Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

www.film-tech.com

Kinoton GMBH

ST 100/200/270/400/470/500 E / FT 3 M Platter Systems
ST 2000 (E-K) Endless Loop System

MT 600/2000 / UT 600/200 / IT 600 / MUU 2000
Make-Up and Rewind Tables

Service Manual

Platter Systems (en)

CINEMA

STUDIO

LARGE FORMAT

SPECIAL VENUE

DIGITAL SYSTEMS

DISPLAY SYSTEMS

Imprint

Printed in Germany, Issue: October 2009

Editor responsible for the contents: KINOTON GmbH
Editing and layout: Carmen Auer - KINOTON GmbH

Manual Version Overview

March 2007	Editorial changes and additions (film guiding)
February 2009	Editorial changes and additions (relay contacts and connections)
October 2009	Editorial changes and changes (wiring schemes for St 2000 encoder)

Contents

1 General Hints

This service manual describes the installation, mounting, connection, adjustments and maintenance for non-rewind systems and make-up tables. If necessary the different types of non-rewind systems are discussed separately.
Furthermore you will find all terminal connection plans and wiring schemes in this manual.

This manual classifies:

the non-rewind systems / platter systems:

- ST 100 E, ST 200 E, ST 400 E, ST 500 E => 35 mm
- ST 270 E => 35 mm / 70 mm
- ST 200 M => 35 mm
- FT 3 M => 35 mm
- ST 270 E-SP => 35 mm / 70 mm
- ST 470 E-SP => 70 mm
- ST 2000 (E-K) Endless Loop System

the make-up and rewind tables:

- MT 600, MT 2000
- UT 600, UT 2000
- IT 600
- MUU 2000

Further available service manuals for cinema film equipment:

- Cinema E-Projectors PREMIERE intermittent sprocket drive FPS
  (FP 25 E, FP 30 E, FP 38 E, FP 50 E, FP 75 E)
- Cinema E-Projectors intermittent sprocket drive MDE (up to 2007)
  (FP 25 E, FP 30 E, FP 38 E, FP 50 E, FP 75 E)
- Cinema D-/A-Projectors
  (FP 25 D, FP 30 D, FP 50 D, PK 60 D / FP 10 A, FP 20 A, FP 30 A, FP 50 A)
- Sound Devices (Reverse-Scan sound device, 16-mm Sound Device, Magnet Sound Device, Red Light Conversion Kit)
- Remotes
  (Lens Turret, Aperture Changer, Focusing and Framing Unit)
- Electronic Rectifiers (KEX 110, KEX 1170)
- Automation System EMK 1
- Automation Systems CCA 3, DMP 1 und SA 2
- Cine Player HD / DMS MF

ATTENTION

△ The works described in this manual is to be carried out only by experts.

△ Observe all safety instructions, accident prevention and precautions, which are always described in chapter 1 of the corresponding operating manual.

△ Make sure that nobody starts the projector and the platter system while you are working on it.

△ During all maintenance and cleaning work you must separate projector and platter system from power supply (switch off main switch).

△ To ensure perfect running and long-life of the system the following checks must be carried out exactly and carefully before the first run of projector and its connected equipment.

△ All trade names and symbols which are not Kinoton are subject to rights of these trade marks.

▶ **QUALITY OF MAINS POWER**

The mains power supplying for the device must meet the demands of DIN EN 602204-1 (VDE01113-1) standard.
These demands are basically geared to the DIN IEC 60038 standard.

2 Mounting / Connecting

2.1 General Hints

ATTENTION

- △ Make sure that electric lines are not damaged or squeezed during transportation.·
- △ Only use suitable hoisting machines (portal crane, fork-lift, truck).
- △ Do not use unit parts as climbing aid.
- △ Electric lines have to be in accordance with local regulations and be laid professionally.
- △ Pay attention for an adequate high flexible PE line (10^2 / 8 AWG), so that charging can discharge. Charging is produced from winding and rewinding of the film.
- △ To avoid charging create connections on ground as short as possible. Therefore connect the platter system and the make-up table on a double socket to mains.
- △ Adapting the control operation of the non-rewind system it is mandatory to connect the run signal via the 5-pole connector to the projector.
- △ The film tension switch on ST 100 E, ST 200 E, ST 400/500 E for 1 projector operation and ST 200 M must be connected in a way that switching is adapted to the connected type of projector (D-/A- or E-projector).
- △ At the FT 3 M the film break and film tension switches are connected parallel for operating normally open (NO) with an A- or a D-projector.
  In case that an E-projector is connected to the FT 3 M the contacts must be modified for working normally closed (NC).
- △ Mounting an optional film break relay in ST 100/200/400/500 E and ST 200 M can require modifications.
- △ The mains power supplying for the device must meet the demands of DIN EN 602204-1 (VDE01113-1) standard.
  These demands are basically geared to the DIN IEC 60038 standard.

2.2 Connection of the Projector Cable (RUN) (for all platter systems)

The RUN connection via the 5-pole plug is mandatory to allow a communication between the platter system and the projector.

2.2.1 Kinoton Projectors

Kinoton projectors have a RUN relay which can switch between “projection mode” and “threading mode”.
Starting the projector will switch the platter system to the “projection mode”.

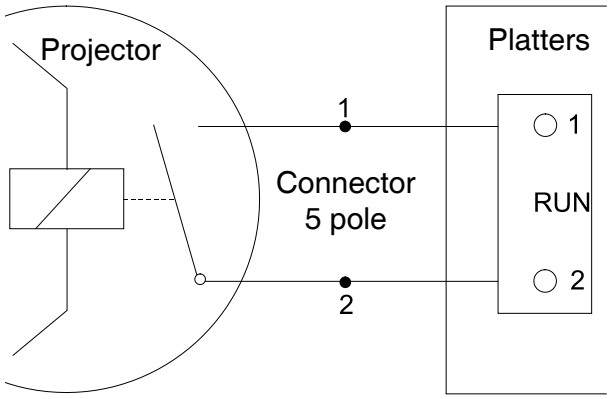
Both signal wires RUN 1 and 2 are mandatory and start the platter system at projector start:
- PIN1 (white) => platter start
- PIN2 (brown) => platter start

▶ **NOTE**

See also connecting plans from chapter 5 on.

2.2.2 Other Projectors

- If other projectors are not equipped with a RUN relay, a suitable relay (electrically insulated) must be mounted in this projector, to connect both RUN signal wires (RUN 1 and RUN 2) from the platter system.



- Connect it to RUN input (pin 1 (white) and pin 2 (brown)) in the platter system.

▶ **NOTE**

See also connecting plans from chapter 5 on.

2.3 Mounting the Platters (for all platter systems)

- Put down a platter onto each flange.
- Fit each platter with eight screws by using a screw driver.

▶ **NOTE**

Slightly oil the screws and do not tighten them too strong, because the platter may be removed for inspection and maintenance.

2.4 Mounting the Set of Guide Rollers (for all platter systems)

A set of guide rollers (corresponding to your projector) will be supplied with the non-rewind system. For all KINOTON projectors the set of guide rollers are pilot-drilled
fittingly.

For projectors from other producers you have to order the universal set of guide rollers.
In this case you have to drill the corresponding holes into the projector's housing for fastening the set of guide rollers.

ATTENTION

Observe the components which are in the projector when drilling holes into the projector housing.

2.5 Mounting and Connecting ST 100/200/270/400/500 E / ST 200 M

2.5.1 Unpacking and Installation

- Transport the boxes with a suitable hoisting machine to the place of installation.
- Open the box and take out the platters and the accessories.
- Remove the box around the non-rewind system.
- Release the non-rewind system from the pallet (release screws).
- Lift up the non-rewind system and remove the pallet.
- Horizontally line up the non-rewind system by levelling the jackscrew.
  Check it with a level.
- Remove (pull off) the transport retainer keys which are cramped between the motors and the support arms.

ATTENTION

Do not jam your fingers, when removing the transport retainer keys, because the motor with the friction wheel will tilt against the flange.

2.5.2 Mounting the Column Head Plate on ST 100/200 E / ST 400/500 E for 1 Projector Operation / ST 200 M

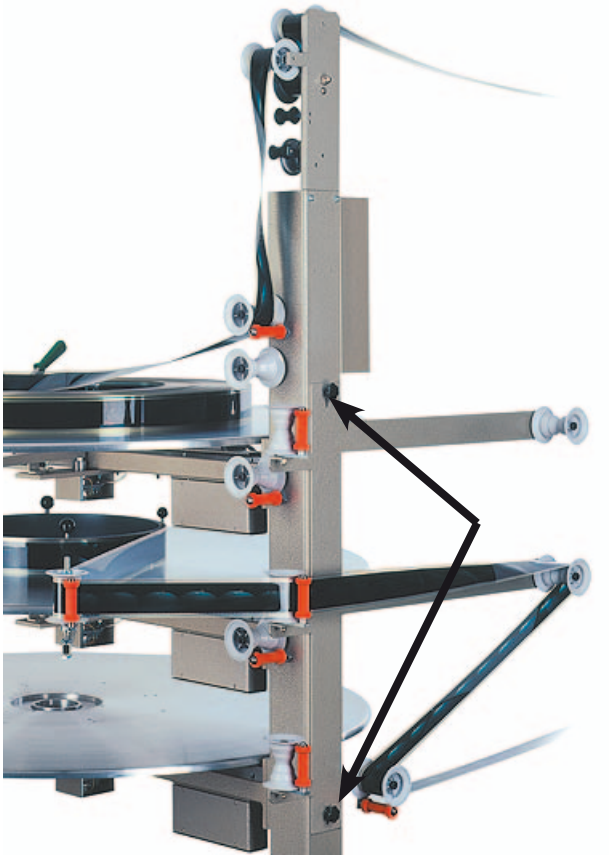
- Mount the head plate (braking and guide roller) on the column top by fastening with two Allen screws (arrows).

2.5.3 Mounting the Guide Roller Unit on ST 270 E / ST 470 E-SP

ST 270 E is equipped with a two-arms guide roller unit.

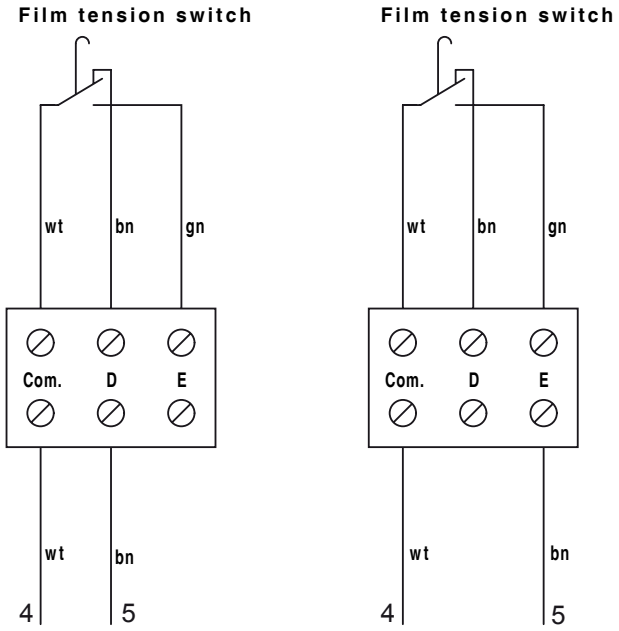
ST 470 E is equipped with a three-arms guide roller unit.

- Fasten the guide roller unit with the handle nuts (arrows) onto the back-side of the column.
- With the aid of long holes the height of the extension arms can be adjusted a little bit.



2.5.4 Adapting the Film Tension Switch on ST 100/200 E / ST 400/500 E for 1 Projector Operation / ST 200 M

Depending on the connected
projector the film tension switch must be modified by changing wire connections on a terminal block:
- E-projector => Connected Normally Closed
- D-/A-projector => Connected Normally Open



D/A - Projector **E - Projector**

- The terminal block is positioned in the top of the column.
- Squeeze the three wires which come from the control board box into the terminal strip on the head plate corresponding to the connected projector type (see drawing).
- Put the terminal strip back into the column.

▶ **NOTE**

▷ On ST 400/500 E for 2 projector operation film tension switches can be retrofit. We recommend to mount them on the film compensation brackets.

▷ The optional film break relay in combination with the film tension switch must be adapted corresponding to the connected projector, therefore see chapter 2.5.6.

2.5.5 Connecting the Projector Cable (RUN + FILM BREAK) on ST 100/200/270/400/470/500 E / ST 200 M / ST 2000 E-K

Both signal wires RUN 1 and 2 must be connected (see chapter 2.2):
- Pin 1 (white) <=> RUN
- Pin 2 (brown) <=> RUN

Both signal wires BREAK 4 and 5 are not necessary for the operation of the platter system, but recommended. If connected, they activate the stop function (film break input) of the projector at an increased film tension (>5 N) on the platter system.
- PIN4 (yellow) => FILM BREAK
- PIN5 (green) => FILM BREAK

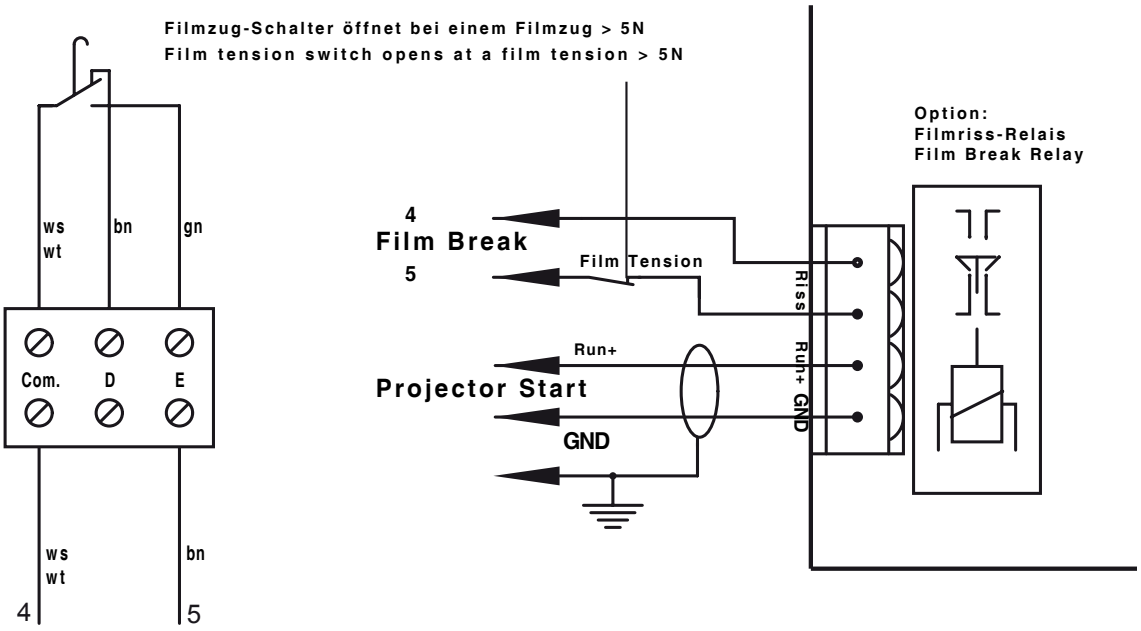
▶ **NOTE**

See also connecting plans from chapter 5 on.

2.5.6 Mounting and Adapting the Film Break Relay (option) for St 100/200/270/400/500 E / ST 200 M

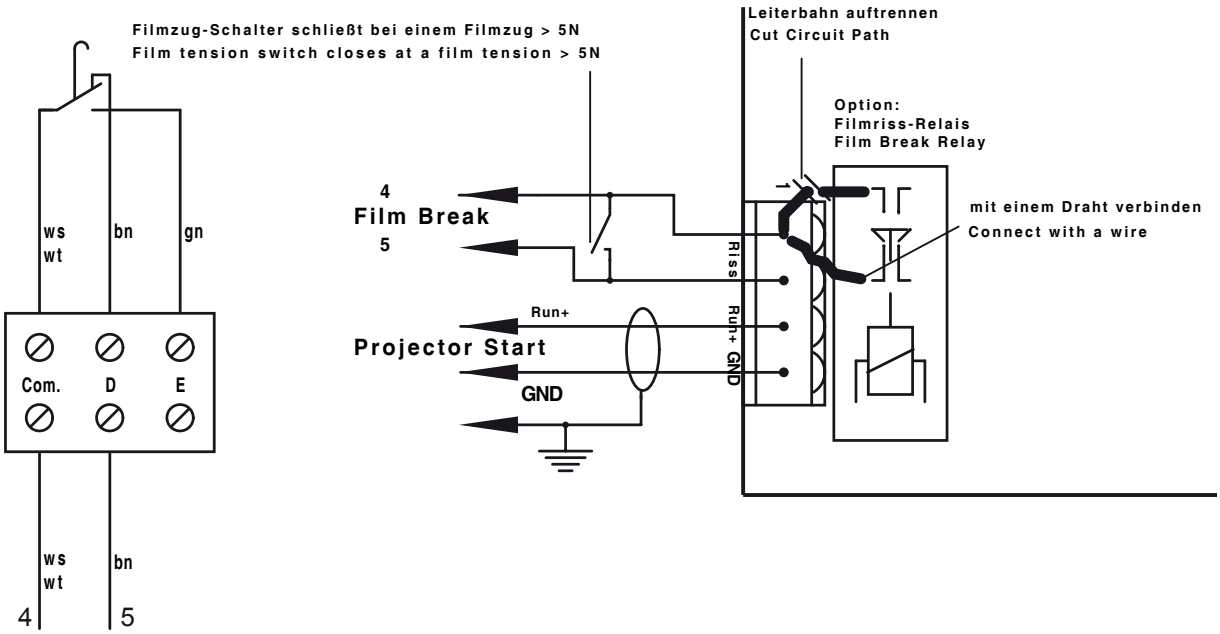
A film break relay can be optionally mounted on the control board of the platter system. This can be useful if the projector is not equipped with a film break sensor. Depending on the connected projector the film break relay has to be modified “NC” or “NO”.

E-projector with platter system



In case that an **E-projector operates with the platter system** the film break relay needs no modification - **“film break” and “film tension” switch NC (serial)**.

D-projector with platter system

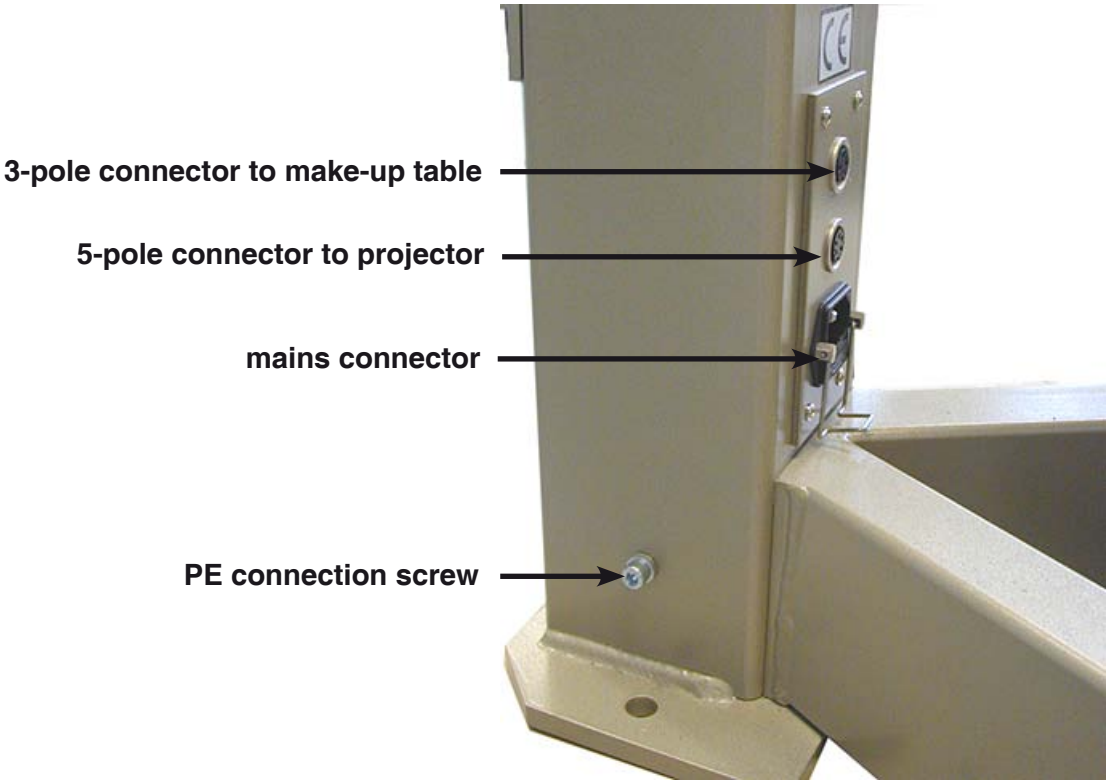


In case that a **D- or A-projector operates with the platter system** the film break relay needs the following modification (NC relay => NO relay) - **“film break” and “film tension” switch NO (parallel)**.

- Cut the film break circuit path: pin 4 to contact 1 of the relay.
- Connect the film break: pin 4 to 3 of the relay by using a wire (see also drawing).

2.5.7 Connecting the PE Cable for St 100/200/270/400/470/500 E / ST 200 M / ST 2000 E-K

- Fasten the PE cable on the available screw on the lower end of the column.



ATTENTION

Pay attention for an adequate high flexible PE line (10^2 / 8 AWG), so that charging can discharge. Charging is produced from winding and rewinding of the film.

2.5.8 Connecting to Mains for St 100/200/270/400/470/500 E / ST 200 M / ST 2000 E-K

- Connect the platter system by using the rubber connector cable to mains.

▶ **NOTE**

▷ See also connecting plans from chapter 5 on.

▷ Plans of terminal connections of the projector, see the corresponding operating manual or service manual.

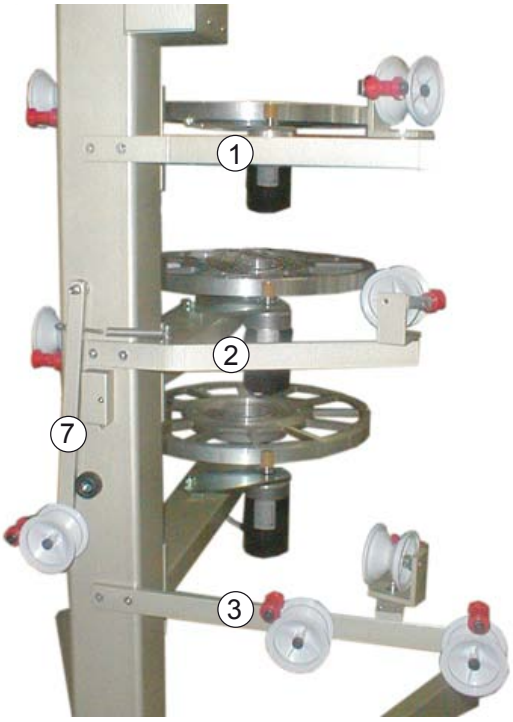
2.6 Mounting and Connecting the FT 3 M

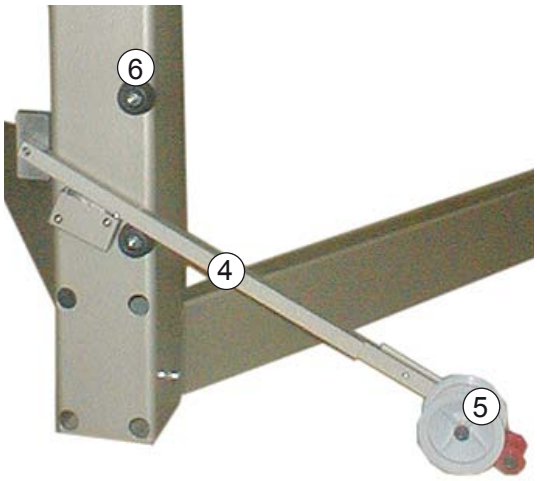
2.6.1 Unpacking and Installation

- Transport the boxes with a suitable hoisting machine to the place of installation.
- Open the box and take out the platters and the accessories.
- Remove the box around the non-rewind system.
- Release the non-rewind system from the pallet (release screws).
- Lift up the non-rewind system and remove the pallet.
- Horizontally line up the non-rewind system by levelling the jackscrew. Check it with a level.

The FT 3 M is delivered with removed:·
- extension arms ①, ②, ③
- guide roller on lever arm ⑤
- guide roller on film tension switch arm ⑦
- guide roller ② on the top of the column
- extension arm with guide roller on the upper end of the column.
- The lever arm is fixed on the column.
- The springs on the platter drive motors are released.
- The spring on the film tension switch arm is released.

