See the difference

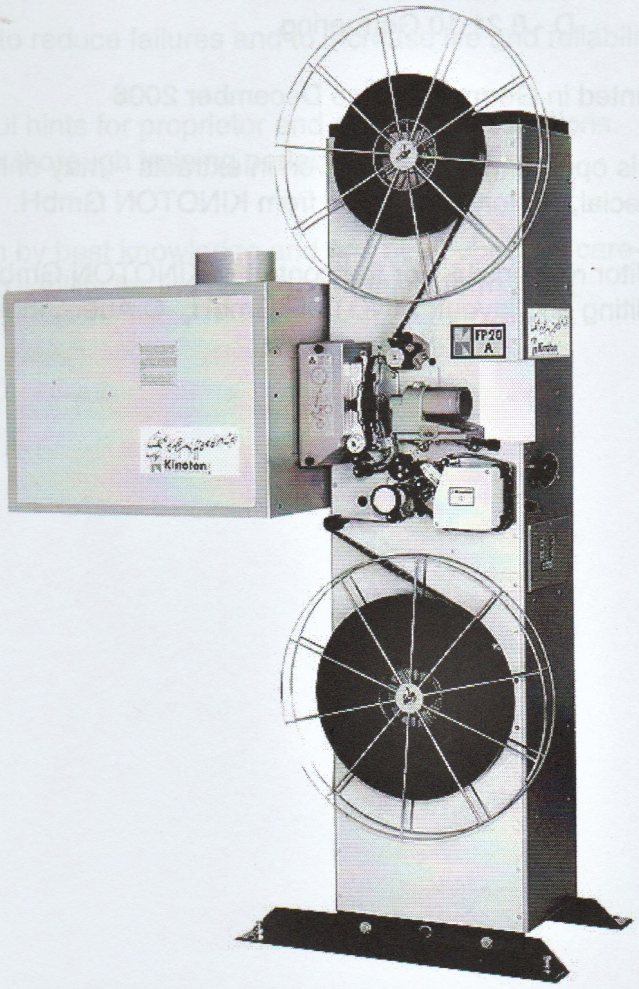
FP 20 A (en)

Kinoton GMBH

[redacted]

Kinoton GMBH

FP 20 A Projector



Operating Manual

FP 20 A (en)

CINEMA

STUDIO

LARGE FORMAT

SPECIAL VENUE

DIGITAL SYSTEMS

DISPLAY SYSTEMS

Changes / Additions / Notes

Issue of this manual: December 2006

Contents

1 Safety

1.1 Safety Notes

1.1.1 General Hints

- This operating manual is to be kept with the projector at all times.
- For safe and trouble free operation of the projector a good working knowledge of basic safety regulations and the projector's correct use is required.
- This operating manual contains the most important instructions for running the projector safely.
- This operating manual must be read and understood by all persons working with the projector, with particular emphasis on all aspects regarding safety.
- In addition, all valid regulations and measures concerning accident prevention must be observed.

1.1.2 Owner's Responsibilities

The owner is responsible to assure that all persons who work with and / or operate the projector:

- are familiar with safe operating practices and accident prevention techniques and have a complete working knowledge of the projector and all additional machines and components of the system
- have read and fully understand the safety chapter and the warnings within this operating manual.
- The owner must assure that safe working procedures are followed by personnel.

1.1.3 Personnel's Responsibilities

Those persons who work with the projector are responsible:

- to observe safe operating practices and accident prevention techniques
- to have read and fully understand the safety chapter and the warnings within this operating manual.

1.1.4 Dangers when Working with the Projector

Projectors are constructed according to the latest engineering and state-of-the art safety standards. The projector is only to be employed for its intended purpose and is only used when functioning absolutely perfectly.

Serious danger may result from improper use of the projector, causing injury to the user or a third person, or damage may be done to the projector or other items in the vicinity.

Faults that could adversely affect safety must be rectified immediately.

The projector must not be used until any faults are rectified.

1.1.5 Intended Purpose

The projector is only suitable to reproduce 35 mm film images and sound.

Any other or further use is not classified as an "intended purpose". KINOTON cannot be held liable for any damage resulting from different or extended operation.

As part of the "intended purpose" these tasks must be performed:

- observing all instructions and warnings contained in this manual
- inspecting the equipment for damage and correct function
- implementation of maintenance and repair work.

1.1.6 Guarantee and Liability

By reference KINOTON's "General Terms of Business" apply. They are available to the customer on conclusion of sale at the latest.

Guarantee and liability claims for damage to persons and property are invalid if due to one of the following causes:

- improper use of projector
- improper assembly, commissioning, operating and maintenance of projector
- operation the projector with defective and / or non-functioning safety and protection devices
- non-observance of instructions in the manual regarding transportation, storage, assembly, commissioning, operation and maintenance
- modification of the projector without written authorisation from the manufacturer
- connecting to power other than as specified
- failure to monitor and/or replace parts subject to wear and tear
- improper repairs
- emergencies due to influence from outside bodies or force majeure.

1.2 Important Safety Instructions for US Customers

When using your motion picture equipment, basic safety precautions should always be followed, including the following:

- Read and understand all instructions before using.
- Care must be taken as burns can occur from touching hot parts.
- The equipment's switch is provided with the symbols 0 indicating off and I indicating on.
- Do not operate equipment with damaged wiring or if the appliance has been damaged until it has been examined by qualified service personnel.
- Position any cord so that it will not be tripped over, pulled, or contact hot surfaces.
- If an extension cord is necessary, a cord with a current rating at least equal to that of the appliance should be used. Cords rated for less amperage than the appliance may overheat.

- Always disconnect appliance from electrical supply before cleaning and servicing.
- To reduce the risk of electric shock, do not disassemble this equipment, but call in qualified personnel when service or repair work is required. Incorrect reassembly can cause electric shock when the appliance is used subsequently.
- The use of an accessory attachment not recommended by the manufacturer may cause a risk of fire, electric shock, or injury to persons.
- Connect this appliance to a grounded circuit.
- Disconnect this unit from its source of supply before replacing the projection lamp.
- This appliance may have a polarized plug (one blade is wider than the other). To reduce the risk of electric shock, this plug is intended to fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician. Do not modify the plug in any way.

SAVE THESE INSTRUCTIONS

1.3 Explanations of Symbols and Notes

DANGER

This symbol indicates an imminent threat of danger to life and personal health. Disregarding this warning can result in serious personal injuries or highly dangerous injuries.

ATTENTION

This symbol indicates a possibly dangerous situation. Disregarding this warning can result in small personal injuries or damage to projector

▶ **NOTE**

This symbol indicates where notes, user tips and useful information can be found. They serve to help use the projector to its fullest.

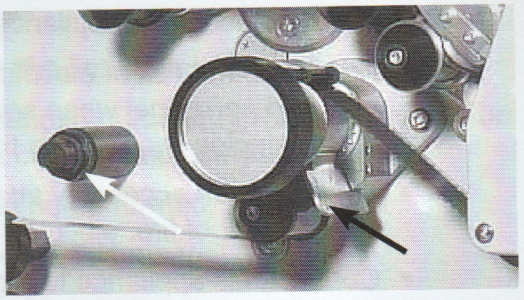
1.4 Protective Devices

All existing safety devices must be checked regularly

1.4.1 Main Switch

In case of an emergency, you can switch-off projector witch main switch (on the frontal bottom of the projector housing). Switch-off - the red button lamp gets off.

1.4.2 IR Reflex Film Break Sensor (option)



The film break sensor (white arrow) will switch-off projector when no film is passing the sensor (e. g. a film break has happened). In this case the projector will be stopped.

1.4.3 Film Stripper

The film stripper (black arrow) prevents that film does not wind around sprocket after a film break or loss of tape fixing.

▶ **NOTE**

Film strippers are with all sprockets.

1.5 Special Hazard Points

Mechanical danger - pressure:

- when threading films
- when putting on the film reels

ATTENTION

Do not put your fingers between the film track and film pressure skate or between sprockets and pad shoes.

Mechanical danger - entanglement:

- when operating the projector
- when threading the film

DANGER

Do not work around the machine with long loose hair, or loose clothing such as scarves or ties, they may get trapped in the drive mechanism and pull you in.

Mechanical danger - cutting:

- when operating the projector with no aperture or the shutter housing off.

DANGER

Only open shutter housing when projector is standing still with power disconnected. If projector is running with covers open be careful and do not touch the rotating shutter or other moving parts. Serious cuts can result.

Danger on lamphouse, because of electrical shock and burn:
- when switching on the rectifier directly

DANGER

▲The rectifier must be exclusively enabled from projector only.

▲The 4060 DC ignition unit is directly supplied via the rectifier. Therefore the lamp can be ignited by switching on the rectifier itself. Igniting the lamp by switching on the rectifier at open lamphouse can cause serious injuries and damages to the lamphouse and projector.

▲If not already done the rectifier's ON/OFF switch must be disabled.

▲The safety devices in the lamphouse (door switches and air flow switch) must not be deactivated. Safe service work on open lamphouse is possible with functional safety devices only, because rectifier and mains power will be switched off.

DANGER OF EXPLOSION

▲Only work on open lamphouse and with destruction of xenon bulb with face protection (shield), neck protection and safety gloves which reach to the elbow.

▲If the xenon lamp explodes you can suffer hurts in face, eyes and artery. In cold condition the xenon lamp has an inner pressure of about 8 to 10 bar and in hot condition of about 30 bar.

▲Dispose xenon bulb: Before removing xenon lamp put protective cover around it, pack xenon bulb in original package and give it back to your supplier.

Danger because of formation of ozone:
- when operating the xenon lamp

DANGER

Operate projector in a well ventilated room only. Better method: Connect an outgoing air pipe with exhaust fan at the top of the projector and lead it to the outside of the building.

Danger because of ultraviolet radiation:
- when operating the xenon lamp at open lamphouse

Danger because of high voltage:
- when igniting the xenon lamp

DANGER

Ignite xenon lamp in closed lamphouse only.

Mechanical danger because of errors or malfunctions:

- unexpected projector movement
- film break sensor malfunction
- drive system malfunction
- touching film in motion
- igniting the lamp by switching on the rectifier

DANGER

▲Regularly check film break sensors for proper operation.

▲Never touch film during operation.

▲Make sure that nobody starts the projector while anyone is working on it.

▲Make sure that power is disconnected while anyone is working on projector.

▲Never ignite the xenon lamp by switching on the rectifier.

1.5.1 Electric Power Hazards

DANGER

▲Work on the electrical supply conductors or circuits must only be done by competent electricians.

▲The projector's electrical parts and connections must be checked regularly. Any loose connections must be tightened immediately.

▲The rear cover must always be kept closed. Only authorized staff may access the rear area. Hazardous voltage and moving parts are in this area.

▲When working on electrical parts, switch off the main switch and disconnect power.

1.5.2 Modification of Projector Construction

No alterations, additions or modifications may be made to a projector without written consent of KINOTON. This includes welding of load bearing parts.

Only use original spare and wear parts. Parts obtained from third party manufacturers cannot guarantee strength and safety standards.

1.5.3 Cleaning and Disposal

Substances and materials used for cleaning and lubrication must be handled and disposed of correctly, especially:

- when cleaning with solvents
- when lubricating the projector

1.5.4 Copyright

2 Transportation and Installation / Mounting

2.1 Transportation

Delivery by a forwarding agent, train, ship or aircraft

- Projector is mounted (without lamp house and film reel) on a pallet and fixed with screws.
- With delivery to countries over-sea the projector on pallet is packed in a wooden crate.
- The accessories are packed into a box or into the wooden crate too.
- Weight (gross): about 160 kg

Storage

If projector is stored for a longer time:

- Only store in dry rooms.
- Choose a suitable protective coating or leave projector in the original coating.

▶ **NOTE**

Although most parts are delivered with a protective cover, you have to clean the projector and its components before the first start.

2.2 Delivery or Equipment Variations

- Projector FP 20 A
- Lamphouse
  - up to 2000 W
  - up to 7000 W
- Reverse-scan sound device
  - only analog, not upgradeable to Dolby Digital
  - optical stereo analog, upgradeable to Dolby Digital
  - optical stereo analog and Dolby Digital (option)
- Lens holder
  - electronic focusing control (option)
- Lens turret (option)
  - 2 lenses and manual lens change
  - 2 lenses and automatic lens and aperture change
    - electronic focusing control (option)
  - 3 lenses and manual lens change
  - 3 lenses automatic lens and aperture change
    - electronic focusing control (option)
- Film gate cooling unit (option)
- Water cooling system (from 4000 W lamp capacity on)

- Roller set for using with a rewind system (option)
- Pedestals
- Film cleaner (option)
- rectifier (option)
- Operating manuals

▶ **NOTE**

For further information about accessories please contact your local dealer or look to our website: www.kinoton.com.

2.3 Installation

ATTENTION

△ The projector will be delivered completely wired and factory tested.

△ Only use suitable hoisting machines (crane, fork-lift).

△ Do not use unit parts as climbing aid.

△ Electrical connections have to be in accordance with local regulations and be installed professionally.

△ The whole installation should be carried out from service technicians only.

2.3.1 Place of Installation, Place of Operation

The place on which unit will be installed must be even, solid and clean.

Figure 1 shows the projector's dimensions and figure 2 the recommended installation order.

2.3.2 Unpacking and Installation

- Remove lid from wooden crate.
- Remove wooden braces and screws from crate.
- Carefully lift projector head from crate. Do not lift by controls or delicate parts.
- Place projector on its pedestals to the place of installation.
- Line up projector. The pedestals are adjustable and have a variable projection angle of ±5°. If you have a projection angle of more than ±5° you need the additional pedestals (up to ±10°).

Figure 1: Projector Dimensions

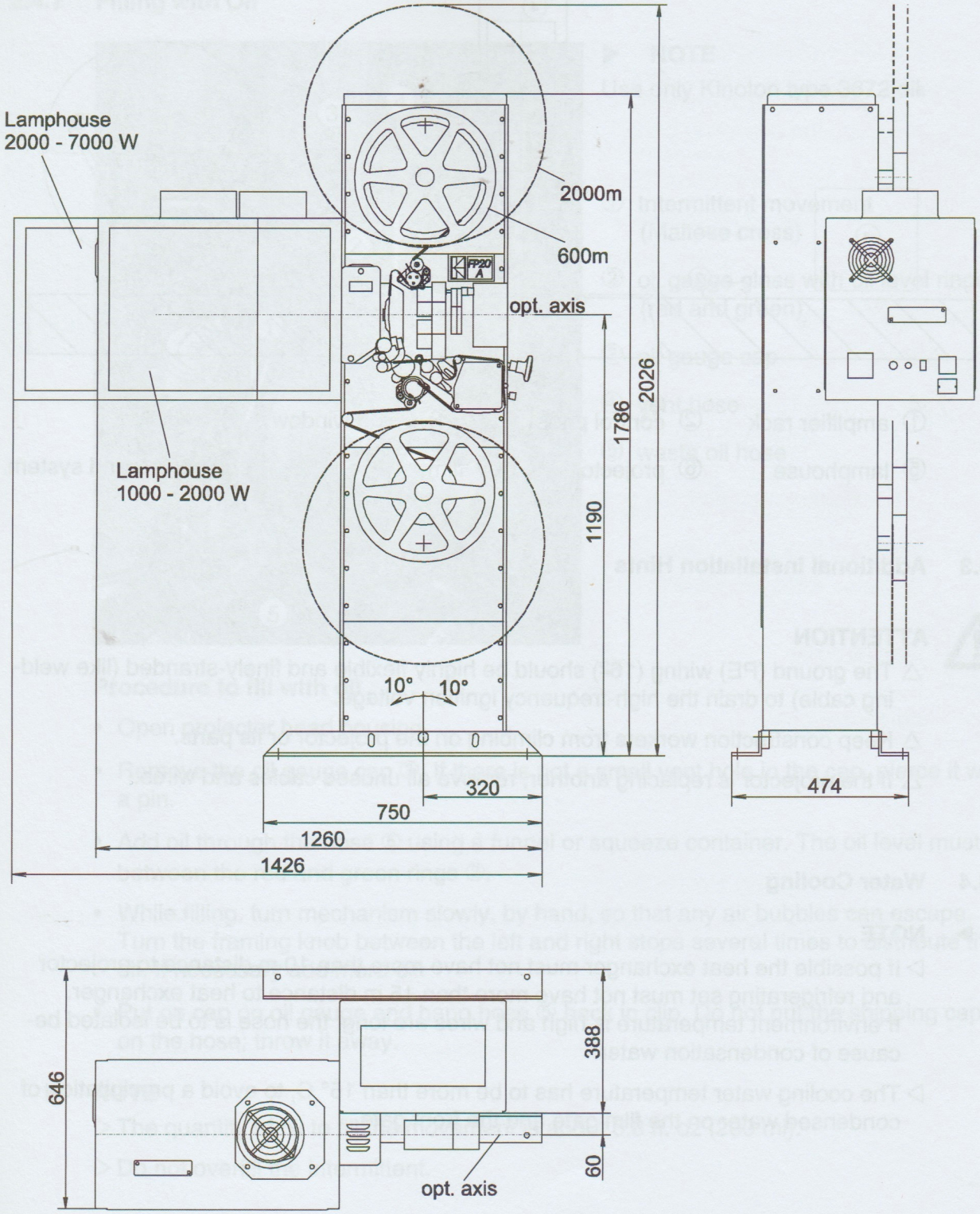
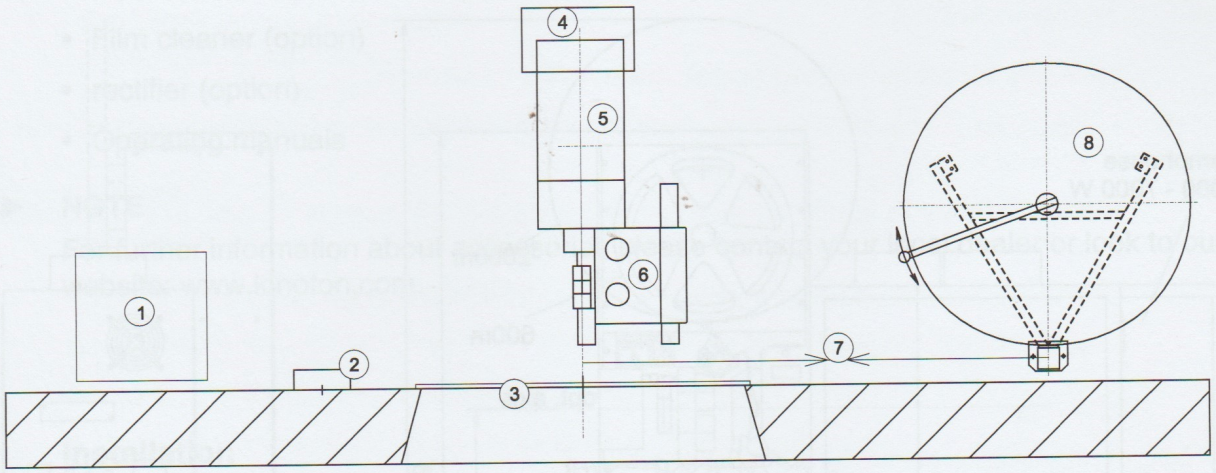


Figure 2: Installation Order



① amplifier rack ② control panel ③ projection window ④ rectifier

⑤ lamphouse ⑥ projector ⑦ film run ⑧ non-rewind system

2.3.3 Additional Installation Hints

ATTENTION

△ The ground (PE) wiring (16^2) should be highly flexible and finely-stranded (like welding cable) to drain the high-frequency ignition voltage.

