

# PHILIPS

## Projector FP 7

*FP 7 projector  
with type EL 5860 magnetic soundhead,  
and type EL 4455 H.I. arc lamp, 85 amps.*

*Cinema*

Projector FP 7

Catalogue sheet A-II-6-E









### ***Principal features***

The Philips FP 7 projector is suitable for projection of any 35 mm film (standard, wide-screen and CinemaScope) in any class of cinema.

Its principal features are:

- Sturdy and modern design.
- Constructed of hard-wearing materials manufactured with highest precision.
- High light output.
- Simple operation.
- Little maintenance.
- Entire film path enclosed by a door with large glass window.
- Built-in optical soundhead.
- Automatic lubrication.
- Oil and dust-tight housing.
- Easy replacement of all the components.
- Built-in water-cooling system.
- Sprockets with loop correctors.
- Stand with adjustable height.
- Can be supplied for 110 V and 220 V, 50 or 60 c/s or for D.C. mains.
- Suitable for use under tropical conditions.

On request, the projector can be equipped with:

- air-cooling duct;
  - soundhead with door for magnetic sound tracks;
  - spool boxes for 6000 ft (1800 m) of film.
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## Maximum reliability

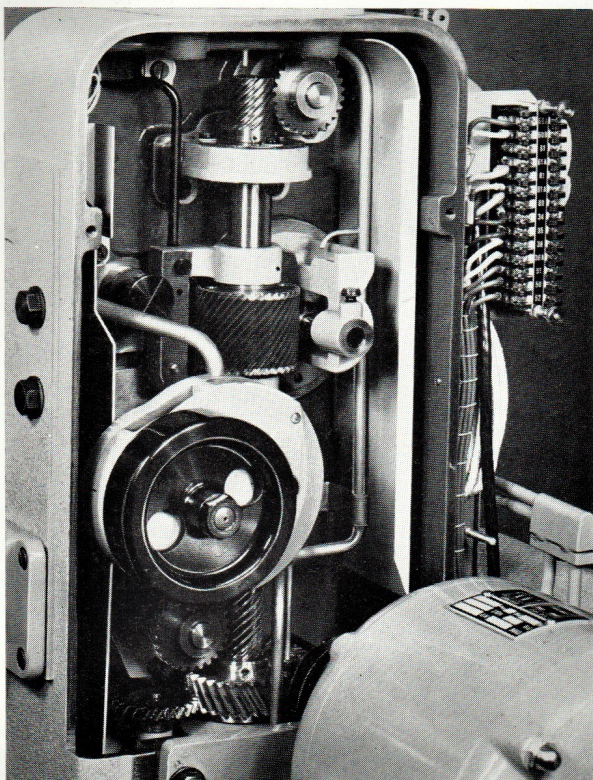
The reliability of a projector depends largely on the driving system, the intermittent movement and the lubrication. Special attention has therefore been paid to these three points.

### Driving system

The driving system is simple and very sturdy. A split-phase asynchronous flange motor drives the vertical main shaft by means of gear-wheels. The shaft has a diameter of  $1\frac{3}{16}$ " (21 mm) and its speed is only 360 r.p.m.; troublesome vibrations are consequently precluded.

In its turn, the main shaft drives:  
the intermittent mechanism,  
the upper and the lower sprocket,  
the drum shutter,  
the high-pressure spur-gear oil pump,  
the lower film spool.

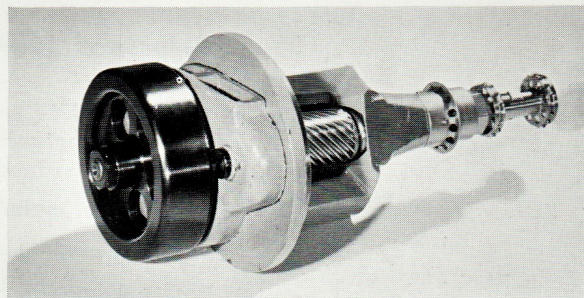
A safety clutch located between motor and main shaft prevents the gear-wheels from being damaged in the event of a breakdown.



*Driving mechanism and lubricating system.*

### Intermittent mechanism

The intermittent mechanism satisfies the most stringent requirements, owing to the use of high-grade materials, high-precision finish and an excellent lubricating system.



*Intermittent mechanism.*

### Continuous lubrication

The whole driving system is lubricated continuously by means of a very robust high-pressure spur-gear oil pump, which is always below the oil level. The oil circuit contains two magnetic filters, one combined with the normal gauze filter of the pump, the other being suspended in the oil flowing to the intermittent mechanism. These filters remove all iron and steel particles from the oil and thus both reduce the wear of the driving system and minimize acidification of the oil. The oil circuit keeps the intermittent mechanism continuously supplied with pure, thrice-filtered oil.

