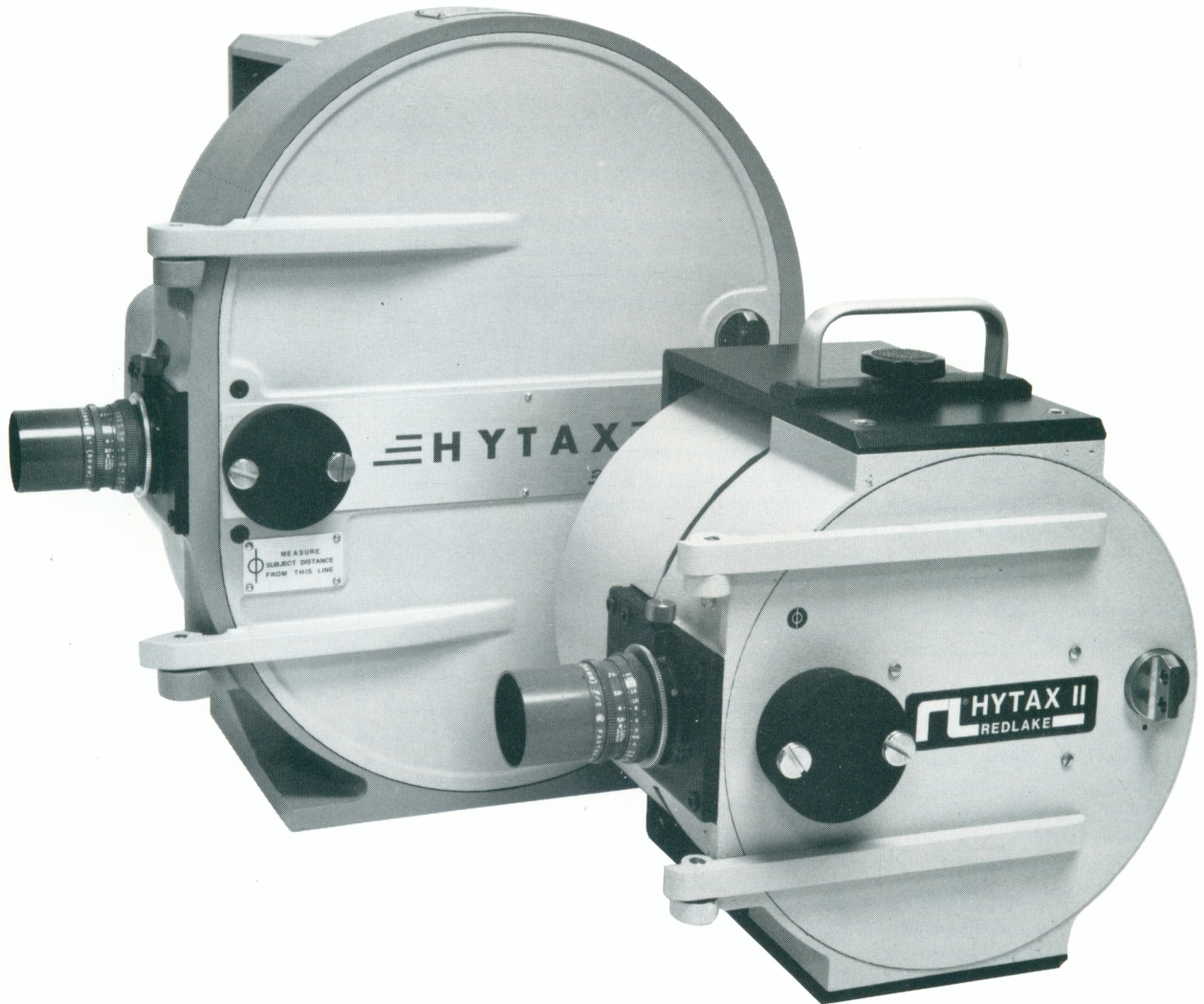


REDLAKE CORPORATION

PRECISION PHOTO-INSTRUMENTATION SYSTEMS

HYTAX[®] II

high speed 35mm streak/synchro-ballistic cameras



REDLAKE CORPORATION

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The Hytax II instrumentation

camera is an advanced, high speed, continuous recording camera designed for the photography of rapid transient phenomena using streak or synchro-ballistic techniques. The Hytax system has gained wide acceptance in defense and scientific facilities throughout the world. The new generation Hytax II incorporates many system improvements that further enhance effectiveness and user benefits.