△ Keep construction workers from climbing on the projector or its parts.

△ If the projector is replacing another, remove all unused cables and wires.

2.3.4 Water Cooling

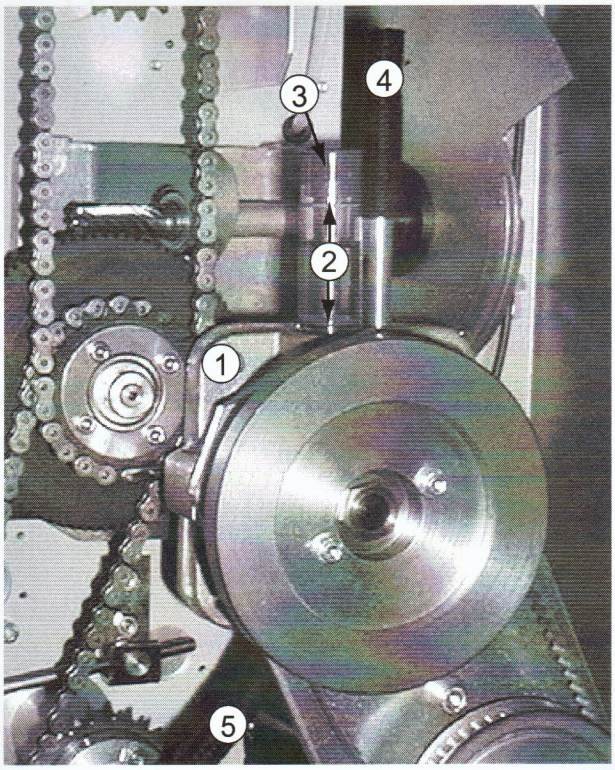
▶ **NOTE**

▷ If possible the heat exchanger must not have more than 10 m distance to projector and refrigerating set must not have more than 15 m distance to heat exchanger. If environment temperature is high and wires are long, the hose is to be isolated because of condensation water.

▷ The cooling water temperature has to be more than 15° C, to avoid a precipitation of condensed water on the film gate and the front gate.

2.4 Mounting

2.4.1 Filling with Oil



▶ **NOTE**

Use only Kinoton type 3672 oil.

① Intermittent movement (Maltese cross)

② oil gauge glass with oil level rings (red and green)

③ oil gauge cap

④ vent hose

⑤ waste oil hose

Procedure to fill with oil

- Open projector head housing.
- Remove the oil gauge cap ③. If there is not a small vent hole in the cap, pierce it with a pin.
- Add oil through the hose ⑤ using a funnel or squeeze container. The oil level must be between the red and green rings ②.
- While filling, turn mechanism slowly, by hand, so that any air bubbles can escape. Turn the framing knob between the left and right stops several times to distribute the oil. If necessary add more oil.
- Put on cap on oil gauge and hang hose ⑤ back in clip. Do not put the shipping cap on the hose; throw it away.

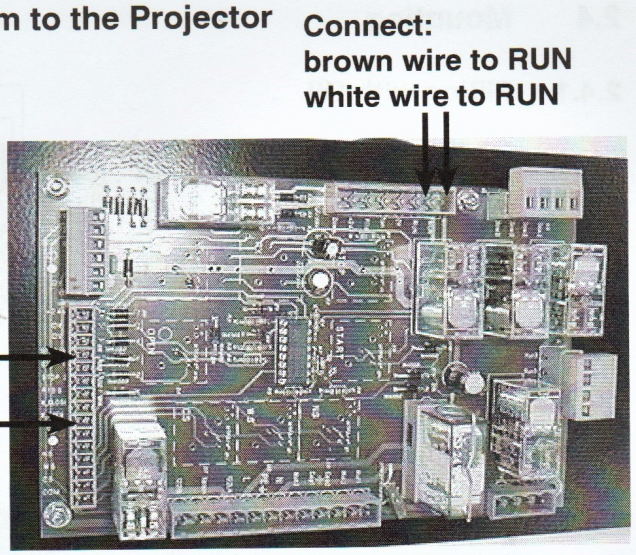
▶ **NOTE**

▷ The quantity of oil to fill the movement is about 6.8 fl. oz (200 ml).

▷ Do not overfill the intermittent.

2.5 Connecting the Non-Rewind System to the Projector

- Connect the 4-pole cable from non-rewind system to the FPA-81-01 main board in projector which is behind the operating panel.



- ☛ The installation of the non-rewind system is described in "ST 200 E / MT 600/2000" or FT 3 M operating manual.
- ☛ The roller set for the film run between the projector and the non-rewind system should not be mounted until the projector has its final position to the screen.

▶ **NOTE**
See also wiring scheme in chapter 8.4.1.

ATTENTION
Installing the non-rewind system's connection should be carried out from service personnel only.

2.6 Connecting the Projector

The projector should be connected to mains via the 3-pole cable, which is stored in the projector.

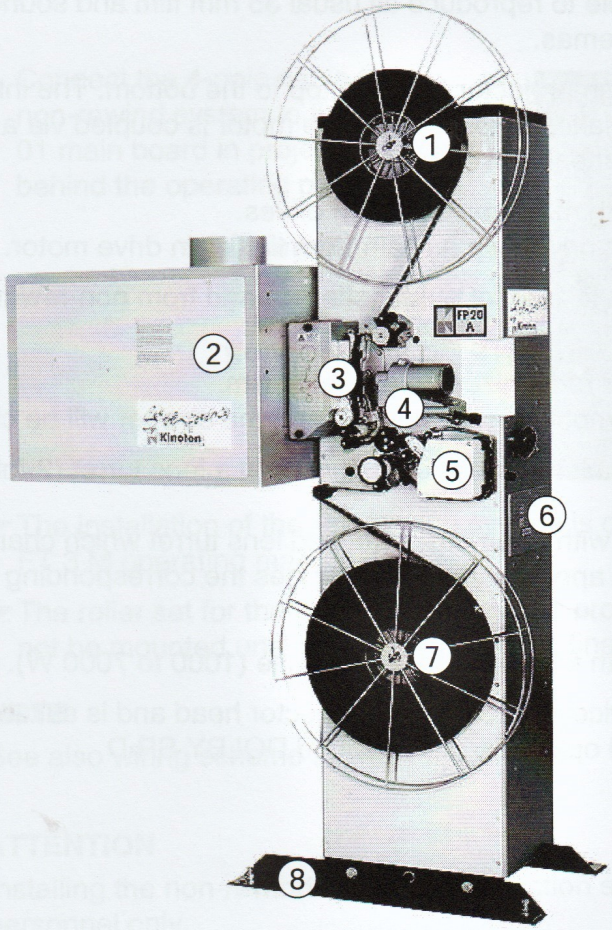
ATTENTION
The mains connection must be done by electricians or service personnel only.

3 Function and Components

The FP 20 A projector is suitable to reproduce all usual 35 mm film and sound formats in small, medium and large cinemas.

- The film is transported through projector from the top to the bottom. The intermittent sprocket is driven from the Maltese cross. The drive motor is coupled via a synchronous drive unit on the intermittent movement.
- The projector is equipped with mechanical friction drives.
  - The lower take-up friction is driven via a chain from the main drive motor.
- The film can also be guided via a set of guide rollers to and from non-rewind system.
- An optional film break sensor recognizes an available film.
  At a film break the projector motor will be stopped and the dowser will be closed.
- The lenses can be stored in a lens holder or optionally in a lens turret (2-folded or 3-folded).
  - If the projector is equipped with a remote controlled lens turret which changes the lenses electronically an aperture changer changes the corresponding aperture automatically.
- The projector is equipped with the universal lamphouse (1000 to 7000 W).
- The reverse-scan sound device is mounted on projector head and is suitable to reproduce analog sound and optionally digital sound DOLBY SR·D.

3.1 Components Overview



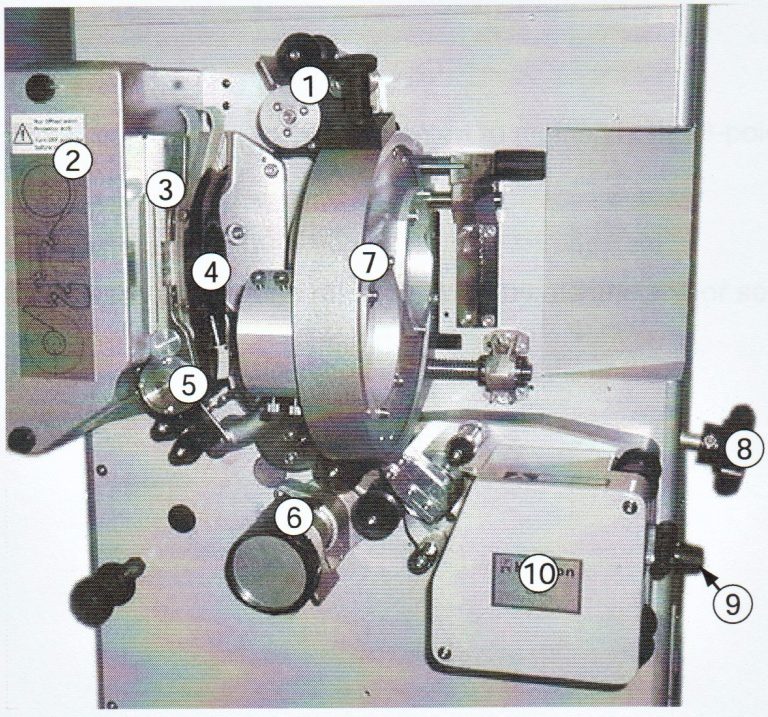
① take-off friction with film spool
② lamphouse
③ shutter housing and film gate
④ lens holder
⑤ reverse-scan sound device
⑥ operating panel
⑦ take-up friction with film spool
⑧ pedestals (adjustable)

3.1.1 Housing

Projection equipment, sound devices, frictions or/and set of guide rollers are mounted on the housing.

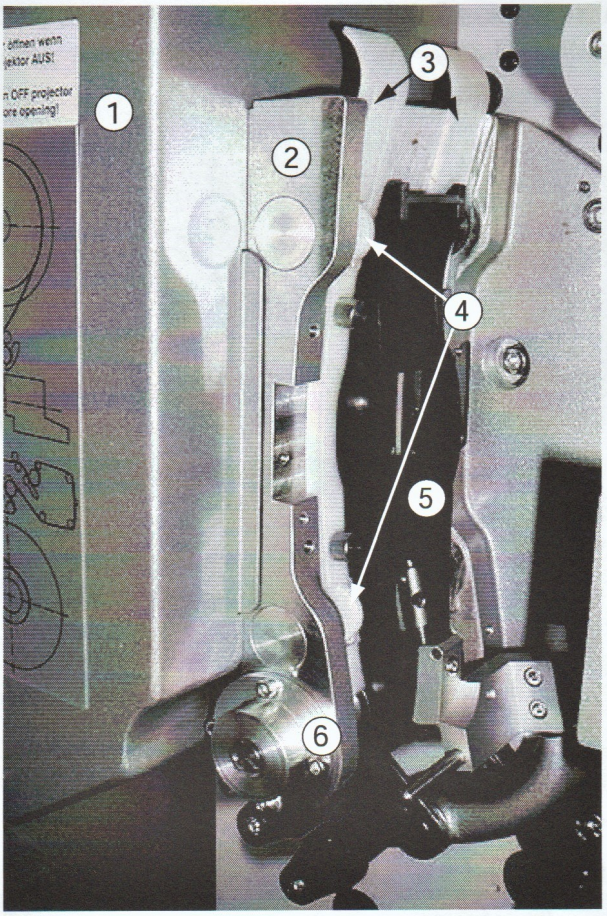
Drives, motors and the whole electrical equipment are mounted in projector housing.

3.1.2 Projection Components



① feed sprocket
② shutter housing
③ film gate
④ film pressure skate
⑤ intermittent sprocket
⑥ bottom / holdback sprocket
⑦ lens turret (option)
⑧ framing knob
⑨ skate pressure adjusting knob
⑩ reverse-scan sound device

3.2 Film Gate and Film Track



In the film gate the film is precisely positioned. With the film pressure skate adjustments you can optimize picture steadiness.
After threading the film, close the film track with the film pressure skate.
The four ceramic rollers guide the film laterally.

① shutter housing

② film gate

③ film runner strips (2)

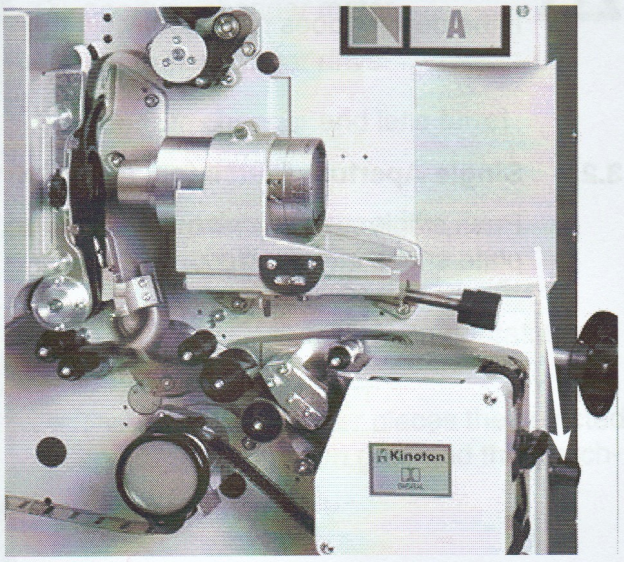
④ ceramics roller (4)

⑤ film pressure skate

⑥ intermittent sprocket

3.2.1 Film Pressure Skate

- Adjust skate pressure by turning the adjusting knob (arrow) such that the skate tension scale moves in the negative direction until the picture begins shaking on screen.
- Increase the skate pressure just until the picture is steady.



▶ **NOTE**

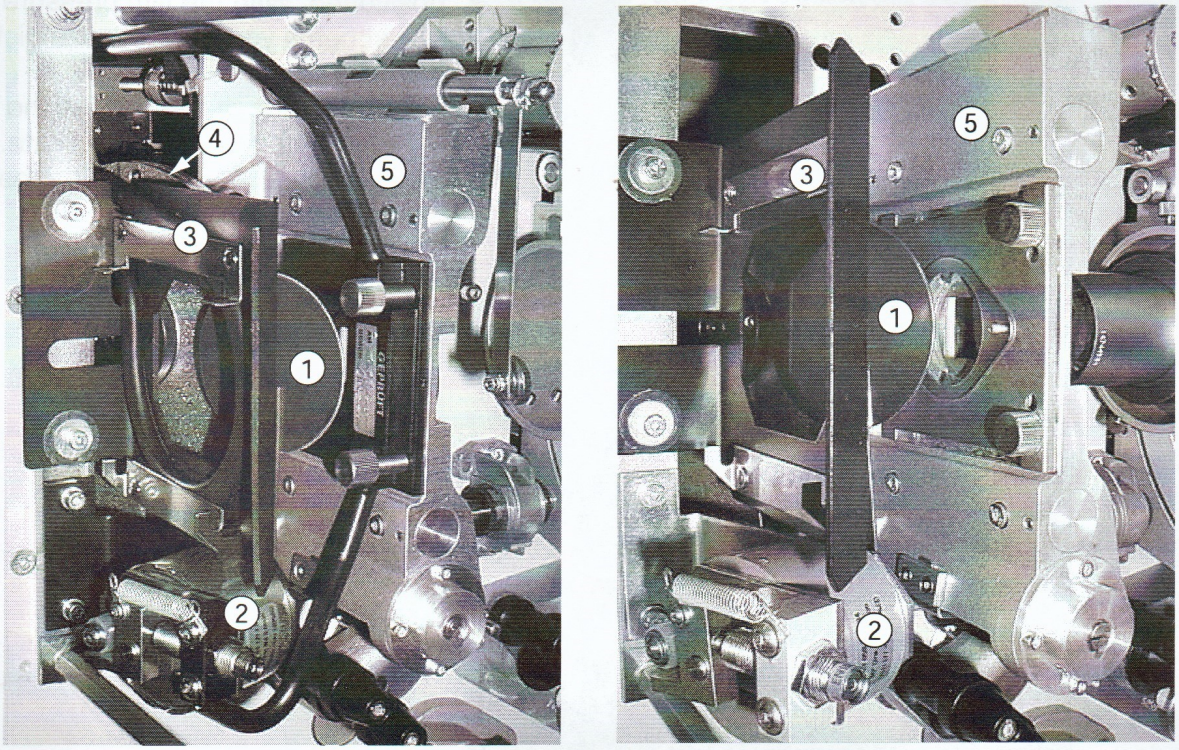
▷ Only tighten the film pressure skate as much as is absolutely necessary!