Oil throwers prevent the oil from leaking along the shafts.

### Efficient cooling

To guarantee perfect projection it is necessary to protect the film against being dried out by heat from the arc lamp. The following cooling precautions have therefore been incorporated: automatic cooling by means of the shutter, water cooling, and the possibility of using an air compressor.

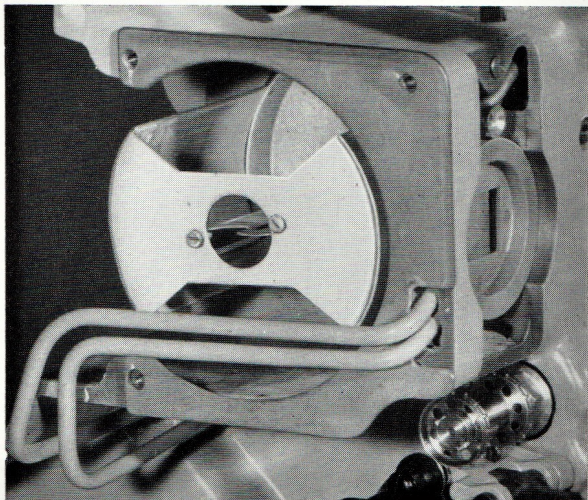
### Ventilating shutter

The drum shutter cools the film automatically in the picture gate, even when no air compressor is used.

### Water cooling

For water cooling, the projector is equipped with a hollow protective mask through which cooling water flows; thus the projector mechanism, the





*Water-cooled protective mask.*

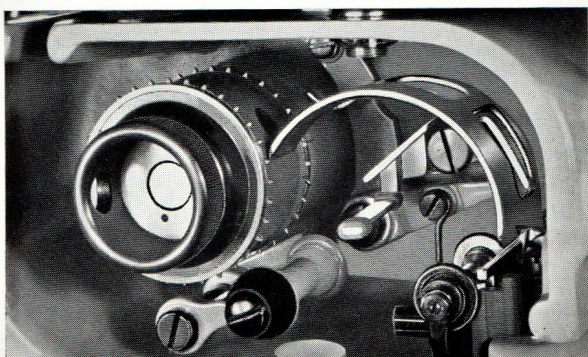
runner plate and hence also the guiding edges of the film, all remain cool; the oil, moreover, retains its full lubricating properties.

#### **Air cooling**

Additional air cooling may be provided when H.I. light sources with great heat radiation are used. The FP7 projector can easily be equipped with the necessary air duct to be connected to the air compressor; since this duct ends above the aperture plate in front of the film, the latter is efficiently cooled.

#### **Perfect safety**

The projector is equipped with a double-acting, automatic film-rupture device. The upper film loop passes between the two levers of this device which is operated as soon as the loop becomes too large



*Sprocket with loop corrector and automatic film-rupture device.*

(in the event of film rupture in the gate) or too small (for example, due to bad film transport when running old prints with torn perforations). In both cases, the light beam is intercepted and both the motor and the exciter lamp are switched off immediately.

The upper and the lower spool box are both provided with solid fire traps which prevent any film fire from spreading into the spool boxes.

Finally, the spool boxes have fine-mesh, metal gauze windows which ensure a supply of fresh air sufficient to eliminate any risk of explosion.

#### **Excellent film protection**

In order to ensure maximum film protection, four important measures have been taken:

- central adjustment of the skate pressure;
- splices enter and leave the runner plate at the lowest speed;
- the oil for the pad-roller bearings cannot grease the film, because they are lubricated from within;
- all parts of the film path—including the pad and guide rollers—are so profiled that the picture and sound-track areas of the film are never in contact with any part of the projector.

#### **Steady picture**

Steadiness of the picture in a horizontal direction is obtained by lateral guide rollers at the top of the runner plate.

Steadiness in a vertical direction is ensured by the intermittent shaft being supported almost entirely by a long bearing. This results in a very good centring of this shaft and the avoidance of any irregularity in the rotation of the intermittent sprocket.

To ensure that the film lies absolutely flat against the running surfaces between the teeth of the intermittent sprocket, there is a groove at the base of the teeth.

The Novotext pressure skates are very light in weight; as they react rapidly, the passage of splices remains unnoticed.

#### **Highest light efficiency**

Maximum light efficiency is ensured by the use of a drum shutter and by the large-diameter lens holder.



