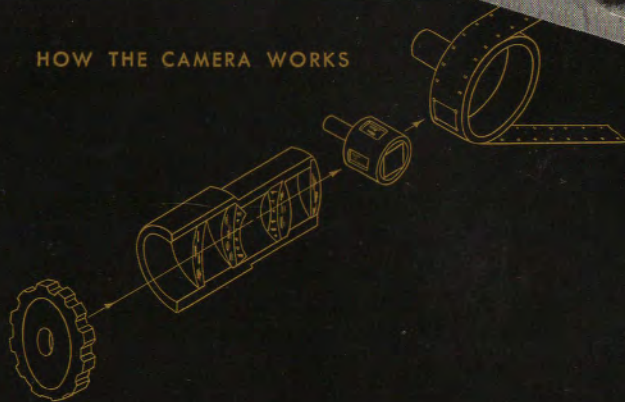


FASTAX

HIGH-SPEED MOTION PICTURE CAMERAS



HOW THE CAMERA WORKS



1957

WOLLENSAK

OPTICAL COMPANY • ROCHESTER, N. Y.

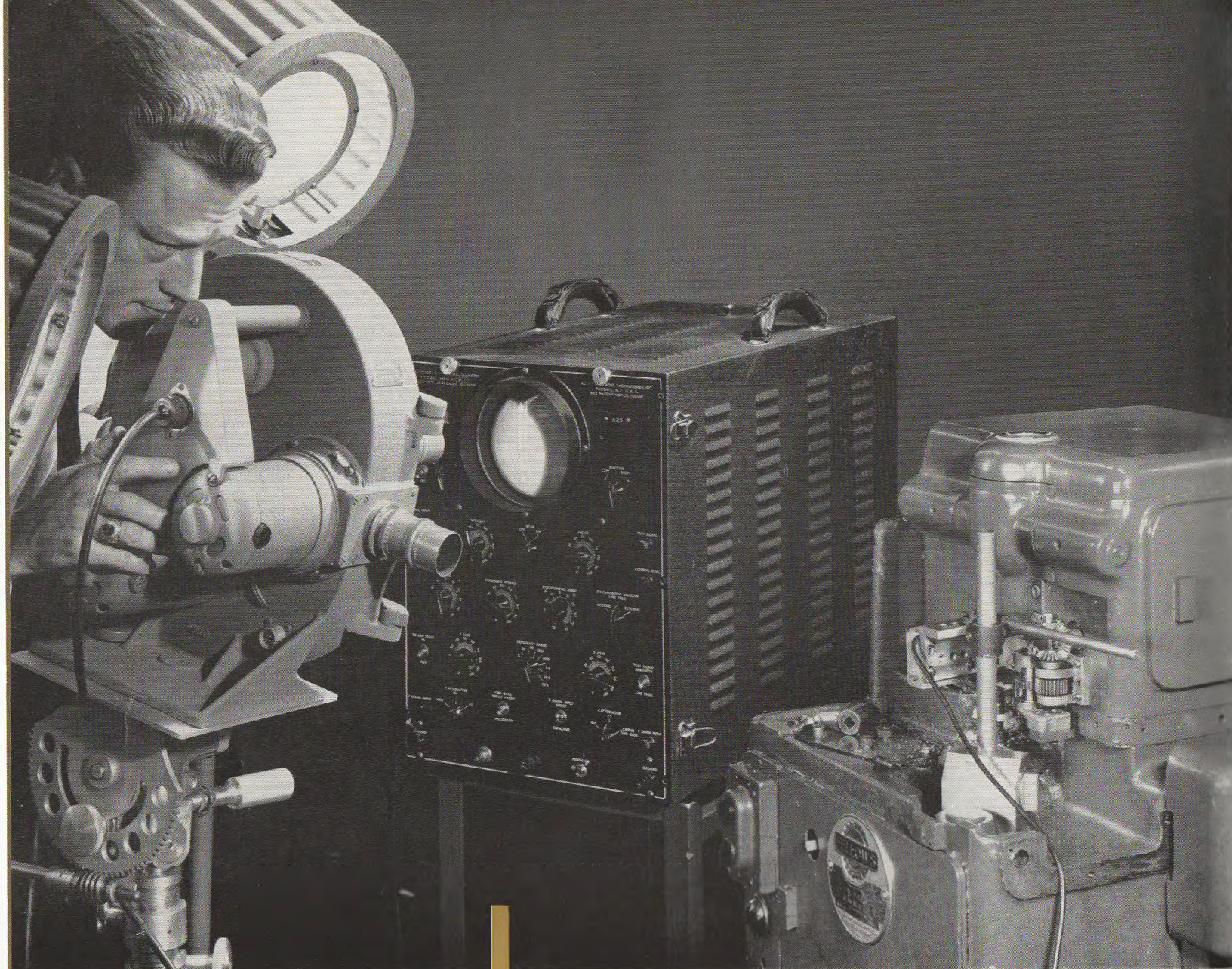
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Preface

Fastax photography is the taking of high-speed motion pictures to record permanently, for study and analysis, phenomena too fast for the human eye to discern.

Just as a micrometer is used to measure space in terms of thousandths of an inch, the Fastax Camera is used to measure action in thousandths of a second. The Fastax Camera is, in effect, a time microscope, designed to "stop" motion, thereby magnifying space and time.

Fastax Applications Unlimited

High-speed photography has almost unlimited applications. A variety of studies in the electrical, mechanical, chemical, medical, and physical fields have been notably successful. For example, a study of aircraft wing tips, made by a prominent research laboratory, showed that at supersonic velocities, structural weaknesses resulted. Analysis of the projected film pointed to the elements needing redesign. A medium-sized tool company studied cracking of rapidly moving metal cams. "Seeing" the problem made the solution easy. A small ruler-manufacturing company cut printing rejects to a fraction of a percent by using high-speed photography, which reduced the blur of speed to action the eye could follow and provided a solution to what had been an unseeable problem.

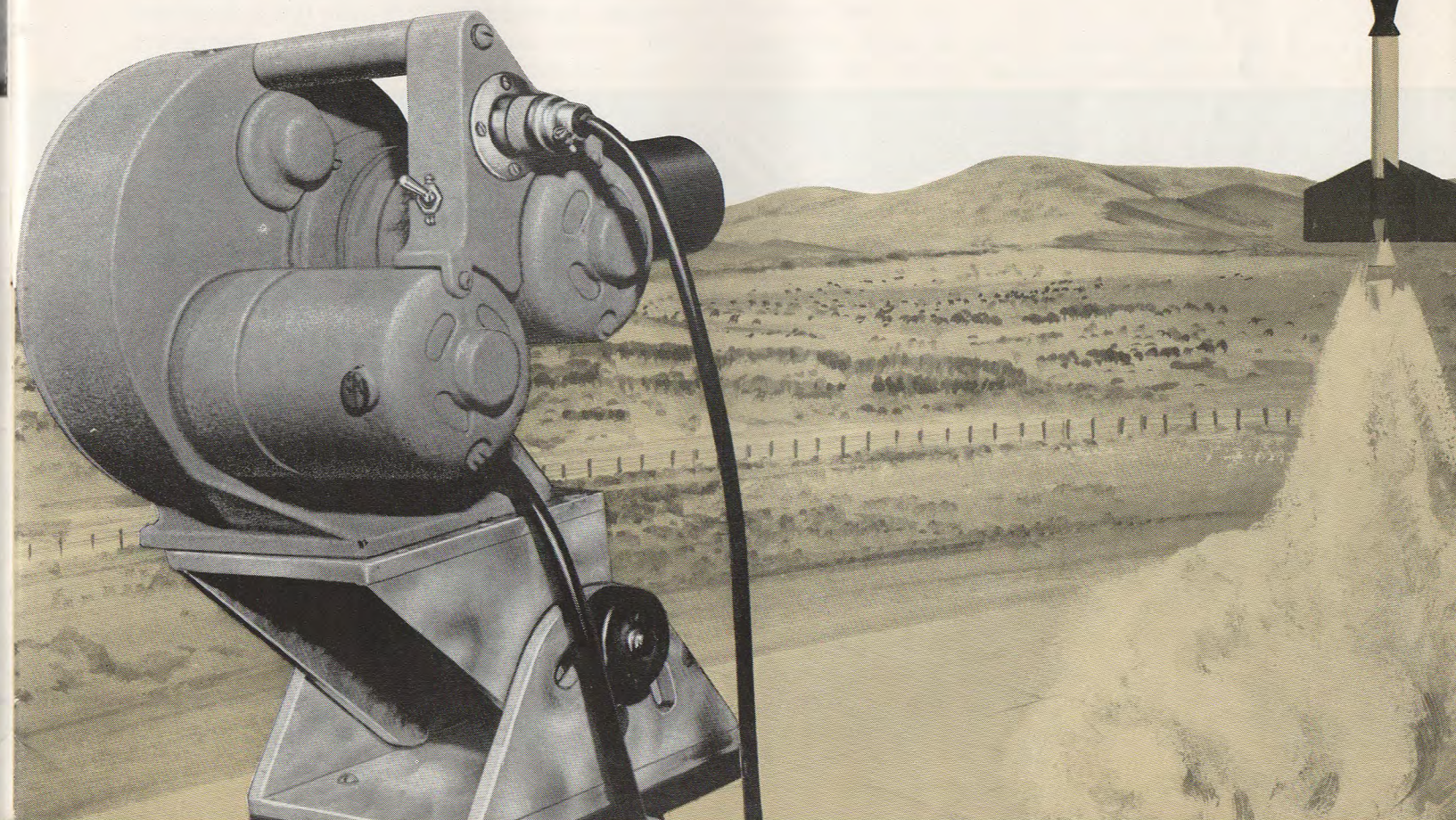
High-speed motion-picture photography can help many types of businesses, both large and small. It will pay you to investigate.

Fastax high-speed motion-picture studies have been successfully made in the following fields:

MILITARY AND NAVAL STUDIES

Bomb releases
Effect of impact and pressure waves on various materials
Ejection of torpedoes from both deck tubes and underwater tubes
Explosive effect of bombs, shells, rockets, and grenades
Flight-of-projectile studies

Impact of incendiary bullets and shells
Jamming actions on machine guns
Measurement of acceleration of missiles
Measurement of muzzle velocities
Power units of torpedoes
Rocket studies
Wind tunnel studies



BUSINESS MACHINERY

Calculating machinery, both mechanical and electrical
Cams
Cash registers
Clutches
Gears
Springs
Tabulating machines
Typewriters
Vibration

ELECTRICAL INDUSTRY

Air flow
Arcs and flashovers
Circuit breakers
Coil-winding machines
Contacts
Equipment shock and vibration
Fuse blowouts
Governors
Mercury switches
Motors and generators
Relays
Telephone equipment
Welding

TRANSPORTATION

Aircraft, both ground and flight studies
Cavitation
Carburetor and valve studies
Internal-combustion firing chambers
Jet propulsion
Propellers
Transmissions
Turbine studies
Wind tunnel studies

FACTORY STUDIES

Air compression
Cutting and wrapping machinery
Evaporation of liquids
Flow of liquids
Linotype machines
Printing presses
Textile equipment
Watch and clock movements

MACHINE-SHOP STUDIES

Flow of metals
Impact and tension tests
Cutting tools

High-speed photography has saved engineering time, spotlighted design weaknesses in models, and exposed the reasons for parts failure. The result is a saving in time . . . in money . . . in company reputation.

4

THE HIGH-SPEED MOTION-PICTURE FASTAX CAMERA

The Camera

Fastax Cameras are not complex instruments. They can be operated by almost anyone with some knowledge of photography and a little training. Fastax Cameras differ from ordinary motion-picture cameras in that the film is pulled past the aperture in a continuous motion. Instead of using a shutter to expose each film frame during a stationary cycle, Fastax frames are exposed through a rotating prism traveling in synchronism with the film. By this method, speeds of up to 18,000 pictures per second are obtained.

8mm, 16mm, and 35mm Fastax Cameras with 100', 400', and 500' film capacities and speeds of from 150 to 18,000 pictures per second are available in both motion-picture and combined motion-picture-oscillographic models.

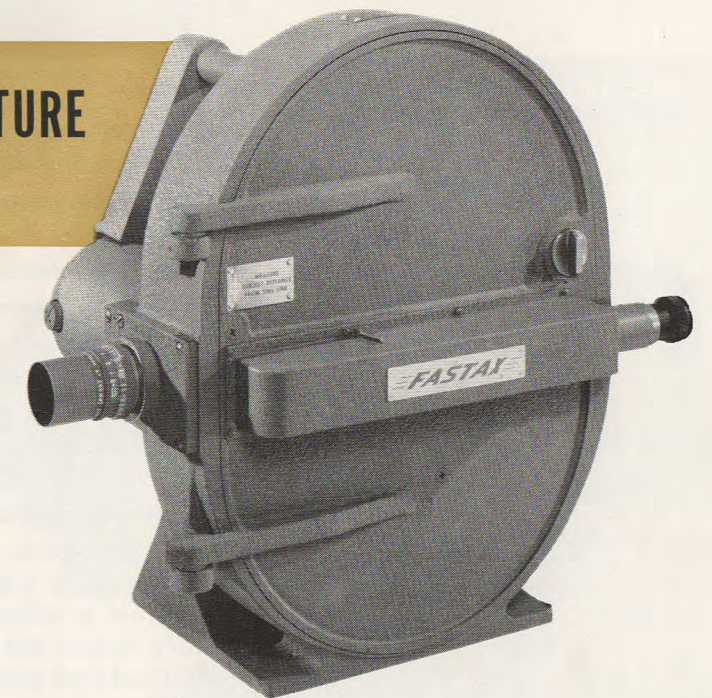
In the Fastax Camera, light from the subject passes through the taking lens, through a rotating prism, and then onto the film. Two motors are used—one to drive the film-sprocket-prism mechanism and the other to take up the exposed film.

Designed to operate on full initial voltage impact of up to 140 volts, the Fastax does not require preliminary accelerating equipment. Above 140 volts a Goose Control Unit is recommended to secure the higher speeds.

The 4- or 8-sided prism is used in Fastax Cameras. Intermittent cameras start and stop the film at the camera aperture; however, intermittent motion pictures in excess of 200 pictures per second are not feasible. Use of these precision-made rotating prisms permits the extremely high picture-taking rate.