▷ Pressure too low:
Picture shakes on projecting screen.

▷ Pressure too high: Sprocket teeth, film perforations, film pressure skate and runner strips will wear excessively and film emulsion will be left in gate.

3.2.2 The Dowser

The dowser opens or closes the path of xenon light to the film gate.



① dowser ② dowser rotation solenoid ③ light baffle

④ rotary shutter ⑤ film gate with water cooling unit or fire protection plate

ATTENTION

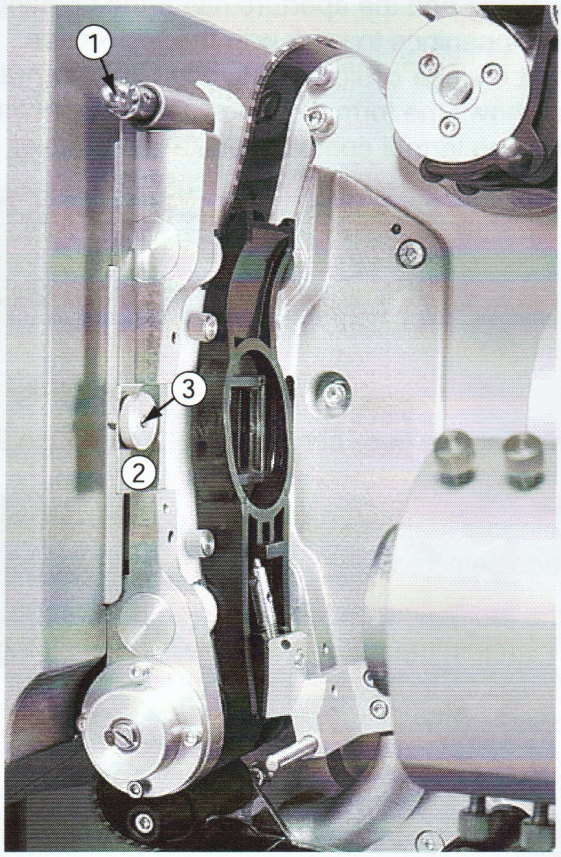
If the dowser does not close while the projector is stopped the film will burn.

3.2.3 Single Aperture Plates (only with lens holder or manual lens turret)

Push single aperture plate into the film gate until the stop is reached and the aperture plate snaps into position.

3.2.4 Aperture Changer (option, only with electronic lens turret)

The aperture changer is suitable for automatically changing the aperture when the corresponding format key is pressed. Simultaneously the lens will be changed too.



① aperture changer

② aperture

③ drive pin (with knurled nut installed)

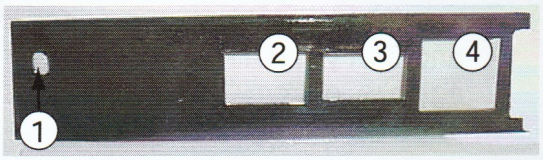
- Push the aperture into the film gate and place the aperture changer drive pin into the hole on the aperture. Tighten the knurled nut on the drive pin.

① hole for drive pin

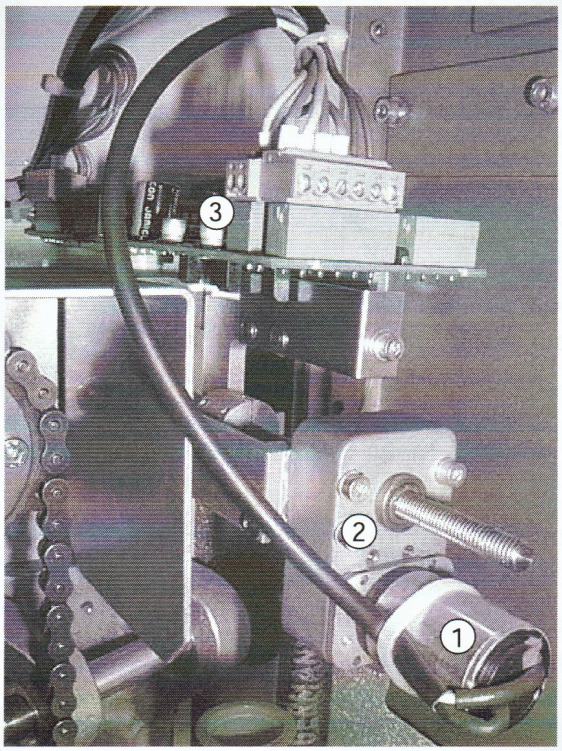
② 1:1.66 aperture

③ 1:1.85 aperture

④ 1:2.39 aperture



3.2.4.1 Drive and Control



① aperture changer motor

② aperture changer drive

③ aperture changer and lens turret control board

3.2.4.2 Format Change with Three Lens Turret

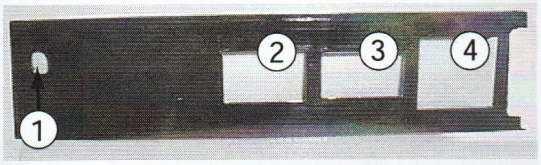
- Push **C**, **W** or **N** on operating panel.

➧ The aperture changer places the selected aperture into the film gate and the matching lens in position.

3.2.4.3 Format Change with Two Lens Turret

- Push **C** or **W**.

☛ If the lens turret is equipped with two lenses and the aperture has three openings you can select any two of the three aperture openings to work with the two lenses. For example for some shows the format change could be between CS (Cinema-Scope) and WS (1:1.85) and for other shows the format change could be between WS (1:1.85) and NS (1:1.33). The following format combinations are available:
- format combination ② and ③ or
- format combination ③ and ④ or
- format combination ② and ④



3.2.4.4 Changing the Format Combination

- The "select" function is activated by holding the **Select** control closed more than 2 seconds.

☛ The turret will not rotate. The turret solenoid makes a clattering sound which means that a new format combination has been selected.

☛ The format combination changes to the next combination, e. g. from ② and ③ to ③ and ④. If you activate the "Select" input again the format combination will change again, e. g. from ③ and ④ to ② and ④ and so forth. After activating the "Select" input three times, the combinations will repeat.

- Check your selection and push WS (flat) or CS (scope) button.

☛ The turret turns itself and the aperture changes depending on your selection.

▶ **NOTE**

- Check your selection and push **C** or **W**.

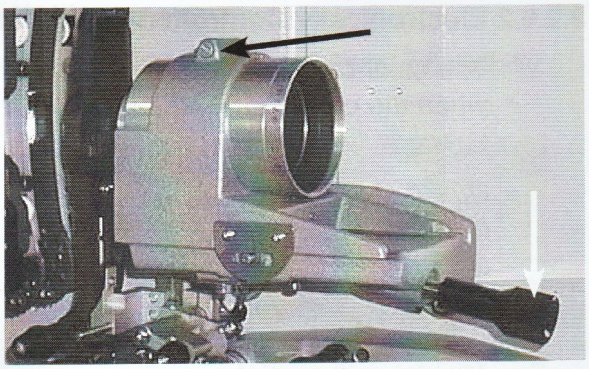
☛ The turret turns itself and the aperture changes depending on your selection.

☛ After pushing button three times, the combinations will repeat.

Hint: Make a note which tells you which aperture combination has to be chosen after how many times of pushing **Select**.

- Changing the aperture the lens is changed too, see also lens turret, chapter 3.2.6.2.
- If the projector has an aperture changer you should not push in single aperture plates because there is no stop and lock device for them.

3.2.5 Lens Holder



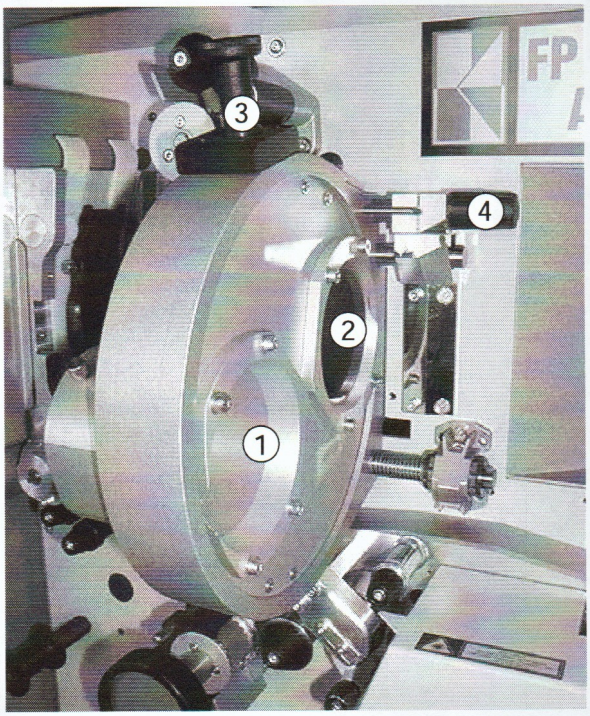
- Loosen clamping screw (black arrow) for inserting a lens and then tighten the screw again.
- For focusing turn focusing adjusting knob (white arrow).

▶ **NOTE**

Adjusting the lens holder, see chapter 6.4.6.

3.2.6 Lens Turret (option)

3.2.6.1 Manual Lens Change



① lens tube

② lens in lens tube

③ handle (arresting pin)

④ focusing knob (manual)

- Loosen knurled screws.
- Push lenses into the lens tubes. The tubes are labelled CS (1:2.40), WS (1:1.85) or NS (1:1.33).
- Precisely focus each lens in its tube without adjusting the focus knob.
- Fasten them with the knurled screws.
- To rotate a lens into position, pull out the handle and turn the lens turret to the desired position. Let handle drop – lens turret is positioned.

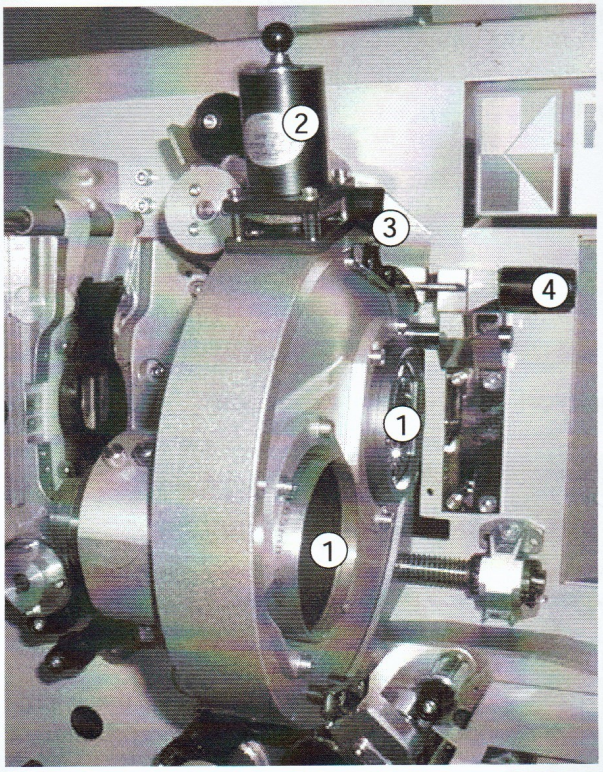
▶ **NOTE**

▷ Some lenses may require rings to support the rear section; these are available from Kinoton.

▷ It is possible to set the handle so it remains up so that the turret can continuously rotate. This position is not used for normal operation.

3.2.6.2 Electronically Controlled Lens Change (option)

The electronically controlled lens turret is suitable for automatically changing the lens when the corresponding format key is pressed. Simultaneously the aperture will be changed too.



① lens tubes with lenses

② latching solenoid

③ sensor board (covered)

④ manual focusing

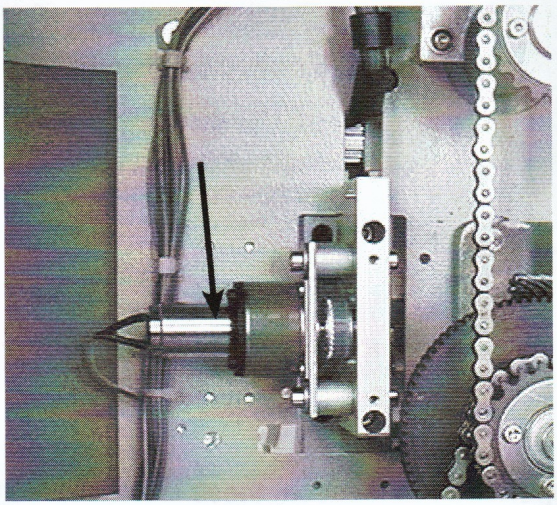
- To select a lens, push one of the format buttons.

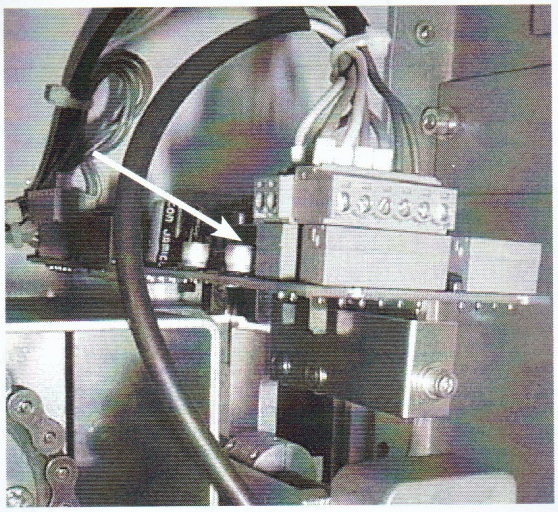
☛ The light barrier on sensor board senses the position of the corresponding code plate (one code plate for each lens).

☛ The lens turret will stop at that position and be magnetically latched.

Drive and Control

The lens turret/aperture changer control board (arrow, right figure) activates the turret motor (arrow, left figure), which changes the lens via a toothed belt.





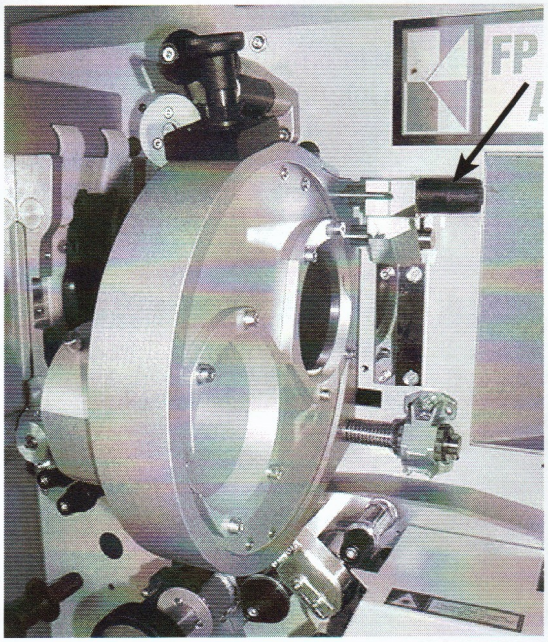
▶ **NOTE**

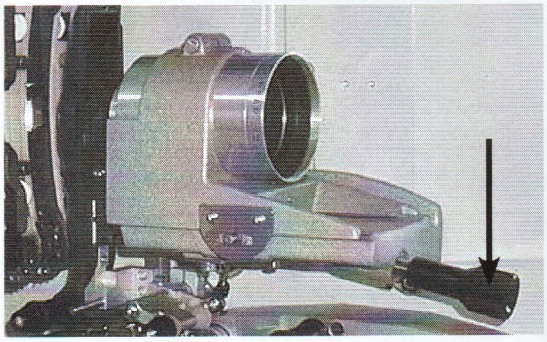
▷ When changing the lens the aperture is changed too (see also chapter 3.2.4).

▷ Initializing the EE-PROM should be only carried out by experts, see “Remotes” service manual.

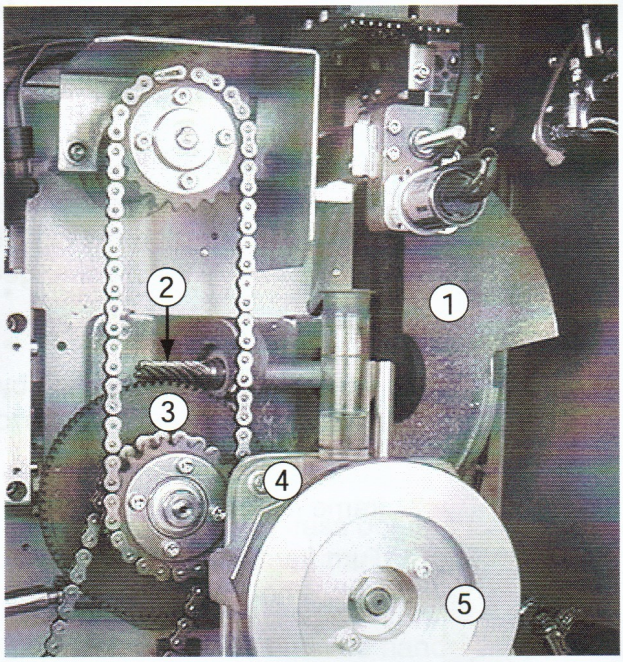
3.2.7 Manual Focusing with Lens Turret / Lens Holder

To adjust the focus you have to move the whole lens turret or lens holder horizontally. Therefore turn the focusing knob (arrows).