2.6.2 Mounting the Roller Arms and Film Guide Rollers

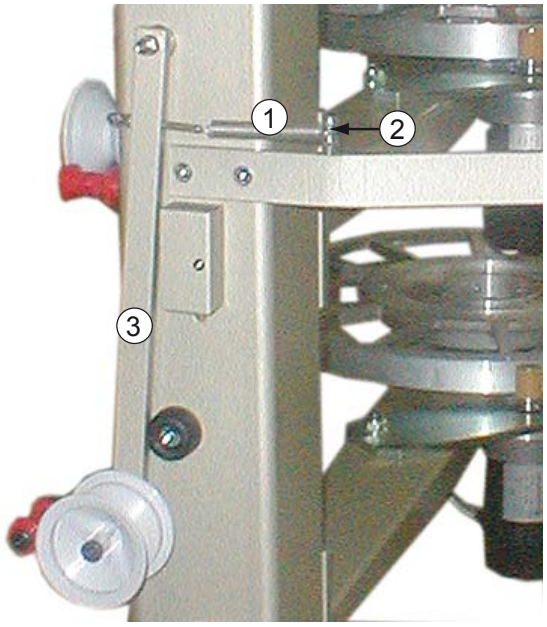




① upper extension arm
② mid extension arm
③ lower extension arm
④ lever arm with
⑤ guide roller
⑥ upper stop
⑦ film tension switch arm

- Mount all 3 roller arms ①, ② and ③ on the associated positions on the column.
- Loosen the tied lever arm and remove the upper stop ⑥ so the lever arm can pass. Then install the stop again.
- Mount the guide rollers onto the end of the lever arm ④ and the film tension switch arm ⑦.

2.6.3 Mounting the Spring on the Film Tension Switch Arm



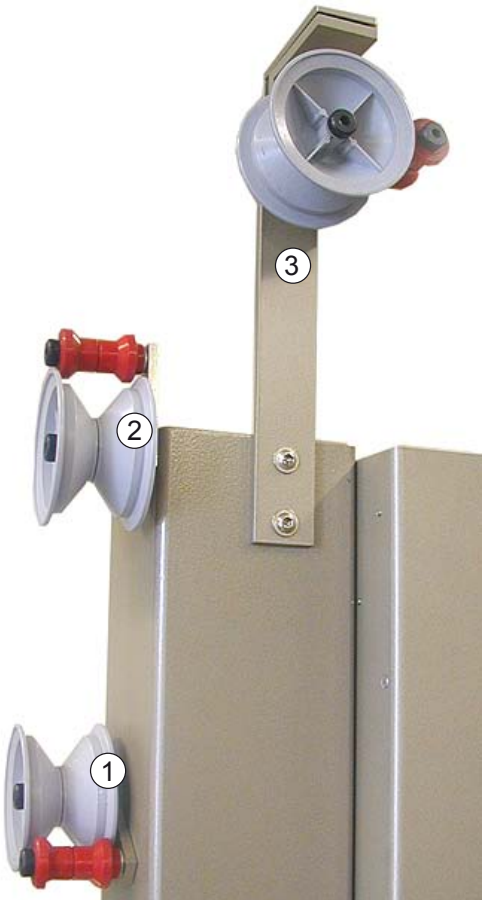
① spring

② spring on pin

③ film tension switch arm

- The spring ① has to be put on the pin ② with disk washers and nuts in the following order (from the bottom to the top):
  - 2 nuts
  - 1 disk washer
  - spring
  - 1 disk washer
  - 1 nut.
- Tighten the last nut in a way that the spring has a play of about 1 mm.

2.6.4 Mounting the Guide Rollers on the Column's Top



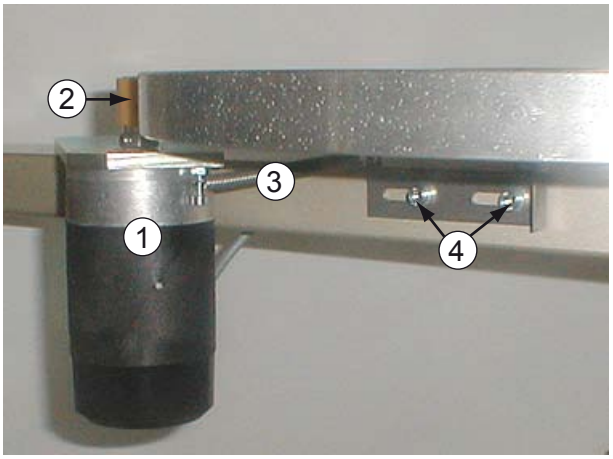
① guide roller

② guide roller

③ extension arm with guide roller

- Fasten the guide rollers ①/② on the upper left side of the column.
- Fasten the angle extension arm ③ with guide roller on the upper backside of the column.

2.6.5 Re-adjust the Tension of Spring on the Friction Wheel



① platter drive motor

② friction wheel on flange

③ spring

④ spring adjusting element

☛ The spring is relaxed for transportation.

- Tension the spring by moving the spring adjustment in its long holes (away from column).
- Adjust the spring tension in a way the friction wheel is just not slipping through when starting the platter.
- It is necessary to tension the spring when the lever arm triggers the film break switch when starting the projector (lever arm falls down).

2.6.6 Connecting the Projector Cable (RUN + FILM BREAK)

At FT 3 M the contacts for film break and film tension are switched parallel (NO) to operate with an A- or D-projector.

In case that an E-projector runs with FT 3 M, the contacts must be modified in a way they switch serially (NC).

The 5-pole projector cable connects:
- Pin 1 (white) <=> RUN
- Pin 2 (brown) <=> RUN
- Pin 4 (white) <=> COM
- Pin 5 (brown) <=> FILM BREAK or FILM TENSION

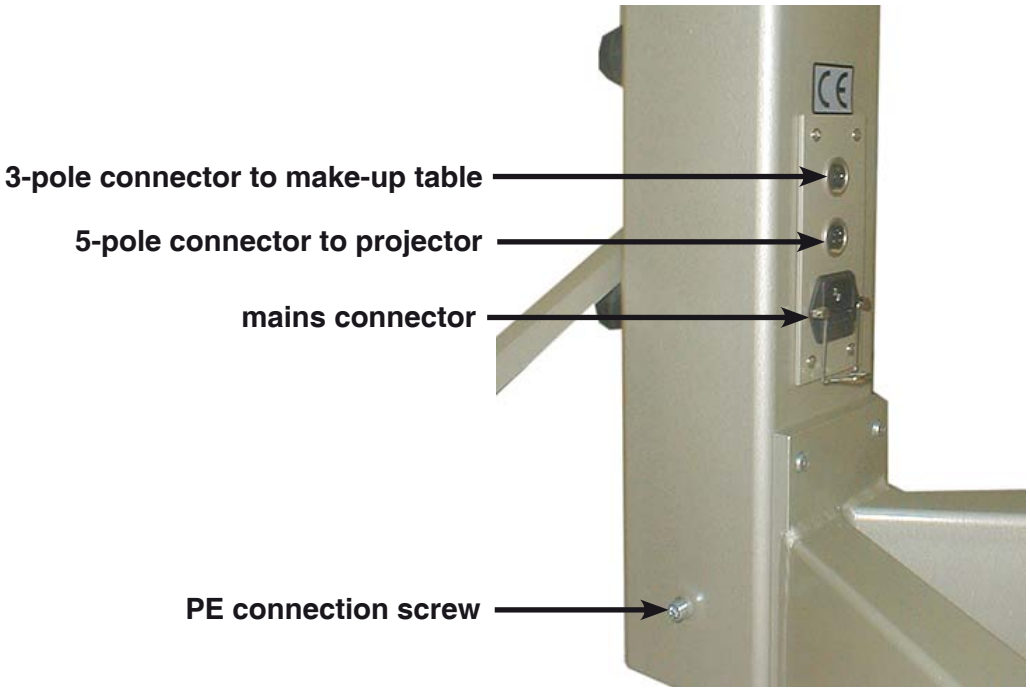
All four wires **RUN 1** and **RUN 2** and **BREAK 4** and **BREAK 5** must be connected. RUN 1 and 2 start the platter system at projector start.

BREAK 4 and 5 activate the stop function of the projector at a film break or at a film over-tension (> 5 N) on the platter system.

▶ **NOTE**

See also connecting plan in chapter 5.3.1.

2.6.7 Connecting the PE Cable



- Fasten the PE cable on the available screw on the lower end of the column.

ATTENTION

Pay attention for an adequate high flexible PE line (10^2 / 8 AWG), so that charging can discharge. Charging is produced from winding and rewinding of the film.

2.6.8 Connecting to Mains

- Connect the platter system by using the rubber connector cable to mains.

▶ **NOTE**

▷ See also connecting plans from chapter 5 on.

▷ Plans of terminal connections of the projector, see the corresponding operating manual or service manual.

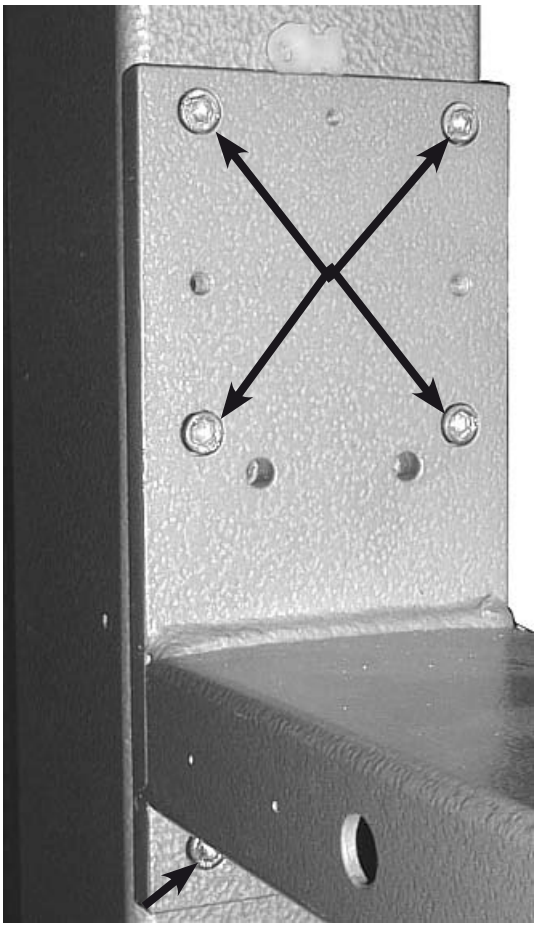
2.7 ST 2000

2.7.1 Unpacking and Installation

- Transport the boxes with a suitable hoisting machine to the place of installation.
- Open the box and take out the platter, the stay and the accessories.
- Remove the box around the endless loop system.
- Release the system from the pallet (release screws).
- Lift up the endless loop system and remove the pallet.
- Horizontally line up the endless loop system by levelling the jackscrew. Check it with a level.

2.7.2 Mounting the Endless Platter Unit and the Stay

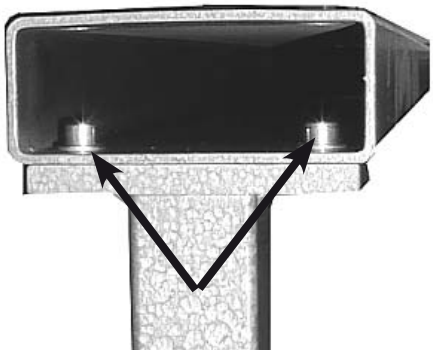
- Install the endless platter unit with the fixed girders to the available 6 threaded holes on the column - use the 6 Allen screws (arrows).



ATTENTION

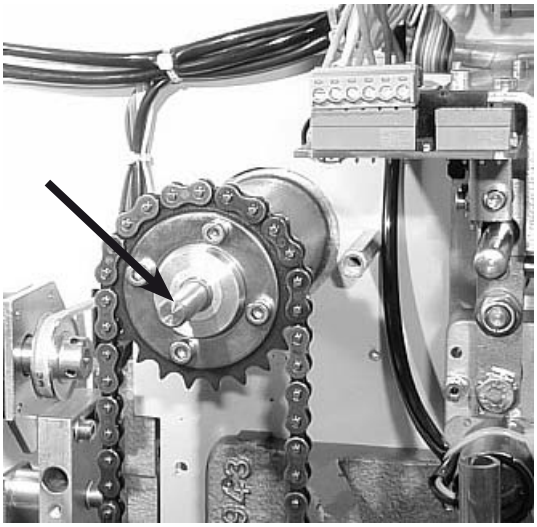
The endless platter unit is very heavy (about 150 kg), therefore 4 persons should transport and hold the unit while one person fasten the platter onto the column.

- After the platter unit is installed, remove the girders.
- Fasten the stay on the end of the support arm by using the 2 delivered Allen screws (arrows).



2.7.3 Installing the Encoder into the D-/A-Projector

- Open the projector housing.
- Put encoder onto the feed sprocket shaft (arrow) and fasten it with the clamping screw.
- Install the 7.5 V power supply unit inside the projector and connect it to the encoder.
- Connect the 5-pole encoder cable plug from ST 2000 main board to the encoder in the projector (5-pole plug / socket).



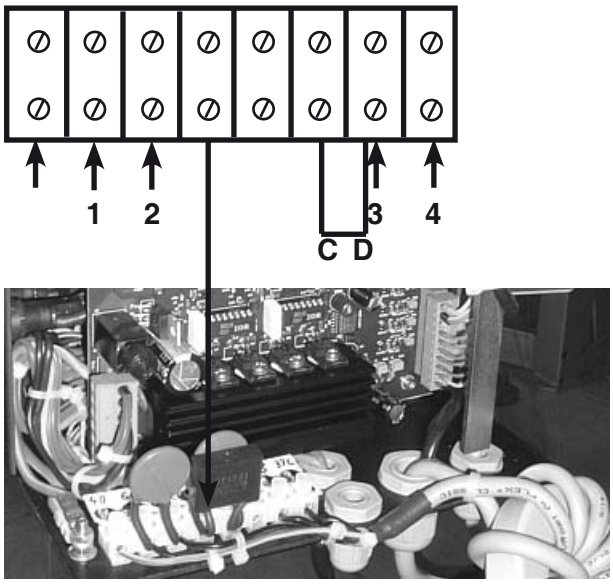
▶ **NOTE**

See also connecting schemes in chapter 5.4.

2.7.4 Connecting and Running the Cables

- Remove the cover of the control box.

☛There you will find two 5-pole cables and the 8-pole terminal strip.



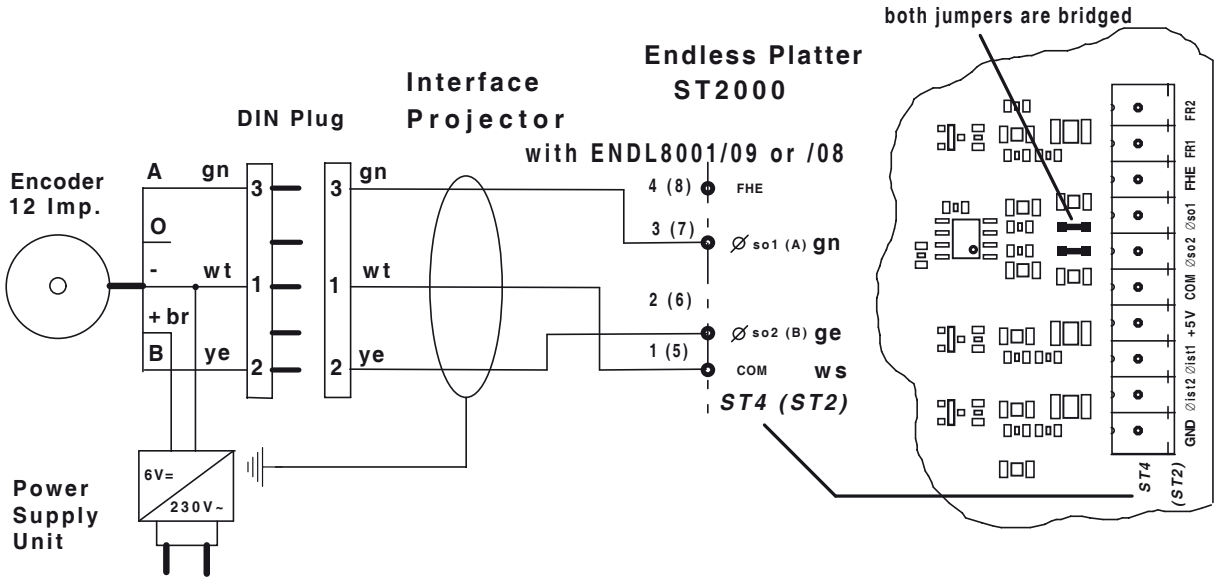
yegn	=>	earth
1	=>	phase
2	=>	0
3	=>	37 C (film break)
4	=>	37 D (film break)
C-D	=>	bridge with E/A projectors

- Run the 3 poles of the 5-pole cable (which is wound around the mains filter): “yegn” - earth / “1” - phase / “2” - 0 (40, 60 and 20 on terminal strip, arrow) to the mains connection.
- Run the 2 poles of the same 5-pole cable: “3” / “4” for film break signals (37 C and 37 D on terminal strip, arrow) to the E-/D-projector’s K1 main terminal strip and connect them to terminals 10 and 11 or 13 (depends on bridge).
- With an A-projector connect the 2 “film break” cables to terminal strip K2-7 “Riss” and K2-3 “GND” on projector’s logic board.
- With E- and A-projectors two terminals (C-D) must be bridged.
  If connecting the ST 2000 E-K combined system the film break signal of the non-rewind system has to be connected also to the projector’s terminal strip.

2.7.5 Setting the Jumpers on ST 2000 (E-K) Control Board

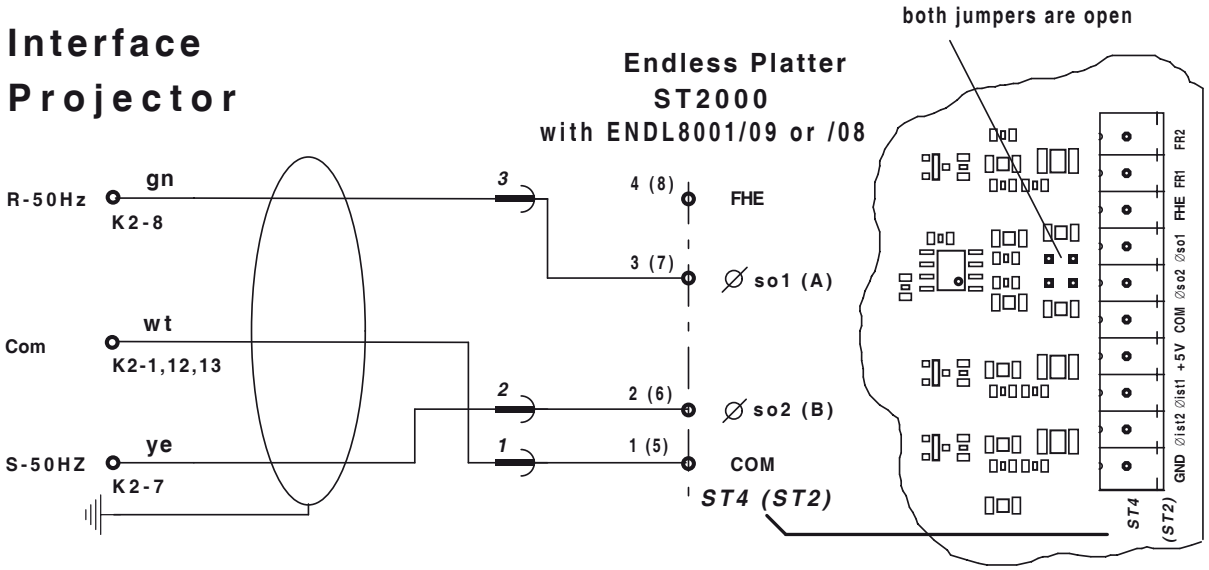
D-Projector

☛Jumpers (R62 and R63) must be **bridged** (factory-set).



E-/A-Projector

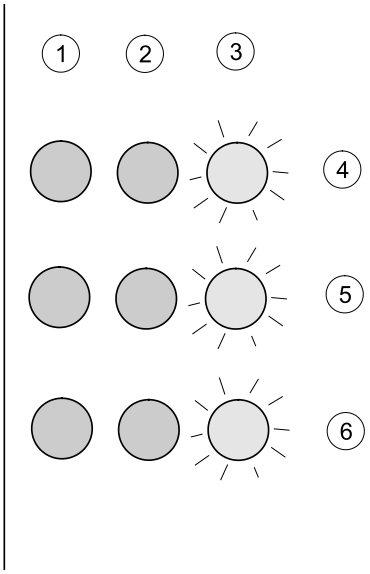
☛Jumpers (R62 and R63) must be **OFF**.



3 Adjustments and Indication

3.1 ST 100/200/270/400/470/500 E / ST 200 M / ST 2000 E-K

3.1.1 LED Indication on Control Board



① LED column indicates the corresponding platter levels state:
- illuminates when the lever arm is in zero-position
- get off when:
- take-off unit is plugged in
- platter level is selected
- lever arm is not in zero-position (stop).

② LED column indicates if lever arm of the corresponding platter level is in working position

③ LED column blinks if processor is working

④ LED row for platter level A

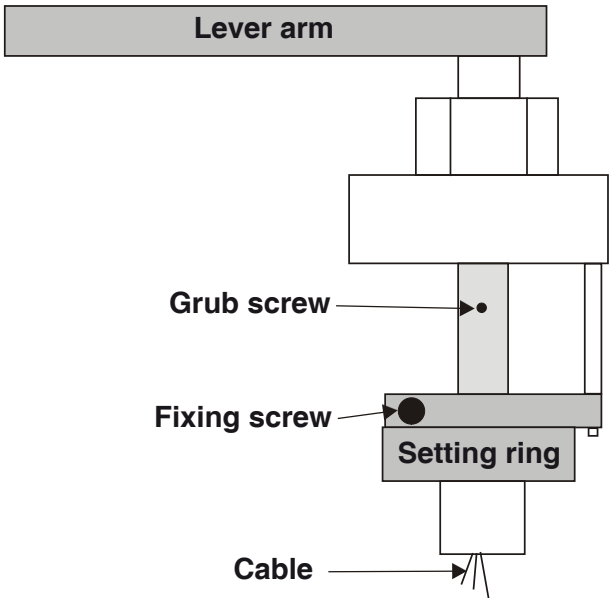
⑤ LED row for platter level B

⑥ LED row for platter level C

▶ **NOTE**

For more than 3 platter levels the non-rewind systems like ST 400 E, ST 500 E, ST 470 E-SP are equipped with a second control board.

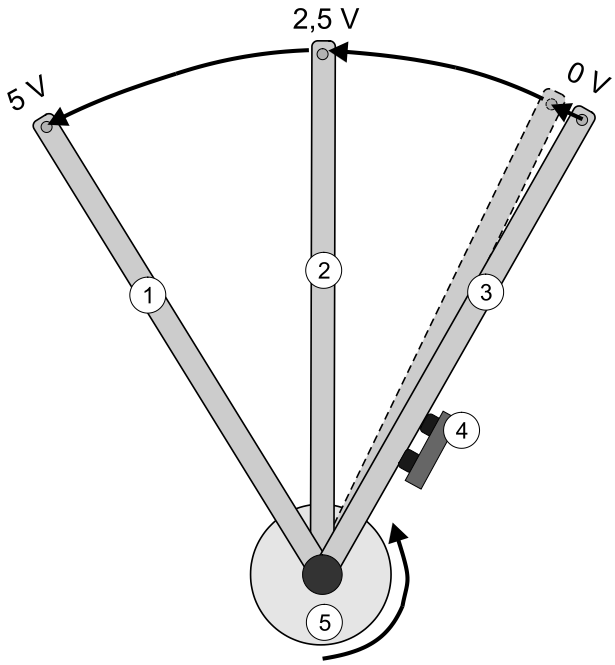
3.1.2 Adjusting the Hall Potentiometers of the Lever Arms



- Remove the cover of the column to reach the control board.
- Connect a voltmeter to the corresponding metering point MP1, MP2, MP3 etc. and to GND.
- Remove the cover of the Hall potentiometer.
- Release the potentiometer fixing screw (Allen key 2.5).

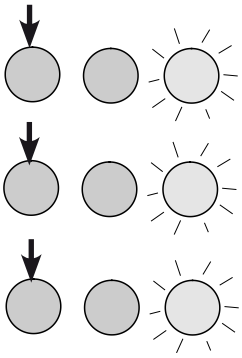
☛ The grub screw (Allen screw 1.5) has to be tightened.

- While turning the setting ring you can carry out the following adjustments.