The Fastax Camera is used to study motion too fast for the eye to catch. The camera expands the viewing-time cycle of an event. Recording an event of 16,000 P.P.S., 1/100 of a second of the completed action can be viewed and analyzed in 10 seconds at a projected speed of 16 P.P.S.

The 8mm and 16mm combined motion-picture-oscillographic cameras give a picture on which the oscillographic trace is superimposed on the subject image. On the 35mm model the oscillographic trace is adjacent to the subject image, which occupies approximately one-half the 35mm frame area. With either of the combined motion-picture



and oscillographic cameras, the trace enters through a lens mounted in the door. The light passes through the lens, then through a right-angle prism, and is recorded on the film. This system permits the simultaneous high-speed photography of a mechanical action and its related electrical characteristics. Nonelectrical problems such as strain, vibration, pressure, and acceleration can also be studied when photographing the tube of a cathode-ray oscilloscope.

Timing Light

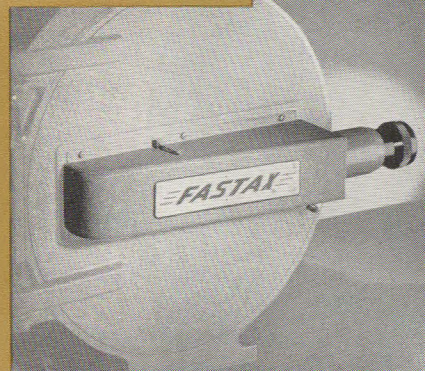
Depending upon the model, Fastax Cameras are equipped with either a single or double externally activated, neon gas timing light. It is mounted to project its light on the edge of the film, exposing small marks, or "pips." The timing light is used for accurate determination of the speed of a moving subject by computing the film rate in terms of P.P.S. at any point during the film run. The "pips" are exposed at the rate of 120 per second when 110-volt 60-cycle current is applied. The Crystal Control Pulse Generator is used to obtain 100 or 1000 pips per second for measurements of movement when extreme accuracy is required.

The double timing light is available as an accessory for cameras normally supplied with a single timing light. This timing light is used to determine zero time on the film if needed and the other side is free for the regular time base.

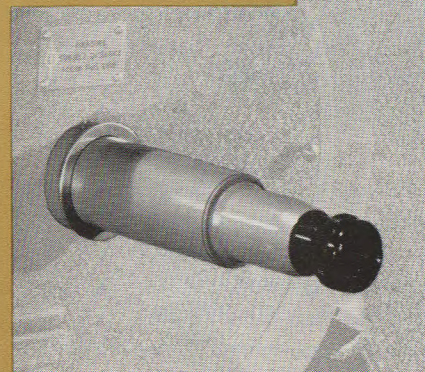
Fastax Cameras are precision instruments and are manufactured to exacting tolerances. They are engineering tools designed to assist in solving the most difficult engineering problems.

5

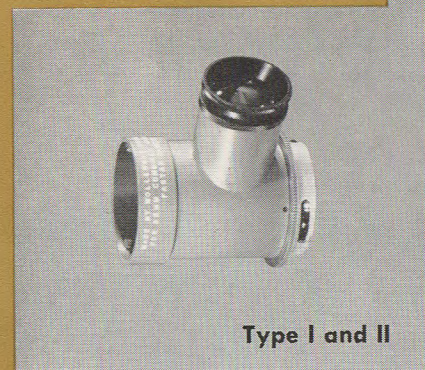
Viewfinder, Integral



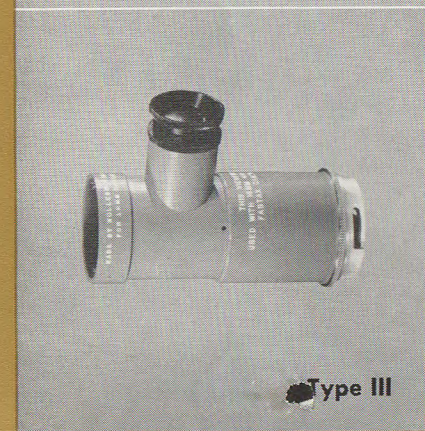
Viewfinder, Removable



Viewfinders, Removable Reflex



Type I and II



Type III

Viewfinder

Fastax Cameras are supplied with an erect-image viewfinder. Various types of finders are supplied, depending upon the camera model.

Viewfinder, Integral.

The Integral Viewfinder is a part of the camera body and is sighted at the rear of the camera.

Viewfinder, Removable.

The Removable Viewfinder is attached to the camera door and is sighted through and from the side of the camera at 90° to the subject.

Lenses for use with the Integral and the Removable Viewfinders have a focusing scale in white. Basic catalog numbers such as WF105 are used for lenses in this category.

Viewfinder, Removable Reflex.

The Removable Reflex Viewfinder is placed between the taking lens and the camera. It is supplied in addition to the camera viewfinder where the field of view is restricted. This finder is used to compose accurately the picture area desired and can be used for focusing. The Reflex Finder is also used on the combined motion-picture and oscillographic camera to compose and focus the oscillographic trace.

Removable Reflex Finders are made in four types, as follows:

Viewfinder, Removable Reflex, Type I, A-7106, supplied with Fastax Cameras WF5 and WF7.

Viewfinder, Removable Reflex, Type II, A-12714, supplied with Fastax Camera WF9.

Viewfinder, Removable Reflex, Type III, A-13465, supplied with Fastax Cameras WF14 and WF15.

When using the Removable Reflex Viewfinder, the camera lens is removed and replaced by the Reflex Viewfinder. The camera lens is then inserted into the finder for viewing and focusing purposes. Lenses supplied for use with these Reflex Viewfinders have a focusing scale in color and another in white. Since the lens is now in a different position, it is focused by using the colored scale. After focusing and composing the picture, the Reflex Viewfinder is removed and the taking lens replaced in its normal position in the camera. The focus ring is now adjusted by taking a reading of the footage mark indicated on the colored scale and transposing it to the white scale.

Double Focusing Scales

Fastax Raptar Lenses in focusing mounts are supplied with double focusing scales for use with Removable Reflex Finders.

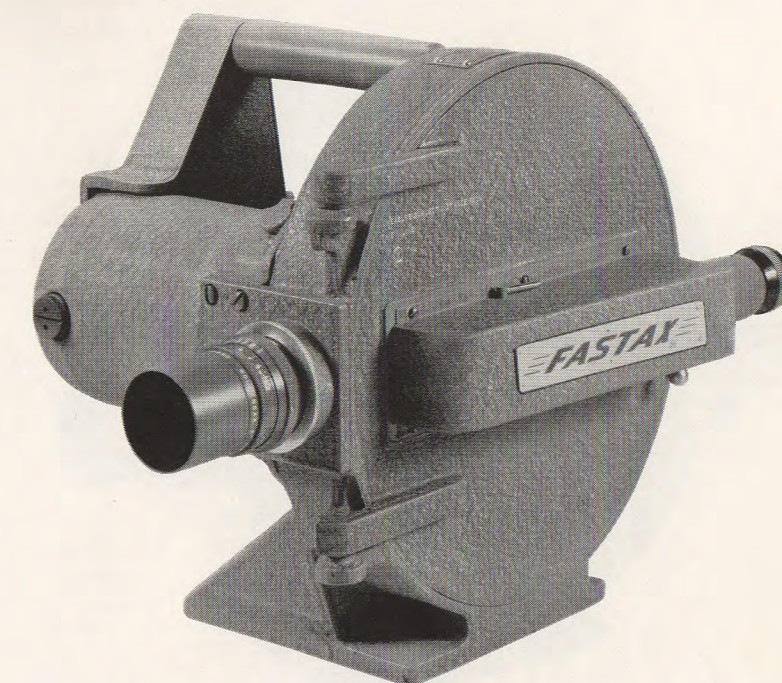
Lenses for use with the Removable Reflex Viewfinder, Type I or Type II, have a red and white focusing scale. Catalog numbers of lenses in this category are followed by the letter R, as, for example, in "WF105R."

The 35mm f/2 yellow and white focusing-scale lens supplied with the WF14 and WF15 cameras is used with the Removable Reflex Viewfinder, Type III, for recording the oscillographic image. If other focal length lenses are used, it is necessary to measure the distances and set the focusing mount accordingly.

The white focusing scale, whether on a double focusing-scale lens or not, can be used to focus the image with any Fastax Camera when the lens is positioned to the camera lens seat.

All lenses in focusing mounts can be furnished with focusing scales calibrated in meters. Order by appropriate catalog number and specify that the focusing scale is to be marked in meters.

WF1-8mm Fastax Camera 100' capacity

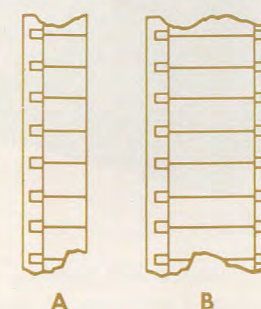


TECHNICAL SPECIFICATIONS

Film Capacity—100' daylight loading spool.

Film—16mm with 8mm perforations.

Frame Size—8mm, single width (A)
or
8mm, double width (B).



Aperture—Interchangeable masks furnished with each camera, one for 8mm, single width (A) and one for 8mm, double width (B).

Speed—300 to 16,000 P.P.S. (pictures per second).

Lens—2" (50mm) f/2.0 Fastax Raptar in focusing mount.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder. For critical focusing and viewing through the camera aperture—covers the full frame for composition.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off power to camera at the end of the film run.

Power Requirements, Recommended—

Minimum— 8 volts DC, 2.3 amps. approx.
Maximum— 28 volts DC, 3.0 amps. approx.
Minimum— 30 volts AC, 3.0 amps. approx.
Maximum—280 volts AC, 11 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle).
One for drive, one for take-up.

Tripod Socket—Thread size, 3/8" x 16 NC.

*Available as an accessory.

PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—25 lbs.

Shipping Weight—Approximately 50 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Instruction book.

One dust cap.

Lubricant atomizer.

100' film spool, for daylight loading.

100' film-spool can.

Warranty card.

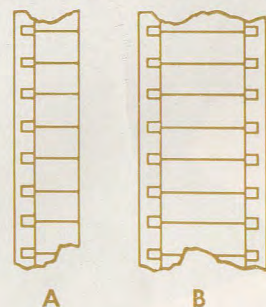
WF2·8mm Fastax Camera 400' capacity

TECHNICAL SPECIFICATIONS

Film Capacity—400' daylight loading spool.

Film—16mm with 8mm perforations.

Frame Size—8mm, single width (A)
or
8mm, double width (B).



Aperture—Interchangeable masks furnished with each camera, one for 8mm, single width (A) and one for 8mm, double width (B).

Speed—700 to 18,000 P.P.S. (pictures per second).

Lens—2" (50mm) f/2.0 Fastax Raptar in focusing mount.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder. For critical focusing and viewing through the camera aperture—covers the full frame for composition.

Timing Light—Supplied with double timing light installed as standard equipment:

1. One light to indicate rate of film travel in terms of P.P.S.
2. Second light to indicate zero time.

Timing light exposes 120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off camera at the end of the film run.

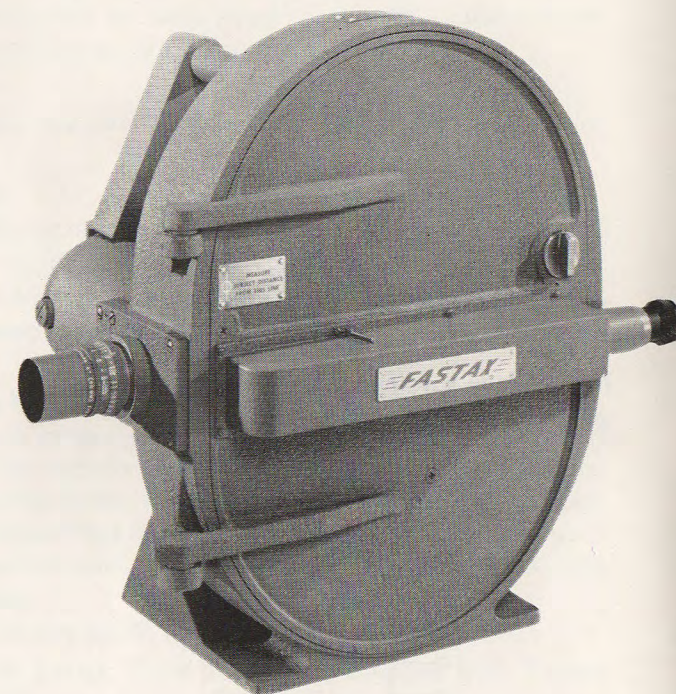
Power Requirements, Recommended—

- Minimum— 12 volts DC, 2.4 amps. approx.
- Maximum— 28 volts DC, 3.0 amps. approx.
- Minimum— 35 volts AC, 2.5 amps. approx.
- Maximum—280 volts AC, 16 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle).
One for drive, one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—14" x 17" x 13".

Camera Weight—38 lbs.

Shipping Weight—Approximately 75 lbs.
in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 20".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Five spools, for daylight loading.

Instruction book.

Two dust caps.

Lubricant atomizer.

400' film-spool can.

$\frac{5}{32}$ " Allen wrench.

$\frac{9}{16}$ " open-end wrench.

Warranty card.

Film-spool gage.

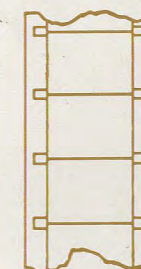
WF3·16mm Fastax Camera 100' capacity

TECHNICAL SPECIFICATIONS

Film Capacity—100' daylight loading spool.

Film—16mm.

Frame Size—16mm, full frame.



Aperture—16mm, full frame.

Speed—150 to 8000 P.P.S. (pictures per second).

Lens—2" (50mm) f/2.0 Fastax Raptar in focusing mount.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder. For critical focusing and viewing through the camera aperture—covers the full frame for composition.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Powerstat, Type 116—Variable range 0-135 volts AC to be used if synchronization between event and camera is not required and whenever maximum camera speeds are not necessary. Supplied with camera as standard equipment.

Cutoff Switch—Automatically cuts off camera at the end of film run.