3.2.8 Rotating Shutter



① shutter (1-blade)

② shutter shaft

③ fibre gear and drive unit

④ Maltese cross

⑤ synchronous gear for intermittent / motor drive

The rotating shutter interrupts the projection light once during film transport and once during picture standstill. (48 interruptions a second at 24 pictures a second).

The shutter is mounted on a shaft which is driven from the intermittent movement via a fibre gear.

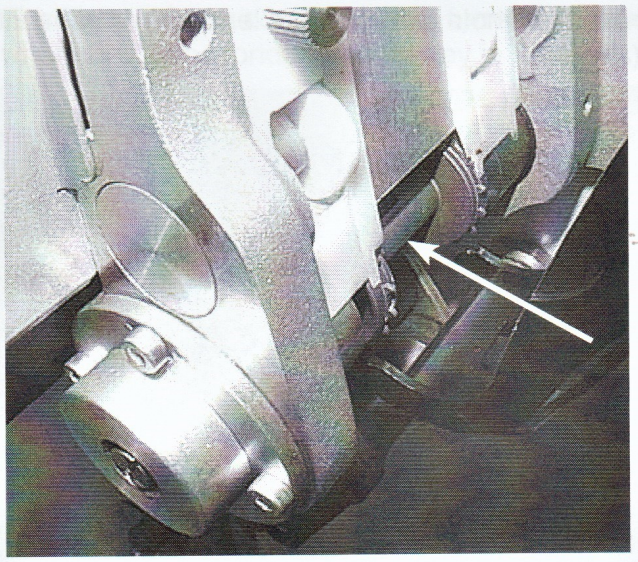
DANGER

Only remove or replace the shutter housing when projector is off.
If you have to work on the projector while it is running be very careful that you do not touch the rotating shutter. Serious cuts can result.

▶ **NOTE**

Adjusting the shutter timing should be carried out from service only.

3.2.9 Intermittent Sprocket



The intermittent sprocket (arrow) is a very precise sprocket. It transports the film step by step through the film gate.

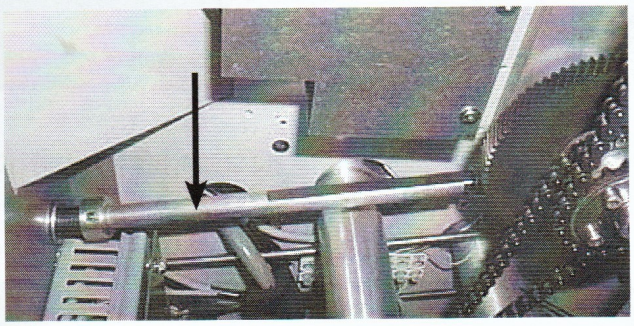
The intermittent sprocket is driven via the intermittent sprocket drive from the main drive motor.

▶ **NOTE**

The sprocket is factory-set.
All adjustment are to be carried out by experts only.

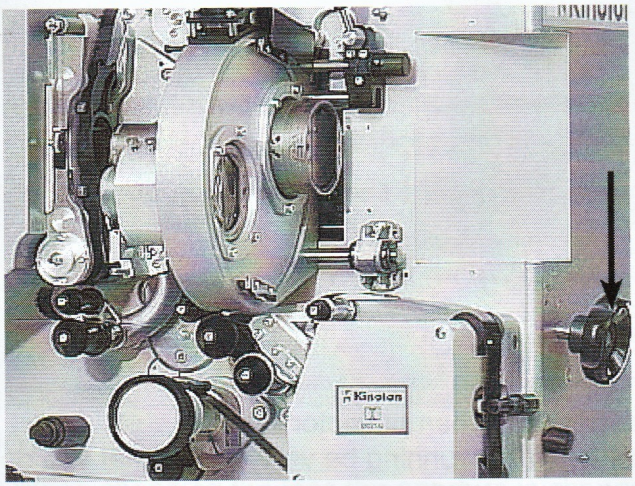
3.2.10 Framing (Manual)

There is an adjustment to move the frame up and down because the picture must be positioned correctly in the film gate. The framing control should be kept in mid-position to allow correction in either direction. There are white position reference dots on the knob and projector for your convenience. These may not align exactly.



The intermittent sprocket and Maltese cross shafts have opposing splines and are connected with a bushing.

When sliding the bushing the framing shaft (arrow) and therefore the sprocket will rotate relative to the Maltese cross. With this action the adjustment of the shutter will not be changed.

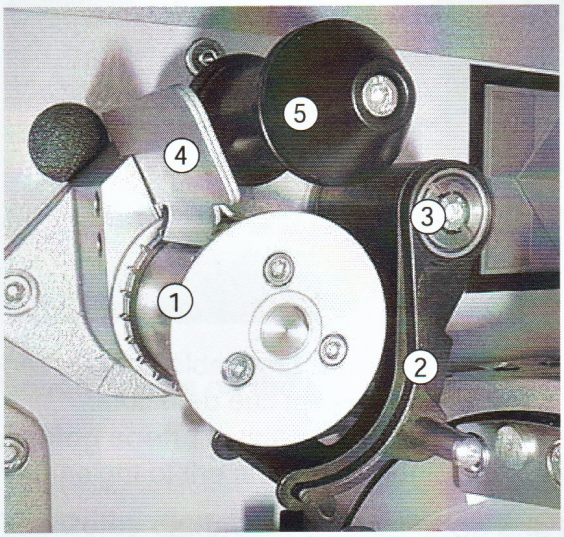


- Adjust the framing position by turning the framing knob (arrow).
- Turn framing knob right: frame moves upwards
- Turn framing knob left: frame moves downwards

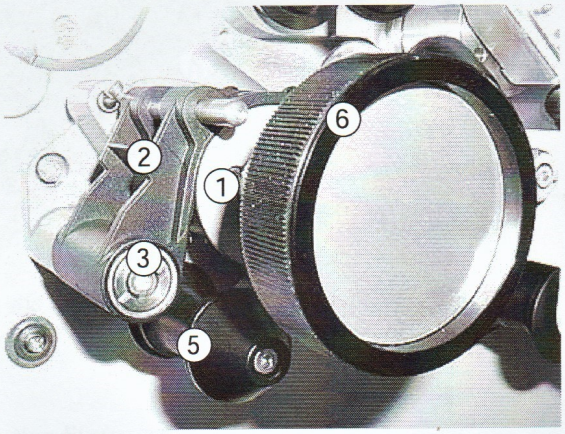
3.2.11 Constant Speed Sprockets

Sprockets are designed to transport the film continuously.
The teeth of the sprocket engage the perforations of the film.
Both sprockets provide for equal loops before and after the film gate.

Feed Sprocket



Bottom Sprocket



① feed sprocket / bottom or holdback sprocket
② pad shoe with handle
③ ring nut with spring
④ film stripper
⑤ guide roller
⑥ hand wheel

- The feed sprocket pulls the film from the take-off friction or platter to the film gate.
- The bottom sprocket pulls the film out of the sound head and feeds it to the take-up friction or platter.
- The pad shoe holds the film on the sprocket.
- The film stripper prevents broken film from being wound up around the sprocket.
- With the handle you can open the pad shoe to thread the film.

Operating a Pad Shoe Gently

The pad shoe has a brass bearing tube which pivots on the pad shoe shaft, and is positioned with a ring nut and a spring.

To avoid damaging the pad shoe and causing the brass tube to revolve within the pad shoe, the pad shoe must be handled gently. Follow these points:

- Do not slam the pad shoe closed.
- Only open the pad shoe as far as the stop pin. Do not open the pad shoe too far - over the stop pin - the spring will break and the brass tube will be damaged.

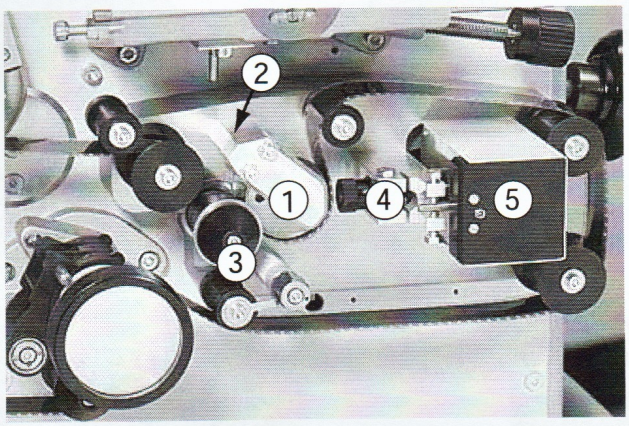
▶ **NOTE**

Changing a sprocket or pad shoe and adjusting the distance between pad shoe and sprocket, see chapter 6.4.6.

3.3 Reverse-Scan Sound Device

Reverse-scan sound devices scan the sound track (analog and optional DOLBY digital) on the film via red LEDs.

3.3.1 Analog Reverse-Scan Sound Device (non-upgradeable)



① LED holder with LED

② sound shaft / drum

③ sound pressure roller

④ analog sound optics

⑤ p. c board with solar cell

▶ **NOTE**

A non-upgradeable analog reader will not accept cue detectors.

3.3.2 Reverse-Scan Sound Device Analog and optional DOLBY Digital (upgradeable)

The Reverse-Scan Sound Device contains an analog sound reader and optionally a Dolby digital reader.

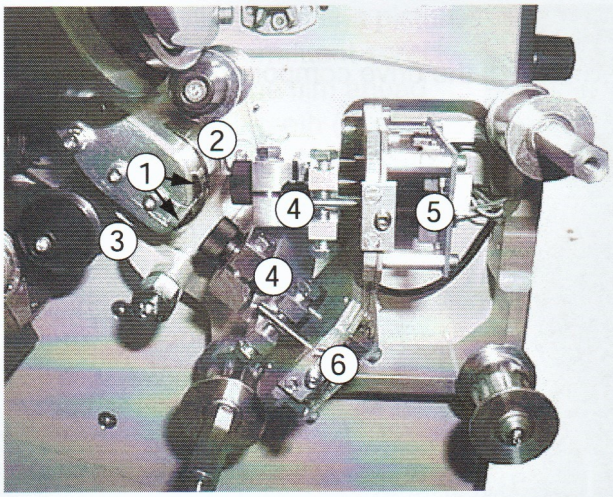
An only analog sound device is upgradeable with DOLBY digital.

▶ **NOTE**

The reverse scan sound head is delivered factory checked and adjusted.

Optional cue sensors for reading metal foil tapes can be mounted in the reverse scan sound device.

3.3.2.1 Components



① LED holder with optional second digital LED

② sound drum

③ sound pressure roller

④ analog (upper) and optional digital (lower) sound optics

⑤ p. c board with solar cell (analog)

⑥ p. c. board with CCD-unit (digital)

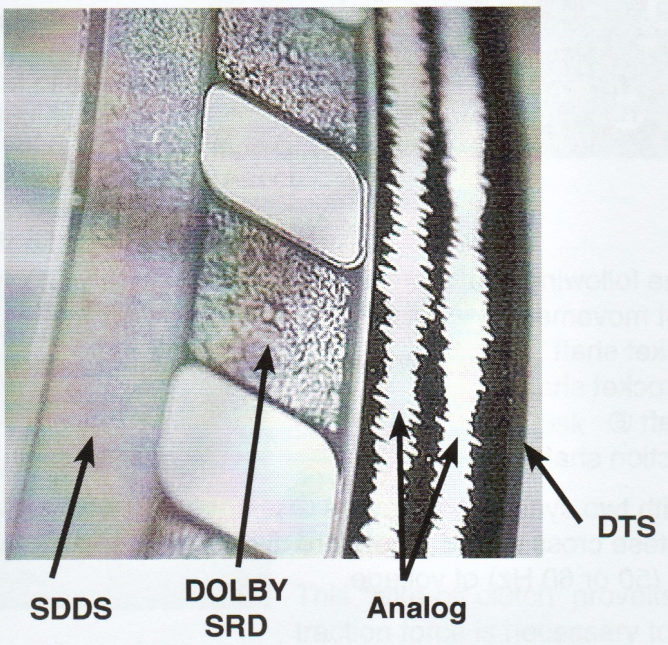
3.3.3 Sound Tracks on the Films

Analog sound is printed as two wavy lines on the film.
The height of the amplitude signifies loudness, frequency signifies pitch.

The **Dolby digital sound** information (DOLBY SR·D) is encoded between the perforations.

The **DTS digital sound** information is encoded between the picture and the analog sound track.

The **SDDS** information is encoded on the edges of the film.

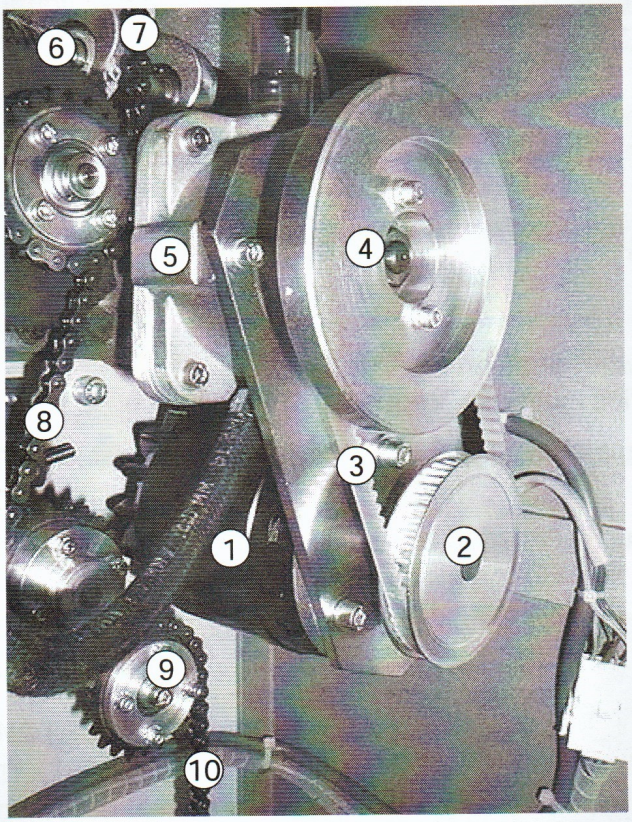


3.4 Drives

▶ **NOTE**

▷ In this chapter you will get an overview of the drive components, which are mounted in the projector.

▷ All work on drives should be carried out by experts only.



① main drive motor

② synchronous gear on motor shaft

③ toothed belt between the synchronous gears

④ synchronous gear on intermittent movement shaft

⑤ intermittent movement

⑥ fibre gear: drives shutter and sprockets

⑦ chain to upper/feed sprocket shaft & cog

⑧ chain

⑨ lower/holdback sprocket shaft & cog

⑩ chain to take-up friction shaft & cog

3.4.1 Main Drive

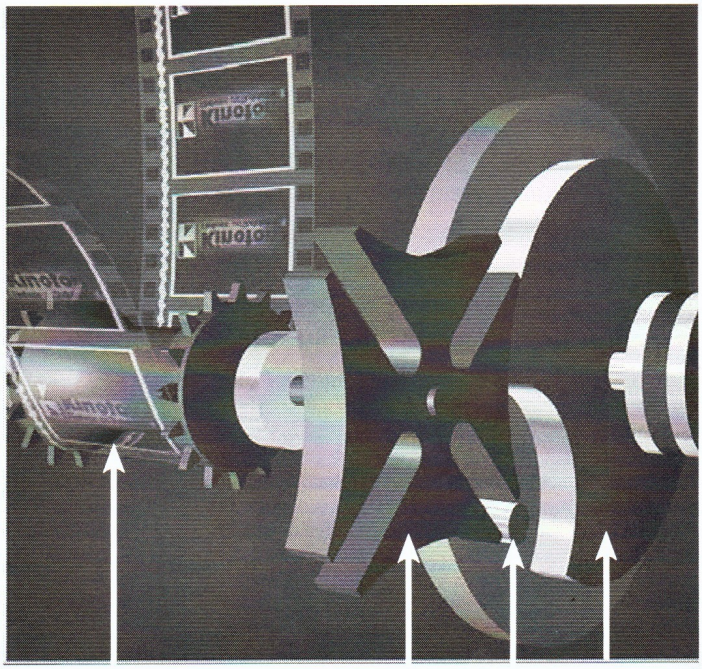
Via gears the following shafts are driven by the main drive motor ①:
- intermittent movement ⑤ via a synchronous drive ② + ④
- feed sprocket shaft
- bottom sprocket shaft ⑨
- shutter shaft ⑥
- take-up friction shaft

The drive with two synchronous gears ② is necessary to synchronize the motor speed and the maltese cross speed. Therefore different drives are available for different frequencies (50 or 60 Hz) of voltage.

3.4.2 Intermittent Movement (also called a Maltese Cross or a Geneva Movement)

To pull the film down one picture at a time the intermittent sprocket has to move the film ahead by four sprocket teeth (¼ of a complete rotation): A motor rotates the cam continuously. During each rotation the cam's pin engages one of the slots in the starwheel and pulls it ¼ turn. As soon as the pin leaves the slot, the outer surface of the cam engages the curved surface of the starwheel which prevents the starwheel from turning until the pin engages the next slot.
During this time the film is held still in film gate and is able to project the picture.

The intermittent movement is in a closed oil bath.

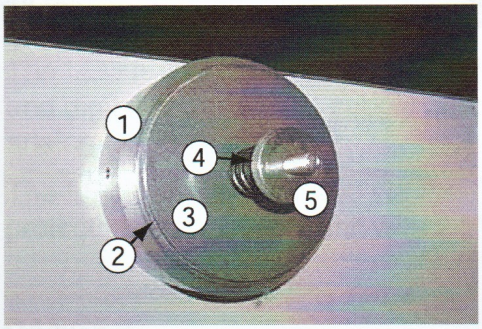


3.4.3 Friction Drive

The friction is a shaft, which is driven with a constant turning moment. The take-off friction is not necessary to be driven, because the feed sprocket - which is driven from the main drive motor - pulls the film from the upper take-off shaft.