① Lever arm in end-position.
② Lever arm in working position
③ Lever arm in zero-position
④ Limit stop
⑤ Hall potentiometer

Lever Arm in Zero-Position (limit stop)



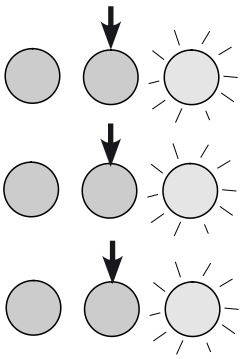
☛ Lever arm is at zero-position ③ (limit stop ④).

☛ The LED (arrows) of the corresponding platter illuminates.

- Turn Hall potentiometer ⑤ on setting ring until the voltmeter indicates “0 V”.

☛ The voltmeter indicates also “0 V”, if the lever arm will only move about 1 cm out of the zero-position.

Lever Arm in Working Position (between zero- and end-position)



- Move lever arm to working position ②.

☛ If the lever arm is at working position the LED (arrows) of the corresponding platter illuminates.

☛ During lever arm is moving from zero-position ③ to working position ② the voltmeter indicates ascending values up to “2.5 V” until reaching the working position ②.

Lever arm in End-Position

- Move lever arm to column in end-position ①.

☛ If the lever arm is at working position the LED (arrows) of the corresponding platter illuminates.

☛ During lever arm is moving from working position ② to end-position ① the voltmeter indicates ascending values up to “5 V” until reaching end-position ①.

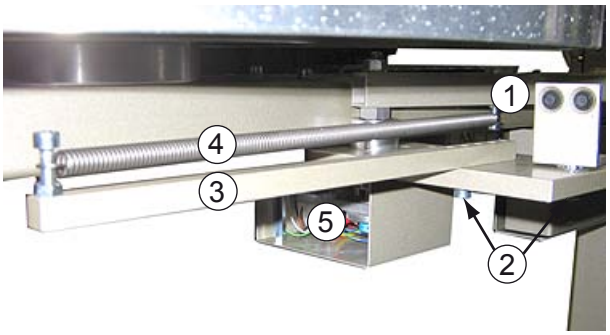
▶ **NOTE**

If necessary repeat the described adjustment for all Hall potentiometers/lever arms.

3.1.3 Adjusting the Tension of the Lever Arm

The spring tension is factory-set.

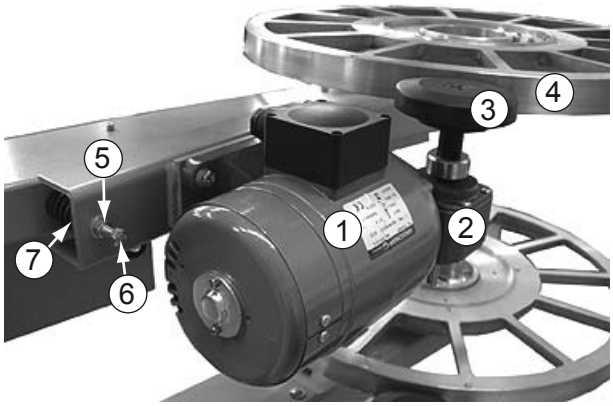
The tightness of a film layer of a film reel depends on the tension of the lever arm spring. If reels are wound up to loose, it is necessary to increase the tension of the spring. The tightness of a film reel depends also on the used film material.
If the film tension is too high the friction wheel and the gearbox will wear too fast.



① lever arm in zero-position
② Allen screws
③ spring bar
④ spring
⑤ potentiometer for lever arm

- Remove the two Allen screws ②.
- Fasten the spring bar ③ with spring ④ on one of the outer threaded holes (adjusting to a higher spring tension).
- Tighten the screws ② again.

3.1.4 Adjusting the Friction Wheel Pressure



① motor
② drive
③ friction wheel
④ platter drive flange
⑤ lock nut
⑥ adjusting screw
⑦ pressure spring

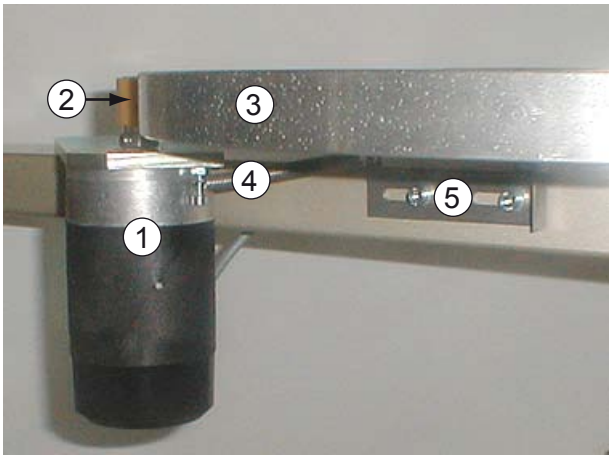
☛ Adjust the pressure in a way a reliable function is guaranteed. If the platter is stopped manually the friction wheel should slip and the motor should turn.
- If the pressure is too high, the drive can be damaged and the friction wheel wears fast.
- If the pressure is too low, the lever arm triggers the film break switch when projector has been started.

Adjusting:

- Release the lock nut ⑤.
- Turn the setting screw ⑥ clockwise - the pressure spring ⑦ relaxes, the friction wheel with motor moves nearer to the flange.
- If the friction pressure is correct, fix this adjustment with the lock nut ⑤.

3.2 FT 3 M

3.2.1 Adjusting the Friction Wheel Pressure



① motor

② friction wheel

③ platter drive flange

④ tension spring

⑤ spring adjusting element

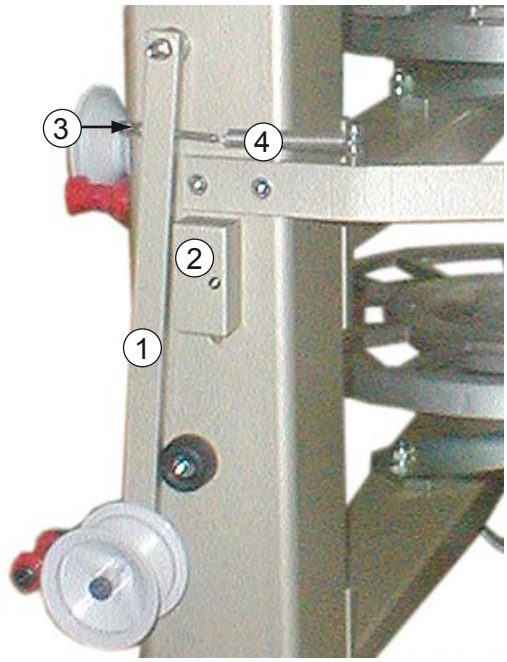
☛ The pressure of the friction wheel against the platter flange should be so strong the platter will be surely driven.

☛ If you stop the platter manually the friction wheel should slip through and the motor should turn itself.
- If the pressure is too strong the friction wheel will worn very fast.
- If the friction wheel pressure is too low the lever arm will trigger the film break switch when starting the projector.

Adjusting:

- Release the Allen screws ⑤ on the adjustment element with the long holes.
- Move the plate in direction far of the column, the tension spring ④ will be stressed, the friction wheel ② with the motor ① will be pulled nearer to the flange.
- If the frictional pressure is correct, fix this adjustment by tightening the two screws ⑤.

3.2.2 Adjusting the Film Tension Switch



① film tension switch arm

② film tension switch

③ self-locking nut

④ spring

☛ The spring tension is factory-set, but if the tension is too low and the film tension switch will be activated too early the spring tension can be adjusted.

☛ The film tension depends also on the film run (from left or right side).

Adjusting:

- Turn the self-locking nut counterclockwise - the spring tension decreases.
- To increase the spring tension turn clockwise.

3.2.3 FT 3 M Diagnosis Software

With the aid of the FT 3 M software it is possible to check and calibrate the FT 3 M platter system very easily and correctly.

Requirement

- personal computer with Windows 9.x, Windows NT or Windows XP
- standard serial cable
- adapter board DEB-81-01
- FT3M diagnosis software

Program Installation / Connection

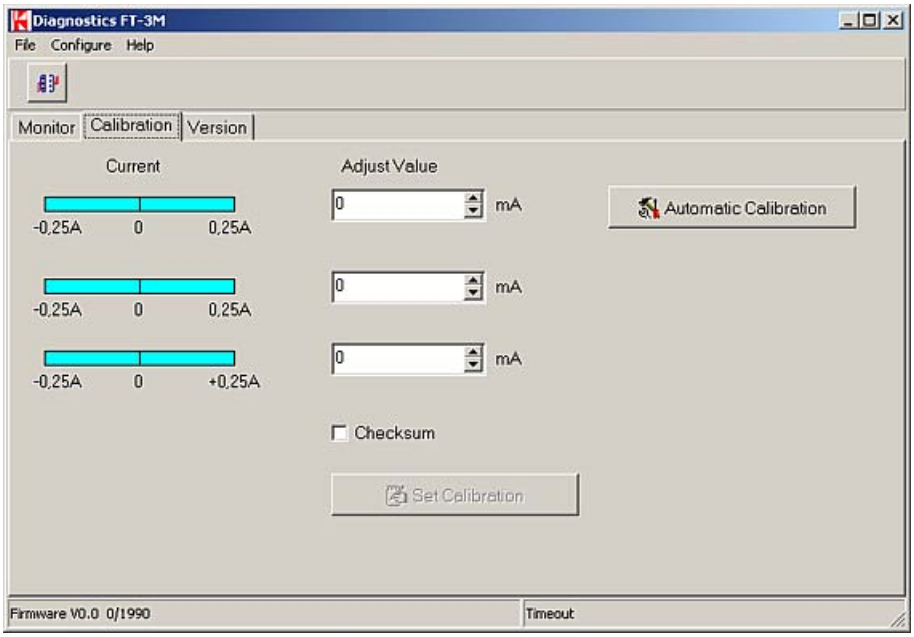
- The delivered software can be installed on the computer by clicking on the “setup. exe file”. Follow the instructions.
- Open the box on the column - the control board is visible.
- Now connect the adapter board DEB-81-01 to the control board (Sub-D connector) and the computer’s serial port with a common serial cable to the adapter board.
- Start the computer.
- Start the software by double-clicking on 

icon or via START - PROGRAMS - DIAGNOSTICS - FT3Mdiag.
- If necessary activate the serial connection (COM1, COM2) by selecting the used one.

3.2.3.1 Calibration Menu

Calibration is necessary if the board or some units are changed or if the calibration of the platter drive motors is lost.

☛ After starting the program the Diagnostics window appears:



- Click on ***Calibration***.
- Click on ***Automatic Calibration***.
- Confirm automatic calibration with ***Yes***.

☛ The calibration runs.

- Follow the instructions and power-off the FT 3 M for 5 seconds and then power-on again.

☛ After the last ***OK***, the new calibration values will be entered in the fields “Adjust Value”. Each value represents one platter.

▶ **NOTE**

▷ For proper adjustment values during the calibration procedure, the platters should not be moved manually!

▷ If ***Checksum Error*** is displayed, click on  to reconnect the port.

3.2.3.2 Monitor Menu

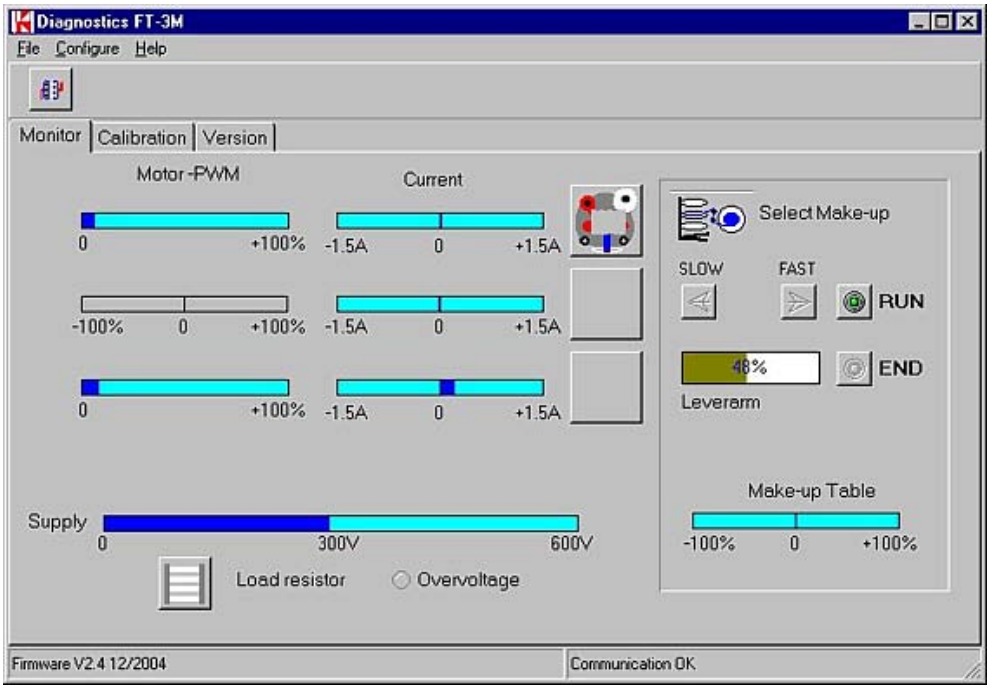
- Click on ***Monitor***:

☛ The monitor menu allows you to
- check/adjust the potentiometer of the lever arm
- check the platter selection switch
- check the take-off unit

☛ The monitor menu indicates:
- the ***Motor PWM*** bar - the pulse wide modulation of the signal which is sent to the motor of the corresponding platter (Observe that the mid platter can turn in both directions, therefore the bar indicates positive or negative PWM corresponding to the motor turn direction.)
- the current of the corresponding platter
- mains voltage
- position of the take-off unit
- the position of the platter selection switch
- the excursion of the take-off unit lever arm (slow or fast direction)

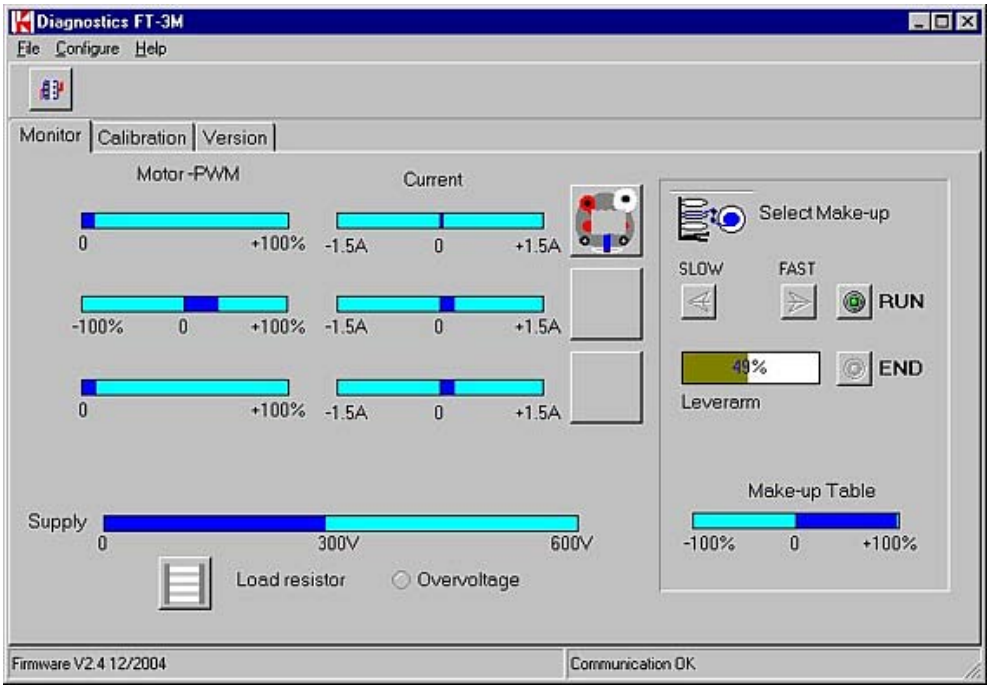
Running FT 3 M

☛The window indicates the following conditions:
- the platter unit is running (RUN)
- the take-off unit is placed on top platter - take-off platter (see take-off unit symbol).
- the lowest platter takes up the film (Motor-PWM bar for the mid platter is not active, but active for the top and low platter)
- the platter selection switch is positioned on the not-used mid platter B (see corresponding symbol ***Select Make-up***)
- lever arm is in the mid position - working position (***Leverarm*** bar)
- take-off unit's lever arm is in the mid position (not ***Slow*** or ***Fast)***.



Running FT 3 M and make-up table

☛ The window indicates the following conditions:
- the platter unit is running
- the take-off unit is placed on top platter - take-off platter
- the lowest platter takes up the film
- the mid platter takes up the film from the make-up table (Motor-PWM value is positive -> make-up operation)
- the platter selection switch is positioned on the mid platter
- lever arm is in the mid position - working position
- take-off unit's lever arm is in the mid position
- make-up table runs at full speed.



3.2.3.3 Adjusting / Checking the Potentiometer of the Lever Arm

Zero-position:

☛ Lever arm is in zero-position (lower stop position) =>
Leverarm indicator bar shows ***0***.

Mid-position:

☛ Lever arm is in mid-position (working position) =>
Leverarm indicator bar shows about ***50%***.

Top-position:

☛ Lever arm moves to top-position (upper stop position) =>
Leverarm indicator bar shows at least ***75%***.

- Correct the potentiometer position if one of these conditions cannot be reached.

3.2.3.4 Checking the Platter Selection Switch

- See “Select Make-up” symbol on the right upper edge of the window.
- Check if the symbol corresponds to the position of the platter selection switch.

3.2.3.5 Checking the Take-Off Unit

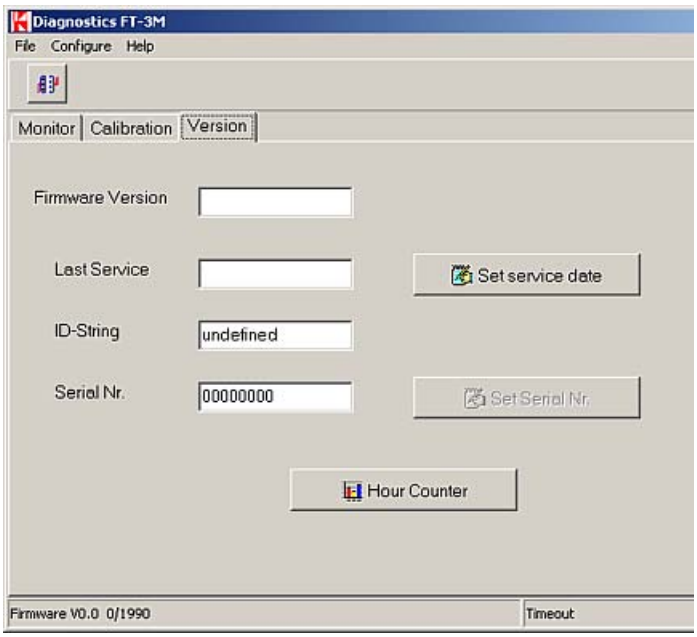
- Carry out the following test on all three platters.
- **SLOW - FAST**
  - Move take-off unit lever arm manually to left => the “FAST” arrow should lit.
  - Move take-off unit lever arm manually to right => the “SLOW” arrow should lit.
- **Checking the rotation direction at FAST**
  - While moving the take-off unit lever arm manually to the left (clockwise), the platter has to turn anticlockwise.

3.2.3.6 Version Menu

- Click on ***Version***:

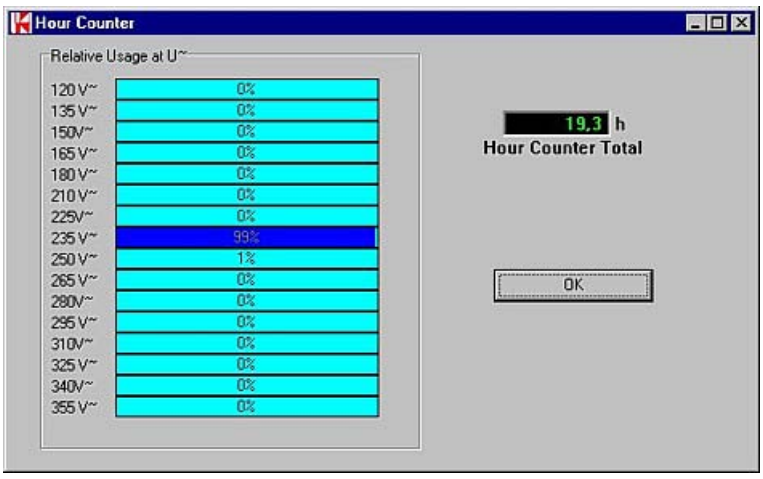
☛ The version menu displays the firmware version, the last service and the serial number.

- The last service date can be set by clicking on ***Set service date***.



- Click on ***Hour Counter*** to open that window.

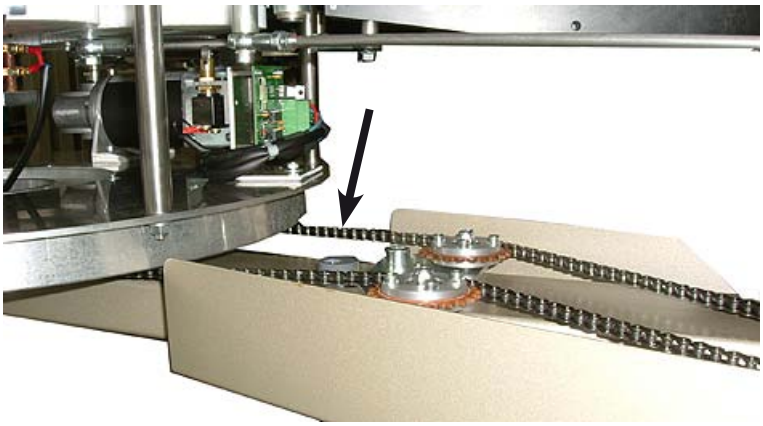
☛ The hour counter window displays the total operating hours and the used voltage values - this example indicates that 235 V is reached at 99%.



3.3 ST 2000

3.3.1 Tension the Drive Chain of Endless Platter

Because the chain runs horizontally, it wears faster. So the chain must be stressed regularly.

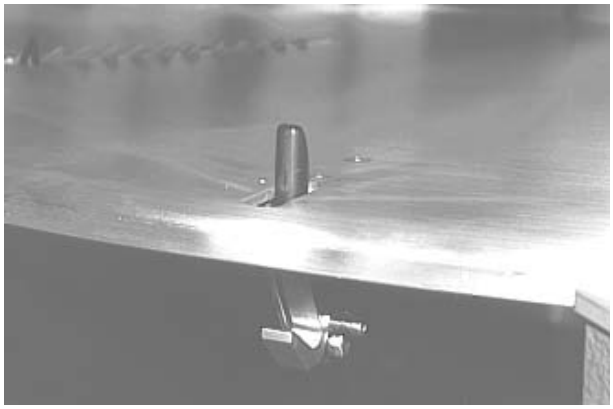


- Adjust the chain with the aid of the turnbuckle (arrow). Hold the turnbuckle screw with an Allen key and move it with the aid of a spanner.

☛ The chain has to be
adjusted in a way you can move the chain a little bit with your thumb.

3.3.2 Adjusting the Guide Pins on the Endless Platter

By loosening the fixing screws, the guide pins can slightly be displaced axially to the film reel.



▶ **NOTE**

▷ The position of the guide pins is factory-set in a way the thickness of a film packet (normal film) will have about 5 to 6 mm between the transport phases.

▷ Using a thicker film the guide pins can be moved 1 to 2 mm towards the platter centre

▷ Using a thinner film the film packet will be thicker than 6 mm. In this case move the pins 1 to 2 mm towards the outside.

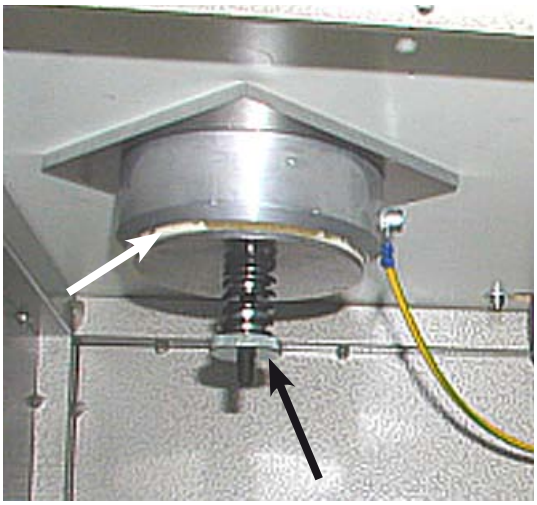
3.3.3 Adjusting the Distance between Pad Shoe and Sprocket

- Turn the distance adjusting screw (on pad shoe) in a way, a play of 2 film layers results - the 2 film layers should be pulled easily.
- Paint-lock the distance adjusting screw.

