



**Kinoton**

PROJECTOR FP 30 D





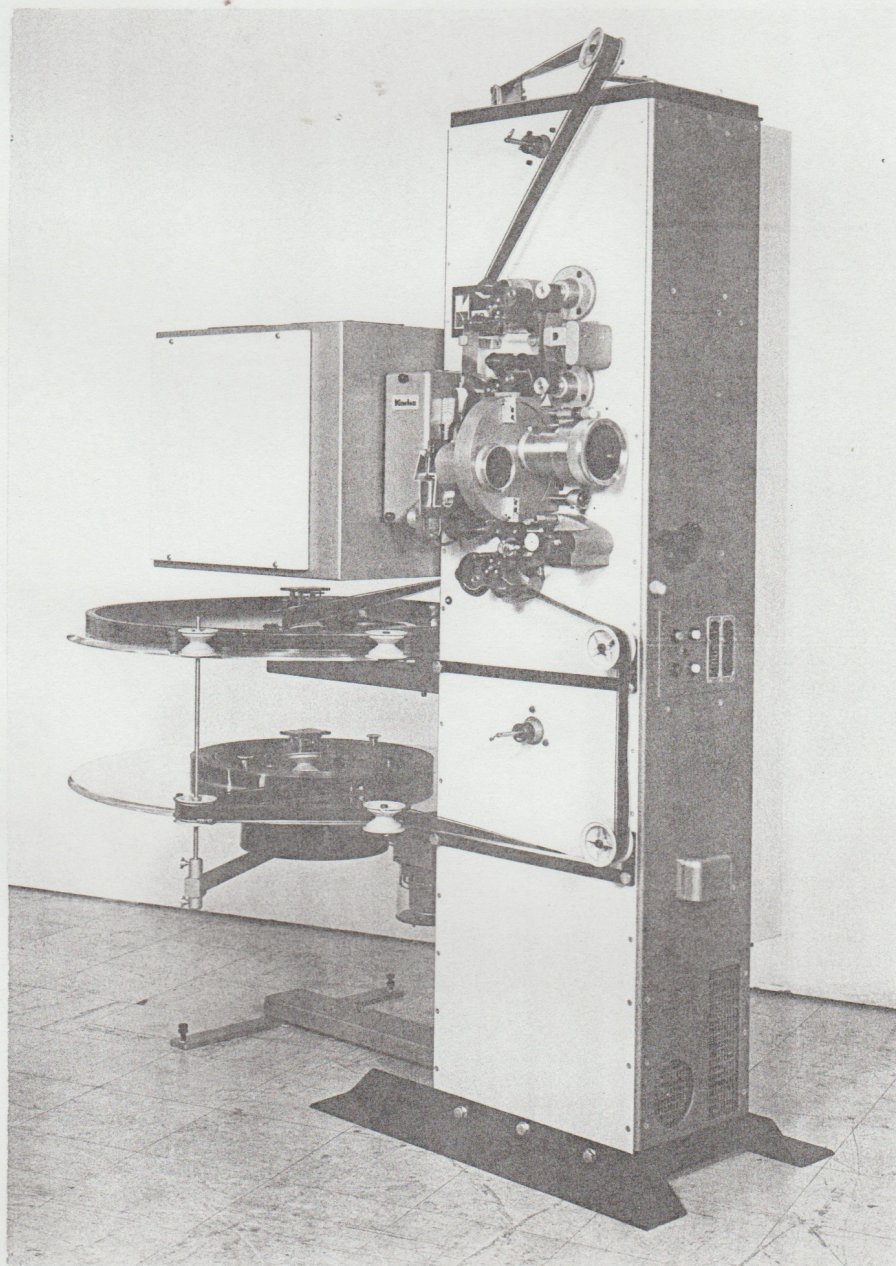




# **Kinoton**

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## SERVICE



**FP 30 D**



## TECHNICAL DATA

1. Mains connection:
  - 110–250 V, 50–60 Hz
  - Power input (without light source) 500 W
2. Picture frequency:
  - 24 frames per sec or 25 frames per sec, upon request forward and reverse speed
3. Motors:
  - Asynchronous or synchronous motors
  - Upon request Interlock or special DC motors
4. Frictions:
  - for reels of 600 m, 1800 m, 3200 m or 4000 m
5. Lens holder:
  - Lens holder or lens turret. Upon request motor-controlled lens turret with automatic change of aperture plates as well as remote controlled image focussing and frame line
6. Light sources:
  - Halogen lamp turret, 400 W, 36 V
  - Xenon lamp 500 W
  - Xenon lamp housing attachment 700/1600 W
  - Xenon lamp housing for mounting on table top 2000/4000 W
7. Rectifier:
  - Built-in rectifier for xenon lamps up to 1000 W
8. Sound assembly:
  - 1 or 2 built-in amplifiers: 50 W or 100 W
  - Built-in cassette recorder
  - Panel with control loudspeaker, motorized theater fader and fading unit for nonsynchronous sound sources
9. Control units:
  - Built-in matrix programmer for 1 or 2 projectors
  - Control device for non-rewind systems, two or three built-in non-rewind systems
  - Pulse generator for slide projection
  - Remote control diagram for projection room and remote control diagram for theater
10. Special models:
  - Special accessories and special models: Upon request



## Modular Program

Depending on requirements, the projector can be assembled from the following components, which are individually described as part of the service documentation (see also Fig. 1, 2 and 3):

- A) Housing
- B) Base elements
- C) Plate slab with film-drive mechanism
- D) Plate slab with upper friction
- E) Plate slab with lower friction
- F) Lower cover plate
- G) Upper cover plate
- H) Four-channel magnetic sound appliance
- I) Insert plate slab
- K) Cable entry
- L) Lens holder
- M) Lens turret
- N) Projector door
- O) Built-in xenon rectifier
- P) Electrical unit
- Q) Matrix automat
- R) Sensor
- S) Control device for horizontal non-rewind system
- T) Cassette recorder
- U) Plate slab for check loudspeaker
- V) Amplifier
- W) Xenon lamp housing attachment
- X) Attached horizontal non-rewind system
- Y) Roller sets for non-rewind system
- Z) Operating panel



## Installation

In comparison with previous projects, installation of the FP 30 is considerably simplified.

The projector column is screwed on the installation location with the two base elements. The longer side stands in the direction of the lamp housing. It is recommended that the middle screw be fastened first, which serves as pivot for inclination of the projector. The other screws are then fastened. It should be assured that the floor is level and the screws tightened to prevent torsion of the projector column.

The lamp housing is screwed firmly to the projector with 4 screws, the connection cables and DC cables located in the projector are passed through the openings provided for them. For this work, the doors of the lamp housing must be removed.

The disk washers are screwed on the base carriage. Care must be taken that the screws do not project above the disks. The disk washers are adjusted with a spirit level to an exact horizontal position. There are 3 adjusting screws on the base of the carriage for this purpose.

The remote control panel is mounted on the front side of the cabin in such a manner that it can be easily reached for operating the projection. It may not be located too far from the projector, since the standard cable length is 180 cm.

The door of the projector is opened by loosening two screws. The rectifier cover plate is removed. The rectifier is then inserted into the tracks provided for it and fastened firmly to them by screws. The rectifier must be installed in such a manner that the vents coincide with the openings in the projector column.

The roller sets of the horizontal carriage are mounted in flanged construction as indicated in Fig. 1.

If a separate film carriage arrangement is used, the roller sets are mounted as explained in the documentation for horizontal film carriage arrangements.

The projector can also be equipped with larger lamp housing of up to 4000 Watts, or with existing lamp housings. In such cases, a table plate is provided which is attached to the column. It is recommended that a base support be provided locally for heavy lamp housings. If a table plate is used, a separated horizontal film carriage arrangement must be used.

## Connection of the projector

Internally, the projector is already completely wired, with exception of the connection of the connection of the lamp housing, the rectifier and the carriage arrangement. For these devices, the complete connection cable harnesses and built into the projector and only have to be connected (Fig. 5).

## Rectifier

The cable for mains and control connection of the rectifier already projects from the main terminal strip in the projector. The terminal strip located therein is removed and the cable attached in the rectifier. In addition, the direct current cables coming from the lamp housing are connected. Care must be taken that the direct current cables have a good, firm connection. If the rectifier is in a separate position, the grounded lines 122a and 122b are clamped to the direct current cable at the front wall of the projector. In case of rectifiers with three-phase current, the rectifier is supplied from the mains directly from the switch panel through an appropriate cable.

## Xenon lamp housing attachment

The direct current cables coming from the rectifier (brown = minus, black = plus) are firmly screwed in the direct current terminals of the lamp housing. The cable harness for mains and control lines are connected to the terminal strip provided for this purpose.

## Horizontal film carriage attachment

The connection cable with thirty-contact socket, present in the projector, is inserted into the carriage arrangement and secured with a safety stirrup. If a separated carriage device is used, connection is likewise made to this socket. An intermediate cable from this socket to the column of the carriage is then necessary and must be requested with the order giving the necessary length.

## Operating panel for projection cabin

The panel has complete cables and is only inserted in the projector. The control lines for theater darkener, stage darkener, curtain and picture covering are connected up there.

The theater operating panel can likewise be connected there, as can also remote monitoring.

## Mains lead

The mains lead to the projector is 3 x 3.5 Ø and is fused at the main switch panel with 25 A. The cable is inserted through the cable entry K and connected to the terminal strip at the front end of the projector.

## Loudspeaker cable

This cable is also inserted through the cable entry K and connected to the terminal strip at the front end of the projector.



Utilization of socket and plug on the front of the FP 30 (seen from the front)

Plug			Socket		
C	B	A	A	B	C
0	Sound tape off	Sound tape on			
9	Sound mixer	Sound louder			
8	Lens CO	Lens mixed			
7	Proj. X 61 D	Proj. X 61 E			
6	Focus -	Focus +			
5	Frame line off	Frame line on			
4	-24 V	Danger			
3	+24 V	Start film pulse			
2	Ground	Start slide pulse			
1	106 Y	106 X			

7 C B A = Hold line for motor  
1 C B A = Changeover

A 7 - B 6 freely utilizable pulse from matrix  
B 7 - C 7 freely utilizable pulse from matrix  
A 6 (109 AY) for use of 2nd projector  
bridged in panel with A 7 (X 61 E) provides pulse  
to matrix for film break (curtain closed/theater light)

## Alarm

If an external signal is desired in case of film break, this likewise can be taken from the main terminal strip. The applied voltage on the terminal strip in case of film break is 220 V.

## Control lines

### Connection in the operating panel

The external functions are connected on the numbered connection terminal strip as follows:

### Theater lighting

- 1 Stop
- 2 Jointly
- 3 Bright
- 4 Slide
- 5 Dark

### Stage lighting

- 6 Stop
- 7 Jointly
- 8 Bright
- 9 Dark

### Curtain

- 10 Stop
- 11 Jointly
- 12 Closed
- 13 Open

### Covering

- 14 Stop
- 15 Jointly
- 16 Normal
- 17 Broadscreen
- 18 CinemaScope

If a second FP 30 projector is connected in change-over operation, the following connections must be applied:

### Operating panel 2nd Projector (Y) 30-contact socket at projector

Motor	31 R - - - - -	61 C - - - - -	B 7
	32 G - - - - -	61 D - - - - -	C 7
	33 E - - - - -	61 E - - - - -	A 7
Change over	34 - - - - -	106 Y - - - - -	C 1
	35 - - - - -	105 - - - - -	B 1
	36 - - - - -	106 X - - - - -	A 1
Sensor	39 - - - - -		A 3
	40 - - - - -		B 3

Cable from solar cell of projector Y to amplifier of projector X entry 2

Film break signal  
for matrix  
bridge from 55 to 33 E

## Connection of theater panel

The theater panel has the same terminal designations for the connection as the projection booth panel. It must be assured that the stop functions (interrupter) are always connected in series, whereas the work contacts are applied in line.



## Projection booth panel Theater panel

## Frame line

On	----- 47 -----
Jointly	----- 48 -----
Off	----- 49 -----

## Focus

+	----- 50 -----
Jointly	----- 51 -----
	----- 52 -----

## Volume

Loud	----- 44 -----
Jointly	----- 45 -----
Soft	----- 46 -----

## Theater lighting

Bright	----- 3 -----
Jointly	----- 2 -----
Dark	----- 5 -----

## Matrix pulse

(Start film)	----- 39 -----
	----- 40 -----

## Danger

(Main switch)	-- 24 R ----- 24 R
	-- 25 R ----- 25 R

## Preparation for placing into operation:

1. Fill oil 3672 by means of funnel or squeeze container into the intermittent movement transmission, that is into the plastic hose. For this purpose, remove cap on oil level tube. Fill oil up to level between red and green ring. Turn projector by hand several times. After disappearance of air bubbles, replenish with oil if necessary. Place plastic cap back on oil level tube, hang plastic hose in holder. Hose must have at least the height of the inspection tube.
2. Place 2 drops of Esso handy oil into the yellow lubrication opening of the front aperture bearing. (Repeat at least once a week.)
3. Insert plug unit and plug rings into the film carriage unit.
4. Insert mirror and lamp in the lamp housing. Insert lamp only with facial protection mask and gloves (danger of explosion!). Beforehand, align lamp housing with adjustment device. Screw lamp housing doors shut. This is necessary because of the safety circuit.
5. Check perfect running of the projector drive mechanism by manual turning.
6. Insert lens and aperture plates. The aperture plates have a marking for the full picture size, but are produced with smaller dimension, so that they can be filed in the theater to the final dimensions (in particular for sloped projection). The aperture plates are marked for N = normal format, B = broad screen and C = CinemaScope, the wide picture with the shortest focal length.

7. Switch on main switch of projector (green key on the door). Check whether the red lamp lights up (mains connection).  
(Main switch phase must be set at 1).

8. Switch on amplifier, turn on regulator for check loudspeaker and theater fader to middle position, switch on tape recorder playback. In case of playback of a cassette, check sound in theater. Check function of the check loudspeaker.

9. For employment of 2 amplifiers, actuate transformer V 1 - V 2 in check loudspeaker field and check method of operation of the second amplifier.

10. Program the control device of the film carriage unit. Switch to the left (upper disk) to position 1 (unwinding), set switch 2 to position 2 (winding), check whether the plug-in unit is plugged into the upper disk. Place switch to the right (lower non-rewind system disk) to position 2 (winding), check whether a plug-in ring is on the lower non-rewind system disk. Lift lever arm with the two rollers for film transport from film break switch in the rest position and fasten with cord in the middle position of the pivot area. Switch on the mains switch of film non-rewind system.

11. Disconnect plug of the remote control panel from the projector.

12. Depress projector start (green knob on print board I), leave knob depressed. The projector must now run, the xenon lamp must automatically light up, the disks of the non-rewind system must turn. Check ammeter immediately whether the current strength for the xenon lamp is not exceeded.

500 Watts max.	30 A
700 Watts max.	42 A
1000 Watts max.	55 A
1600 Watts max.	75 A
2000 Watts max.	85 A
2500 Watts max.	100 A
3000 Watts max.	110 A
4000 Watts max.	140 A

If the current output is too high, adjust balancing potentiometer or stepping switch in the rectifier.

Upon release of the starting knob both the projector as well as the non-rewind system must remain motionless, through automatic switching off of the rectifier, the xenon lamp goes out.

13. Plugging the remote control panel, attachment of the holding clamps.

14. Insertion of a film with film reels, according to scheme as shown on Fig. 6. Prior to inserting the film, open the pressure skate of the aperture. Turn the projector by hand exactly to the point at which the intermittent sprocket ends the turning motion. Insert the film into the aperture so that the complete picture image can be seen in the aperture. Position the pressure skate by means of the adjusting knob on the front of the projector so that a central position is shown on the display.



15. Turn the projector by hand and in so doing check the film loops and the film progress.

16. Work on the film reels and frictions if film tension should not be more than 400 g.

17. With use of horizontal non-rewind systems, the roller guidance must be adjusted. Be sure both rollers on the lever arm of the non-rewind unit are adjusted so that upon entry, the film does not touch the disks. In the other rollers, the film must run exactly in the middle of the lateral guides. In case of diagonally placed rollers, be sure that the film lies uniformly on both lateral guide halves.

18. Now switch on the projector at the remote control panel. Check film running on doing so. The xenon lamp must be lighted. Now open the dowsers by pressing the green knob provided on the projector for this purpose.

19. Move the lens forward and to the rear until the image is projected in focus on the screen. The focussing adjustment remains in the middle position.

20. If the picture framing should be visible on the screen, move the picture framing device upwards or downwards. In this respect observe the change of the size of the film loop (if necessary correct by 1 or 2 cogs).

21. If film movement and image quality is perfect, shut off the projector and insert the second lens in the other interchangeable lens mount or in the lens turret. Move this — without moving the focus — by shifting in such a manner that this lens also produces a sharp focus. Now place the anamorphote for CinemaScope and turn this in front of the fastening in such a manner that the picture framing is horizontally projected. The front adjustment ring is now corrected in such a manner on the projection distance (observe numbers) until a sharp projection of the horizontal and verticals is achieved. (Possibly order test film.)

22. In case picture illumination is not uniform, the following adjustment possibilities exist on the lamp:

- a) horizontal shifting
- b) vertical shifting
- c) shifting of the focal length

Shift adjustment a) and b) so that the brightest spot occurs in the middle of the screen. Then adjust c) forwards and to the rear so that the best possible, even illumination is attained.

23. Balancing of the amplifier system is now made. Change over from projector to sound tape and determine whether equal sound volume is present in the theater for both sound systems. Adjustment is made by the first waferswitch (solar cell) and the third waferswitch (sound tape). Both switches should be approximately in the upper third. By means of the 6th and 7th switch, sound quality (frequency characteristic) is determined in the upper and lower frequencies. A straight-line frequency curve is attained at position 0. Acoustical conditions in the theater and the quality of the loudspeakers

used can necessitate a change.

24. Preparation of the film on the horizontal non-rewind system. A small disk with motor flange and cable is located on the non-rewind system. These units are mounted and connected. The upper disk is then used for combining the copy. The insertion ring is put in place. The 1st act of the film comes with the start of the small disk to the insertion ring and is clamped into place there. The left-hand switch on the control device S) is then set at the third position and the film is wound on to the insertion ring of the large disk. When this has been ended, the 2nd act is glued, whereby end and start tapes are cut off. Winding is done in the same manner. Naturally you start with the preliminary program, if one is on hand.

After completion of the program, the insertion ring is removed from the upper disk and inserted into the lower disk. The insertion unit is now placed above. Check whether the left-hand switch in the control device s) is at position 1 (unwind) and switch 2 is at position 2 (wind).

With the main switch switched on (projector is motionless) the film on the upper disk is passed through the insertion unit. (Carefully observe the dotted markings of the film guide!) The disk operates with removal of the film. The film is placed into the projector and introduced on the insertion ring of the lower disk. The disk is turned by hand until the lever arm is positioned in the center of its movement range. (For more details, see documentation ST200—ST270 non-rewind unit).

25. Upon actuation of the starting knob, the projector must now reproduce the complete program in perfect picture and sound quality.

26. If automatic showing is desired, metal foils must be placed on the film on the framing line between the perforation. They should be approximately 4—5 mm high and occupy the width of the framing line. They are placed on the emulsion side of the film. These metal foils are scanned without contact by the sensor R), which transmits a pulse to the matrix automat every time they are passed. The matrix automat can also receive pulses through the remote control panel (e.g. the start pulse). Upon each pulse, the matrix automat switches into the next horizontal row (signal by lamp). It now performs all functions which are preprogrammed in this row by means of diode plugs (regardless of color). Each function which is to be performed is given a plug. In order, for example, to open the light dowsers automatically, in case of appropriate plugging for the next row there is a pulse after 5 seconds or after 10 seconds.

Thus a complete program can be preprogrammed in the matrix programmer including lens and aperture plate change, curtain, picture covering, theater lighting, stage light, start-stop, subsequent music and pause. The automat is placed at zero again after each showing by means of the zero key and thus set for the next showing. (For more details see documentation ST 450 matrix automat).



27. A showing begins in the customary manner with music from the cassette recorder. The start can be made from the remote control panel for theater. If slides are to be shown, they are triggered by the first pulse on the slide pulse generator. The last slide provides through the slide control unit the pulse automatically to the matrix automat for the start of the projector. If no slides are shown, the projector can be started from a pulse on the sound tape or by hand.
28. A time switch can also be used for this purpose, however it must be remembered that it has to be re-inserted after each showing.
29. When the film after the completed showing is now on the lower disk, the insertion ring is removed and inserted on the upper disk, the insertion unit is brought below. The film is then inserted in a similar manner as described under 24.
30. For perfect performances, the following is necessary:
  - a) Checking the copy for perfect splices and possible metal foils
  - b) Production of perfect splices (best and simplest way is with a butt-type splicer)
  - c) Cleaning of the film movement units after each performance.

## Equipment description

### A Housing

Bearing plates and also the doors are standardized with respect to their boreholes. This means, for example, that one projector base plate can be exchanged for another projector plate. In addition, plates for other frictions or the plate for four-channel magnetic sound can be installed later. The electrical and electronic units are combined for the most part in the door. Here also a rapid exchange of units or a later supplementation is easily possible, particularly since they are plug-type units.

### A1 Drive motors

The motor necessary for the drive is fastened to its motor holder on the inside of the rear of the projector. In order to prevent housing vibrations, the suspension is muffled. The motor drives the projector through a belt connection directly on the flywheel of the intermittent movement transmission. Control of the motor and also the starting capacitors are located in the electrical unit P. An interlock motor can be additionally installed if 2 projectors are to be used for showing of one film in 2 theaters or for use with separated sound machines.

The replacement parts list gives the technical data of the motors and also the necessary capacitors, including

the code numbers. Circuitry of the motors for various voltages can be seen from the circuit diagram.

In mounting the motors care must be taken that they run with as little vibration as possible. V belts may not be installed too tautly, in this case adjust the motor holder.

### A2 Cable form

The cable form for all functions of the system is contained in the projector housing supported in plastic tracks. The course of the cable form is important for the attachment of additional appliances or for trouble shooting. It is illustrated on page

A part of the cable connections runs outside to the operating panel. For this purpose, a 30-connection bushing strip and a 30-connection plug strip is located on the front of the projector. Connection and measurement points are shown on page

### A3 Ventilation

The upper cover plate of the projector can be provided with a fan for dissipating heat from the projector.

### A4 Other parts in the housing

Provided that they are service parts, they are likewise compiled in the replacement parts list.

### B Base parts

They serve to give the projector a secure support. The base parts permit an inclination of the projector of  $5^\circ$  forward and of  $5^\circ$  to the rear. For inclinations of up to  $10^\circ$ , two supplementary side bars will be delivered upon request.

If the inclination of the projector is more than  $8^\circ$  forward, it is recommended that the long side of the base elements be placed forward. After erection of the projector, the base elements should be screwed in the floor. Afterwards, the screws for fastening the projector column should be slightly loosened again and retightened, so that warping of the housing is prevented. If the angle of inclination is larger than indicated above, we recommend placing the projector in vertical position and projecting by means of mirror. If this is not possible, a wooden wedge in the size of the contact surface of the base elements should be locally prepared.

For upward projection of more than  $5^\circ$ , the same side bars (see Fig. 7) are used, the only thing is that in this case they are inserted by the most forward located of the three fastening screws between housing and base tracks.



## Description of the circuit diagram (Fig. 8 and 9)

FP 30 projectors come equipped with electrical unit and cable form for all extension stages. Depending on equipment, there are then more or less appliances installed and connected (e.g. panel with check loudspeaker, motorized theater regulator and fading unit, cassette recorder, slide pulse, generator, matrix programmer, control unit for non-rewind unit, amplifier, etc.) (See also Fig. 10–18).

For a better overview, the individual extension stages are discussed separately:

### 1. — Basic electrical equipment

The basic electrical equipment which is installed in every FP 30 projector enables drive of the projector, picture and sound reproduction and the power supply for all light sources, sound appliances, non-rewind unit and supplementary appliances provided in the FP 30 program.

The mains voltage is connected to the terminal, which is located on the inside below on the front wall of the projector (phase on terminal 60, neutral line on terminal 20, ground on terminal 40).

After switching on the main switch SK 1, the projector can be placed under power with green key SK 3, because RE 1 attracts. Lamp LA 1 lights up in red. With red key SK 2, the projector can be switched off again.

**Note:** The off switch of the remote control panel is connected in series with the holding line of RE 1. If no remote control is used, A4/1 — B4/1 of the plug strip must be bridged.

Transformer T1 supplies through the fuses VL 3 and VL 4 and the rectifier bridges Gr. 1 and G4. 2 direct current of 7 and 24 V respectively.

With the knobs SK4 (green) and SK5 (red), the motor M1 can now be switched on and off via the relay RE2. Current path:

+ 24 V-61-film break switch SK 6 — 61 A — 61 B — SK 4 — 61 C — SK 5 — 61 E — re 3 — RE 2 — 24 V. SK 6 the film break switch above the aperture is switched off ahead of the intermittent sprocket by enlargement of the upper loop. If a non-rewind unit is used, toggle switch SK must be placed at position T (non-rewinding unit). Otherwise it must be switched to F (film), so that the switch of the non-rewinding unit is bridged.

**Note:** The centrifugal switch SK 7, the switch MA of the matrix and the motor stop switch of the remote control panel lie in the holding line of the relay RE 2. If the projector is to run without film, SK 7 must be blocked, whereas without matrix or without remote control, MA and B7/1 — C7/1 respectively must be bridged.

Current path holding line from RE 2 in position F of the toggle switch:

61 C — 61 D — switch MA of the matrix — SK 8 } C7/1 — B7/1 — 61 C — 61 D — SK 7 — 61 S — re 2 — RE 2.

Current path, holding line with position T:

61 C — 61 D — MA — Switch T of the non-rewinding system — C7/1 — B7/1 — 61 C — 61 D — SK 7 — re 2 — RE 2.

The two pushbuttons SK 9 and SK 10 for fading in and out, and in case of 2 projectors for change-over.

SK 9 switches RE 4 on, as a result of which RE 5 is switched off, excite lamp LA is switched on to 6V and change-over relay RE 7 to 24 V and in addition RE 3 is switched on. The exciter lamp is lighted, the picture dower lifts up and releases the projection. With resistance R 1, the exciter lamp voltage can be adjusted to the desired value.

Switching on RE 3 has the effect that voltage reached the possibly existing remote control buttons for focus and framing through the plug contacts B5/1 and B6/1. Simultaneously RE 3 serves also for the alarm circuitry. If while the projector is faded-in, that is RE 4 and RE 3 are switched on, RE 2 is switched off through a film break, mains voltage reaches the alarm output through a re 3 contact.

By depressing the key SK 10, RE 5 is switched on, as a result RE 4 declines, the exciter lamp is extinguished, the dower closes.

In case of change-over operation of 2 projectors, change-over knob SK 9 serves not only to fade in the projector but also simultaneously to fade-out the second projector. Through the change-over lines A1/1, B1/1 and C1/1, both connectors can be connected so that SK 9 of each projector not only closes RE 4 in its own projector and places RE 5 out of operation, but also closes RE 5 in the second projector and places RE 4 there out of operation.

In case of remote control, these lines run over the parallel connected keys to the fade-in and fade-out and change-over of the remote control panel.

The last relay — RE 6 is provided for film slide operation. Through a contact of the matrix it can be switched on, as result of which the exciter lamp is interrupted. Films can thus be shown without sound.

A contact of the relay RE 2 which is attached to the terminals 122 — 122, serves for switching on the rectifier and together with the bridge 122 A — 122 A for switching on the attached xenon lamp.

### 2. Light sources

2.1 Attached xenon lamp house and built-in rectifier. The circuitry of the attached xenon lamp can be seen from circuit diagram 0020 705 and the circuitry of the built-in rectifier (up to 1000 W) can be seen from circuit diagram SGB 4—16707. The control and pulse component of the rectifier is illustrated in diagram SGB 4—16347.

The attached xenon lamp receives voltage as soon as RE 1 of the projector is switched on. As a result, its fan starts also.

On delivery, the rectifier is always set for 220 V. For other mains voltages, the bridges on terminal L2 have to be



changed over. Contactor C1 of the rectifier as already mentioned is switched on from a contact of the relay RE 2, that is simultaneously with the motor of the projector. As a result, the xenon lamp also lights up simultaneously.

**Note:** The rectifier can be switched on and the lamp can be ignited only if the doors of the lamp house are closed and the fan of the lamp house is running, since the line runs over door contacts and contact closed by the fan.

In case of larger rectifiers, which are arranged outside, a similar process should be employed.

A contact of the ignition relay at the moment of the ignition of the xenon lamp short circuits the loudspeaker line 10–11. As a result no ignition noise can be heard in the theater, while the sound interruption is so short that it cannot be noticed.

The direct voltage and consequently the power input of the lamp can be regulated with a potentiometer of the rectifier.

## MAINTENANCE

### Cleaning

After every film reel clean the following with a soft toothbrush:

- the film track
- the pressure pads
- the aperture
- the sprockets
- the magnetic head (if used)

### Daily

- Remove dust with a soft cloth.
- After lifting up remove the pressure pads of the sprockets and clean with toothbrush.
- Clean lens with a badger bristle brush; remove grease or fingerprints with a linen cloth slightly moistened with alcohol.
- If the projector is equipped with an aperture lens, remove holder with lens and clean the latter with a linen cloth.
- Remove the film track and clean with toothbrush and cloth; any embedded hard particles should be cautiously removed; never use sharp objects.

### Weekly

- Clean projector.
- Check whether all film guide sprockets and the 4 ceramic guide rollers run smoothly in the film channel; if not, remove the sprockets, then clean borehole and shaft with a dry cloth; drop one drop of oil on the shaft and rub off with your fingers. Never use viscous oil. N.B. The sprockets are not interchangeable with each other.

### Lubrication

Type 3672 oil is used for the oil bath of the intermittent movement mechanism. In case of new projectors and after replacement of an intermittent movement, the following procedure is used:

1. Oil change after 50 operating hours
2. Oil change after 100 operating hours
3. Oil change after 500 operating hours and subsequently every 500 hours.

The best method for filling the intermittent movement is through the plastic hose after removing the cover of the oil level tube. One should be sure that the oil quantity amounts to around 200 ccm and that the level lies between the red and green ring. The supplied plastic cylinder is used for filling. During oil filling, turn the transmission slowly by hand, so the air bubbles escape.



**Draining oil:**

Remove cover from oil level tube and hose closure. The oil can now be drained through the hose.

**Lubrication of further parts:****Daily:**

Forward bearing of the sprocket shaft. Esso universal oil.