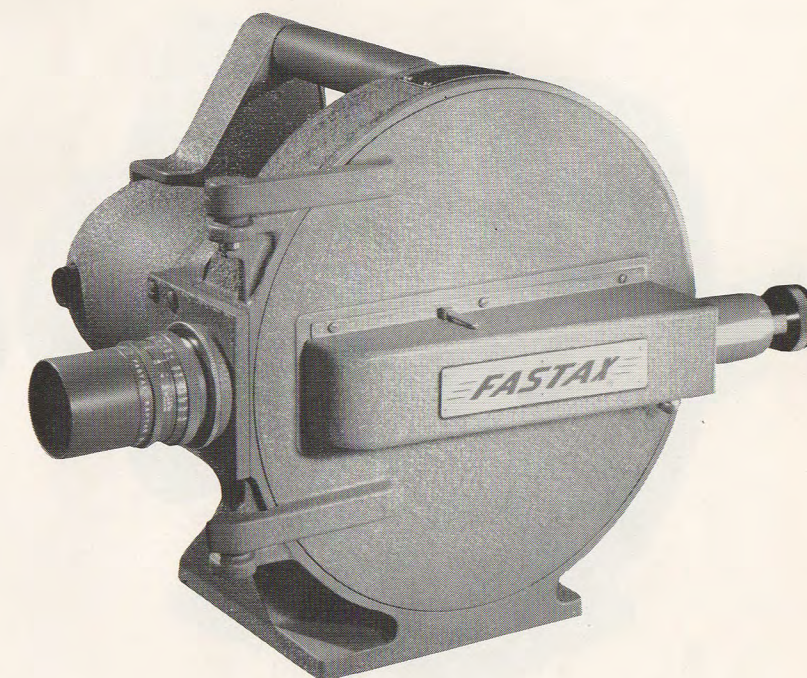
Power Requirements, Recommended—

- Minimum— 8 volts DC, 2.3 amps. approx.
- Maximum— 28 volts DC, 3.0 amps. approx.
- Minimum— 30 volts AC, 3.0 amps. approx.
- Maximum—280 volts AC, 11 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle).
One for drive, one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—25 lbs.

Shipping Weight—Approximately 50 lbs.
in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, for daylight loading.

Instruction book.

One dust cap.

Lubricant atomizer.

100' film-spool can.

Warranty card.

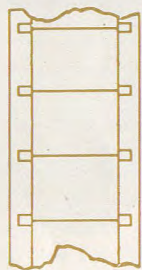
WF4 • 16mm Fastax Camera 400' capacity

TECHNICAL SPECIFICATIONS

Film Capacity—400' daylight loading spool.

Film—16mm.

Frame Size—16mm, full frame.



Aperture—16mm, full frame.

Speed—350 to 9000 P.P.S. (pictures per second).

Lens—2" (50mm) f/2.0 Fastax Raptar in focusing mount.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder. For critical focusing and viewing through the camera aperture —covers the full frame for composition.

Timing Light—Supplied with double timing light installed as standard equipment:

1. One light to indicate rate of film travel in terms of P.P.S.
2. Second light to indicate zero time.

Timing light exposes 120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off camera at the end of the film run.

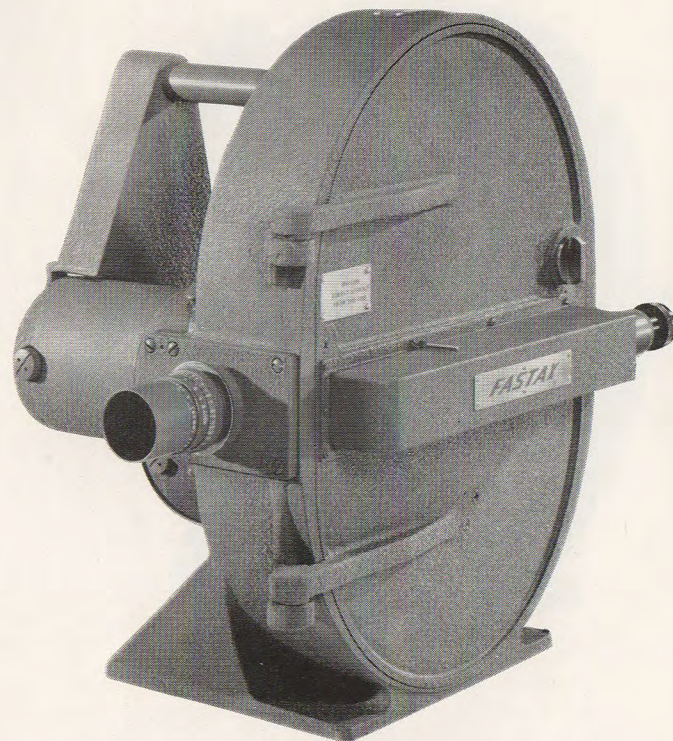
Power Requirements, Recommended—

- Minimum — 12 volts DC, 2.4 amps. approx.
- Maximum— 28 volts DC, 3 amps. approx.
- Minimum — 35 volts AC, 2.5 amps. approx.
- Maximum—280 volts AC, 16 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle). One for drive, one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—14" x 17" x 13".

Camera Weight—38 lbs.

Shipping Weight—Approximately 75 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—15" x 19" x 20".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, for daylight loading.

Instruction book.

Two dust caps.

Lubricant atomizer.

400' film-spool can.

$\frac{5}{32}$ " Allen wrench.

$\frac{9}{16}$ " open-end wrench.

Warranty card.

Film-spool gage.

WF5 • 35mm Fastax Camera 100' capacity

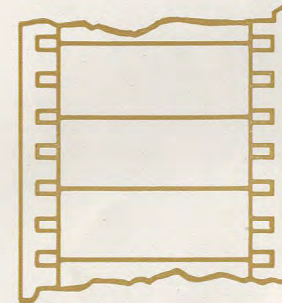
Half Frame

TECHNICAL SPECIFICATIONS

Film Capacity—100' daylight loading spool.

Film—35mm, standard perforation and pitch.

Frame Size—35mm, half frame.



Aperture—35mm, half frame.

Speed—100 to 6000 P.P.S. (pictures per second).

Lens—1 $\frac{3}{8}$ " (35mm) f/2.0 Fastax Raptar in focusing mount, with double focusing scale. (Scale in color is used for focusing when using the Removable Reflex Finder behind the lens. After focusing, using the colored scale, the footage indicated is transposed to the white scale and the Reflex Finder is removed and replaced by the lens.)

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder and Removable Reflex Finder are furnished with the camera.

1. Integral Viewfinder. It is primarily used for critical focusing through the camera aperture.
2. The Removable Reflex Finder, Type I. Used between the camera and taking lens for full area composition and for focusing by using the double focusing scale on the lens.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off camera at end of the film run.

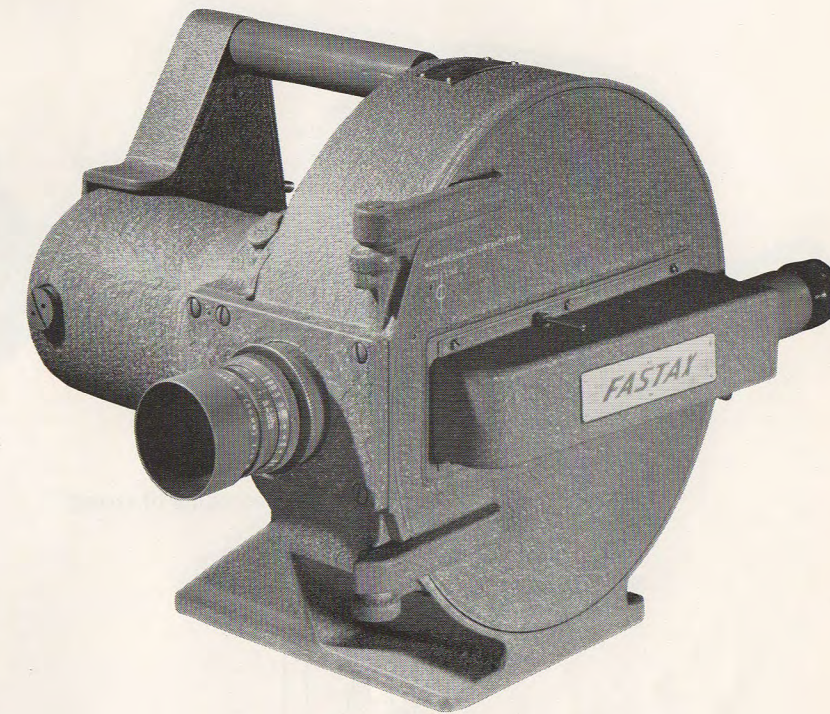
Power Requirements, Recommended—

- Minimum — 8 volts DC, 2.3 amps. approx.
- Maximum— 30 volts DC, 3.0 amps. approx.
- Minimum — 30 volts AC, 2.5 amps. approx.
- Maximum—280 volts AC, 13.5 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle). One for drive and one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—29 lbs.

Shipping Weight—Approximately 50 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, for daylight loading.

Instruction book.

One dust cap.

Lubricant atomizer.

100' film-spool can.

Warranty card.

WF6 • 16mm Fastax Camera 100' capacity

Oscillographic

TECHNICAL SPECIFICATIONS

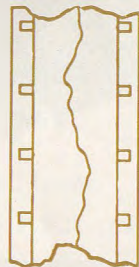
Oscillographic—Similar in design to the WF3 Camera except rotating prism is not supplied.

(Installation of the rotating prism can be made if high-speed *motion-picture* photography is required. Quotation on request.)

Film Capacity—100' daylight loading spool.

Film—16mm.

Frame Size—None—continuous recording of streak or oscillographic image.



Aperture—16mm, full frame.

Speed—(Recording) 4 feet to 200 feet per second.

Lens—2" (50mm) f/2.0 Fastax Raptar in focusing mount.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder. For critical focusing and viewing through the camera aperture—covers the full image area for composition.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off camera at the end of the film run.

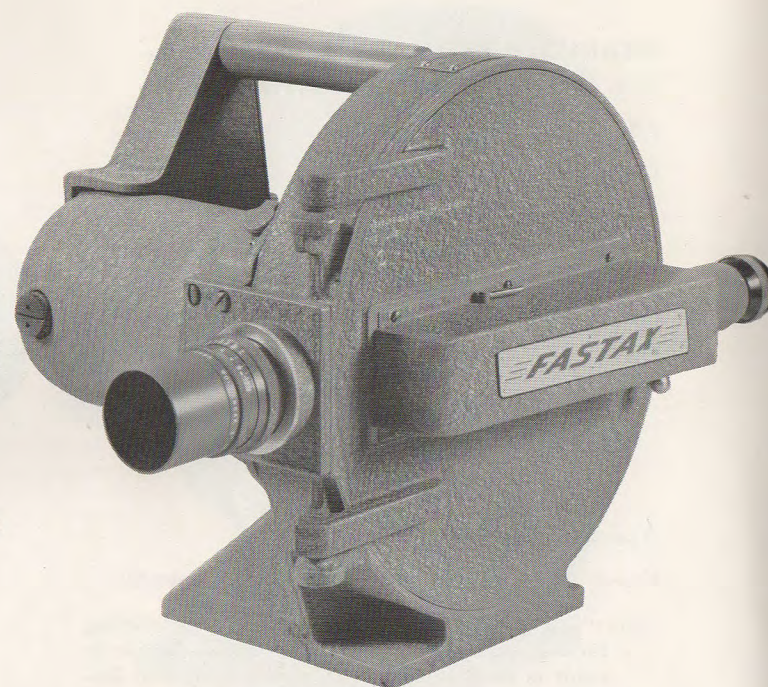
Power Requirements, Recommended—

Minimum— 8 volts DC, 2.3 amps. approx.
Maximum— 28 volts DC, 3.0 amps. approx.
Minimum— 30 volts AC, 3.0 amps. approx.
Maximum—280 volts AC, 11 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle).
One for drive, one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—25 lbs.

Shipping Weight—Approximately 50 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, for daylight loading.

Instruction book.

One dust cap.

Lubricant atomizer.

100' Film-spool can.

Warranty card.

WF7 • 35mm Fastax Camera 100' capacity

Oscillographic

TECHNICAL SPECIFICATIONS

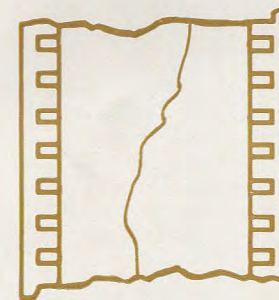
Oscillographic—Similar in design to the WF5 camera except rotating prism is not supplied.

(Installation of the rotating prism can be made if high-speed *motion-picture* photography is required. Quotation on request.)

Film Capacity—100' daylight loading spool.

Film—35mm, standard perforation and pitch.

Frame Size—None—continuous recording of streak or oscillographic image.



Aperture—35mm, half frame.

Speed—(Recording) 3 feet to 190 feet per second.

Lens—1 $\frac{3}{8}$ " (35mm) f/2.0 Fastax Raptar in focusing mount with double focusing scale. Scale in color is used for focusing when using the Removable Reflex Finder behind the lens. After focusing, using the colored scale, the footage indicated is transposed to the white scale and the Reflex Finder is removed and replaced by the lens.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Integral Viewfinder and Removable Reflex Finder are furnished with the camera.

1. Integral Viewfinder. It is primarily used for critical focusing through the camera aperture.

2. The Removable Reflex Finder, Type I. Used between the camera and taking lens for full area composition and for focusing by using the double focusing scale on lens.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

Cutoff Switch—Automatically cuts off camera at the end of the film run.

Power Requirements, Recommended—

Minimum— 8 volts DC, 2.3 amps. approx.

Maximum— 30 volts DC, 3.0 amps. approx.

Minimum— 30 volts AC, 2.5 amps. approx.

