Film-Tech

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Raytheon Electronics

Anschütz
Standard Radio

Film Projector Head

ERNEMANN 15

Operation Manual

1 Operation
2 Attendance and Maintenance
3 Assembly / Adjustment

3226

ERNEMANN DOK012
Edition: 03.12.1996

EU - Konformitätserklärung / EC - Declaration of Conformity

Für das Erzeugnis / for product:	Kinoprojektor Ernemann 15
Typ / type:	012-033
bestehend aus / consisting of:	Unterbau mit Wickeleinrichtung ZNr.: 038-037
	Steuereinschub ZNr.: 037-095
	Xenonlampenhaus ZNr.: 023-081

wird hiermit bestätigt, daß das oben genannte Erzeugnis den wesentlichen Schutzanforderungen entspricht, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit (89/336/EWG) festgelegt sind. Diese Erklärung gilt für alle Exemplare, die nach den anhängenden Fertigungszeichnungen - die Bestandteil dieser Erklärung sind - hergestellt werden.

we declare, that the above-mentioned product meets the major safety requirements, which are layed down in the regulations of the board for the assimilation of the rules for electromagnetic compatibiltiy (89/336/EEC) of the member states. This declaration applies to all devices produced according to the attached production drawings - which are part of this declaration.

Zur Beurteilung des Erzeugnisses hinsichtlich elektromagnetischer Verträglichkeit wurden folgende Normen herangezogen:

The following standards were referred to in examining the product for electromagnetic compatibiltiy.

DIN EN 60945, Ausgabe 3/94

Diese Erklärung wird verantwortlich für Hersteller/Importeur

This declaration is binding for the producer / importer

Name / name:	Raytheon Anschütz GmbH
Anschrift / address:	Zeyestraße 16-24
	D - 24106 Kiel

abgegeben durch / declared by:

Name / name:	Schmoe, Wolfgang
Stellung im Betrieb / position:	Leiter des Qualitätswesens / Quality Assurance Manager

Kiel	09. 01. 1996	
Ort / place	Datum / date	Unterschrift / signature

CONTENTS

1 Operation

1.1 Film Run through the Projector

The film is fed to the projector from the feed spool.

Via the guide rollers and the feed sprocket, the film runs through the curved runner blade which, together with the adjustable pressure pad straps and a laterally spring–mounted pressure pad guarantees an excellent vertical and horizontal image steadiness.

The disk type shutter with its advantageous light efficiency factor provides for an optimum exploitation of the Xenon light.

When the projector is in idle position, the protector flap in the light beam avoids heat damages of the film.

From the sprocket wheel, the film passes through the optical sound head, where the film run is changed from intermittent to steady mode.

The favorable arrangement of brake roller, sound drum and swivel compensator allows a film run without flutter and wow.

1.2 Film Threading

(position see annex – 1)

Attention:	When threading the film, the sound track must always show to the projector outside, towards the operator!

1. Unlock the lens holder (*7*): It will slide to the right at the front on the rail.

2. Open the film gate (*10*): Turn the swivel knob (*5*) clockwise, parallel–guided film gate opens (see annex – 3).

3. Swing out the pressure rollers: Rollers: (*4*), (*13*), (*14*) and (*20*).

4. Adjust the frame line:
   - Turn manual drive wheel (*11*) until sprocket wheel (*12*) stands still.
   - Turn the frame line setting knob (*9*) until the cross mark on sprocket wheel (*12*) is in (**X**) position.
   - If the setting is correct, the sprocket wheel – after another turn – stops in the (**X**) position (see cross mark on sprocket wheel).

5. Film threading (unwind approx. 4 m of film from the feed spool) Feed the film according to the film run diagram:
   - via feed roller to feed sprocket (*3*)
   - around feed sprocket to pressure roller (*4*)
   - via the pressure roller (*4*) to the film gate (*10*)
   - through the film gate to sprocket wheel (*12*)
   - position a film frame line on the cross marking of sprocket wheel (*12*)
   - from sprocket wheel to pressure roller (*13*)
   - around pressure roller (*13*) to brake roller (*16*), lift the spring arm for this purpose
   - via brake roller (*16*) to sound drum (*18*)
   - via sound drum (*18*) to swivel compensator (*17*)
   - via swivel compensator (*17*) to take–up sprocket (*15*)
   - having passed take–up sprocket (*15*), the film is led to the take–up friction via the guide rollers.