**Monthly**

Guide sprocket shafts	Esso universal oil
Reel axes	

**Every three months**

Guide of the lens holder	EL 4854
Chains	Esso universal oil
Novotex geared wheel with geared wheel of the shutter shaft	

**After reconditioning**

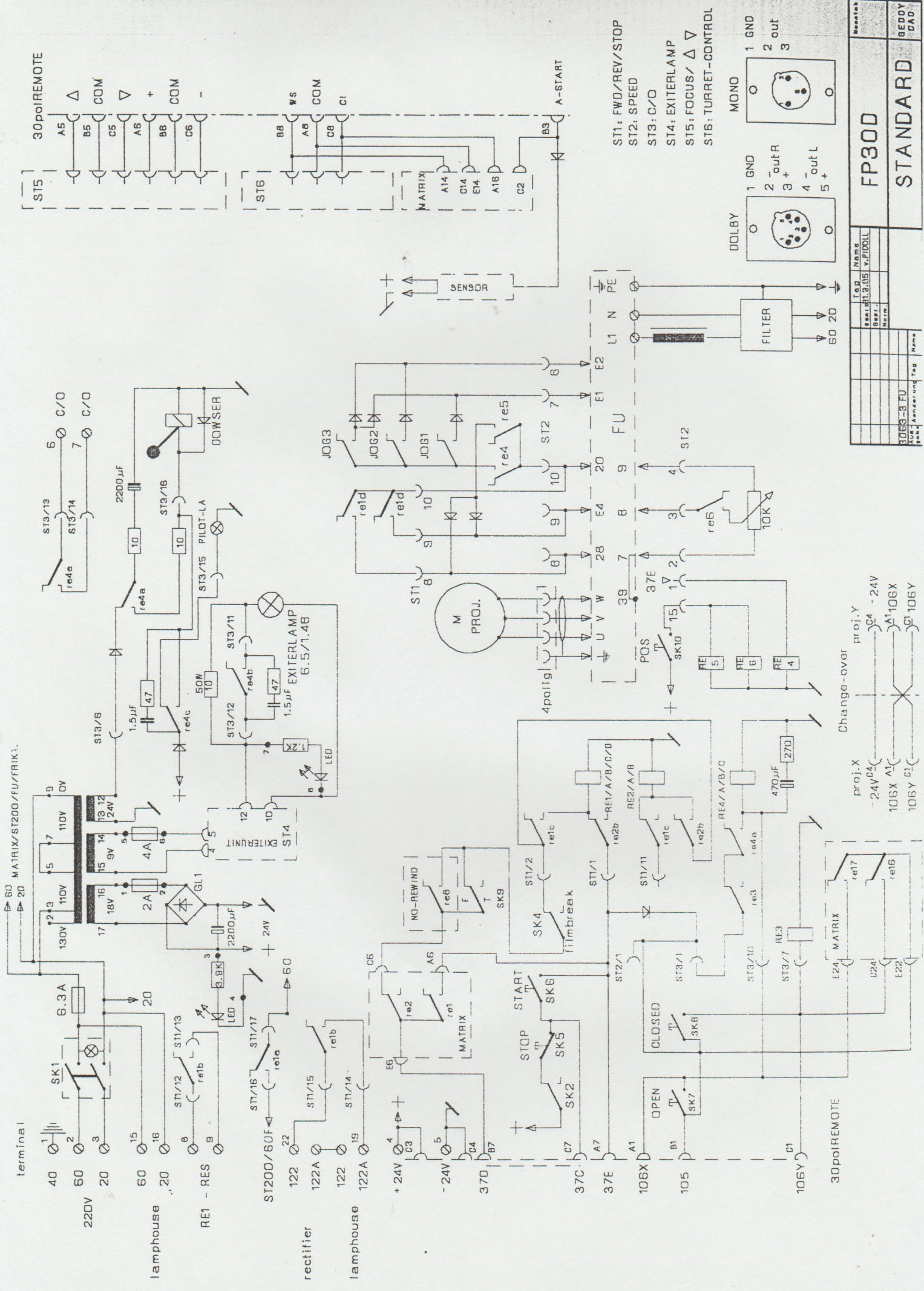
Ball bearings of the sound shaft	
	Esso universal oil
Ball bearings of the pressure roller	
	EL 4854

**Yearly**

- With Cardan oil, type 8657:
- Joint of the pressure roller of the optical sound appliance and
- Tension roller of the magnetic sound appliance;

Screw out the fixing screw of the chrome cap of the roller arm, remove arm with roller, push roller from the shaft, lubricate borehole and shaft with some oil and reassemble the parts. Adjust tension of the torsion spring to 600–800 g, measured at the shaft.





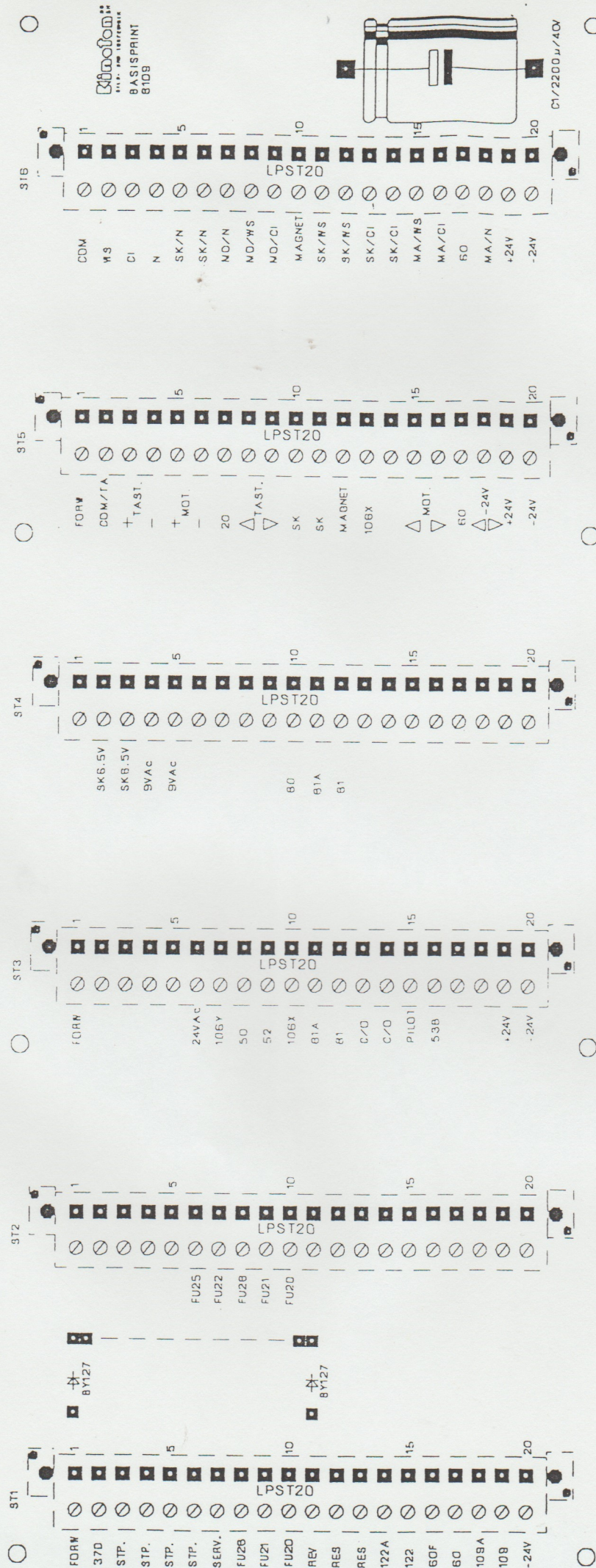
		Tag	Name	FP300	Buddy GAD
		see 101	v. PUDOLL		
		Dep.			
			Costs	STANDARD	
1069-3 FU					
AUG 1		Vendor	Tag		
Kabb			Name		



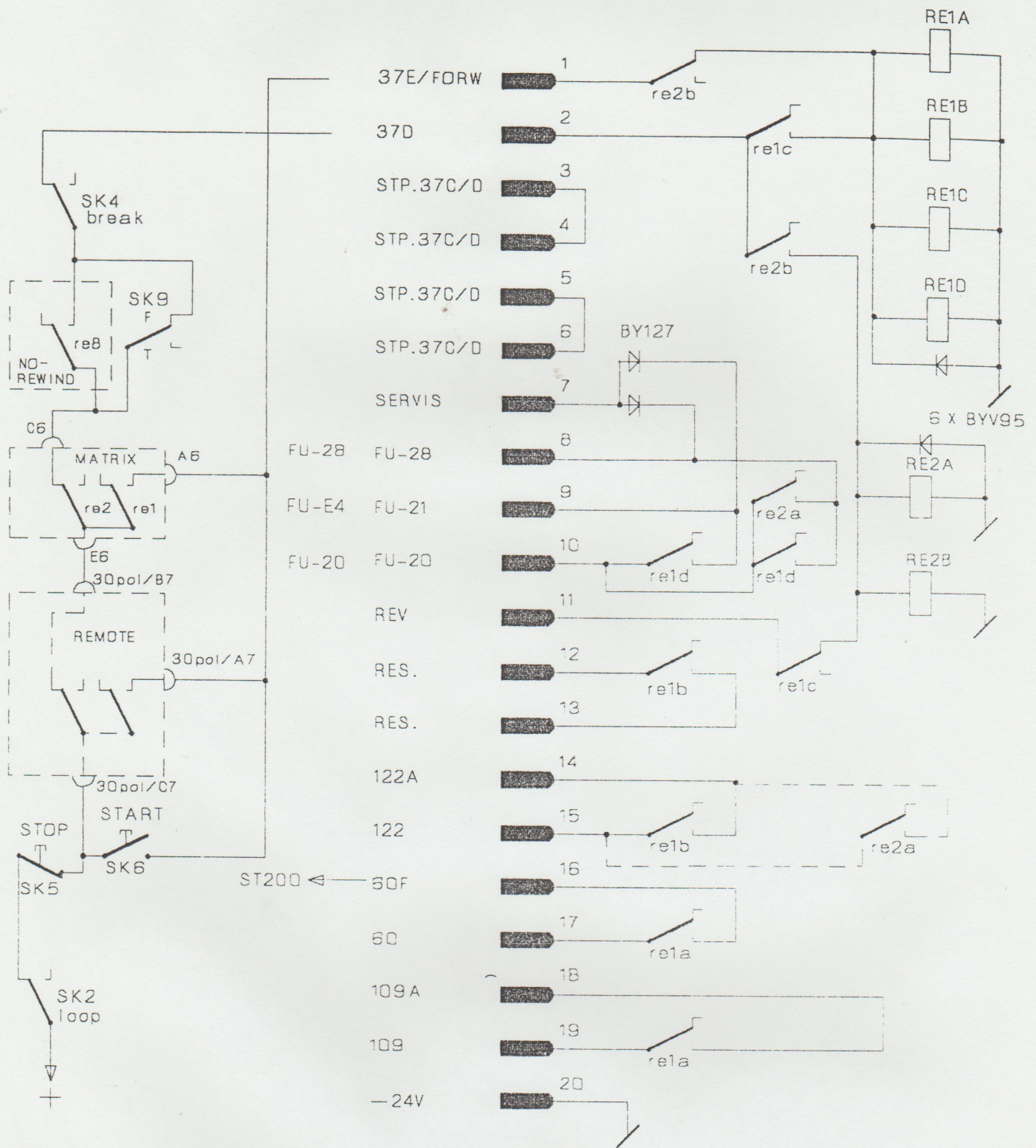
# Allocaction of Clamps FP 30 D

1	Ø	40	ground	)	
2	Ø	60	phase	)	220 V input
3	Ø	20	zero	)	
4	Ø		+ 24 V		
5	Ø		- 24 V		
6	Ø		C/O change-over of sound		
7	Ø		C/O change-over of sound		
8	Ø		res. operating contact RE 1		
9	Ø		res. operating contact RE 1		
10	Ø				
11	Ø				
12	Ø				
13	Ø				
14	Ø				
15	Ø	60	phase	}	220 V lamphouse
16	Ø	20	zero		
17	Ø	10	}		loudspeaker safety contact
18	Ø	11			
19	Ø	122 A	rectifier control		
20	Ø		]		
21	Ø				
22	Ø	122	rectifier control		
0	+		}		d.c. connection xenon lamp
0	-				
23	Ø	40	ground		



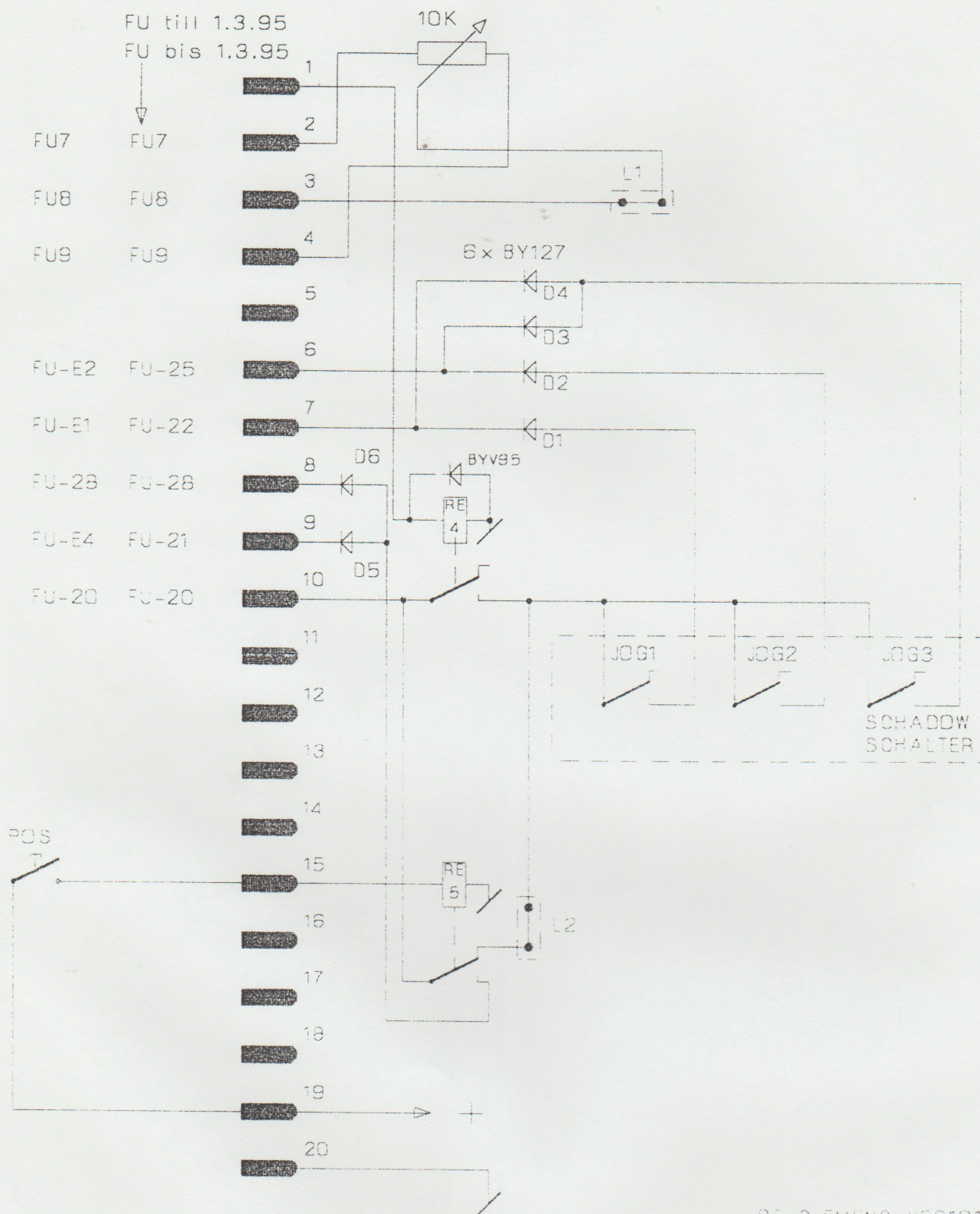






				Tag	Name	ST1 START-STOP	Masstab
				Gepr.	4.3.1995 v.PIDOLL		
				Norm.			
				Kinoton <sup>GM</sup> <sub>BH</sub>		FP30D	GEDDY CAD
8051-2				BILD- UND TONTECHNIK			
Aus- gabe	Änderung	Tag	Name				

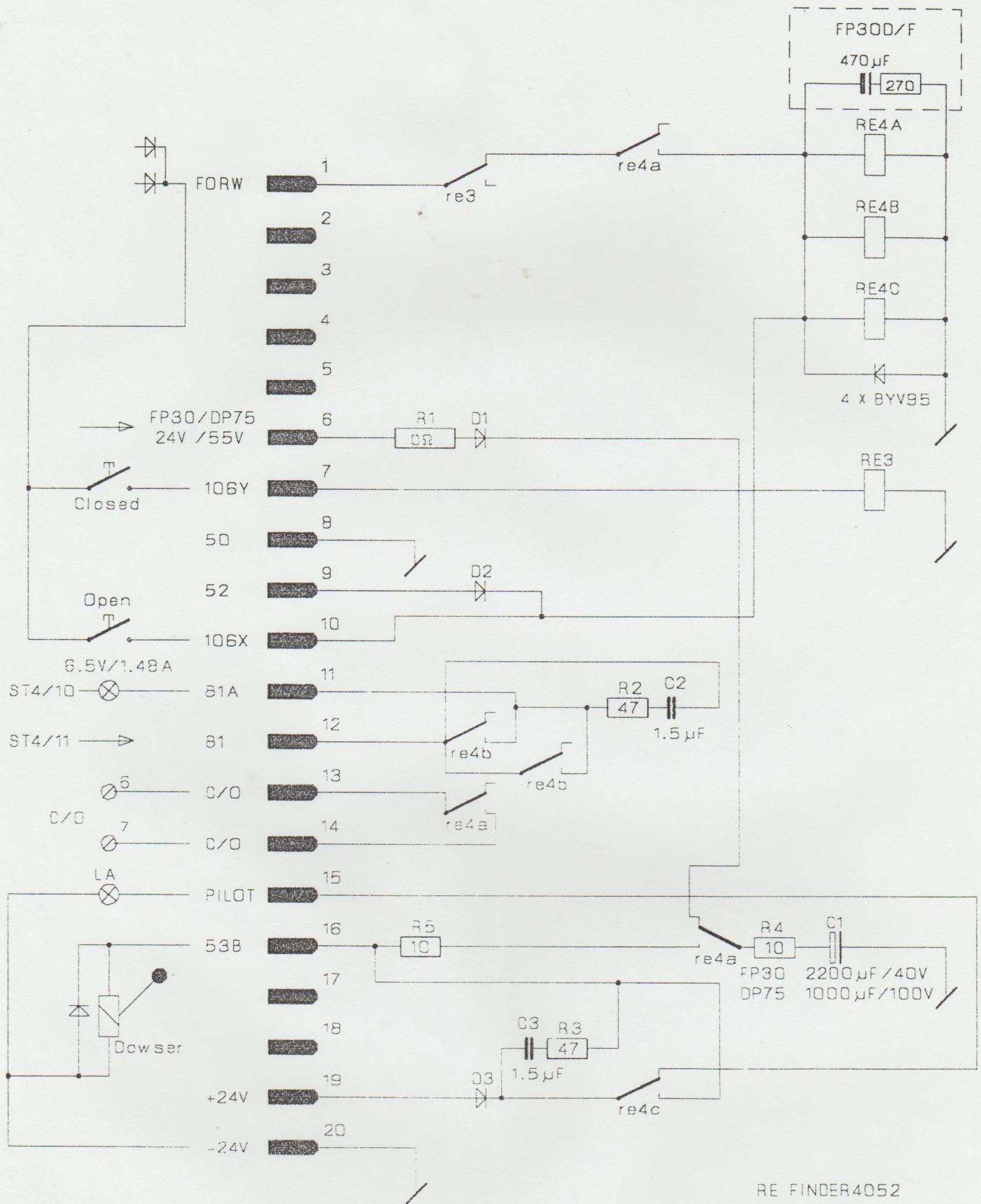




RE=SIEMENS V23101/A101

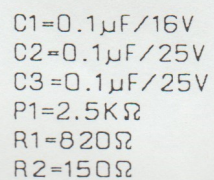
				Tag	Name	ST2 SPEED	Masstab		
				Beard	27.2.95 v. PIDOLL				
				Geor.					
				Norm.		FP30 STANDARD	GEDDY CAD		
8053-7				Kinton <sup>GM</sup> BH					
Aus- gabe	Änderung	Tag	Name	BILD- UND TONTECHNIK					






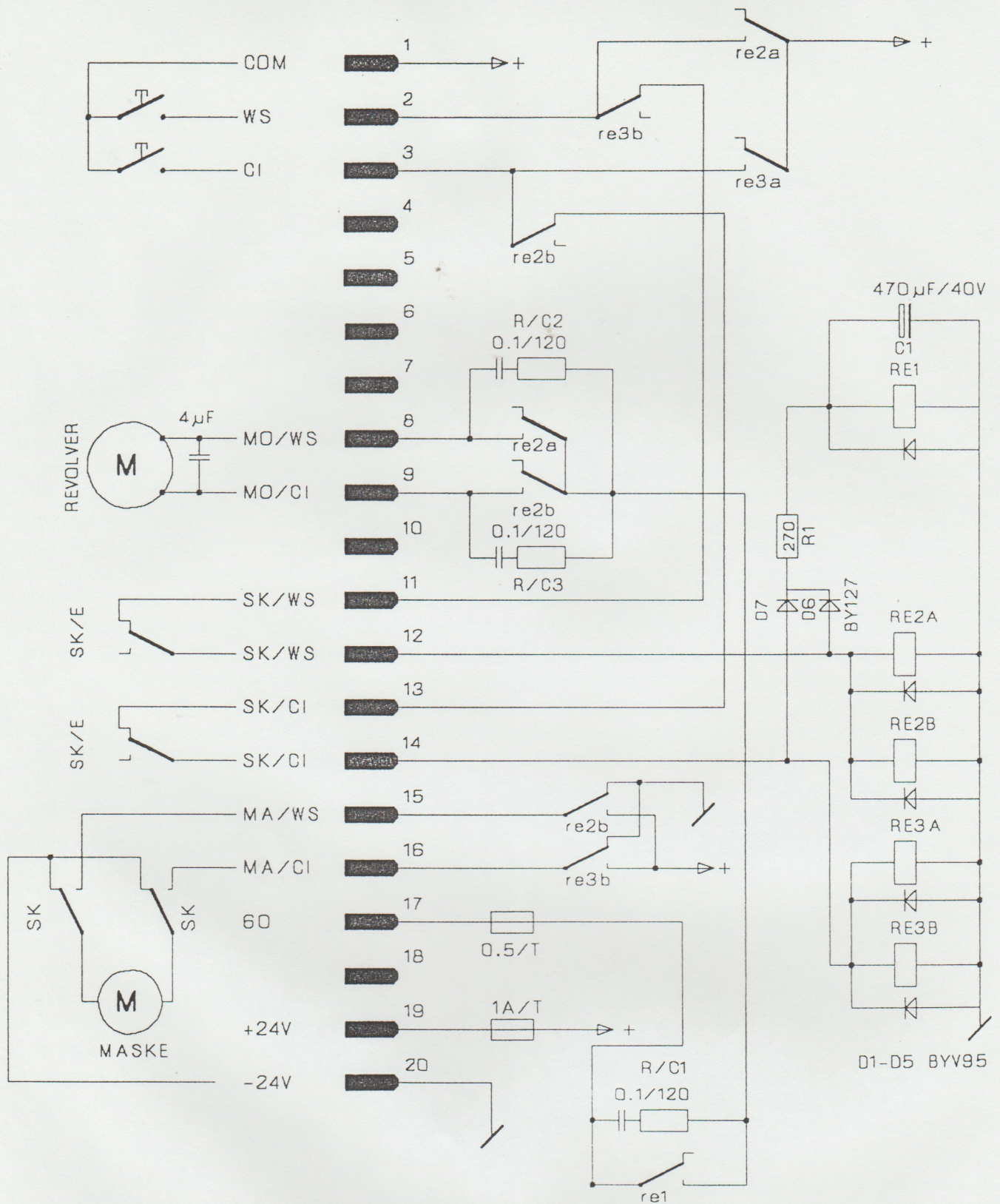
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				31.3.95	v. PIDOLL		
				Geor.			
				Norm.		GEOFFY CAD	
				Kinoton <sup>GM</sup> <sub>BH</sub>			
				BILD- UND TONTECHNIK			
8052-1	Aenderung	Tag	Name				
Ausgabe							





				Tag	Name	ST4 TONLAMPEN-GL	Masstab
				Bearb	28.7.92 v.PIDOLL		
				Gepr.			
				Norm.			
							GEDDY CAD
Aus- gabe	Änderung	Tag	Name	BILD- UND TONTECHNIK			





RE = FINDER 4052

				Tag	Name	ST6 REVOLVER	Masstab
				Bearb.	2.8.92 v.PIDOLL		
				Gepr.			
				Norm.			
				Kinoton <sup>GM</sup> <sub>BH</sub>		GEDDY CAD	
Aus- gabe	Änderung	Tag	Name	BILD- UND TONTECHNIK			



## FU adjustment with new FU type 33.8201E1D.11 at normal operation with Jog 1.2.3 for FP 30 D

**Attention:** FU has 2 code meter levels Par1 and Par2  
For safety reasons adjust both levels with the same value

Basic adjustments: 5 . . .  
1 . . . ↔ jumper on 3-4

After switching on it appears OFF.

60 Hz maximum rotary-field frequency (30 frames = 60 Hz)  
Code meter level is C011

1. Shortly tap PRG (it appears C001/Par1)
2. Tap key ▲ (increase) up to C011 (▲ + SH is quick operation)
3. Press key SH (it appears 50 Hz factory setting and Par1 is flashing)
4. Tap key ▲ until it appears 60 Hz
5. Now store: Tap PRG and SH together (it appears ST0 and then C011)
6. Press key SH (it appears 60 Hz/Par1), press it again (it appears 50 Hz/Par2)
7. Tap key ▲ until it appears 60 Hz
8. Now store (procedure point 5)

### Jog adjustment 1.2.3

U/F characteristic and U/min setting

U/F characteristic C014

1. Tap key▲ up to C014
2. Press key SH (factory setting -0-/Par1 is flashing)
3. Tap key ▲ to -2-
4. Now store: (PRG and SH) it appears ST0 and then C014
5. Press key SH (it appears -2-/Par1), press it again (it appears -0-/Par2)
6. Tap key ▲ until it appears -2-
7. Now store: (procedure point 4)

U/min setting

1. Tap key ▲ up to C016
2. Press key SH (factory setting 8.00) Par1 is flashing
3. Tap key ▲ until it appears 25.00
4. Now store: (PRG and SH) it appears ST0 and then C016
5. Press key SH (it appears 25/Par1), press it again (it appears 8.00/Par2)
6. Tap key ▲ until it appears 25.00
7. Now store: (procedure point 4)



### Jog adjustment 1.2.3

#### Jog 1

1. Key ▲ until it appears C37
2. Press key SH (factory setting 20/Par1)
3. Tap key ▲ up to 48 Hz
4. Now store: (PRG and SH) it appears ST0 and then C037
5. Press key SH (it appears 48 Hz/Par1), press it again (it appears 20/Par2)
6. Tap key ▲ until it appears 48 Hz
7. Now store: (procedure point 4)

#### Jog 2

1. Key ▲ until it appears C38
2. Press key SH (factory setting 30/Par1)
3. Tap key ▲ until it appears 50 Hz
4. Now store: (PRG and SH) it appears ST0 and then C038
5. Press key SH (it appears 50 Hz/Par1), press it again (it appears 30/Par2)
6. Tap key ▲ until it appears 50 Hz
7. Now store: (procedure point 4)

#### Jog 3

1. Key ▲ until it appears C39
2. Press key SH (factory setting 40/Par1)
3. Tap key ▲ until it appears 60 Hz
4. Now store: (PRG and SH) it appears ST0 and then C039
5. Press key SH (it appears 60 Hz/Par1), press it again (it appears 40/Par2)
6. Tap key ▲ until it appears 60 Hz
7. Now store: (procedure point 4)

After the programming press PRG and then RUN.

For special applications concerning starting ramps and slowing down ramps, please see operating instructions for programming.



## 8. Code table

The following table shows which settings can be performed with which codes. Detailed explanation about the codes and the functions which can be achieved, are described in special chapters.