### Efficient drum shutter

The use of a drum shutter increases the light efficiency because it cuts off the light beam from two directions, thus making the period of light interruption as short as possible.

### Condenser lenses

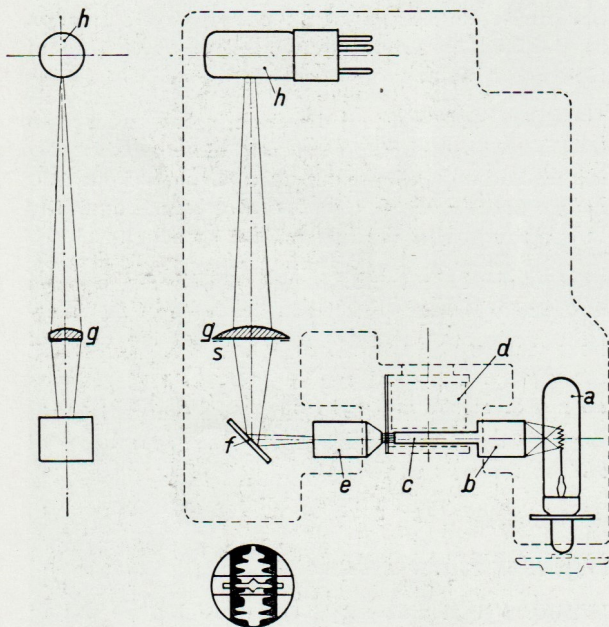
When lenses of very short focal length are used, a condenser lens placed behind the gate greatly improves both the light output and the light distribution. For fitting the condenser lens it is only necessary to replace the normal aperture plate by a plate with attached lens holder, type 8663.

### True-to-life sound reproduction

The scanning part for optical sound contains a rotary sound drum, driven by the film. As both the shaft of this drum and its resilient pressure roller run in ball-bearings, the starting time is only about 3 seconds and a very small pull is sufficient to keep the drum rotating at its rated velocity. The film is therefore not stretched between the sound drum and the take-up sprocket, but forms a slack loop which acts as a very light and hence practically inertia-free resilient element, thus eliminating all the small shocks caused by the teeth engaging the film perforations.

### Ingenious sound-scanning system

The path of the light rays for optical sound reproduction



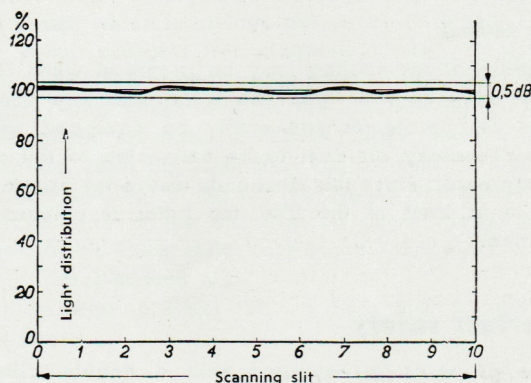
Path of the light rays for optical sound reproduction.

duction is shown in the illustration below. The light of the exciter lamp (a) is projected on to the end of a glass rod (c) by means of a condenser system (b). The glass rod conducts the light by total reflection through the sound drum (d) towards the film. Thus, a small and very intense light spot is thrown on to the sound track. This light spot is enlarged 13.5 times by a carefully calculated micro lens (e) and the light is concentrated on to a very sensitive photocell (h) via a mirror (f), a screen (s) having a slit of 0.011" x 1.0625" (0.27 mm x 27 mm) and a condenser (g).

The mirror deflects the path of the light rays by 90°, thus making it possible to place the photocell at the rear of the sound-scanning system; this reduces the dimensions of this system and makes cell-changing easy.

### Very uniform slit illumination

As the glass rod produces a diffused light on the sound track the variation in output measured over the entire length of the slit is less than 0.5 dB.



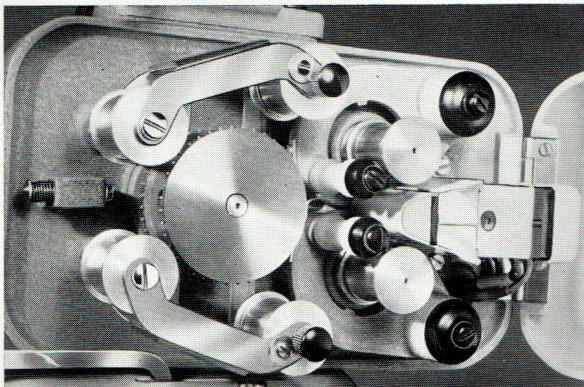
Slit-illumination curve.