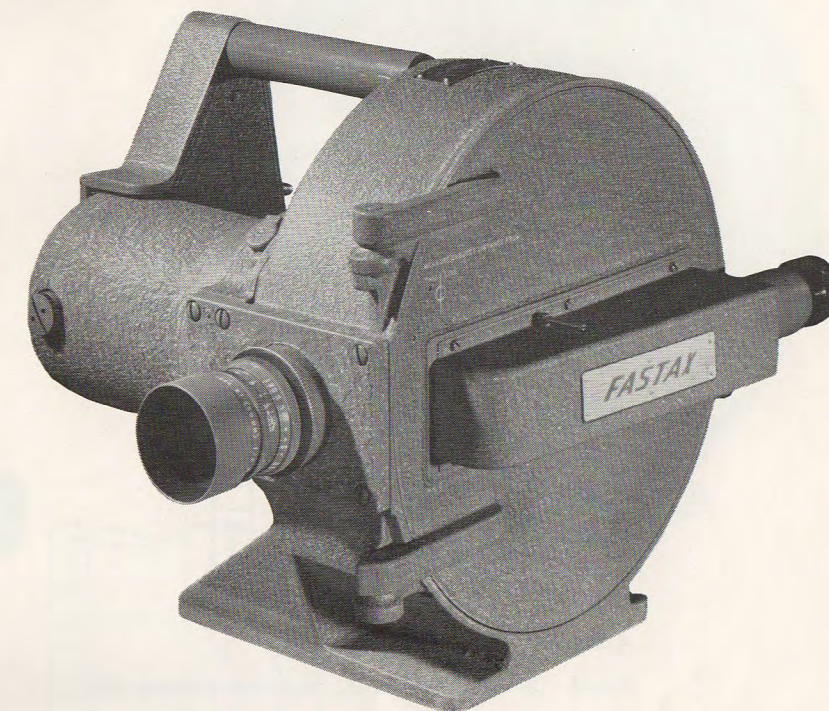
Maximum—280 volts AC, 13.5 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle).

One for drive, one for take-up.

Tripod Socket—Thread size, $\frac{3}{8}$ " x 16 NC.

*Available as an accessory.



PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—29 lbs.

Shipping Weight—Approximately 50 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, for daylight loading.

Instruction book.

One dust cap.

Lubricant atomizer.

100' film-spool can.

Warranty card.

WF8 · 35mm Fastax Camera 500' capacity

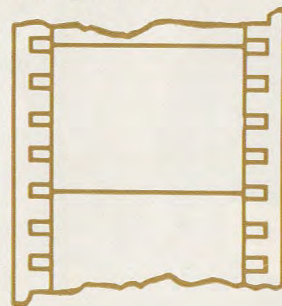
Full Frame

TECHNICAL SPECIFICATIONS

Film Capacity—500' daylight loading spool.

Film—35mm, standard perforation and pitch.

Frame Size—35mm, full frame.



Aperture—35mm, full frame.

Speed—200 to 2500 P.P.S. (pictures per second).

Magazines—One external magazine furnished—Loads with 500' daylight loading spool.

Lens—4" (101mm) f/2.3 Fastax Pro-Raptar in focusing mount.

Lens Mount—FX2 Fastax Bayonet Pro Mount.

Viewfinder—Removable Finder. View is through the camera aperture and from the side of the camera at 90° to the subject. For critical focusing and viewing—covers the full image area for composition.

Timing Light—Supplied with double timing light installed as standard equipment.

1. One light to indicate rate of film travel in terms of P.P.S.
2. Second light to indicate zero time.

Timing light exposes 120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

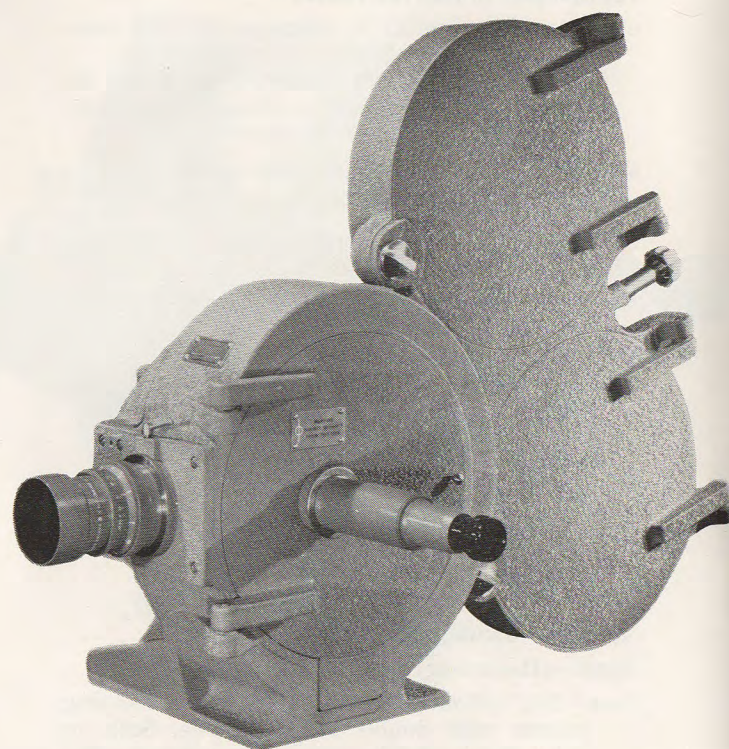
Cutoff Switch—Automatically cuts off camera at the end of the film run.

Power Requirements, Recommended—

- Minimum — 10 volts DC, 3.0 amps. approx.
- Maximum — 30 volts DC, 5 amps. approx.
- Minimum — 35 volts AC, 3.5 amps. approx.
- Maximum — 200 volts AC, 19 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle). One for drive, one for take-up.

Tripod Socket—Thread size, 3/8" x 16 NC.



PHYSICAL CHARACTERISTICS

Size—17" x 22" x 26".

Camera Weight—62 lbs.

Shipping Weight—Approximately 150 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—28 1/2" x 21 3/4" x 18 1/2".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spools, for daylight loading.

Instruction book.

Large dust cap.

Small dust cap.

Lubricant atomizer.

500' film-spool can.

5/32" Allen wrench.

9/16" open-end wrench.

Film-spool gage.

Warranty card.

"V"-cut film

trimmer.

Camera dust

cover.

Magazine dust

cover.

WF9 · 35mm Fastax Camera 100' capacity

Combined Motion-Picture and Oscillographic Half Frame

TECHNICAL SPECIFICATIONS

Film Capacity—100' daylight loading spool.

Film—35mm, standard perforation and pitch.

Frame Size—Picture area covers one half of the frame and the oscillographic trace image covers the other half adjacent to the picture area.

Aperture—35mm, half frame.

Speed—100 to 6000 P.P.S. (3 ft. per second to 190 ft. per second).

Lenses—Two lenses furnished. One, a 50mm f/2.0 Fastax Raptar in focusing mount, is mounted on the front of the camera to record picture image; the other, a 35mm f/2.0 Fastax Raptar in focusing mount, mounted on the camera door to record the oscillographic trace simultaneously with the picture image.

The color scale on the 50mm lens is used for focusing with the Removable Reflex Finder behind the lens. After focusing, using the color scale, the footage indicated is transposed to the white scale and the Reflex Finder is removed and replaced by the lens. Focusing the 35mm lens is done by direct measurement from the camera to the oscilloscope screen.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Removable Reflex Finder, Type II. Used between the camera and taking lens for full area composition and focusing by using the double focusing scale on the lens.

Timing Light—Single timing light—120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

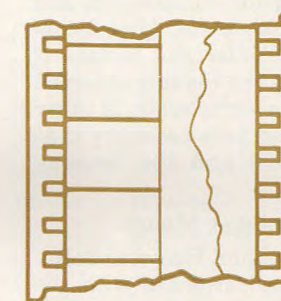
Cutoff Switch—Automatically cuts off camera at the end of the film run.

Power Requirements, Recommended—

- Minimum — 8 volts DC, 2.3 amps. approx.
- Maximum — 30 volts DC, 3.0 amps. approx.
- Minimum — 30 volts AC, 2.5 amps. approx.
- Maximum — 280 volts AC, 13.5 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle). One for drive, one for take-up.

Tripod Socket—Thread size, 3/8" x 16 NC.



Frame Size

PHYSICAL CHARACTERISTICS

Size—12" x 12" x 12".

Camera Weight—29 lbs.

Shipping Weight—Approximately 50 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 16" x 16".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

Compartmented fiber carrying case with metal-reinforced corners.

Camera test film, and focusing film.

Camera speed characteristic chart.

2-ounce bottle of camera lubricant.

20-foot power cord.

Plug, for timing light.

Spool, 100' for daylight loading.

Instruction book.

One dust cap.

Lubricant atomizer.

100' film-spool can.

Warranty card.

Focusing film.

Dental mirror.

WF14-16mm Fastax Camera 400' capacity

Combined Motion-Picture and Oscillographic Superimposed

TECHNICAL SPECIFICATIONS

Film Capacity—400' daylight loading spool.

Film—16mm.

Frame Size—16mm, full frame.

Aperture—16mm, full frame.

Speed—650 to 8000 P.P.S. (16 ft. per second to 200 ft. per second).

Lenses—Two lenses furnished. One, a 50mm *f*/2.0 Fastax Raptar in focusing mount, is mounted on the front of the camera to record the picture image; the other, a 35mm *f*/2.0 Fastax Raptar Lens in focusing mount, mounted on the camera door to record the oscillographic trace simultaneously with the picture image.

The 35mm lens is used with the Removable Reflex Finder, Type III, for composition and focusing of the oscillographic trace. After focusing, remove the Reflex Finder and replace it with the lens, transferring the reading obtained on the yellow scale to the white scale. If other focal length lenses are used, it is necessary that the distances be measured and the focusing mount set accordingly.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Removable Finder and Removable Reflex Finder, Type III, are furnished with the camera.

1. Removable Viewfinder. View is through the camera aperture and from the side of the camera at 90° to the subject for critical focusing and viewing—covers the full image area for composition.
2. The Removable Reflex Finder, Type III. Used between the 35mm *f*/2.0 lens and the camera to compose and focus the oscillographic trace.

Timing Light—Supplied with double timing light installed as standard equipment.

1. One light to indicate rate of film travel in terms of P.P.S.
2. Second light to indicate zero time.

Timing light exposes 120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on edge of film indicate rate of film travel in terms of pictures per second.

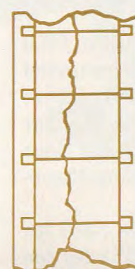
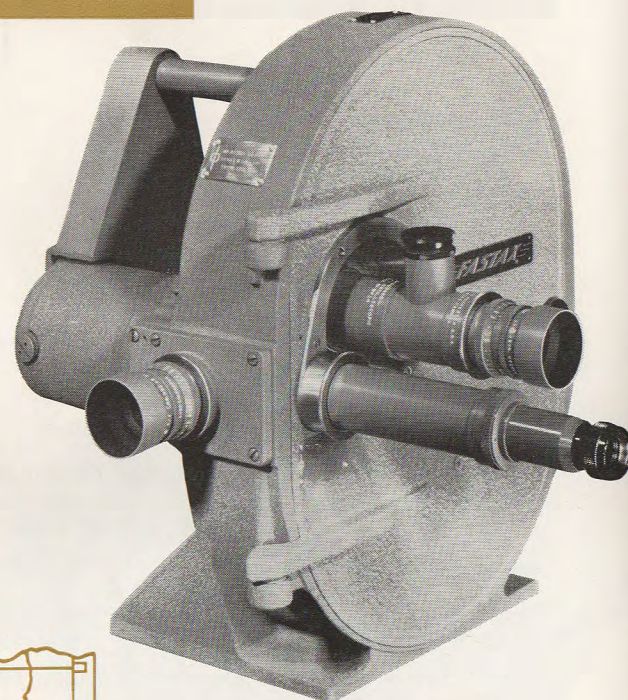
Cutoff Switch—Automatically cuts off camera at the end of the film run.

Power Requirements, Recommended—

- Minimum—16 volts DC, 2.5 amps. approx.
- Maximum—28 volts DC, 3.0 amps. approx.
- Minimum—35 volts AC, 2.5 amps. approx.
- Maximum—280 volts AC, 16 amps. approx.

Motors—Two motors (115-volt AC-DC 60-cycle). One for drive, one for take-up.

Tripod Socket—Thread size, 3/8" x 16 NC.



Frame Size

PHYSICAL CHARACTERISTICS

Size—14" x 17" x 13".

Camera Weight—38 lbs.

Shipping Weight—Approximately 75 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 19" x 20".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS

FURNISHED WITH CAMERA

- Compartmented fiber carrying case with metal-reinforced corners.
- Camera test film, and focusing film.
- Camera speed characteristic chart.
- 2-ounce bottle of camera lubricant.
- 20-foot power cord.
- Plug, for timing light.
- Spools, 400' for daylight loading.
- Instruction book.
- Two dust caps.
- Lubricant atomizer.
- 400' film-spool can.
- 5/32" Allen wrench.
- 9/16" open-end wrench.
- Warranty card.
- Film-spool gage.
- Focusing film.
- Dental mirror.

WF15-8mm Fastax Camera 400' capacity

Combined Motion-Picture and Oscillographic Superimposed

TECHNICAL SPECIFICATIONS

Film Capacity—400' daylight loading spool.

Film—16mm with 8mm perforations.

Frame Size—8mm, single width (A)

or

8mm, double width (B).

Aperture—Interchangeable masks furnished with each camera, one for 8mm, single width (A) and one for 8mm, double width (B).

(8mm single width for motion pictures only; 8mm double width for motion-picture, oscillographic-trace, or combined motion-picture and oscillographic-trace photography.)

Speed—1300 P.P.S. to 16,000 P.P.S. (16 ft. per second to 200 ft. per second).

Lenses—Two lenses furnished. One, a 50mm *f*/2.0 Fastax Raptar in focusing mount, is mounted on the front of the camera to record picture image; the other, a 35mm *f*/2.0 Fastax Raptar Lens in focusing mount, mounted on the camera door to record the oscillographic trace simultaneously with the picture image.

The 35mm lens is used with the Removable Reflex Finder, Type III, for composition and focusing of the oscillographic trace. After focusing, remove the Reflex Finder and replace it with the lens, transferring the reading obtained on the yellow scale to the white scale. If other focal length lenses are used, it is necessary that the distances be measured and the focusing mount set accordingly.

Lens Mount—FX1 Fastax Bayonet Mount.

Viewfinder—Removable Finder and Removable Reflex Finder, Type III, are furnished.