Generally the spring ④ pushes the driving disk ③ (or gear at take-off friction) and the felt disk ② against a fitted disk on the friction body ①. The more the pressure onto the felt disk the more is the braking effect.

3.4.3.1 Take-Off Friction (non-driven)



① friction body

② felt disk

③ friction driving disk

④ spring

⑤ knurled nut

This "take-off clutch" provokes that a certain traction force is necessary to wind off the film. This friction prevents spinning of the film spool in case the projector suddenly stops which would cause film clutter – in the worst case the film material could be damaged or even break.

▶ **NOTE**

Changing the felt disk and adjusting the friction, see chapter 6.4.5.

3.4.3.2 Take-Up Friction (driven)

As it is with the take-off friction where the braking force is regulated the film tension can be controlled by the take-up friction. The take-up shaft is driven via a chain by the main drive motor.

- Is it too strong, it brings too much tension to the sprocket which can lead to perforation damages.
- Is it too weak the film will be wound too loose. This can lead to film damages during rewinding (scratches, etc.).
- Furthermore the take-up friction must work quietly as it also would lead to periodically occurring damages at perforation (at the sprocket) or even lead to yowling with optical sound.

Available frictions shafts:

- 9 mm (DIN)
- 7.92 mm (5/16“)
- 12.7 mm (1/2“)

▶ **NOTE**

▷ Depending on frictions (from 600 up to 2000 meters) the film tension has to be adapted.

▷ The film tension is inversely proportional to reel diameter:
Film tension is less, when reel diameter is large (beginning of take-off friction).

▷ Optionally the projector can be equipped with frictions and extension arms with guide rollers for operation with a platter system.

ATTENTION

Never use reels which have an inner diameter less than ¼ of the reel diameter because the film tension gets too large when the reel diameter approaches the inner diameter.

3.5 Electronic Components

▶ **NOTE**

▷ In this chapter you will get an overview of the electronic components, which are mounted in the projector console.

▷ The console door should only be opened by authorized service staff.

▷ All work on electronic parts should be carried out by experts only.

3.5.1 Main Control / Interface Board

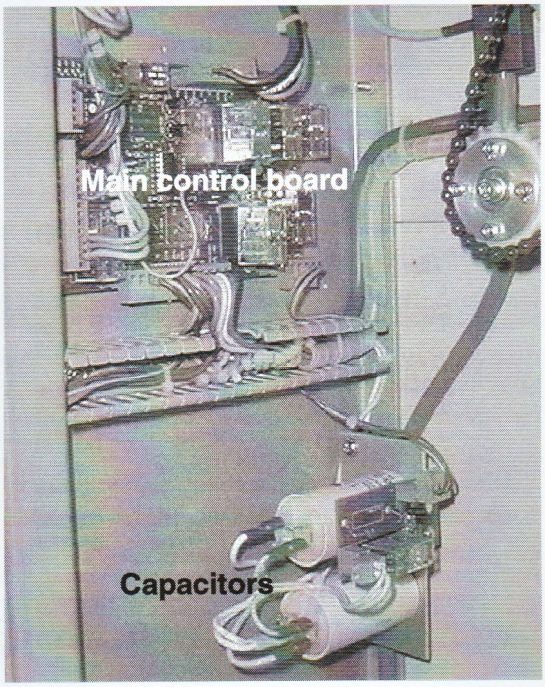
▶ **NOTE**

▷ Plan of terminal connections, see chapter 8.3.

▷ Wiring scheme, see chapter 8.4.1.

DANGER

Works on the electrical equipment are carried out by experts only!



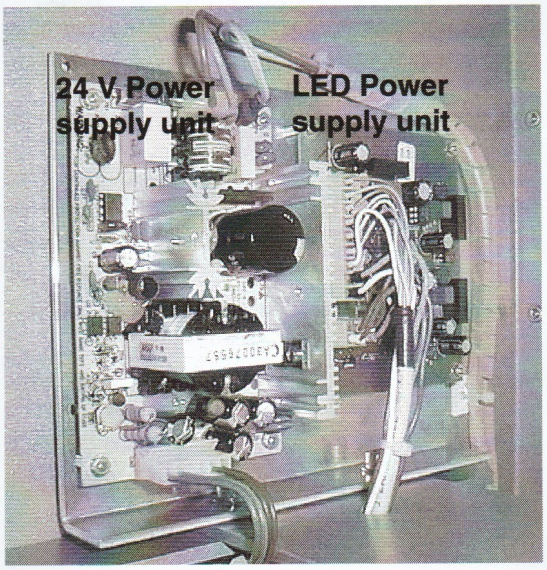
3.5.2 Power Supply Unit / LED Power Supply Unit for Reverse-Scan Sound Device

The LED board can be designed for analog and digital sound LED's supply or for analog LED's supply only.

The LED board is powered via the projector power supply unit with 24 V.

DANGER

Works on the electrical equipment are carried out by experts only!



4 Operating Elements

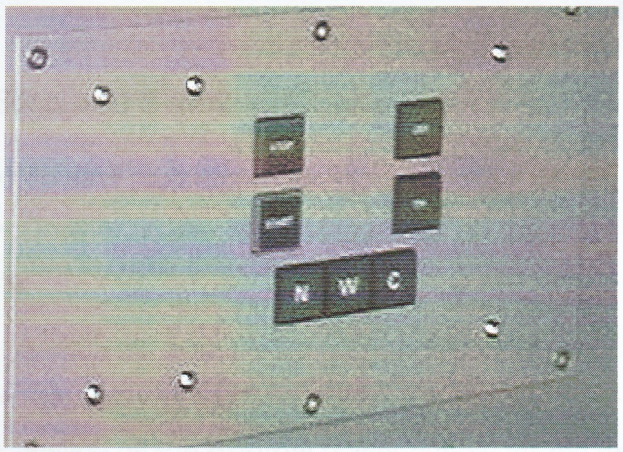
4.1 Main Switch

You will find the main switch on the projector housing lower front side.

Main switch in position I:
Current transfer is switched on.
The switch lights up red.

Main switch in position 0:
Current transfer is switched off.
The switch is off.

4.2 Operating Panel



Standard buttons:

STOP Projector STOP

START Projector START

OFF Dowser CLOSE

ON Dowser OPEN

Optional buttons remote controlled with lens turret / aperture changer:

C Format CS

W Format WS

N Format NS (for 3-folded lens turret)

Select Format SELECT (for 2-folded lens turret)

Issue: 12/2006

5 Operation / Threading

5.1 Switch-On and Start Projector

- Switch on external power supply for the performance room.
- Switch on main switch  (position "I").

➧ Switch illuminates red.

- Thread film (see chapter 5.3).
- Push the projector START button.

➧ Projector is running, ventilation is on, xenon lamp is on.

- If necessary push button ON, to open the dowser after the start leader has run through.

5.2 Stop and Switch-Off Projector

- To stop projector manually push STOP and close dowser by pushing OFF.

➧ Dowser closes, xenon lamp gets off, projector stops and ventilation is on (if temperature is more than 60° C).

- Switch off main switch  (position "0").

➧ Key lamp gets off.

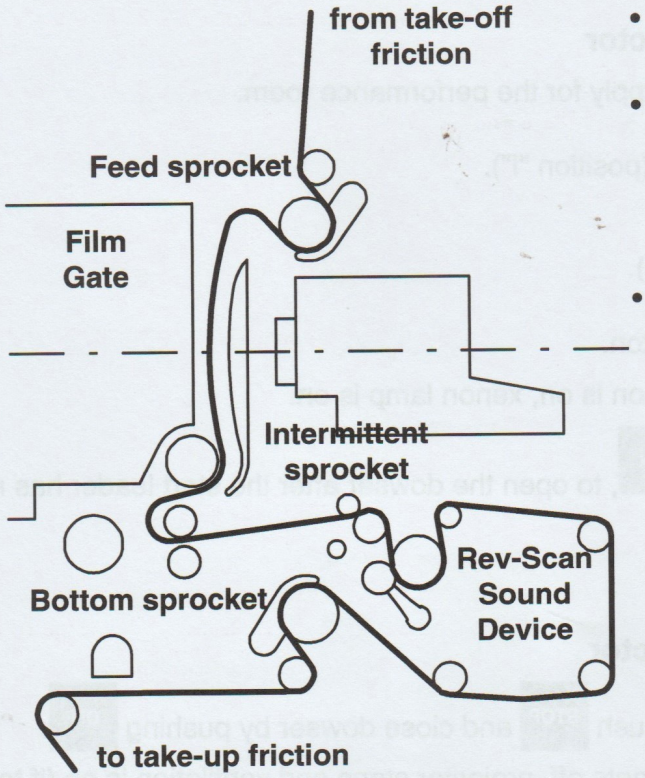
- Switch off the external power supply for the performance room.

▶ **NOTE**

▷ If you have an emergency stop, push main switch  (position "0"), to cut the power.

▷ If the film is run through the projector stops due to the film break sensor.

5.3 Threading for Projection Operation



- Put full reel on upper reel shaft or prepare platter system.
- Open sprocket pad shoe.
  - Thread film in feed sprocket (all perforations engaged in sprocket teeth).
  - Close pad shoe.
- Thread film in film gate.
  - Close film pressure skate.
  - One whole frame must be centered vertically in front of aperture opening.
    There is a small light inside the aperture to assist in centering.
  - Assure film is centered horizontally between ceramic discs.

A film loop of about 4 frames - 16 perforations (35 mm film) must be left both just above and just below the gate!
- If the loops are too big the film will touch stationary parts and be scratched.
- If the loops are too small the film may break, the image may jump, or the sound may warble.

- Thread film through guide rollers to sound head and then to bottom sprocket. Sound pressure roller may be lifted to ease threading
- Open sprocket pad shoe.
  - Thread film in holdback/bottom sprocket (all perforations engaged in sprocket teeth).
  - Close pad shoe.
  - Verify loop below gate is still OK.
- Wind-up the film several times around the take-up reel or lead film to “take-up” level of platter system.

▶ **NOTE**

When operating the projector with the handwheel, do not jerk (quickly twist) the handwheel; instead start its rotation gently and smoothly. Abusing the handwheel can break teeth from the lower CSS shaft’s fibre cog.

5.4 Troubleshooting

5.4.1 General Hints

Even though we produce high quality, reliable equipment, there still can be problems due to incorrect operation, poor maintenance, incorrect procedures etc.
This chapter has information about some common problems and about solving those problems. It is not possible to cover all possible problems in an operating manual; we suggest each owner develops a relationship with a competent cinema service provider.

▶ **NOTE**

▷ Items marked (service) usually require experienced service technicians.

▷ Basically there are two types of errors:
- Type 1 errors: projector won't run/stops immediately
- Type 2 errors: errors which do not stop projector

5.4.2 Projector Troubleshooting Chart (Type 1 errors)

Error	Cause	Solution
nothing works	- main power is not available - loose main power connection - 24 V DC supply failed - 24 V DC fuse on main terminal blown	- check fuses or circuit brakers - check main power connections - change (service) - change
motor runs, pilot lamp is on, sound-head LED won't lit	- fuse blown on LED power supply board	- check all, replace if blown

5.4.3 Projector Troubleshooting Chart (Type 2 errors)

Error	Cause	Solution
noisy operation	- film is threaded incorrectly - chains and/or gears are worn - outboard intermittent bearing worn - intermittent movement is worn [rare]	- thread correctly - change - change (service) - change (service)
rollers don't turn	- poor cleaning - roller worn or damaged	- clean regularly with alcohol - change
film break when starting the film run	- frictions are not adjusted correctly - friction shafts are running dry	- adjust - lubricate with Cardan oil
oil leak	- wrong oil - too much oil - oil tube / vent is blocked - seals are defective [clean unit with alcohol; find leak's source]	- use Kinoton 3672 oil - reduce oil quantity - clean oil tube / vent - replace seals (service)
foam in oil gauge glass	- wrong oil - too little oil	- use Kinoton 3672 oil - fill oil

Error	Cause	Solution
picture moves vertically (jumps)	- skate pressure isn't adjusted correctly	- adjust
	- skate height isn't adjusted correctly	- adjust
	- film print defective [test film]	- get new print
	- skate is worn	- change
	- intermittent sprocket damaged	- change (service)
	- framing bushing defective	- change (service)
	- intermittent movement defective [rare]	- change (service)
picture moves horizontally (waves)	- ceramic discs are blocked or dirty	- remove and clean
	- ceramic discs are worn [rare]	- change
perforation damage in direction of travel	- skate pressure is too strong	- adjust
	- intermittent or upper/feed sprocket teeth have worn	- change the worn sprocket(s)
perforation damage against moving direction of travel	- take-up friction is too strong	- adjust
	- lower/holdback sprocket teeth have worn	- change the worn sprocket
perforation side damage	- sprocket teeth are damaged	- change sprocket
	- pad shoe is damaged	- change pad shoe
	- film gate position is not correct [rare]	- adjust
scratches on film	- film loop is too large	- thread film correctly
	- emulsion particles / dirt on rollers	- clean
	- rollers, skate, and/or film runner strips are defective or worn	- change the worn or defective part
picture blurring	- shutter is not adjusted correctly	- adjust (service)
	- skate pressure too low	- increase pressure
soft image	- dirt on lens elements	- properly clean front and rear of lens
unable to stay in focus	- excessive heat from xenon lamp	- decrease xenon current and/ or use IR heat filter
		- replace damaged IR heat filter
		- make sure light is properly distributed (no "hot spot")
misframed image	- incorrect threading	- thread properly
	- misframed splices	- re-make specific bad splice
automatic aperture registers imprecisely	- aperture or operating arm was moved by hand	- do not force automatic aperture. If mechanism has been damaged, see service information on reducing play.
	- operating arm tube has been lubricated	- clean well with alcohol Do not lubricate the operating arm tube.

5.4.4 Analog Sound

Error	Cause	Solution
no sound / some channels missing	- sound processor failure - amplifier failure - speaker failure	- check plugs and power; call service - check if sound track is threaded on the correct side - check / replace exciter lamp (standard sound) or red LEDs (rev. scan sound) - check all equipment for blown fuses / tripped circuit breakers
sound out of sync with picture	- lower loop wrong size - wrong threading path	- thread correctly - thread correctly
loss of high frequencies	- dirty sound optics - sound optics focused poorly	- clean with lens cleaner and Q-tip - adjust sound optics' focus (service)
garbled sound	- scanning drum jammed - sound pressure roller loose	- remove blockage; change or oil bearings - adjust tension (service)
hissing sounds	- scratches on sound track - dirt on sound track - defective sound electronics	- replace print - clean - check and replace (service)

5.4.5 Digital Sound

Error	Cause	Solution
no sound	- check the following [also see the "no sound / some channels missing" section of "Analog Sound", above.]	- use film for digital playback - switch-on digital sound processor - switch correct processor mode - load disk loaded correctly and check the right disk is in place [DTS only] - thread film correctly
sound out of sync with picture	- loops wrong size - wrong threading path	- thread correctly - thread correctly
poor digital sound	- improper tension - dirt on lens - dirt on digital sound track - scratches on digital track	- re-thread - remove dust using compressed air - clean digital soundtrack - replace print

5.4.5 Lamphouse

Error	Reasons	Clearing
Nothing works	• main power is not available	• check fuses or circuit breakers
	• loose main power connection	• check main power connections
Xenon lamp does not ignite	• no contact	• ignite manually
	• ignition unit is defect	• change·
	• lamphouse is open	• close lamphouse door to contact the door switches
Screen lighting is uneven	• xenon unit is not in optical axis	• service
	• xenon bulb is not adjusted correctly	• adjust
	• xenon bulb has been run too many operating hours	• change xenon bulb
Base cover (anode) discolored	overheating of base (over 230° C)·	
	• electrical connections are poor	• fasten contacts change
	• not enough cooling	• check cooling
	• not correctly adjusted optical axis	• service
	• intensity of currents too high	• check, adjust
Bulb gets black or dark colored	• because of overheating the bulb gets fractures	• check, described in line above “change bulb”
Slug on the top of cathode	• wrong polarity, wrong connection	• check, Service
	• wrong connection of lamphouse	• check, anode (the bigger electrode) must be connect above cathode (Service)
Deformation of electrodes and lamp blackening	restless arc	
	• not in range of current control	• adjust intensity of currents
	• alternating component is too high	• check rectifier
	• bad or missing arc stabilization	• Service
	• bad or wrong cooling	• check cooling
Bulb gets milky	• life of xenon bulb is reached	• change lamp
	• intensity of currents is too high	• check and adjust intensity of currents
		• remove fingerprints on xenon bulb before switching on
Asymmetrical bulb blackening	• bad or missing arc stabilization	• Service

▶ **NOTE**

If there are any serious other problems please call local service or head office of KINOTON, telephone 00 49 / 89 / 89 44 46-0.

6 Cleaning / Maintenance / Repair

6.1 General Hints

ATTENTION

△ Any work on electric supply wiring must be carried out by competent electricians.

△ Make sure that nobody starts projector while you are working on it. For all maintenance, cleaning and repair you must disconnect the projector from its power supply (switch off main switch).

△ All adjustments must be carried out by experts.

Because of using many maintenance-free parts, the consumption of material and the expenditure of time for maintenance work and repair are reduced to a minimum.

The necessary maintenance and cleaning work may be performed by the projector's operators. This work has to be carried out regularly and carefully. See the following lists regarding the schedule for this work.

6.2 Cleaning

▶ **NOTE**

The film print should not be used oily or dirty with antiblocking agents, but always clean and dry.