6. Close the film gate (*10*): Turn the swivel knob (*5*) counterclockwise, the parallel–guided film gate closes.

7. Reposition pressure rollers: Swing pressure rollers (*4*), (*13*), (*14*) and (*20*) in again.

8. Check the film run: Turn the manual drive wheel (*11*) clockwise and check film for correct run. The upper and lower film loops have to move freely. If necessary, reposition the film at feed sprocket (*3*) and take–up sprocket (*15*).

9. Close the lens holder: To do this , push the film gate in the direction of the runner blade until the lens turret (*7*) clicks into place again.

1.3 Setting into Operation

Refer to the operation manual of the console manufacturer.

1.4 Function Controls

(pos. see annex – 1)

- **Frame line adjustment**
  - Check the frame line position, and, if necessary, adjust by means of frame line adjuster (*9*).

- **Sharp focusing**
  - Check the image sharpness and, if necessary, correct by means of sharp focusing adjuster (*8*).

- **Film pressure adjustment**

(pos. see annex – 2)

  - The film pressure is adjusted in the runner blade.
    The film passes through the projector between the curved pressure pads (*4*) and the pressure pad straps (*1*).

    Thus, a friction is generated which is an important factor for film transport.

1.5 Technical Data

1.5.1 Mechanical Data

wow and flutter (measured at 3150Hz):	35mm ≤ 0.1% 16mm ≤ 0.4%
image steadiness error with test film BT 35, DIN 15506:	35mm ≤ 0.1% 16mm ≤ 0.4%
film transport speed:	24 frames/s
shutter speed: at 24 images/s	1440 min/rev 48 light impulse/s
light transmittance of the shutter:	51%
lens turret, max. mounting diameter: adapters available for diameters	80mm 70.6 / 62.5 / 42.5mm
noise level with running projector (measured at a height of 1.35m and 0.6m away from the projector):	≤ 60dBA
weight projector head	approx. 105 kg

1.5.2 Electrotechnical Data

power supply: option	230V, 50Hz 60Hz or other current
power consumption:	approx. 0.7 kVA without DC supply
control voltage:	24V DC
Laser Audio Sound:	
power consumption	5 mW
voltage	5 – 7 V DC

optical sound:	
scanner	Ernemann solar cell
signal–to–noise ratio	≥ 56 dBA
solar cell voltage:	25 mV

2 Attendance and Maintenance

Attention!
Prior to starting work, the film projector must be electrically isolated.
When work is performed on the opened lamp house, the safety regulations absolutely must be observed! Even the cold Xenon lamp is under pressure and may burst.
A protective mask and protective gloves must be put on!

You must regularly carry out the works described below.
Thus, your projector will keep

- a permanent readiness for operation
- its operation safety
- its longevity.

2.1 Cleansing Agents

In case of slight dirt:

- Soft brushes (small – medium – large), e.g. for dedusting the mirror surface
- Soft leather cloth
- Cleaning clothes of various sizes, not pilling
- Brush (e.g. soft toothbrush).

In case of obstinate dirt:

- Alcohol
- Distilled water.

2.2 Daily Works

- Check pressure rollers for easy run
- Remove heavy going rollers
  (To remove the rollers, screw off screws or knurled knobs)
- Clean film gate, runner blade, pressure pad straps, sprockets and guide rollers from adhesive dirt and abrasion particles.

After cleaning:

- Apply one drop of projector oil to each axle
  Attention: Plastic rollers must not be oiled!
- Re–assembly of rollers to be made in reverse order
- Check rollers for easy run.

2.3 Weekly Works

- Remove all rollers and clean them
- Clean plastic rollers, but do not oil !
- Oil axles (as described under "Daily Works", section 2.2)
- Check pressure pad straps and replace completely, if worn.
- Mirrors, lenses and projection screens are carefully to be freed from dust with a soft brush to ensure a constant optimum light efficiency.

Cleaning in case of heavy contamination:

- Moisten dirt with alcohol or distilled water and carefully clean and polish with a clean, non–pilling cloth.
  No other cleansing agents must be used !