3.4 MT 600 / MT 2000 (MUU 2000)

3.4.1 Changing the Felt Disk of the optional Mechanical Friction and Adjusting the Friction (MT 600/2000)

- Remove the front plate of the make-up table.
- Remove the knurled nut, spring, friction plate and felt disk on the friction shaft (arrow).
- Once in a year the felt disk should be put in a Cardan oil bath.
- If the felt disk is worn (surface is hard-ened) it has to be changed. The new felt disk has to be oiled too.
- Mount the friction again.



Adjusting

- Thread a film and adjust the friction by turning the knurled nut such the film gets no loops when stopping the rewinding:
  - Right turn => spring increases the pressure (friction increases)
  - Left turn => spring decreases the pressure (friction decreases)

3.4.2 Diagnosis Software for Use with 1 Friction Drive

With the aid of the MT600/2000 software it is possible to check and calibrate MT 600/2000 and MUU 2000 very easily and correctly.

Requirement

- Diagnosis
  - personal computer with Windows 9.x, Windows NT or Windows XP
  - standard serial cable
  - MT600/2000 diagnosis software
- Calibration (additional):
  - weight (1000 to 1700 g)
  - film reel (radius: 105 to 182 mm) (the heavier the weight the smaller the radius)
  - strong rope.

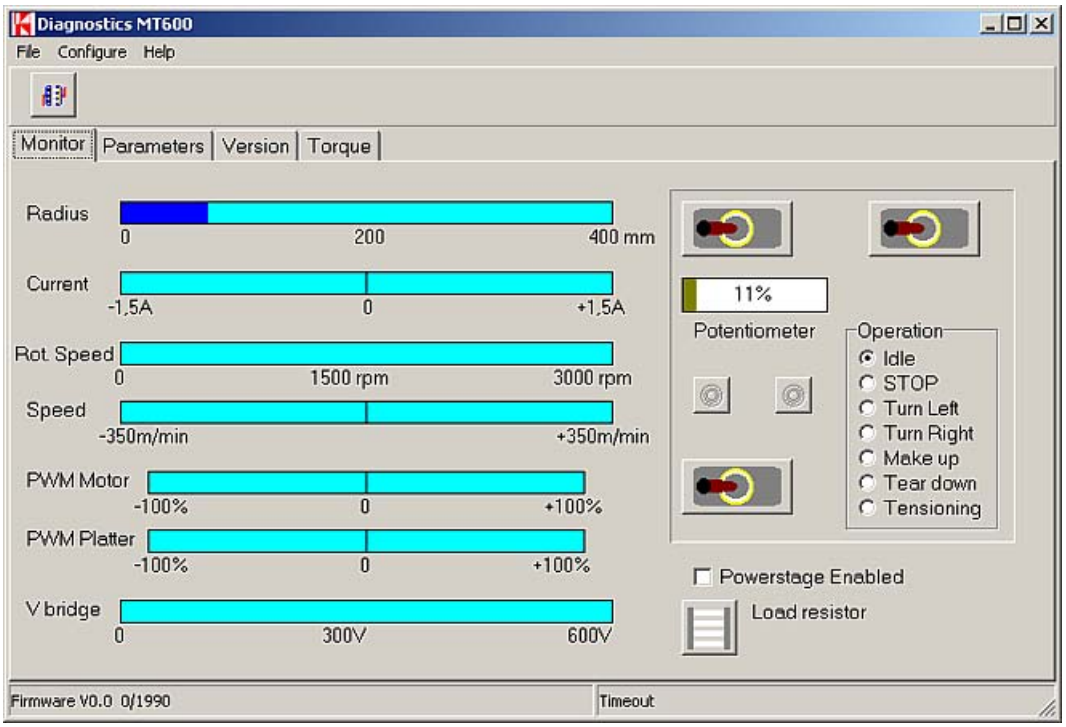
3.4.2.1 Program Installation / Connection

- The delivered software can be installed on the computer by clicking on the “setup. exe file”. Follow the instructions.
- Open the front plate of the make-up unit - the control board is visible.
- Now connect the Sub-D connector of the control board and the computer’s serial port with a common serial cable.
- Start the computer.
- Start the software by double-clicking on 

icon or via START - PROGRAMS - DIAGNOSTICS - MT600.
- If necessary activate the serial connection (COM1, COM2) by selecting the used one.

3.4.2.2 Monitor Menu

☛ After starting the program the monitor window appears:



☛ The **toggle switches** indicate the switching positions on the make-up table corresponding to the set operation mode.

☛ The ***potentiometer value*** bar displays the position of the monitoring switch (speed potentiometer) of the make-up table.

☛ The ***operation mode*** indication shows the current operation mode which is actually switched on the make-up table.

☛ The amplifier/power stage is enabled when it provides the make-up table motor with the necessary current - “Powerstage Enabled” is marked.

☛ The ***Radius*** bar indicates the current reel radius.

☛ The ***Current*** bar indicates the motor current.

☛ The ***Rot.Speed*** bar indicates the current motor rotation speed.

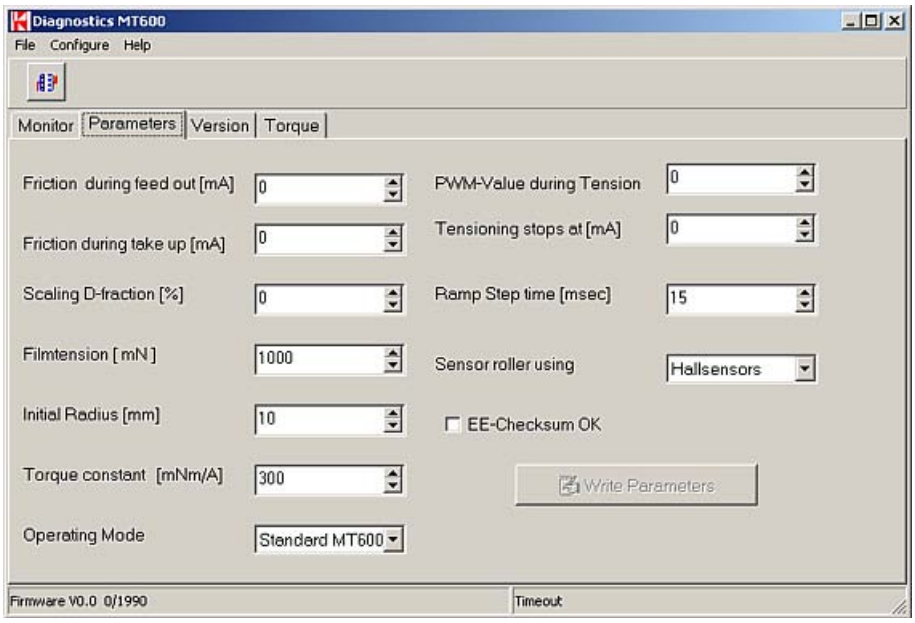
☛ The ***PWM Motor*** bar indicates the pulse wide modulation of the signal which is sent to the motor of the make-up table according to the selected operation mode.

☛ The ***PWM Platter*** bar indicates the pulse wide modulation of the signal which is sent to the non-rewind system according to the selected operation mode.
For example, if you make-up a film reel the “PVM Motor” bar indicates a positive value and if you tear-down a negative value will be indicated.

☛ The ***V bridge*** bar indicates that voltage (more than 300 V) which comes back to the power supply unit when the motor is decelerating. If the voltage is too high the ballast step (resistor) reduces the voltage. When the ballast step works it will be indicated on the menu window.

3.4.2.3 Parameter Menu

- Click on ***Parameter***:



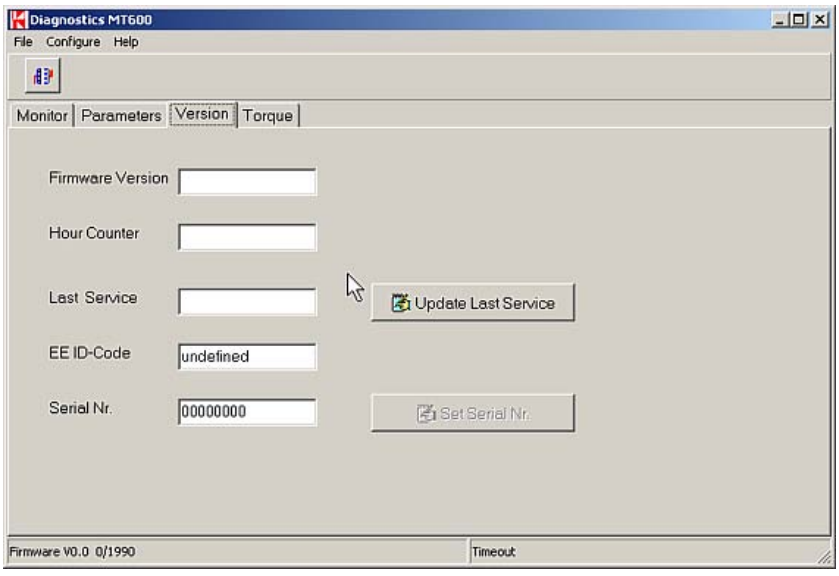
☛ The parameter menu displays all parameters which can be stored in the EE-PROM by clicking on ***Write Parameters***.

▶ **NOTE**

Changing the parameters is carried out by an expert only or by request with Kinoton.

3.4.2.4 Version Menu

- Click on ***Version***:



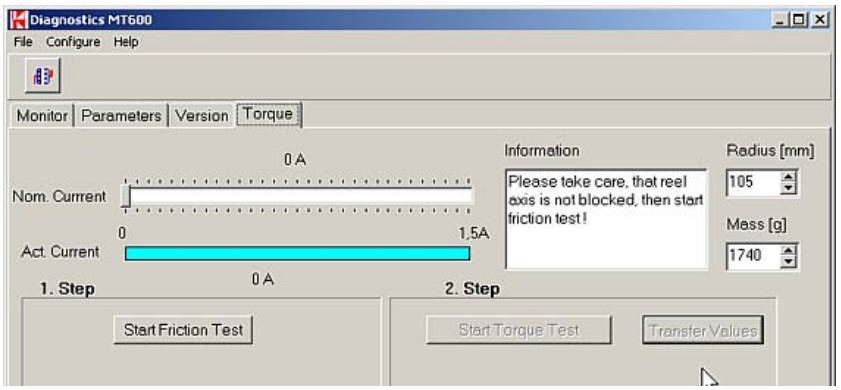
☛ The version menu displays the version, the operating time and the serial number. The last service date can be set by clicking on ***Update last service***.

3.4.2.5 Calibrating the Make-up Table Motor / Torque Menu

Calibrating the motor is necessary when the motor or the control board has been changed.

To carry out the calibration you need a weight (1000 to 1700 g), film reel (radius: 105 to 182 mm -the heavier the weight the smaller the radius and a strong rope.

- Click on ***Torque*** tab:

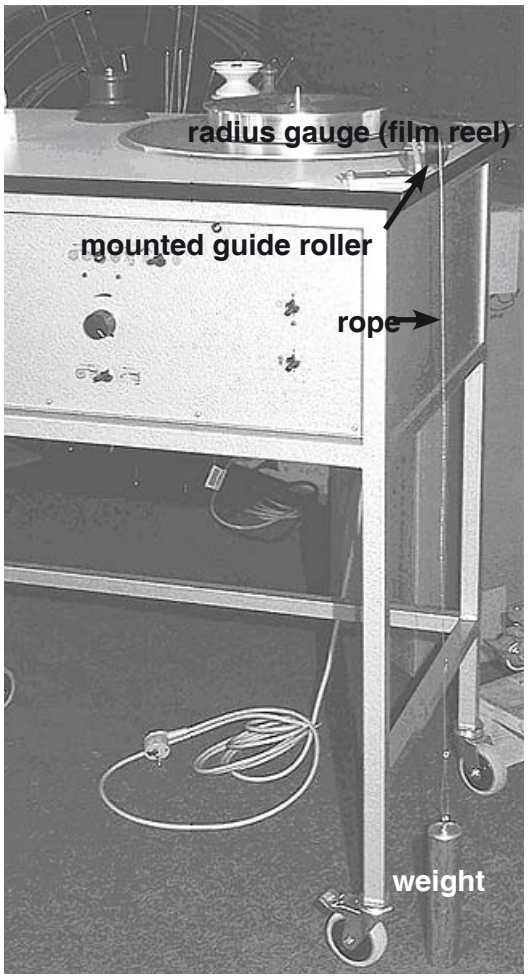


- Switch on the make-up table.
- **1. Step**: Start the friction test by clicking on ***Start Friction Test***.

☛ The current increases until the motor begins to turn.

☛ The ***Act Current*** bar displays the actual current.

- Prepare the make-up table with the measurement equipment as you can see on page before.
- Enter the value of the radius of the film reel or of the radius gauge and the weight value.



- **2. Step**: Start the torque test by clicking on ***Start Torque Test***.

☛ The current increases until the weight begins to lift.

☛ The ***Act Current*** bar displays the actual current.

- Click on ***Transfer Values***.

☛ The measured values will be overtaken to the parameter menu.

- Click on ***Write Parameter*** in the parameter menu.

☛ The values will be overtaken to the EE-PROM.

☛ Now the make-up table motor is calibrated.

3.5 UT 600 / UT 2000 / IT 600

3.5.1 Diagnosis Software for Use with 2 Friction Drives

With the aid of the UT600 software it is possible to check and calibrate the rewind table UT 600/2000 and IT 600 (two friction drives) very easily and correctly.

Requirement

- diagnosis
  - personal computer with Windows 9.x, Windows NT or Windows XP
  - standard serial cable
  - UT600/2000 diagnosis software
- calibration (additional):
  - weight (1000 to 1700 g)
  - film reel (radius: 105 to 182 mm) (the heavier the weight the smaller the radius)
  - strong rope.

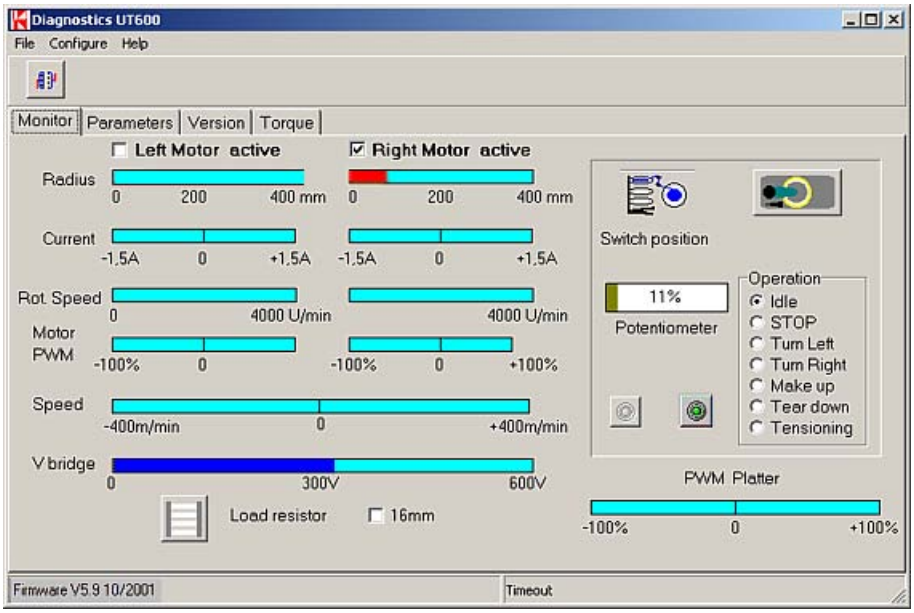
3.5.1.1 Program Installation / Connection

- The delivered software can be installed on the computer by clicking on the “setup. exe file”. Follow the instructions.
- Open the front plate of the make-up unit - the control board is visible.
- Now connect the Sub-D connector of the control board and the computer’s serial port with a common serial cable.
- Start the computer.
- Start the software by double-clicking on 

icon or via START - PROGRAMS - DIAGNOSTICS - UT600.
- If necessary activate the serial connection (COM1, COM2) by selecting the used one.

3.5.1.2 Monitor Menu

☛ After starting the program the monitor window appears:



☛ The **toggle switch** indicates the switching positions on the make-up table corresponding to the motor running directory (right or left).

☛ The **rotary switch** indicates the switching positions on the make-up table corresponding to the set reel mode.

☛ The ***Radius*** bar indicates the current reel radius for right or left motor.

☛ The ***Current*** bar indicates the motor current for right or left motor.

☛ The ***Rot.Speed*** bar indicates the current motor rotation speed.

☛ The ***PWM Motor*** bar indicates the pulse wide modulation of the signal which is sent to the right or left motor of the make-up table according to the selected operation mode.

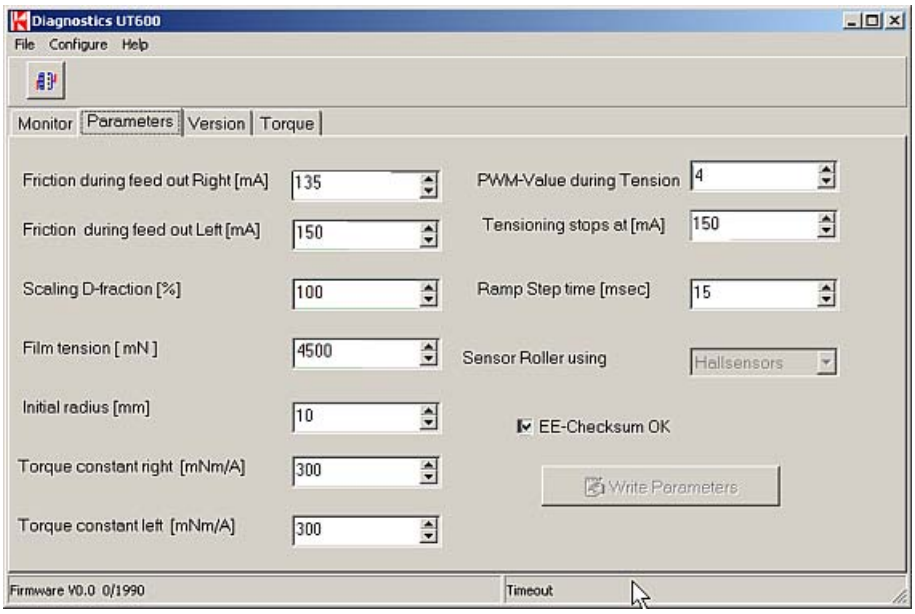
☛ The ***Speed*** bar indicates the rewind speed.

☛ The ***PWM Platter*** bar indicates the pulse wide modulation of the signal which is sent to the non-rewind system according to the selected operation mode.
For example, if you make-up a film reel the “PVM Motor” bar indicates a positive value and if you tear-down a negative value will be indicated.

☛ The ***V bridge*** bar indicates that voltage (more than 300 V) which comes back to the power supply unit when the motor is decelerating. If the voltage is too high the ballast step (resistor) reduces the voltage. When the ballast step works it will be indicated on the menu window.

3.5.1.3 Parameter Menu

- Click on ***Parameter***:



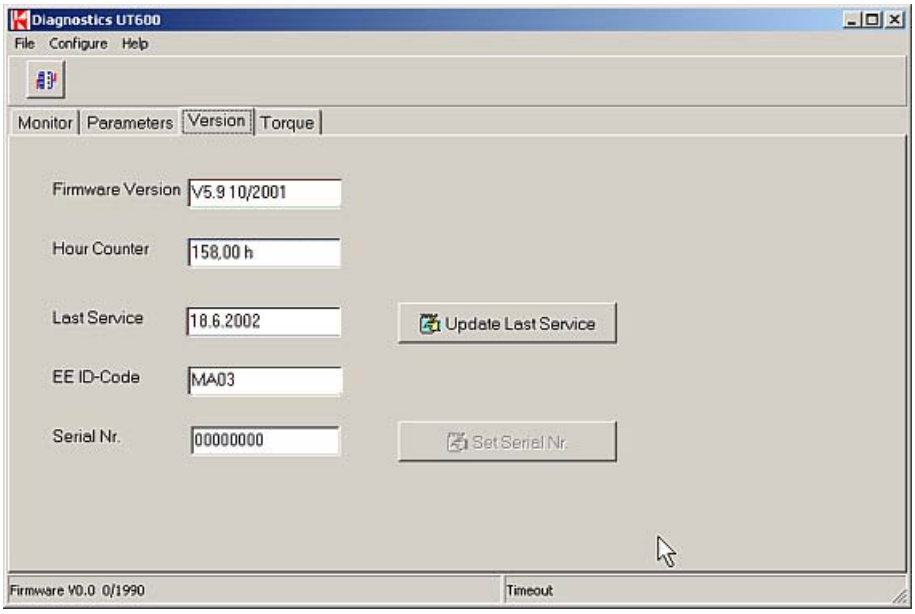
☛ The parameter menu displays all parameters which can be stored in the EE-PROM by clicking on ***Write Parameters***.

▶ **NOTE**

Changing the parameters is carried out by an expert only or by request with Kinoton.

3.5.1.4 Version Menu

- Click on ***Version***:



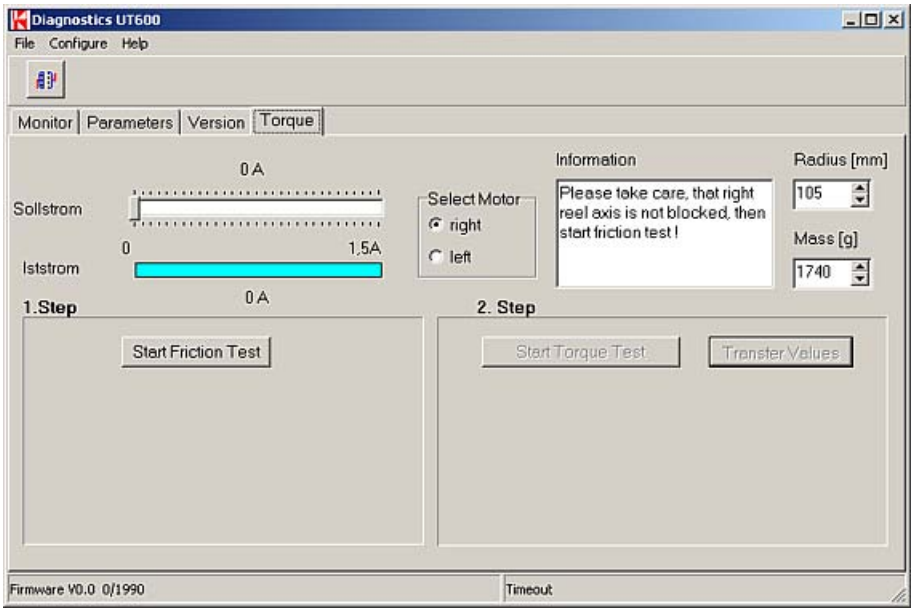
☛ The version menu displays the version, the operating time and the serial number. The last service date can be set by clicking on ***Update last service***.

3.5.1.5 Calibrating the Rewind Table Motor / Torque Menu

▶ **NOTE**

Mounting the calibration tool, see calibrating MT 600/2000, chapter 3.4.2.5.

- Click on ***Torque*** tab:



- Switch on the rewind table.
- Select the motor.

- **1. Step**: Start the friction test by clicking on ***Start Friction Test***.

☛ The current increases until the motor begins to turn.

☛ The ***Act Current*** bar displays the actual current.

- Prepare the make-up table with the measurement equipment as you can see on page before.
- Enter the value of the radius of the film reel or of the radius gauge and the weight value.
- **2. Step**: Start the torque test by clicking on ***Start Torque Test***.

☛ The current increases until the weight begins to lift.

☛ The ***Act Current*** bar displays the actual current.

- Click on ***Transfer Values***.

☛ The measured values will be overtaken to the parameter menu.

- Click on ***Write Parameter*** in the parameter menu.

☛ The values will be overtaken to the EE-PROM.

- If necessary repeat with the other motor.

☛ Now the rewind table motor is calibrated.

4 Service and Retrofitting

4.1 Changing defective Gear Boxes for motors of ST 100/200/400/500 E and ST 200

The manufacturing of the grey gear boxes for the grey KM94-60 motor has been
discontinued by the supplier.
The following grey gear boxes are not available anymore:
- gear ratio 1:7 for ST 100/200/400/500 E
- gear ratio 1:18 for ST 200

The gear boxes can be still repaired by Kinoton.

Alternatively the grey motor with the damaged gear box can be completely changed by the new blue motor with the blue gear box.

▶ **NOTE**

Due to changed dimension it is not possible to mount the grey gear box on the blue motor and vice versa.

4.2 Overview of different Motors and Amplifier Boards for ST 100/200/400/500 E and different Motors for FT 3 M

In the past years several mechanical and electrical modification have been performed on the drives of the non-rewind systems.

To facilitate your future orders of spare parts we want to provide you with an overview of motors, gear boxes and amplifiers which has been used since the first day of manufacturing.