### Accurate adjustment of the sound track

Since in practice the sound track is not always printed at the correct place on the film, it must be possible to shift the latter with respect to the scanning slit. In the FP7 projector this can be done by simply turning a milled knob which displaces the pressure roller on the sound drum, thus causing the film to be shifted in a lateral direction.

The position of the sound track with respect to the scanning light-beam can be checked on the slotted screen (s), visible through the window on the left of the sound-scanning part. The middle of the sound track should coincide with the centre of the slit, which is distinctly indicated on the screen.





*Magnetic soundhead EL 5860/01.*

### **Magnetic soundhead**

The magnetic soundhead, type EL 5860/01, is mounted between the upper spool box and the projector housing. It is equipped with a quadruple magnetic head for four-channel reproduction.

Irrespective of the regularity with which the film is taken from the upper spool, the length of film running through the soundhead is kept constant, owing to the fact that one large sprocket is used both for feeding the film into the soundhead and for taking it off.

Rigorously constant film speed at the scanning spot—and hence undistorted sound reproduction—is ensured by two rotating sound drums of anti-magnetic material, running in ball-bearings and provided with brass flywheels, and by two resilient nylon rollers.

### **Simple operation**

#### **Easy threading**

Threading of the film is very simple. The knobs of all guide and pad rollers are streamlined, so that the film slides easily between them. The pad rollers have an "off" position. A framing lamp behind the picture gate simplifies the threading of the film.

The pad roller of the intermittent sprocket can be closed independently of the lens holder when the film has been threaded in the gate. If one forgets to close this roller, it will be closed automatically when the lens holder is pushed back.

The pressure roller on the sound drum, being spring-loaded, returns automatically to its working position; flutter in sound reproduction, which is apt to occur in other constructions if one accidentally forgets to close this roller, is thus completely avoided.

### **Sliding lens holder**

The very robust lens holder and the skate holder form one unit. By pressing a button, the unit can be slid along two rods, which considerably simplifies the threading of the film.

The lens holder has a large diameter (4" - 101.6 mm). A sleeve of 4"/2.781" (101.6/70.6 mm) is supplied with each projector.

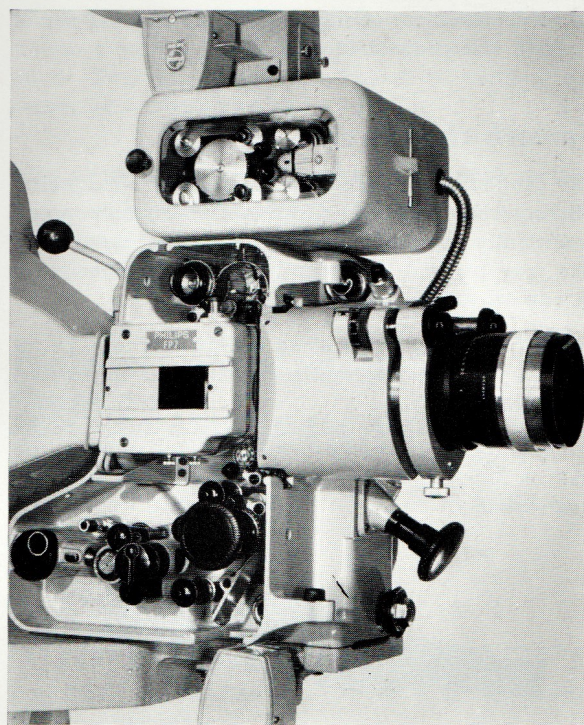
One or more additional sleeves (e.g. for Wide-Screen or CinemaScope) as well as an adapter tube of 2.781"/2.461" (70.6/62.5 mm) can be supplied on request.

For cleaning, the lens can be taken out of the holder together with its sleeve.

### **Instantaneous focusing**

The lens is focused without any backlash by means of a fine-focusing ring with scale. Special features are:

- Very accurate focusing: one turn of the ring corresponds to a shifting of the lens by 0.04" (1 mm).
- Easy replacement of the lens for various projection systems: the lens together with its sleeve can be taken out simply by loosening the centring screw one turn.
- The lens is automatically focused when it is inserted after removal.



*Film path and lens holder with fine-focusing device.*



### Easy film-loop adjustment

The lengths of the film loops can be adjusted either before or during the performance, by means of the loop correctors on the upper and lower sprockets.

### Central framing device

The framing knob is at the front of the projector and can be operated from both sides. The position of the framing device is indicated by a pointer fitted behind the upper oil-inspection glass. During framing, the sizes of the upper and lower film loops are automatically kept constant.