Note:

Improper cleaning of the mirror may cause damages to the mirror coating and the antireflex coating!
Do not touch the mirror surface with your fingers!
Utmost caution is advised with cold–light mirrors!
Possible finger marks or contaminations are carefully to be removed with pure alcohol.

2.4 Possible Malfunctions and Remedies

The following hints only refer to the film projector. For hints concerning additional equipment as amplifiers, rectifiers etc., please refer to the operating instructions delivered with the respective equipment.

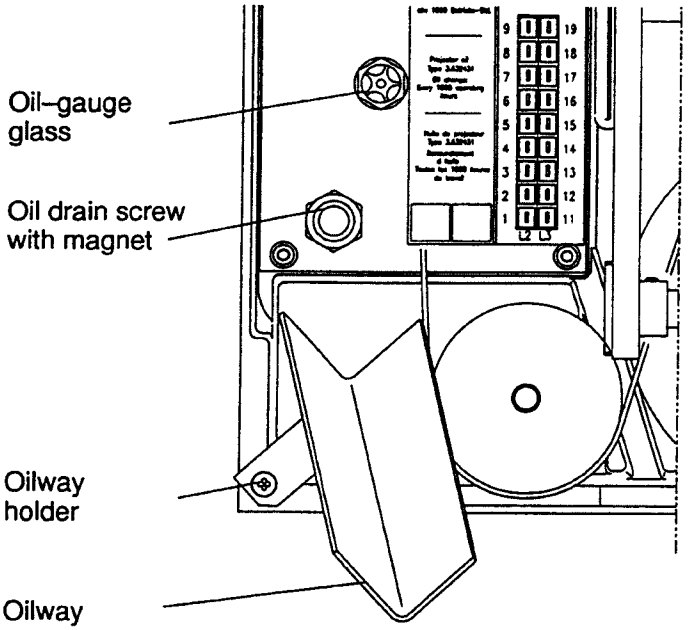
MALFUNCTION	POSSIBLE CAUSE	REMEDY
Projector does not run	– main power switch not ON	– check
Operating lamp in projector mechanism not alight	– main distributor fuse defective – fuse in control slide–in unit defective	– replace defective fuse – replace defective fuse
Projector stops	– driving motor overheated	– let motor cool down * CALL FOR SERVICE !
(Only for automatic type projectors) Lens turret doesn't work	– projector start key has not been pressed	– press projector start key
Image position: – immediately after projector start – during projection	– wrong film threading – bad joint	– actuate frame adjustment – actuate frame adjustment, renew joint before next session

MALFUNCTION	POSSIBLE CAUSE	REMEDY
Image steadiness: – quick height variations	– displaced perforation – perforation damage – insufficient friction between runner blade/film/ pressure pad straps – abrasion particles in the film gate – extremely worn pressure pad straps – beating sprocket wheel – Maltese cross error – defective washer	– no remedy, bad film – repair perforation – increase pressure pad strap tension – clean film gate – replace pressure pad straps – replace sprocket wheel * CALL FOR SERVICE !
Oil leaks at the projector mechanism	– defect sealing – oil leakage from bearings	– fill in oil immediately * in all cases of oil leakage, CALL immediately FOR SERVICE !
Sound interruption – no sound at all – howling sound	Optical sound head – defective laser – no laser voltage – stuck brake roller	– clean sound optics – replace laser (see section 3.1) * CALL FOR SERVICE ! – dismount brake roller, clean axle and felt disk, oil slightly and remount roller
– Sound volume loss	– dirty sound optics – insufficient exciter lamp current – Incorrect slit image setting	– clean * CALL FOR SERVICE ! – replace laser (see section 3.1) * CALL FOR SERVICE !

2.5 Oil Change

The first oil change in the projector mechanism is to be effected after 500 h of operation. Then, oil is to be changed every 1,000 h of operation as described below:

Attention: Only use the special oil for ERNEMANN 15 projectors as specified by the order number. Any other oil will cause accelerated wearing.



EMPTYING

1. Remove rear wall of the projector.
2. Mount oilway using the oilway holder.
3. Position a suitable receptacle (with at least 1 liter capacity) under the the oil way.
4. Screw out the oil drain screw, clean magnet.
5. When completely empty, replace oil drain screw and screw tight.
6. Dispose of the used oil properly at a used–oil disposal station!