Code	Name	Parameter (factory setting is printed in bold)	See page	Your settings
C001	Operating mode	-0- Set value provision via terminal 8 <b>Control via terminals</b> <b>Parameter setting via 8201BB</b> -1- Set value provision via 8201BB <b>Control via terminals</b> -2- Parameter setting via 8201BB Set value provision via terminal 8 <b>Control via terminals</b> -3- Parameter setting via LECOM Set value provision via LECOM <b>Control via LECOM</b> Parameter setting via LECOM Acceptance of settings with PRG+SH	34	
C002*	Parameter set	-0- Function executed -1- Overwrite PAR1 with factory setting -2- Overwrite PAR2 with factory setting -3- Overwrite PAR1 and PAR2 with data of LCD keypad -4- Overwrite PAR1 with the data of LCD keypad -5- Overwrite PAR2 with the data of LCD keypad -6- Transmit PAR1 and PAR2 to LCD display acceptance of settings with PRG+SH	34	
C004	Switch-on display	-0- Field frequency $f_d$ -1- Inverter load -2- Motor current Acceptance of settings with PRG+SH	31	

Code	Name	Parameter (Factory setting is printed in bold)	see page	Your settings
C007*	Terminal configuration	-0- CW/CCW GSB JOG 1/2/3 -1- CW/CCW PAR JOG 1/2/3 -2- CW/CCW QSP JOG 1/2/3 -3- CW/CCW PAR GSB JOG1 -4- CW/CCW QSP PAR JOG1 -5- CW/CCW GSB Trip-Set JOG1 -6- CW/CCW PAR Trip-Set JOG1 -7- CW/CCW PAR GSB Trip Set -8- CW/CCW QSP PAR Trip Set -9- CW/CCW QSP Trip Set JOG1 -10- CW/CCW Trip Set UP DOWN -11- CW/CCW GSB UP DOWN -12- CW/CCW PAR UP DOWN -13- CW/CCW QSP UP DOWN -14- CW/CCW QSP GSB JOG1 -15- CW/CCW QSP PAR JOG1 -16- CW/CCW QSP JOG 1/2/3 -17- CW/CCW QSP PAR GSB -18- CW/CCW QSP PAR Trip-Set -19- CW/CCW QSP GSB Trip-Set -20- CW/CCW QSP Trip-Set JOG1 -21- CW/CCW QSP UP DOWN -22- CW/CCW QSP UP JOG1 Acceptance of settings with PRG+SH	41	-0-
C008	Relay function	-0- Ready to operate <b>TRIP fault indication</b> -1- Motor running -2- Motor running / CW rotation -3- Motor running / CCW rotation -4- Field frequency $f_d = 0$ -5- $f_{dset}$ reached -6- $Q_{min}$ reached -7- $I_{max}$ reached -8- Overheat ( $\dot{\eta}_{max} - 10^\circ C$ ) -9- TRIP or $Q_{min}$ or IMP -10- Acceptance of settings with PRG+SH	44	
C009*	Controller address	1 1 to 99 only for LECOM applications		
C010	Minimum field frequency	0.0Hz 0.0 to 480 Hz	35	
C011	Maximum field frequency	50Hz 30 to 480 Hz	35	60 Hz
C012	Acceleration time	5.0s 0.0 to 640 s	35	
C013	Deceleration time	5.0s 0.0 to 640 s	35	
C014	Control mode	-2- linear characteristic $V \sim f_d$ with constant $V_{min}$ boost -3- square characteristic $V \sim f_d^2$ with constant $V_{min}$ boost <b>Motor current control</b> -4- Acceptance of settings with PRG+SH	36	-2-
C015	V/f rated frequency	50Hz 30 to 960Hz	37	



Code	Name	Parameter (Factory setting printed in bold)	see page	Your setting
C016	Vmin setting	Factory setting depending on type 0 to 40%	38	25%
C017	Threshold Q <sub>min</sub>	0Hz 0 to 480 Hz	44	
C018	Chopper frequency	-0- 4 kHz -1- 8 kHz -2- 12 kHz -3- 16 kHz	49	
C021	Slip compensation	Acceptance of settings with PRG+SH 0% 0.0 to 12%	49	
C022	I <sub>max</sub> limit motor mode	150% 30 to 150%	47	
C023	I <sub>max</sub> limit generator mode	80% 30 to 110%	47	
C034*	Master current	-0- 0 to 20mA -1- 4 to 20mA Acceptance of settings with PRG+SH	39	
C036	Voltage for DC injection brake	Factory setting depending on type 0 to 40%	42	
C037	JOG value 1	20 Hz 0 to I <sub>dmax</sub> [Hz]	40	48
C038	JOG value 2	30 Hz 0 to I <sub>dmax</sub> [Hz]	40	50
C039	JOG value 3	40 Hz 0 to I <sub>dmax</sub> [Hz]	40	60
C040*	Controller enable	-0- Controller inhibited -1- Controller enabled Only possible via LECOM		
C043*	Trip-Reset	-0- Fault reset -1- Fault Only possible via LECOM		
C046*	Frequency set value	0 to I <sub>dmax</sub> [Hz] Only possible via LECOM		
C050*	Output frequency	- Display -	31	
C052*	Motor voltage	- Display -	31	
C054*	Motor current	- Display -	31	
C056*	Inverter load	- Display -	31	
C061*	Heatsink temperature	- Display -	31	
C068*	Operating status	Bit commands for LECOM control Only possible via LECOM		
C087	Rated motor speed	Factory setting depending on type 0 to 9999	48	
C088	Rated motor current	Factory setting depending on type 0.0 to output rated current	48	
C089	Rated motor frequency	50Hz 0 to 480 Hz	48	
C091	Motor cos φ	Factory setting depending on type 0.40 bis 1.0	48	
C093*	Inverter type	821x	50	
C099*	Software version	82.0.x	50	
C105	Deceleration time for quick stop	5s 0 to 640s	42	



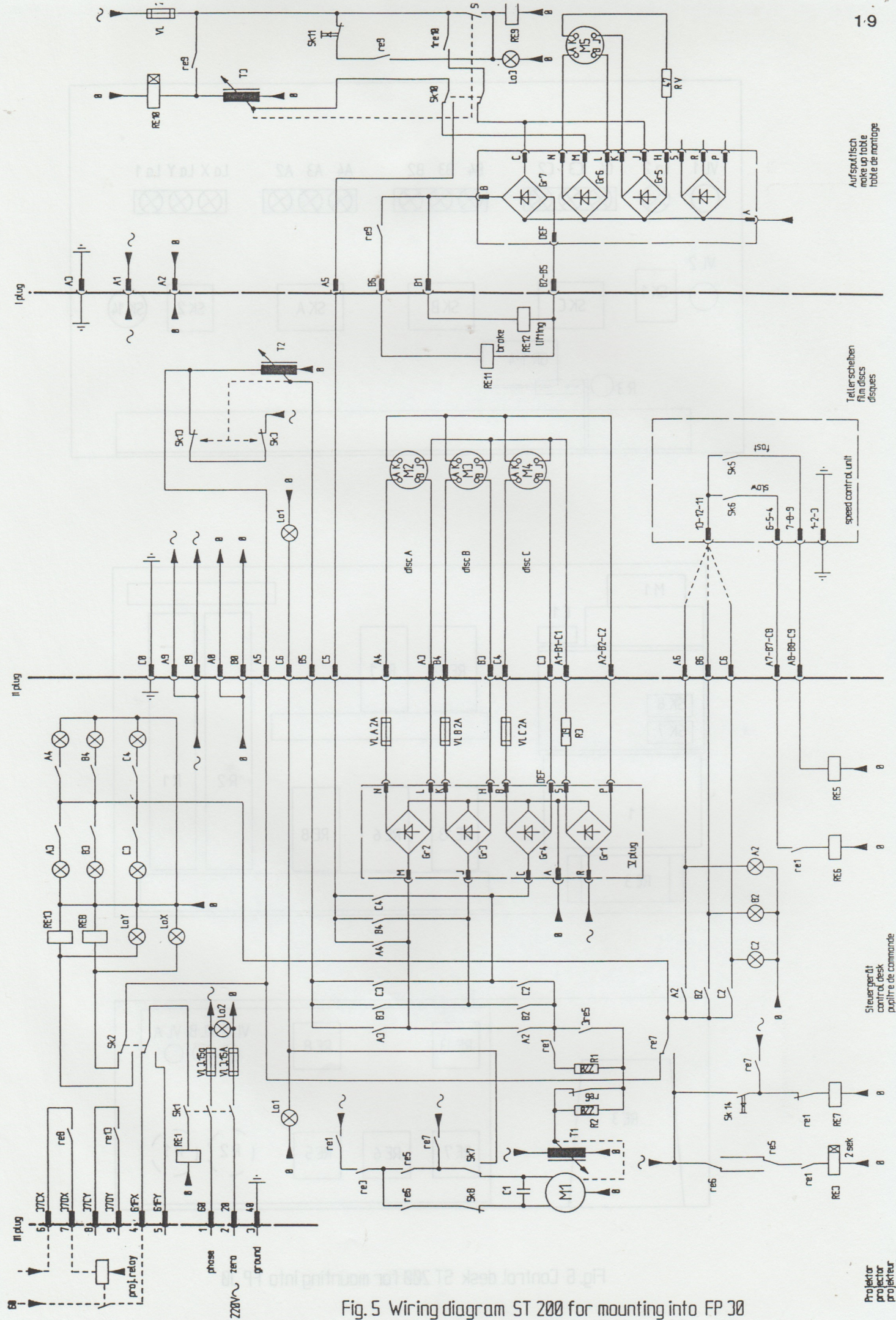


Fig. 5 Wiring diagram ST 200 for mounting into FP 30



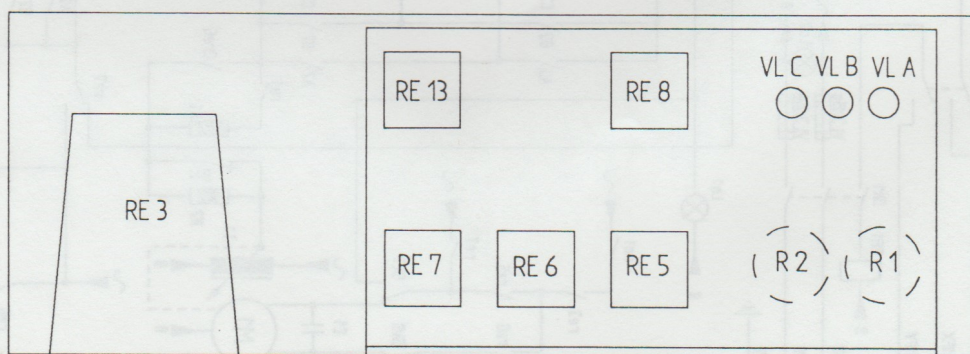
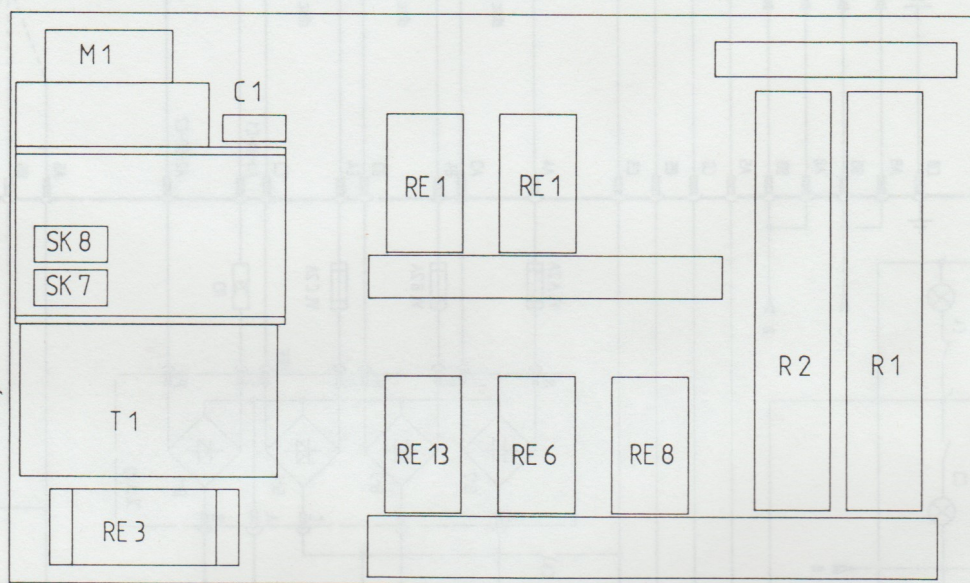
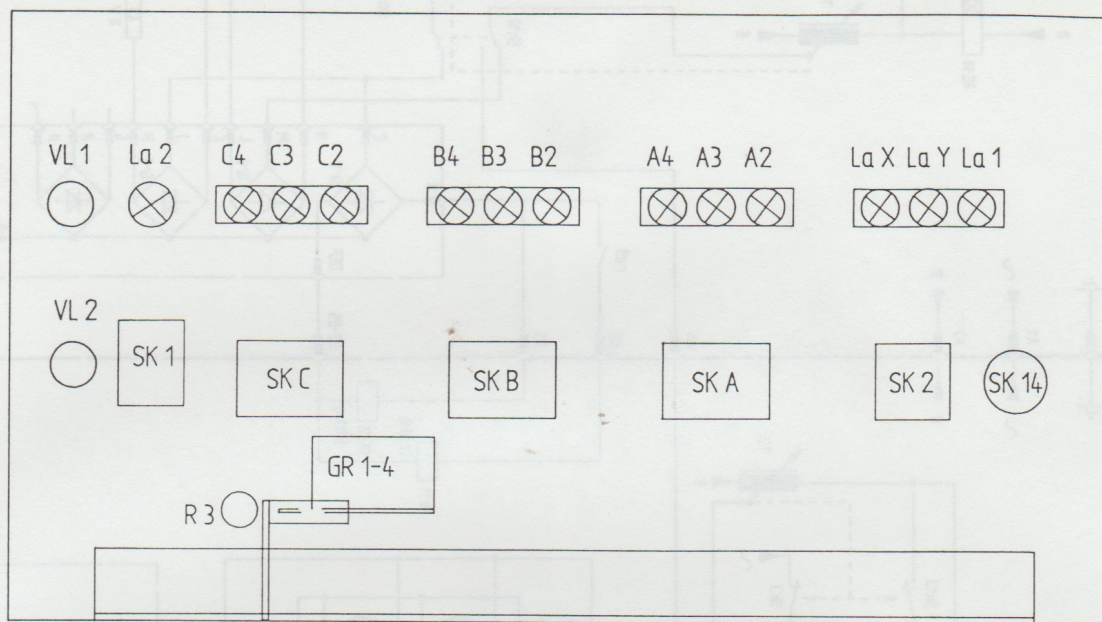
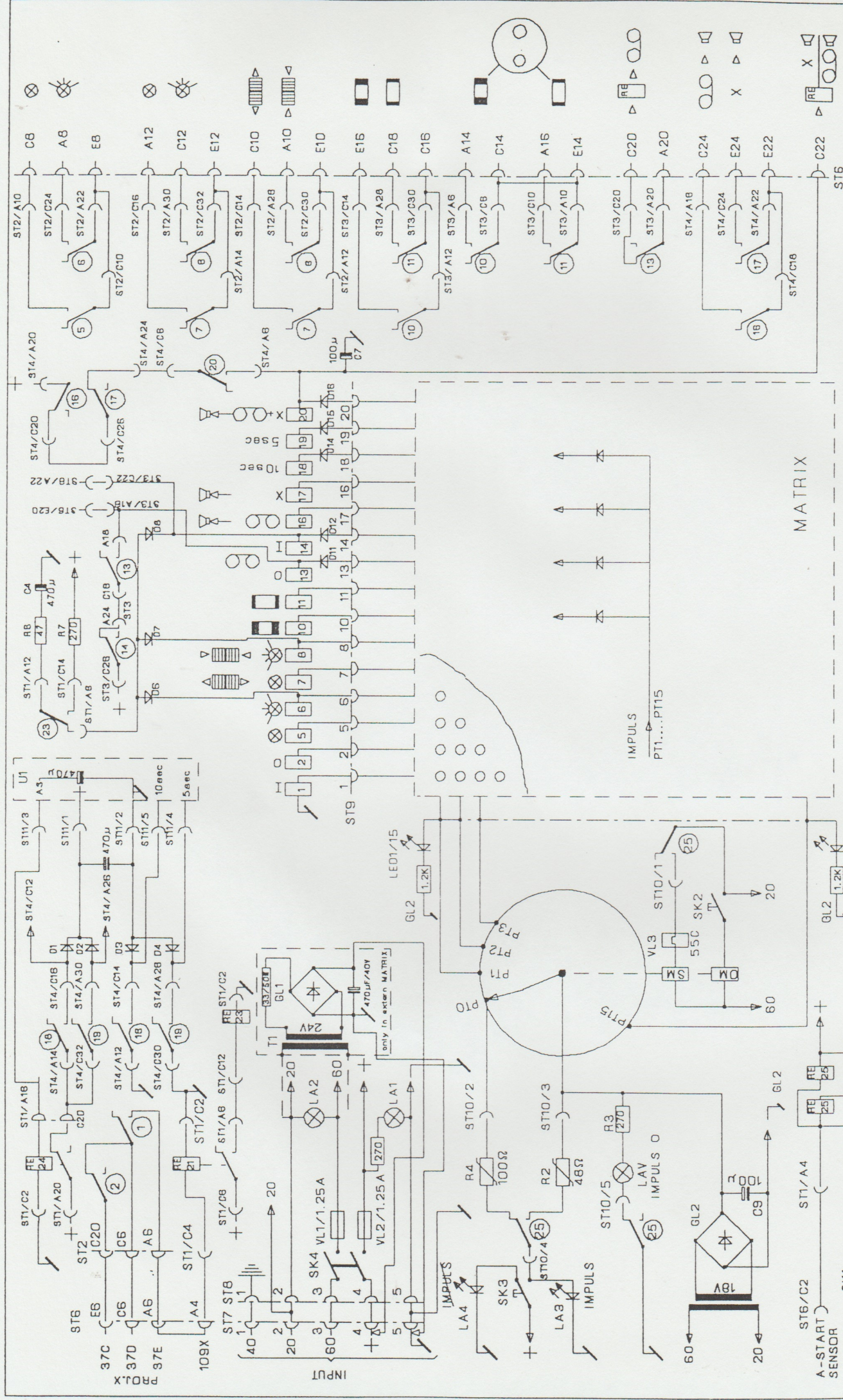


Fig. 6 Control desk ST 200 for mounting into FP 30





Name			
Tag	31.1.93	Rev.	PIDOLL
Gepr.		Norm.	
Name			
Ausg.	Sendung	Tag	
Geb.			

MATRIX 15/15

GEDDY CAD







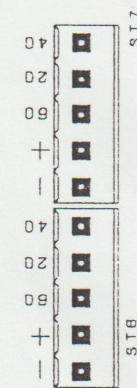
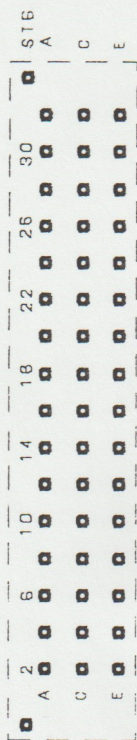
# Steckerbelegung 48-pol.

E 2	+ 24 V	C 2	Auto. Start	A 2	Sensor - 24 V
E 4	- 24 V	C 4	109 Y	A 4	109 X
E 6	37 C	C 6	37 D	A 6	37 E
E 8	Saal COM	C 8	Saal DU	A 8	Saal HE
E 10	Vorh. COM	C 10	Vorh. AUF	A 10	Vorh. ZU
E 12	Bühne COM	C 12	Bühne HE	A 12	Bühne DU
E 14	Rev. <u>CI</u> COM	C 14	Rev. <u>WS</u>	A 14	Rev. WS
E 16	Kasch WS	C 16	Kasch COM	A 16	Rev. CI
E 18	H-Kasch Abwärts	C 18	Kasch CI	A 18	H-Kasch COM
E 20	Stop Tonband	C 20	PH-Tonband	A 20	PH-Tonband
E 22	105	C 22	Filmdia	A 22	Start - Tonband
E 24	106 X	C 24	106 Y	A 24	37 EY
E 26		C 26	37 DY	A 26	37 CY
E 28	Kasch Todd	C 28	Rev. N	A 28	
E 30	Kasch Normal	C 30	Rev. N	A 30	RE 15
E 32	H-Kasch Aufwärts	C 32	H-Kasch Abwärts	A 32	RE 15

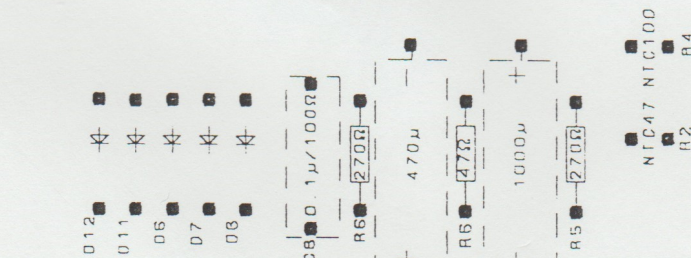
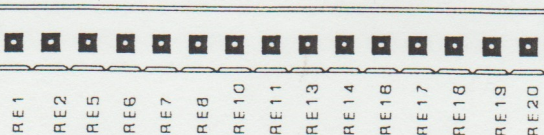


Matrix 8116

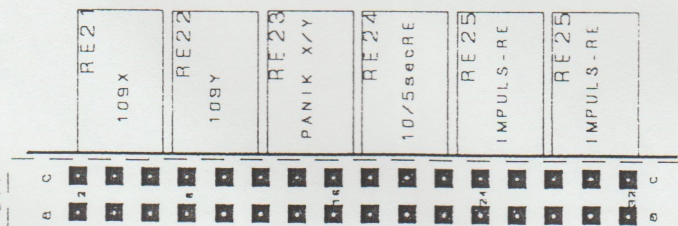
MATRIX 8116



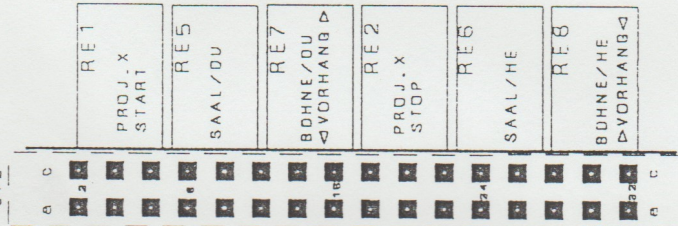
ST9



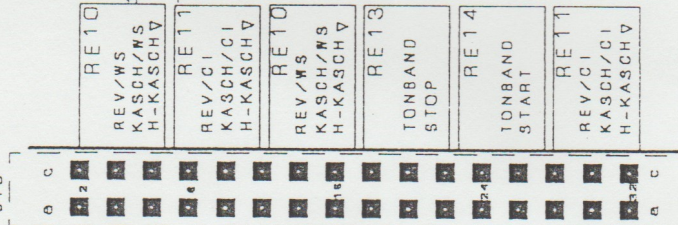
ST1



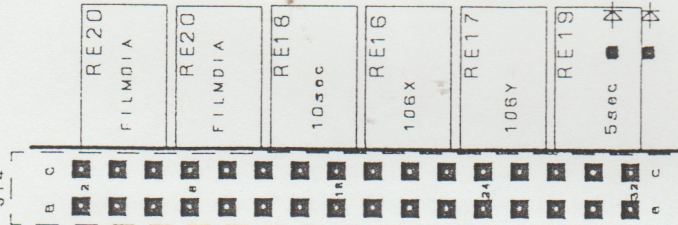
ST2



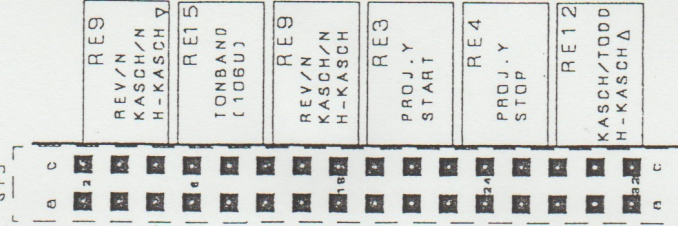
ST3



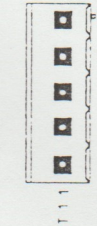
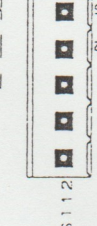
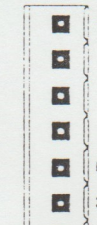
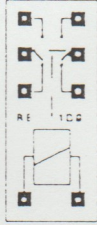
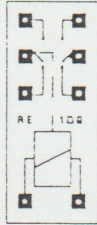
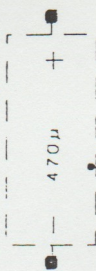
ST4



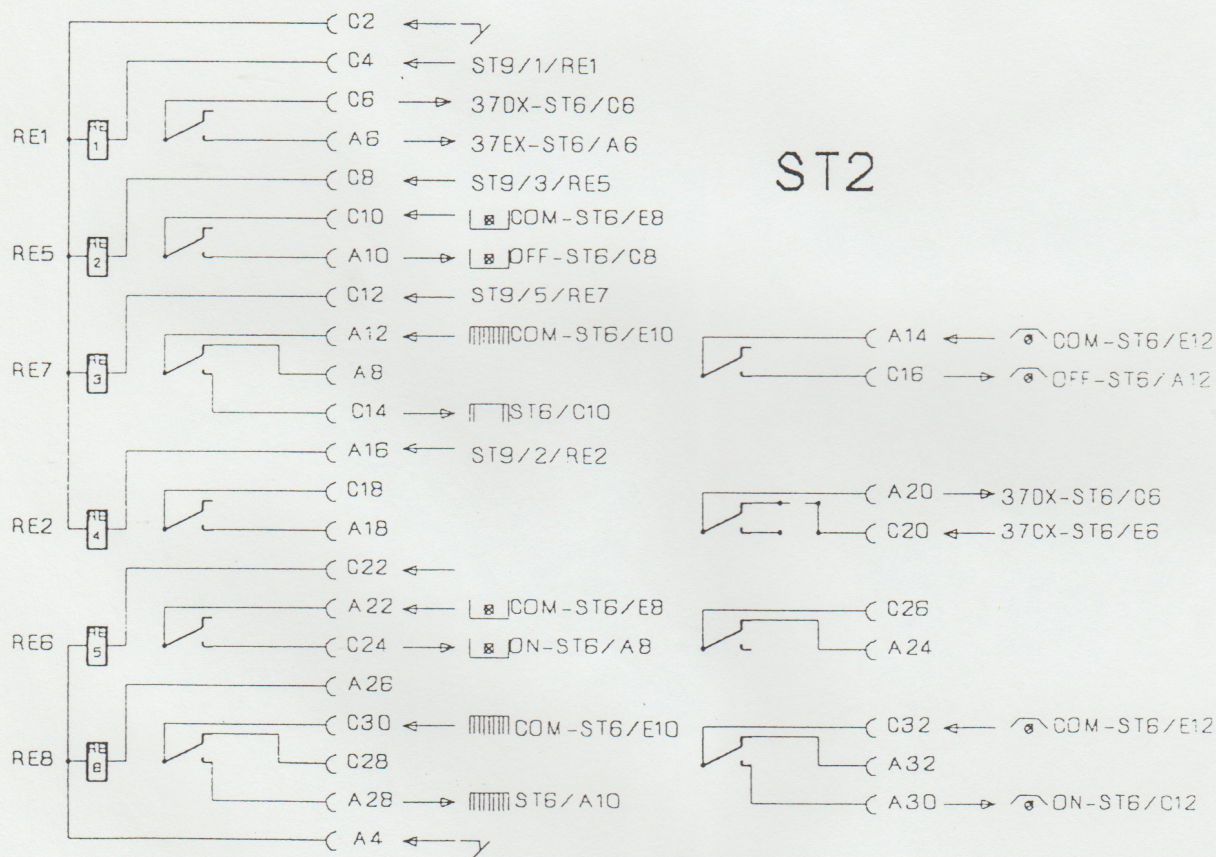
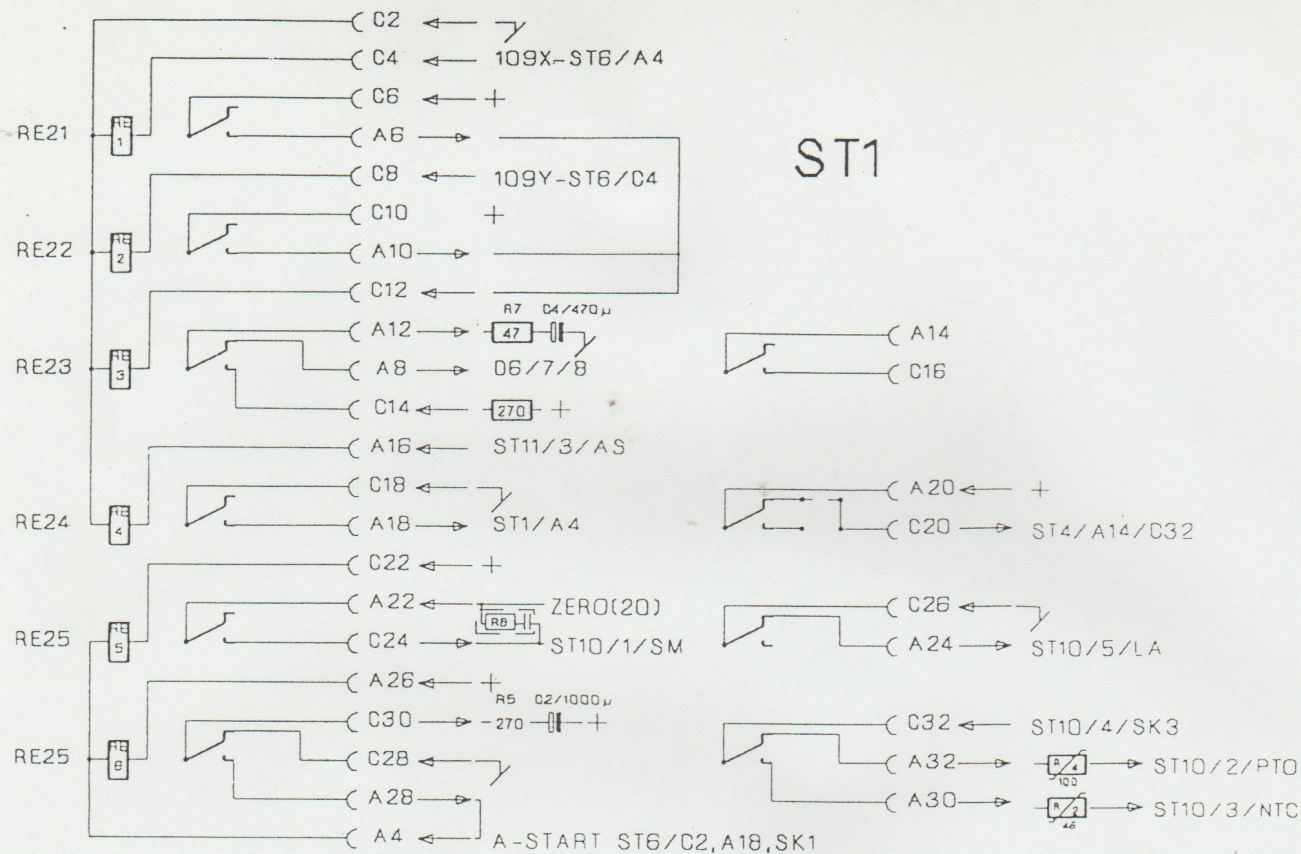
ST5



