the keypad/table connector is well connected. Remove and connect it for some times. Open the keypad and check the wire / board connections. If required, check continuity of wire between board and free connector. Replace the 130 board. Replace the keypad. Replace the inside column wire (connector JP8 - board 130). Replace the 120 board. Call technical assistance service.
Some buttons on the remote control do not work.	Open the remote control and check right connection of the connector between the button panel and card 120. Replace the keypad of the remote control. Replace the keypad 120 card. Replace the complete keypad.
The IR remote control keypad does not work.	Replace the battery inside the keypad. Test with another keypad with the same address (see internal switches). Check if the signal is received on only one of two handsets, so if you replace the receiver fault (one is in the display indicating battery charging 103.3 and the other on the opposite side of the column 103b.) Replace the card 130. Call technical assistance service.
Some buttons on the IR remote control keypad do not work.	Open the remote control and check right connection of the connector between the button panel and card 105. Replace the keypad button panel. Replace the keypad. Replace the 130 board. Call technical assistance service.



A drive LED lights up on the keypad and the movement is blocked.	If the drive does not move at all: Check drive fuses F1 on the 110 board. Check connector JP1-JP2 on the 130 board and if necessary, replace them. Check connector J1-J2-J3 on the 110 board and if necessary, replace them. Use the multimeter to check the voltage on connector contacts 5 and 6 when a drive button is pressed. In this case check the drive wiring, the drive and the mechanics. If no voltage is output from the connector, try replacing the 110 board. If the drive starts up and then stops: • Check for a mechanical problem (overload). • Check that the mobile connector-potentiometer contacts along the line are correct. Check for voltage between pole 0V of the potentiometer and the central. Check that during movements, this voltage increases or decreases. If this is not so, check the fastening between potentiometer shaft and actuator. If it is so, try replacing the potentiometer. Replace the 110 board.
The drive does not stop at end-stroke and/or does not correctly reach zero position or a scheduled position.	Check the drive connections (connector, wire, potentiometer). Check that the mobile connector-potentiometer contacts along the line are correct. Check the potentiometer shaft's mechanical fastening. Try replacing the 110 board (Storing the end-stroke). Call technical assistance service.
Transitory faults which may be hard to identify	Check all connections and removable terminal blocks Try replacing the 130 board. Call technical assistance service.
The system shows that the batteries are charged, but by disconnecting of the charger batteries are already discharged	Check whether the battery voltage drops rapidly to 22V after a charge at 27.6V. In this case, replace both the batteries. In any case, replace the batteries after 4 years of operation. Disconnect the fuse between the battery and check the voltage individually, if the voltage difference is greater than 0.5 V replace the batteries. Try replacing the battery-charger. Try replacing the 103.3 board. Call technical assistance service.
The yellow charge LED on the table display is not ON when the battery-charger is connected.	Check that the battery-charger is connected to the mains and switched ON. The green warning light on the switch and the yellow LED on the battery-charger light should be ON. Check the correct connection of the charging connector. Check that the voltage between connector J7 pins 3 and 5 starts rising after a few seconds after the flap is closed. Replace the battery-charger. Call technical assistance service.
The batteries do not charge in twelve hours (100% charge on the display) when the battery-charger is connected and the yellow LED is on	Check battery voltage. After approximately 12 hours it should be 27.6V. In this case, try changing the 101 board.2. If the voltage is not 27V remove the batteries and check whether the voltage on the battery wires reaches 27V. In this case, replace the batteries. If with the batteries disconnected the voltage is lower than 27V, try calibrating with potentiometer P1 on board 102 on the battery-charger. If the calibration is not possible try to replace the power supply. Call technical assistance service.



The yellow LED on the battery-charger does not light up when the battery-charger is connected.	Check the connection and the working of cables and connector. Check the fuses in the battery-charger. Replace the 106 board. Replace the battery-charger.
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7 Spare parts

7.1 Table

Code	Description
EM CA	Pair of Batteries 12V/12A
EM TU-5	Remote control 5 motors with spiral wire and connector
EM TU-6	Remote control 6 motors with spiral wire and connector
EM TF-5	Remote control 5 motors
EM TF-6	Remote control 6 motors
R300	Logic card 130
R400	Logic card 110
R231	Batteries display card 103.3
R310-5	Remote control panel 5 motors
R310-6	Remote control panel 6 motors
R235-5	Remote control IR panel 5 motors
R235-6	Remote control IR panel 6 motors
R207/3	Wire 4 poles JP8 (Card 130) on keyboard
R240/D	Wire 10 poles JP4 (Card 130) on display
R207	Connection wire, keypad 4 poles with connector

7.2 Remote-control EM TU

Code	Description
R307	Connectivity Cable for EM TU
R307/1	DIN 8-pin male connector for EMTU (on remote control)
R308	Structure external PVC for EM TU
R309	Inside electronic board for EM TU Series 2010
R310	Keyboard remote control EM TU

7.3 Battery-charger

Code	Description
R221	Illuminated switch on/off
R222	LED + Port LEDs
R223	Network socket
R224	Network Cable 220V
R225	Connection cable charger / operating table (Combined with n.2 R227)
R227	Male connector cable charger - the operating table
R228	Socket for male input connector (on column or charger)
R229	Board battery charge
R230	Power Supply switching battery-charger
R231	Control display battery charge status
R232	Electronic board control display state of charge of battery + infrared receiver



7.4 Infrared remote-control EM TF

Code	Description
R233	Outside cover in PVC
R234	Inside electronic board
R235	Remote Keypad
R236	Hook for remote engagement
R237	9V Battery
R238	Infrared receiver for display on stand
R239	Electronic board infrared receiver placed on the column
R240	Cable infrared adapter

7.5 Trolley

Code	Description
R241	Swivel wheel
R242	Directional wheel
R243	Control footswitch for trolley wheels
R245	Pedal up/down trolley
R246	Snap fold-away handle for Trendelenburg and counter Trendelenburg trolley
R347	Cover for trolleys SE TR3-2010 and SE TR4-2010
R349	Protective housing pump up / down on trolleys SE TR3-2010 and SE TR4-2010

7.6 Spare parts ordering

Provide the following data when ordering spare parts:

- Table or power supply serial number.
- Code.
- Description.
- Quantity.
- Type of shipping required (e.g., normal or fast).

Spare parts are available for a period of 10 years from the date of delivery of material.

The most up-to-date versions of the electronic boards are usually provided. Refer to the technical documentation of the respective updates and / or contact the manufacturer for upgrading the oldest models of tables and power supplies.