After each show

Component	What is to do?
film path / aperture	Clean with a soft toothbrush or cloth / Blow out with air pressure.
sprockets / pad shoe	

Daily

Component	What is to do?
film path / aperture	Clean with a soft toothbrush or cloth / Blow out with air pressure.
sprockets / pad shoe	
lens	Clean with a lens cleaning brush.

ATTENTION

△ Using air pressure can make problems, because the dirt will not be absorbed but pressed into bushings and optics.

△ Never use sharp objects to remove particles from film path.

Every 2 weeks

Component	What is to do?
ceramics roller	Remove the ceramics rollers and then remove the dirt in the holes by using air pressure. Clean the ceramics roller with a alcohol moisturized cloth.

Every 3 month

Component	What is to do?
film break sensor	Clean the film break sensor with a soft cloth.
main drive motor / fan	Blow out the dust with pressurized air.
guide rollers	Clean the guide rollers and roller shafts with alcohol.

Every 6 month

Component	What is to do?
shutter housing	Clean the shutter housing with pressurized air. Clean shutter edges with a soft toothbrush.
lens turret (if existing)	Clean coding plates and sensors on sensor board with a Q-tip moisturized with Isopropyl or Isopropanol.

ATTENTION

Do not blow with pressurized air into the rotor - particles can be blown into the rotor and block the rotation.

O-rings of sound pressure roller	Check if they are worn, if necessary call service.
reverse-scan sound device's guide rollers	Check rollers for smooth running and wearing.

6.3 Maintenance

Daily

Component	What is to do?
intermittent movement	Check oil level => oil level must be between the red and the green ring, if necessary refill oil, see chapter 6.3.2.

Every 3 month

Component	What is to do?
lens holder	Lubricate the lens holder guidance with Cardan oil, type 8657
fibre gear / shutter shaft worm	Lubricate with Kinoton EL 4854 grease.
chains	Lubricate with Esso universal oil.
aperture changer (if installed)	Clean the part of the shaft above the film path with a cloth, and the threaded part of the shaft (inside the back cover) with a brush. After cleaning lubricate the threaded part of the shaft with Klübertex BEM 43-132 or Esso universal oil. Do not lubricate the brass tube/non threaded parts of shaft!

Annually

Component	What is to do?
sound pressure roller	Dismount sound pressure roller and put one drop of Cardan oil into the ball bearings.

▶ **NOTE**

▷ Cardan oil is very pasty therefore the ball bearings will be retarded for a proper film run. By getting move the guide roller with one finger, the roller has to stop at last after a half of turn. Otherwise you have to clean the bearing and then fill it with Cardan oil.

▷ You must not use any oil or grease!

intermittent movement	Change oil annually or each 4000 hours, whichever comes first (more often during first 500 hours). See below for details.
water cooling (if existing)	Empty and clean and refill coolant. Check whether pump and refrigeration system are sealed and working properly.

6.3.1 Drain and Refill Oil (Kinoton type 3672 oil):

- after 50 operating hours after the first running
- after 500 total operating hours or after a quarter of year
- after every 4000 operating hours or once in a year, whichever comes first

6.3.2 Changing the Intermittent Oil

Procedure to change oil (Use Kinoton type 3672 oil only.):

- Remove the oil gauge cap and remove hose from clip. Move open end of hose down into empty container. Let the oil drain out completely.
- Add oil through the hose. The oil level must be between the red and green ring.
- During filling, turn mechanism slowly, by hand, so that any air bubbles can escape. Several times turn the framing knob alternately between the left and right stops to distribute the oil. If necessary add more oil.
- Put cap on oil gauge and hang hose back in clip. There should be a vent hole in the oil gauge cap. There must not be any cap on the hose.

▶ **NOTE**

The quantity of oil to fill the movement is about 6.8 fl. oz (200 ml). Do not overfill the intermittent.

6.4 Repair

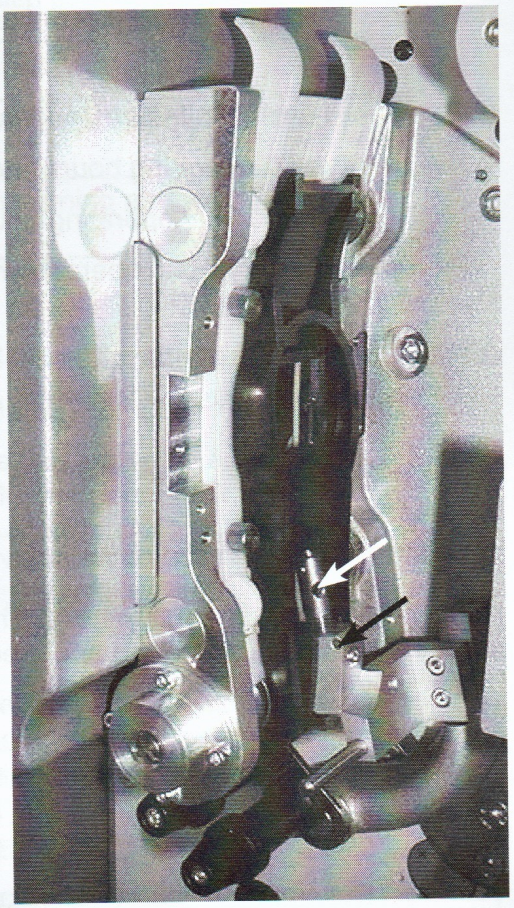
6.4.1 Changing the Pilot Lamp

ATTENTION

Before opening the shutter housing, wait until the shutter stands still!

- Remove the shutter housing.
- Put screw driver behind the lamp socket and lift the lamp out of the socket.
- Push the new pilot lamp into the socket and close shutter housing.

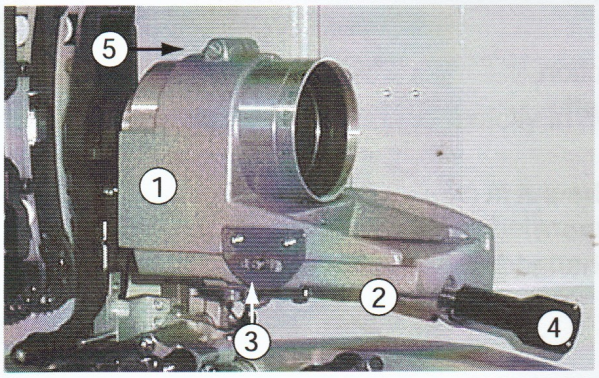
6.4.2 Adjusting the Film Pressure Skate Height



The film pressure skate has to be adjusted so that it rides perfectly on the film gate and the intermittent sprocket.

- To adjust height, the skate must be removed.
- Loosen the setscrew (black arrow).
- Screw the ball pin (white arrow) out or in to the desired length. The idea is to have two film thicknesses between the bottom of the intermittent sprocket and the skate. You can use an Allen wrench in the holes of the ball pin to rotate it.
- Put on the skate and check your adjustment.
- When the adjustment is correct fasten the setscrew again.

6.4.3 Adjusting the Lens Holder



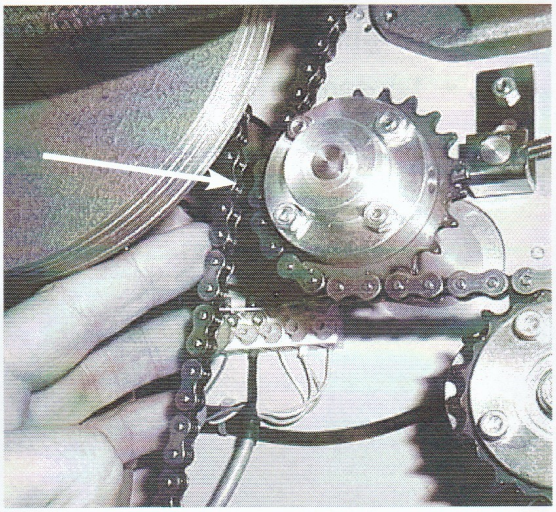
① lens holder
② lens bed
③ focus scale
④ focusing knob (fine adjustment)
⑤ lens holder clamping screw

- To set up lenses, set scale in the mid-position.
- Loosen the clamping screw and push the lens into the holder until picture is sharp.
- Tighten the clamping screw ⑤.
- Repeat the adjustment for each lens and its holder without adjusting the focus knob ④.
- To adjust the picture focus turn the knob slightly as required.

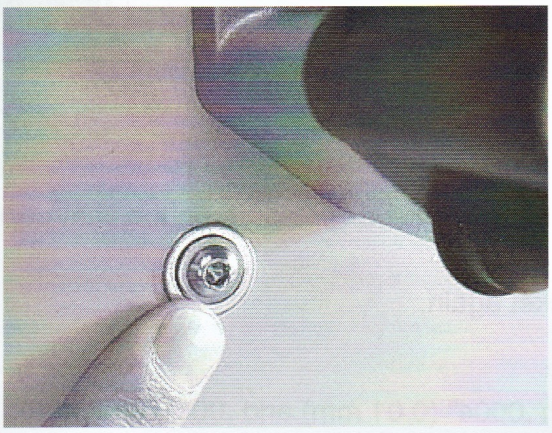
6.4.4 Tension the Chains

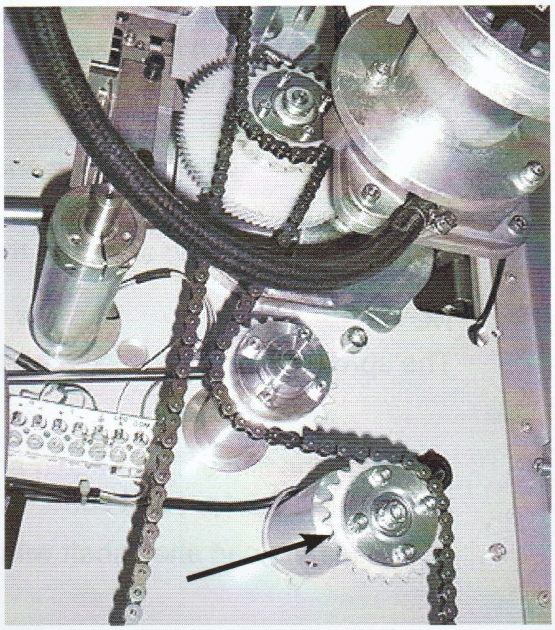
▶ **NOTE**

The chains must not be taut, but must not flap during movement. The chain should be stressed in a way that a distance of 1 cm remains, when the chain is pressed towards the bottom sprocket (arrow).



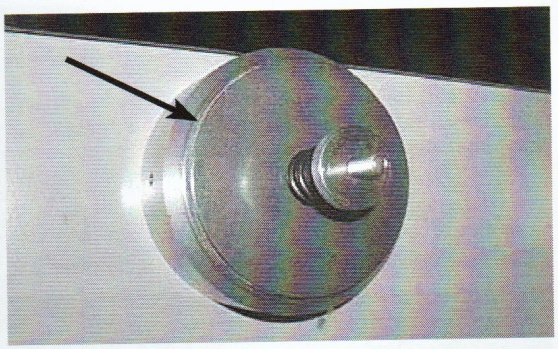
- Open the projector.
- Loosen the Allen screw from the projector front side (left figure).





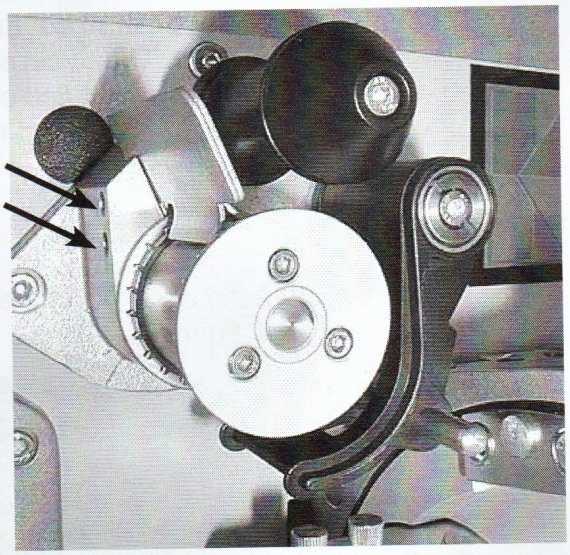
- Slide the eccenter sprocket (arrow, right figure) vertically until the chain is stressed correctly.
- Then fasten the Allen screw again.

6.4.5 Changing and Lubricating the Felt Disk of the Mechanical Friction



- Open the projector door.
- 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 hardened) it has to be changed. Oil the new felt disk.
- Mount the friction again.
- Thread a film and adjust the friction by turning the knurled nut such the film gets no loops when stopping the projector:
  - Right turn spring increases the pressure (friction increases)
  - Left turn spring decreases the pressure (friction decreases)

6.4.6 Changing /Adjusting a Constant Speed Sprocket / Pad Shoe



- Loosen the locking and adjusting nut of the pad shoe with the special tool – the spring will relax.
- Pull the pad shoe from its shaft.
- Loosen the film stripper setscrews (arrows) and remove the film stripper.
- Turn the sprocket locking screw (on sprocket surface) anticlockwise five to six turns to loosen the sprocket.
- Pull the sprocket from its shaft.

▶ **NOTE**

If the teeth of sprocket are worn on one side only, you can turn it and use the other side. Otherwise you must replace the sprocket.

- Install the sprocket onto the shaft with a slight counter-pressure on the chain wheel in the projector.
- Tighten the locking screw on the sprocket again.

▶ **NOTE**

The sprocket end play should be between .0004" (0.01 mm) and .001" (0.03 mm).

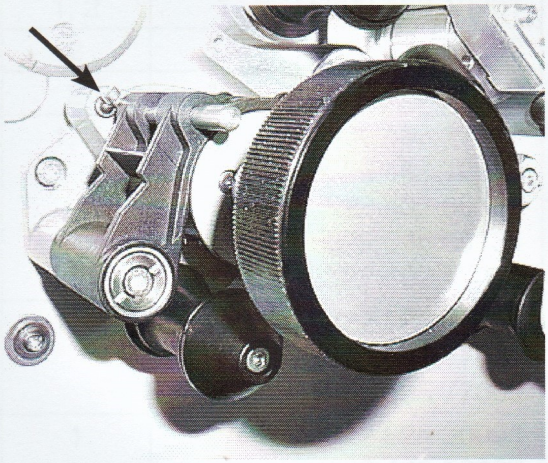
- Put on the film stripper again and fasten the 2 stripper setscrews in a way that it does not touch the sprocket surface.
- Grease the pad shoe shaft with Cardan oil and then put the pad shoe onto the shaft.

- Place the torsion spring in the hole of spring cage and place the whole assembly in pad shoe again.

▶ **NOTE**

Be sure that spring end is placed exactly in hole of pad shoe.

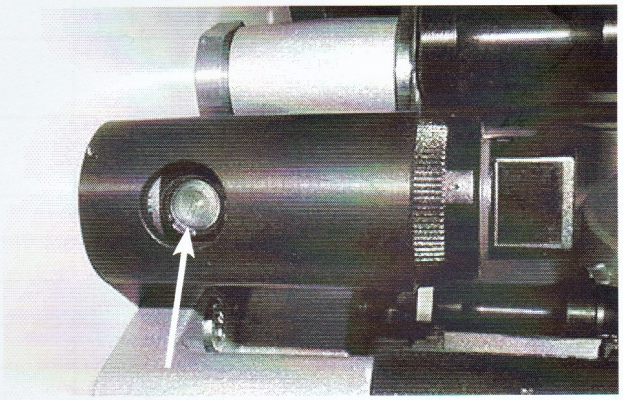
- Adjust the distance screw (arrow) in a way that a play of two film thickness is between the pad shoe and the sprocket - the two film layers should be moved through the closed sprocket easily without a resistance.
- Tighten the locking screw again.

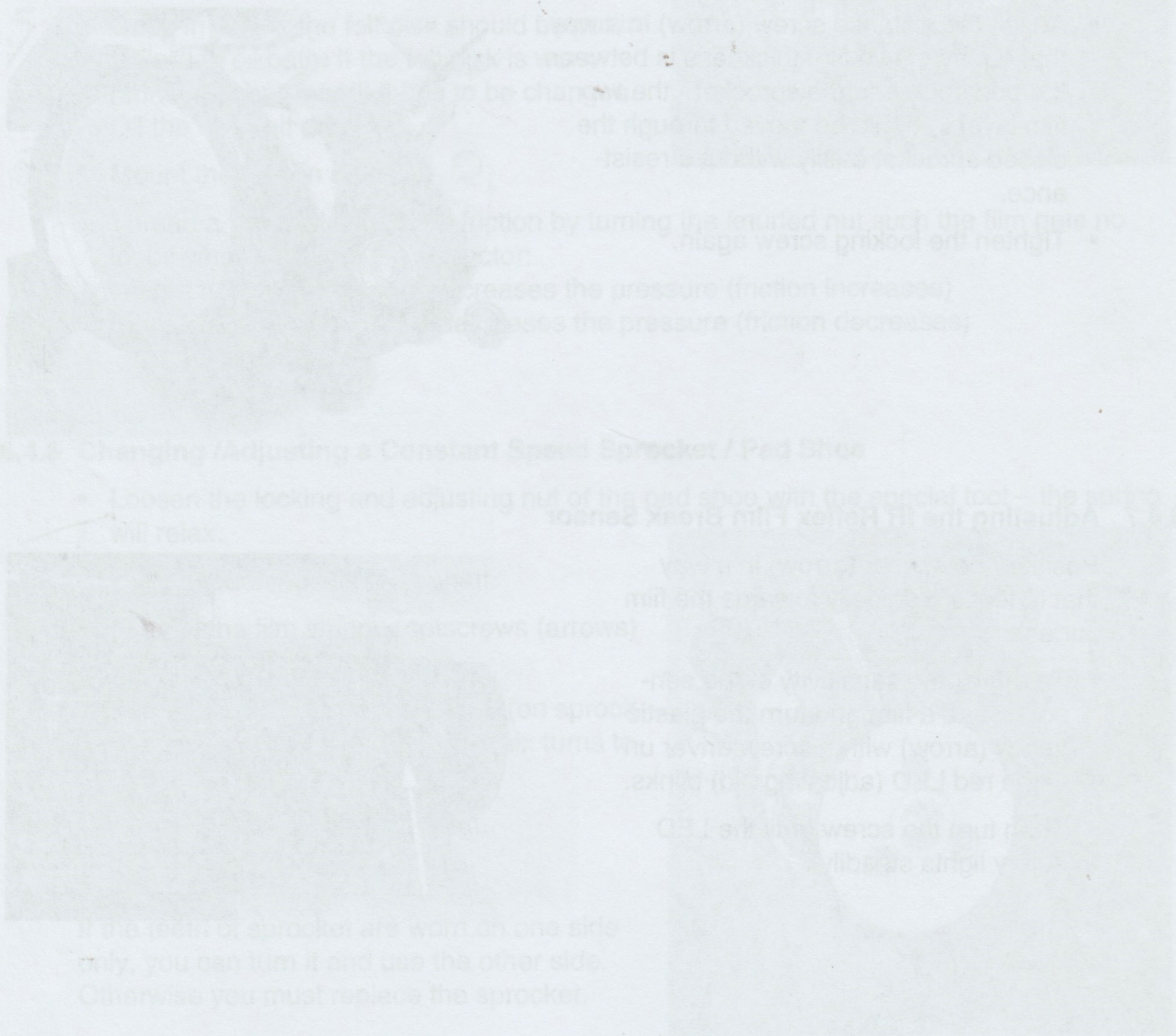


6.4.7 Adjusting the IR Reflex Film Break Sensor

Position the sensor (arrow) in a way that it "looks" vertically towards the film surface.