C6

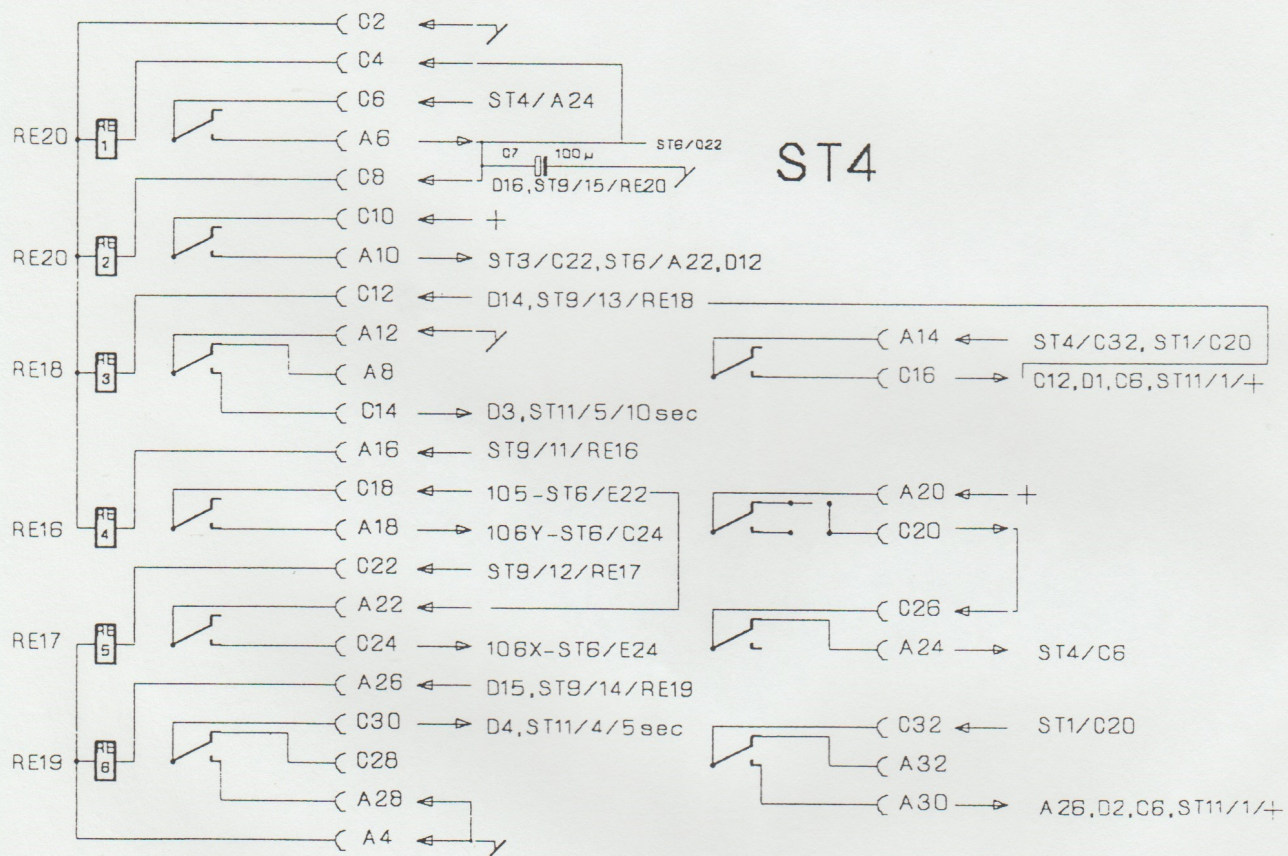
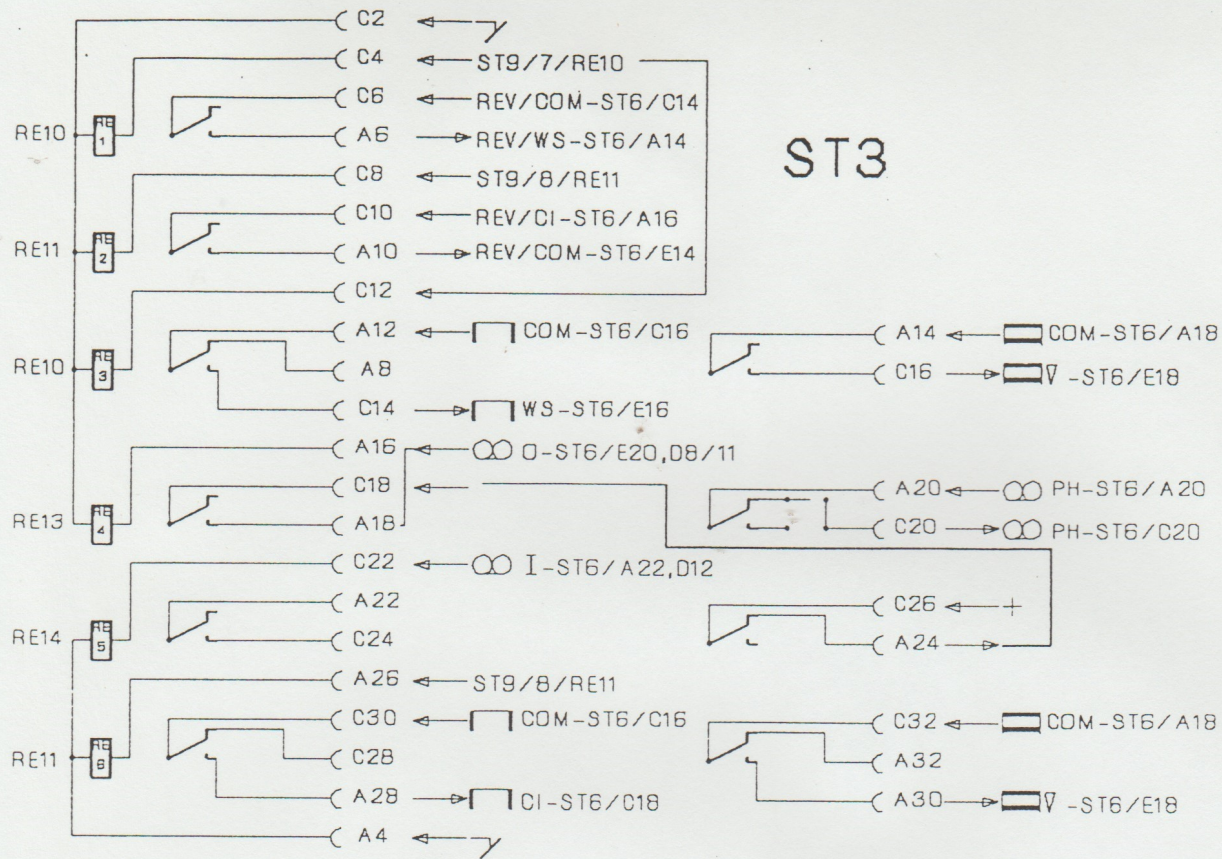




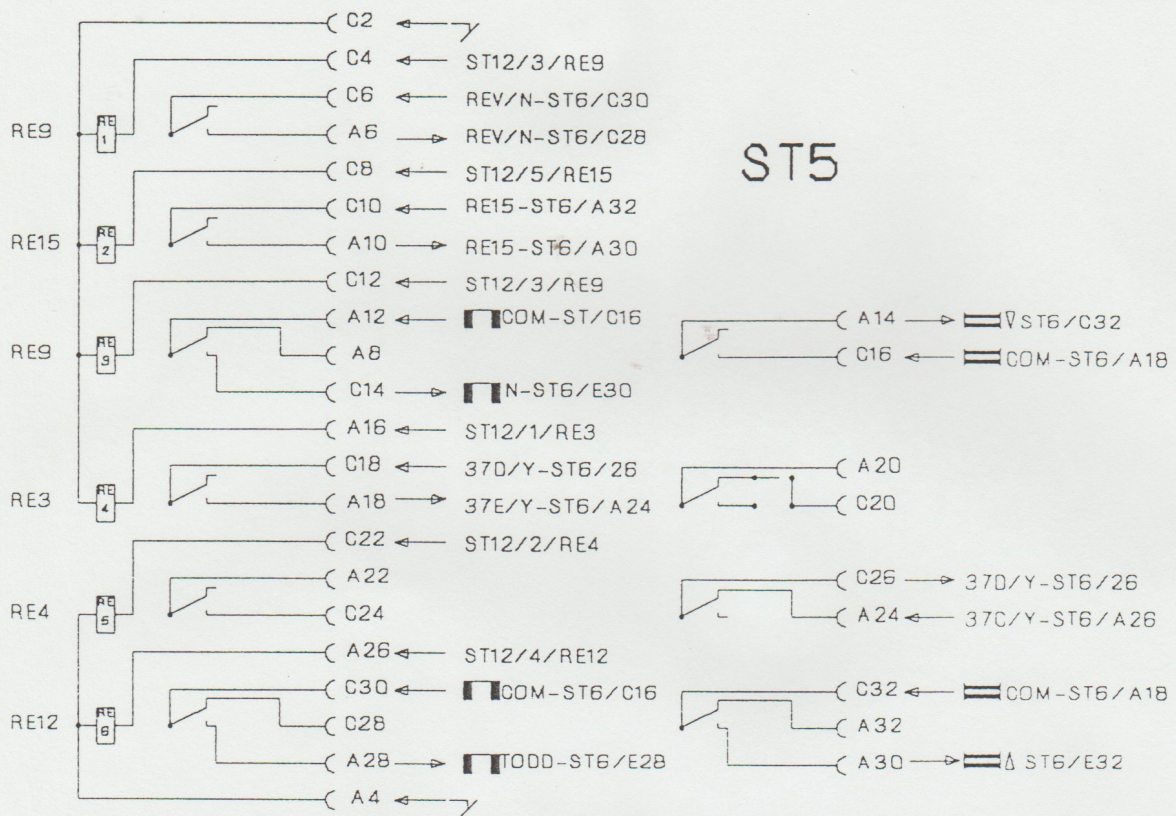


Tag	Name	Maßstab
4.2.83	v. P. DOLL	
Geor.		
Norm.		
8088	Kinoton	RELAISPLATINENPLAN
Änderung	Tag	Name
		ST1/ST2
		GEDDY CAD









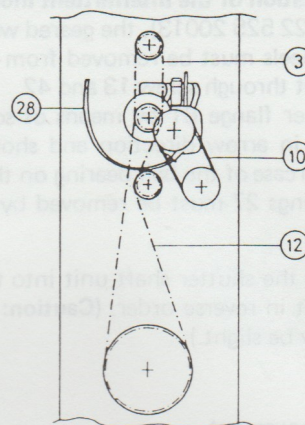
				Tag	Name		Maßstab
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				Gepr.		RELAISPLATINENPLAN	
				Norm.			
				Klinton			
				BILD- UND FORTSCHRITT			
Änderung	Tag	Name				ST5	GÉDDY CAD



## REPLACEMENT OF INDIVIDUAL PARTS AND ADJUSTMENTS

### 1. Replacement of the intermittent movement mechanism

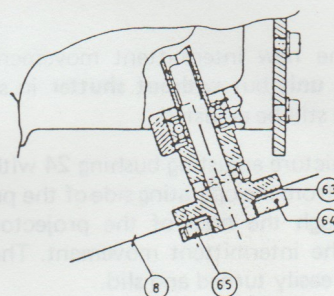
Drain oil using hose 28. Remove drive belt 10 and the chains 3/12.



Remove shutter housing:

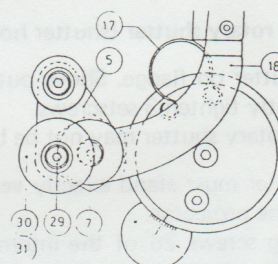
Loosen 3 setscrews 65 in fixing ring 64, they can be reached through the slot in the heat plate.

Remove ring, rotary shutter 8 and washer 63.

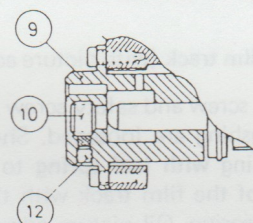


### Disassembly of the film track:

Unscrew bolt 29 of the large roll cap 31. Remove cap 31 with half 30. Unscrew bolt 7 of the roller plate 5 and remove plate. Pull off toggle joint 18 with Omega spring 17.



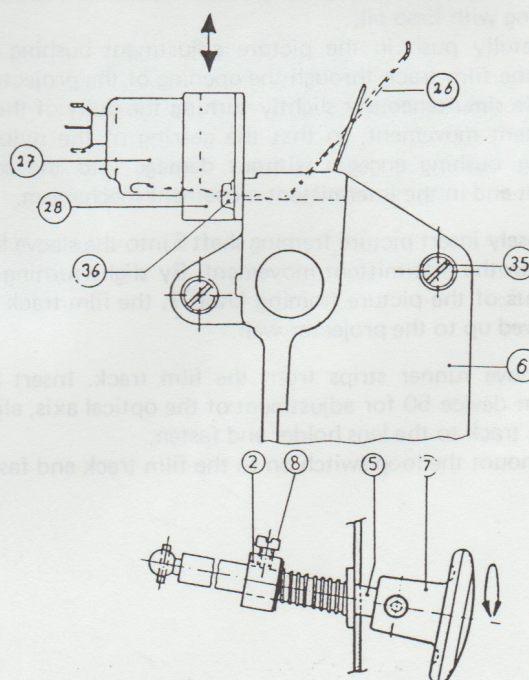
Loosen the safety screw 12 and turn the adjusting screw 10 of the front film track bearing bushing 9, 2–3 rotations.



Loosen 2 screws 36 of the fastening angle piece 28. Remove loop switch 27 with angle upwards.

Remove 4 screws 35 of film track 6. Remove film track slowly from the projector while simultaneously turning the framing adjustment knob 7 backwards and forwards.

Screw out as far as possible the picture setting bushing 24 by turning to the left sleeve bearing 39 on the intermittent movement mechanism. Screw in screw M 3 into the thread of the bushing and thus remove the bushing completely.



Loosen the locking ring 2 on the framing adjustment shaft 5. Pull shaft around 5 cm out of the projector housing.

In case of automatic framing loosen angle.

Remove 4 fixing screws 40, 26 of the intermittent movement mechanism. The intermittent movement must simultaneously be kept in the interior of the projector.



### Prior to installation of the intermittent movement

(Code No. 5322 525 20013), the geared wheel unit 38, 4, 5 with chain wheels must be removed from the old intermittent movement through screw 13 and 42.

Remove shutter flange 61 by means of screw 19, 62, pull out shaft 66 in arrow direction and shove out both ball bearings 60. In case of the ball bearing on the shutter flange, the 2 safety rings 27 must be removed by means of special pliers.

Installation of the shutter shaft unit into the new intermittent movement in reverse order. (**Caution:** axial play of the shaft may only be slight.)

### Intermittent movement

#### Assembly:

Screw on the new intermittent movement with **built-in shutter shaft unit** but **without shutter** in such a way that the latter can still be adjusted.

Push in the picture adjusting bushing 24 without **leaf spring** provisionally from the operating side of the projector around 30 mm through the hole of the projector wall into the opening of the intermittent movement. The bushing must be able to be easily turned and slid.

#### Insertion of the rotary shutter (shutter housing removed):

Place rotary shutter on flange. Shove out washer, screw on fixing ring, slightly tighten 3 setscrews.

(**Caution:** The rotary shutter may not be bent.)

The rotary shutter must stand exactly **vertical** to the shutter opening of the projector.

Tighten 4 fixing screws 26 of the intermittent movement and then pull out the picture adjustment bushing, and remove screw M 3.

#### Insertion of the film track (with picture adjustment bushing):

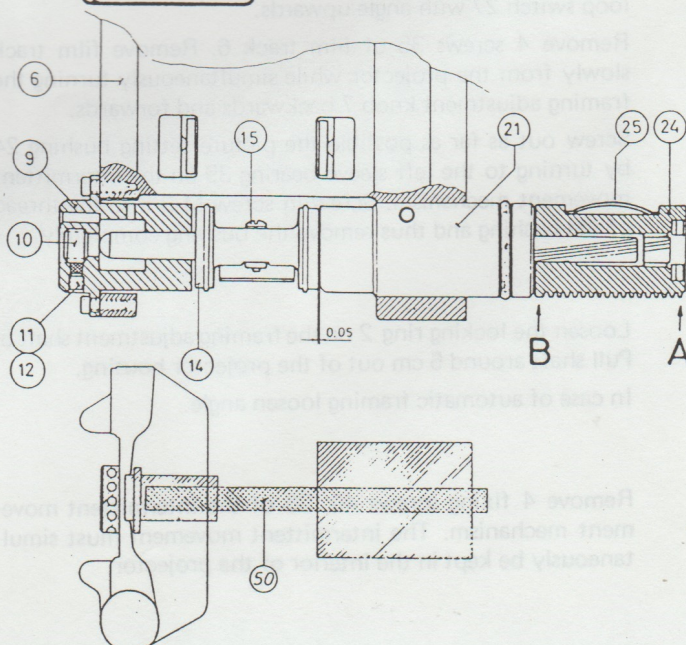
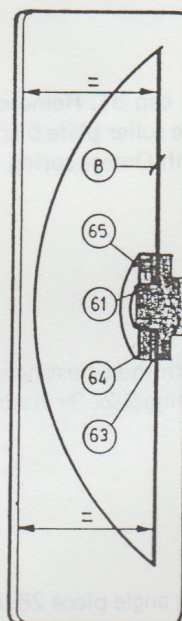
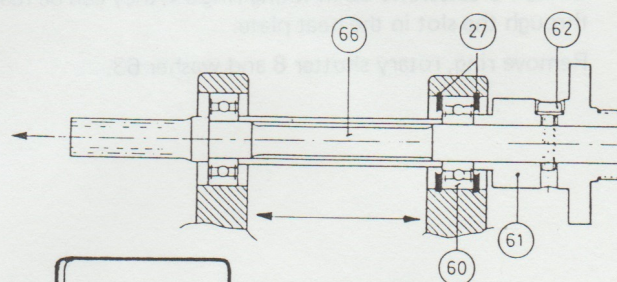
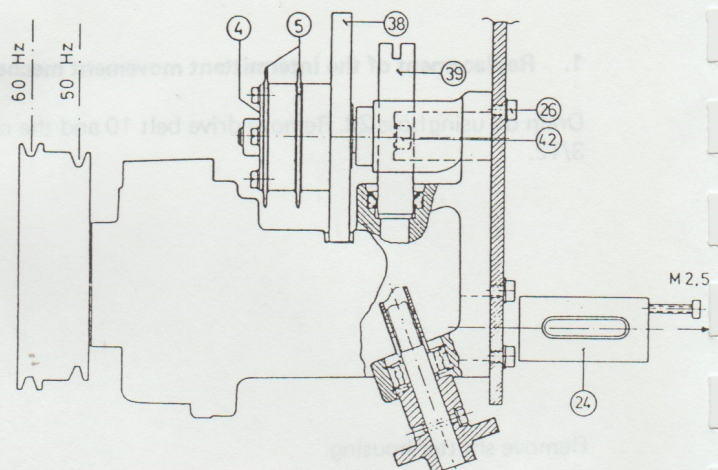
Fine adjustment screw and safety screw of the forward film track bearing bushing are loosened. Shove on the picture adjustment bushing **with leaf spring** to the projecting serrated shaft end of the film track with the B-side up to the rear film track bearing. Oil picture adjustment bushing and O-ring with Esso oil.

Carefully push in the picture adjustment bushing placed on the film track through the opening of the projector wall **while simultaneously** slightly **turning** the **pully** of the intermittent movement, so that the gearing of the nylon coupling bushing engages **without damage** into the serrated shaft end in the intermittent movement mechanism.

**Loosely** insert picture framing shaft 5 into the sleeve bearing 39 on the intermittent movement. By slight turning movements of the picture framing knob 7, the film track can be shoved up to the projector wall.

Remove runner strips from the film track. Insert adjustment device 50 for adjustment of the optical axis, align the film track to the lens holder and fasten.

Remount the loop switch on to the film track and fasten.





### Adjustment of the interrupter shaft:

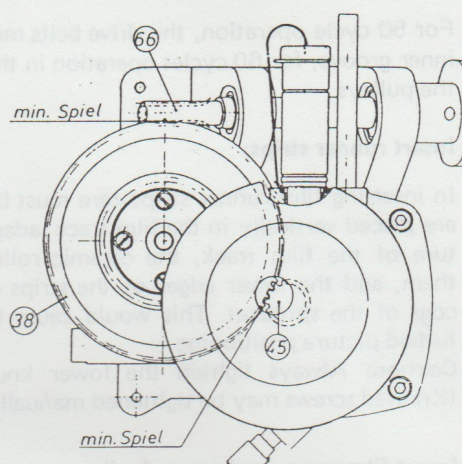
Loosen fixing screw 11, 12 of the sprocket 14, cautiously screw in fine adjustment screw 10 on the front film track bushing until noticeable resistance is felt and after 1/8 turn release. Slightly tighten safety screw 11 and 12.

### Adjustment of the sprocket:

Turn picture framing adjustment knob 7 somewhat to the right, place a piece of writing paper (approx. 0.05 mm thick) between the rear film track bearing bushing 21 and the sprocket 14 and press the sprocket **lightly** against the paper. Tighten fixing screw 15, 16 and 17, remove the paper.

By turning the pulley (without drive belt), check intermittent movement and interrupter shaft for easy operation.

By turning the picture framing knob 7, check whether the sprocket has a perceptible play.



### Insertion of the gear- and chain wheel unit:

Insert this unit by means of fixing screw 42 so that it can still be adjusted. (It is accessible through a borehole next to the film track from the operating side.)

Adjust so that there is still perceptible play between gear wheel 45 in the intermittent movement and the gearing of the shutter shaft 66.

If correctly set, there is a total play of 3–4 mm measured on the outside diameter of the rotary shutter.

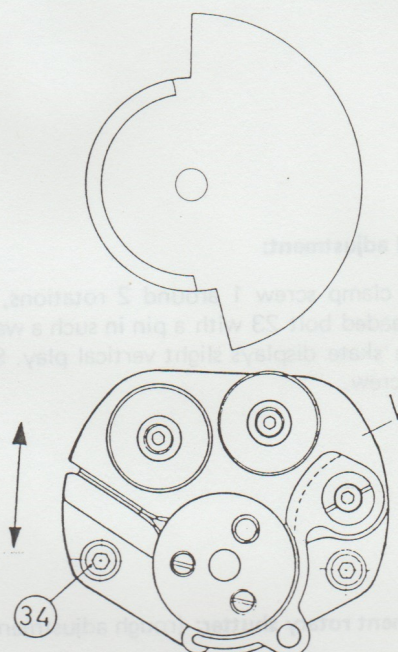
Tighten fixing screw.

### Insert chains and tension:

The chains may not be too tautly tensioned, but may also not flutter during movement.

#### Chain-above:

The short chain from the intermittent movement to the prewind gear sprocket bearing V can be tensioned by vertical sliding of the bearing upwards. (In doing so, loosen screws 34/35 and retighten after correct chain tensioning).

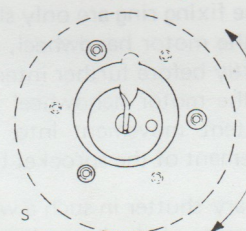


#### Chain-below:

The long chain can be tensioned by turning (by 120° each) the bearing flange of the lower friction.

(The 3 fixing screws S must be removed for this purpose.)

The postwinding bearing may not be adjusted.

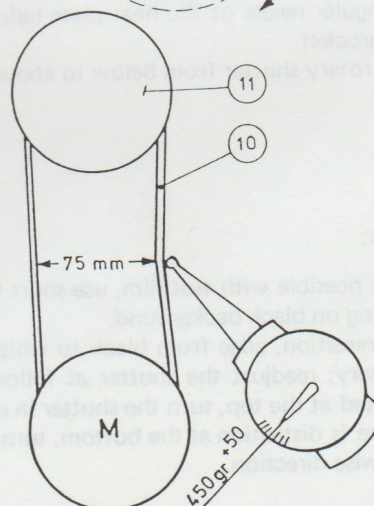


### Insertion of the drive belt:

Belt 10 should be so tensioned that when it is pressed with a force of 450 – 500 grams in the middle between the two pulleys, an inside dimension of 75 mm is present.

The belt tension can be adjusting the two Allen screw nuts on the upper suspension axle of the motor.

(**Caution:** Use only belts with the designation LR = run quietly).





For 50 cycle operation, the drive belts must be set into the inner groove, for 60 cycles operation in the outer groove of the pulleys.

#### Insert runner strips:

In inserting film runner strips care must be taken that they are placed vertically in the film track, adapted to the curvature of the film track, the ceramic rollers do not touch them, and the lower edges of the strips do not lie on the cogs of the sprocket. This would cause fuzziness and **disturbed** picture positioning.

**Caution:** Always tighten the lower knurled screw first. (Knurled screws may be tightened manually only.)

#### Insert film pressure skate and adjust:

Insert 2 short film pieces (around 30 cm) into the film track. Scale of the skate pressure adjustment in middle position.

#### Vertical adjustment:

Loosen clamp screw 1 around 2 rotations, adjust the ball top threaded bolt 23 with a pin in such a way that the film pressure skate displays slight vertical play. Slightly tighten clamp screw.

#### Adjustment rotary shutter: (rough adjustment)

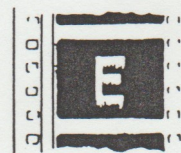
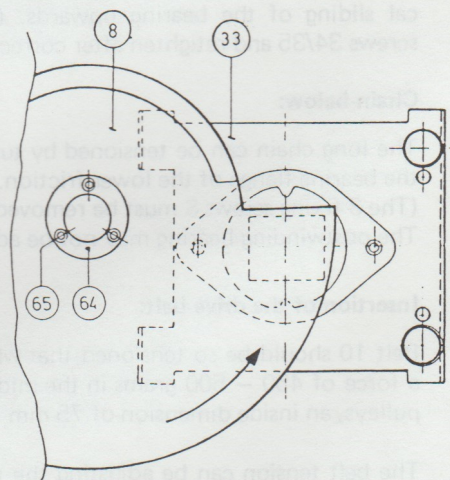
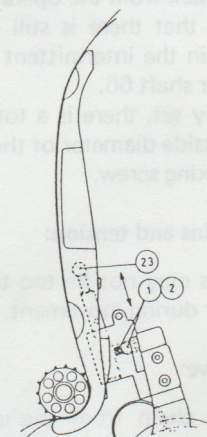
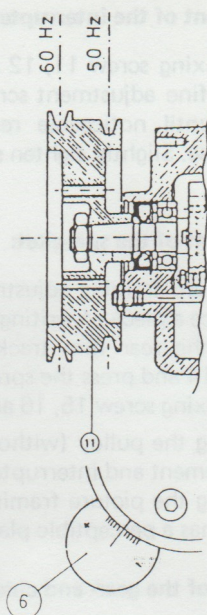
3 screw in the fixing ring are only slightly tightened. By turning the motor handwheel, rotate the sprocket into position shortly before further intermittent movement. By turning the motor handwheel back and forward bring the intermittent movement into the position where the turning movement of the sprocket begins.

Turn the rotary shutter in such a way that it just covers the rectangular recess of the heat plate before the next click of the sprocket.  
(turn rotary shutter from below to above.)

#### Check:

If not possible with test film, use short film reel with white lettering on black background.

The transition, edge from black to white must be sharp. If necessary; readjust the shutter as follows: If the image is distorted at the top, turn the shutter in clockwise direction, if there is distortion at the bottom, turn shutter in counter-clockwise direction.





### 3. Replacement of the sprocket shaft with sealing ring:

Disassemble film track as described in replacement of the intermittent movement mechanism (Fig. 13–21).

Remove sprocket as described in Fig. 46.

Push out the sprocket shaft 13 through the rear film track bearing bushing.

Remove the sealing ring from the rear film track bearing bushing 20. (Taking care not to damage the bushing in the process).

Carefully press in the oiled correct version of the 2 supplied sealing rings with attachment.

Oil new sprocket shaft with Esso oil and push in through the rear film track bearing bushing.

Push on sprocket by hand. Screw on fixing screw (original) loosely. (For further details see Fig. 47 and Fig. 27–31).

### 4. Replacement of sprockets:

Loosen screw 20 of the film stripper 19. Remove film stripper.

Unscrew clamping screw 13 of sprocket 11 by 5–6 turns. Open pad shoe 12. Pull sprocket from the shaft.

#### The sprocket:

If the gear teeth are worn out on one side, the sprocket can be turned over. If the other side is also worn, then the face gears have to be replaced. For adjustment, gauge 5322 395 80016 is used and the following procedure applies:

„Shove the pin of the gauge into the parts of the sprocket in the sequence in which they are to be mounted and fasten with three screws.

Then adjust the second face gear with the gauge and fasten.”

The number of a face gear set: 5322 522 30466.

Shove new sprocket on to the shaft with slight counterpressure on the chain wheel (inside of projector). Tighten clamping screw. If properly adjusted, the axial play will amount to 0.01–0.03 mm.

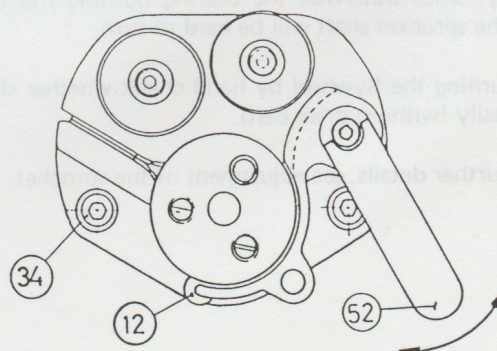
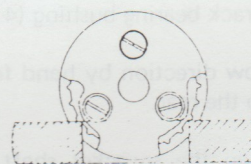
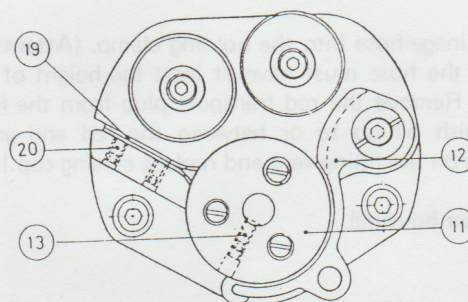
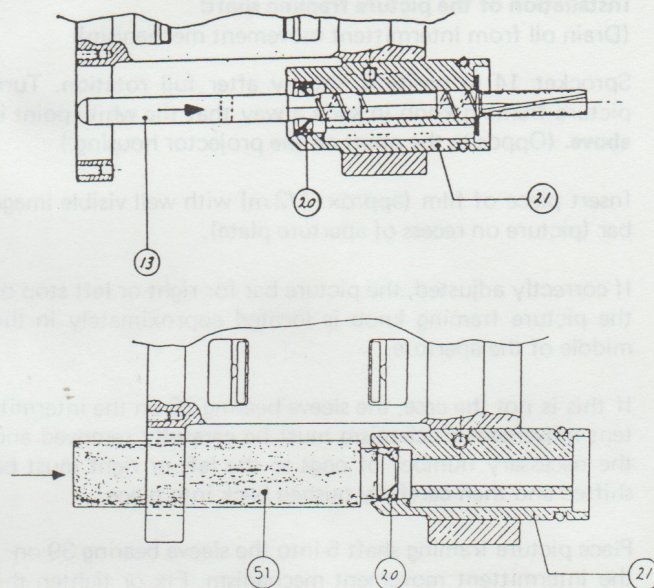
Insert film stripper and place old film pieces between sprocket and film stripper. Press stripper lightly against sprocket, tighten screws of stripper.

### 5. Replacement of pad shoes:

Disassembly:

Place offset screw driver into the slot of the spring cage 18, unscrew screw 32; the spring in the cage slackens.

Pull the pad shoe 12 from its shaft.





### 3. Replacement of the sprocket shaft with sealing ring:

Disassemble film track as described in replacement of the intermittent movement mechanism (Fig. 13–21).

Remove sprocket as described in Fig. 46.