### Steel and velvet-covered runner plate

The projector is equipped with a steel runner plate which can easily be removed and refitted. For running new film prints, a strip of velvet can be applied in a very simple manner to the normal runner plate.

### Controls, etc.

All the other controls, etc. for operating the projector are on the mounting table, viz.:

- motor switch,
- 100-A arc-lamp switch,
- meter for checking both the arc current and the arc voltage,
- transformer for supplying the inspection lamps,
- push-button for changing over picture and sound from one projector to the other.

### Smooth change-over

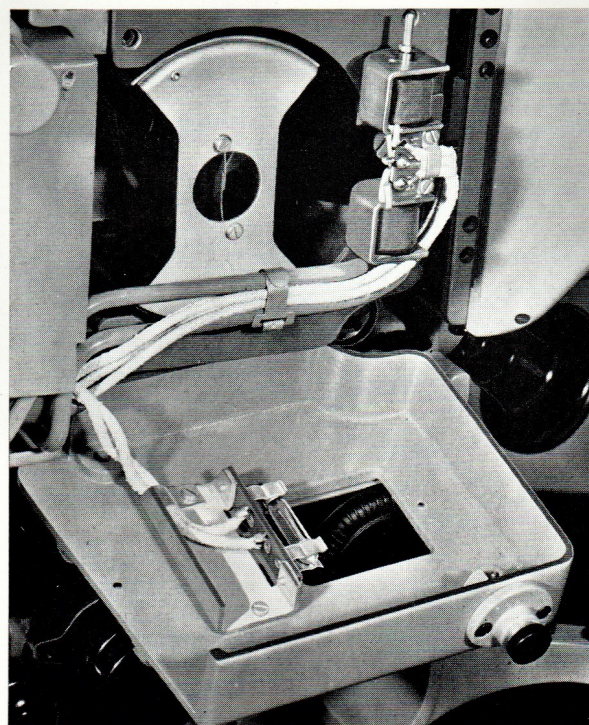
The projector is equipped with an electro-magnetically controlled dowser, which can easily be coupled electrically to the sound change-over switch. In this way picture and sound can be switched over in one movement simultaneously.

The dowser is situated close behind the gate, i.e. at the point where the light beam is at its narrowest.

Consequently, the picture is covered and exposed so quickly that change-over from one reel to the next is imperceptible, and the film seems to run on continuously.



*Combined magnetic oil filter and gauze filter.*



*Picture change-over device.*

### Easy maintenance

#### Visible oil circulation

Oil level and oil circulation can be inspected through the oil-level gauge at the bottom and through the illuminated inspection glass at the top, both on the operating side of the projector.

#### Easy cleaning and servicing

All parts are readily accessible for cleaning.

Special attention has been paid to easy replacement of the vital parts, such as the magnetic oil filters and the gauze filter, the projection lens, the pad rollers, the sprockets and the intermittent mechanism. This greatly facilitates maintenance and servicing.

The rear cover of the projector can be removed together with the oil screen merely by loosening two screws. As no packing material is required between the projector casing and the rear cover, the latter is refitted by simply tightening up the two screws.

#### Instantaneous replacement of exciter lamp and photocell

The replacement of the exciter lamp is very easy and takes only a few seconds; the lamp is equipped



with a slotted centring flange which makes it impossible to insert this lamp wrongly.

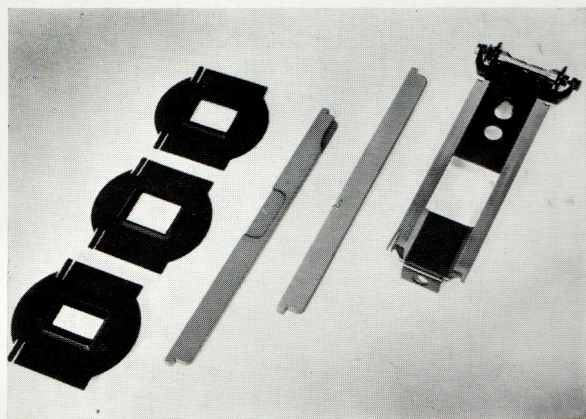
The photocell can be replaced after removing the cap at the rear, which is fixed with only one milled nut.

## Universal application

The FP 7 projector can be installed in any projection room, used for any kind of 35-mm film projection in any size of hall, and be connected to practically all existing mains.