1. Removable Viewfinder. View is through the camera aperture and from the side of the camera at 90° to the subject for critical focusing and viewing—covers the full image area for composition.
2. The Removable Reflex Finder, Type III. Used between the 35mm *f*/2.0 lens and the camera to compose and focus the trace.

Timing Light—Supplied with double timing light installed as standard equipment:

1. One light to indicate rate of film travel in terms of P.P.S.
2. Second light to indicate zero time.

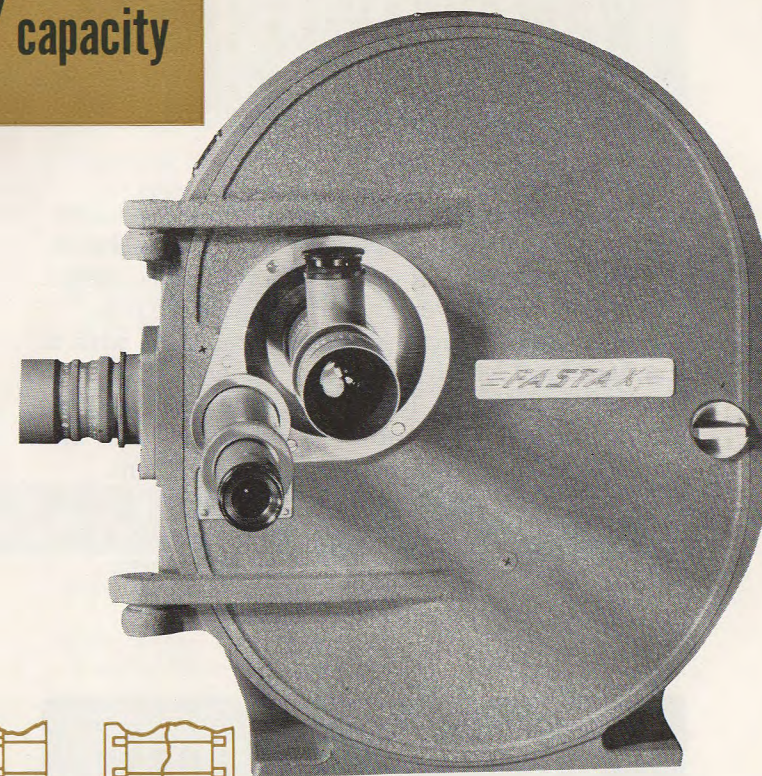
Timing light exposes 120 "pips," or "marks," per second when energized by 60-cycle current, or 100 or 1000 pips per second when activated by WF311 Timing Light Generator.*

Pips, or marks, exposed on the edge of film indicate rate of film travel in terms of pictures per second.

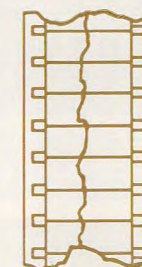
Cutoff Switch—Automatically cuts off camera at the end of the film run.

Power Requirements, Recommended—

- Minimum—16 volts DC, 2.5 amps. approx.
- Maximum—28 volts DC, 3.0 amps. approx.
- Minimum—35 volts AC, 2.5 amps. approx.
- Maximum—280 volts AC, 16 amps. approx.



A



B

Frame Size

Technical Specifications (Continued)

Motors—Two motors (115-volt AC-DC 60-cycle).

One for drive, one for take-up.

Tripod Socket—Thread size, 3/8" x 16 NC.

PHYSICAL CHARACTERISTICS

Size—14" x 17" x 13".

Camera Weight—38 lbs.

Shipping Weight—Approximately 75 lbs. in carrying case packed in carton for domestic shipment.

Size of Shipping Carton—17" x 19" x 20".

Camera Color—Fastax Gray.

ADDITIONAL ITEMS FURNISHED WITH CAMERA

- Compartmented film carrying case with metal-reinforced corners.
- Camera test film, and focusing film.
- Camera speed characteristic chart.
- 2-ounce bottle of camera lubricant.
- 20-foot power cord.
- Plug, for timing light.
- Spools, 400' take-up for daylight loading.
- Instruction book.
- Lubricant atomizer.
- 400' film-spool can.
- 5/32" Allen wrench.
- 9/16" open-end wrench.
- Two dust caps.
- Warranty card.
- Film-spool gage.
- Focusing film.
- Dental mirror.

WOLLENSAK LENSES

Raptar lenses are designed to meet the highest standards of performance. Each lens has high resolution without the sacrifice of contrast. It is color corrected and provides full coverage to the edge of the film.

Each Fastax camera is supplied complete with a standard focal length lens.

A series of Fastax Raptars in focal lengths from 25mm to the 80" Mirrotel and extension tubes are available to meet each high-speed requirement.

In order to improve the adaptability of Fastax Cameras for general laboratory and field use, a lens kit is available as an accessory for the camera.

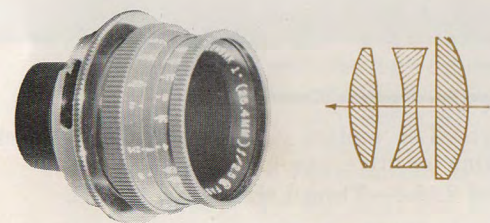
The lens kit consists of a 35mm or a 2" Raptar (depending on the lens supplied with the camera), 101mm and a 152mm lens with four extension tubes.

The longer focal length lenses permit one to take the camera farther away from the subject for a given magnification. The shorter focal length lenses permit wide-angle coverage. The extension tubes permit macro high-speed motion pictures to be taken, or subjects to be photographed at distances less than normally allowed on the focusing mount of the lens. The equivalent focal length of each lens is precisely measured and is engraved on the lens mount.

**Fastax Raptar Lenses

for use with Fastax Cameras WF1, WF2, WF3, WF4, WF6, WF14, WF15

*WF100 1" (25.4mm) f/2.5 Fastax Raptar in focusing mount



Special aperture plates are required for 8mm cameras with serial numbers up to 50, 16mm cameras with serial numbers up to 325. The WF101 1" (25.4mm) f/2.5 Fastax Raptar in focusing mount with special aperture plate is

Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—12" to infinity.

Aperture—f/2.5 to f/22.

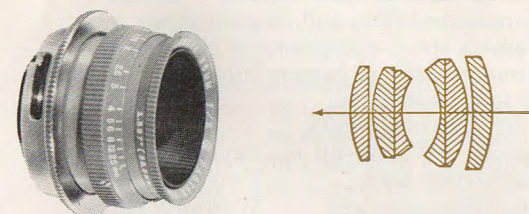
Horizontal Angular Coverage:

For 8mm—11.4°.

For 16mm or double width 8mm—22.6°.

available at the same price for these cameras. When ordering lens, specify serial number and model of camera (8mm or 16mm) so the proper aperture plate will be supplied with the lens.

*WF102 1 3/8" (35mm) f/2.0 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on lens mount.

Click Stops—Yes.

Focusing Scale—1.5' to infinity.

Aperture—f/2.0 to f/22.

Horizontal Angular Coverage:

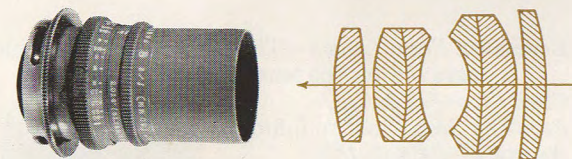
For 8mm—8.3°.

For 16mm or double width 8mm—16.5°.

*Available for Kodak High Speed Cameras. Quotation on request.

**All lenses in focusing mounts are available with scales marked in meters when specified.

*WF105 2" (50mm) f/2.0 Fastax Raptar in focusing mount



Better results will be obtained at reduced lens apertures.
WF106 50mm f/2.7 Fastax Raptar Lens in focusing

Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—28" to infinity.

Aperture—f/2.0 to f/22.

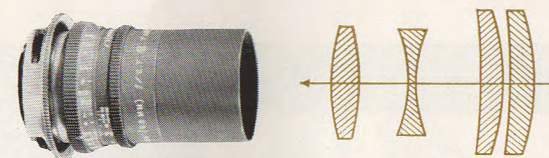
Horizontal Angular Coverage:

For 8mm—5.7°.

For 16mm or double width 8mm—11.4°.

mount is available for those applications where there is adequate illumination.

*WF107 2 1/2" (63mm) f/2.7 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—3 1/2' to infinity.

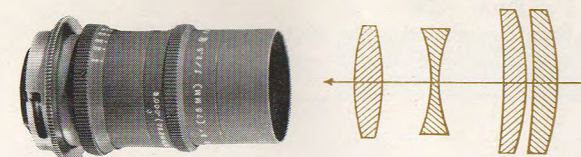
Aperture—f/2.7 to f/22.

Horizontal Angular Coverage:

For 8mm—4.6°.

For 16mm or double width 8mm—9.1°.

*WF108 3" (75mm) f/2.5 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—5' to infinity.

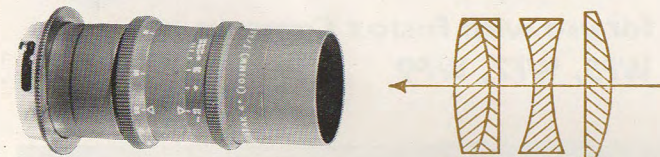
Aperture—f/2.5 to f/22.

Horizontal Angular Coverage:

For 8mm—3.8°.

For 16mm or double width 8mm—7.6°.

*WF110 4" (101mm) f/3.5 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—8' to infinity.

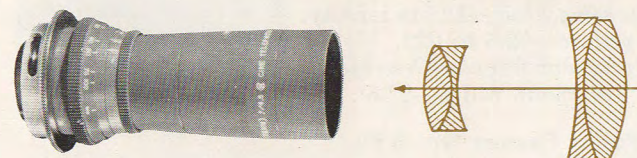
Aperture—f/3.5 to f/22.

Horizontal Angular Coverage:

For 8mm—2.8°.

For 16mm or double width 8mm—5.7°.

*WF111 6" (152mm) f/4.5 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.

Click Stops—Yes.

Focusing Scale—20' to infinity.

Aperture—f/4.5 to f/32.

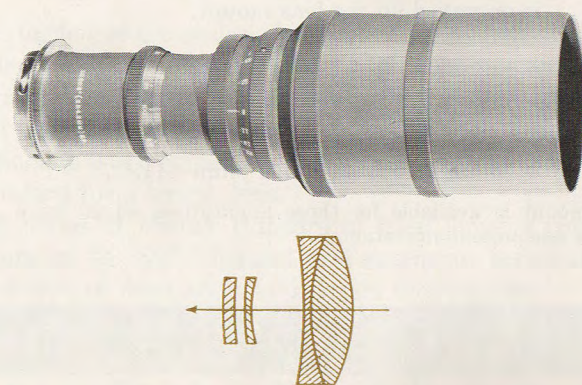
Horizontal Angular Coverage:

For 8mm—1.9°.

For 16mm or double width 8mm—3.8°.

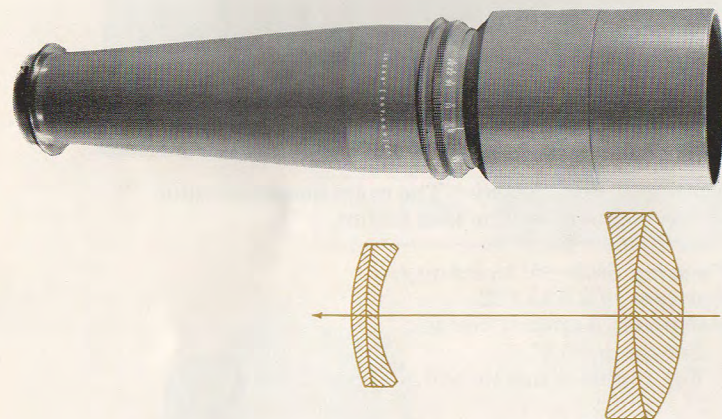
*Available for Kodak High Speed Cameras. Quotation on request.

***WF113 10" (254mm) f/4.5 Fastax Raptar in focusing mount**



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—50' to infinity.
Aperture—f/4.5 to f/22.
Horizontal Angular Coverage:
 For 8mm—1.1°.
 For 16mm or double width 8mm—2.3°.

***WF115 15" (381mm) f/5.6 Fastax Raptar Fixed-Focus**



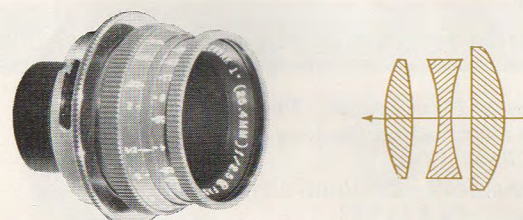
Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Range—Fixed focus.
 418 ft. to inf.—at f/5.6.
Aperture—f/5.6 to f/32.
Horizontal Angular Coverage:
 For 8mm—.76°.
 For 16mm or double width 8mm—1.5°.

*Available for Kodak High Speed Cameras. Quotation on request.

****Fastax Raptar Lenses**

for use with Fastax Cameras WF5, WF7, WF9

WF100R 1" (25.4mm) f/2.5 Fastax Raptar, for WF9 camera only, in focusing mount with red and white double focusing scale.

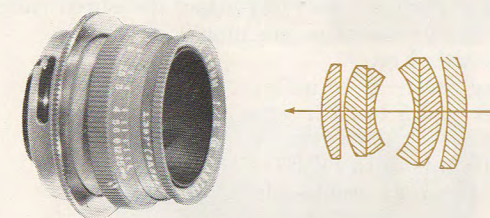


Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—12" to infinity.
Aperture—f/2.5 to f/22.
Horizontal Angular Coverage:
 For 16mm width—22.6°.

For use with Reflex Finder No. A-12714, supplied with Fastax Camera No. WF9.
 This lens cannot be used with the WF5 and WF7 Cameras.

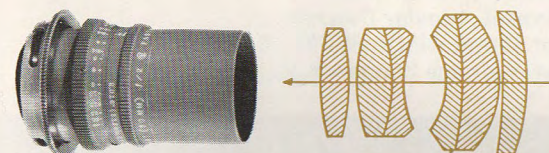
**All lenses in focusing mount are available with scales marked in meters when specified.