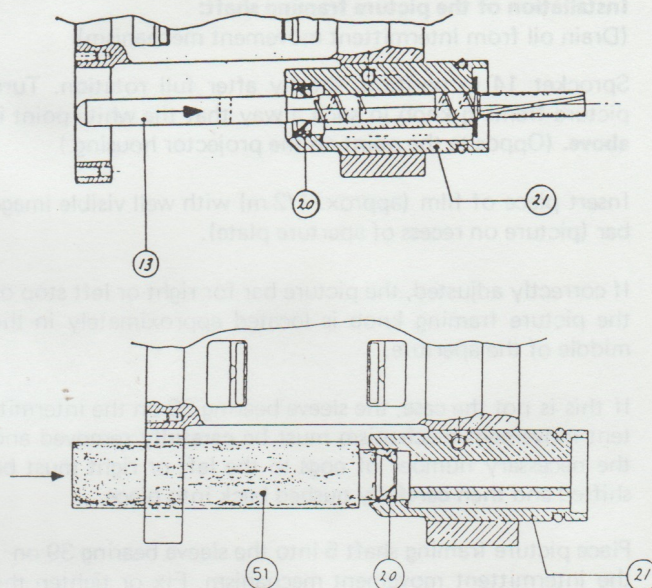
Push out the sprocket shaft 13 through the rear film track bearing bushing.

Remove the sealing ring from the rear film track bearing bushing 20. (Taking care not to damage the bushing in the process).

Carefully press in the oiled correct version of the 2 supplied sealing rings with attachment.

Oil new sprocket shaft with Esso oil and push in through the rear film track bearing bushing.

Push on sprocket by hand. Screw on fixing screw (original) loosely. (For further details see Fig. 47 and Fig. 27–31).



### 4. Replacement of sprockets:

Loosen screw 20 of the film stripper 19. Remove film stripper.

Unscrew clamping screw 13 of sprocket 11 by 5–6 turns. Open pad shoe 12. Pull sprocket from the shaft.

#### The sprocket:

If the gear teeth are worn out on one side, the sprocket can be turned over. If the other side is also worn, then the face gears have to be replaced. For adjustment, gauge 5322 395 80016 is used and the following procedure applies:

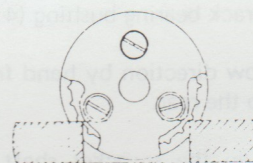
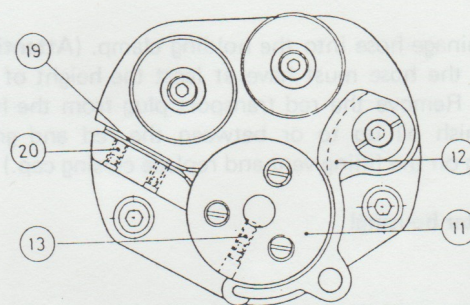
„Shove the pin of the gauge into the parts of the sprocket in the sequence in which they are to be mounted and fasten with three screws.

Then adjust the second face gear with the gauge and fasten.”

The number of a face gear set: 5322 522 30466.

Shove new sprocket on to the shaft with slight counterpressure on the chain wheel (inside of projector). Tighten clamping screw. If properly adjusted, the axial play will amount to 0.01–0.03 mm.

Insert film stripper and place old film pieces between sprocket and film stripper. Press stripper lightly against sprocket, tighten screws of stripper.

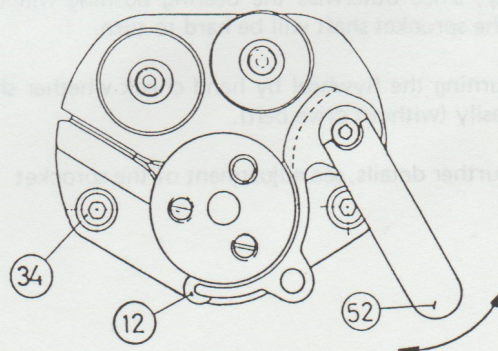


### 5. Replacement of pad shoes:

Disassembly:

Place offset screw driver into the slot of the spring cage 18, unscrew screw 32; the spring in the cage slackens.

Pull the pad shoe 12 from its shaft.





### Assembly:

Shove new pad shoe on to its shaft (lubricated with guide grease or Cardan). Place torsion spring 17 in the hole of the spring cage 18, shove torsion spring and cage into the pad shoe. (Be sure that the spring end is seated in the hole of the pad shoe).

### Adjustment of the pad shoe:

Place offset screwdriver 52 into the slot of the spring cage 18, by turning offset screwdriver to the right.

Tension the spring so that the pad shoe 12 opens at a spring tension of 450 gr + 50 gr (basic projector) and closes at around 150–250 gr measured at the pad shoe with a spring scale.

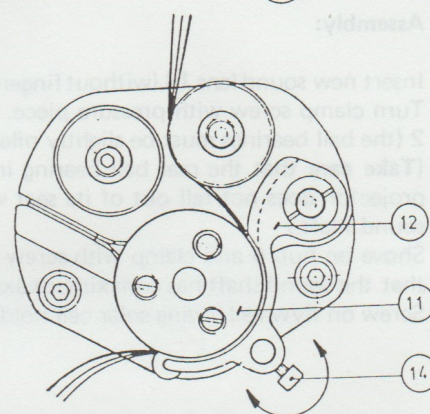
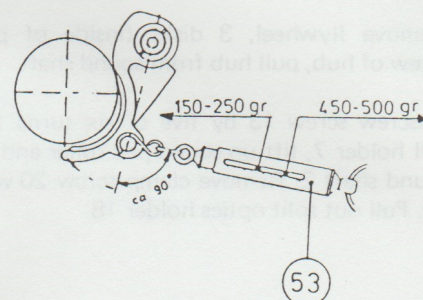
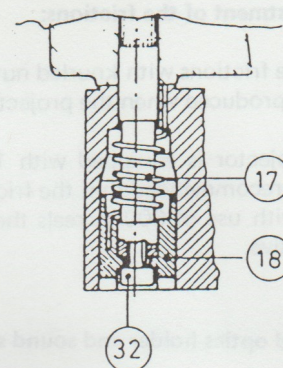
Tighten screw.

### Adjustment of the interval between pad shoe and sprocket:

A pad shoe that is too close to the sprocket causes accumulation of film waste which can produce film damage. The distance between the pad shoes and the sprockets must be at least two film thicknesses. It can be adjusted with the stop screw located on the rear of the shoes.

### Method:

Turn the stop screw to the left. Place **three** pieces of film between pad shoe and sprocket. Place a piece of paper between stop screw and stop point. Turn stop screw to the right until it touches the stop point. Remove the paper; the interval is then correct.



### 6. Splitting switch unit:

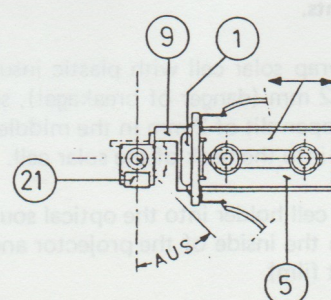
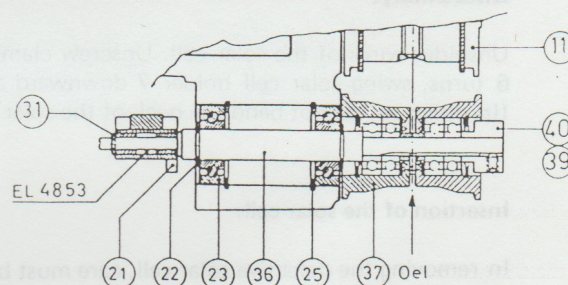
After adjustment of the lower sprocket bearing, the reed switch must be checked.

The free space in the 3.1 mm diam. borehole of the magnetic support must be completely filled with grease.

Upon turning of one of the two sprockets, **no jamming** of the gearing may be perceptible.  
(oil slightly with Esso oil.)

Functional efficiency of the Reed switch can be adjusted by horizontal sliding of the reed carrier.

(Make check with ohmmeter only.)





## 7. Adjustment of the frictions:

Adjust the frictions with knurled nuts in such a way that no loops are produced when the projector is stopped.

If the projector is equipped with 1800 m – 2000 m film reels, it is recommended that the frictions be set or adjusted so that with use of 600 m reels the tension on the film is not excessive.

## 8. Sound optics holder and sound shaft:

### Disassembly:

Remove flywheel, 3 disks (inside of projector), loosen screw of hub, pull hub from sound shaft.

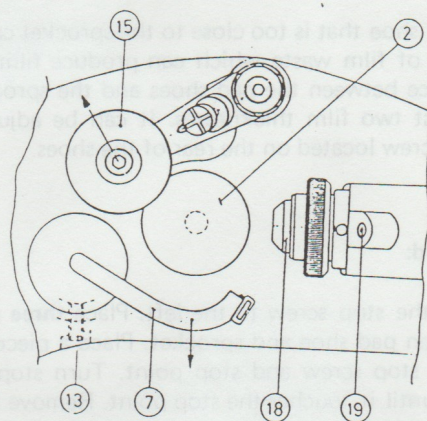
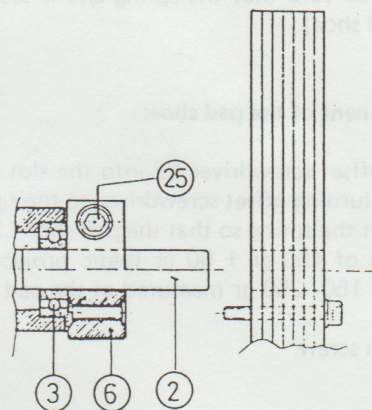
Unscrew screw 13 by five or six turns. Swing down solar cell holder 7, lift up sound pad roller and carefully pull out sound shaft 2. Remove clamp screw 20 with pressure piece 19. Pull out split optics holder 18.

### Assembly:

Insert new sound lens 18 (without fingerprints on the lenses). Turn clamp screw with pressure piece. Slide in sound shaft 2 (the ball bearings must be slightly oiled with Esso oil).

(**Take care** that the rear ball bearing in the interior of the projector does not fall out of its seat while pushing in the sound shaft.)

Shove on hub 6 and clamp with screw 25 in such a manner that the sound shaft has a maximum axial play of 0.03 mm. Screw on flywheel, swing solar cell holder into place.



## 9. Replacement of the solar cell:

### Disassembly:

Unsolder wires of the solar cell. Unscrew clamp screw 5 to 6 turns, swing solar cell holder 7 downward and pull off. (In doing so, do not bend the neck of the solar cell holder.)

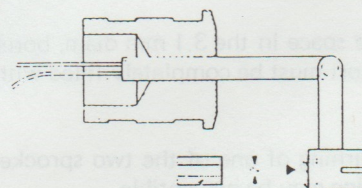
### Insertion of the solar cell:

In removing the defective solar cell, care must be taken that the slide-in unit is not damaged. **Cautiously remove any glue remnants.**

Carefully wrap solar cell with plastic insulation tape 0.2 x 12 mm x 12 mm (danger of breakage!), so that the darker side has an open slit of 2 mm in the middle.

Insert wires into the neck of the solar cell.

Insert solar cell holder into the optical sound head, resolder the wires in the inside of the projector and adjust solar cell holder. (test film)





## 10. Sound pad roller:

### Disassembly:

Unscrew screw, remove cap an washer and ball bearing sealing washer. Take out sound pad roller.

**Caution:** Take care with projectors having automatic lens changer. The roller must be removed in slanted position! In the process, the rear ball bearing must be kept on the shaft with a pin, only then can the pad roller be completely removed.

### Assembly:

**Attention:** Both ball bearings of the sound pad roller may be well oiled with cardan oil only!

Slide rear ball bearing on to the shaft, forward bearing in the seat of the pad roller. Place pad-roller in place, attached ball bearing sealing washer, screw on cap with **spacer** and screw.

(**Attention:** The black cap may **not** press against the **ball bearing sealing washer**, since otherwise the sound pad roller will jam.)

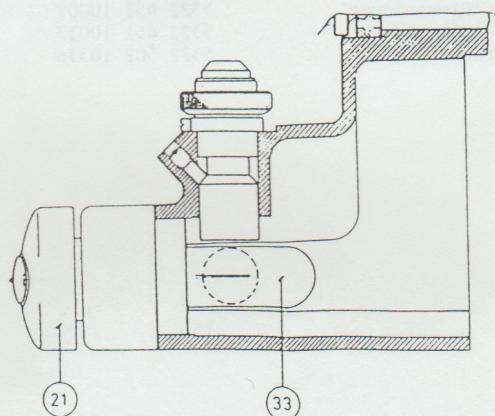
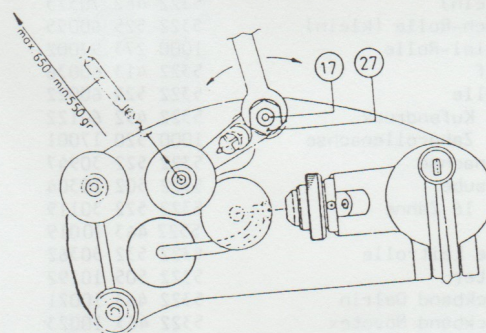
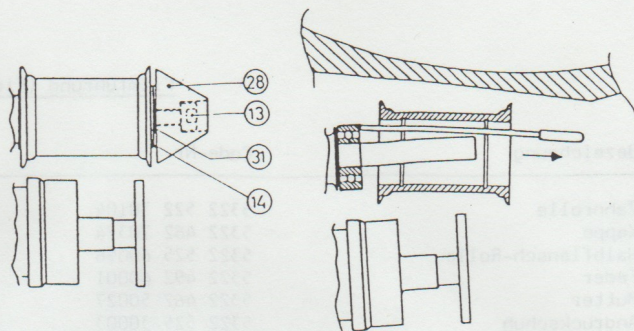
### Adjustment of the sound pad roller:

Place fork wrench SW 14 on hexagonal spring cage, loosen screw somewhat. Turn cage with fork wrench so that the pad roller lifts with a force of 550–650 grams.

Tighten screw:

### Replacement of exciter lamp:

Open black closing cover (press locking lever upwards). Remove used exciter lamp, place new exciter lamp (without fingerprints on the glass piston) with the groove in the blocking pin.





Filmführung (Fig. 19)

Pos.	Bezeichnung	Code-Nr.	Description	Désignation
1	Zahnrolle	5322 522 30104	sprocket	tambour
2	Kappe	5322 462 70374	cap	capuchon
3	Halbflansch-Rolle	5322 525 60096	half flange roller	galet à demi-collet
4	Feder	5322 492 40001	spring	ressort
5	Mutter	5322 462 50027	tension nut	écrou
6	Andruckschuh	5322 525 30003	pad shoe	patin presseur
7	Skala	5322 450 30018	scale	échelle
8	Arretierung f. Objektivhalter	5322 535 80089	pin for lens mount	goupille d'arrêt pour objectif
9	Knopf f. Scharfeinstellung	1000 413 17002	lens adjusting knob	bouton de mise au point
10	Feder, Andruckrolle	5322 492 40002	spring, pressure roller	ressort, galet presseur
11	Hebel	5322 404 50018	lever	levier
12	Tonoptik	5322 381 20004	sound lens assy.	lentille de son
13	Tonlampenfassung	5322 255 20021	exciter lamp holder	support pour lampe excitatrice
14	Tonlampe 6,5 V 1,48 A	5322 134 80007	exciter lamp 6.5 V 1.48 A	lampe excitatrice 6.5 V 1.48 A
14a	Tonlampe 5 V 4 A	5322 134 80008	exciter lamp 5 V 4 A	lampe excitatrice 5 V 4 A
15	Tonwelle	5322 535 50014	sound shaft	axe de son
16	Kugellager	5322 520 20047	ball bearing	roulement à billes
17	Solarzelle	5322 130 90005	solar cell	cellule solaire
18	Sensor	1000 282 67002	sensor	senseur
19	Filmführung Sensor	1000 525 37002	film path sensor	senseur pour couloir-film
20	Kappe (klein)	5322 462 70373	cap	capuchon
21	Halbflansch-Rolle (klein)	5322 525 60095	half flange roller	galet à demi-collet
22	Differential-Rolle	1000 273 97002	differential roller	galet différentiel
23	Stellknopf	5322 413 60036	inching knob	bouton d'ajustage
24	Andruckrolle	5322 525 60022	pressure roller	galet presseur
25	Feder für Kufendruck	5322 492 60122	spring for skate pressure	ressort pour pression patin
26	Lager für Zahnrollenachse	1000 520 17001	sprocket shaft bearing	palier de tambour
27	Zahnrollenachse	5322 522 30947	sprocket shaft	axe de tambour
28	Stellschraube	5322 502 10304	adjusting screw	vis de réglage
29	Zahnrolle 16 Zähne	5322 522 30119	sprocket 16 teeth	tambour 16 dents
30	Kufe	5322 463 10019	skate	patin
31	keramische Leitrolle	5322 532 50362	ceramic guide roller	galet-guide céramique
32	Rändelmutter	5322 505 10192	knurled nut	écrou moleté
33	Filmandruckband Delrin	5322 463 10021	runner strip Delrin	glissière Delrin
33a	Filmandruckband Novotex	5322 463 10023	runner strip Novotex	glissière Novotex
34	Mikroschalter	5322 271 30008	microswitch	microrupteur
35	Bildmaske 'Normal'	5322 451 10011	aperture 'normal screen'	cache format normal
35a	Bildmaske 'Breitbild'	5322 451 10012	aperture 'wide screen'	cache format large
35b	Bildmaske 'CinemaScope'	5322 451 10009	aperture 'CinemaScope'	cache format CinémaScope
35c	Bildmaske 'Blind'	5322 451 10013	aperture 'blind'	cache aveugle
36	Rändelschraube	5322 502 10336	knurled screw	vis moletée



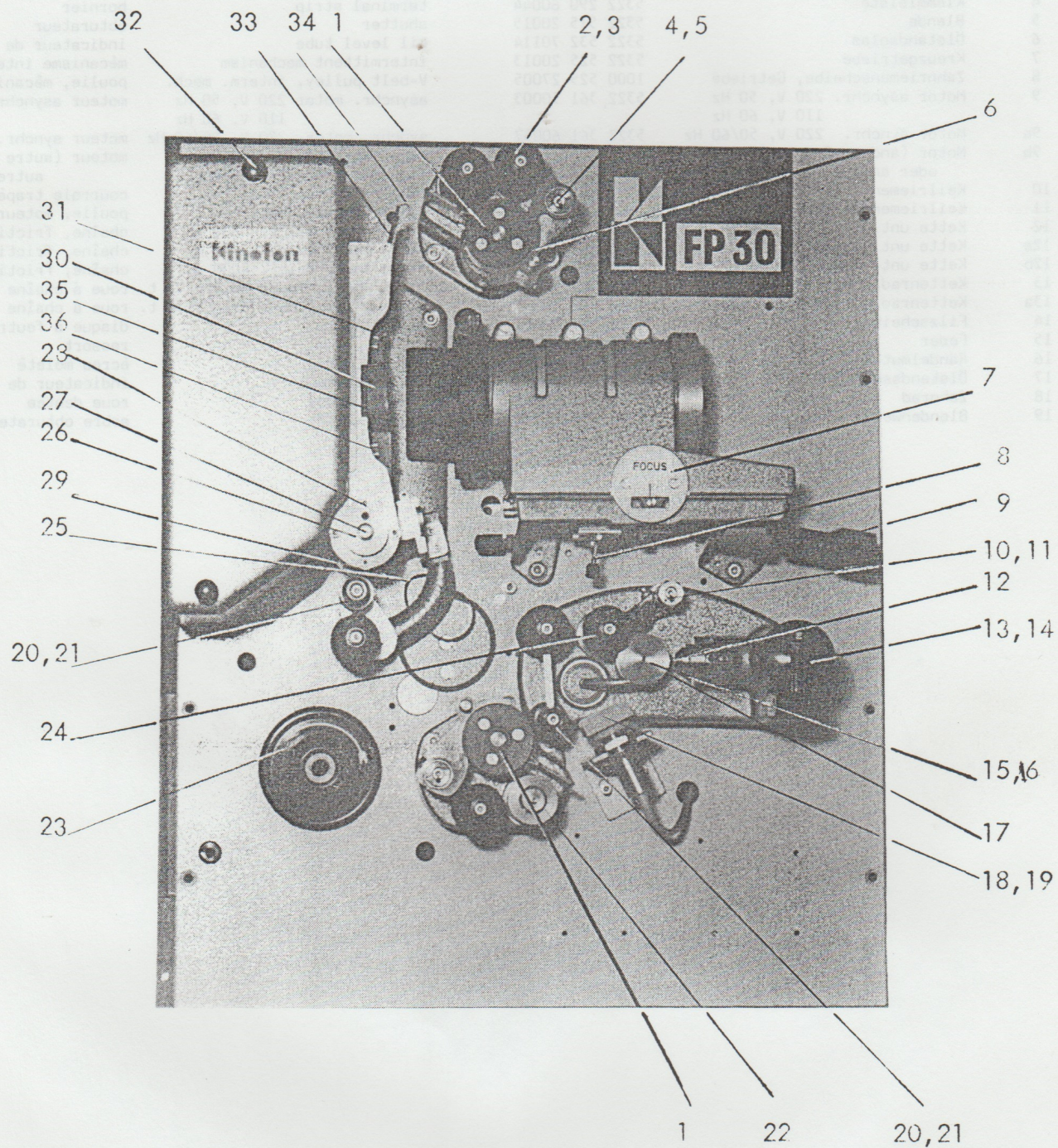


Fig. 19



Getriebe (Fig. 20)

Pos.	Bezeichnung	Code-Nr.	Description	Désignation
1	Kettenrad	5322 522 30088	chain wheel	roue à chaîne
2	Kettenrad-Achse	5322 535 90485	chain wheel shaft	arbre de roue à chaîne
3	Kette	5322 358 50007	chain	chaîne
4	Klemmleiste	5322 290 60044	terminal strip	bornier
5	Blende	5322 515 20015	shutter	obturateur
6	Ölstandsglas	5322 532 70114	oil level tube	indicateur de niveau d'huile
7	Kreuzgetriebe	5322 525 20013	intermittent mechanism	mécanisme intermittent
8	Zahnriemenscheibe, Getriebe	1000 525 27005	V-belt pulley, interm. mech.	poulie, mécanisme intermitte
9	Motor asynchr. 220 V, 50 Hz	5322 361 50003	asynchr. motor 220 V, 50 Hz	moteur asynchr. 220 V, 50 Hz
	110 V, 60 Hz		110 V, 60 Hz	110 V, 60 Hz
9a	Motor synchr. 220 V, 50/60 Hz	5322 361 60057	synchr. motor 220 V, 50/60 Hz	moteur synchr. 220 V, 50/60
9b	Motor (andere Spannung oder andere Frequenz)		motor (different voltage or different frequency)	moteur (autre tension ou autre fréquence)
10	Keilriemen	5322 358 10035	V-belt	courroie trapézoïdale
11	Keilriemenscheibe, Motor	1000 528 87007	V-belt pulley, motor	poulie, moteur
12	Kette unt. Friktion 600 m	5322 358 50009	chain lower frict. 600 m	chaîne, friction inf. 600 m
12a	Kette unt. Friktion 1800 m	5322 358 50011	chain lower frict. 1800 m	chaîne, friction inf. 1800 m
12b	Kette unt. Friktion 4000 m	1000 358 57008	chain lower frict. 4000 m	chaîne, friction inf. 4000 m
13	Kettenrad unt. Friktion 74 Z.	5322 522 30105	chain wheel, lower frict. 74 t.	roue à chaîne frict. inf. 74
13a	Kettenrad unt. Friktion 30 Z.	5322 522 31091	chain wheel, lower frict. 30 t.	roue à chaîne frict. inf. 30
14	Filzscheibe	5322 358 50028	felt disc	disque à feutre
15	Feder	5322 492 50064	spring	ressort
16	Rändelmutter	5322 505 10049	knurled nut	écrou moleté
17	Ölstandsschlauch	5322 530 20236	oil level tube	indicateur de niveau d'huile
18	Zahnrad	5322 522 30089	toothed wheel	roue dentée
19	Blendenwelle	5322 535 50009	shutter shaft	arbre obturateur



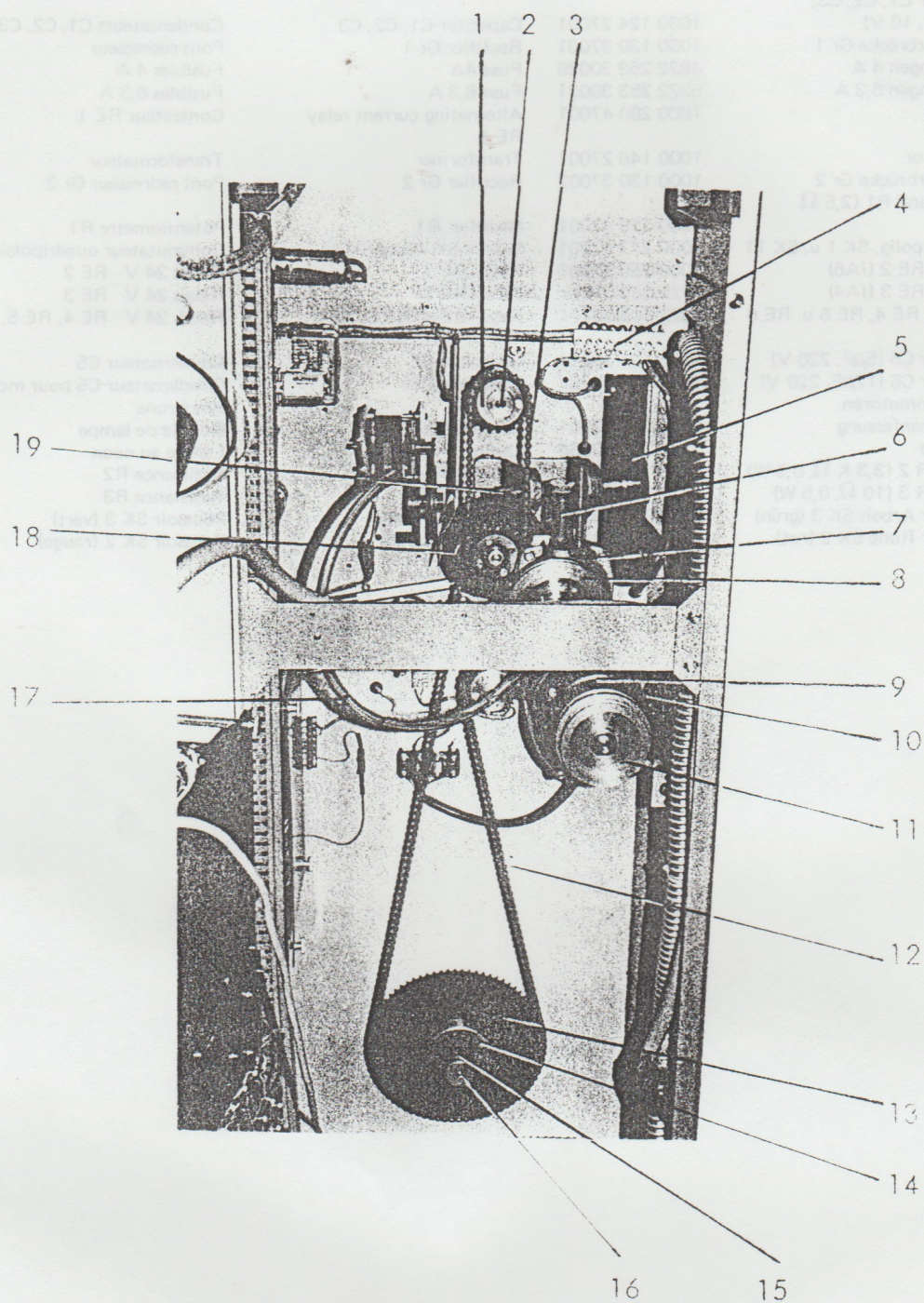


Fig. 20



## Elektrische-Einheit (Fig. 21)

Pos.	Bezeichnung	Code-Nummer:	Description	Désignation:
1	Printplatte	1000 216 97004	Print plate	Circuit imprimé
2, 3	Kondensator C10 u. C11	4822 120 50167	Capacitor C10 and C11	Condensateurs C10, C11
4	Kondensator C4 (100 $\mu$ F, 40 V)	5322 124,20483	Capacitor C4	Condensateur C4
5	Kondensator C1, C2, C3, (10.000 $\mu$ F), 10 V)	1000 124 27001	Capacitor C1, C2, C3	Condensateurs C1, C2, C3
6	Gleichrichterbrücke Gr 1	1000 130 37001	Rectifier Gr 1	Pont redresseur
7	Feinsicherungen 4 A	4822 253 30028	Fuse 4A	Fusibles 4 A
8	Feinsicherungen 6,3 A	5322 253 30031	Fuse 6,3 A	Fusibles 6,3 A
9	Schütz RE 1	1000 280 47001	Alternating current relay RE 1	Contacteur RE 1
10	Transformator	1000 146 27001	Transformer	Transformateur
11	Gleichrichterbrücke Gr 2	1000 130 37002	Rectifier Gr 2	Pont redresseur Gr 2
12	Stellwiderstand R1 (2,5 $\Omega$ 15 W)	1000 115 47001	Rectifier R1	Potentiometre R1
13	Schalter vierpolig, SK 1 u. SK 11	1000 277 17001	Switch SK 1 and SK 11	Commutateur quadripolaire, SK 1 – SK 11
14	Relais 24 V RE 2 (1A6)	1000 280 77001	Relay RE 2	Relais 24 V RE 2
15	Relais 24 V RE 3 (1A4)	5322 280 74014	Relay RE 3	Relais 24 V RE 3
16	Relais 24 V, RE 4, RE 5 u. RE 6 (KC4)	5322 706 30111	Relay RE 4, RE 5, RE 6,	Relais 24 V RE 4, RE 5, RE 6
17	Kondensator C5 (5 $\mu$ F, 220 V)	1000 121 17002	Capacitor C5	Condensateur C5
17b	Kondensator C6 (12 $\mu$ F, 220 V) bei Synchronmotoren	1000 121 17004	Capacitor C5	Condensateur C5 pour moteur synchrone
18	Kontrollampenfassung	1000 255 37001	Lamp holder	Douille de lampe
19	Glimmlampe	5322 705 30866	Lamp	Lampe au neon
20	Widerstand R 2 (3,3 K $\Omega$ , 0,5 W)	4822 110 53121	Resistor R 2	Resistance R2
ohne B.	Widerstand R 3 (10 $\Omega$ , 0,5 W)	4822 110 53054	Resistor R 3	Resistance R3
	Doppeltaster Arbeit SK 3 (grün)	5322 276 10134	Push-button green	Poussoir SK 3 (vert)
	Doppeltaster Ruhe SK 2 (rot)	5322 276 10432	Push-button red	Poussoir SK 2 (rouge)