### Suitable for all kinds of 35 mm film

With each projector are supplied aperture plates for aspect ratios of 1:1.37 (normal film), 1:1.85 (Wide-Screen) and 1:2.34 (CinemaScope). Other aperture plates as well as the anamorphic attachment can be supplied on request.



*Masks for the various projection systems, pressure skates and runner plate.*

A wedge can be inserted between top spool arm and projector; in this way the projector can always be installed close to the wall, even at large tilting angles. Two types of wedges are available:

type 8644 with an angle of 10° and  
type 8645 with an angle of 20°.

### Wide tilting angle and variable height

Because of the narrow width of the pedestal, the tilting angle can be adjusted between 30° downwards and 15° upwards. In both extreme positions, the lubrication is still amply sufficient.

As the mounting table can be turned in a horizontal plane and the height of the optical axis can be

adjusted between 46 7/8" (119 cm) and 54" (137 cm), the FP 7 can always be lined up with the existing projection-room windows.

### Choice of spool boxes

Normally the projector is equipped with spool boxes for up to 3000 ft (900 m) of film. On request, it can be supplied with spool boxes for up to 6000 ft (1800 m).

The upper spool box is provided with a friction coupling and a 6-V inspection lamp, the lower spool box with a take-up device and a friction coupling.

### Adjustable picture-sound distance

In very long halls the sound is sometimes heard at the back of the auditorium after the corresponding picture is projected, thus spoiling the "talking" impression. To avoid this, the distance between picture and sound in the FP 7 projector can be adjusted between 17.5 and 20 frames by simply shifting one guide roller.

### Suitable for all mains

Normally the projector is supplied for mains of 110 and 220 V A.C., 50 c/s. It can, however, also be supplied for 110 and 220 V, 60 c/s. In both cases the projector is driven by an asynchronous flange motor.

For A.C. mains of another frequency and for D.C. mains, a pulley motor for 110 V or 220 V is supplied. For D.C. mains the speed is verified by means of a speedometer.

### Also available with synchronous or interlock motors

For use in film studios the projector can be supplied with either a synchronous motor or an interlock motor.

## Technical data of asynchronous flange motor

Voltage .....	110 and 220 V ~
Frequency .....	50 or 60 c/s
Power factor .....	0.9
R.p.m. at 50 c/s .....	1440
Power .....	1/4 H.P.
Consumption .....	165 W