8 Guarantee Conditions

Tekno-Medical warrants the equipment against all defects of materials or manufacturing for 24 months from shipment date.

During this period of time Tekno-Medical will replace or repair free of charges the parts sent by the customers, acknowledged to be defective.

This warranty does not include consumable parts (mattresses, clamps etc...).

The warranty immediately expires in case the goods are repaired or altered from people not authorized in a written form by Tekno-Medical.

Damage or accidents due to customer's actions such as negligence, lack of supervision, a wrong or bad installation, non-observance of the instructions, surcharge or improper use of the table are not included in this warranty.

Warranty repairs and replacements do not extend the initial warranty period.

This warranty does not include refund for direct or indirect damage occurred to people or objects.



9 Technical assistance service

The technical assistance service is provided by the area agent or directly by the manufacturer.

9.1 Repairs

Tekno-Medical provides a board repair service.

The service ensures component repairs and tests which are carried out with the same care adopted for new products. Overhauled boards can be purchased at a price lower than the new product price. The required parts may not be available at the time of order. Please return the faulty boards, unless the board is damaged beyond repair (broken, burnt, visibly damaged, etc.).

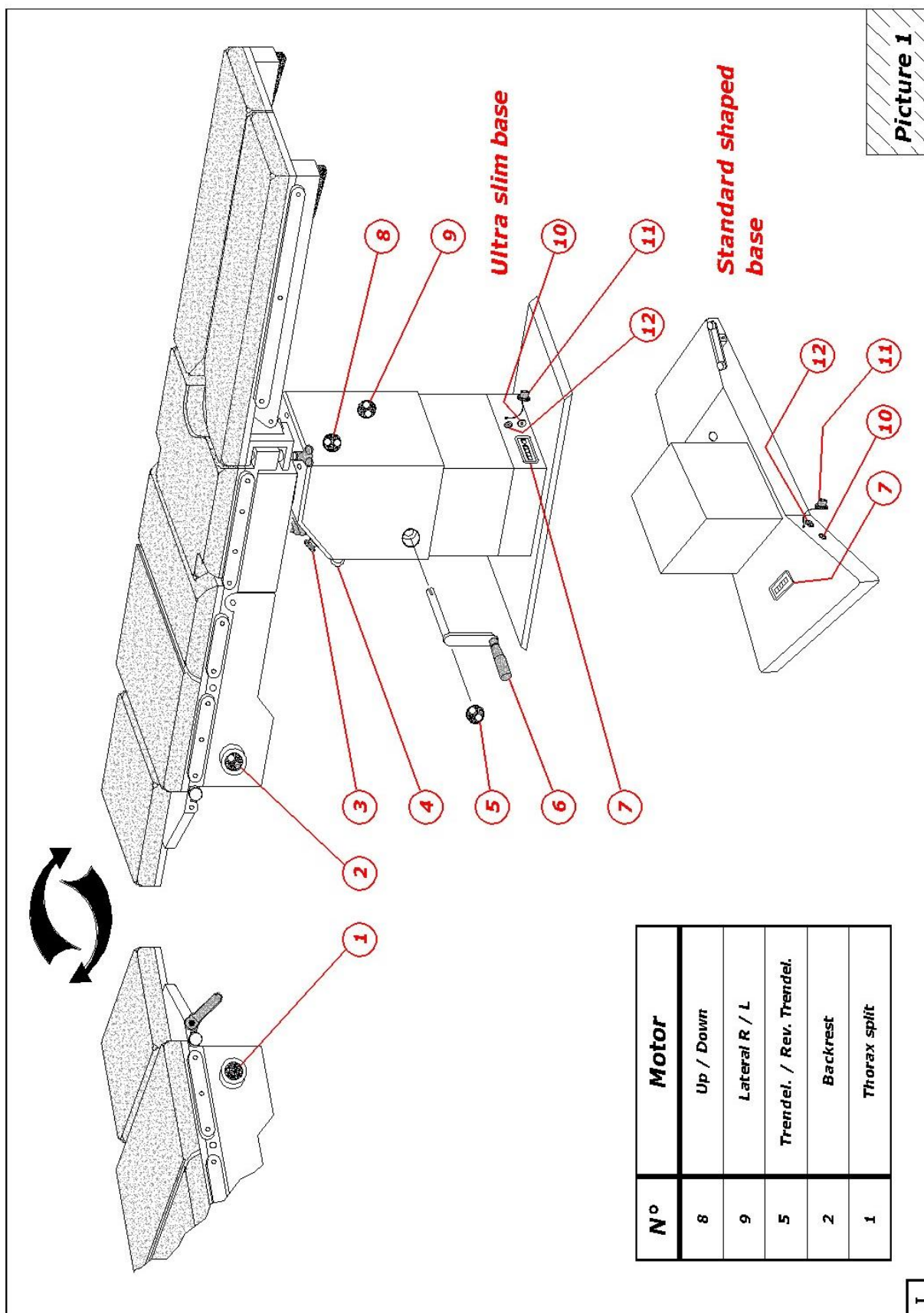
9.2 Returns

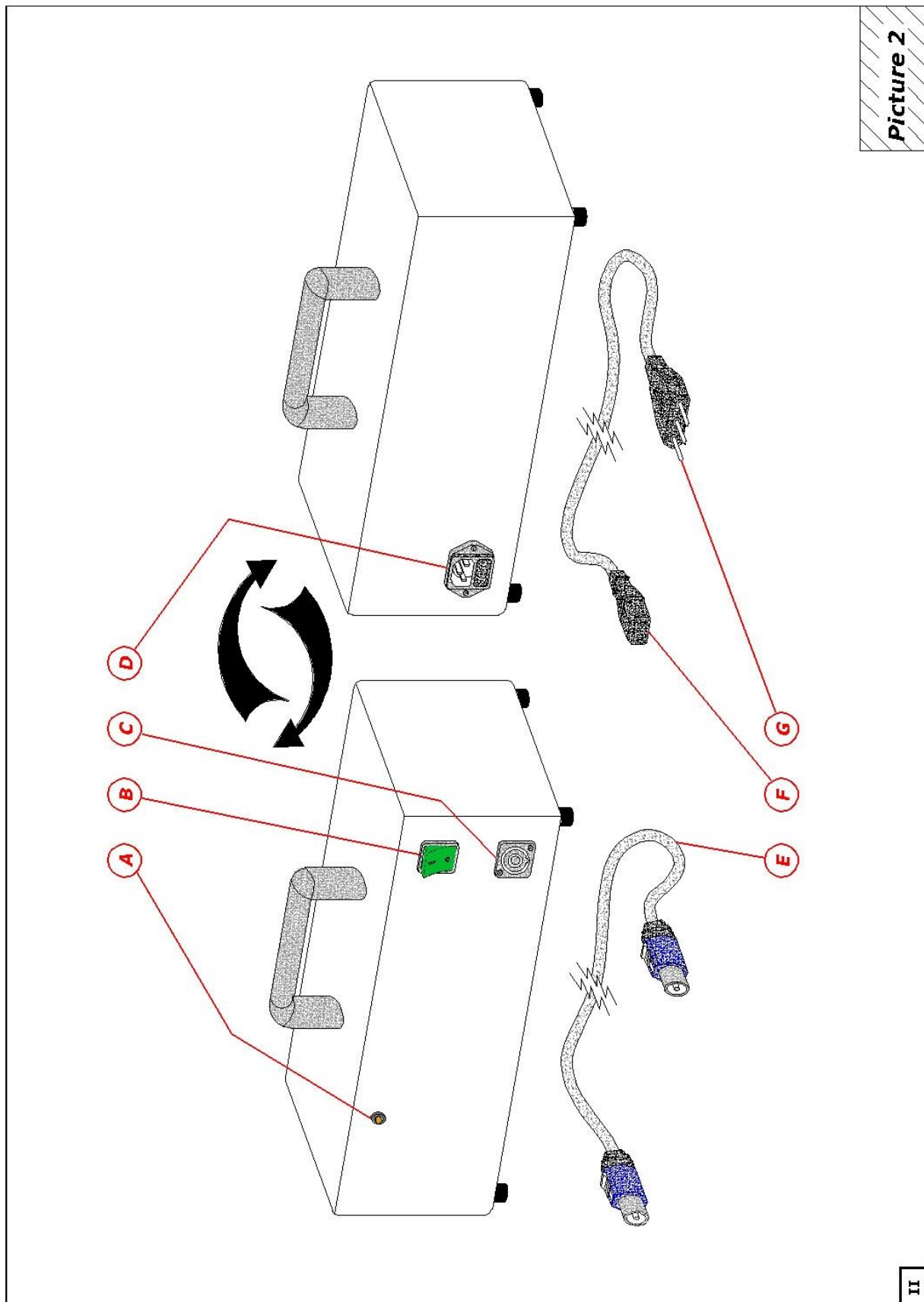
Goods can be returned within ten (10) days from the date of shipping, if the material has not been used.

9.3 Updates

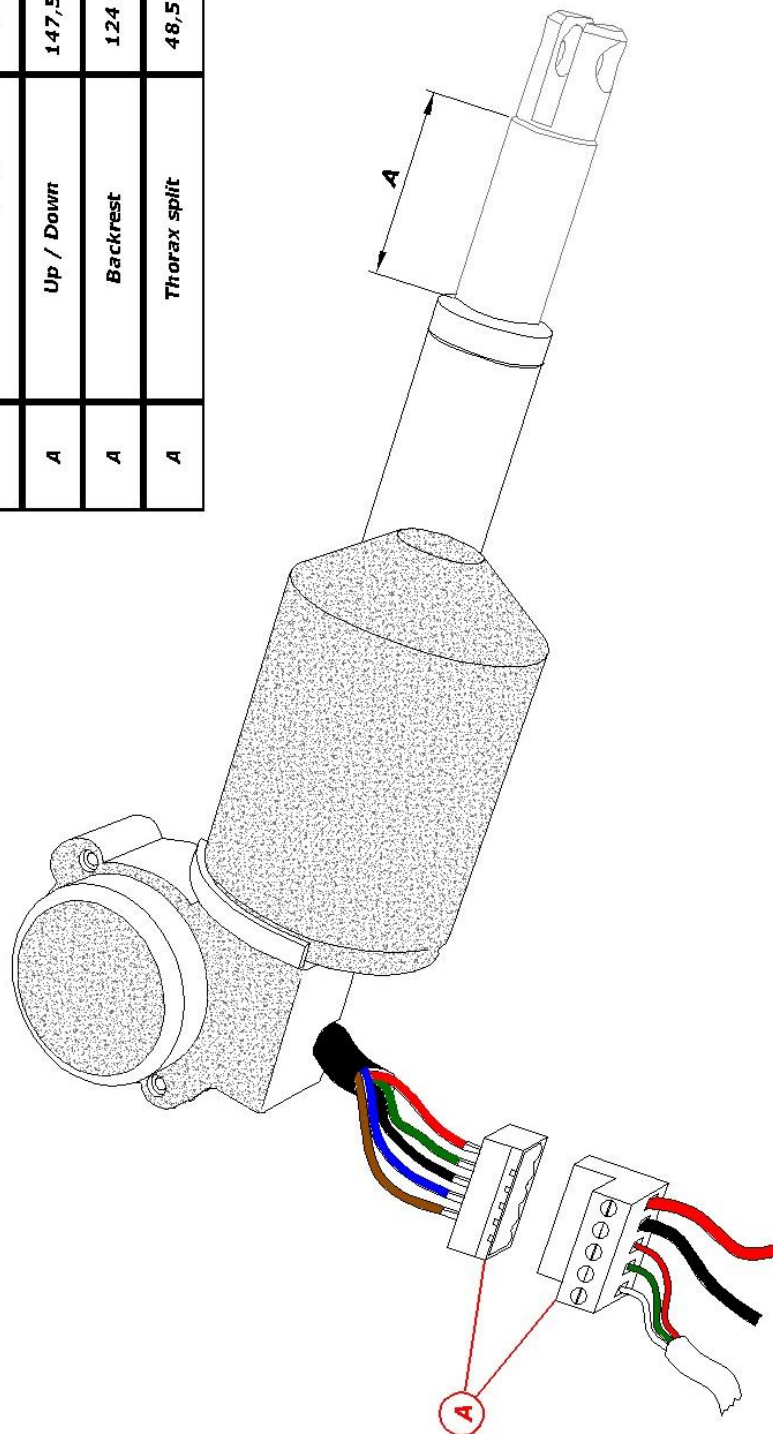
Updates of this manual and the IfU are a result of improvements and / or changes at the discretion of Tekno-Medical.

The actual version of this manual can be ordered at mail@tekno-medical.com.