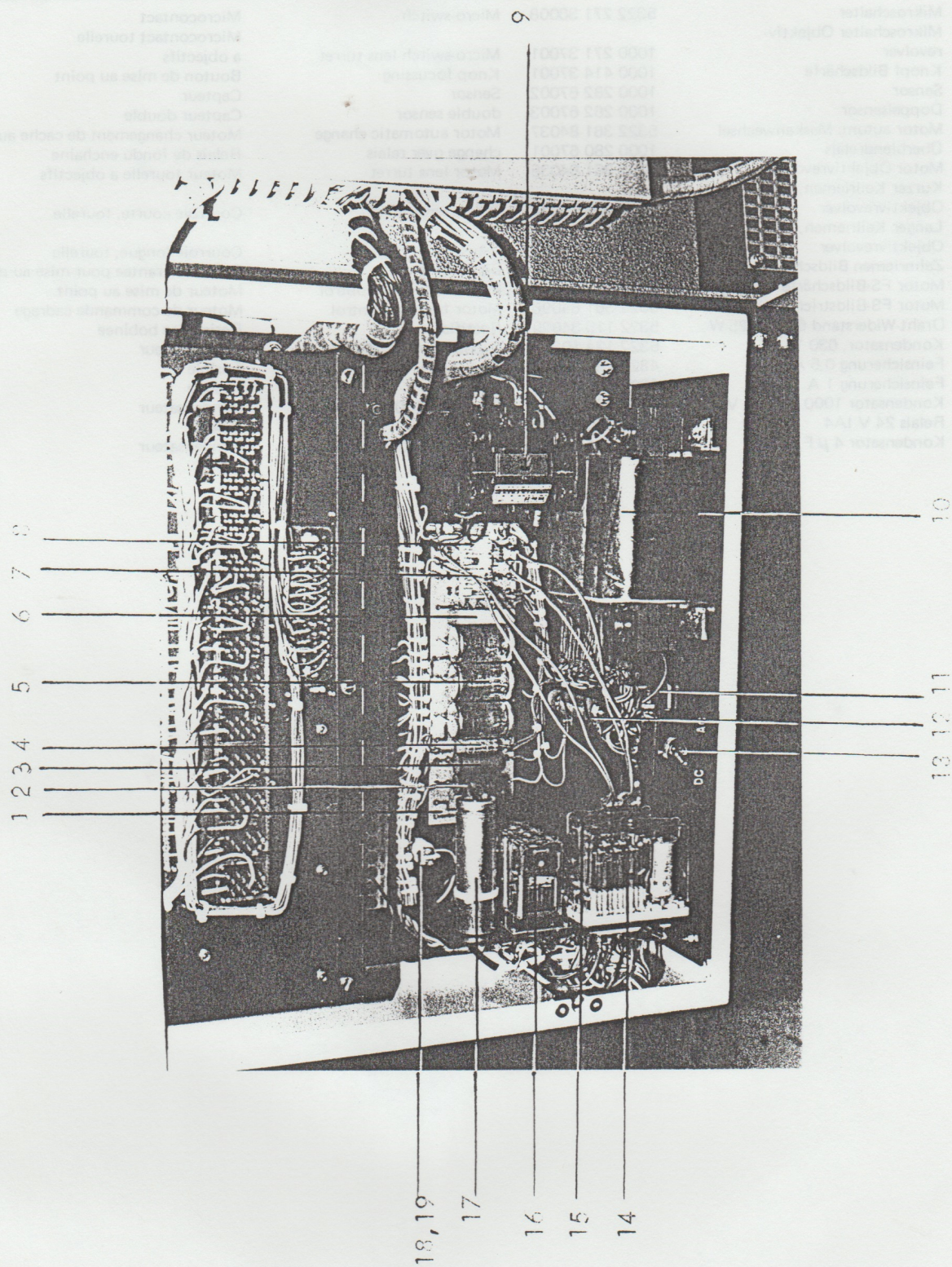


Fig. 21



## Steuerungen (Fig. 22)

Pos.	Bezeichnung	Code-Nummer	Description	Désignation:
1	Mikroschalter	5322 271 30008	Micro-switch	Microcontact
2	Mikroschalter Objektiv- revolver	1000 271 37001	Micro-switch lens turret	Microcontact tourelle a objectifs
3	Knopf Bildschärfe	1000 414 37001	Knop focussing	Bouton de mise au point
4	Sensor	1000 282 67002	Sensor	Capteur
4b	Doppelsensor	1000 282 67003	double sensor	Capteur double
5	Motor autom. Maskenwechsel	5322 361 84037	Motor automatic change	Moteur changement de cache automatique
6	Überblendrelais	1000 280 67001	change over relais	Relais de fondu enchaîne
7	Motor Objektivrevolver	5322 361 84038	Motor lens turret	Moteur tourelle a objectifs
8	Kurzer Keilriemen, Objektivrevolver	1000 358 27003	V-belt lens turret	Courroie courte, tourelle
8a	Langer Keilriemen, Objektivrevolver	1000 358 27002	V-belt lens turret	Courroie longue, tourelle
9	Zahnriemen Bildschärfe	5322 358 20006	Belt focussing	Courroie crantée pour mise au point
10	Motor FS-Bildschärfe	5322 361 60012	Motor focussing control	Moteur de mise au point
11	Motor FS-Bildstrich	5322 361 84096	Motor framing control	Moteur de commande cadrage
12	Draht-Widerstand 620 $\Omega$ , 25 W	5322 115 34029	Rectifier	Resistance bobinée
13	Kondensator, 630 V	5322 124 10261	Capacitor 4 $\mu$ F, 630 V	Condensateur
14	Feinsicherung 0,5 A	4822 253 30017	Fuse 0,5 A	Fusible
15	Feinsicherung 1 A	4822 253 30021	Fuse 1 A	Fusible
16	Kondensator 1000 $\mu$ F, 40 V	1000 124 27002	Capacitor 1000 $\mu$ F, 40 V	Condensateur
17	Relais 24 V 1A4	5322 280 74014	Relay 1A4	Relais
18	Kondensator 4 $\mu$ F, 630 V	5322 124 10261	Capacitor 4 $\mu$ F, 630 V	Condensateur



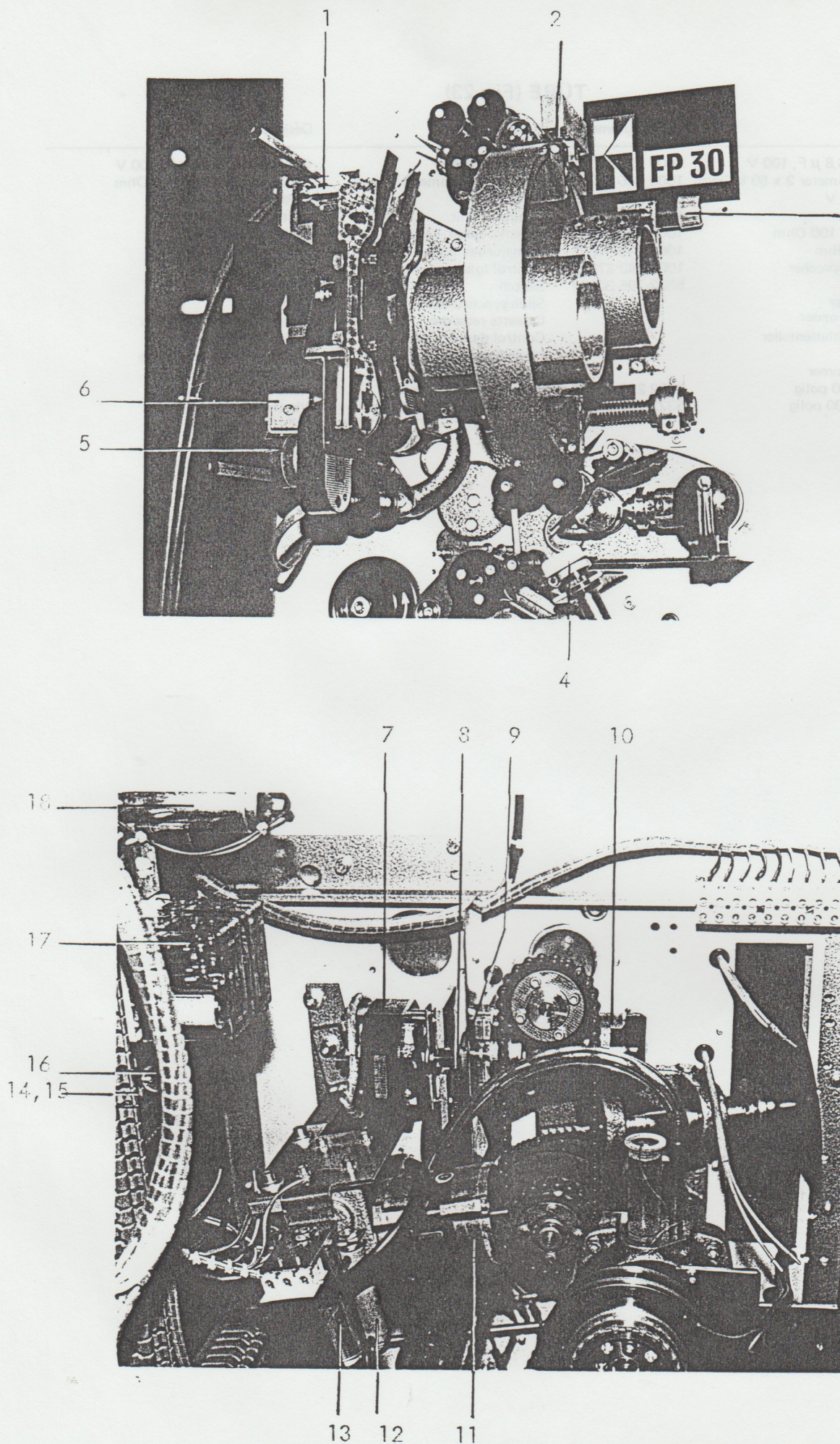


Fig. 22



## TÜRE (Fig. 23)

Pos.	Bezeichnung	Code-Nummer:	Description:	Désignation:
1	Kondensator 6,8 $\mu$ F, 100 V	1000 121 47002	Capacitor 6,8 $\mu$ F	Condensateur 6,8 $\mu$ F, 100 V
2	Motorpotentiometer 2 x 50 K Ohm	1000 105 97002	Motor Potentiometer	Potentiometre 2 x 50 K Ohm
3	Relais KC4 24 V	5322 706 30111	Relay 24 V	Relais KC4 24 V
4	Fading-Einheit	1000 214 67001	Fading — unit	Unite d'évanouissement
5	Potentiometer 100 Ohm	1000 103 37001	Potentiometer 100 Ohm	Potentiometre 100 Ohm
6	Übertrager 4 Ohm	1000 140 47001	Transformer 4 Ohm	Transformateur 4 Ohm
7	Kontroll-Lautsprecher	1000 240 37001	Control loudspeaker	Haut-parleur témoin
8	Kippschalter	5322 705 30887	Switch	Basculeur
9	Dia-Impulsgeber		Slide synchronizer	Synchrodi
10	Cassetten-Recorder		Cassette recorder	Magnetophone a cassettes
11	Steuergerät Schleifenteller		Control desk for non-rewind system	Unite de commande pour derouleur sans rebobinage
12	Matrix-Programmer		Matrix-Programmer	Programmateur a matrice
13	Steckerleiste 30 polig	5322 265 50003	Pin connector 30-pole	Fiche male, 30 broches
13b	Buchsenleiste 30 polig	5322 267 60004	Socket connector, 30-pole	Prise femelle, 30 contacts



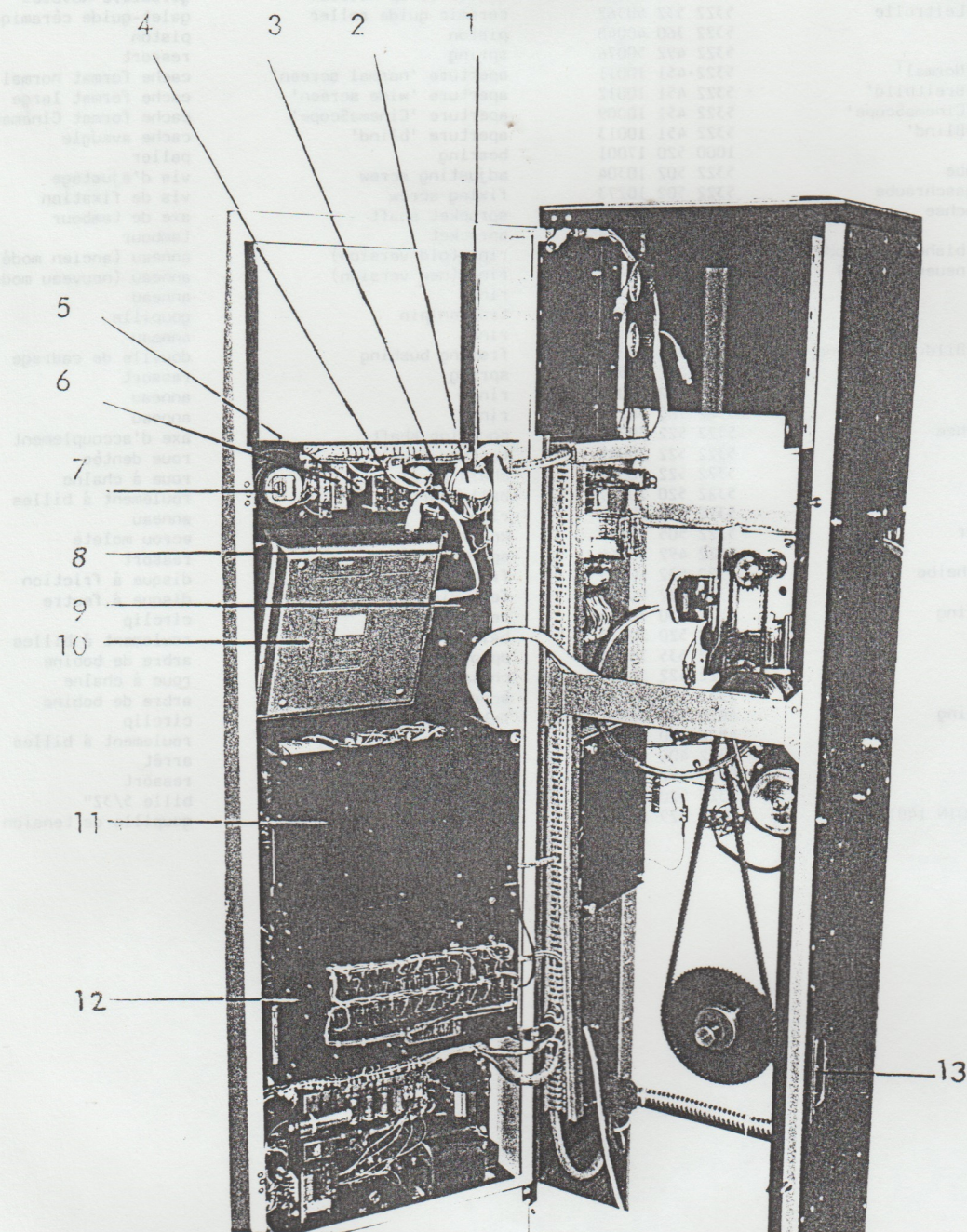


Fig. 23



## Filmkanal, Malteserkreuzgetriebe und Friktionen (Fig. 24 und 25)

Pos.	Bezeichnung	Code-Nr.	Description	Désignation
1	Filmandruckband Delrin	5322 463 10021	runner strip Delrin	glissière Delrin
1a	Filmandruckband Novotex	5322 463 10023	runner strip Novotex	glissière Novotex
2	keramische Leitrolle	5322 532 50362	ceramic guide roller	galet-guide céramique
3	Kolben	5322 360 40048	piston	piston
4	Feder	5322 492 50076	spring	ressort
5	Bildmaske 'Normal'	5322-451 10011	aperture 'normal screen'	cache format normal
5a	Bildmaske 'Breitbild'	5322 451 10012	aperture 'wide screen'	cache format large
5b	Bildmaske 'CinemaScope'	5322 451 10009	aperture 'CinemaScope'	cache format CinémaScope
5c	Bildmaske 'Blind'	5322 451 10013	aperture 'blind'	cache aveugle
6	Lager	1000 520 17001	bearing	palier
7	Stellschraube	5322 502 10304	adjusting screw	vis d'ajustage
8	Befestigungsschraube	5322 502 10273	fixing screw	vis de fixation
9	Zahnrollenachse	5322 522 30947	sprocket shaft	axe de tambour
10	Zahnrolle	5322 522 30119	sprocket	tambour
11	Dichtring (bisheriges Modell)	5322 532 40006	ring (old version)	anneau (ancien modèle)
11a	Dichtring (neues Modell)	5322 530 50427	ring (new version)	anneau (nouveau modèle)
12	Dichtring	5322 530 50097	ring	anneau
13	Stift	5322 529 50058	tension pin	goupille
14	Dichtring	5322 705 30171	ring	anneau
15	Buchse für Bildverstellung	5322 525 60074	framing bushing	douille de cadrage
16	Feder	5322 492 61368	spring	ressort
17	Dichtring	5322 532 40006	ring	anneau
18	Dichtring	5322 705 30172	ring	anneau
19	Kupplungsachse	5322 522 30824	coupling shaft	axe d'accouplement
20	Zahnrad	5322 522 30089	toothed wheel	roue dentée
21	Kettenrad	5322 522 30088	chain wheel	roue à chaîne
22	Kugellager	5322 520 20057	ball bearing	roulement à billes
23	Dichtring	5322 530 50147	ring	anneau
24	Rändelmutter	5322 505 10049	knurled nut	écrou moleté
25	Feder	5322 492 50064	spring	ressort
26	Friktionsscheibe	5322 532 10499	friction disc	disque à friction
27	Filzscheibe	5322 532 50028	felt disc	disque à feutre
28	Sicherungsring	4822 530 70021	retaining ring	circlip
29	Kugellager	4822 520 20032	ball bearing	roulement à billes
30	Spulenachse	5322 535 70024	spool shaft	arbre de bobine
31	Kettenrad	5322 522 30105	chain wheel	roue à chaîne
32	Spulenachse	5322 535 70027	spool shaft	arbre de bobine
33	Sicherungsring	4822 530 70021	retaining ring	circlip
34	Kugellager	4822 520 20032	ball bearing	roulement à billes
35	Arretierung	5322 404 50303	lock	arrêt
36	Feder	5322 492 50693	spring	ressort
37	Kugel 5/32"	5322 520 40012	ball 5/32"	bille 5/32"
38	Spannstift DIN 1481 2x8	1000 529 57001	tension pin	goupille de tension



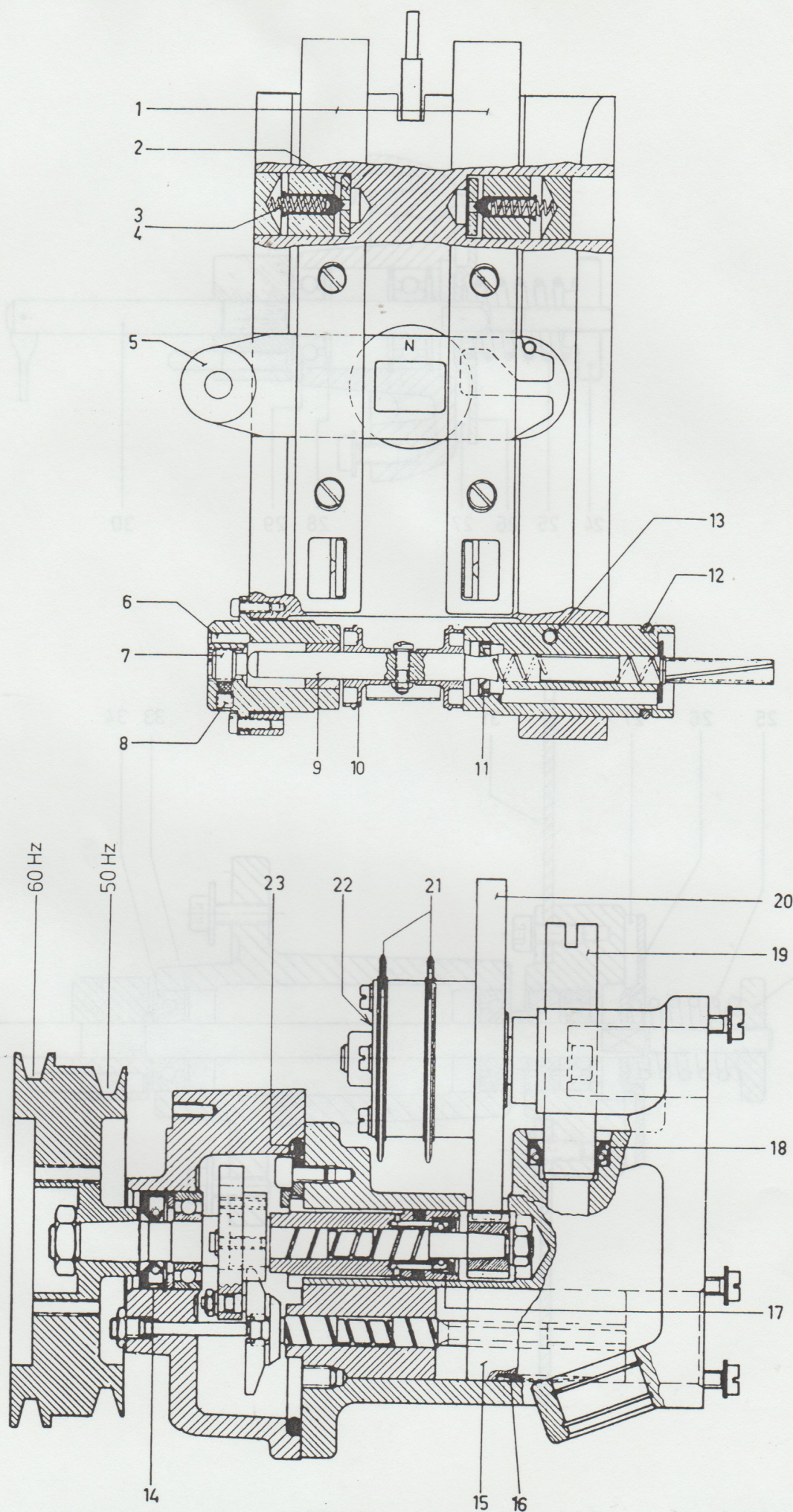


Fig. 24



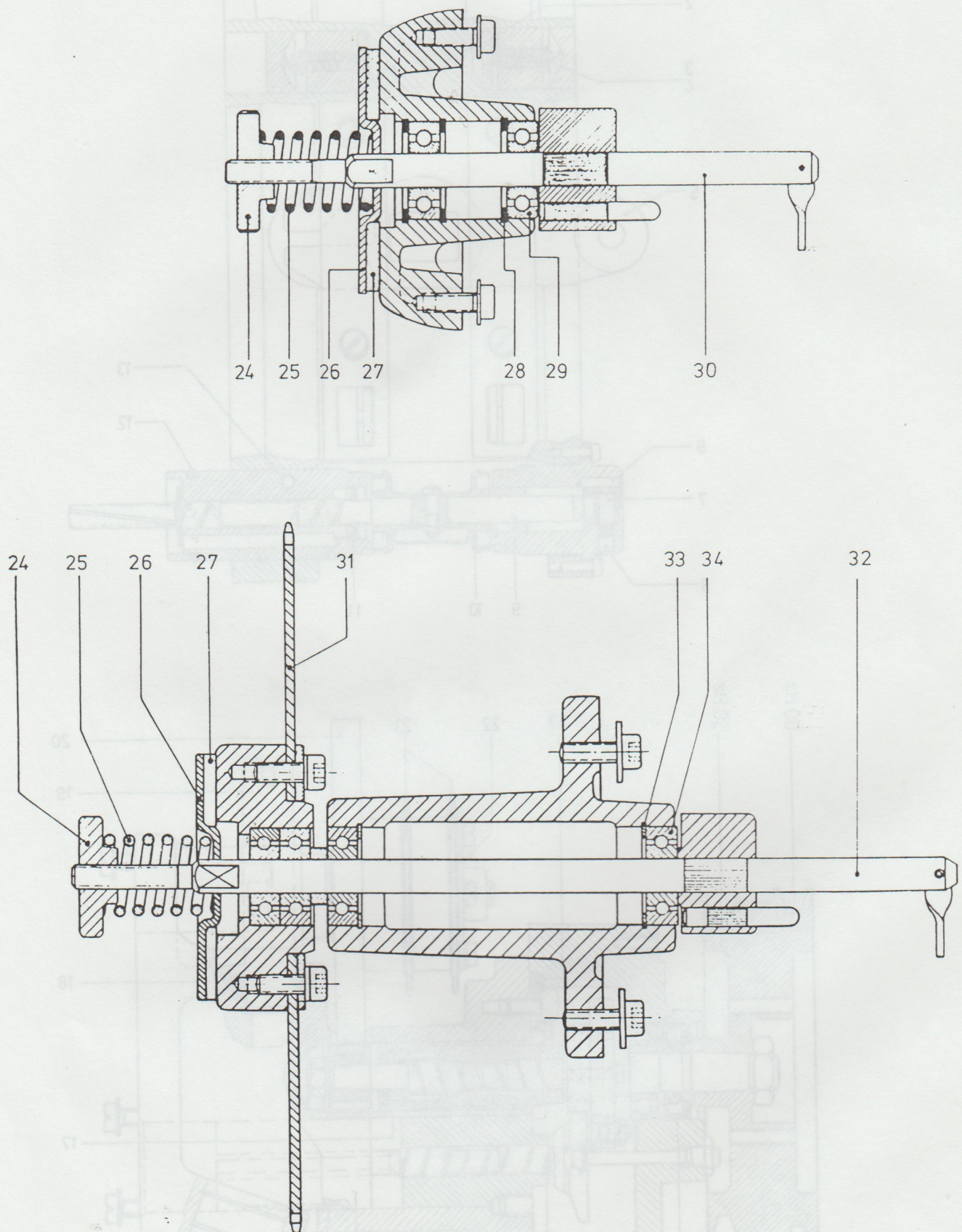


Fig. 25



Fig. 1

Fig. 2

Focus  
Bildstrich  
Kufendruck

Focus  
Framing line  
Skate pressure

Mise au point  
Position image  
Pression patin

Fig. 3

grün: Projektor start  
rot: Projektor stop  
weiß: Überblendung  
Schalter Filmriß  
F = Riß – Schalter Teller-  
einrichtung überbrückt  
I = Riß – Schalter Teller-  
einrichtung in Betrieb  
Schalter Netzphase  
Drücker grün:  
Hauptschutz ein  
Drücker rot:  
Hauptschutz aus  
Achtung!  
Wenn Überblendung offen  
oder wenn Hebelarm der  
Tellereinrichtung auf End-  
umschlag steht (Filmriß-  
Schalter), läßt sich der Pro-  
jektor nicht starten.  
Er startet auch nicht, wenn  
die Schleife oberhalb des  
Bildfensters den dort be-  
findlichen Abriß-Schalter  
berührt.

green: Start projector  
red: Stop projector  
white: Change-over  
Film break switch  
F = Break switch/non-  
rewind unit bridges  
I = Break switch/non-  
rewind unit in operation  
Switch for mains phase  
Green button:  
Main contactor on  
Red button:  
Main contactor off  
Attention!  
The projector cannot be  
started if the change-over  
is open or if the lever arm of  
the non-rewind unit is at the  
terminal stop (film break  
switch). It cannot be started  
either when the loop above  
the picture window touches  
the film break switch  
installed in this zone.

vert: Projecteur marche  
rouge: Projecteur arrêt  
blanc: Fondu enchaîné  
Contact de rupture film  
F = contact de rupture  
sur dérouleur shunté  
I = contact de rupture  
sur dérouleur en service  
Interrupteur de phase secteur  
Poussoir vert:  
contacteur principal excité  
Poussoir rouge:  
contacteur principal désexcité  
Attention!  
La mise en marche du pro-  
jecteur est impossible lors-  
que le contact de fondu-  
enchaîné est ouvert ou  
lorsque le bras du dérou-  
leur se trouve à la butée  
(contact de rupture film  
ouvert). Il en est de même  
lorsque la boucle au-dessus  
de la fenêtre d'image vient  
ouvrir le contact de rupture de  
film installé dans cette zone.