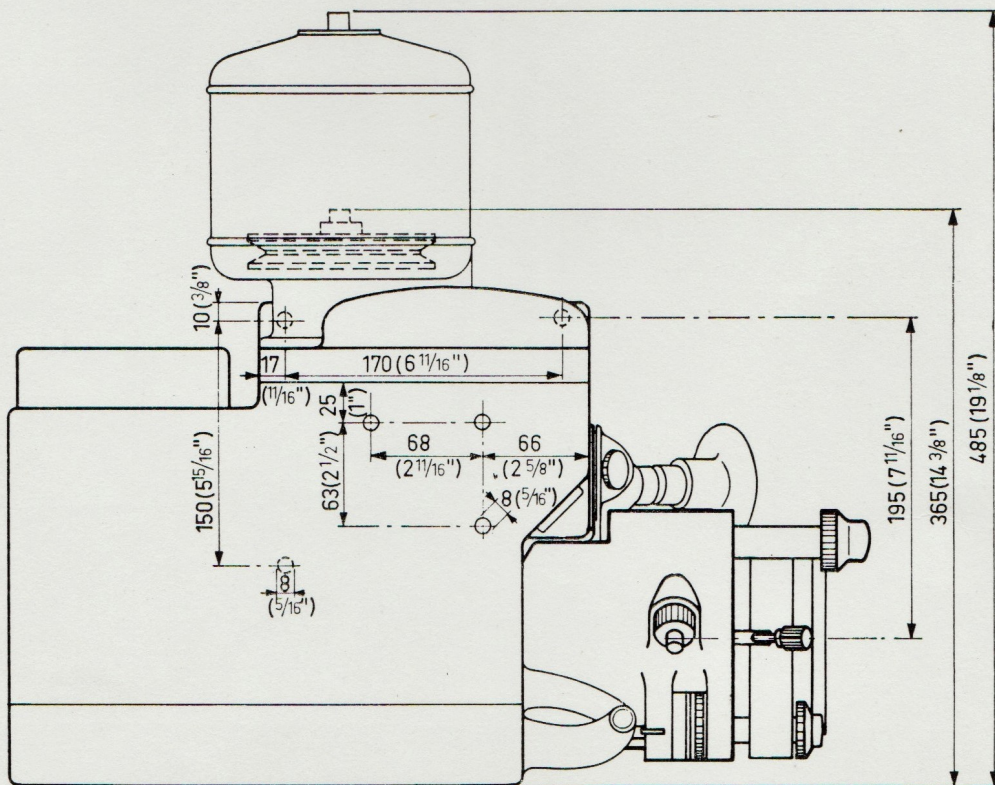
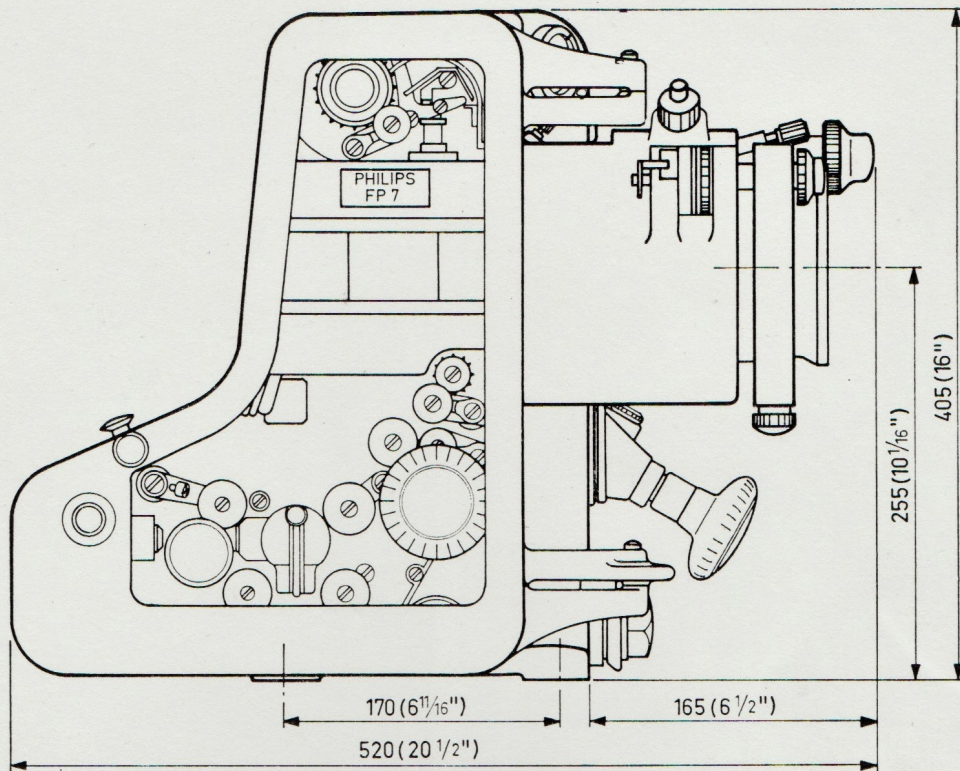
For other frequencies the use of a pulley motor is recommended.