FILLING

7. Screw out oil input screw.
   Fill the projector head with 0.9 Liter ERNEMANN Special Oil.
8. Insert oil input screw and screw tight
9. Screw rear wall back on.

Fig. 3–1: Projector head, rear opened

Oil filling volume:	0.9l
Projector oil, Order No.:	5027–13
Oilway, Order No.:	12–034.50

Attention:
Only use the special oil for ERNEMANN 15 projectors as specified by the order number. Any other oil will cause accelerated wearing.

2.6 Control of Drive Belts

Free toothed belt and wheels from dirt regularly.
(pos. see annex – 5)

Main drive belt

– The main drive belt (*7*) has to be checked for correct tension every 1,000 h of operation.

  Tension is correct if the main drive belt can be pressed down (use thumb, medium force) 5 mm approx. between the toothed wheel on the motor shaft and the toothed wheel on the shutter axle.

– Belt tension can be adjusted by changing the position of the drive motor (*8*). For this purpose, loosen the fastening screws of the drive motor, adjust the drive motor (oblong holes in motor base) and then re–tighten the fastening screws.

Attention:	A too strong belt tension will cause unnecessary wearing of the bearings!

Replacement of the main drive belt

In case of wear, the main drive belt is to be replaced.

Drive belts for feed and take–up sprocket

– Check the belt tension between belt tensioner (*2*) and take–up sprocket driving wheel (*10*) (cf. section – Main drive belt –).

– Adjustment is effected by shifting the belt tensioner (*2*). For this, loosen the fastening screws of the belt tensioner, and – after adjustment – re–tighten them again.

3 Assembly / Adjustment

Attention! Laser beam.
Do not look into the beam. Not even with optical instruments. Laser Class 3A, wave length 675nm.

3.1 Laser replacement

Check:

- whether the projector runs
- whether the protection flap is opened
- whether the green control LED on the slide–in unit is alight

If the light slit on the film remains invisible the laser has to be exchanged.

Replacement of the laser (see Fig. 4–1)

- Remove the cover plate of the laser and the bottom covering metal sheet.
- Disconnect power supply of the laser.
- Release the hollow screw (A) and pull the laser casing off to the rear.
- Push on a new laser unit from the rear to the stop on the optics housing; fasten with the hollow screw (A). The tip of the headless screw must reach into the guiding slot of the optics housing.
- Attach connecting cable with 2–pole plug, taking note of the orientation to the cable socket.
- START projector.

If the light is weak, readjust the illumination:

- Loosen the slit screw (B2) with half a turn.
- By turning the hollow screw (B1) set the highest possible slit brightness.
- Tighten the slit screw (B2) again.

The lightning optics can be adjusted more precisely by watching the pencil of light between the front objective of the lens and the film surface. If a piece of paper is held in the beam parallel to the direction of propogation, one sees the diffraction pattern of the slit. When the adjustment is correct, this pattern is symmetrical.

- Screw on the bottom covering metal sheet and the cover plate.