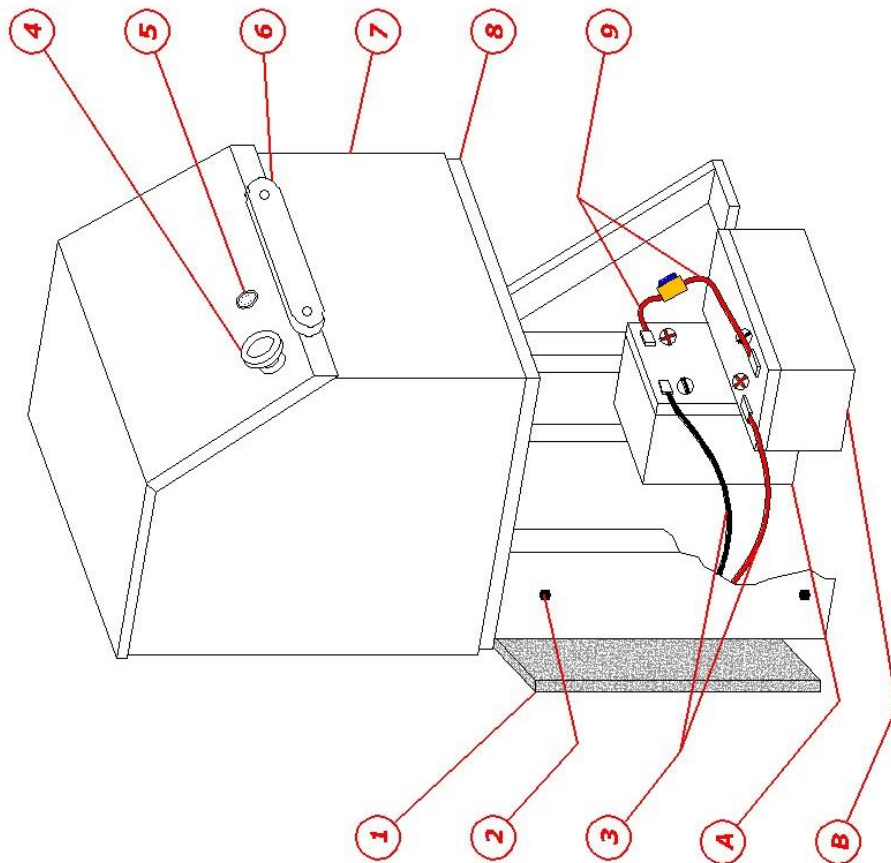
N°	Motor	Length
A	Trendel. / Rev. Trendel.	99,5 [mm]
A	Lateral Left / Right	48,5 [mm]
A	Up / Down	147,5 [mm]
A	Backrest	124 [mm]
A	Thorax split	48,5 [mm]