†WF102R 1 3/8" (35mm) f/2.0 Fastax Raptar in focusing mount with red and white double focusing scale.



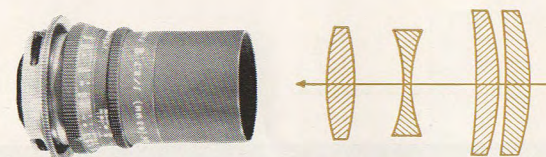
Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—1.5' to infinity.
Aperture—f/2.0 to f/22.
Horizontal Angular Coverage:
 For 16mm width (WF9)—16.5°.
 For 1/2-frame 35mm—39.9°.

†WF105R 2" (50mm) f/2.0 Fastax Raptar in focusing mount with red and white double focusing scale.



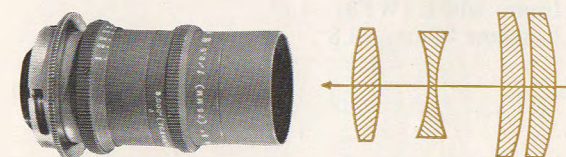
Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—28" to infinity.
Aperture—f/2.0 to f/22.
Horizontal Angular Coverage:
 For 16mm width (WF9)—11.4°.
 For 1/2-frame 35mm—28.1°.

†WF107R 2 1/2" (63mm) f/2.7 Fastax Raptar in focusing mount with red and white double focusing scale.



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—3 1/2' to infinity.
Aperture—f/2.7 to f/22.
Horizontal Angular Coverage:
 For 16mm width (WF9)—9.1°.
 For 1/2-frame 35mm—22.6°.

†WF108R 3" (75mm) f/2.5 Fastax Raptar in focusing mount with red and white double focusing scale.

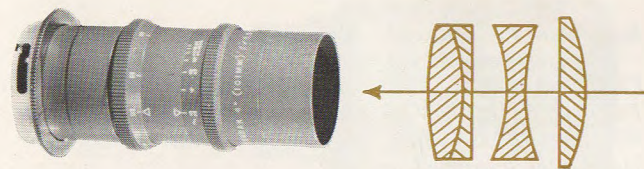


Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—5' to infinity.
Aperture—f/2.5 to f/22.
Horizontal Angular Coverage:
 For 16mm width (WF9)—7.6°.
 For 1/2-frame 35mm—18.9°.

†For use with Removable Reflex Viewfinder, Type I (No. A-7106), supplied with Fastax Cameras WF5 and WF7.
 OR for use with Removable Reflex Viewfinder, Type II (No. A-12714), supplied with Fastax Camera WF9.

†WF110R

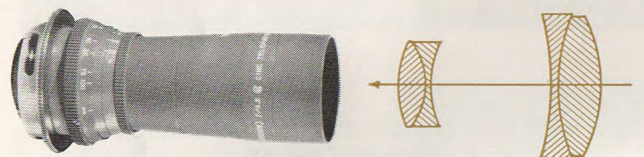
**4" (101mm) f/3.5 Fastax Raptar in focusing mount
with red and white double focusing scale**



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—8' to infinity.
Aperture—f/3.5 to f/22.
Horizontal Angular Coverage:
For 16mm width (WF9)—5.7°.
For 1/2-frame 35mm—14.2°.

*WF111

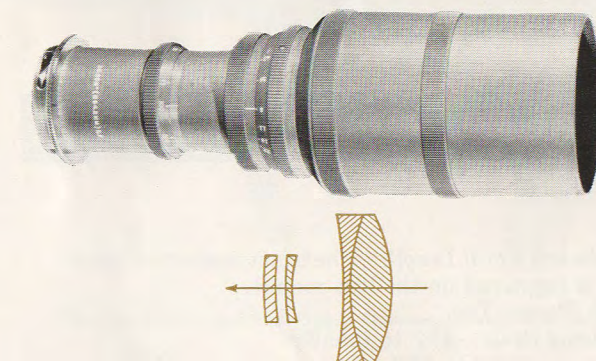
6" (152mm) f/4.5 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—20' to infinity.
Aperture—f/4.5 to f/32.
Horizontal Angular Coverage:
For 16mm width (WF9)—3.8°.
For 1/2-frame 35mm—9.5°.

*WF113

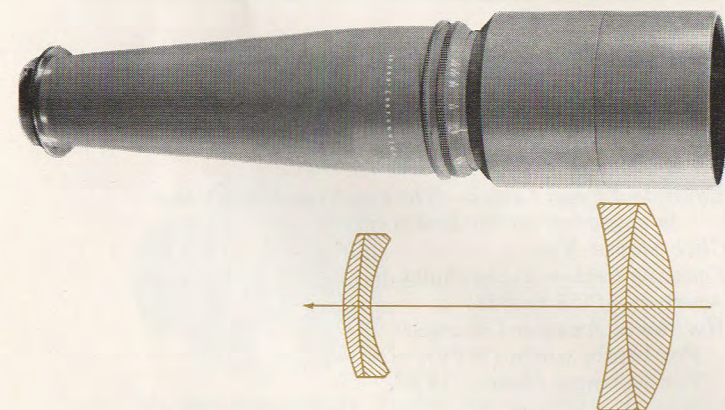
10" (254mm) f/4.5 Fastax Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—50' to infinity.
Aperture—f/4.5 to f/22.
Horizontal Angular Coverage:
For 16mm width (WF9)—2.3°.
For 1/2-frame 35mm—5.7°.

*WF115

15" (381mm) f/5.6 Fastax Raptar Fixed Focus

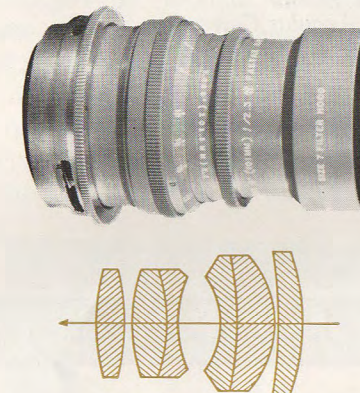


Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Range—Fixed focus.
418 ft. to inf.—at f/5.6.
Aperture—f/5.6 to f/32.
Horizontal Angular Coverage:
For 16mm width (WF9)—1.5°.
For 1/2-frame 35mm—3.8°.

†For use with Removable Reflex Viewfinder, Type I (No. A-7106), supplied with Fastax Cameras WF5 and WF7.
OR for use with Removable Reflex Viewfinder, Type II (No. A-12714), supplied with Fastax Camera WF9.
*Available for Kodak High Speed Cameras. Quotation on request.

WF201

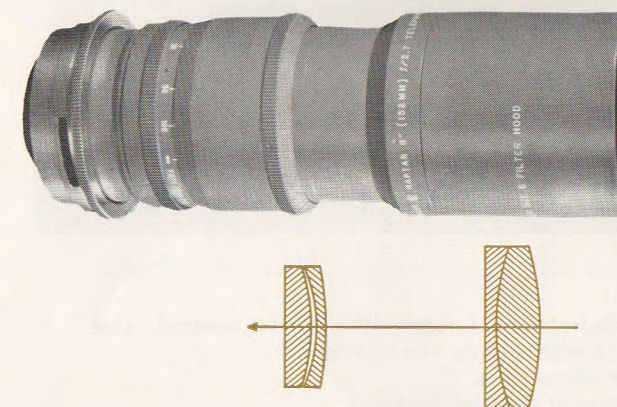
4" (101mm) f/2.3 Fastax Pro-Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—4' to infinity.
Aperture—f/2.3 to f/22.
Filter Size—No. 7 (drop in).
Horizontal Angular Coverage:
For full-frame 35mm—14.2°.

WF202

6" (152mm) f/2.7 Fastax Pro-Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Focusing Scale—8' to infinity.
Aperture—f/2.7 to f/22.
Filter Size—No. 8 (drop in).
Horizontal Angular Coverage:
For full-frame 35mm—9.5°.

WF203

3" (75mm) f/2.3 Fastax Pro-Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Horizontal Angular Coverage:
For full-frame 35mm—18.9°.

**All lenses in focusing mounts are available with scales marked in meters when specified.

†WF204 1" (25mm) f/2.3 Fastax Pro-Raptar in focusing mount



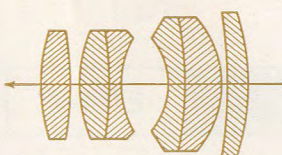
Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Horizontal Angular Coverage:
 For full-frame 35mm—53.1°.

†WF205 1-3/8" (35mm) f/2.3 Fastax Pro-Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Horizontal Angular Coverage:
 For full-frame 35mm—39.9°.

†WF206 2" (50mm) f/2.3 Fastax Pro-Raptar in focusing mount



Equivalent Focal Length—The exact measured value is engraved on the lens mount.
Click Stops—Yes.
Horizontal Angular Coverage:
 For full-frame 35mm—28.1°.

†NOTE: Lens must be used with Fiducial Marking Attachment WF209.

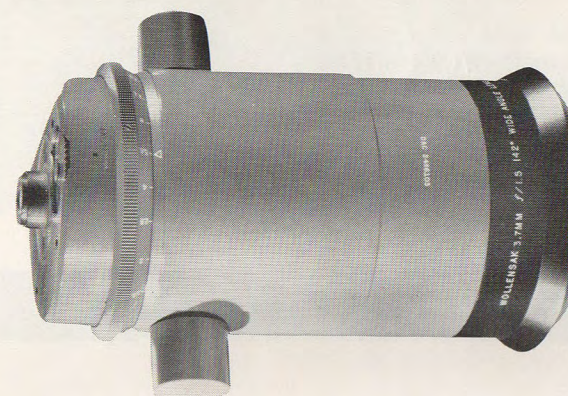
Wide-Angle Lenses

In order to meet the many needs of professional users of 35mm motion-picture cameras, Fastax cameras, 16mm cameras, and special applications of these cameras, several new series of wide-angle lenses have been developed by Wollensak. These wide-angle lenses have proved to be invaluable where an extreme field of view is required. The lens system is basically that of reversed telephotos in form. An extreme depth of field is possible for the lenses at the maximum apertures, because of the small residual aberrations with the exception of distortion. The

resultant distortion is characteristic of extreme wide-angle lenses of high relative aperture.

The lenses can be used, for example, to record instantaneous instrument data shown on a variety of instruments over a large area where the distance from panel to camera is restricted. In many cases the instruments or objects must be located in azimuth and elevation within the distorted field, necessitating correction charts to compensate for the distortion present in the optical system. Distortion curves can be furnished if necessary.

***WF121 3.7mm f/1.5, 142° Wide-Angle Fixed Focus for Fastax Camera WF3**

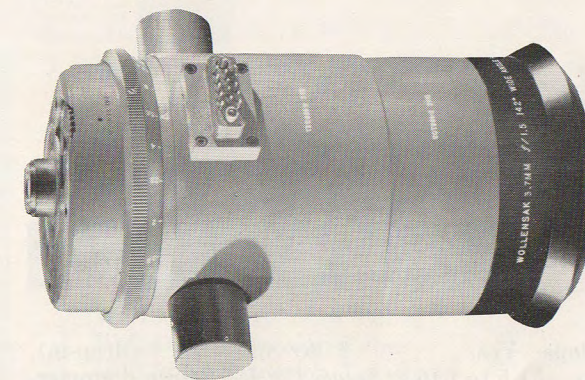


Click Stops—Yes.
Aperture—f/1.5 to f/16.
Image Circle—7.5mm diameter.

This lens (WF121) is available only on special order for Fastax Camera model WF3. When ordering this lens it is necessary to forward the camera to Wollensak Optical Company for adaptation and mounting.

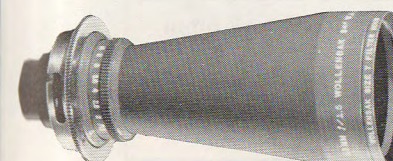
NOTE: Remote time-indicator panel assembly (scoring device) for WF121 supplied when specified on original order. Can be furnished assembled to WF121 Lens or can be added to existing lens previously supplied if lens is returned for installation (at an extra charge).

This lens also available in either GSAP or C mounting. Prices on request.



(With remote time-indicator assembly scoring device)

***WF122 5.3mm f/1.5 Fastax Raptar, 84° Wide-Angle Fixed Focus**



Click Stops—Yes.
Aperture—f/1.5 to f/16.
Filter Size—No. 7 (drop-in).
Image Circle—7.5mm diameter.

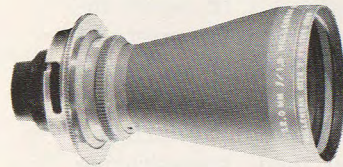
NOTE: To be used with the following cameras:

WF1 } double width	WF6
WF2 } 8mm only	WF14
WF3	WF15—double width
WF4	8mm only

This lens (WF122) also available in either GSAP or C mounting. Prices on request.

*Available for Kodak High Speed Cameras. Prices on request.

***WF137 12.0mm f/1.5 Fastax Raptar, 60° Wide-Angle Fixed Focus**



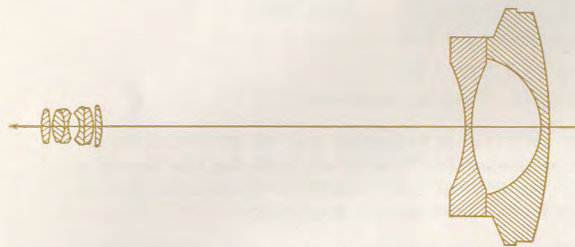
Click Stops—Yes.
Aperture—f/1.5 to f/16.
Filter Size—No. 7 (drop-in).
Image Circle—12.7mm diameter.

NOTE: To be used with the following cameras:

WF1 double width	WF6
WF2 8mm only	WF14
WF3	WF15—double width
WF4	8mm only

This lens (WF137) is available in either GSAP or C mounting. Prices on request.

WF138 8.3mm f/1.5, 142° Wide-Angle Fixed Focus for Fastax Cameras WF5, WF7, WF9



Click Stops—Yes.
Aperture—f/1.5 to f/16.
Image Circle—18mm diameter.

NOTE: Angular coverage for lens WF138 when used with the WF9 Camera is 84°. Image circle, 15mm diameter.