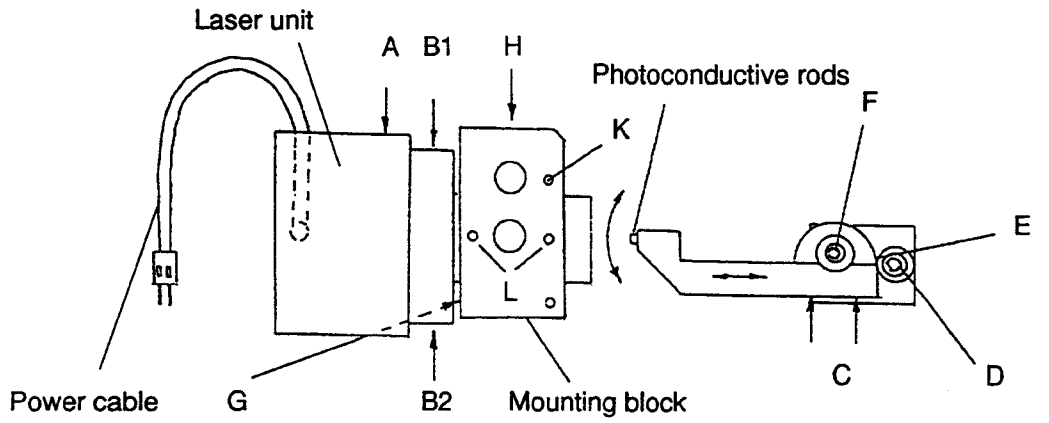


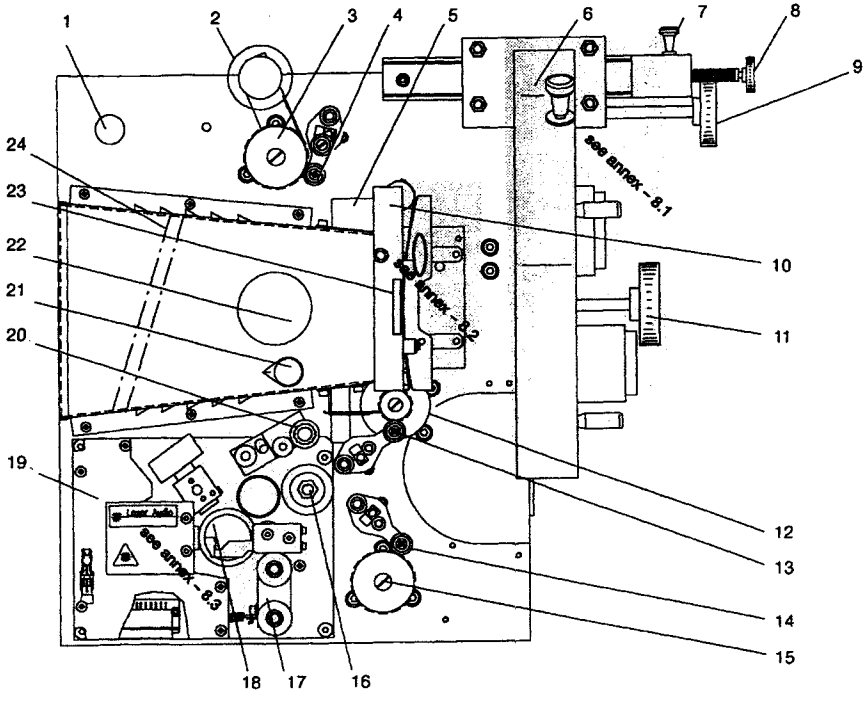
Fig. 4–1: Attachment of the laser unit (analogue sound scanning)

ANNEX–CONTENTS

Annex

SPARE PARTS

POS.	STOCK–NO.	DESIGNATION	PART–No.	QUAN-TITY
1	1 724 149	Operating lamp		
2	1 536 510	Half roller, big deviation roller	50–089.00–1	2
3	1 508 827	Feed–up sprocket	12–027.01–015	1
4	3 534 236	Pressure roller (for feed–up sprocket)	12–027.86–005	2
5	1 504 186	Tubular lamp	NB12–048.00–031	1
6		*Turret*	see annex – 8.1	
7	1 631 468	Unlocking knob adjuster	–	1
8	1 690 334	Sharp focusing adjuster	–	1
9	1 690 333	Frame line adjuster	–	1
10	–	*Film gate*	see annex – 8.2	1
12	1 508 826	Sprocket wheel	12–027.01–001	1
13	3 534 236	Pressure roller (for sprocket wheel)	12–027.86–005	1
14	3 534 236	Pressure roller (for take–up sprocket)	12–027.86–005	1
15	1 508 827	Take–up sprocket	12–027.01–015	1
19		*Sound unit*	see annex – 8.3	
20	3 632 530	Rubber pressure roller	16–033.19	1
21	1 762 130	Shutter	–	1
22	1 530 720	Green glass window	–	1
24	1 420 001	Heat protection filter	–	1