Fig. 4

Maße und Gewichte  
1 Projektor mit elektri-  
scher Einheit  
1 Programmautomat  
1 Steuergerät  
1 Cassetten-Recorder  
1 Kontroll-Einheit  
1 Verstärker  
1 Gleichrichter  
1 Zweitellereinrichtung  
1 Xenonlampenhaus  
500 W  
1 Xenonlampenhaus  
700/1600 W  
1 Halogensatz mit Trafo

Weights and measures  
1 projector with  
electrical unit  
1 program automat  
1 control device  
1 cassette recorder  
1 checking unit  
1 amplifier  
1 rectifier  
1 double disk non-rewind  
system  
1 xenon lamp house  
500 W  
1 xenon lamp house  
700/1600 W  
1 halogen set with trans-  
formator

Poids et dimensions  
1 projecteur avec unité  
électrique 125,0 kg  
1 programmeur 6,5 kg  
1 unité de commande 7,5 kg  
1 magnétophone à cassettes 4,0 kg  
1 unité de contrôle 3,0 kg  
1 amplificateur 11,0 kg  
1 redresseur 52,0 kg  
1 dérouleur à deux plateaux 91,0 kg  
1 lanterne à lampe xénon  
500 W 10,0 kg  
1 lanterne à lampe xénon  
700/1600 W 27,0 kg  
1 jeu de lampes halogène  
avec transformateur 9,5 kg

Fig. 5

FP 30 Anschlußschema  
Projektor  
Lampenhaus  
Gleichrichter  
Netzspannung  
Lautsprecher

FP 30 Connection diagram  
Projector  
Lamp house  
Rectifier  
Mains voltage  
Loudspeaker

Schéma de branchement FP 30  
Projecteur  
Lanterne  
Redresseur  
Tension secteur  
Haut-parleur

Fig. 6

Film-Einlegeschema FP 30  
Projektor  
Tonspur  
Objektiv  
Bildkopf  
Film

Film insertion diagram  
FP 30  
Projector  
Sound track  
Lens  
Image head  
Film

Trace du film FP 30  
Projecteur  
Piste sonore  
Objectif  
Tête d'image  
Film



Fig. 7

Zusatzlasche rechts und links. Anstelle der Distanzscheibe über die vorhandenen Gewinde M5 montieren.	Additional side bar at the right and left. Mount instead of the spacing washer over the existing thread M5.	Pattes supplémentaires droite et gauche. A monter à la place des rondelles sur les trous taraudés M5.
Zur Aufhängung unteres Gewinde M 12 im Fußteil verwende.	Use lower thread M 12 in the base portion for suspension.	Pour la suspension, utiliser le trou taraudé M 12 inférieur dans le pied.
Bei Aufwärtsprojekten die Zusatzlaschen bei „X“ montieren.	For upward projection, mount the additional side bars at "X".	Pour la projection vers le haut, monter les pattes en "X".
Einbauschema – Projektoren mit Neigungswinkel 5° – 10°	Installation diagram for projectors with angle of inclination from 5° – 10°	Plan de montage projecteurs. Inclinaison 5° – 10°

Fig. 8

Netz	Mains	Secteur
Lautsprecher	Loudspeaker	Haut-parleur
Lichtton Eingang	Optical sound entry	Entrée son optique
Tonband Eingang	Sound tape entry	Entrée son magnetique
Lautstärkeregelung	Loudspeaker control	Réglage haut-parleur
Verstärker	Amplifier	Amplificateur
Diodenstecker	Diode plugs	Fiche à diodes
Panel Kontrollautsprecher	Panel for check loud speaker	Panneau haut-parleur témoin
Kassetten-Recorder	Cassette Recorder	Magnétophone à cassettes
Fading Einheit	Fading unit	Evanouissement
Motor	Motor	Moteur
Saalregler	Theater control	Eclairage salle
Mikroschalter Objektivwechselrevolver	Microswitch lens change turret	Micro-contact tourelle à objectifs
Schleifenschalter	non-rewind unit	Contact boucle
Pilotlampe	Pilot lamp	Lampe pilote
Überblendungsrelais	Change-over relay	Relais fondu enchaîné
Motor autom. Maskenwechsel	Motor for automatic aperture plate change	Moteur changement caché
FS Bildstrich	Motor for remote control film framing	Télécommande position image
Steuerung Objektivrevolver	Motor for lens turret	Commande tourelle à objectif
Tonlampe	Exciter lampe	Lampe excitatrice
Motor Objektivrevolver	Motor for lens turret	Moteur tourelle objectif
Fotodiode	Photo diodes	Photodiode
Endschalter	End switch	Fin de course
Motor FS Bildschärfe	Motor for remote control focussing	Moteur de mise au point
Anschluß-Motor	Connection motor	Branchement moteur
SK 7 Reedkontakt	Reed channel	Contact Reed
Steuergerät Schleifenteller	Control device non-rewind unit	Commande dérouleurs
Buchsenleiste	Socket panel	Réglette à prise
Matrixprogrammer	Matrix programmer	Programmeur à matrice
Sensor	Sensor	Capteur
Elektrische Einheit	Electric unit	Unité électrique
Kabelbaum für alle Ausbaustufen	Cable form for all stages	Faisceau de câbles pour tous niveaux d'équipement
Steckerleiste	Plug panel	Réglette à prises
Druckertableau	Pushbutton panel	Panneau poussoirs

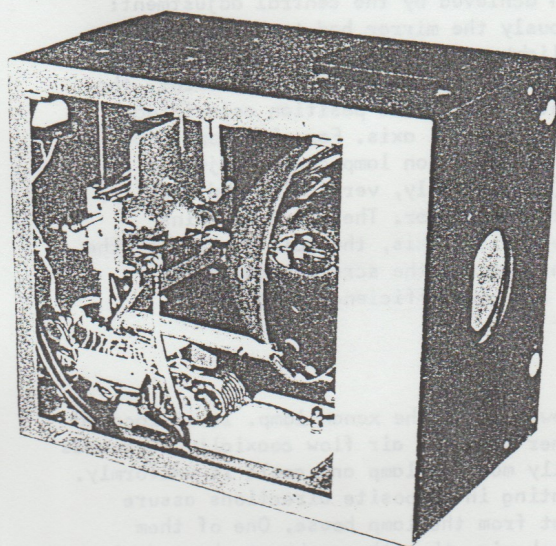


Fig. 9	Schaltbild FP 30 Motor FS Bildstrich  Bildstrich auf Bildstrich ab Motor FS Bildschärfe  Bildschärfe Motor Objektivrevolver Motor Maskenwechsler  Motorpotentiometer Laut- stärkeregelung Ton leiser Ton lauter Gleichrichter Lampenhaus Tonlampe LA 2 Überblendrelais RE 7 Überblendung zu Überblendung auf Hauptmotor Motor start Motor stop Anschlußklemmleiste Gefahrenschalter Fernbedienung Anschlüsse Steuerung Projektorrelais angetriebene Elemente Endschalter SK 14	Circuit diagram FP 30 Motor for remote control picture framing Picture framing Picture framing Motor for remote control focussing Focus Motor for lens turret Motor for aperture plate change Motor potentiometer sound volume control Sound softer Sound louder Rectifier Lamp housing Exciter lamp LA 2 Change over relay RE 7 Change over off Change over on Main motor Motor start Motor stop Connection terminal strip Danger track Remote control Connections Control Projector Driven elements End switch SK 14	Schema FP 30 Moteur télécommande position d'image Montée image Descente image Moteur télécommande position d'image Mise au point Moteur tourelle à objectifs Moteur changement de cache  Potentiometre de volume motorisé Volume bas Volume haut Redresseur Lanterne Lampe excitatrice LA 2 Relais fondu enchaîné RE 7 Fondu enchaîné fermé Fondu enchaîné ouvert Moteur principal Moteur marche Moteur arrêt Bornier de raccordement Arrêt d'urgence Télécommande Raccordements Commande Relais projecteur Organes entraînés Fin de course SK 14
Fig. 10	Schaltbild Lampenhaus	Circuit diagram for lamp	Schéma de lanterne
Fig. 11	Panel NF-Input NF-Output NF-Output Fading Tonband-Netz Matrix re13 oder Schalter Input Output Motor Potentiometer	Panel NF-Input NF-Output NF-Output Fading Sound tape-mains Matrix re13 or switch Input Output Motor potentiometer	Panneau de branchement Entrée BF Sortie BF Sortie BF Evanouissement Magnétophone secteur Matrice re 13 ou interrupteur Entrée Sortie Potentiometre motorisé
Fig. 12	Fading Output I Kontrolle ein Matrix Schalter Output II Netz Tonband	Fading Output I Check on Matrix Switch Output II Mains Tape recorder	Evanouissement Sortie I Contrôle marche Matrice Interrupteur Sortie II Secteur Magnétophone
Fig. 13	Matrix	Matrix	Matrice
Fig. 14	Matrix FP 30 einfach — Bestückungsplan	Matrix FP 30 single Arrangement of components	Matrice FP 30 — plan d'équipe- ment



# Kinoton

## SERVICE



# XL 1000



## 1. Introduction

The xenon 700/1600 W lamp house for 35 mm and for 16 mm projectors is characterized by its highly modern compact construction, its possibilities of being optimally adjusted and its perfect illumination optics. The lamp house can supply an adequate luminous flux for the screen of motion picture theaters with up to 700 seats.

The xenon block for 700 W, 1000 W or 1600 W lamps has been accommodated in a lamp house with a length of only 22" (56 cm), a width of 13.4" (34 cm) and a height of 17.3" (44 cm), which can be bolted directly to the housing of the projector.

### 1.1 Optical system

The arc of the xenon lamp is accurately stabilized by a permanent magnet that has been adjusted prior to delivery. The optical system consists of an elliptical mirror with a diameter of 11" (280 mm) which can be supplied as a "cold" or as a "warm" mirror.

### 1.2 Central adjustment

A significant improvement over conventional xenon lamps has been achieved by the central adjustment: whereas previously the mirror had to be adjusted for aligning the light source, which necessarily led to luminous losses, in the new central adjustment, the mirror is mounted in a fixed position coinciding exactly with the optical axis. For alignment, the horizontally mounted xenon lamp can be adjusted in three planes (horizontally, vertically and axially) with respect to the mirror. The mirror remains exactly in the optical axis, the main portion of the reflected light reaches the screen through the aperture, and luminous efficiency is optimal.

### 1.3 Cooling

A powerful blower cools the xenon lamp. It is located in such a manner that the air flow coaxially surrounds the horizontally mounted lamp and cools it uniformly. Two fans operating in opposite directions assure removal of heat from the lamp house. One of them introduces fresh air, the other exhausts heated air.

### 1.4 Ignition

Although the lamp can be ignited automatically, as is the case with all Kinoton projectors, a pushbutton has been provided for igniting the lamp manually. The ignition device is mounted on the support plate of the xenon block and protected against heat radiation. A counter giving the number of hours that the lamp has been in operation and an ammeter are mounted on the rear of the lamp house where they can be easily read. The housing is designed so that the lamp can be ignited only when fully ventilated and the doors are firmly closed.

The xenon block can also be supplied with mirror and ignition device but without housing to be built into existing lamp houses. The lamp house must have a clear width of at least 11.8" (30 cm), a clear height of 14 3/4" (40 cm) and a length great enough to permit an interval of from 21 1/4" (540 mm) to 23.6" (600 mm) between the aperture plate and the vertex of the mirror of the built-in lamp.

Whenever attachable lamp houses of older projectors do

not permit direct mounting on the projector housing because of the location of the upper spool box, an appropriate intermediate frame will be delivered.

Power is supplied to the xenon lamp through a rectifier. For the 700 W lamp, maximum current is 37 A, while for the 1000 W and the 1600 W lamp, it is 50 A and 65 A respectively. The lamps generate no ozone during operation. Rectifiers up to 1000 W can be directly mounted in the column of the FP 30 projector.

As is the case with all our light sources, the lamp house can be delivered optionally for connection to 220 V, 50 Hz or 110 V, 60 Hz mains.

### 1.5 Type numbers

0020 705	.....	<u>Attachable lamphouse, 700/1600 W</u> with built-in xenon block ignition device, electrical equipment, integrated blowers for forced air- cooling
0020 705 10	....	with normal mirror, 280 mm diam. (11")
0020 705 20	....	with dichroic mirror, 280 mm diam. (11")
....	... ..2..	220 V, 50 Hz model
....	... ..1..	110 V, 60 Hz model
....	... ..10	with flue-type blower
0020 710	.....	<u>Built-in xenon block 700/1600 W</u> with blower for lamps and ignition de- vice
0020 710 1	....	with normal mirror, 280 mm diam. (11")
0020 710 2	....	with dichroic mirror, 280 mm diam. (11")
....	... ..2..	220 V, 50 Hz model
....	... ..1..	110 V, 60 Hz model
....	... ..11	with heat filter and flue-type blower
....	... ..10	with flue-type blower, without heat filter

All type numbers are in each case combined into a 12-digit number. Digits that are not required are replaced with 0.

Example: Attachable xenon lamphouse 700/1600 W with dichroic mirror, 220 V, 50 Hz model has the type number: 0020 705 20200.

### 1.6 Dimensions

The attachable lamphouse 700/1600 W has the following dimensions:

Length	560 mm
Width	340 mm
Height	440 mm

The mirrors employed have the following setting data:

Mirror vertex - focal point of lens	540 mm
Mirror vertex - aperture	approx. 450 mm
Mirror vertex - focal point of lamp	60 mm

## 2. Attachment of the lamphouse and electrical connection

The attachable xenon lamphouse 700/1600 W is screwed directly onto the projector housing.

To do this, the doors of the lamphouse are removed (the doors can be lifted up and out after loosening the two screws on the upper edge). The 4 screws M 6 securing the lamphouse are screwed out of the rear housing wall of the projector, and rescrewed from the inside of the lamphouse through the fastening



holes of the front wall of the lamp. To do this, the lamphouse must be held so that the light exit opening of the lamphouse lies in front of the opening of the shutter housing.

The prepared direct current and connecting cables in the projector are inserted through the cable lead-in opening into the lamphouse and connected (see Fig. 1).

Two large clamps marked with + and - are provided for the two direct current cables, whereas the wires of the cable harness are connected directly to the terminal strip of the built-in xenon block. Mains connection to 20, 60, 40 (neutral wire to 20, phase to 60 and ground to 40), ignition control line to 122 and 122 A and loudspeaker line to 10 and 11.

A main connection terminal strip is located in the lamphouse. It is marked with

10	Loudspeaker line
11	Loudspeaker line
21	Hour meter
122	Switching line projector/rectifier
122 A	Switching line projector/rectifier
40	Ground
60	Phase
20	Zero
108	Ignition pushbutton
108 A	Ignition pushbutton

Terminals 21 as well as 108 and 108 A are already connected. For the mains connection a diameter of 1.5 is adequate, the ground line proceeds to the grounding point of the projector. Poor grounding can lead to destruction of the ignition devices.

The loudspeaker line is tapped parallel between output amplifier and loudspeaker and connected to the terminals 10 and 11. The loudspeaker line is shorted through relay RE A upon ignition to suppress ignition static.

If automatic ignition is to be made in addition to ignition by means of ignition pushbutton SK 2, connections 122 and 122 A are used.

There is a contactor in the rectifier to switch the mains supply on and off. The low-pass filter of this contactor is connected to contact 122 on relay RE 2 of the projector. The line leads from contact 122 A to point 122 of the ignition device and from 122 A back to the contactor spool of the rectifier. If the above circuit is used to start the projector, the contactor of the rectifier goes into operation simultaneously. Ignition is triggered by the direct current. If the lamp does not burn, re-ignition is automatic.

If the circuit 122 - 122 A is interrupted by switching off the projector, by the air-flow switch SK 5 or the door switch upon opening of the lamphouse, the rectifier and consequently also the xenon lamp are switched off.

### 3. Basic setting with setting gauge

Kinoton lamphouses are always delivered with a completely adjusted xenon block. This means that the lamp is completely adjusted for mounting the lamphouse on a Kinoton projector. If the lamphouse is attached to another projector, or if the position of the xenon block has changed in the lamphouse (e.g. after a repair job or because of transport, etc.), the adjustment must be repeated.

It is absolutely essential that the xenon lamp be adjusted accurately, since only then can full light

efficiency with uniform illumination of the screen be assured.

Adjustment is simplified by use of the appropriate tool, the so-called "setting gauge" (see Fig. 2).

This gauge is used as follows:

1.- Disk 2 is inserted into the mirror mounting instead of the mirror. To do this, loosen the screw of the upper mirror holder until it can be lifted. The disk is inserted into the two lower holders, the upper holder is then put back into place and its screw retightened.

2.- Rod 1 is inserted through the borehole of the disk and screwed with the threaded end into the lamp holder, so that this rod takes the place of the xenon lamp. The lamp holder is moved from right to left and upwards and downwards until the rod comes to rest exactly in the middle of the borehole of the disk.

3.- Disk 3 is placed on the free end of the rod and screwed tight.

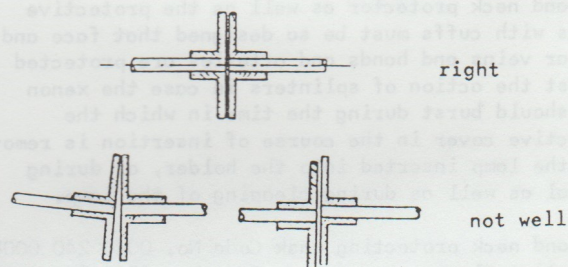
4.- Bushing 5 is clamped into the lens holder and the long rod 6 is inserted through the borehole of the bushing, through the aperture, past the shutter held open by hand, past the lens stop into the lamphouse.

#### Caution:

In order not to damage lens stop and shutter, the lens stop housing is removed prior to inserting rod 6. To do this, the two black knurled nuts (item 32 in Fig. 19 of the Service Documentation FP 30) are screwed off, the housing can then be taken off.

5.- Disk 4 is shoved onto the free end of rod 6 in the lamphouse and screwed on. Afterwards, rod 6 is pushed further until the two disks (items 3 and item 4) touch.

6.- The xenon lamp is adjusted exactly when the two disks are parallel and coaxial.



The lamp is not well adjusted if the disks are staggered or not parallel. In this case, the xenon built-in block must be adjusted as a whole.

The fastening screws of the built-in block are loosened and the built-in block pushed until the adjustment is correct. If necessary, shims must be placed under the frame of the built-in block. Within minor limits, the entire lamphouse can also be shifted with respect to the projector.

7.- As soon as the two disks are parallel and coaxial, the built-in block is definitively tightened. The optical axis is perfectly adjusted!

The parts of the gauge are now removed in reverse order.

If the xenon lamp is adjusted according to the method described above using the adjusting gauge, you will obtain a perfect optical axis, an optimal light



efficiency and a uniform illumination of the screen.

#### 4. Insertion of the mirror

The mirror may not be touched on the inner, reflecting surface, the so-called foil with bare uncovered hands. If this should inadvertently happen, the spot touched must be wiped clean carefully with a rag moistened with alcohol.

To insert the mirror, the fastening screw of the upper mirror holder is loosened until this holder can be swung lightly upwards. The mirror is now placed into the lower holders. The upper holder is then placed on the upper edge of the mirror and the fastening screw is retightened.

Care must be taken that the mirror is not firmly clamped, otherwise when heated during operation it would not be able to expand and would break. The mirror should lie only on the two lower holders, whereas it is pressed only by the spring, lightly against the front edge of the holder.

#### 5. Insertion of the xenon bulb

Xenon bulbs are high-pressure glow-discharge lamps, in which the light is generated by a discharge in a translucent bulb filled with gas between electrodes and in which a high interior pressure exists even when not in operation. In order to avoid accidents, safety regulations (DIN 15995, Part I) must be observed during insertion of the bulb.

Xenon short-arc lamps for horizontal burning position of 700 W, 1000 W or 1600 W can be inserted into the xenon attachable lamphouse. These xenon lamps are delivered in transparent protective covers, which also serve for screwing the lamp into the holder. This protective cover is designed in such a way that it protects against splinters in case the lamp bursts during transport, in storage or upon insertion or removal. A face mask and neck protector as well as protective gloves with cuffs must be worn when inserting the xenon lamp into the lamphouse. Face mask and neck protector as well as the protective gloves with cuffs must be so designed that face and jugular veins and hands and arteries are protected against the action of splinters in case the xenon lamp should burst during the time in which the protective cover in the course of insertion is removed from the lamp inserted into the holder, or during removal as well as during cleaning of the lamp.

Face and neck protecting mask Code No. 0040 240 00080  
Protective gloves Code No. 0040 240 00081

After putting on the mask and gloves, the lid of the protective cover is taken off. With the aid of the protective cover the xenon lamp is passed through the central borehole of the mirror with the negative base forwards and screwed into the lamp holder up to the stop. The cylindrical protective cover is now removed. For this purpose it must be pushed far into the lens stop housing. The cable located on the + base is then firmly screwed on the connection terminal of the high-voltage coil on the base plate in front on the mirror. In order to avoid current leakage resistances and consequently disturbances to lamp operation, all connection positions should display good contact. The lamphouse can now be closed. The doors are screwed shut.

#### 6. Ignition of the lamp and regulating the lamp current

Blinding danger, ultraviolet radiation, high voltage of the ignition spark and the increased gas pressure during

operation are the reasons why xenon lamps may not be ignited without ventilation and with opened lamphouse doors. That is why an air-flow circuit breaker (see page 21) and interrupters are provided on the lamphouse doors, which permit ignition of the lamp only in case ventilation is in operation and the doors are closed. If the doors are firmly screwed shut, the lamp can be ignited.

The high-voltage pulse required for ignition is supplied by the built-in ignition device. In Kinton projectors, ignition is automatic after start of the projector (see Fig. 1), if a rectifier is attached, whose floating voltage is at least 75 V.

Functioning of the ignition is explained with an example:

If voltage is applied to projector FP 30, for example, then RE 1 switches also alternating current to the terminal of lamp and rectifier. If the motor is now started through SKS, RE 2 also switches on the contactor C 1 of the rectifier. The lamphouse receives direct current, RE A of the ignition device picks up briefly, RE B picks up briefly, mains voltage reaches the transformer of the ignition device, a high-voltage pulse ignites the xenon lamp. If the lamp does not burn, re-ignition follows automatically.

By pressing the ignition pushbutton SK 2, ignition can be done manually. In this case, the loudspeakers are shorted for the period of the ignition pulse. As soon as the lamp burns, the value of the direct voltage drops to the arc drop of the xenon bulb (19-22 V), the relay RE A drops out, the automatic ignition is interrupted.

The third contact of relay RE A serves to suppress any ignition static. For this purpose the loudspeaker line between output terminal and loudspeaker is tapped parallel and placed on the terminals 10 and 11 of the lamphouse. At the moment of ignition, a short-circuit of the loudspeaker line is made over RE A 3. The ignition static is not reproduced by the loudspeaker, whereas the brief interruption of sound is not noticed by the audience.

After initial ignition of the xenon lamp, the desired lamp current is adjusted with the rectifier regulation.

#### Note:

Care must be taken that the current indicated by the ammeter lies within the range of current driving specified by the manufacturer of the xenon lamps.

Rated out- put of the lamps	Current control range	Rated current inten- sity (A)	Operating voltage (V)
(W)	(A)		
700	30 - 45	37	19
1000	30 - 55	50	20
1600	45 - 70	65	22

#### 7. Screen illumination

After the xenon built-in block including mirror has been aligned during the basic adjustment exactly in the optical axis of the projector, the screen illumination must now be optimally re-adjusted with running projector and burning lamp. This is done with the aid of the central adjustment of the xenon bulb.

Using the supplied socket head cap screw wrench, the xenon lamp is adjusted as much along the optical axis from the rear until only a reduced round illuminated



spot can be seen on the screen. Through adjustment from right to left (through the side wall of the lamphouse) and up and down (through the cover of the lamphouse) this circular light spot is brought precisely into the middle of the screen.

#### Note:

Whenever in extreme special cases, the light spot cannot be brought into the center of the screen with the aid of the central adjustment of the xenon bulb, the possibility exists of correction of the mirror position with the aid of the adjustment screws on the 3 mirror holders. To do this, however, the lamp must be switched off and after a waiting period of 10 minutes the lamphouse doors must be opened and the operator must wear the face mask and gloves. After the adjustment has been made, the check nuts of the adjusting screws must be retightened and the lamphouse doors screwed shut.

As soon as the reduced circular light spot is in the middle of the screen, it is enlarged by adjustment of the focal point (regulation along the optical axis) until the entire screen is optimally illuminated. In this connection, according to DIN 15571 the luminance in the center of the screen should be  $40 \text{ cd/sq m} = 126 \text{ apostilb}$  (minimum value  $30 \text{ cd/sq m} = 95 \text{ apostilb}$ ). The luminance on the lateral measurement points (see illustration) should not be less than 50 %, preferably 68 % of the luminance in the center of the screen.

To determine the illumination intensity, the illumination in lux must be measured and multiplied with the reflection factor or in the case of reflex screens with the luminance factor.

$$\text{Screen luminance in cd/sq m} = \frac{\text{Reflection factor}}{3.14} \times \text{illumination in lux}$$

$$\text{Screen luminance in apostilb} = \text{Reflection factor} \times \text{illumination in lux}$$

### 8. Operation

Dimensions of the xenon short-arc lamps are small in comparison with the large electrical power input. Because of the high thermal load, natural convective cooling is no longer adequate for these lamp types, a directed, forced air cooling of the discharge vessel and of the base is necessary.

The xenon attachable lamphouse 700/1600 W is therefore equipped with a blower, which generates a directed air flow symmetrical to the lamp axis. In order to assure that the lamp is not operated without ventilation, an air-flow circuit-breaker is incorporated which does not permit ignition of the lamp unless the air flow is in operation and which shuts off the lamp as soon as the blower becomes inoperative for any reason.

After switching off the lamp it is recommended that the blower be permitted to operate for at least 5 minutes.

Two oppositely working blowers remove heat from the lamphouse. One of them introduces fresh air, the other exhausts hot air. These two blowers as well as the blower of the xenon bulb operate as soon as and as long as mains voltage is applied to the lamp.

Xenon short-arc lamps are produced only in so-called "ozone-free" models, so that upon operation of the attachable xenon lamphouse 700/1600 W no gases and vapors injurious to health occur. If despite this,

connection of the lamphouse to an exhaust flue should be desired, an exhausting nozzle or a flue-type blower can be built in place of the exhausting blower. If xenon short-arc lamps are operated at the start at rated current, reduction in luminous flux with longer use can be completely compensated up to the maximal value by increasing the current.

If the lamps are operated at constant current, there will be toward the end of the average operating life of 1500 hours a decrease in luminous flux of 25 to 30 % depending on operating current strength.

Operating life of the lamps and also reduction in luminous flux depend substantially on the unavoidable blackening of the bulb by deposit of the electrode material.

Stabilization of the arc of the xenon lamp through an installed permanent magnet has among other effects a location of the arc exactly in the middle of the xenon bulb, thus keeping blackening as small as possible. That is why the position of the permanent magnet is important, which if at all possible should not be adjusted. To prevent its being accidentally incorrectly installed, one side is marked with red paint.

The maximal current prescribed by the manufacturer for each lamp type may not be exceeded under any circumstances, since otherwise operational safety would become questionable and the operating life reduced considerably. Operation below the current driving range leads to arc irregularity and to shortening of operating life.

After the average operating life indicated by the manufacturers has been exceeded by about 25 %, it is recommended for safety that the xenon lamps be replaced. After this period of use, the degree of blackening of the discharge bulb is usually so far advanced that the emission intensity no longer meets requirements.

Greater switching frequency, current pulsation of the rectifier used of more than 10 % as well as underloading and overloading shorten operating life. The ventilation openings on the lamphouse may never be covered, since otherwise the lamp will be destroyed prematurely by overheating.

### 9. Service work

If the above installation, adjustment and operating instructions are followed, the attachable xenon lamphouses are robust and require scarcely any maintenance.

#### Required service work:

- 9.1 - Checking and possible readjustment of the screen illumination.
- 9.2 - Replacement of the xenon bulb.
- 9.3 - Cleaning the mirror.
- 9.4 - Replacement of service parts subject to natural wear and tear (see table on page 18).

9.1 As a matter of principle, the screen illumination is set once and for all and has to be reset only after replacement of the lamp or the mirror. Since however in the course of time the shape of the arc can change slightly due to nonuniform burning of the electrodes, it is recommended that the screen illumination be checked from time to time (e.g. every 3 months) and if necessary readjusted (see section 7 - screen illumination). The position of the arc is stabilized with the aid of a permanent



magnet. If the latter should have become displaced, it must be readjusted so that the arc lies axially in the middle of the bulb.

9.2 Replacement of the xenon lamp, as well as cleaning or replacement of the mirror and replacement parts requires opening the lamphouse.

#### Caution:

- 1.- The lamphouse may not be opened earlier than 10 minutes after switching off the lamp, when the xenon bulb has cooled off.
- 2.- Prior to opening the lamphouse, the voltage must be switched off from lamp and rectifier at all poles. This means that the main switch of the projector must be switched off. Simply switching off the lamp is not sufficient.
- 3.- Facial and protective neck mask as well as safety gloves must be worn.

To remove the xenon bulb, the cable must be released from the connection terminal of the high-voltage coil on the base plate in front of the mirror. The cylindrical lamp protective cover is then inverted over the xenon bulb until the slots at the end of the cover engage into the lateral studs of the negative base of the xenon lamp. The xenon lamp can now be screwed out with the aid of the protective cover. The new lamp is inserted as described on page 10.

Used xenon bulbs are explosive. For this reason, they may not be kept in the projection booth. If they are to be reused, it is recommended that they be stored in their original packaging. If not, they should be destroyed.

9.3 Cleaning the mirror. Dichroic mirrors must be cleaned at regular intervals. Do not wait until the mirrors are very dirty and the deposits have been burnt into place.

After opening the lamphouse and removal of the xenon bulb (see above) and complete cooling off of the mirror shell, cleaning can start. First of all, dust and dirt are removed with a clean, soft painter's brush or brush. Any remaining dirt deposits are carefully wiped off with a clean rag moistened with alcohol. Care must be taken that hard particles do not cause any scratches on the mirror surface during their removal. Such damages to the surface can easily result in even greater damages. Deposits and spatters that cannot be removed as described above must be cautiously loosened with a soft lindenwood stick. Under no circumstances may hard objects such as a knife, screwdriver, etc. be used for this purpose.

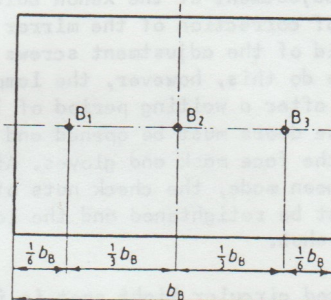
If fine deposits cannot be removed by alcohol, we recommend using the cleaning agent SIDOL. A few drops of SIDOL are placed on a clean rag and cleaning is done cautiously with only light pressure in the sequence given above. With normal use, SIDOL does not attack the mirror surface. It can be obtained from the following company: Siegel-Werke GmbH, Eupenerstrasse 57, D-5000 Köln-Braunsfeld.

#### Caution:

Improper usage of SIDOL can result in removal of the mirror layers.

To exclude every risk, cleaning with soapsuds is also possible. The dichroic mirror is first thoroughly rinsed off under running water. The mirror is rubbed off with increasing pressure using a large cotton pad soaked in soapsuds and then rinsed off again thoroughly and abundantly in running water. After this treatment, the mirror surface is immediately

dried with a clean cotton towel. When this cleaning procedure is used, great care must be taken that neither soapsuds nor rinsing water are allowed to dry in place.