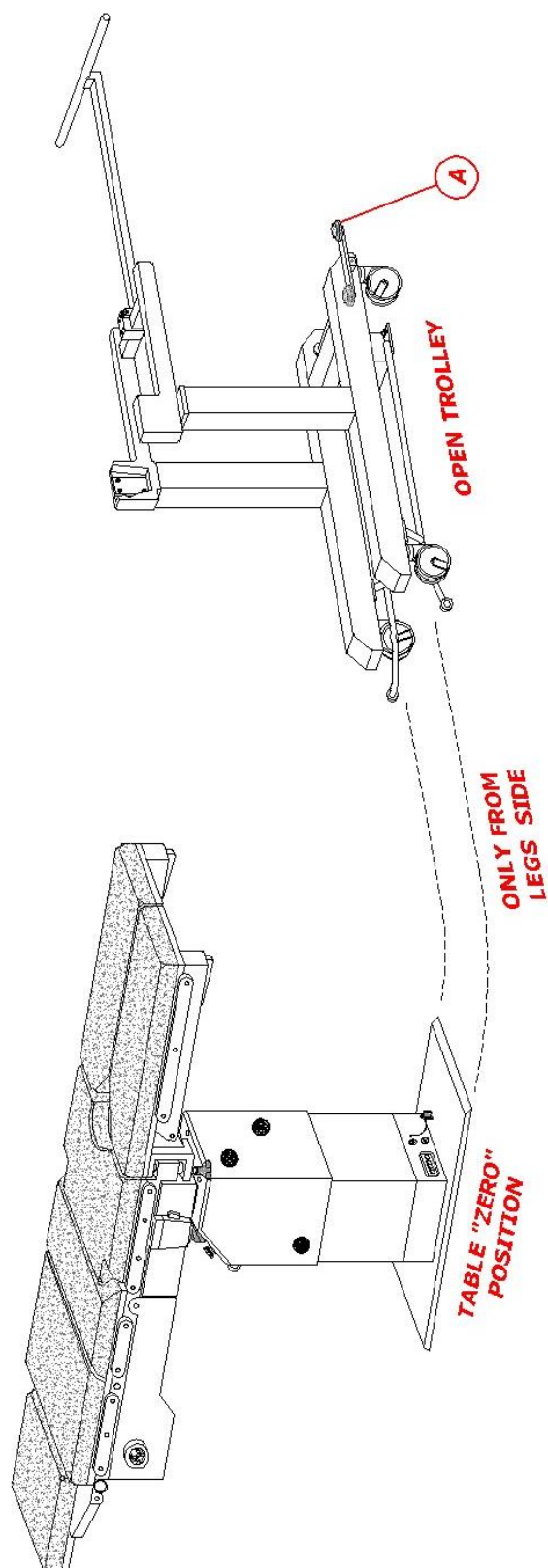


Picture 3

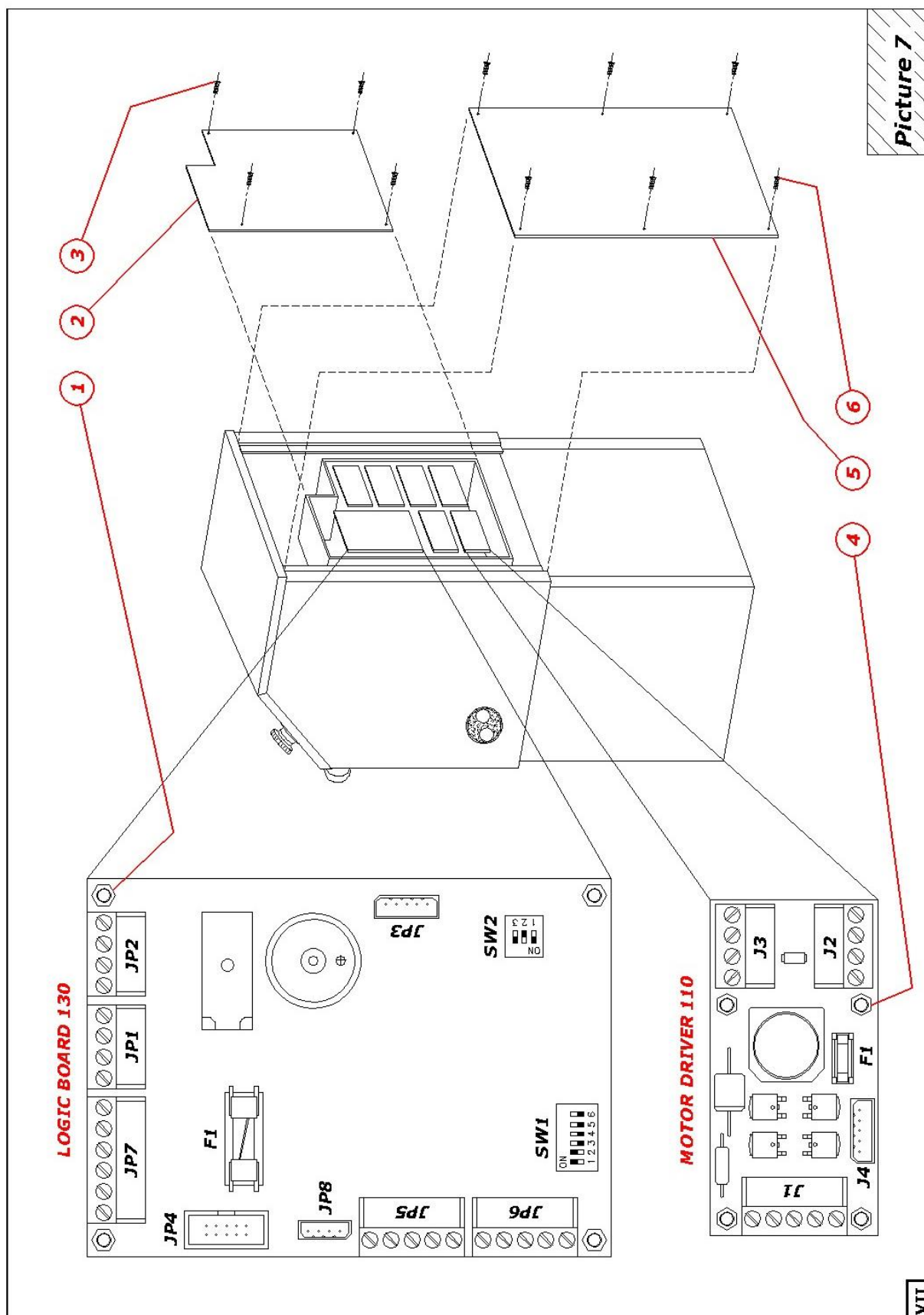
III

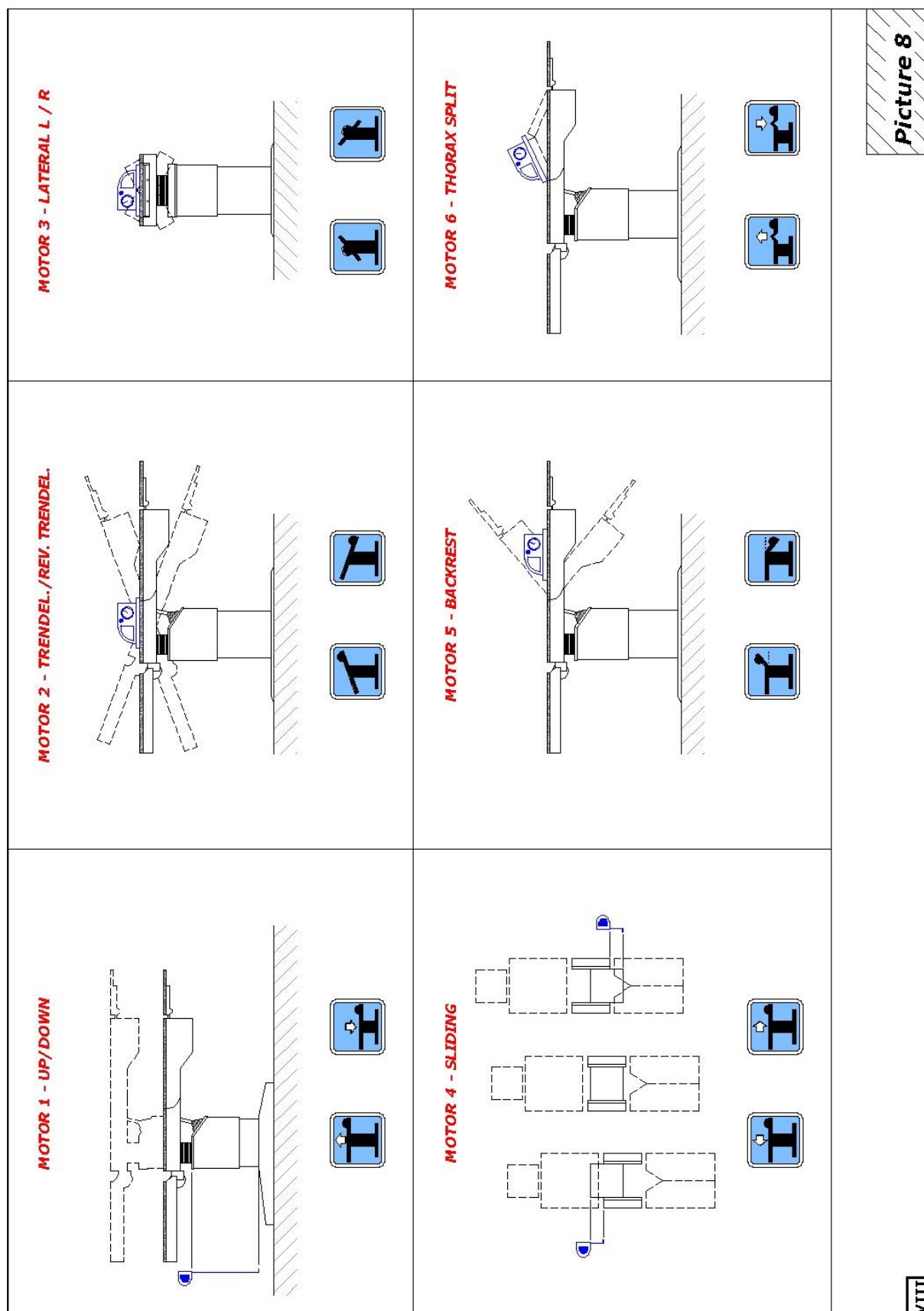
Picture 4