- To adjust the sensitivity of the sensor thread a film and turn the plastic screw (arrow) with a screw driver until the red LED (adjusting aid) blinks.
- Then turn the screw until the LED surely lights steadily.





7 Parts and Wearing Parts

7.1 Projection Parts

Part	Figure	Position	Code number
film runner strips white	1, 2	**1**	5322 463 10021
ceramics roller	2	**1A**	5322 532 50362
knurled screw for runner strips fastening	2	**1B**	5322 505 10192
film pressure skate 35 mm (black) film pressure skate 35 mm (brown) skate pressure spring ball screw for skate holder skate holder setscrew M6x4	1, 2 2 2	**2** **2A** **2B**	1000 463 17019 5322 463 10019 5322 492 60122 5322 535 80184 5322 502 10273
feed/bottom sprocket (35 mm) feed sprocket shaft bottom sprocket shaft	1, 3	**3**	5322 522 30104 1000 535 77061 1000 535 77060
pad shoe right 35 mm nut spring left	1	**3A**	5322 525 30003 5322 462 50027 5322 492 40001
film stripper	3	**3B**	1000 404 57012
hand wheel for bottom sprocket	1, 4	**3C**	1000 413 47005
guide roller large (Ø = 34 mm) cap	1, 3, 4	**4**	1000 525 37042 5322 462 70374
guide roller small (Ø = 29 mm) cap	1, 2	**4A**	1000 525 37043 5322 462 70373
focusing adjusting knob	1	**5**	5322 413 10007
framing knob	1	**6**	5322 413 60023
knurled nut for standard friction	5	**7**	5322 505 10049
spring for standard friction	5	**7A**	5322 492 50064
felt disk standard	5	**7B**	5322 532 50028
knurled screw for shutter housing			1000 413 37002
knurled nut M 4x8			1000 502 17004
IR film break sensor			1000 282 67008
lens holder 35 mm knurled screw for lens holder			8990 240 29009 5322 502 10336
film cleaner			0040 060 0048X
Esso universal oil EL 4805, 100 ml			4822 390 10048
projector oil 3672/00, 1 l			0040 160 00010
fuse 6.3 AT			4822 253 30031
pilot lamp, 24 V / 3 W pilot lamp, 24 V / 5 W			0040 120 00059 0040 120 00056
lamp for keys			1000 134 87005

Figure 1

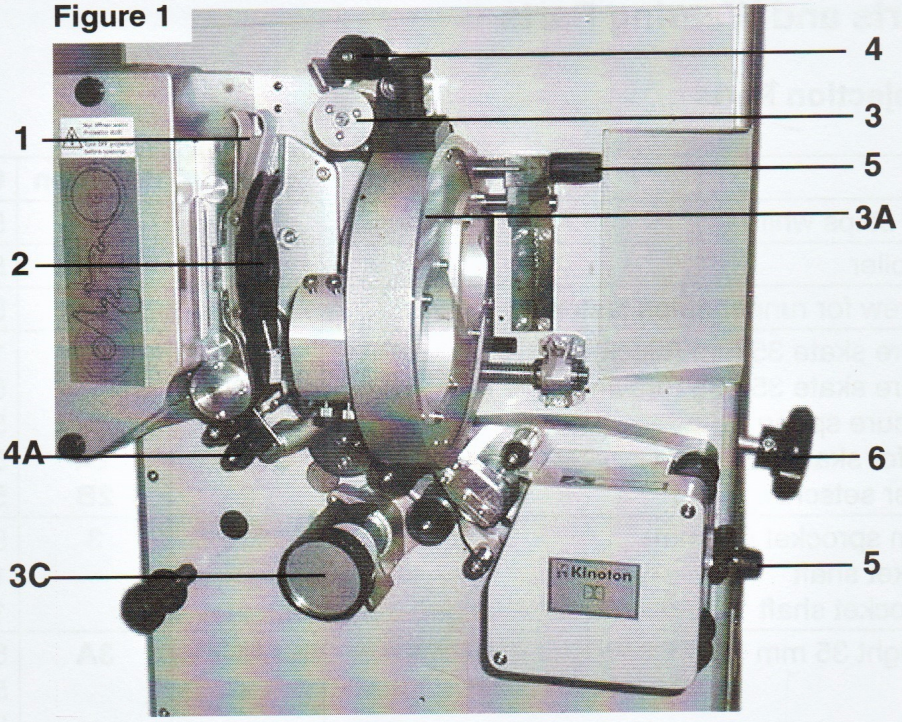


Figure 2

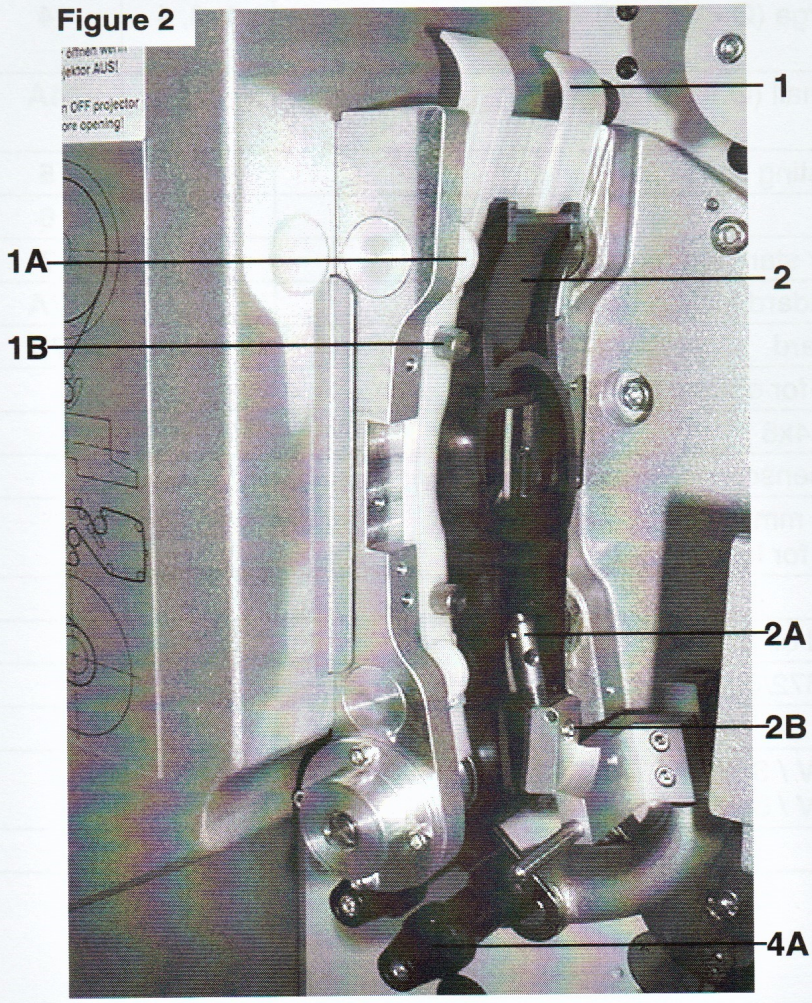


Figure 3

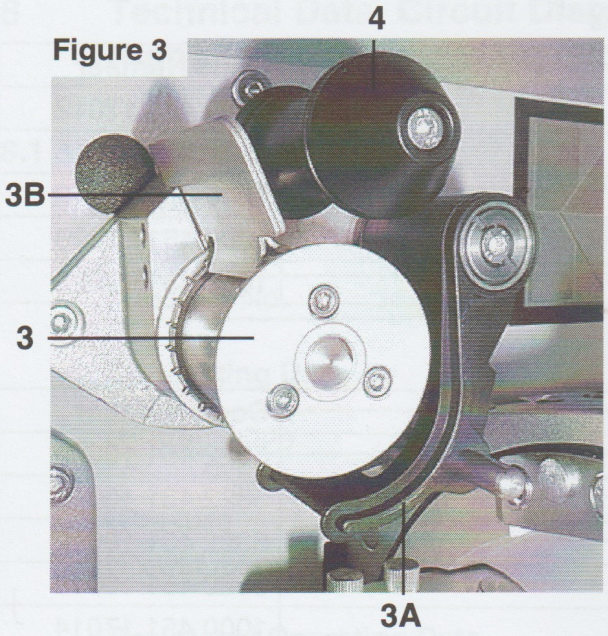


Figure 4

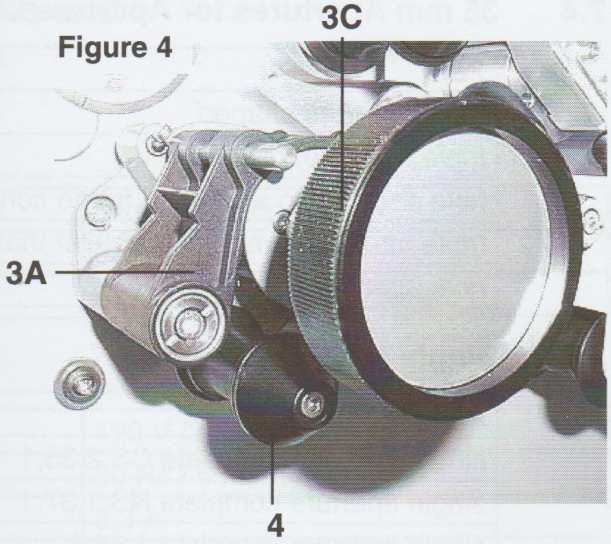
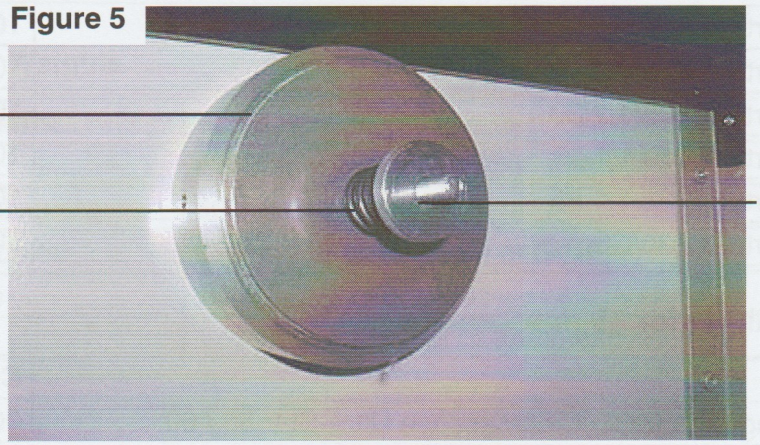


Figure 5



7.2 Film Spools

Part	Code Number
film spool 600 m with shaft Ø 9 mm	0040 060 00050
film spool 1800 m with shaft Ø 12.7 mm	0040 060 00765
film spool 2000 m with shaft Ø 12.7 mm	0040 060 00770

7.3 Film Spool Friction Shafts

Part	Code Number
friction shaft Ø 12.7 mm (USA)	1000 535 77055
friction shaft Ø 12.7 mm	1000 535 77054
friction shaft Ø 9 mm	1000 535 77053

7.4 35 mm Apertures for Aperture Changer

Part	Code Number
triple aperture shaped	1000 451 17012
triple aperture for filing	1000 451 17016
hole aperture to adjust the frame center	1000 451 17017
triple aperture dimension smaller than specified	1000 451 17020
hole aperture for filing	1000 451 17022

7.5 Single Apertures

Part	Code Number
single aperture complete CS 2.35:1	5322 451 10009
single aperture complete NS 1.37:1	5322 451 10011
single aperture complete 1.85:1	5322 451 10012
single hole aperture complete	5322 451 10013
single aperture for silent movies	1000 451 17014
single aperture complete Super 35 mm	1000 451 17015
single aperture finished size 1:1.37	1000 451 17023
single aperture finished size 1:1.66	1000 451 17024
single aperture finished size 1:1.85	1000 451 17030
single aperture finished size 1:2.39	1000 451 17034
single aperture S35/1:2.39	1000 451 17029
single aperture CS+1:1.66	1000 451 17031
single aperture S35/1.1.85	1000 451 17032
single aperture S35/CS	1000 451 17033

7.6 Adapter Rings for 35 mm Lenses

Part	Code Number
adapter ring 1 for ISCO Cinemascope Ultra-Star 55 / 60	0070 410 00003
adapter ring 2 for Schneider Super-Cinelux 50 / 52,5 / 55 / 57.5 / 60ISCO Ultra-Star HD 42 / 45 / 48 / 50 / 55 / 60 / 65 / 70 / 75 / 80 / 85 / 90 / 95ISCO Ultra-MC 35 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80 / 85 / 90ISCO Cinemascope Ultra-Star 50	0070 410 00018
adapter ring 3 Schneider Super-Cinelux 28 / 30 / 32.5	0070 410 00015
adapter ring 4 Schneider Super-Cinelux 42.5 / 45 / 47.5	0070 410 00017
adapter ring 5 Schneider Super-Cinelux 35 / 37.5 / 40	0070 410 00016
adapter ring 6 ISCO Cinemascope Ultra-Star HD 29 / 32 / 35 / 38 / 40	0070 410 00001
adapter ring 7 ISCO Cinemascope Ultra-Star HD 95 / 100	0070 410 00002
adapter ring 8 Schneider Super-Cinelux 2 / 90	0070 410 00019
adapter ring 9 ISCO Ultra-Star-Plus 2.1 37.5/ 40/ 45	0070 410 00013
adapter ring 10 ISCO Ultra-Star-CS	0070 410 00014
adapter ring 11 Schneider Super-Cinelux 2/ 95	0070 410 00009
adapter ring 70.6 / 62.5	0070 410 00010

8 Technical Data, Circuit Diagrams and Plans of Terminal Connections

8.1 Projector Data

Name	Film Projector
Type	FP 30 D
Machine No.	See data plate on housing.