WF139 8.3mm f/1.5, 142° Wide-Angle Fixed Focus for Fastax Camera WF8



Click Stops—Yes.
Aperture—f/1.5 to f/16.
Image Circle—18mm diameter.

WF140 13.0mm f/2.0, 84° Wide-Angle Fixed Focus for Fastax Cameras WF5, WF7, and WF9

Click Stops—Yes. Filter Size—No. 7 (drop-in).
Aperture—f/1.5 to f/16. Image Circle—24mm diameter.
NOTE: Angular coverage for lens WF140 when used with the WF9 Camera is 70°. Image circle, 15mm diameter.

WF141 13.0mm f/2.0, 84° Wide-Angle Fixed Focus for Fastax Camera WF8

Click Stops—Yes. Filter Size—No. 7 (drop-in).
Aperture—f/1.5 to f/16. Image Circle—24mm diameter.
The 8.3mm 142° and 13.0mm 84° lenses are also available in mounts for Mitchell, Bell & Howell, etc. Prices on request.

The following wide-angle lenses can be made available for special adaptations and mountings to various makes of cameras and instrument data recording devices other than Fastax.

Focal Length	f/No.	Diagonal Coverage	No. of Elements	Image Circle	Circle of Illumination
3.7mm	f/1.5	142°	8	7.5mm	7.5mm
5.3mm	f/1.5	84°	8	7.5mm	7.5mm
12.0mm	f/1.5	60°	8	12.7mm	12.7mm
8.3mm	f/1.5	142°	8	18mm	18mm
13.0mm	f/2.0	84°	8	24mm	24mm

These lenses are made on special order. Prices and types of mountings are available on request. Specifications and other pertinent data should be included with the inquiry.

*Available for Kodak High Speed Cameras. Prices on request.

Fastax Lens Kits



WF126

Fastax Lens Kit in compartment case consisting of one each of the following:

WF102 35mm f/2.0 Raptar
WF110 101mm f/3.5 Raptar
WF111 152mm f/4.5 Raptar
WF129 3/8" Extension Tube
WF130 5/8" Extension Tube
WF131 1" Extension Tube
WF132 2" Extension Tube

NOTE: Lens Kit WF126 for Fastax Cameras WF1, WF2, WF3, WF4, WF6, WF14, WF15.

WF126R

Fastax Lens Kit consisting of lenses with red and white double focusing scale in compartment case:

Includes same focal length lenses and tubes as for WF126.

NOTE: Lens Kit WF126R for Fastax Cameras WF5, WF7, WF9.



WF127

Fastax Lens Kit in compartment case consisting of one each of the following:

WF105 50mm f/2.0 Raptar
WF110 101mm f/3.5 Raptar
WF111 152mm f/4.5 Raptar
WF129 3/8" Extension Tubes
WF130 5/8" Extension Tubes
WF131 1" Extension Tubes
WF132 2" Extension Tubes

NOTE: Lens Kit WF127 for Fastax Cameras WF1, WF2, WF3, WF4, WF6, WF14, WF15.

WF127R

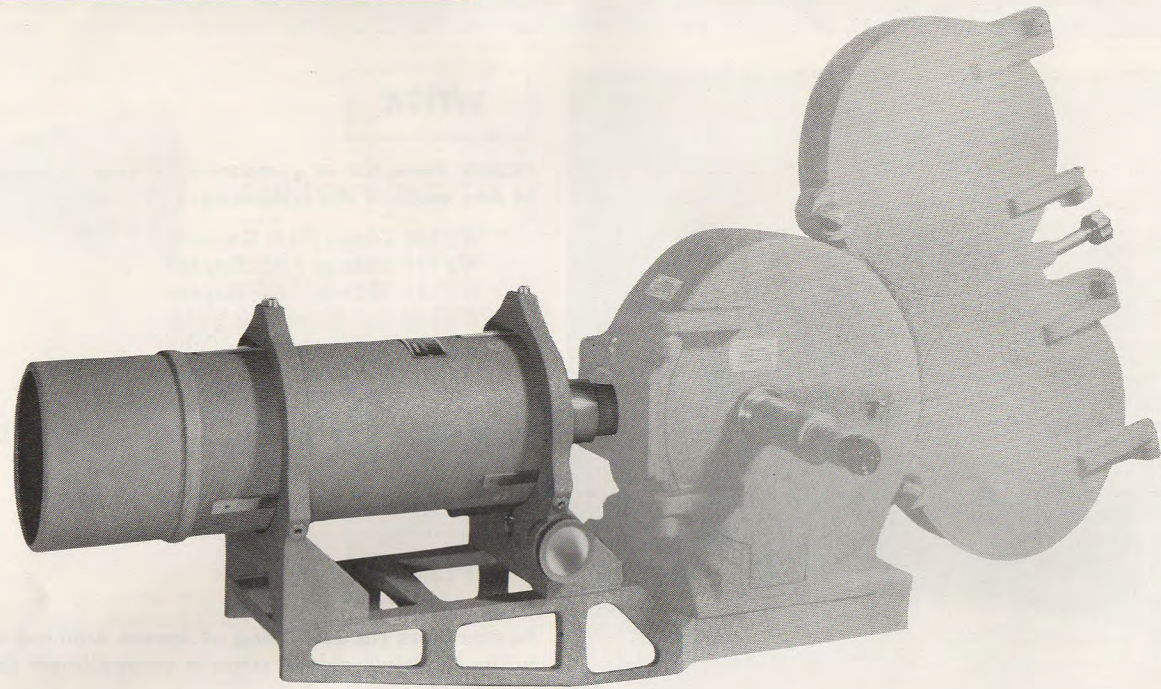
Fastax Lens Kit consisting of lenses with red and white double focusing scale in compartment case.

Includes same focal length lenses and tubes as for WF127.

NOTE: Lens Kit WF127R for Fastax Cameras WF5, WF7, WF9.

*Mirrotel Lenses

for Fastax Cameras



Mirrotel Lenses are available for installation to the Fastax Cameras. These lenses are of the long-focus type to record phenomena where distance to subject is restricted by the terrain or because of the nature of the event. These lenses are available in focal lengths of 20", 40", and 80".

THE MIRROTEL: Probably the most important and obvious advantage of optical-mirror systems is the complete absence of chromatic aberration (no special focusing for infrared!). There are no secondary color and no lateral color to fuzz up the image. Because the light path is "folded" three times within the system, the length and weight are less than one-third those of an equivalent refractive telephoto objective, thereby permitting greater stability (extremely important for long-focus objectives), ease of operation, and superior performance. *Example:* a conventional 80" EFL refractive telephoto objective would be 68" long measured from focal plane to front lens. The 80" Mirrotel is only 20" from focal plane to front. This ratio is also true for the 20" and 40" Mirrotel.

The Mirrotels are concentric systems; therefore, the straight line containing the center of curvature parallel to any given ray of light may be regarded as an axis of the system. There is no coma, astigmatism, or distortion. This means that the high-quality axial image is maintained at all extra-axial image points.

The mirror surfaces and all glass-to-air surfaces

*Mirrotel Lenses and supporting bracket focusing mounts are available for Mitchell, Cameraflex, Kodak High Speed Cameras, etc. Specify model of camera when ordering.

are treated with Wollensak anti-reflection hard coating, Wocote. This coating effectively reduces internal reflections, bouncing light and flare... greatly increases image contrast and brilliance... sharpens detail... produces purer, richer colors in full-color photography. Wocoting is done by Wollensak, in the Wollensak factory, with the best precision equipment under rigidly controlled conditions to assure uniformity and highest possible performance.

Only with the Wollensak Mirrotels is the physical limit of resolution attained as defined by Lord Rayleigh on the basis of the Airy disc.

Every Mirrotel lens is individually assembled, adjusted, and tested to meet the standard of resolution defined by the design. A photograph is made with each lens, using a target one mile away. This photograph is furnished with the lens to prove its performance.

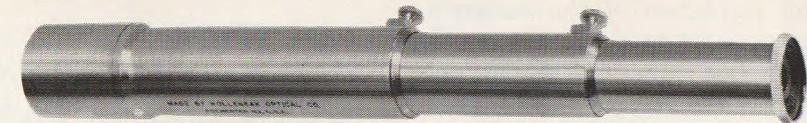
Mirrotel Lenses can be ordered for use with Fastax Cameras or for those cameras in the field. Prices for lenses and supporting bracket focusing mounts are available upon request. Additional technical data and specifications for Mirrotel Lenses are included in the Wollensak "Optical Instrumentation" Catalog.

Catalog numbers WF10 through WF13, WF117 through WF120, WF207, and WF208 previously assigned to Fastax Cameras with Mirrotel Lenses and for Mirrotel Lenses only for use with Fastax Cameras have been eliminated. When ordering Mirrotel Lenses, it is necessary to specify the model of camera on which it is to be mounted.

Auxiliary Optical Equipment

WF135

Microscope Eyepiece, 40-Power, for critical focusing through Fastax Camera viewfinders



FIDUCIAL MARKING ATTACHMENT

The Fiducial Marking Attachment is an optical system used between the camera and the taking lens. It records simultaneously the subject image and reference marks in the form of cross hairs on each frame.

The image from the camera lens is focused on a collecting lens engraved with the cross-hair reticle. A 1:1 lens system then relays the image and reticle pattern to the film plane. It is designed for frame-by-frame analysis.

WF136

Fiducial Marking Attachment for lenses used with Fastax Cameras WF1 through WF7, WF14, and WF15



SPECIFICATION

The Fiducial Marking Attachment adds a fiducial mark to the image, thus eliminating the need for reference lines at the subject. The unit includes a bayonet-type mount, and is used between the lens and the camera. Any Fastax Raptar lens in focal length from 1" to 15" can be mounted on the attachment.

WF209

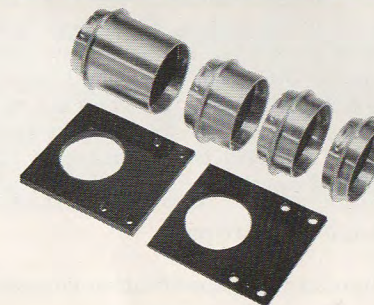
Fiducial Marking Attachment for lenses used with Fastax Camera WF8



SPECIFICATION

The Fiducial Marking Attachment adds a fiducial mark to the image, thus eliminating the need for reference lines at the subject. The unit includes a bayonet-type mount and is used between the lens and camera. Any Fastax Pro-Raptar lens in focal length from 1" to 6" can be mounted on the attachment.

Lens extension tubes and shims for all Fastax Cameras, except WF8



Used to photograph objects at shorter distances than can be obtained with the lens without extension tubes. The longest tube permits the shortest working distance.

WF129 Extension Tube $\frac{3}{8}$ "
WF130 Extension Tube $\frac{5}{8}$ "
WF131 Extension Tube 1"
WF132 Extension Tube 2"
WF133 Lens Plate Shim $\frac{1}{8}$ "
WF134 Lens Plate Shim $\frac{1}{4}$ "

Power Control Units

for Fastax Cameras

1. GOOSE CONTROL UNIT

The Goose Control Unit permits the synchronization of the camera with the event being studied, remote-control operation, and regulation of the camera's speed. It incorporates a variable AC autotransformer with an output of up to 280 volts—the voltage required for maximum operating speed—and employs a set of electrical timers.

Synchronization of the camera with the event can be controlled by means of a selector switch on the Goose. The event can be started before, simultaneously with, or after the camera has started. Camera speed is controlled by the voltage applied.

Since sprocket starting torque increases to the point that the sprocket tends to tear the film perforations, on application of voltages above 130 volts AC, the Goose acts as a time-delay mechanism which

allows the camera to start under a maximum of 130 volts and, 70 milliseconds later, releases the higher voltage necessary to obtain the higher frame rate.

2. POWERSTAT

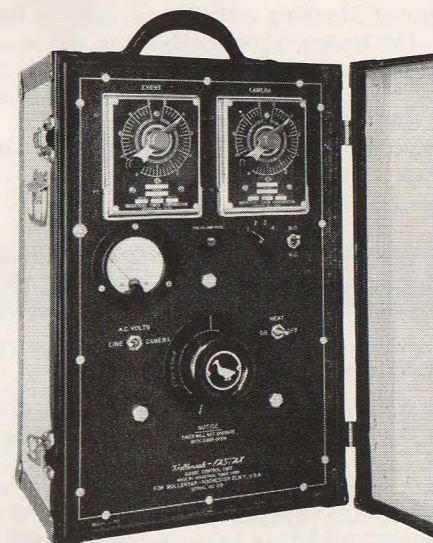
The Powerstat is a variable AC transformer with an output of up to 130 volts. It is used only when intermediate speeds are desired and controlled synchronization of the camera with the event is not required.

3. DC RECTIFIER

The Fastax Rectifier affords a DC power supply and is designed to operate the Fastax Cameras over their low-speed range. It is lightweight, portable, and delivers a continuous output, variable from 0 to 30 volts DC, controlled by a variable AC input.

WF301

Goose Control Unit, 115-volt AC 60-cycle, for Fastax Cameras



SPECIFICATIONS

Size—12" x 18" x 10". Voltage Control—0-280 volts output; 115 volts at 60-cycle input.

Weight—60 pounds. Dust-tight—Yes.

Power Line Required—30 amperes, with capacity to withstand 100-ampere momentary shock.

*Timers Supplied—Two plug-in 5-second timers supplied for camera and event. 15-second, 30-second, 60-second, and 5-minute timers also available and are usually used on the camera circuit.

Event—Internal contacts normally open or closed, selectable by panel switch. There is no potential on these contacts. The sequence-selector switch permits the event to be started before, simultaneously with, or after the camera has started. The event timer can be set at the desired time of operation.

Control—Push-button or remote.

Connectors—Standard AN specification connectors.

WF357

Goose Control Unit, 115-volt AC 50-cycle, for Fastax Cameras

SPECIFICATIONS

Size—12" x 18" x 10". Voltage Control—115 volts at 50-cycle input; 0-280 volts output.

Weight—60 pounds. Dust-tight—Yes.

Power Line Required—30 amperes, with capacity to withstand 100-ampere momentary shock.

*Timers Supplied—Two plug-in 6-second timers supplied for camera and event. 18-second, 36-second, 72-second, and 6-minute timers also available and are usually used on the camera circuit.