Measurement points  
for screen luminance



## 10.- Ersatzteile - Spareparts - pièces de rechange

Pos.	Bezeichnung	Code-Nummer	Description	Désignation
1	Xenonlampe 700 W Philips SCX 700 W/HSC OFR	0040 120 00110	Xenon Lamp 700 W Philips SCX 700 W/HSC OFR	Lampe au xénon 700 W Philips SCX 700 W/HSC OFR
1 a	Xenonlampe 700 W Osram XBO 700 W/HSC OFR	0040 120 00101	Xenon Lamp 700 W Osram XBO 700 W/HSC OFR	Lampe au xénon 700 W Osram XBO 700 W/HSC OFR
1 b	Xenonlampe 1000 W Philips SCX 1000 W/HSC OFR	0040 120 00111	Xenon Lamp 1000 W Philips SCX 1000 W/HSC OFR	Lampe au xénon 1000 W Philips SCX 1000 W/HSC OFR
1 c	Xenonlampe 1000 W Osram XBO 1000 W/HSC OFR	0040 120 00102	Xenon Lamp 1000 W Osram XBO 1000 W/HSC OFR	Lampe au xénon 1000 W Osram XBO 1000 W/HSC OFR
1 d	Xenonlampe 1600 W Philips HSC 1600 W/HSC OFR	0040 120 00112	Xenon Lamp 1600 W Philips HSC 1600 W/HSC OFR	Lampe au xénon 1600 W Philips HSC 1600 W/HSC OFR
1 e	Xenonlampe 1600 W Osram XBO 1600 W/HSC OFR	0040 120 00103	Xenon Lamp 1600 W Osram XBO 1600 W/HSC OFR	Lampe au xénon 1600 W Osram XBO 1600 W/HSC OFR
2	Warmlichtspiegel Ø 280 mm 60/540	0040 180 00137	Normal mirror 11" (280 mm) dia- meter	miroir normal de 280 mm de di- mètre
2 a	Kaltlichtspiegel Ø 280 mm 60/540	0040 180 00150	Dichroic mirror 11" (280 mm) diameter	miroir froid de 280 mm de dia- mètre
3	Feder für Spiegelhalter	1000 492 37001	spring for mirror clamp	ressort pour fixation miroir
4	Spiegelhalter	1000 256 97002	mirror clamp	fixation miroir
5	Magnethalter	1000 256 97003	Magnet holder	porte-aimant
6	Stabilisierungsmagnet	1000 526 27001	arc stabilizer magnet	aimant stabilisateur d'arc
7	Rückholfeder rechts-links Ver- stellung	1000 492 37002	Return spring lateral ad- justement	Ressort réglage horizontal
8	Rückholfeder Längsverstellung	1000 492 37003	Return spring axial ad- justement	Ressort réglage axial
9	Kolbenhalter	1000 256 97001	Bulb holder	Porte-lampe
10	Isolierbüchse Kolbenhalter	1000 532 67002	Insulating bush bulb holder	
11	Rückholfeder Vertikalver- stellung	1000 492 37004	Return spring vertical ad- justement	Ressort réglage vertical
12	Minuskabel kompl.	1000 320 27001	Negative cable	câble negative complet
13	Pluskabel (nur für Kolben ohne eigenes Kabel)	1000 320 27002	Positiv cable (only for bulbs without annexed cable)	câble positiv
PR	Printplatte Zündgerät kompl. bestückt	1000 214 67002	Print plate with electrical parts	
15	Klemmleiste	5322 290 60193	Terminal strip	Plaquette connexions
16	Indikationsplatte	1000 455 57001	Indication plate	Plaquette indicatrice
17	Klemmleiste Gleichstromkabel	1000 290 67003	DC terminal	bloc de connexions +
18	Sicherungshalter	5322 705 30871	Fuse holder	Porte fusible
Si2	Sicherung 4 A träge	4822 253 30022	Fuse slow 4 A	Fusible 4 A temporisé
Si1	Sicherung 1, A träge		Fuse slow 1, A	Fusible 1, A temporisé
SK 1	Schalter für Stundenzähler	1000 280 27004	Switch for hour counter	commutateur pour horametre
SK 2	Zünddrücker	5322 276 10134	Ignition push button	Bouton-poussoir d'amorçage



SK 3/SK 4	Tür-Sicherheitsschalter	5322 276 10064	door safety switch	Interrupteur de porte
SK 5	Luftstromschalter (nur Mikroschalter)	1000 271 37004	Air flow switch	Commutateur de flux d'air
	Luftstromschalter SK 5 komplett mit Luftplatte	1000 271 37005	Air flow switch compl. with air flap	Commutateur de flux d'air compl. avec clapete d'air
M 1	Motor für Lampenventilator 220 V - 50 Hz	1000 361 17002	Ventilator motor 220 V	Moteur de ventilateur 220
M 1	Motor für Lampenventilator 110 V - 60 Hz	1000 361 17004	Ventilator motor 110 V	Moteur de ventilateur 110
M 1	Ventilator kompl. mit Motor	1000 361 17001	Complete ventilator with motor	Ventilateur compl. avec mo
M 2/M 3	Absauglüfter 220 V	1000 361 17005	220 V Exhauster	Exhausteur 220 V
	Absauglüfter 110 V	1000 361 17006	110 V Exhauster	Exhausteur 110 V
	Abdeckgitter Lüfter	1000 458 17001	Protection grate	Grille protectrice
M 4	Rohrlüfter Ø 130 mm	0040 240 00041	Chimney exhauster	Exhausteur à cheminée
RE A/RE B	Relais 48 V	1000 280 77004	Relay 48 V	Relais 48 V
C 1/C 2	Kondensator 0,022 µF 1000 V	5322 121 40196	Capacitor 0,022 µF 1000 V	Condensateur 0,022 µF 1000 V
C 3	Kondensator 0,1 µF 1000 V	5322 121 40214	Capacitor 0,1 µF 1000 V	Condensateur 0,1 µF 1000 V
C 4	Kondensator 0,01 µF 1000 V	1000 121 47004	Capacitor 0,01 µF 1000 V	Condensateur 0,01 µF 1000 V
C 5	Hochspannungskondensator 1000 pF 15 KV	1000 122 57001	High-tension capacitor 1000 pF 15 KV	HT Condensateur 1000 pF 15
C 6	Elektrolyt-Kondensator 470 µF 100 V	1000 124 27002	Electrolytic capacitor 470 µF 100 V	Condensateur electr. 470 µF 100 V
C 7	Kondensator 22 nF 1000 V	1000 121 47005	Capacitor 22 nF 1000 V	Condensateur 22 nF 1000
PTC	Kaltleiter P 390/C 16	1000 130 97001	Thermistor P 390/C 16	Thermistor P 390/C 16
D 1/D 2	Diode EM 513	1000 130 37004	Diode EM 513	Diode EM 513
R 1	Widerstand 3,3 K 1 W	5322 110 23121	Resistor 3,3 K 1 W	Résistance 3,3 K 1 W
R 2	Widerstand 2,2 K 0,33 W	5322 110 63116	Resistor 2,2 K 0,33 W	Résistance 2,2 K 0,33 W
R 3	Widerstand 3,9 K 1 W	5322 110 23123	Resistor 3,9 K 1 W	Résistance 3,9 K 1 W
R 4	Widerstand 1,5 K 1 W	5322 110 23112	Resistor 1,5 K 1 W	Résistance 1,5 K 1 W
R 5	Widerstand 100 Ohm 0,5 W	5322 110 53081	Resistor 100 Ohm 0,5 W	Résistance 100 Ohm 0,5 W
T 1	Hochspannungstransformator	0040 240 00028	High voltage transformer	Transformateur haute tension
T 2	Tessla-Transformator	0040 240 00029	Tessla transformer	Boline d'induction
F	Funkenstrecke	0040 240 00020	Spark gap	Éclateur
H	Betriebsstundenzähler	0040 240 00060	Hour counter	Horamètre
A	Ampèremeter	0040 240 00065	Ammeter	Ampèremètre



# Xenon-Lampenhaus 700/1600 W für Montage auf Tischplatte

Das Xenon-Lampenhaus 700/1600 W für Montage auf Tischplatten verwendet denselben Xenon-Bausatz mit Zentralverstellung wie das Anbaulampenhaus. Es wird für die verschiedensten Projektoren verwendet, deren Gehäuse ein direktes Anschrauben des Lampenhauses nicht gestattet. Die optische Achse liegt 226 mm über dem Lampenhausboden. Bei Projektoren, deren Tischplatte nicht auf dieses Maß angehoben werden kann, finden entsprechende Zwischenstücke Verwendung.

In diesem Lampenhaus wird ein Spiegel mit längerer Brennweite verwendet, so daß der Abstand Bildfenster-Spiegelscheitel sich auf 735 mm vergrößert und das Gehäuse eine Länge von 89 cm, eine Breite von 45 cm und eine Höhe von 56 cm aufweist. Lichttechnisch und anschlusmäßig entspricht das Tischlampenhaus dem Anbaulampenhaus.

Besondere Bedeutung hat das Tischlampenhaus 700/1600 W

700/1600 W xenon lamp house for mounting on a lamp-house bracket

The xenon block of the lamp house for mounting on a bracket is identical to that of the attachable lamp house described above. Recourse must be had to mounting the lamp house on a bracket if it is used in combination with a projector to which the lamp house cannot be fixed. The optical axis is situated 8,9" (226 mm) above the bottom plate of the lamp house. For projectors the bracket of which cannot be raised to the required height, auxiliary spacers can be interposed.

In this lamp house a mirror is used which has a longer focal length than employed in the previously described version. The distance between the aperture plate and the vertex of the mirror has been increased to 28 3/4" (735 mm). As a result the dimensions of the housing had to be modified; the length is 35" (89 cm), the width 17,7" (45 cm) and the height 22" (56 cm). The optical and technical properties of both types, including the method of wiring the installation, are identical.

## Lanterne Xénon 700/1600 W pour montage sur tablette

Le module de lampe au Xénon pour la lanterne destinée au montage sur une tablette est identique à celui de la lanterne attachable décrite précédemment. On aura recours au montage de la lanterne sur une tablette si elle doit être utilisée en combinaison avec un projecteur ne permettant pas la fixation. L'axe optique se trouve à 226 mm au dessus de la plaque de fond de la lanterne. Pour les projecteurs dont la tablette ne peut pas être élevée jusqu'à la hauteur requise, il est possible de placer des entretoises.

Dans cette lanterne, se trouve un miroir dont la distance focale est plus longue que celle du modèle décrit plus haut. La distance entre le cache et le sommet du miroir a été portée à 735 mm. De ce fait, il a fallu modifier les dimensions du boîtier: la longueur est de 89 cm, la largeur de 45 cm et la hauteur de 56 cm. Les propriétés optiques et techniques des deux modèles sont identiques, même la méthode utilisée pour le câblage de l'installation.

als Lichtquelle von Doppelprojektoren 35 mm/16 mm, wie FP 38. Eine speziell entwickelte Lichtumlenkeinheit erlaubt das wahlweise Ausleuchten des 35-mm-Bildfensters oder, durch Einschwenken einer Umlenkoptik, die Projektion des 16-mm-Films.

## Typennummern

- 0020 703 ..... Xenon-Lampenhaus 700/1600 W für Montage auf Tischplatte  
Xenon-Block und Zubehör wie bei Anbaulampenhaus
- 0020 703 1.... mit Normalspiegel Ø 280 mm  
0020 703 2.... mit Kaltlichtspiegel Ø 280 mm Balzers  
0020 703 .1... mit Tubus für FP 20/FP 30  
0020 703 .2... mit Tubus für DP 75 und DP 70  
0020 703 .3... mit Tubus für FP 16/FP 18  
0020 703 ..2.. 220 V, 50 Hz Version  
0020 703 ..1.. 110 V, 60 Hz Version  
0020 703 ...10 mit Rohr-Aufsatzlüfter zus.  
0020 703 ...11 Hitzefilter und Rohr-Aufsatzlüfter zus.

The 700/1600 W bracket type lamp house is of particular interest to be used as the light source of 35/16 mm dual-purpose projectors, such as the FP 38. A light change-over device, specially designed for this purpose, permits full illumination of the 35 mm aperture plate, or - by revolving a converting optical system so as to enter the light beam - projection of the 16 mm film.

## Type numbers

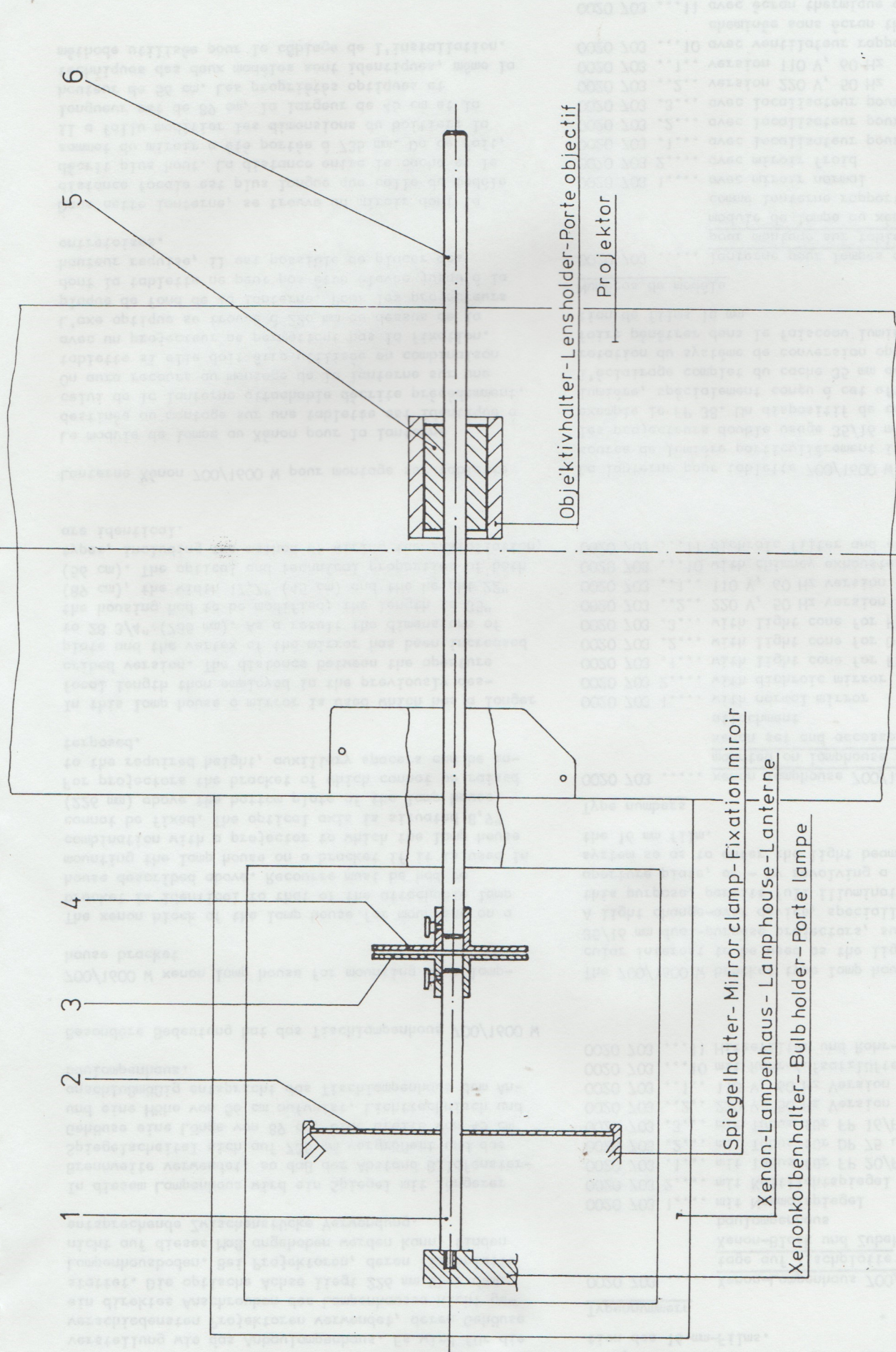
- 0020 703 ..... xenon lamphouse 700/1600 W to be mounted on lamphouse bracket  
xenon set and accessories as lamp house attachment
- 0020 703 1.... with normal mirror 11" (280 mm) Ø  
0020 703 2.... with dichroic mirror 11" (280 mm) Ø  
0020 703 .1... with light cone for FP 20/FP 30  
0020 703 .2... with light cone for DP 75 and DP 70  
0020 703 .3... with light cone for FP 16/FP 18  
0020 703 ..2.. 220 V, 50 Hz version  
0020 703 ..1.. 110 V, 60 Hz version  
0020 703 ...10 with chimney exhaustor add.  
0020 703 ...11 dichroic filter and chimney exhaustor add.

La lanterne pour tablette 700/1600 W constitue une source de lumière particulièrement intéressante pour les projecteurs double usage 35/16 mm, comme par exemple le FP 38. Un dispositif de commutation de lumière, spécialement conçu à cet effet, permet l'éclairage complet du cache 35 mm ou bien - par rotation du système de conversion optique pour le faire pénétrer dans le faisceau lumineux - la projection de films 16 mm

## Numéros de modèle

- 0020 703 ..... lanterne pour lampes au xénon 700/1600 W pour montage sur tablette  
module de lampe au xénon et accessoires comme lanterne rapportable
- 0020 703 1.... avec miroir normal  
0020 703 2.... avec miroir froid  
0020 703 .1... avec localisateur pour FP 20  
0020 703 .2... avec localisateur pour DP 75 et DP 70  
0020 703 .3... avec localisateur pour FP 16  
0020 703 ..2.. version 220 V, 50 Hz  
0020 703 ..1.. version 110 V, 60 Hz  
0020 703 ...10 avec ventilateur rapportable à cheminée sans écran thermique  
0020 703 ...11 avec écran thermique et ventilateur rapportable à cheminée (miroir froid impératif)





Einstell-Lehre Xenonlampe  
 Setting gauge Jauge de réglage

Fig. 2







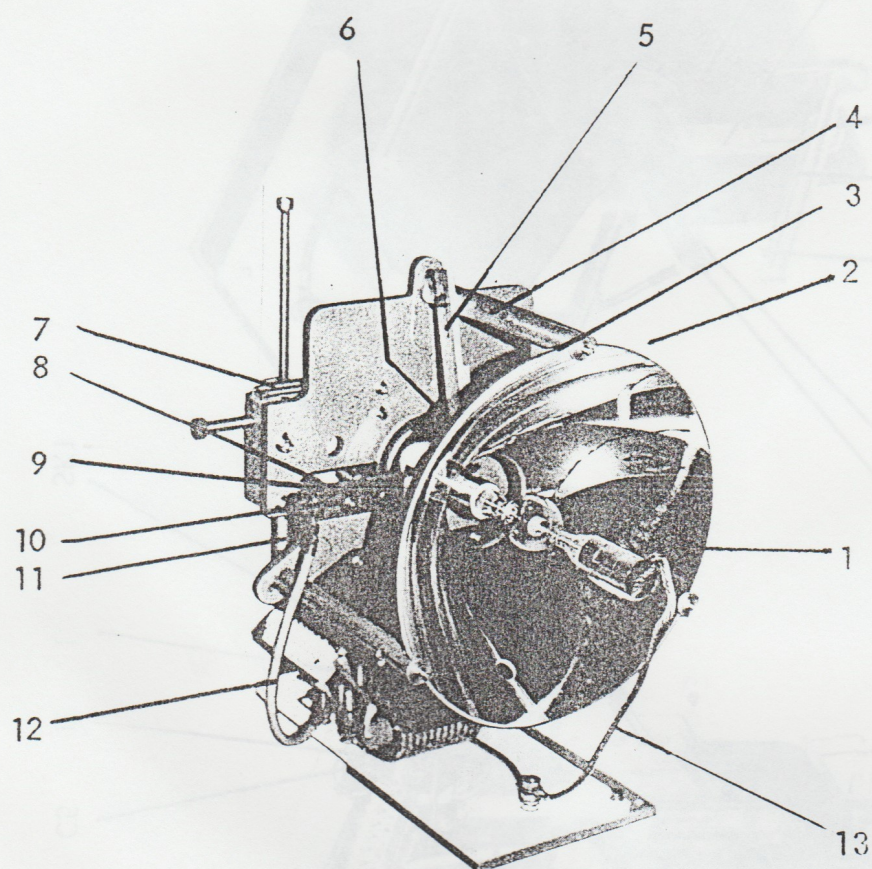


Fig. 3



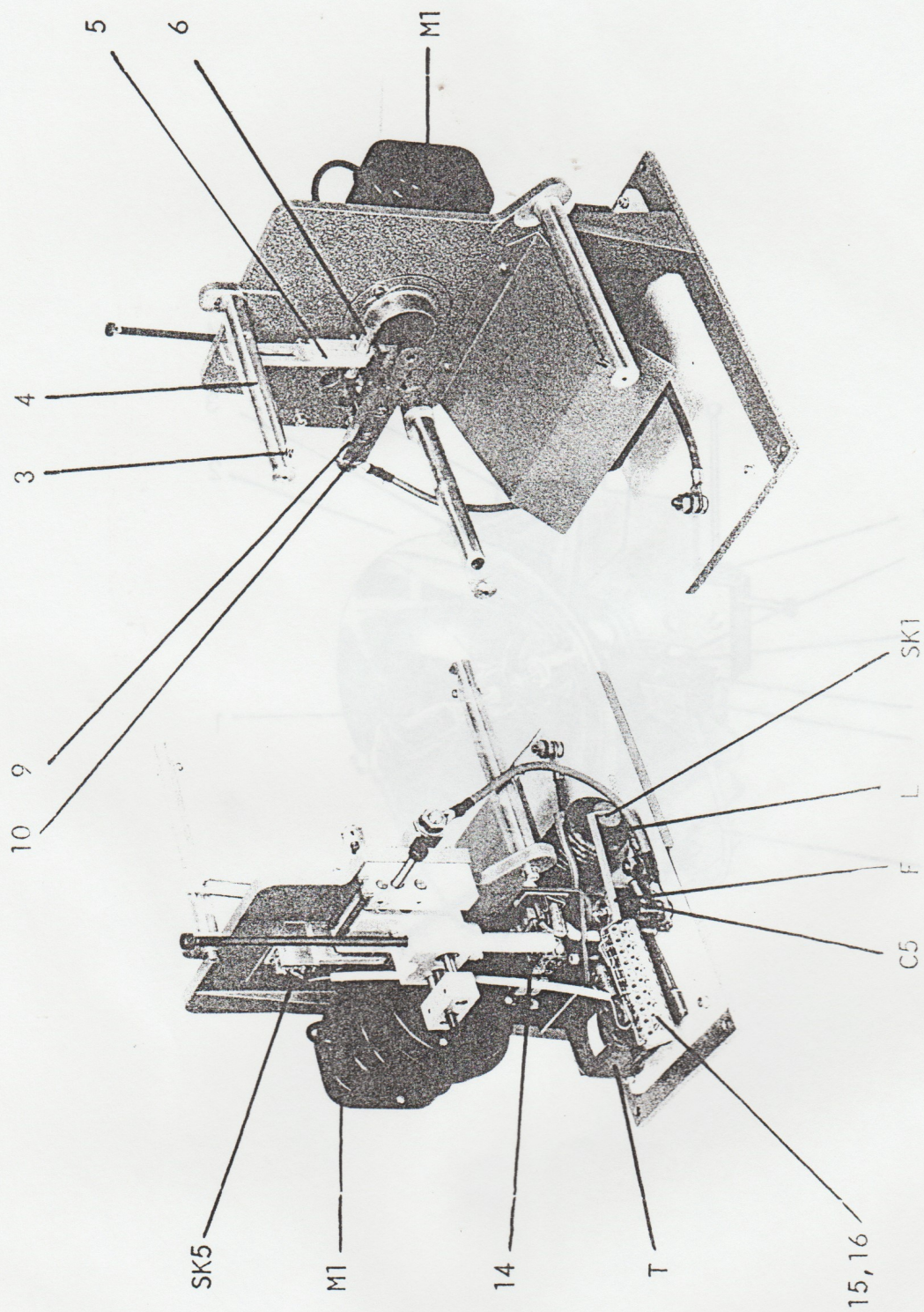


Fig. 4



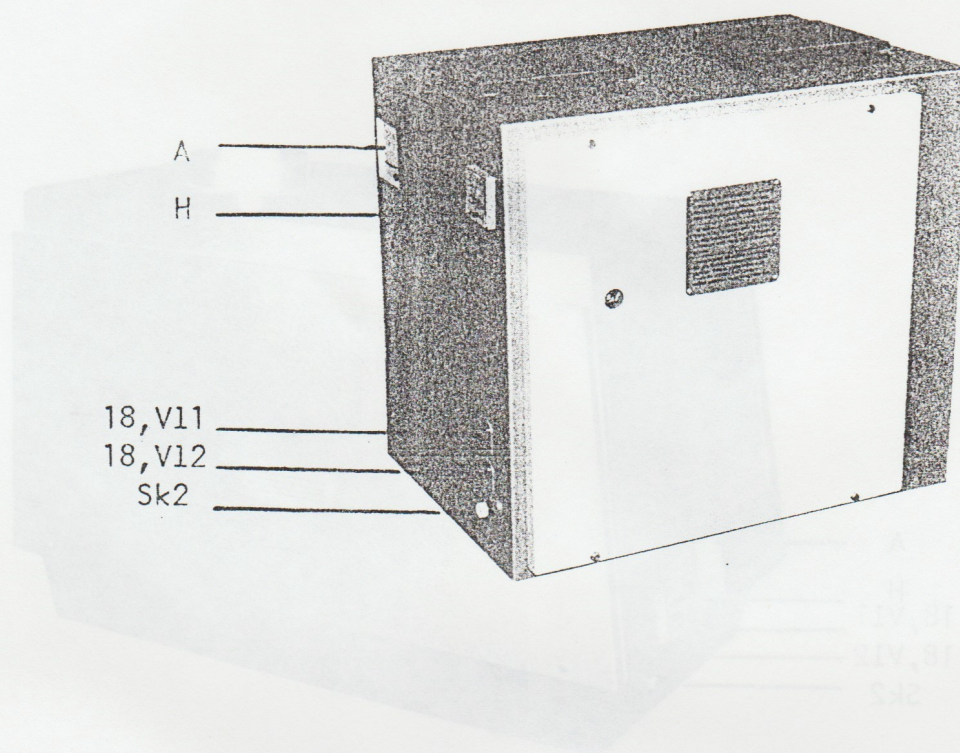


Fig.5



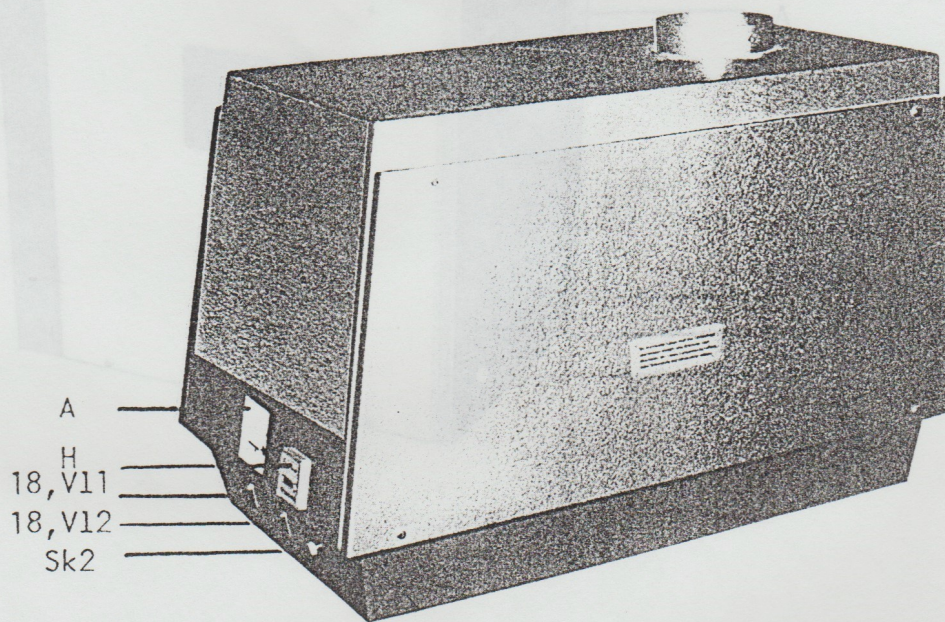


Fig.6



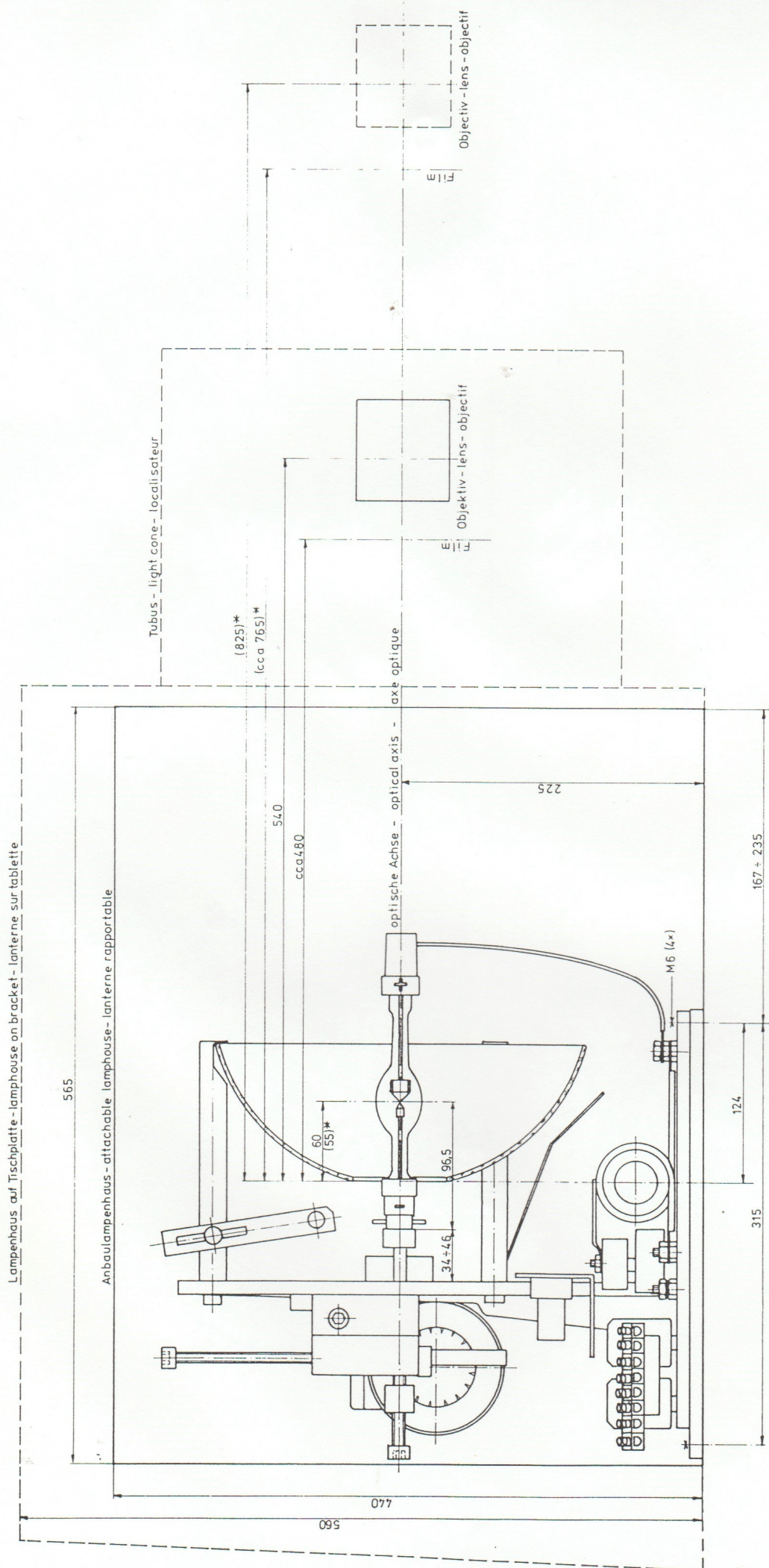


Fig.7  
Einbaumaße Xenonblock - Measures for built xenonblock -  
Dimensions pour échipier des lanternes avec module de  
lampe au xénon

\* Werte in Klammer für den Spiegel 825/55  
values in brackets for the mirror 825/55  
valeurs en paranthèses pour miroir 825/55









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