For a proper identification you will find all necessary information regarding the serial numbers and spare part numbers on the next pages.

▶ **NOTE**

▷ The serial numbers, given in the following tables, correspond to all platter systems ST 100/200/400/500 E and FT 3 M which are equipped with the associated motor or amplifier from that number on.

▷ Refer the service information **ST-Gear/0306** for information about changing the gear box at grey Groschopp motor.

4.2.1 ST 100/200/400/500 E

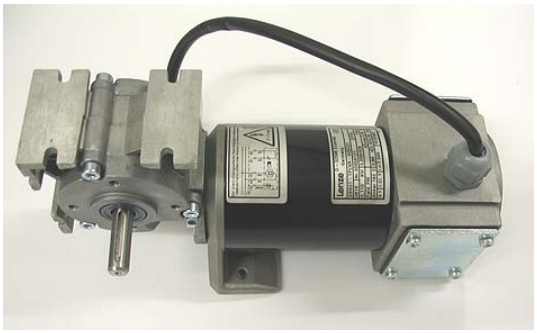
Groschopp Motor (grey)

Part numbers:
- Motor with drive: 1000 361 87008
- Motor without drive: 5322 705 30859
- Carbon brush (set of 2): 5322 705 30861

System	ST 100/200 E	ST 400 E	ST 500 E
Serial Number	J3939	L0562	K0563

Lenze Motor (black)

Part numbers:
- Motor with drive: 1000 361 87022
- Carbon brush (set of 2): 1000 362 470015



System	ST 100/200 E	ST 400 E	ST 500 E
Serial Number	J3940 - J5007	L0562 - L0611	K0563 - K0609

Groschopp Motor (blue)

Part numbers:
- Motor with drive: 1000 361 87025
- Carbon brush (set of 2): 5322 705 30861
- Gear box 1:7 (blue): 1000 522 1701

System	ST 100/200 E	ST 400 E	ST 500 E
Serial Number	J5008	L0612	K0610

Amplifier Board for Groschopp Motor (blue / grey)

Part number: 1000 216 97057

Amplifier Board for Lenze Motor (black)

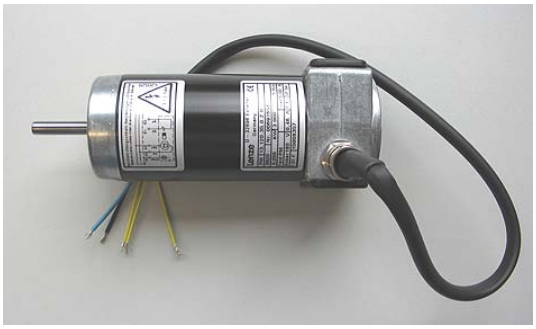
Part number: 1000 216 97172

4.2.2 FT 3 M

Lenze Motor

used up to serial number: **KJ0436**

Part numbers:
- Motor: 1000 361 87023
- Carbon brush (set of 2): 1000 362 470013



Groschopp Motor

used up to serial number: **KJ0437** an

Part numbers:
- Motor: 1000 361 87026
- Carbon brush (set of 2): 1000 362 470018

Control Boards

The change of the motor type requires also a change of the control software (motor parameters) on the control board.

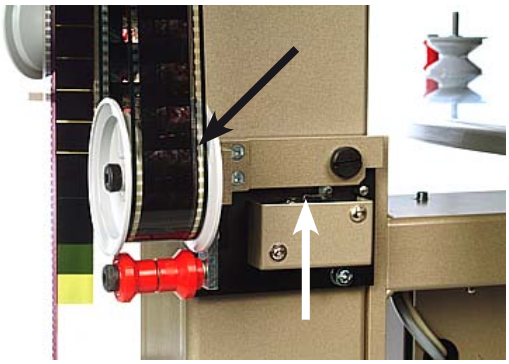
The following software versions (last issue) are available:

- For Lenze motor (1000 361 87023) => FT8106N-L V2.9
- For Groschopp motor (1000 361 87026) => FT8106N-G V2.9

4.3 Retrofitting a Film Tension Switch on ST 200

General

If an operating trouble happens, which results in excessive high film tension on the take-off platter the film tension roller (black arrow) disengages, the switch (white arrow) stops the projector motor, and the film slides over the film tension roller. Therefore an idle film loop is formed. The projector can run out without any damages on the film material or on the projection system.



Scope of Delivery

- Film tension switch unit
- Column head plate with braking and guide roller
- Guide roller
- Set of mounting screws and cables
- Film threading scheme

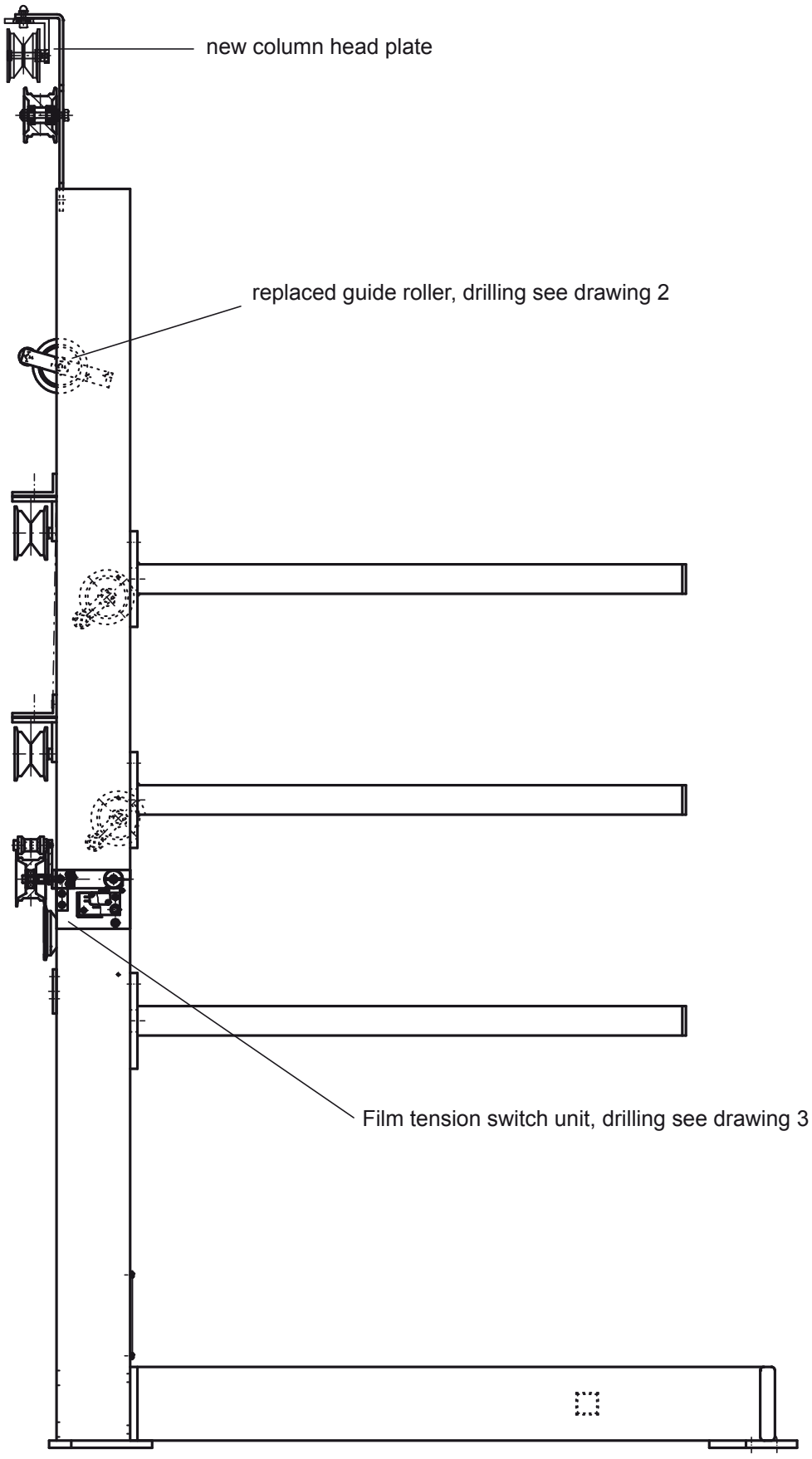
Retrofitting

▶ **NOTE**

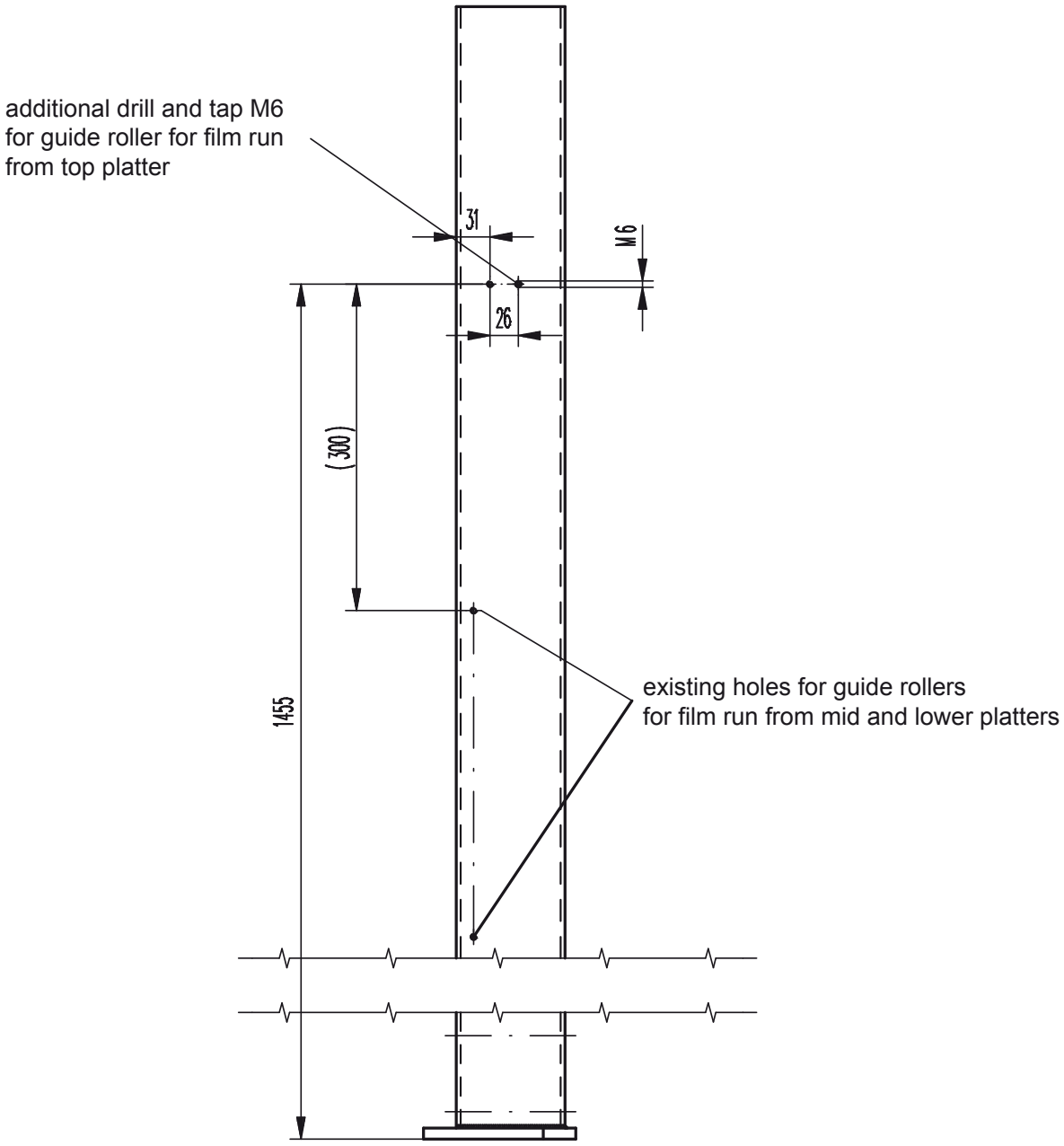
On the next pages you will find the corresponding mounting drawings (1 - 3).

- Remove the old column head plate.
- Mount the new column head plate - fasten it on the column inside, the rollers facing column outside (see drawing 1).
- Remove the upper guide roller for film run to projector from the top platter.
- Drill a hole for and tap M6 for fastening the new replaced guide roller and threading the cable (see drawing 2).
- Drill a hole (20 mm) and 2 holes for M6 threading to fasten the film tension switch unit (see drawing 3 and observe the hint).
- Run the film tension switch cable to the main control board and connect it corresponding to the wiring scheme.

Drawing 1

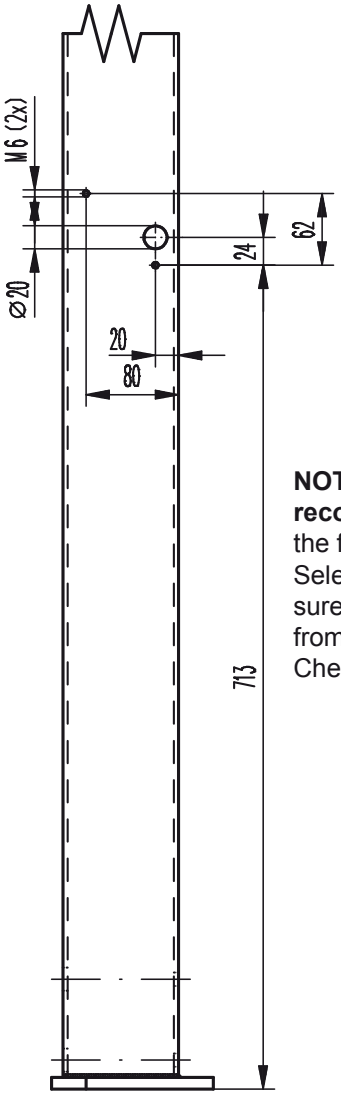

new column head plate
replaced guide roller, drilling see drawing 2
Film tension switch unit, drilling see drawing 3

Drawing 2


additional drill and tap M6
for guide roller for film run
from top platter
31
M6
26
(300)
1455
existing holes for guide rollers
for film run from mid and lower platters

Drawing 3

2 x tap M6 for fastening
hole Ø 20 mm for cable threading



NOTE
recommended position of
the film tension switch
Selecting a different position, make sure not to interfere with the film run from projector to a platter.
Check the film run before drilling holes!

4.4 FT 3 M: Degreasing the Flanges of the Platter Drive Wheels

Due to conditional of manufacturing the platter drive wheel material can be greasy. The grease on the flange effects slipping of the drive belt.

Therefore degrease the flanges of the platter drive wheels by using a degreasing agent:
- about four weeks after installation
- always when the drive belt is slipping.

5 Technical Data and Wiring Schemes

5.1 Technical Data

5.1.1 ST 1007200/270/400/500 E

Connecting Data

Mains voltage	120 V / 230 V
Frequency	50 Hz / 60 Hz
Pre-fuse	6.3 A
Input power max	500 VA

Power and Operating Data

Nominal rotary frequency of motor	3000 rpm
motor power	100 VA
Nominal reel rotary speed	27.4 m/min
Reel rotary speed max.	400 m/min

Sizes and Weights

Components	Ratio of Sizes	Weights
ST 100 E	1440 mm x 1320 mm x 1920 mm	approx. 120 kg
ST 200 E / ST 270 E	1440 mm x 1320 mm x 1920 mm	approx. 210 / 260 kg
ST 400 E	1440 mm x 1320 mm x 1920 mm	approx. 280 kg
ST 500 E	1440 mm x 1320 mm x 2220 mm	approx. 310 kg
Film platter	Ø 1320 m	approx. 55 kg
Distance between the platters	300 mm	

5.1.2 FT 3 M

Connecting Data

Mains voltage	120 V / 230 V
Frequency	50 Hz / 60 Hz
Pre-fuse	6,3 A
Input power max	400 VA

Operating and Power Data

Nominal rotary frequency of motor	3000 rpm
motor power	50 VA
Nominal reel rotary speed	27.4 m/min

Sizes and Weights

Components	Ratio of Sizes	Weights
FT 3 M	1440 mm x 1320 mm x 1920 mm	approx. 100 kg
Film platter	Ø 1320 m	approx. 55 kg
Distance between the platters	300 mm	

5.1.3 ST 2000

Connection Data

Mains voltage	230 V
Frequency	50 Hz or 60 Hz
Pre-fuse	6.3 A
Power max.	500 VA

Power and Operating Data

Endless platter drive motor:	
Nominal rotary frequency	5000 rpm
motor power	90 VA
Reel rotary speed max.	1 m/min
Eccentric drive motor:	
Nominal rotary frequency	3000 rpm
motor power	100 VA
Film tension motor:	
Nominal rotary frequency	3000 rpm
motor power	20 VA
Non-rewind platter drive motor:	
Nominal rotary frequency	3000 rpm
motor power	100 VA
Reel rotary speed max.	400 m/min
Nominal rotary speed	27.4 m/min

Sizes and Weights

Components	Ratio of Sizes	Weights
ST 2000 E-K	1650 mm x 1495 mm x 1940 mm	approx. 400 kg
Endless platter	Ø 1465 m	
Non-rewind platter	Ø 1320 m	
Distance between the platters	300 mm	

5.1.4 MT 600/2000

Connecting Data

Mains voltage	230 V AC
Frequency	50 Hz / 60 Hz
Power input max.	250 VA

Power and Operating Data

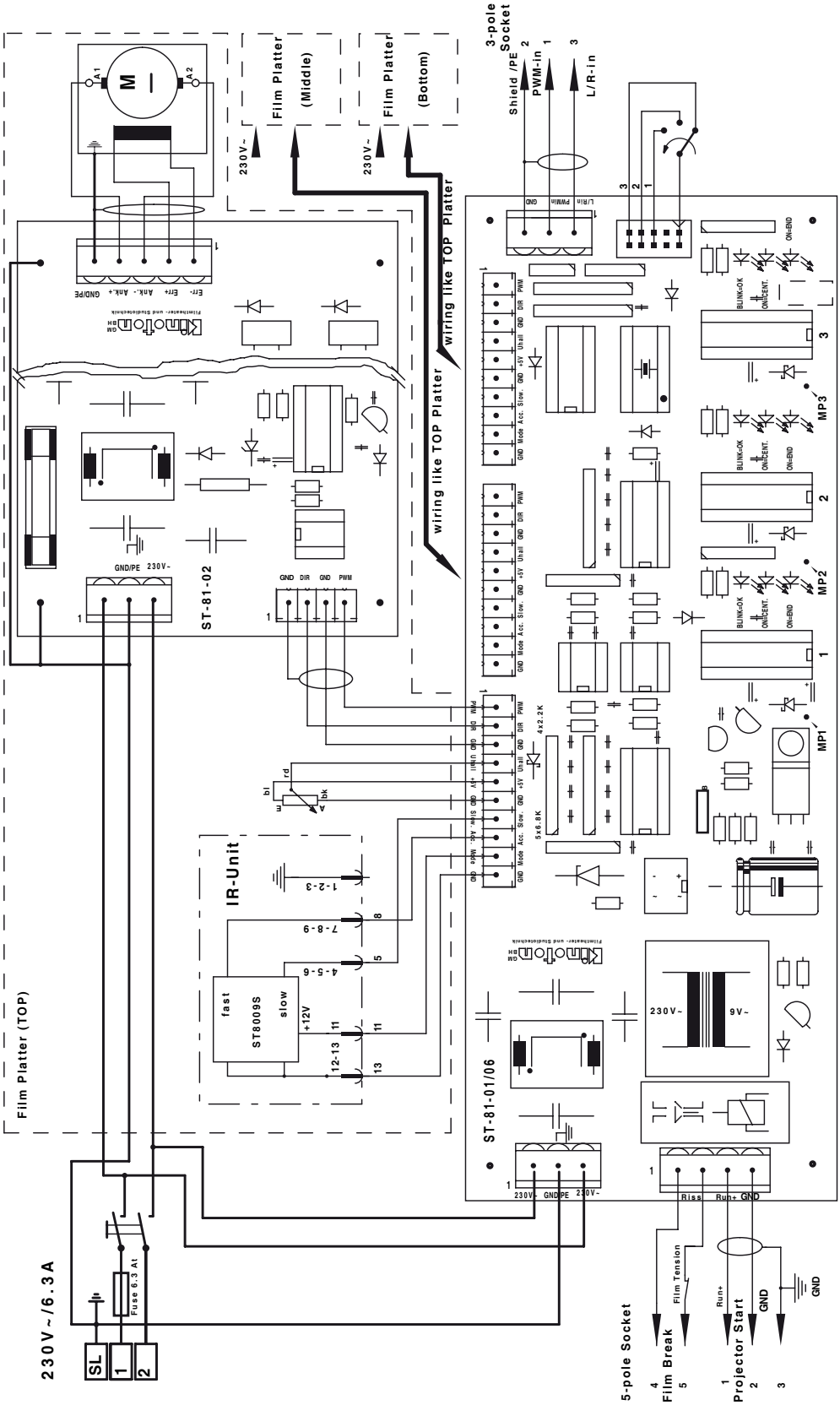
Nominal rotary frequency of motor	3000 rpm
motor power	200 VA
Reel rotary speed max.	400 m/min

Sizes and Weights

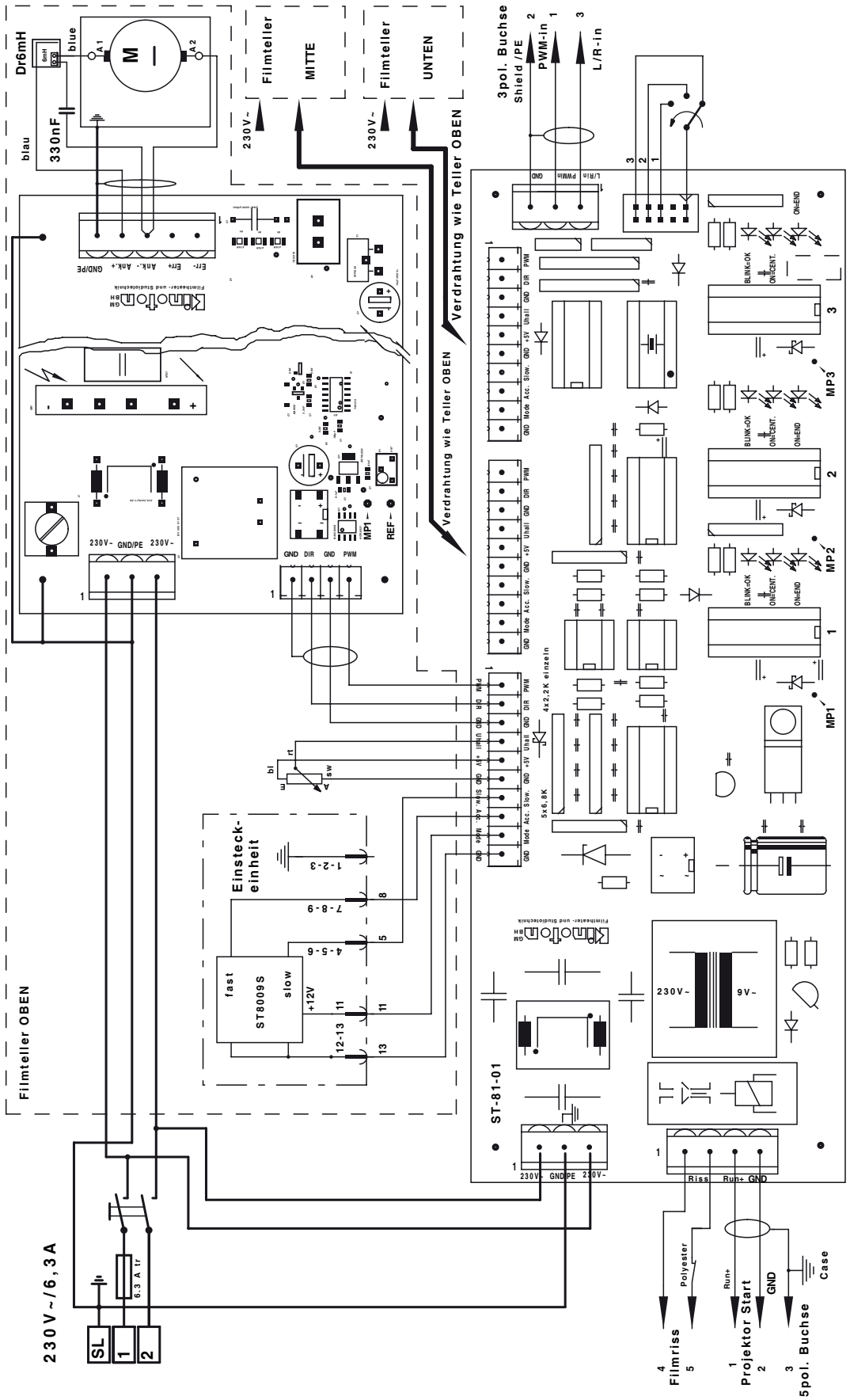
Components	Ratio of Sizes
MT 600	696 mm x 890 mm
MT 2000	746 mm x 1350 mm
Reel platters	Ø 1320 m
Film spool	up to 2000 m