### Type numbers and weights

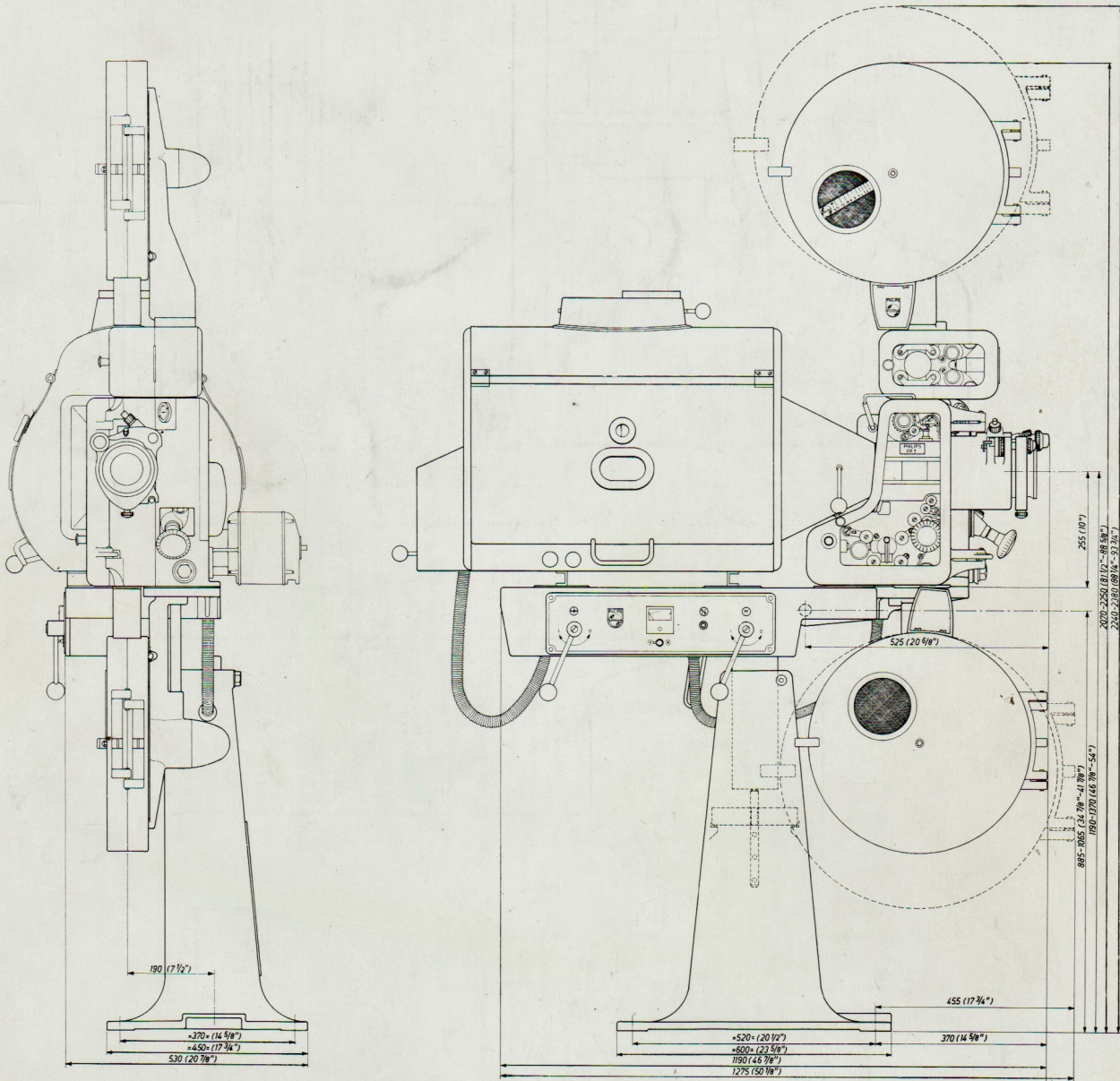
Description	Type	Weights			
		net		gross	
		lbs	kg	lbs	kg
<b>FP 7 projector with built-in optical soundhead:</b> with asynchronous flange motor for 110 and 220 V, for 50 c/s, 24 frames/s for 60 c/s, 24 frames/s	8670/11 8676/11	170	77	253	115
with synchronous flange motor for 3 x 220/380 V, 24 frames/s 25 frames/s	8674/11 8675/00				
with pulley, without motor	8671/11				
<b>Pulley motors with pulley, protecting cover, belt and mounting bracket:</b> for 110 and 220 V A.C., 40 c/s 50 c/s 60 c/s 100 c/s for 220 V, D.C. for 110 V, D.C. Speedometer with pulley and belt	8601/00 8602/00 8603/00 8604/00 8605/00 8606/00 8662/10	31	14	42	19
<b>Stands with mounting table, of variable height, with complete wiring, motor switch, 100-A arc- lamp switch, measuring instrument and picture and sound change-over switch:</b> for 220 V, 50 and 60 c/s for 110 and 220 V, 50 and 60 c/s for 3 x 220/380 V, 50 and 60 c/s for 110 or 220 V, D.C.	EL 4050/00 EL 4050/01 EL 4050/03 EL 4050/02				
<b>Spool boxes with friction device and fire trap:</b> upper 3000' (900 m) box lower 3000' (900 m) box upper 6000' (1800 m) box lower 6000' (1800 m) box	8640/21 8641/21 8642/21 8643/21	68 68 111 111	31 31 51 51	148 148 200 200	67 67 91 91
<b>Magnetic soundhead with door</b> .....	EL 5860/01	33	15	64	29
<b>Aperture plates with condenser-lens holder:</b> aspect ratio 1 : 1.37 aspect ratio 1 : 1.85 aspect ratio 1 : 2.34 blind aperture plate	8663/00 8663/11 8663/14 8663/10				
<b>Wedges for upper spool box:</b> 10 ° 20 °	8644/00 8645/00				
<b>Exciter lamps:</b> 5 V - 4 A 6 V - 1.48 A	7251C 3874C				
<b>Photocell, max. 100 V</b> .....	3533				
<b>Inspection lamps, 6 V - 0.5 A</b> .....	6844				







### Principal dimensions



**Data subject to change without notice**