*When used with 400' and 500' cameras, specify timers required.

Event—Internal contacts normally open or closed, selectable by panel switch. There is no potential on these contacts. The sequence-selector switch permits the event to be started before, simultaneously with, or after the camera has started. The event timer can be set at the desired time of operation.

Control—Push-button or remote.

Connectors—Standard AN specification connectors.

WF358

Goose Control Unit, 115/230-volt AC 50-cycle, for Fastax Cameras

SPECIFICATIONS

Size—12" x 18" x 10".

Weight—60 pounds.

Dust-tight—Yes.

Voltage Control—Toggle switch control 115/230 volts at 50-cycle input; 0-280 volts output.

Power Line Required—30 amperes, with capacity to withstand 100-ampere momentary shock.

*Timers Supplied—Two plug-in 6-second timers supplied for camera and event. 18-second, 36-second, 72-second, and 6-minute timers also

*When used with 400' and 500' cameras, specify timers required.

available and are usually used on the camera circuit.

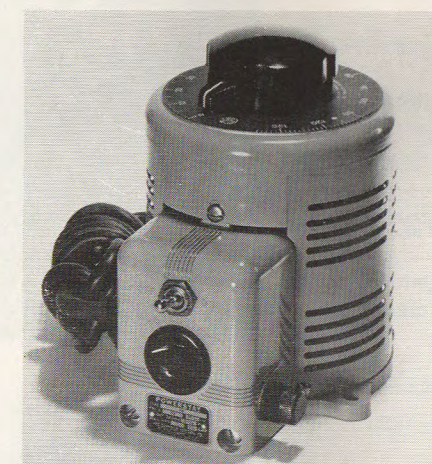
Event—Internal contacts normally open or closed, selectable by panel switch. There is no potential on these contacts. The sequence-selector switch permits the event to be started before, simultaneously with, or after the camera has started, or to stop the event after the camera has started. The event timer can be set at the desired time of operation.

Control—Push-button or remote.

Connectors—Standard AN specification connectors.

WF314

Powerstat AC Variable Transformer, Type 116



SPECIFICATIONS

Line Input—115 volts AC 50-60 cycle.

Variable Range—0 to 135 volts AC.

Current Rating:

Amperes Maximum —7.5 amperes.

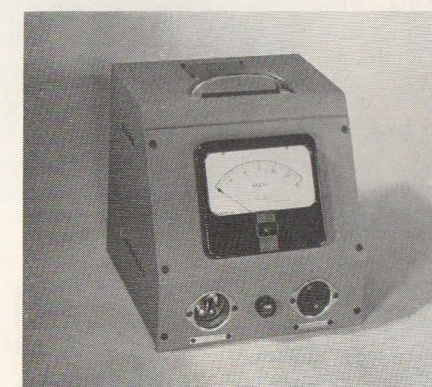
Output Power Rating—1.0 KVA maximum.

Size—6½" x 4⅝" x 6½".

Weight—10¼ lbs.

WF300

Fastax Rectifier for Fastax Cameras



SPECIFICATIONS

Input—115 volt AC.

Output—DC full-wave rectified, 0 to 30 volts.

Amperes—4 amperes DC maximum.

Meter—Panel-mounted DC output voltmeter.

Size—8" x 8" x 8⅞".

Weight—7¾ lbs.

Must be used with WF314 Powerstat.

Miscellaneous Accessories

for Fastax Cameras and Equipment

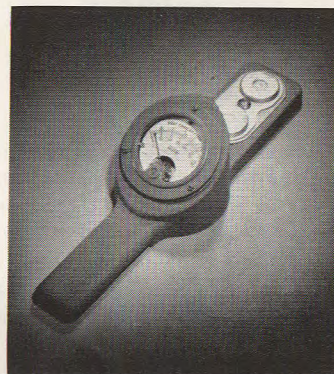
Fastax Exposure Meter

The Fastax Exposure Meter is manufactured for Wollensak by Weston Electric Instrument Corporation. Because of the extreme speed of the Fastax, a conventional exposure meter cannot be used, and the human eye is incapable of estimating the high light values employed. Improperly exposed film not only is film lost but may also mean hours of preparation time lost. This meter is made exclusively for use with the Fastax Camera and is made in accordance with Wollensak specifications.

The meter has ranges of 0-3000, 0-30,000, and 0-300,000 foot-candles. These ranges cover all light conditions from normal sunlight to extremely high artificial-light levels, such as that obtained with multiple banks of high-intensity spotlights.

WF327

Fastax Exposure Meter—An incident-type meter for measuring 0-3000, 0-30,000, and 0-300,000 foot-candles.



Tripods

WF326

Fastax Tripod—portable tripod with table allowing 180° vertical and 360° horizontal swing.



WF326A

Fastax Heavy-Duty Tripod—recommended for WF2, WF4, WF8, WF14, and WF15 Cameras.



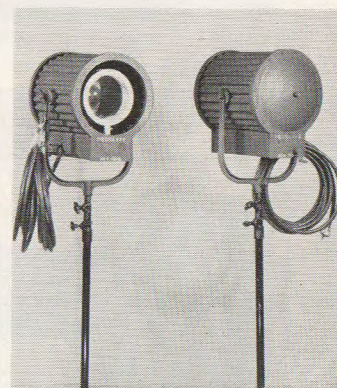
Lighting Equipment

Fastax lighting equipment has been specially designed to cope with the illumination problems of high-speed photography. Photography at high speeds requires the subject to be well lighted. For portable use the 750-R Lamp has been developed. This is a prefocused lamp designed to be most effective at distances of from 14" to 18" from the subject. These lamps are used with alligator clamps, made to clamp tightly on any surface. The High-Lo series-parallel switch should be used with these lamps to reduce the voltage in half while setting up and composing the picture.

Wollensak Fastlites are available when higher illumination is required. Fastlites are condensing projection-type lamps designed to cover a reasonable area with maximum illumination. In the Fastlite an image of the filament is projected through an aspheric condensing lens onto the subject. A spherical mirror is placed behind the lamp to reimage the filament for maximum light output. By moving the lamp back and forth the filament image can be focused on the subject. A water cell can be placed in front of the Fastlite to absorb the heat.

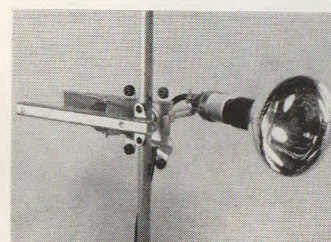
WF322

Fastlites (focusing), with water cells, on stand. Complete with lamps. (Sold in pairs.)



WF321

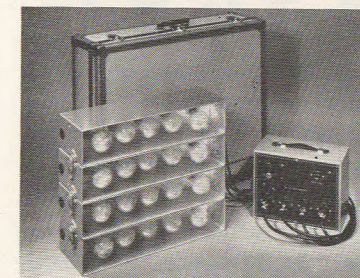
Clamp, Alligator, with porcelain socket and heavy-duty cord. Without lamps.



Fastflash Control Unit

WF328

Fastflash, complete with control unit and four reflectors.



SPECIFICATIONS

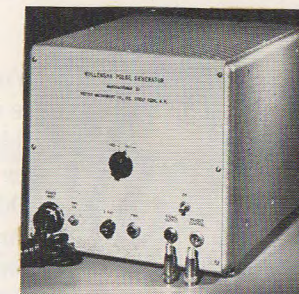
Fastflash Control Unit for firing in sequence twenty No. 31 photoflash lamps. Four reflectors, each holding five receptacles, are provided with plastic shield. Will operate off event circuit on WF301 Goose Control Unit. Carrying case furnished. (Lamps not furnished.)

Weight—75 lbs. Dimensions—28" x 24" x 9". Shipping Carton—29½" x 25½" x 10½".

Pulse Generator

WF311

Timing Light Pulse Generator.



SPECIFICATIONS

Power Input—115 volts AC. Frequency variable from 50 to 400 cycles.

Power Output—100 or 1000 cycles per second square top wave for operating timing light.

Stability—1 part/million, crystal controlled.

Pip Length—Approx. 40 microseconds.

Weight—Approximately 15 lbs.

Size—10" x 10" x 10" (approximate).

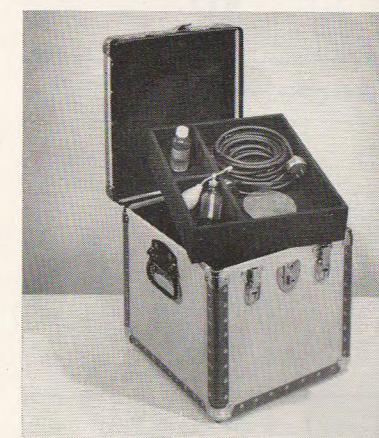
Timers for Goose Control Units

WF304 Timer, 5-Second; plug-in type.
WF305 Timer, 15-Second; plug-in type.
WF333 Timer, 30-Second; plug-in type.
WF306 Timer, 60-Second; plug-in type.
WF307 Timer, 5-Minute.

WF351 Timer, 6-Second; plug-in type, for 50-cycle operation.
WF352 Timer, 18-Second; plug-in type, for 50-cycle operation.
WF356 Timer, 36-Second; plug-in type, for 50-cycle operation.
WF353 Timer, 72-Second; plug-in type, for 50-cycle operation.
WF354 Timer, 6-Minute; plug-in type, for 50-cycle operation.

Miscellaneous Accessories

WF323 Lamp, 750-R.
WF324 Lamp, NE66 for Timing Light.
WF325 Lamp, 1000W for Fastlites.
WF315A High-Lo Switch, Heavy-Duty.
WF316 Carrying Case for Fastax Cameras, Models WF1, WF3, WF6.
WF330 Carrying Case for Fastax Cameras, Models WF2, WF4, WF14, WF15.
WF331 Carrying Case for Fastax Cameras, Models WF5, WF7, WF9.
WF332 Carrying Case for Fastax Camera, Model WF8.
WF317 Oil (2-ounce bottle).
WF318 Atomizer.
WF319 Lens Plate Dust Covers for all Fastax Cameras except WF8.



WF316—Carrying Case for Fastax Cameras.

WF315A—High-Lo Switch, Heavy-Duty.



Wollensak Fastax Film

NUMERICAL INDEX

Fastax Film is made exclusively for Wollensak by Du Pont and is made available to assure a source of supply of a film that is especially suitable for high-speed photography. Film pitch tolerances for Fastax Film are held to A. S. A. standards ± .0005.

Type 931 is a new high-speed panchromatic reversal film, designed to give a combination of highest picture speed and very rapid processing characteristics. Highly hardened emulsions characterize this film, making it very suitable for use at high temperatures and for ultrarapid processing without impairment of picture quality. A standard antihalation safety base contributes to the excellent definition of this film. Its emulsion and processing characteristics

prove ideal for original reversals for immediate use where only one positive is required.

This film has good inherent contrast and will produce good brilliant pictures either by reversal or negative processing. It is a fast film with good grain characteristics when developed in normal fast-acting developers. The film has a wide exposure latitude and reacts very favorably when developed in fine-grain developers.

Superior 4 has an ultra high-speed and fine-grain emulsion, making it ideal for high-speed photography when processing to a negative only is required.

Neither 931 nor Superior 4 suffers reciprocity law failure even at highest picture taking rates.

Type 931 Reversal

Reversal Processing					Negative Processing			
Daylight—ASA 125-160		Incandescent—ASA 100-125			Daylight—ASA 80		Incandescent—ASA 64	
Wollensak Catalog No.	Type	Emulsion	Film	Length in Feet	Perforation	Perforation Pitch	Pack	For Cameras
WF401	Rev.	931	8mm*	100	ASA	.1500	D.L.	WF1, WF2
WF402	Rev.	931	16mm	100	ASA	.3000	D.L.	WF3, WF6
WF404	Rev.	931	16mm	400	ASA	.3000	L.P.	WF4, WF14
WF405	Rev.	931	8mm*	400	ASA	.1500	L.P.	WF2, WF15
WF408	Rev.	931	35mm	100	Rect.	.1870	D.L.	WF5, WF7, WF9
WF406-1	Rev.	931	35mm	500	Rect.	.1870	L.P.	WF8
WF406	Rev.	931	35mm	1000	Rect.	.1870	L.P.	WF8

*16mm width perforated for 8mm D.L.—Daylight Loading L.P.—Laboratory packaging (for darkroom loading)

Superior 4 Negative

Daylight—ASA 400 Incandescent—ASA 320								
Wollensak Catalog No.	Type	Emulsion	Film	Length in Feet	Perforation	Perforation Pitch	Pack	For Cameras
WF411	Neg.	Sup. 4	8mm*	100	ASA	.1500	D.L.	WF1, WF2
WF412	Neg.	Sup. 4	16mm	100	ASA	.3000	D.L.	WF3, WF6
WF414	Neg.	Sup. 4	16mm	400	ASA	.3000	L.P.	WF4, WF14
WF415	Neg.	Sup. 4	8mm*	400	ASA	.1500	L.P.	WF2, WF15
WF418	Neg.	Sup. 4	35mm	100	Rect.	.1870	D.L.	WF5, WF7, WF9
WF416-1	Neg.	Sup. 4	35mm	500	Rect.	.1870	L.P.	WF8
WF416	Neg.	Sup. 4	35mm	1000	Rect.	.1870	L.P.	WF8

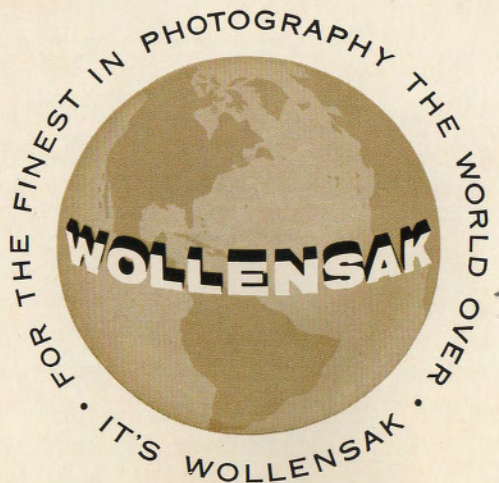
*16mm width perforated for 8mm D.L.—Daylight loading L.P.—Laboratory packaging (for darkroom loading)

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