5.2 Circuit and Wiring Diagrams for ST 100/200/270/400/500 E

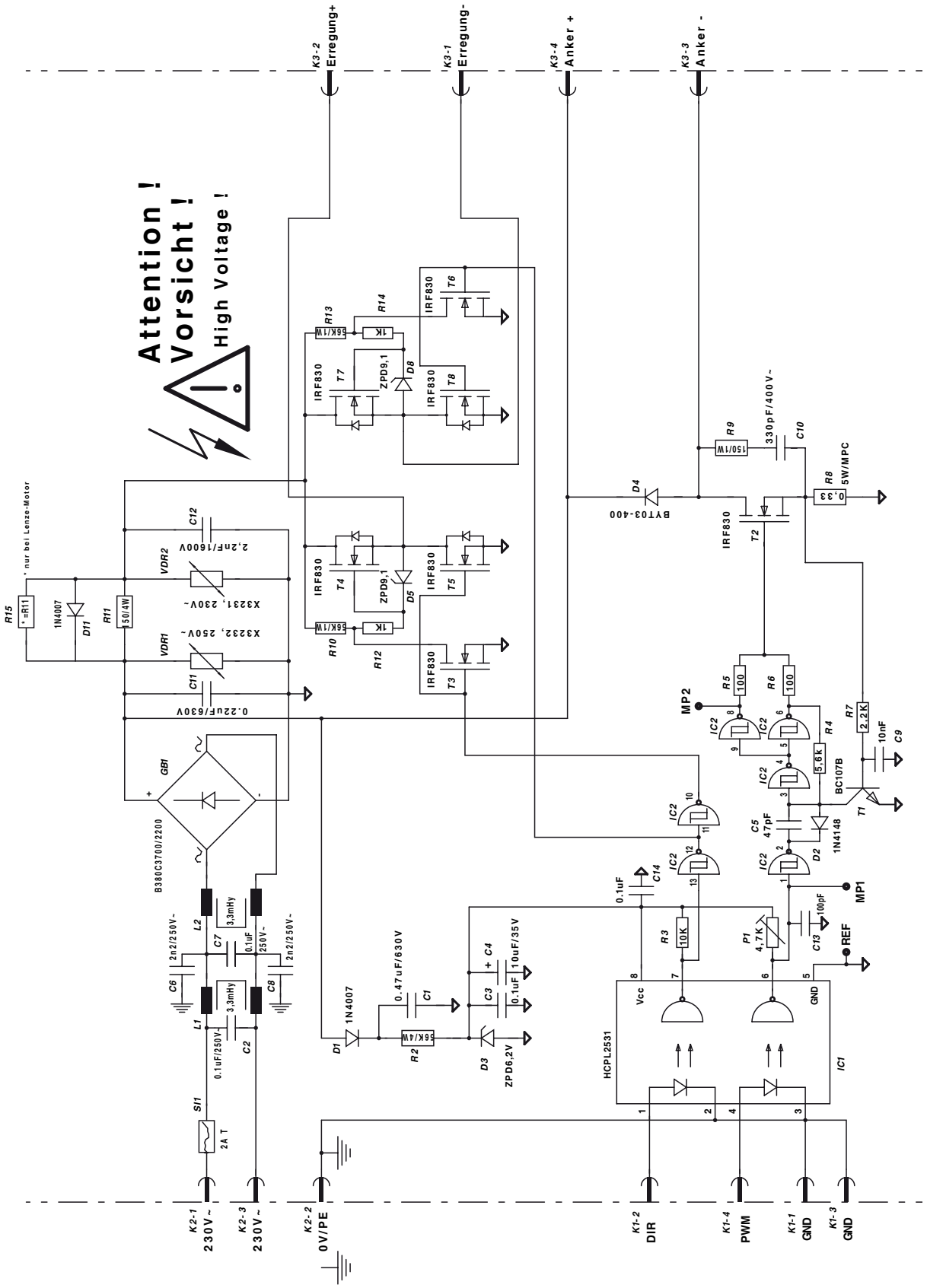
5.2.1 Control Board ST-8001



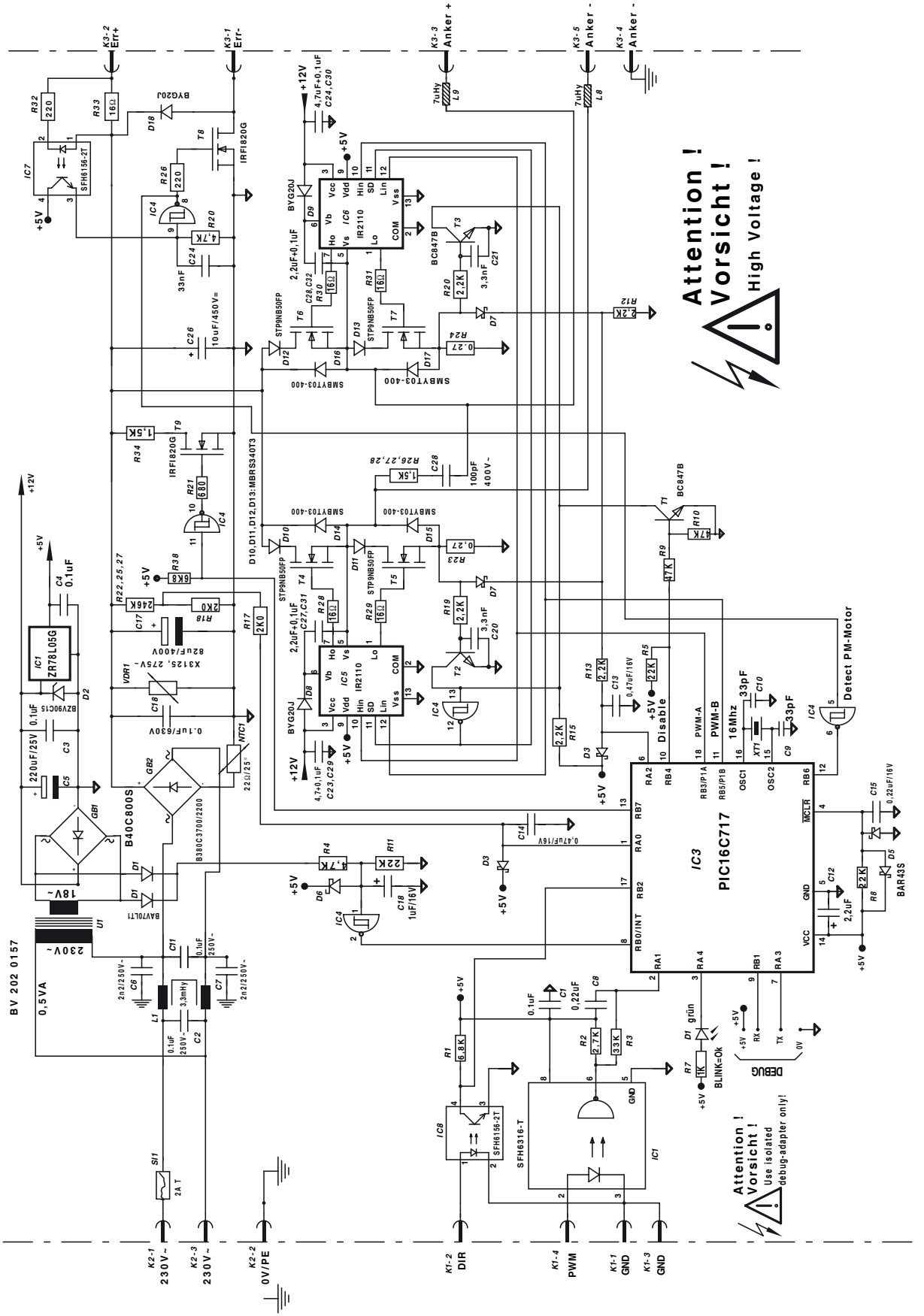
5.2.2 Control Board ST-8001N



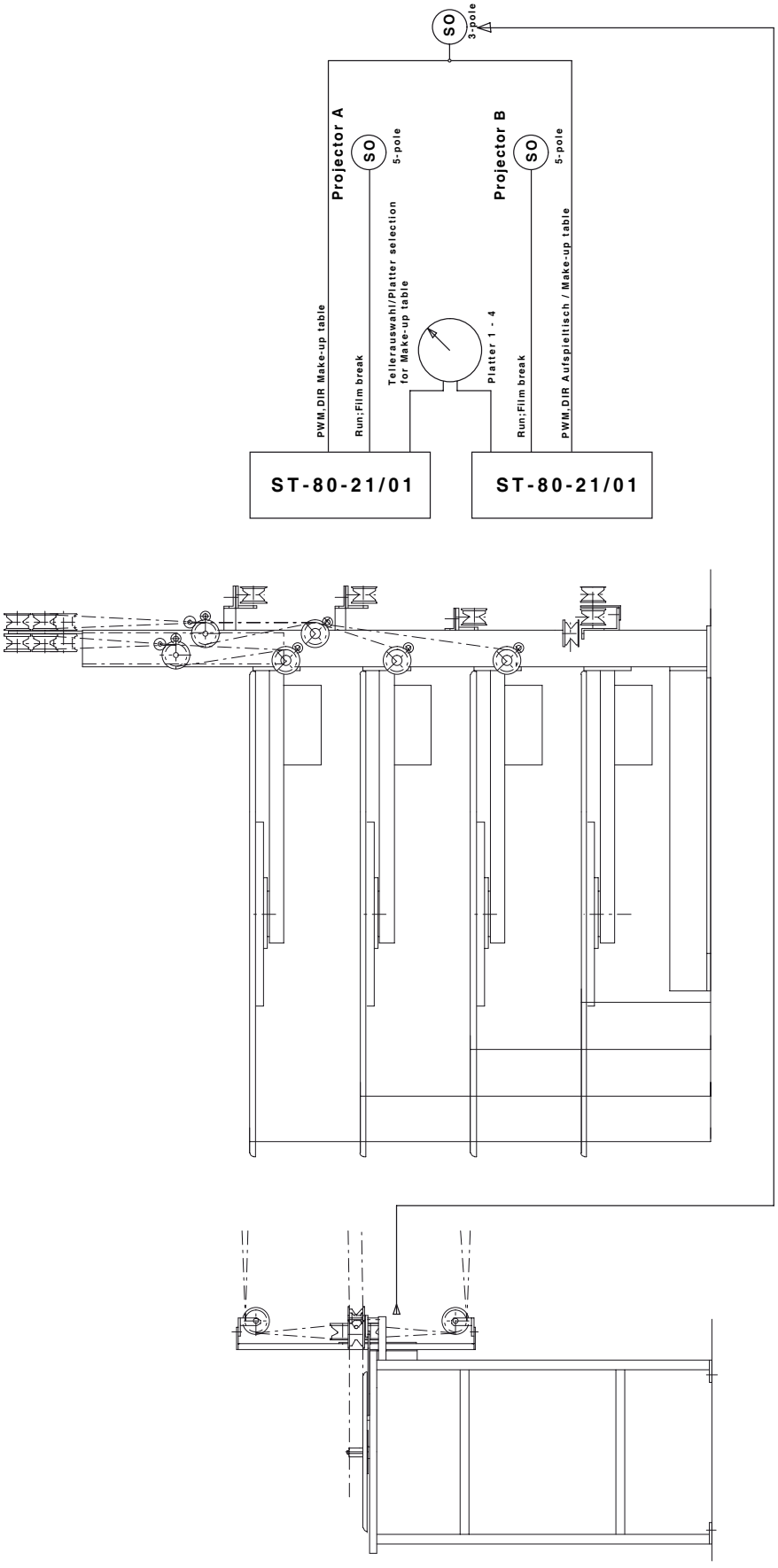
5.2.3 Amplifier Board ST-8002 (for Groschopp motors grey and blue)



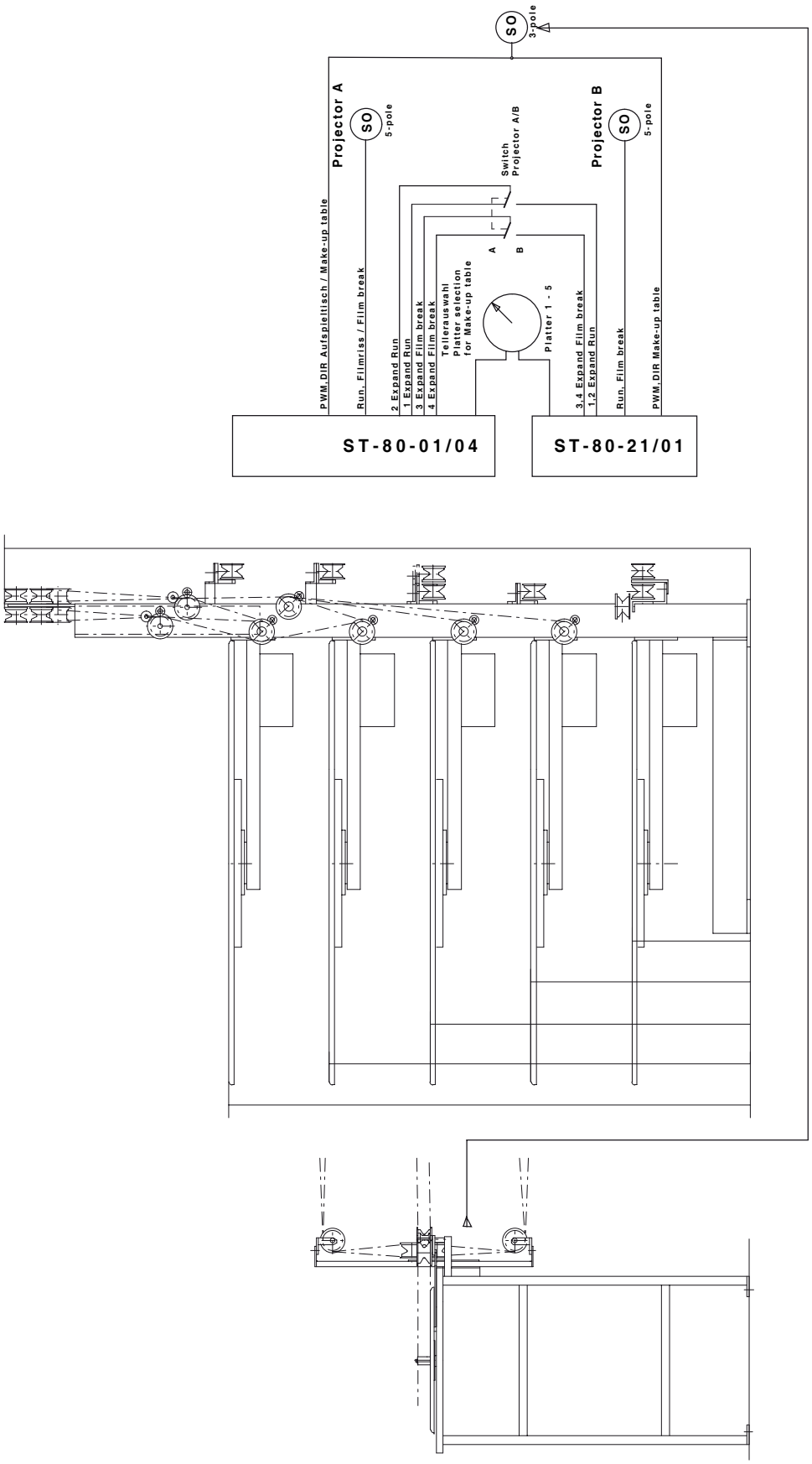
5.2.4 Amplifier Board ST-8002N (for Lenze motor black)