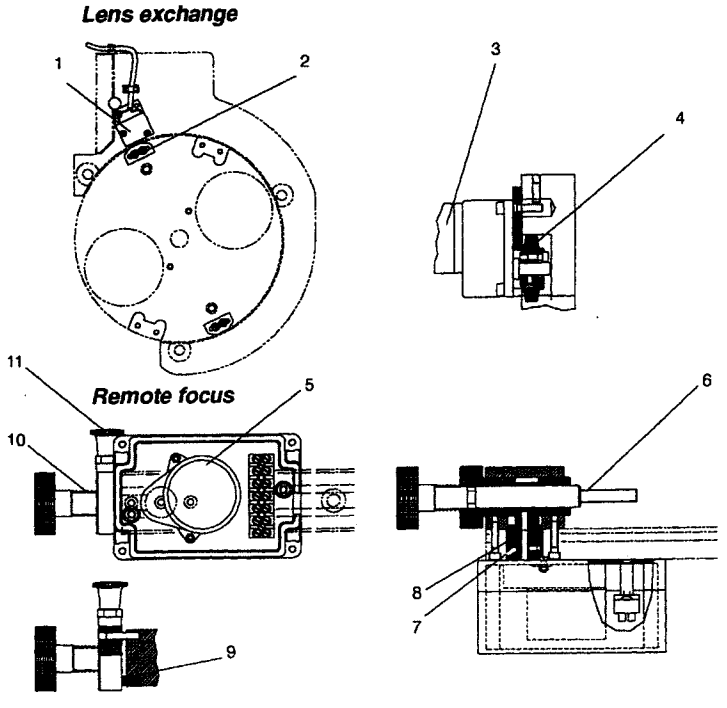


Projector Mechanism with Identification of Rollers

1	Operating lamp	9	Frame line setting knob	17	Swivel compensator
2	Deviation roller	10	Film gate	18	Sound drum
3	Feed sprocket	11	Manual drive wheel	19	Sound unit
4	Pressure roller (Feed up sprocket)	12	Sprocket wheel	20	Rubber pressure roller
5	Tubular lamp	13	Pressure roller	21	Shutter
6	Locking knob	14	Pressure roller	22	Green glass window
7	Unlocking knob adjuster	15	Take–up sprocket	23	Format slide
8	Sharp focusing adjuster	16	Brake roller	24	Heat protection filter

SPARE PARTS

POS.	STOCK-NO.	DESIGNATION	PART-No.	QUAN-TITY
		Lens exchange		
1	1 720 060	Micro switch	1006.1201	2
2	3 534 343	Trip cam	20-068 00-005	2
3	1 790 048	Gear motor	1610.5036306	1
4	3 530 031	Friction wheel	20-077 07-003	1
		Remote focus		
5	1 530 013	Geared engine	20-7705-010	1
6	3 632 565	Threaded sprindle	20-73.06	1
7	3 530 044	Eccentric	20-077.05-004	1
8	1 660 012	Friction bearing	2020 EP	1
9	1 790 560	Compression spring	VD072 A	1
10	1 508 663	Spring	20-073 05-003	1
11	1 631 468	Locking bolt	GN617-5-ANI	1

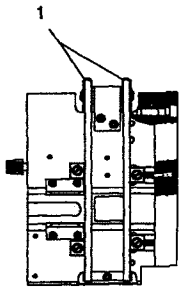


Lens turret / Remote focus

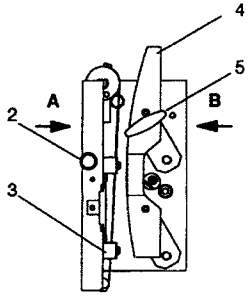
1	Microswitch	7	Eccentric
2	Trip cam	8	Friction bearing
3	Gear motor	9	Compression spring
4	Friction wheel	10	Spring
5	Geared engine	11	Locking bolt
6	Threaded spindle		

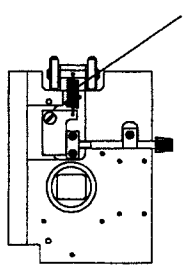
SPARE PARTS

POS.	STOCK–NO.	DESIGNATION	PART–No.	QUAN-TITY
1	3 632 513	Pressure pad tensioner, set	24–006.X01	1
2	1 670 031	Adjusting screw		1
3	1 530 041	Sliding stone		4
4	3 630 035	Pressure pad	24–010.01	1
5	1 610 008	Swivel knob		1
6	1 650 007	Tension spring		1



View A
(without pressure pad)