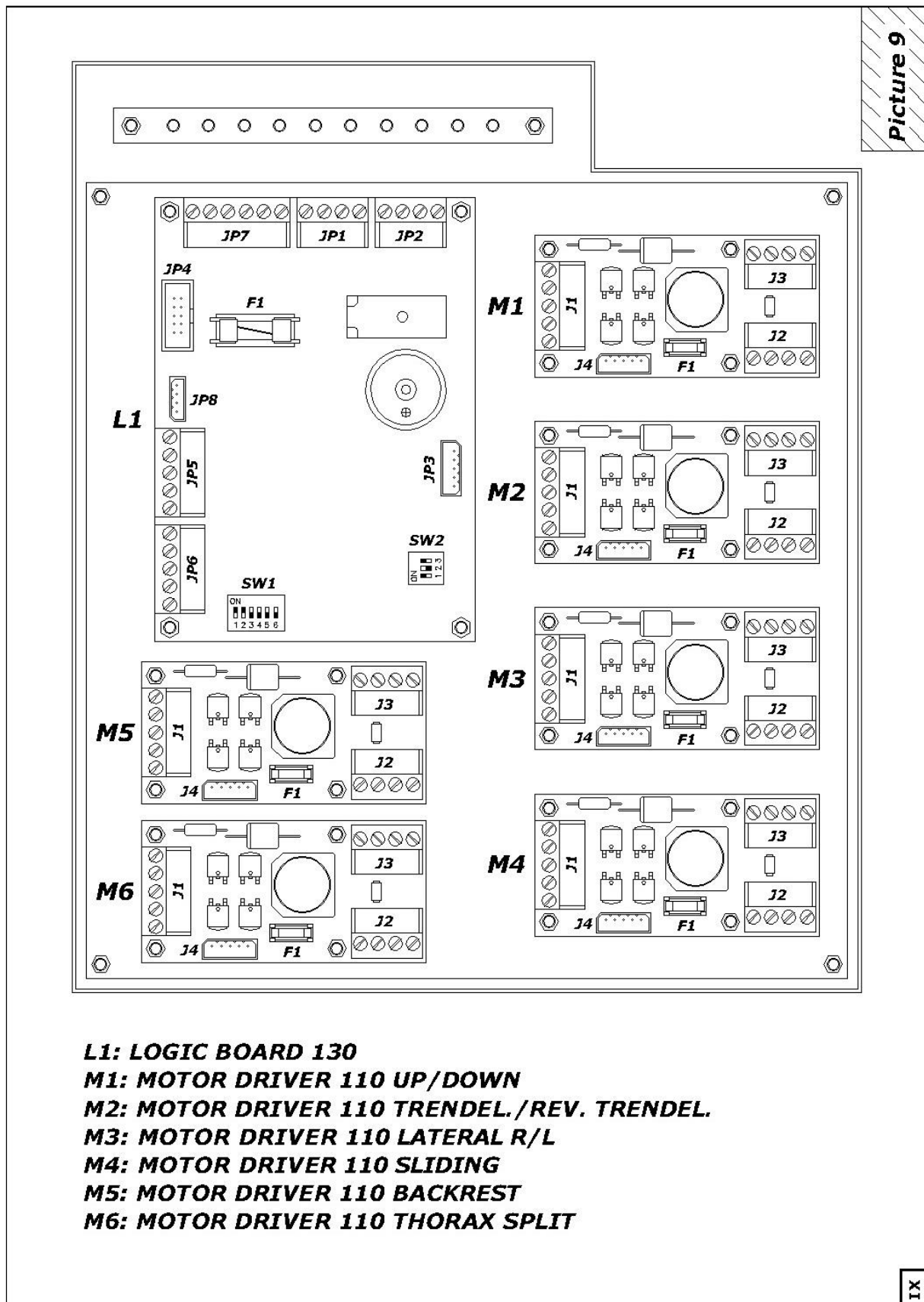


Picture 5

v









L1: LOGIC BOARD 130

M1: MOTOR DRIVER 110 UP/DOWN

M2: MOTOR DRIVER 110 TRENDL./REV. TRENDL.