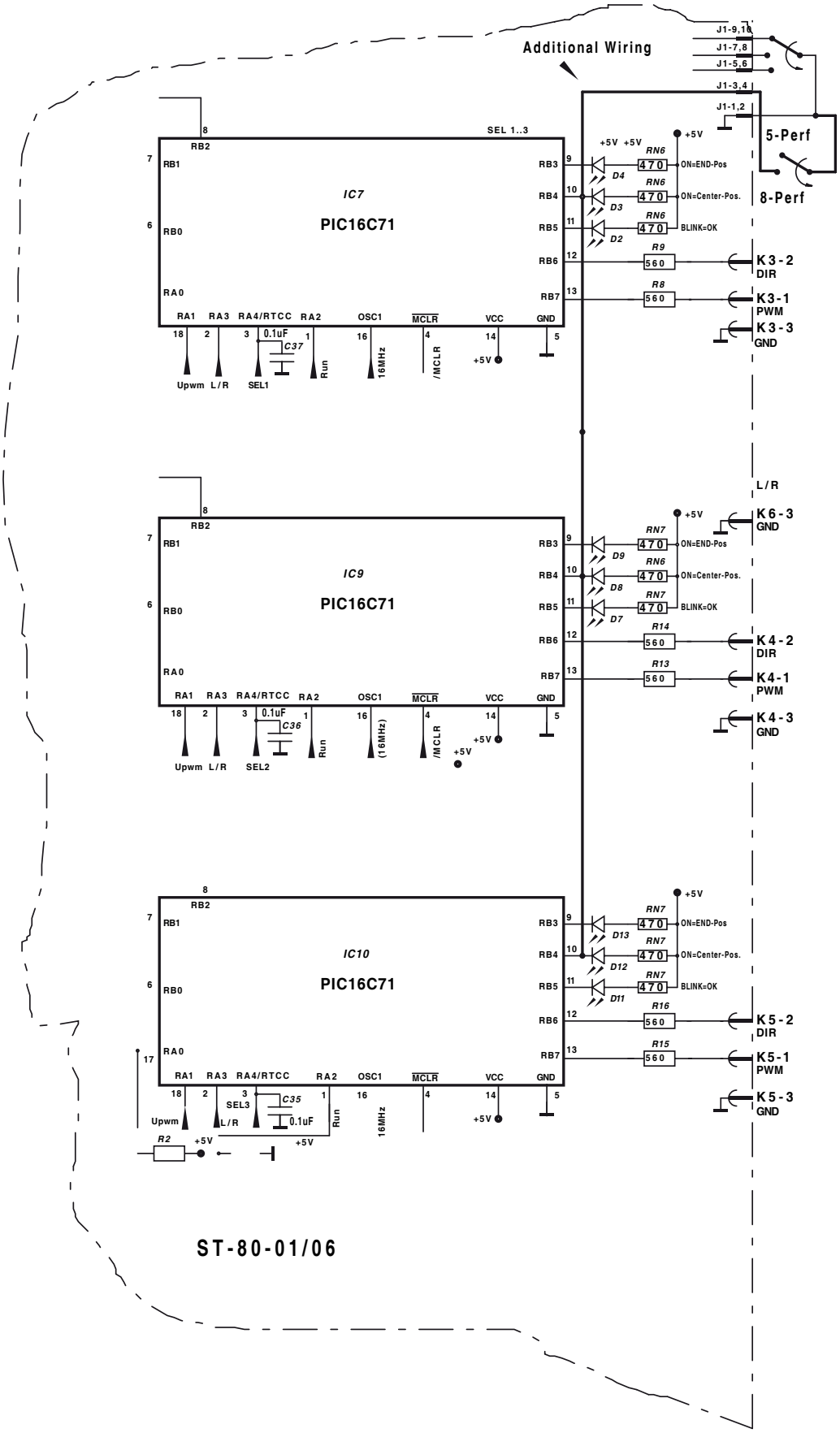
5.2.5 ST 400 E Connecting Scheme



5.2.6 ST 500 E Connecting Scheme

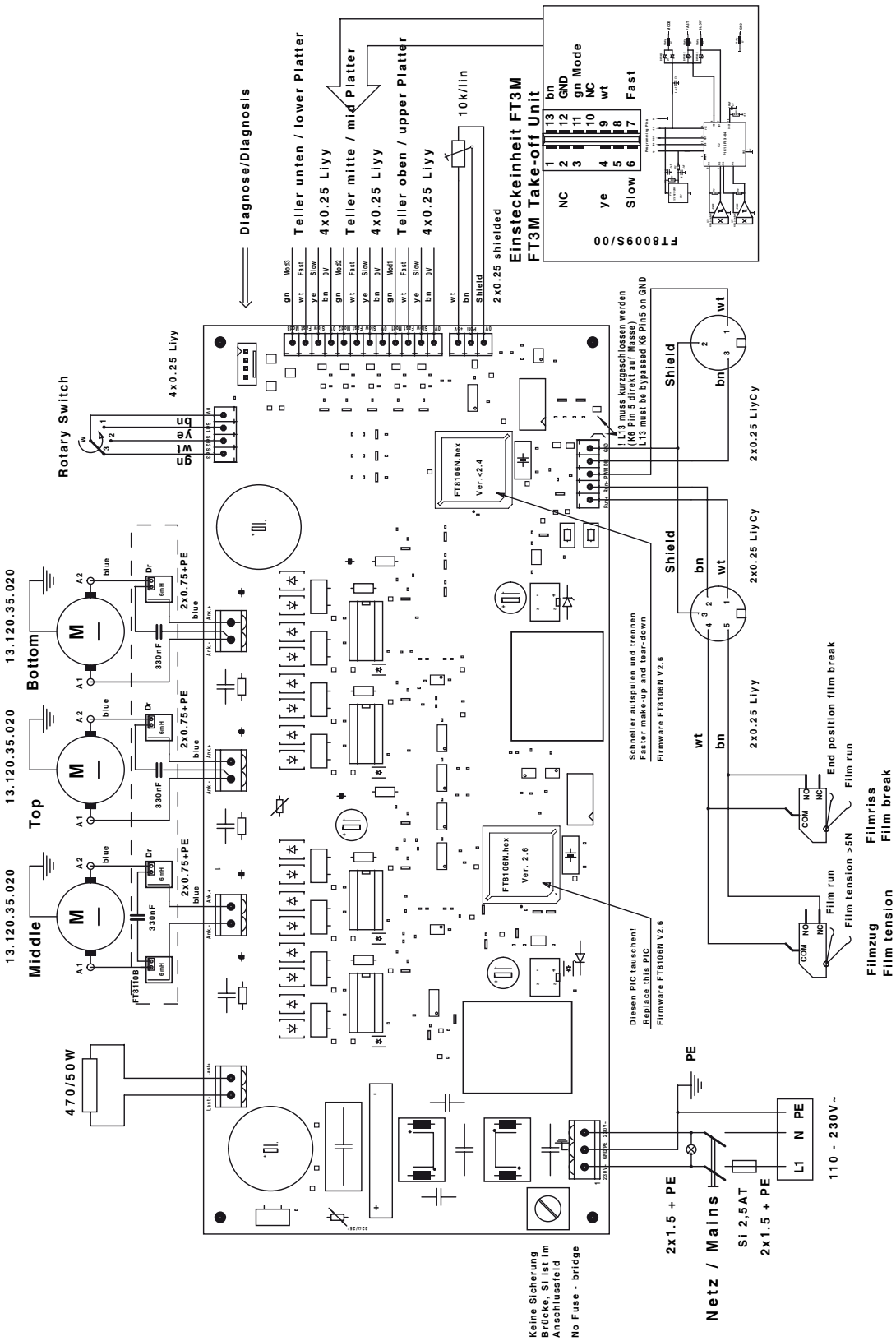


5.2.7 ST 270 E Format Switching (on Main Control Board)

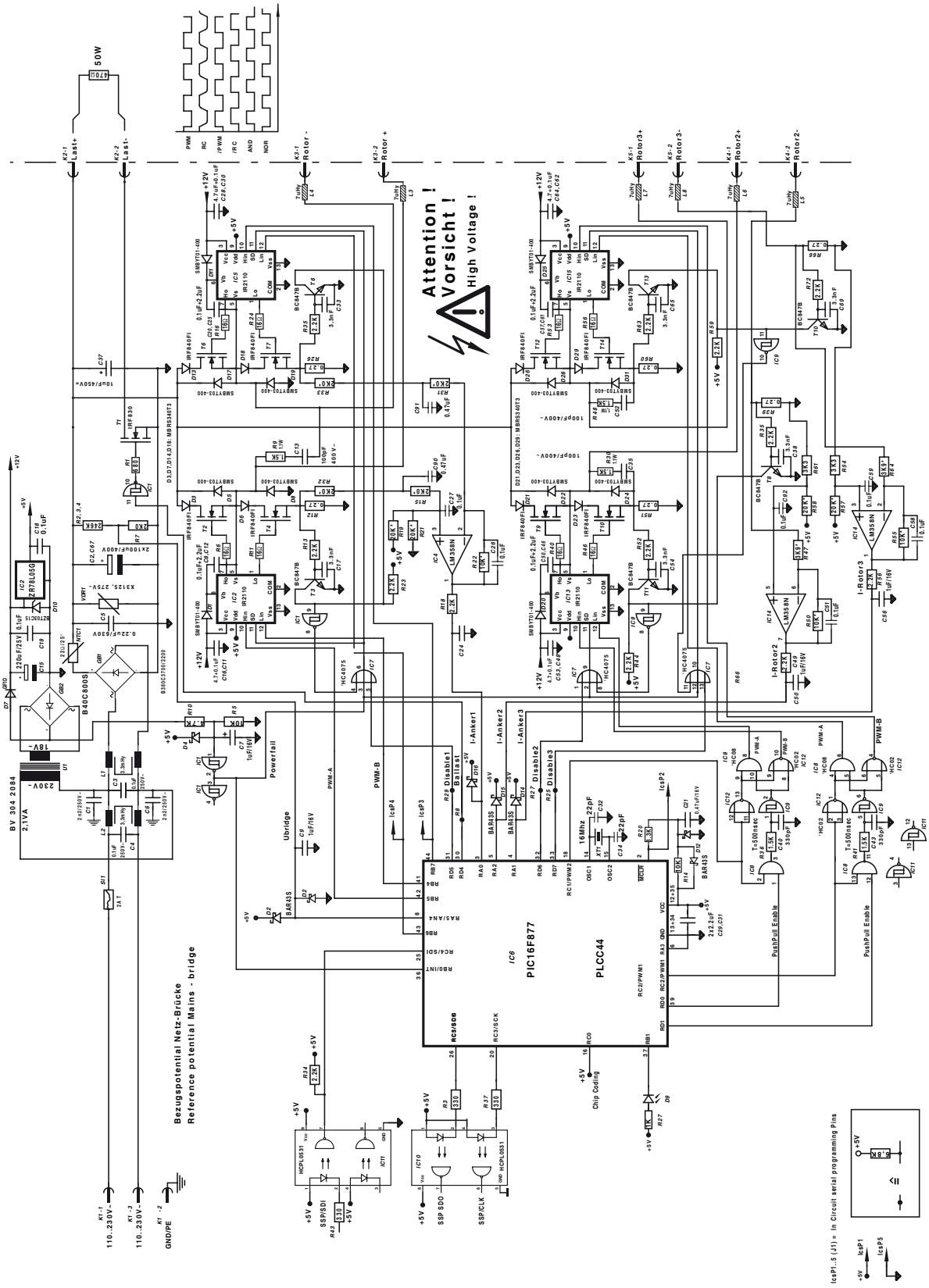


5.3 Circuit and Wiring Diagrams for FT 3 M

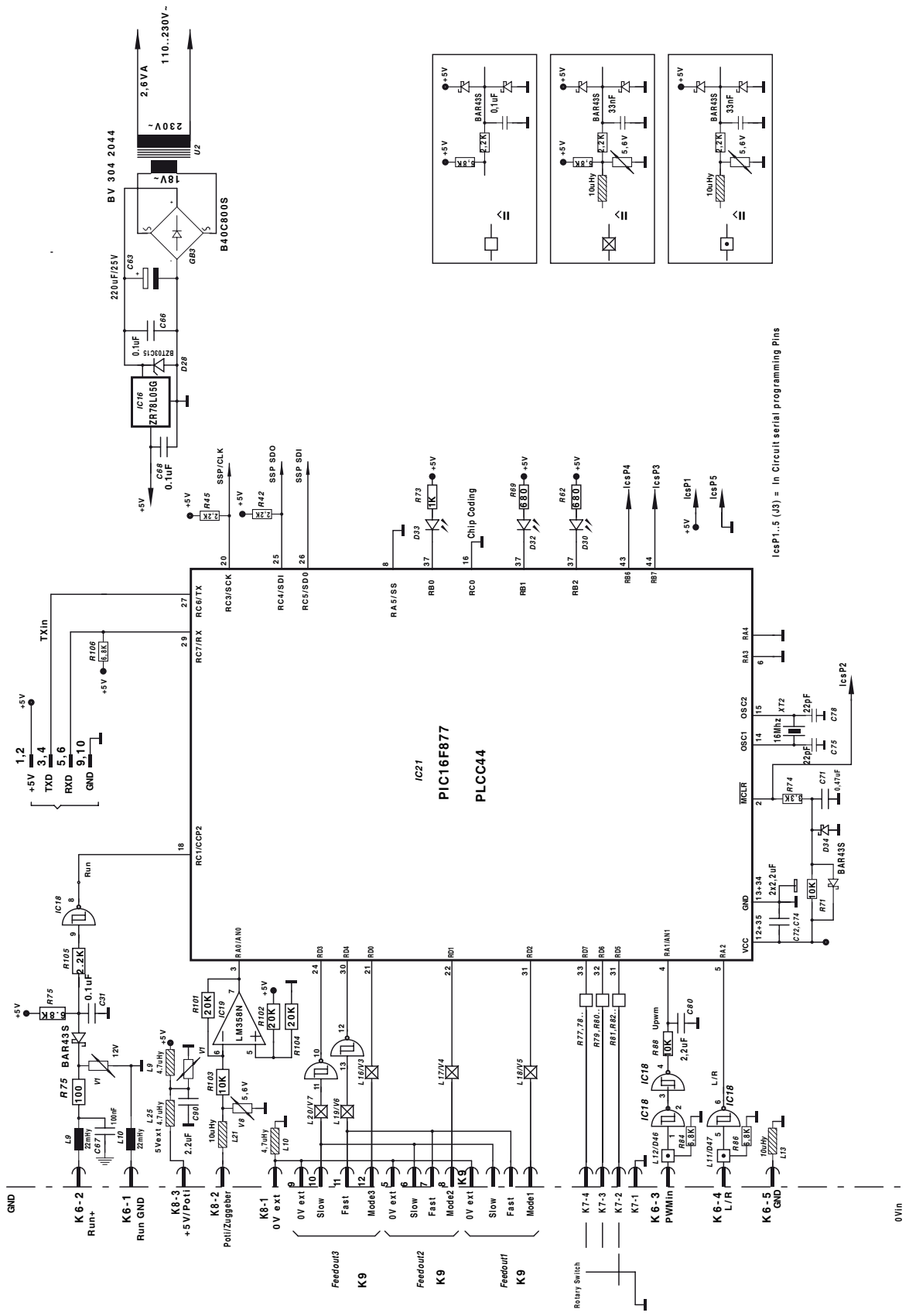
5.3.1 Control Board FT-8001



5.3.2 Motor Amplifier FT-8006A

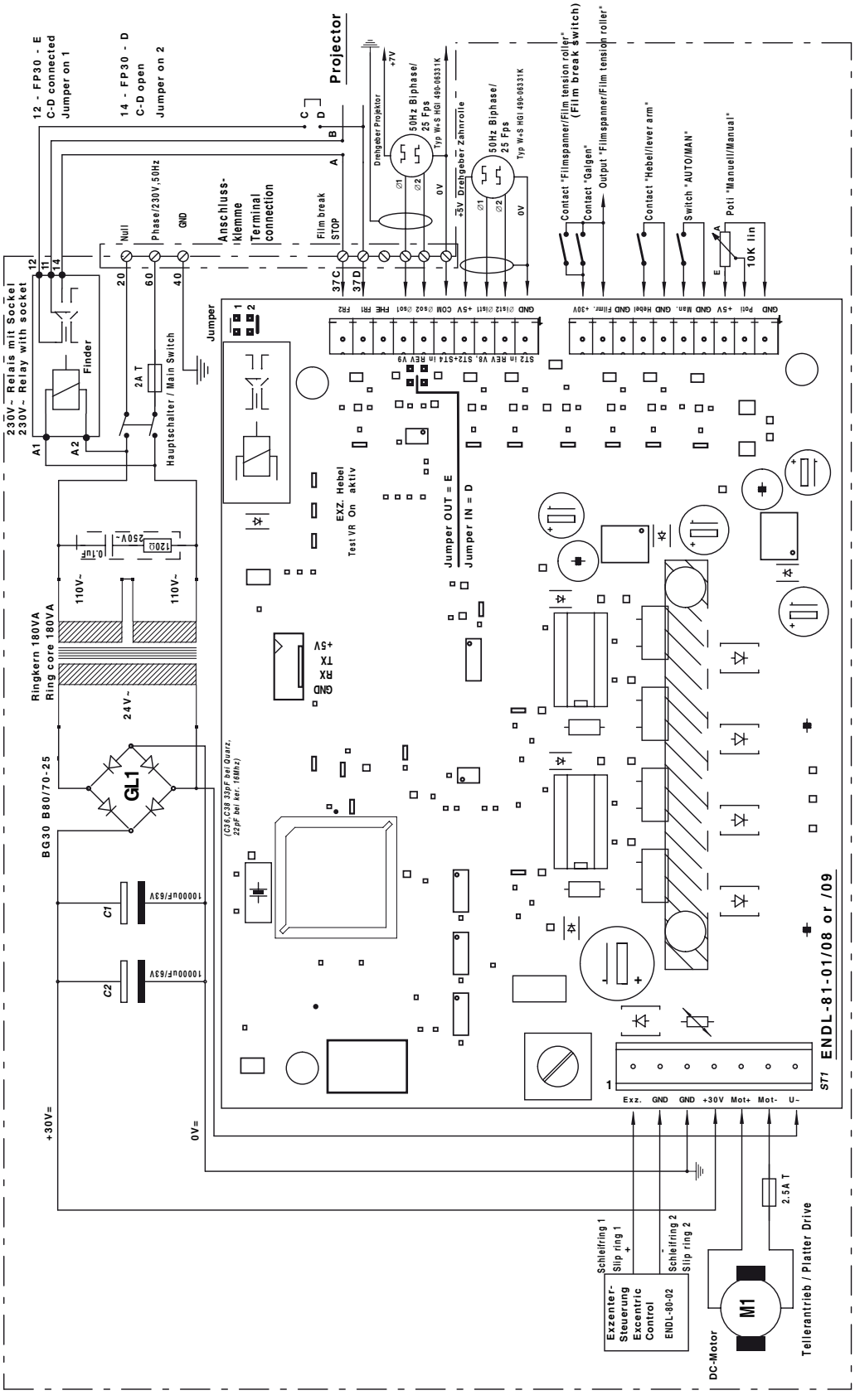


5.3.3 Platter Control FT-8006B

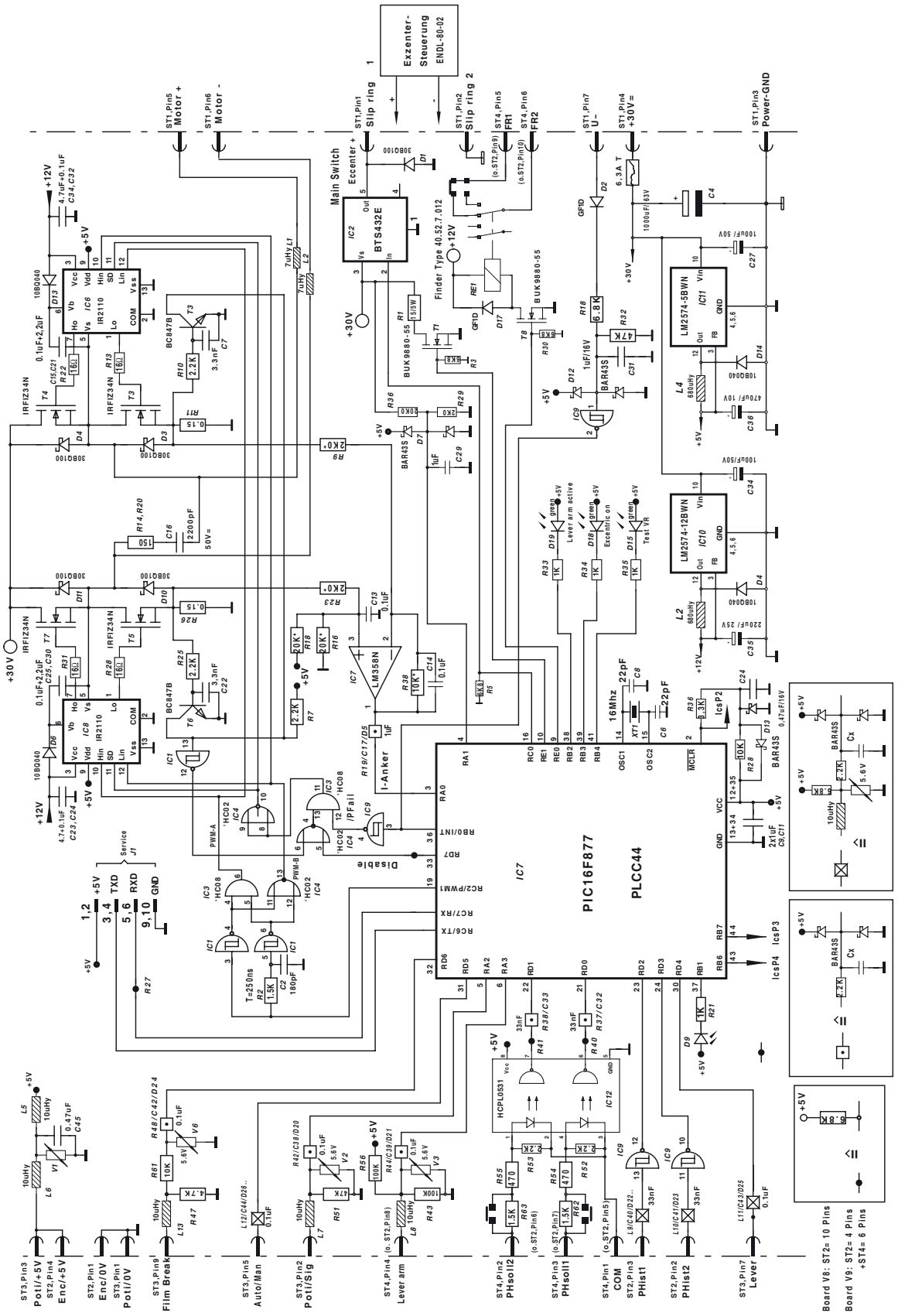


5.4 Circuit and Wiring Diagrams for ST 2000

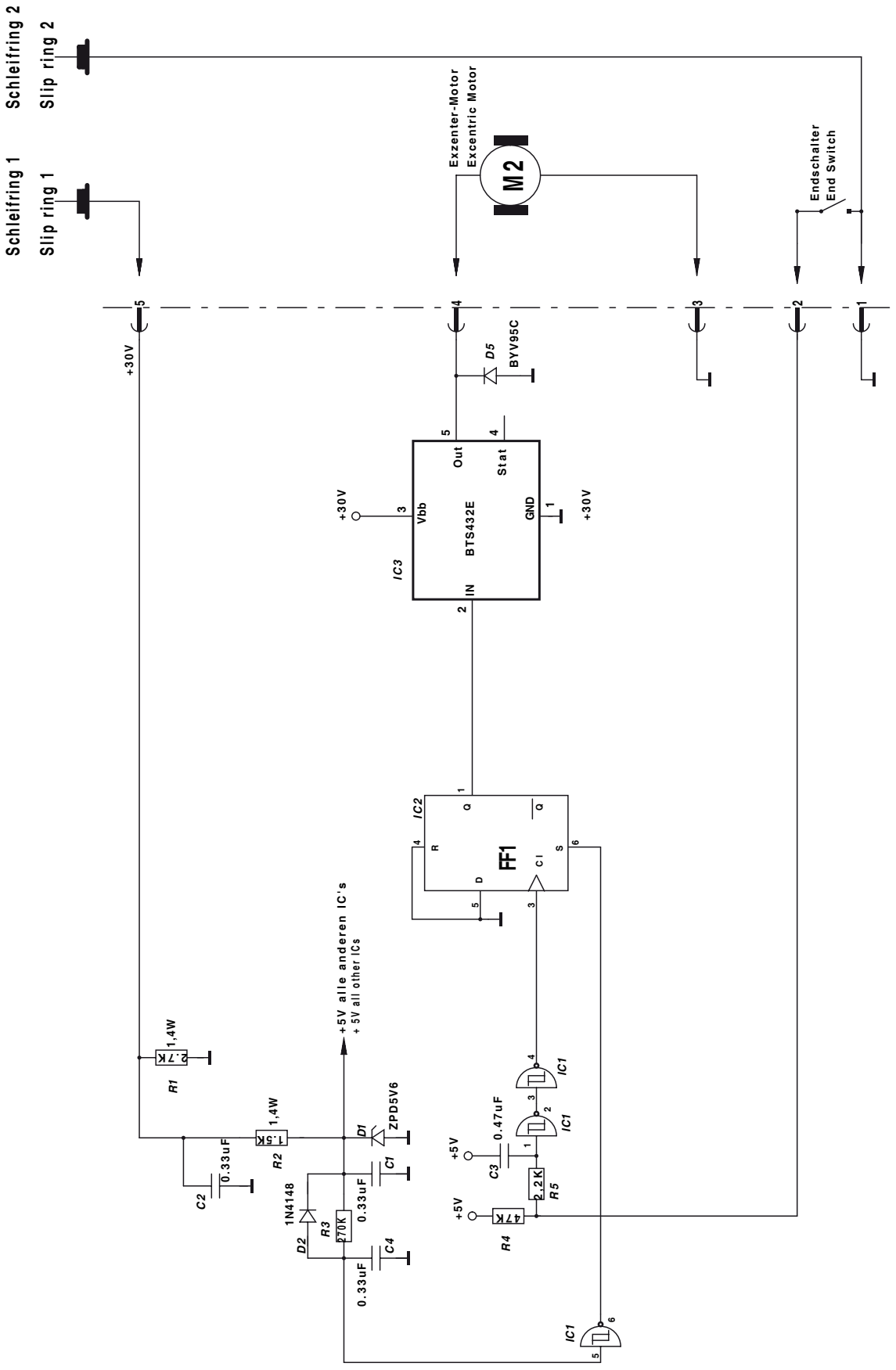
5.4.1 Main Control Board ENDL-80-01



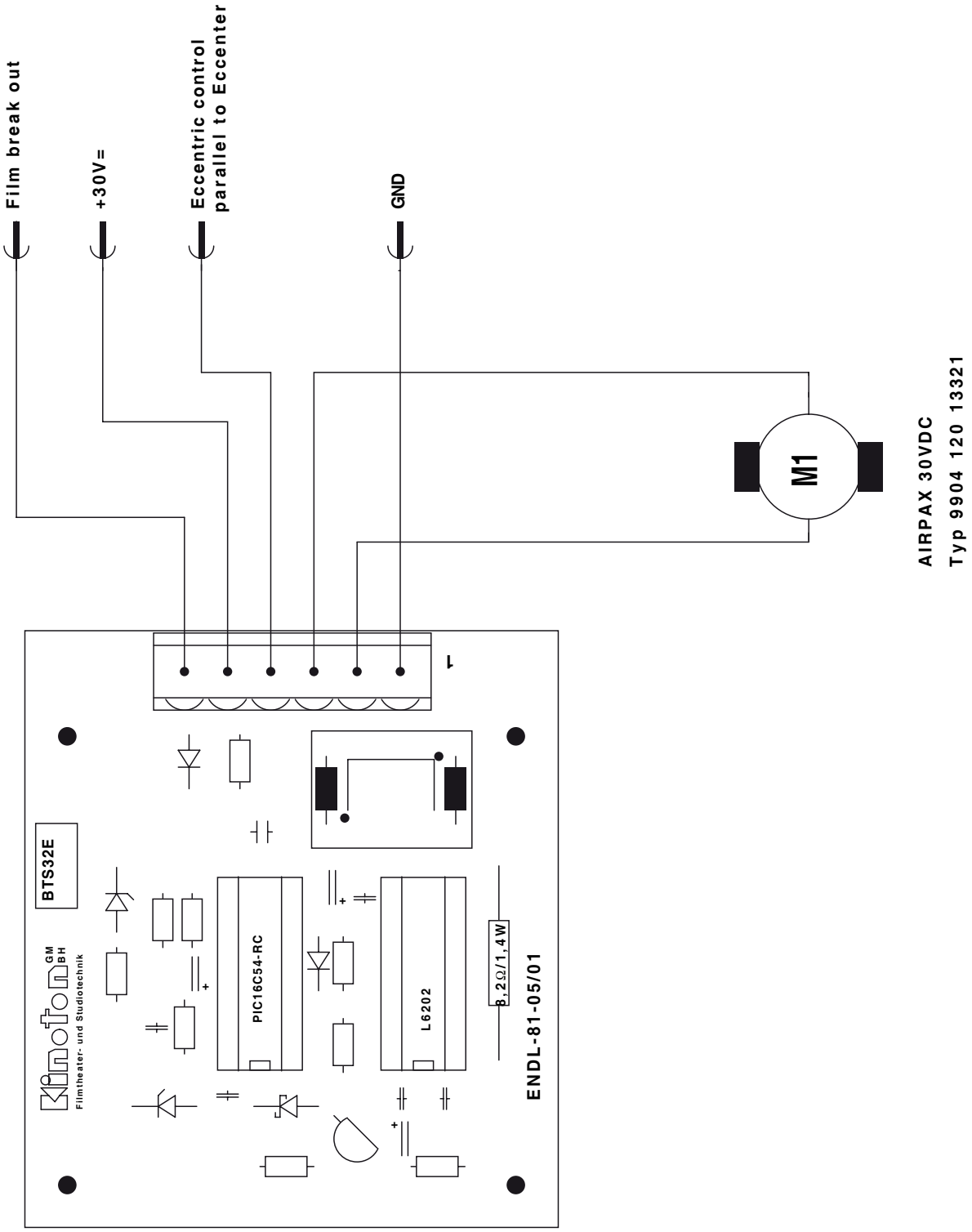
5.4.2 Main Control Board ENDL-8001/09



5.4.3 Eccentric Control Board ENDL-8002

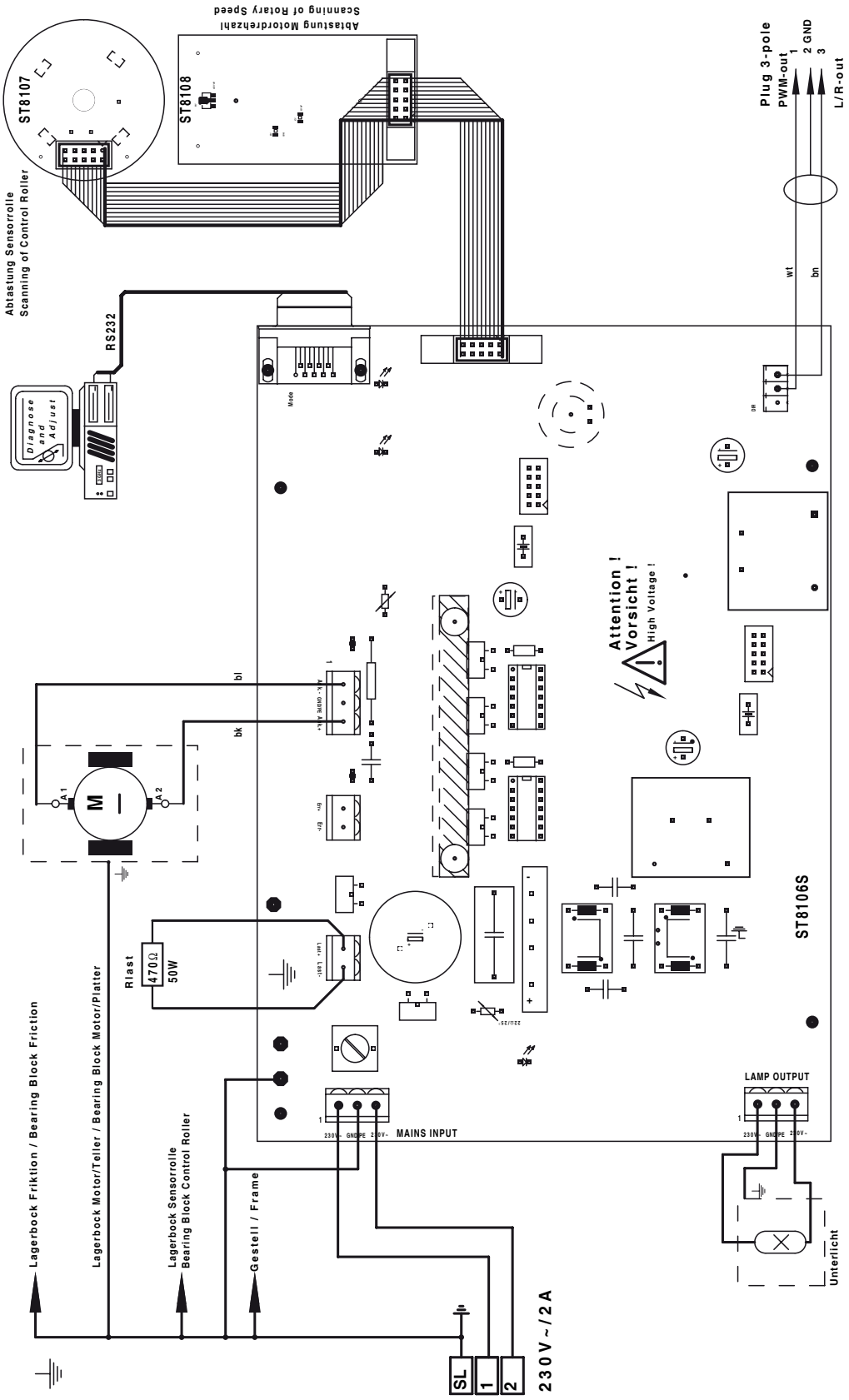


5.4.4 Film Tension Sprocket Control Board ENDL-8005

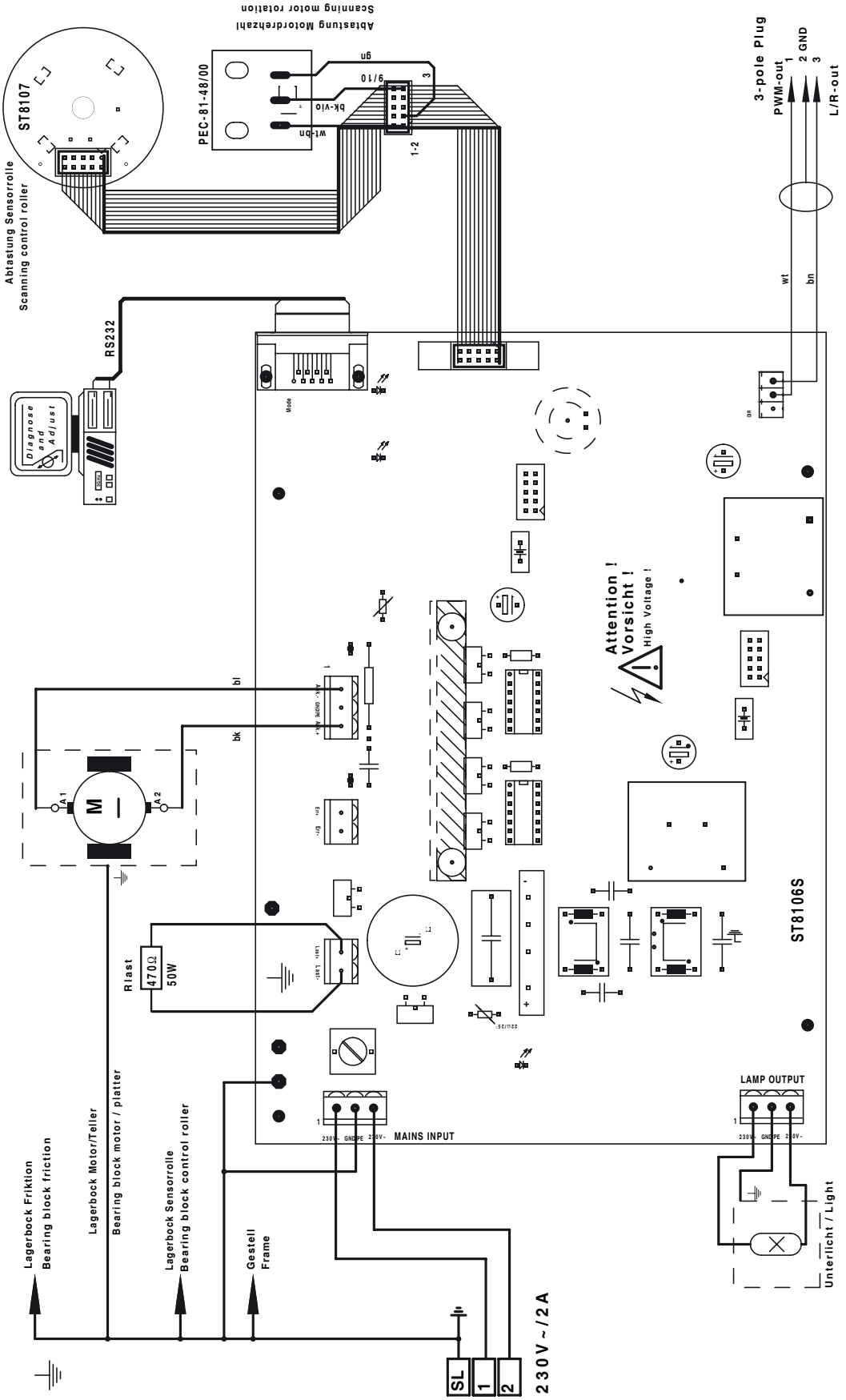