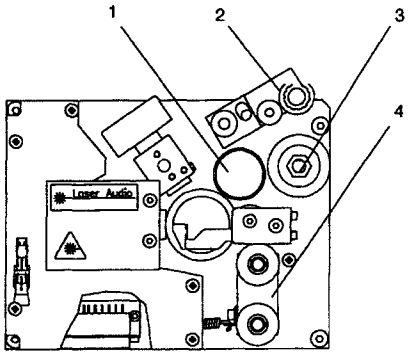
View B

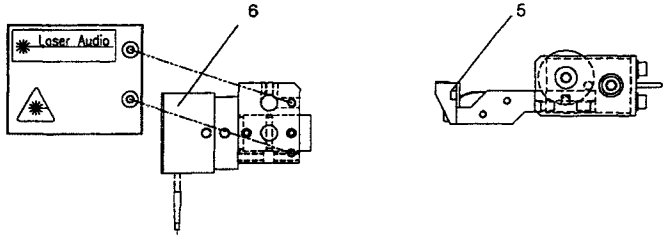
Film Gate

1 Valved pressure pad straps, Set
2 Adjusting screw
3 Sliding stone
4 Pressure pad
5 Swivel knob
6 Tension spring

SPARE PARTS

POS.	STOCK–NO.	DESIGNATION	PART–No.	QUAN-TITY
1	3 630 044	Spring roller	16–034.06	1
2	3 632 530	Rubber pressure roller	16–033.19	1
3	3 630 043	Brake roller	16–034.05	1
4	3 630 045	Swivel compensator	16–034.09	1
5	3 632 456	Scanning unit	27–056.01	1
6	3 630 053	Laser head	16–034.20	1