M3: MOTOR DRIVER 110 LATERAL R/L

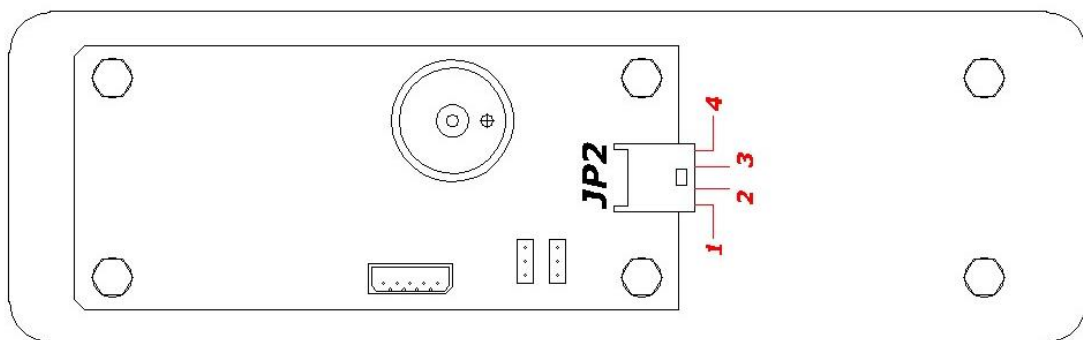
M4: MOTOR DRIVER 110 SLIDING

M5: MOTOR DRIVER 110 BACKREST

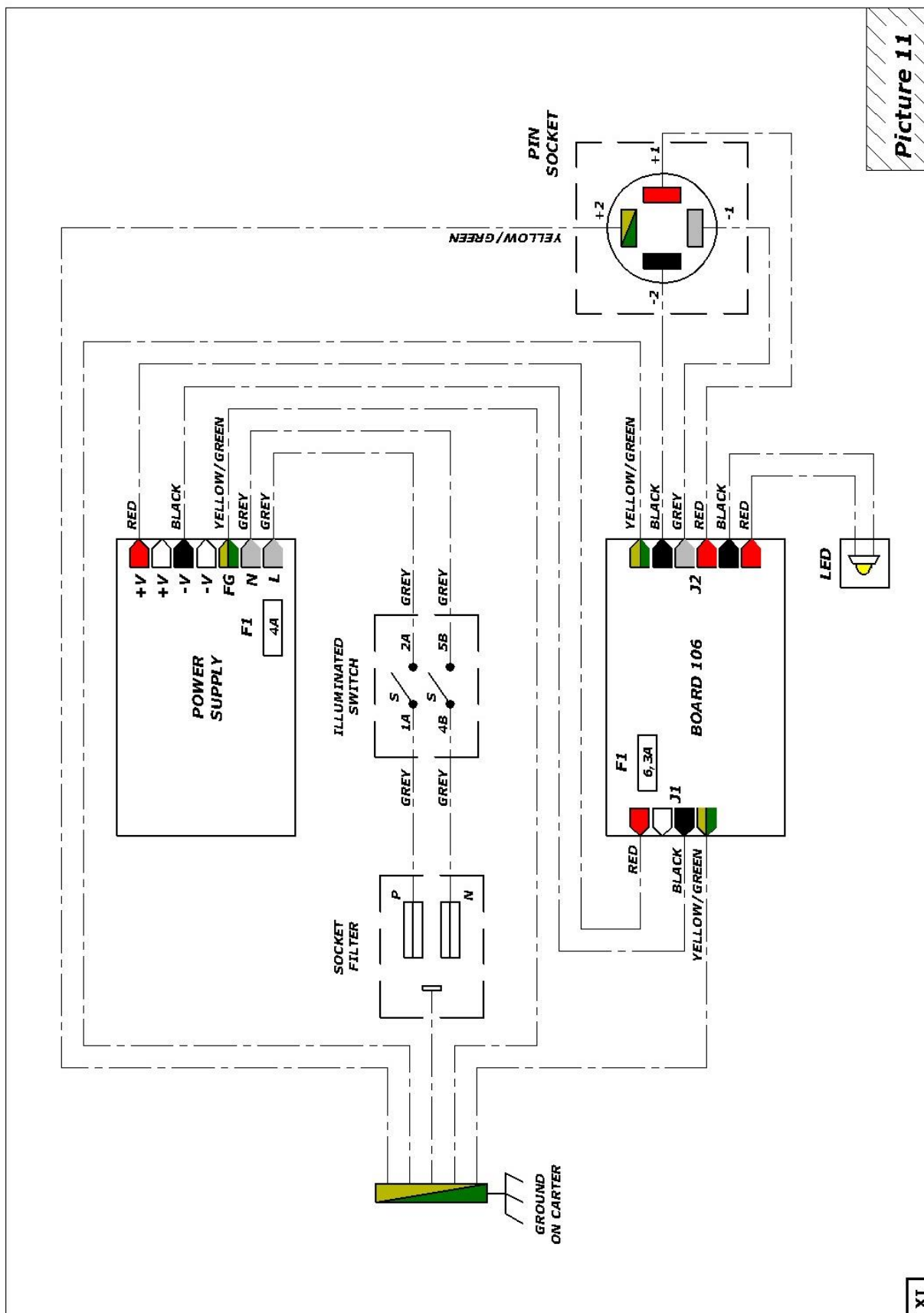
M6: MOTOR DRIVER 110 THORAX SPLIT