5.5 Circuit and Wiring Diagrams for MT 600 / MT 2000 / MUU 2000

5.5.1 Control Board Connection for MT 600/2000 (ST-8006SV)

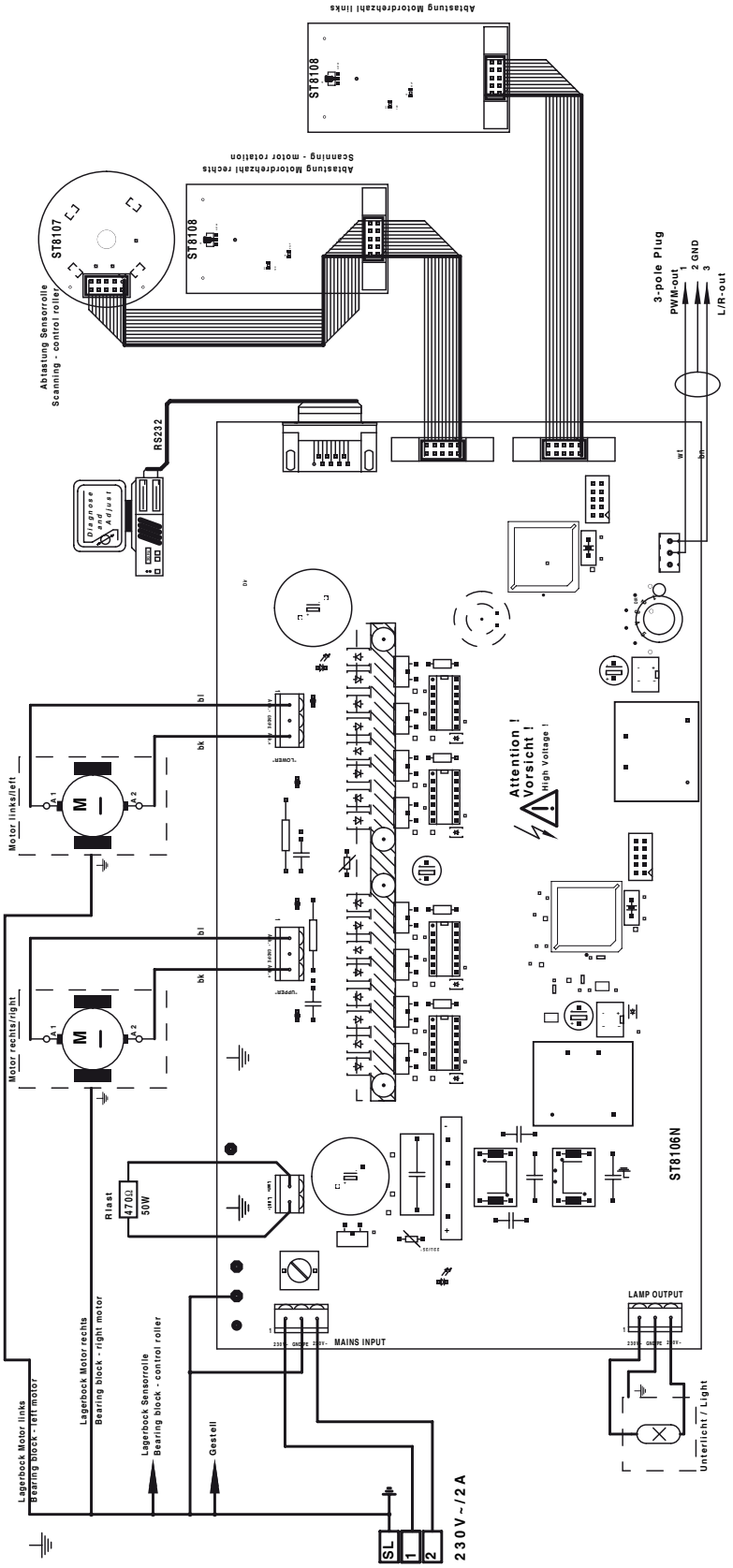


5.5.2 Control Board Connection for MUU 2000 (ST-8006UU)

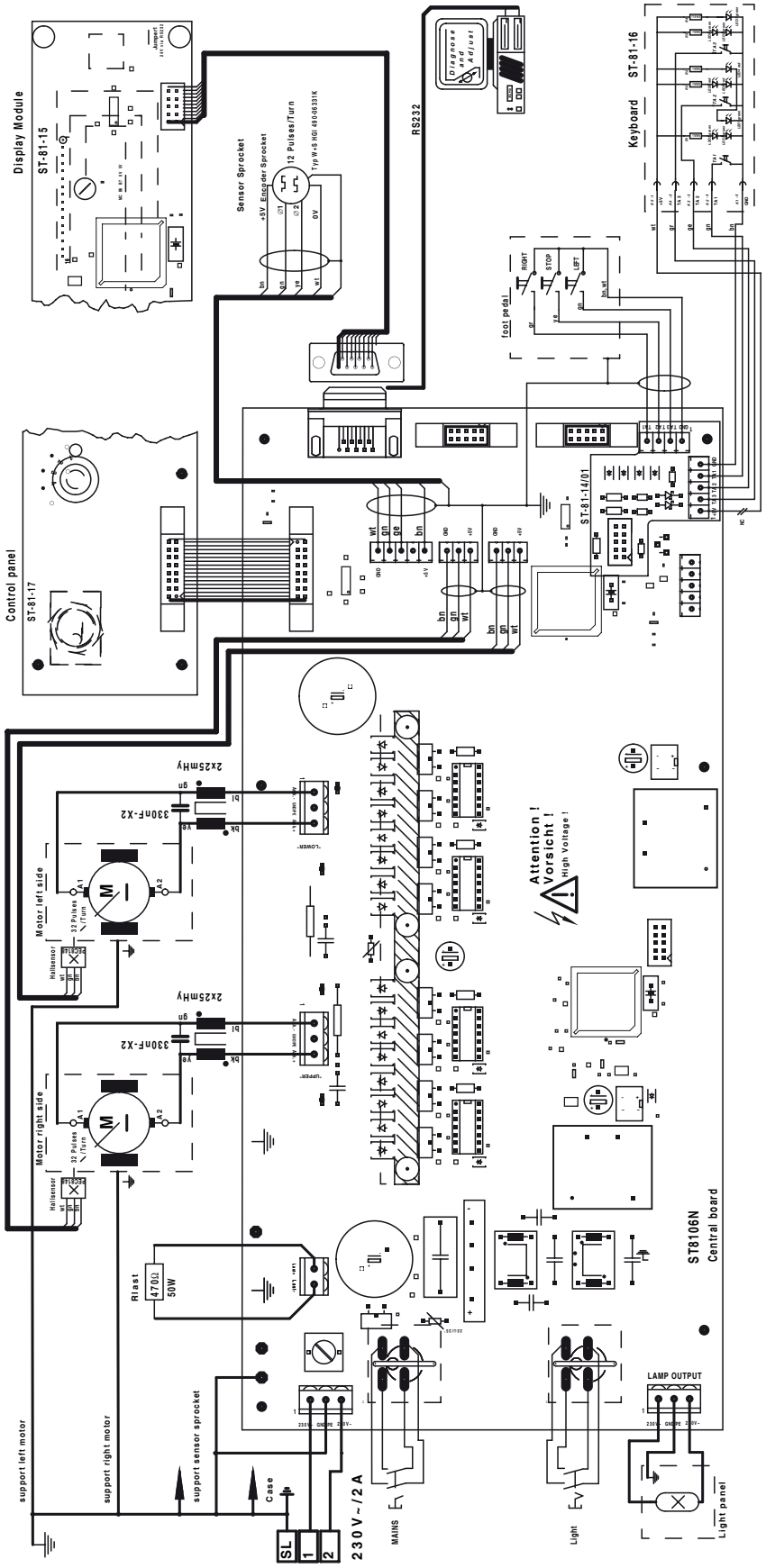


5.6 Circuit and Wiring Diagrams for UT 600 / UT 2000 / IT 600

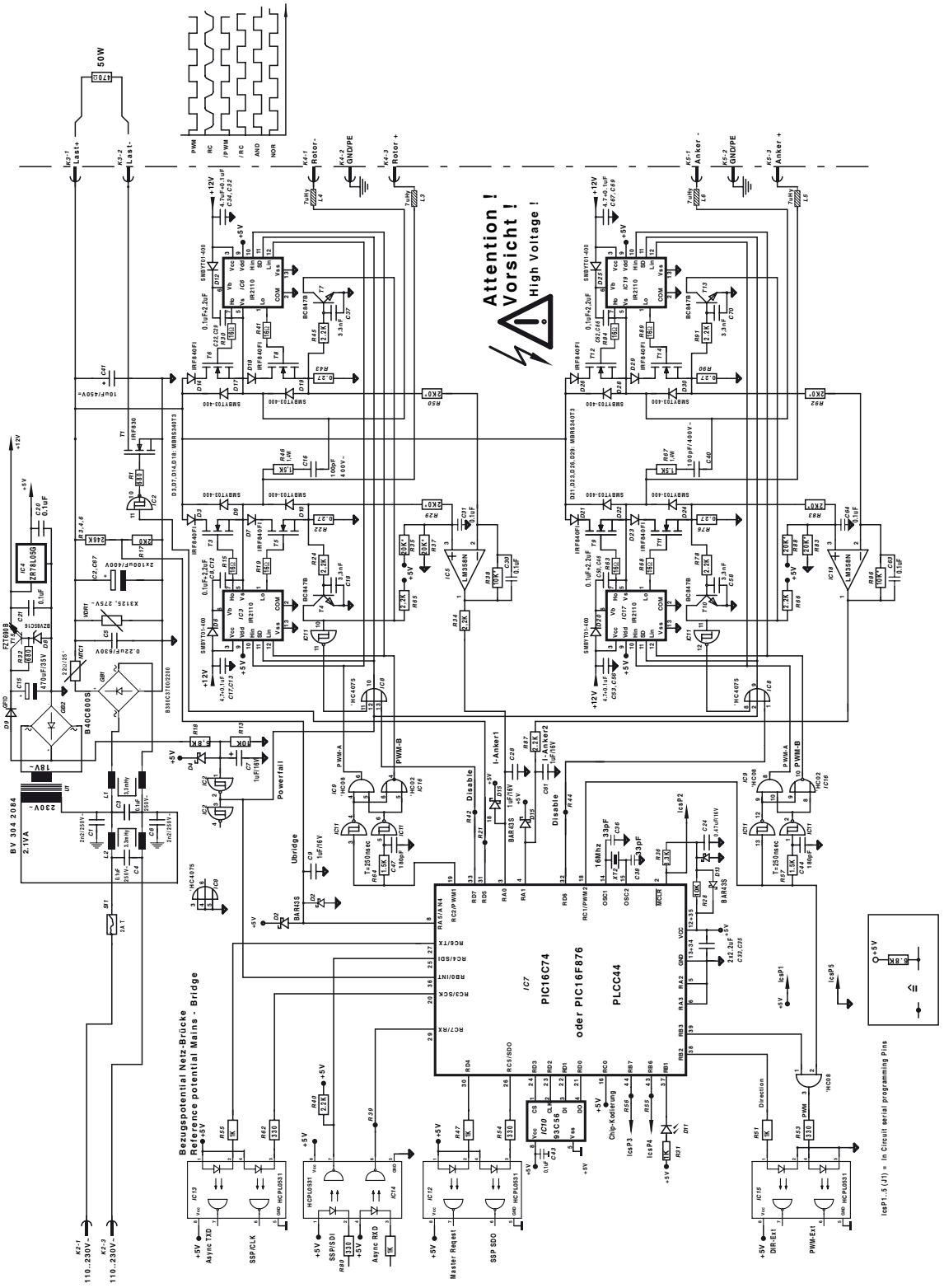
5.6.1 Control Board Connection (ST-8006N/04) for UT 600/2000



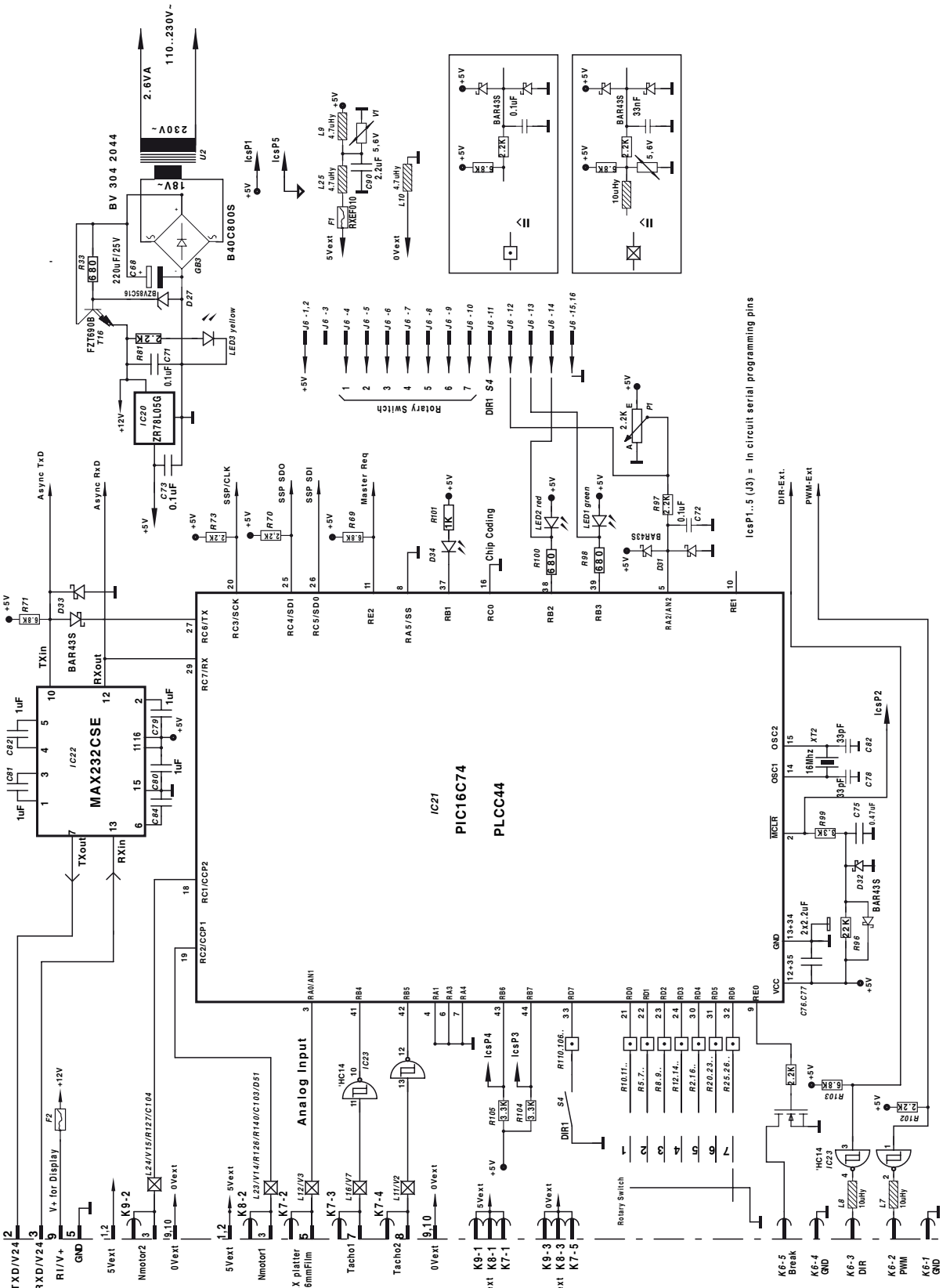
5.6.2 Control Board Connection (ST-8306NV) for IT 600



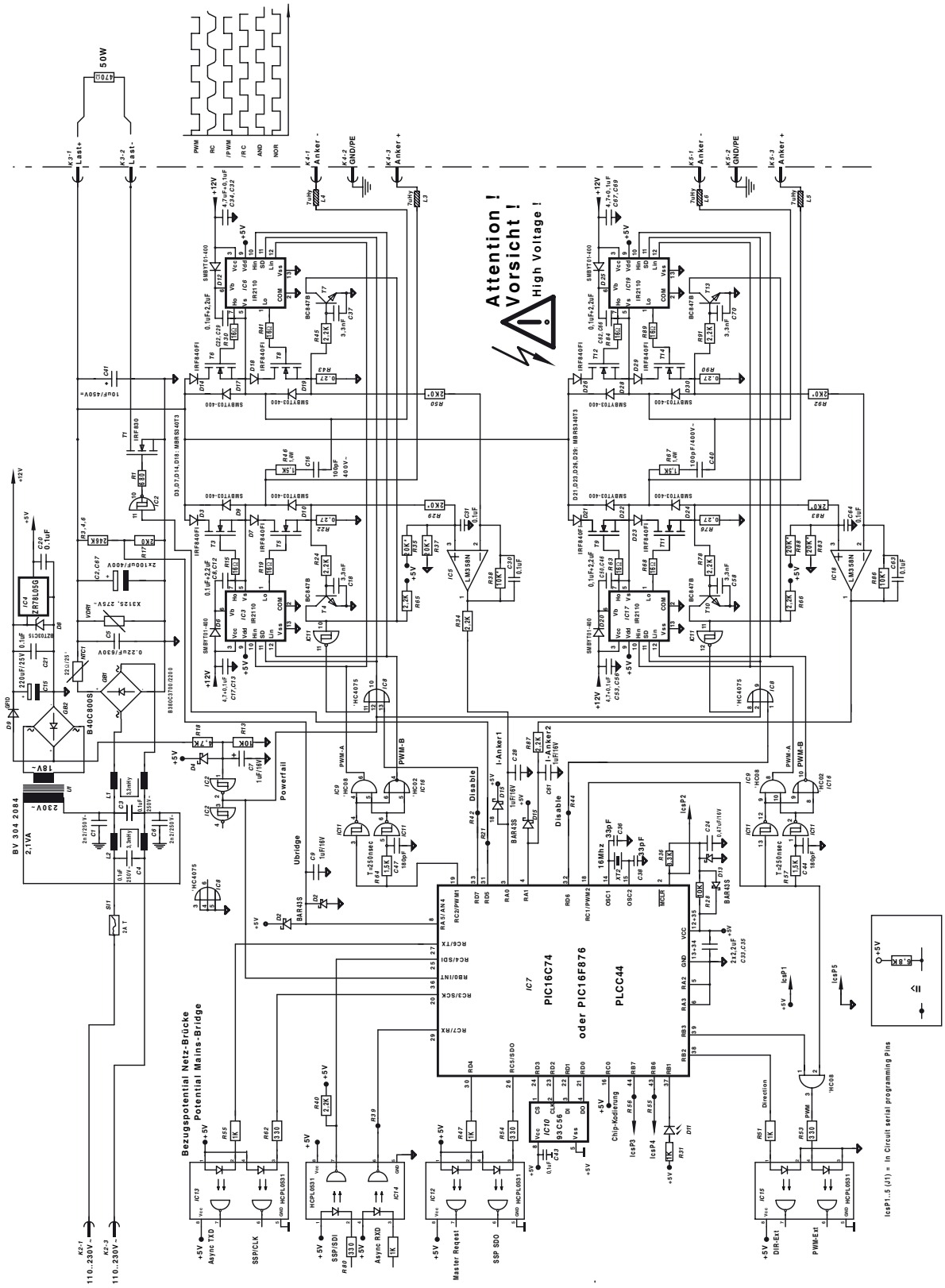
5.6.3 Control Board, Part A for UT 600/2000 and IT 600 (ST-8006N/04 A) (used from 2007 on for UT and IT)



5.6.4 Control Board, Part B for UT 600/2000 and IT 600 (ST-8006N/04 B) (used from 2007 on for UT and IT)



5.6.5 Control Board, Part A for UT 600/2000 (ST-8006A) (used up to 2007 only for UT)



5.6.6 Control Board, Part B for UT 600/2000 (ST-8006B) (used up to 2007 only for UT)