Connecting Data

Power supply	120 V /230 V
Frequency	50 Hz / 60 Hz
Pre-fuse	6.3 A
Power max.	500 W (without lamphouse)

Power and Operating Data

Nominal rotary frequency of main drive motor	1500 rpm
Power of main drive motor	100 VA

Sizes and Weights

Components	Sizes	Weights
Projector	424 mm x 750 mm x 2340 mm	approx. 180 kg
Film spools	600 m / 1800 m / 2000 m	
Friction shafts	Ø 9 mm or Ø 12.7 mm or 5/16"	
Apertures	1:1.37 / 1:1.66 / 1:2.35	
Framing	± ½ picture manual or automatic	

8.2 Reverse-Scan Sound Device Data

Connecting Data

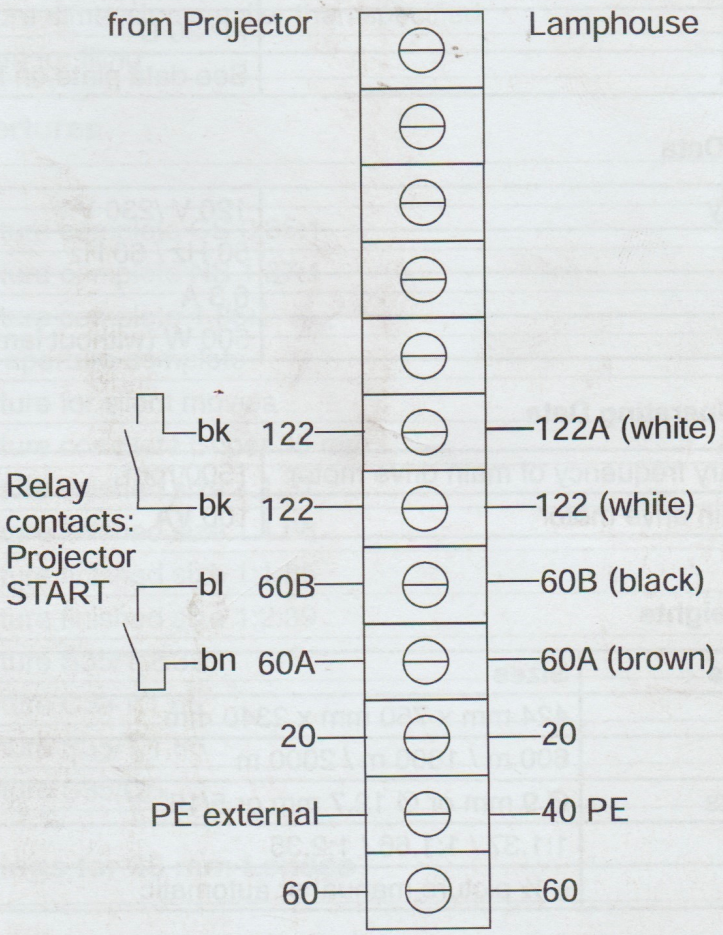
Power supply	24 V =
Frequency	50 Hz / 60 Hz
Power max.	6 W

Power and Operating Data

Frequency response	analog: 30 Hz - 16 kHz ± 1 dB digital: 20 Hz - 20 kHz ± 0.5 dB
Wow and flutter	≤ 0.1%

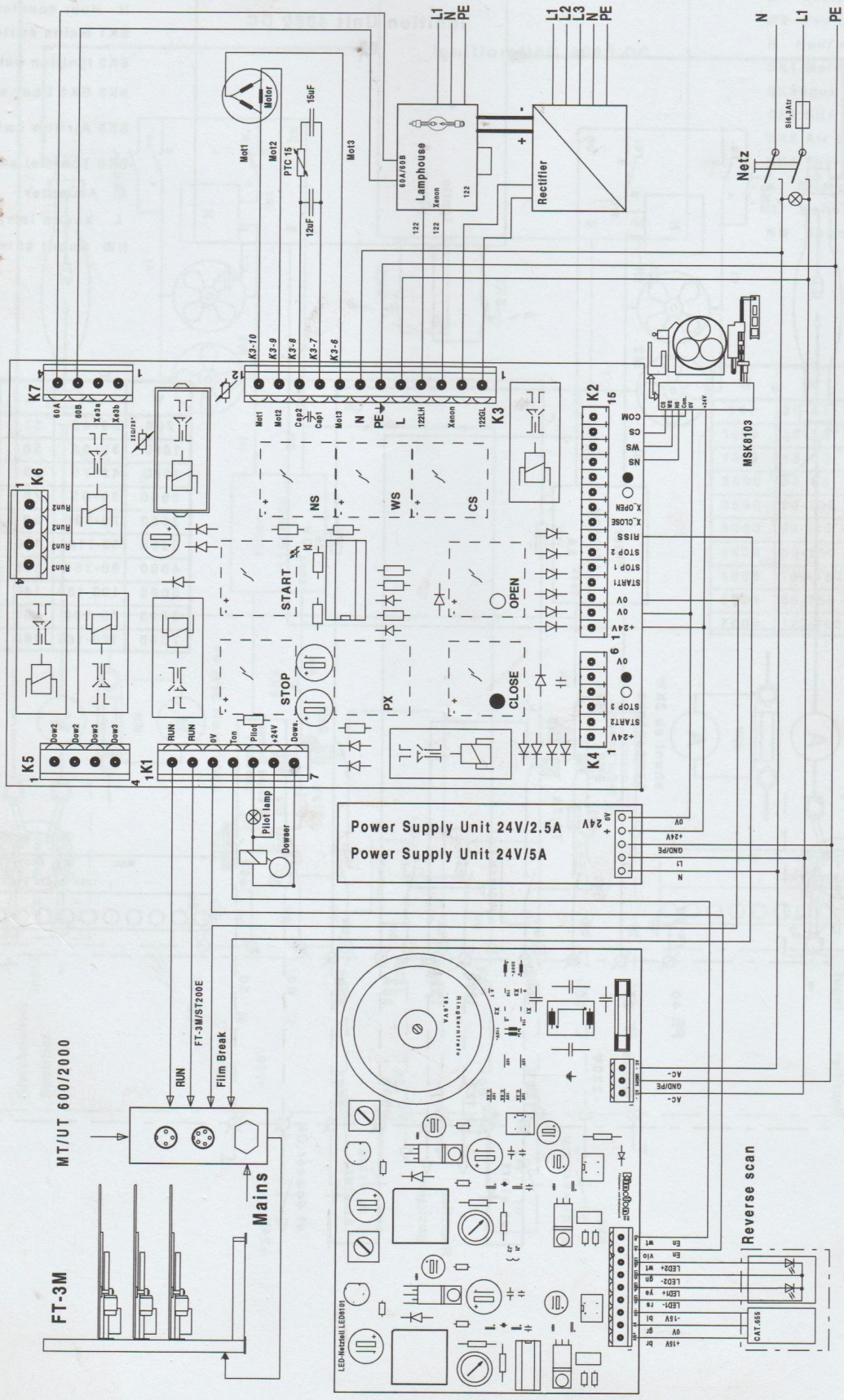
8.3 Terminal Connection: Projector / Rectifier - Lamphouse

Connect the 4-pole cable (relay contacts), the rectifier cable and the mains cable to the lamphouse terminal strip as you can see on the figure below.

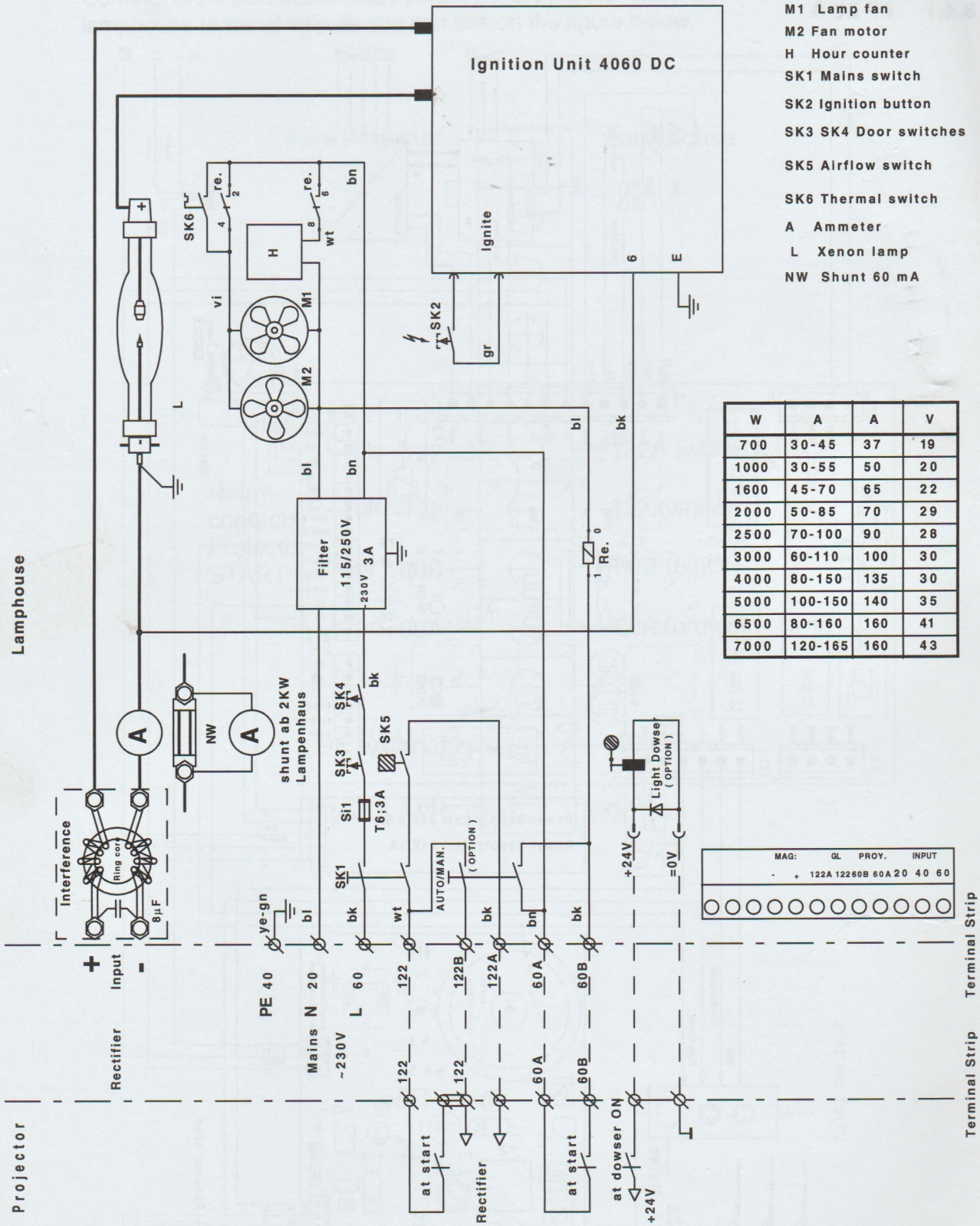


8.4 Wiring Schemes

8.4.1 FP 20 A

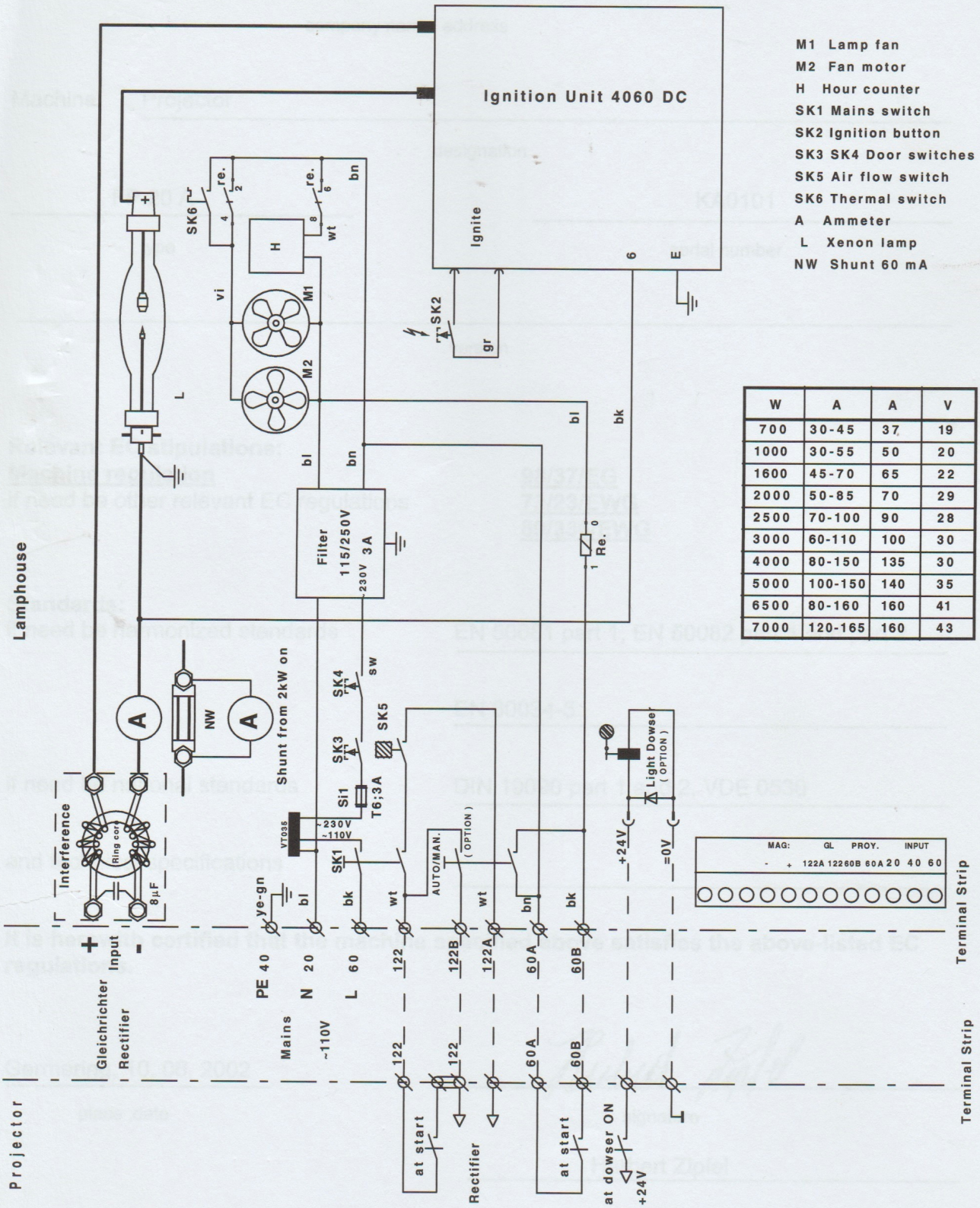


8.4.2 Lamphouse (230 V mains connection)



W	A	A	V
700	30-45	37	19
1000	30-55	50	20
1600	45-70	65	22
2000	50-85	70	29
2500	70-100	90	28
3000	60-110	100	30
4000	80-150	135	30
5000	100-150	140	35
6500	80-160	160	41
7000	120-165	160	43

8.4.3 Lamphouse (120 V mains connection)



W	A	A	V
700	30-45	37	19
1000	30-55	50	20
1600	45-70	65	22
2000	50-85	70	29
2500	70-100	90	28
3000	60-110	100	30
4000	80-150	135	30
5000	100-150	140	35
6500	80-160	160	41
7000	120-165	160	43

EC Declaration of Conformity

Messrs.: **Kinoton GmbH, Industriestr. 20 a, 82110 Germering**

company name, address

Machine: Projector

designation

FP 20 A — type

KA0101 — serial number

version

Relevant EC stipulations:
Machine regulation — **98/37/EG**
if need be other relevant EC regulations — **73/23/EWG**, **89/336/EWG**

Standards:
if need be harmonized standards — EN 50081 part 1, EN 50082 part 1 and part 2

EN 60034-5

if need be national standards — DIN 19090 part 1 and 2, VDE 0530

and technical specifications

It is herewith certified that the machine specified above satisfies the above-listed EC regulations.

Germering, 10. 06. 2002

place ,date

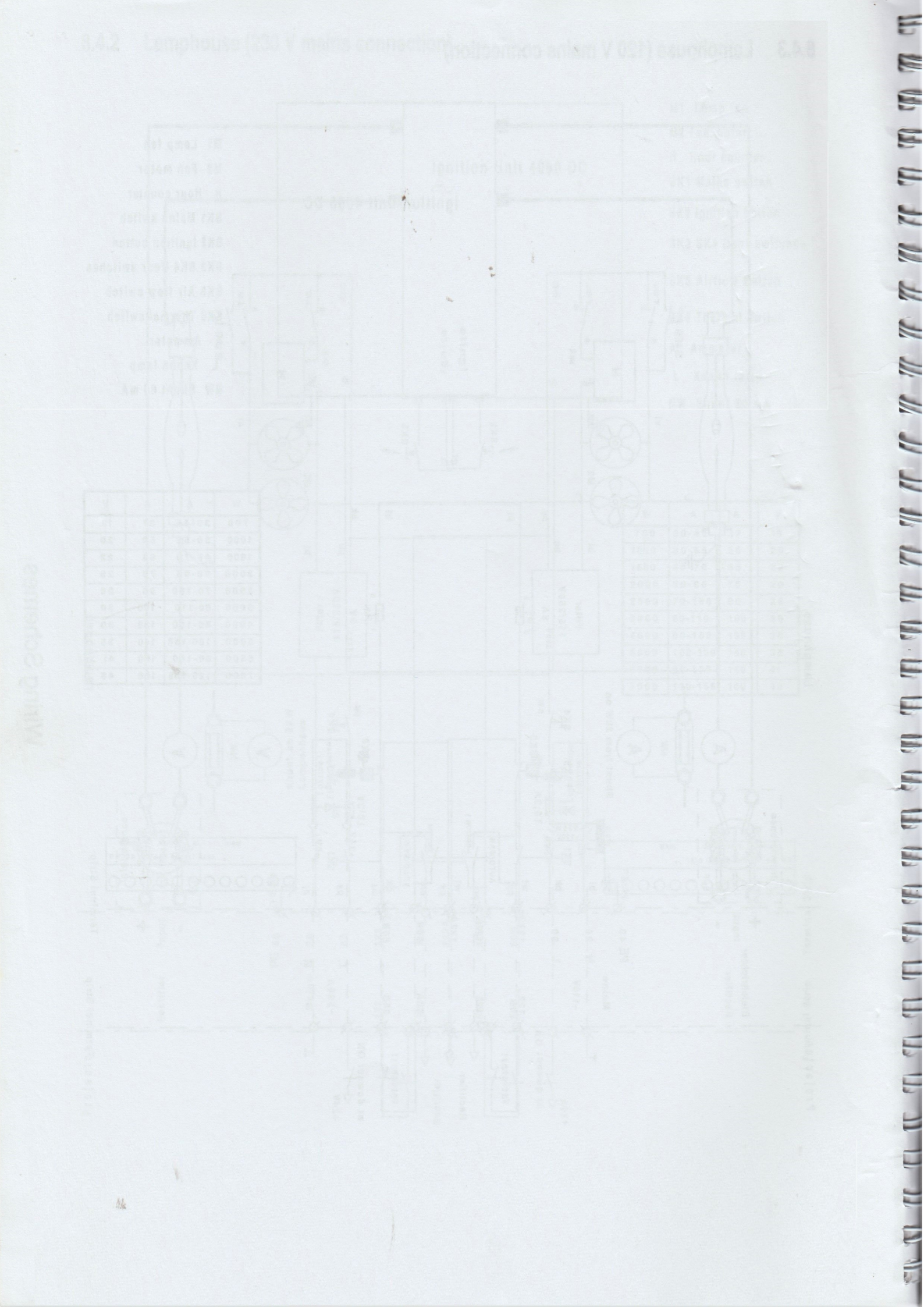
signature

Herbert Zipfel

prename, name

Production Manager

function



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