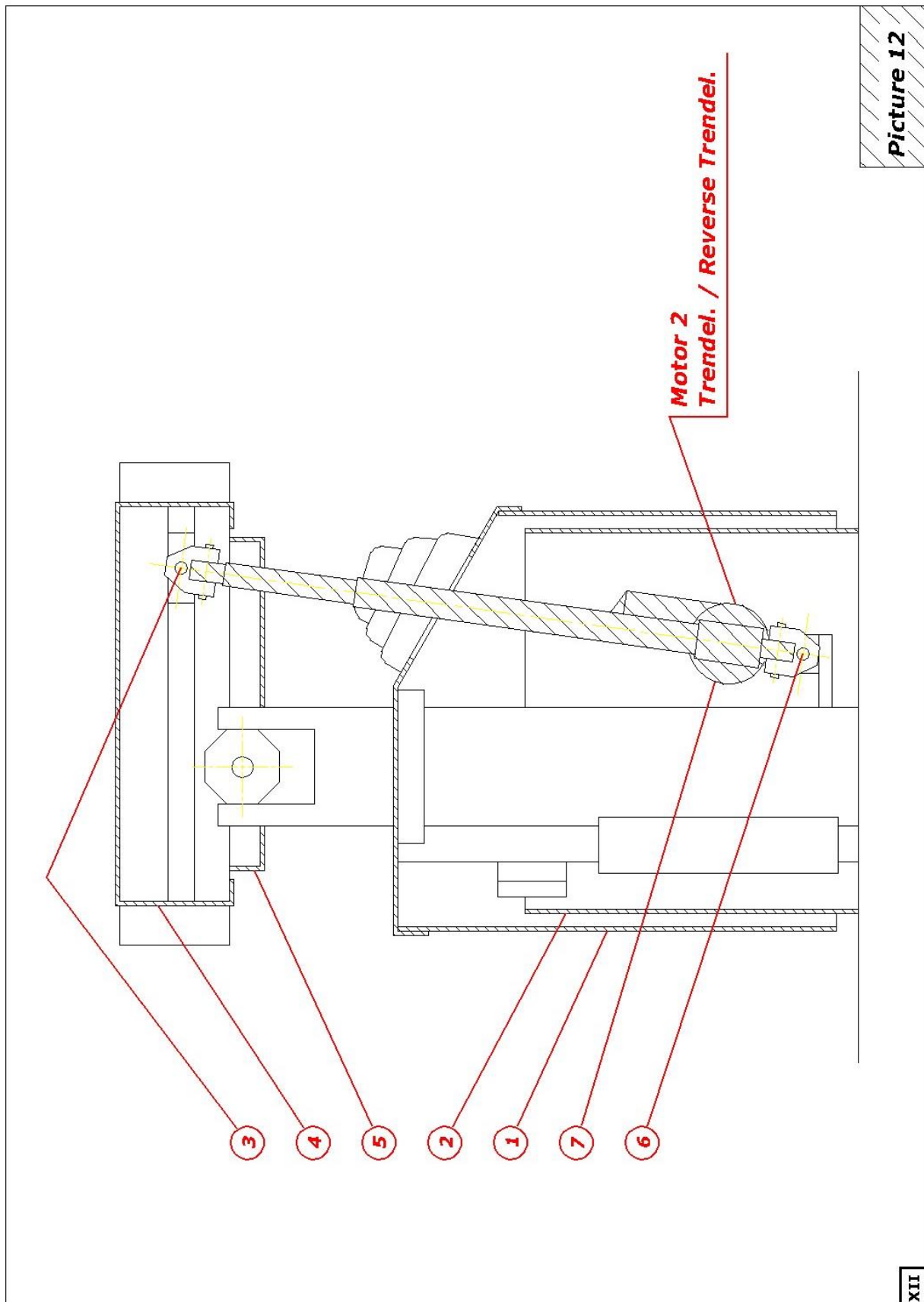
Picture 10

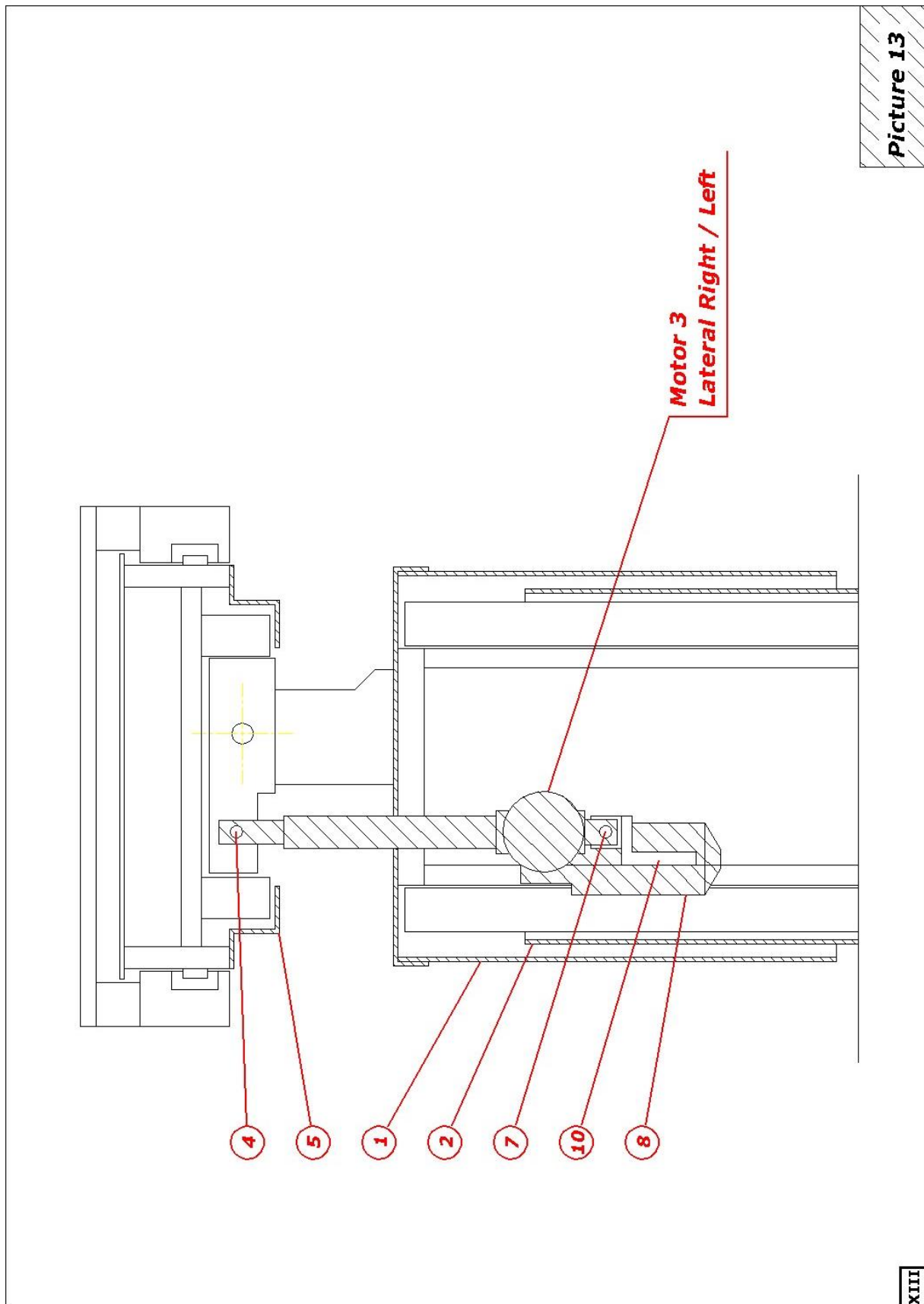
REMOTE CONTROL KEYBOARD
(VIEW FROM BELOW)



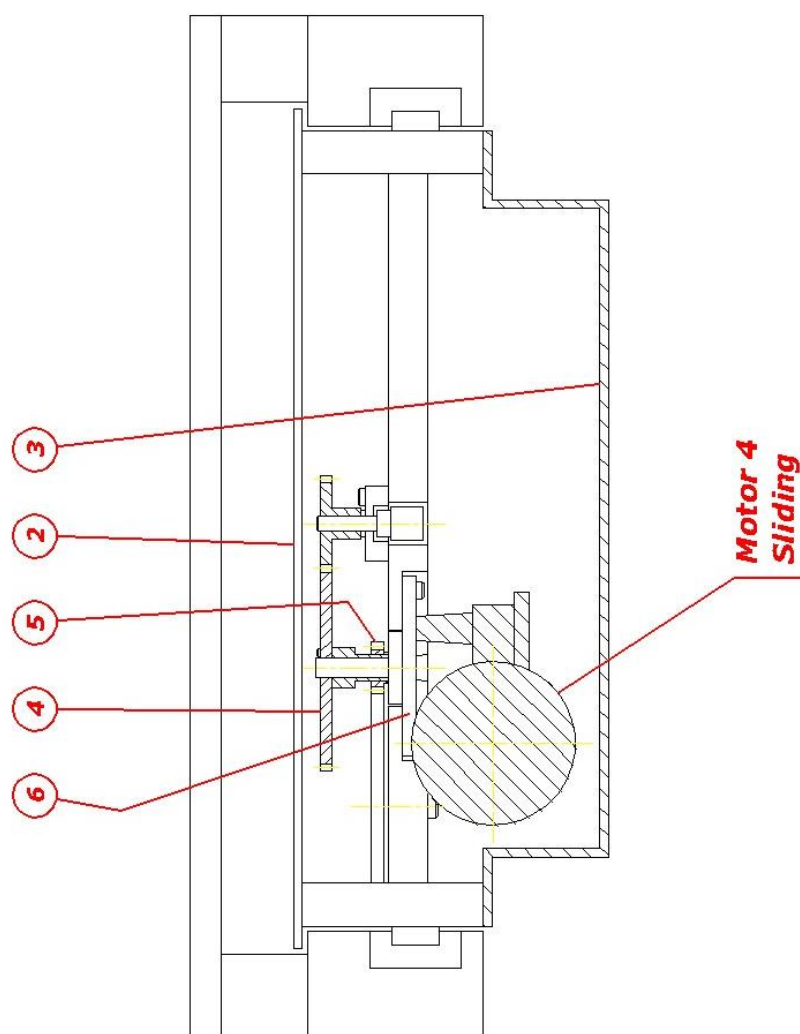
x







Picture 14



XIV