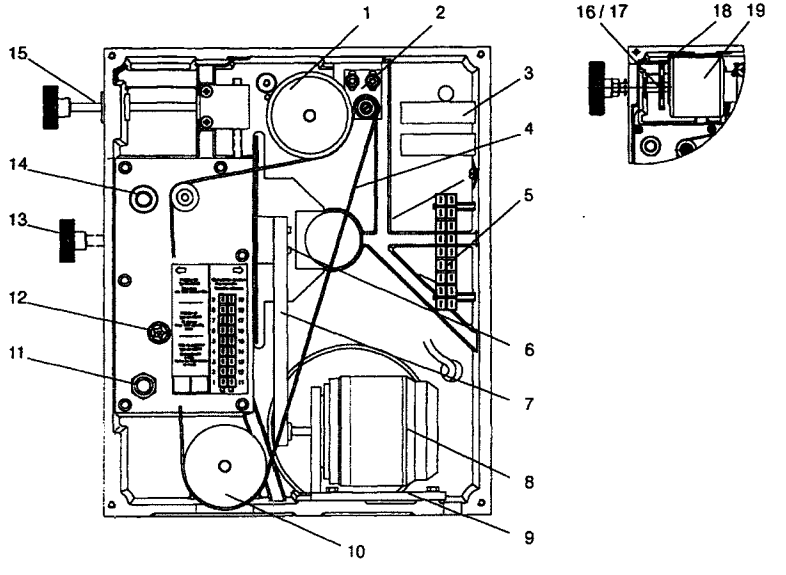
Sound Unit

1 Spring roller
2 Rubber pressure roller
3 Brake roller
4 Swivel compensator
5 Scanning unit
6 Laser head

SPARE PARTS

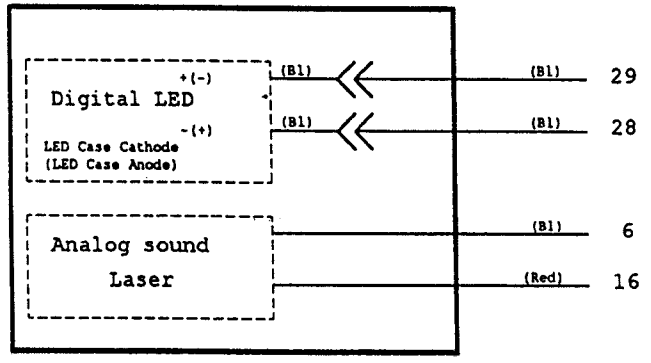
POS.	STOCK–NO.	DESIGNATION	PART–No.	QUAN-TITY
1	1 530 001	Drive wheel (Feed–up sprocket)	12–033.54–003	1
2	3 630 012	Belt tensioner	12–034.02	1
3	1 735 180	Condenser	–	2
4	1 502 654	Toothed belt, feed a. take–up sprockets	NB 08–015.00–023	1
5	1 502 662	Terminal strip	–	1
6	1 530 008	Drive wheel (Gearing)	12–034.01–002	1
7	1 539 027	Main drive belt	NB 08–015.00–026	1
8	1 508 370	Drive motor	–	1
9	–	Motor plate	–	1
10	1 530 012	Drive motor (Take–up)	12–033.54–003	1
11	1 670 018	Oil drain plug	–	1
12	1 620 020	Oil–gauge glas	–	1
13	1 690 334	Manual drive wheel	–	1
14	1 670 019	Oil filler plug	–	1
14a	3 632 431	Gear oil, 0.9l	5027–13	1
15	–	Shaft	–	1
		Remote framing		
16	3 530 107	Toothed wheel motor	14–133.00–002	1
17	1 670 033	Chain	–	1
17a	1 670 034	Chain locking (without picture)	–	1
18	3 534 358	Toothed wheel wave	14–112.00–004	1
19	1 503 042	Geared engine	14–133.00–010	1

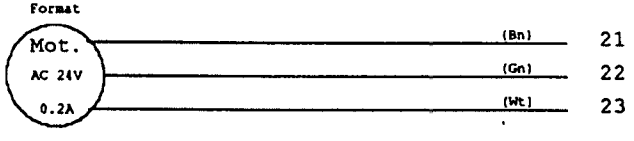
Remote framing

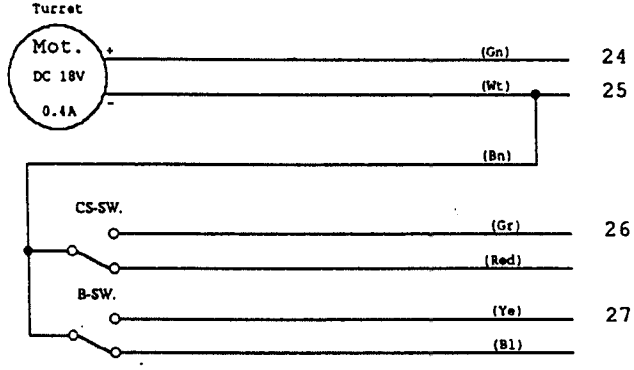


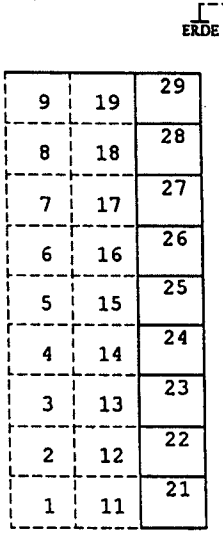
Projector – Rear Side (opened)

1 Drive wheel (for deviation roller)
2 Belt tensioner
3 Condenser
4 Toothed belt
5 Terminal strip
6 Drive wheel (Gearing)
7 Main drive belt
8 Drive motor
9 Motor support
10 Drive wheel (for take–up roller)
11 Oil drain plug
12 Oil–gauge plug
13 Manual drive wheel
14 Oil filler plug
15 Shaft
(for frame line adjustment with handwheel)
16 Toothed wheel motor
17 Chain and chain locking
18 Toothed wheel wave
19 Geared engine









29 Digital LED 0.5A=
28 Digital LED Gnd
27 Limit Sw. B
26 Limit Sw. CS
25 Gnd
24 Turret Mot. +18V=
23 Format Mot.24V~ AC
22 Format Mot. B
21 Format Mot. CS
19 Opt.Sound right
9 Shield
18 Opt.Sound left
8 Opt.Sound Gnd
17 Light framing
7 Ligt framing 24V 0.25A
16 Laser Supply +
6 Laser Supply - 6V DC (0.1A)
15 Protector +
5 Protector - 24V DC 0.5A
14 Bridge
4 C1 16UF L1
13 Ph Motor (L1)
3 Mp Motor (N)
12 Bridge
2 Lamp Power ON
11 L1 Softstart (Ph ca.2 Sec.)
1 Lamp Power ON

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Date: 20-May-1996	Sheet 2of 3		
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