A continuous film movement and a choice of six stationary narrow slit apertures are key features of the Hytax design. The split aperture extends across the film width, perpendicular to the direction of film travel. Slit width may be varied by means of interchangeable masks to provide a wide range of exposure control. The Hytax II design enables positioning of the slit close to the surface of the film. In this way the slit can function as a focal plane shutter. The result is a continuous film record covering the entire duration of the subject event with exposure time expressed in microseconds.

While framing type cameras may miss significant data during closed shutter periods, the Hytax II provides 100% time resolution. Hytax II cameras provide large image size and high resolution data, free from image-motion blur. They are entirely electronically self-contained, providing operational flexibility and easy set-up.

FEATURES

- Three models offer the user choice of film capacity and velocity.
- Camera speed is controlled by electronic servo over the entire dynamic range. Thumbwheel speed selection offers 1 ft/sec. increments to match film velocity to subject velocity or displacement.
- Bi-directional film movement simplifies set-up (model 61 series).
- Standard timing lights with optional built-in crystal-controlled timing generator print data on the film with no displacement from the recorded image. Amber and red LED's facilitate printing on color and black and white film.
- Fixed aperture slit masks are quickly interchangeable to accommodate variations in lighting level, film velocity and film sensitivity. Slit widths are 0.005"; 0.010"; 0.020"; 0.030"; 0.040"; and 0.050".



- Optional 10X boresight viewfinder scans full slit width; 61-1200 fiducial mask aids focusing and alignment.
- Compact, rugged, dust-sealed design accommodates field and range conditions.
- Pentax, Fastax and Nikon lens plates are available, allowing access to a wide range of lenses.
- A connector enables the camera to be started remotely by one of two methods through use of a remote RUN/STOP switch or by breaking a continuity circuit.
- Available for 115V or 230V 50/60 Hz operation.

THREE MODELS

Redlake offers three Hytax II camera models. Two model 61s are available. Each offers up to 500 foot film capacity but the cameras differ in film velocity—30-250 feet per second or 6-50 feet per second. The choice of camera is dictated by the expected subject velocity.

The Model 60 has a reduced film capacity (up to 150 feet of polyester film), but is smaller and lighter for applications where a 400 foot load is not required, or where space or weight is an important consideration.

APPLICATION

Streak Photography involves filming a subject that remains in the camera field of view and exhibits movement in only one plane. The camera is positioned so that subject motion is parallel to the slit aperture and perpendicular to film travel. The moving film provides one component of motion and the subject provides the second at 90°. The result is a continuous line image with time measured along the length of the film and spatial displacement across the film width.

The streak technique is often used when an oscillograph-type record with the rapid transient response time from a cathode ray oscilloscope is needed. Beam deflection in the direction of film travel is reduced to zero. The camera is set up to cover the full beam sweep across the tube face in the direction of the slit aperture. Extremely rapid transient phenomena may be recorded with the high writing speed offered by this technique.

Streak film techniques can also be used to study time/displacement of mechanical parts and other moving objects. The only limitation is that the movement must be in a linear motion at 90° to the direction of film travel.

Small targets attached to the subject can aid the display of motion. Jewelled reflectors, reflective tape or small point source lamps attached to the object can provide an excellent streak film record.

Synchro-Ballistic Photography

is concerned with the recording of objects that move across the camera field of view perpendicular to the slit aperture. Continuously moving film compensates for image motion and cancels the motion effect of the high velocity subject.

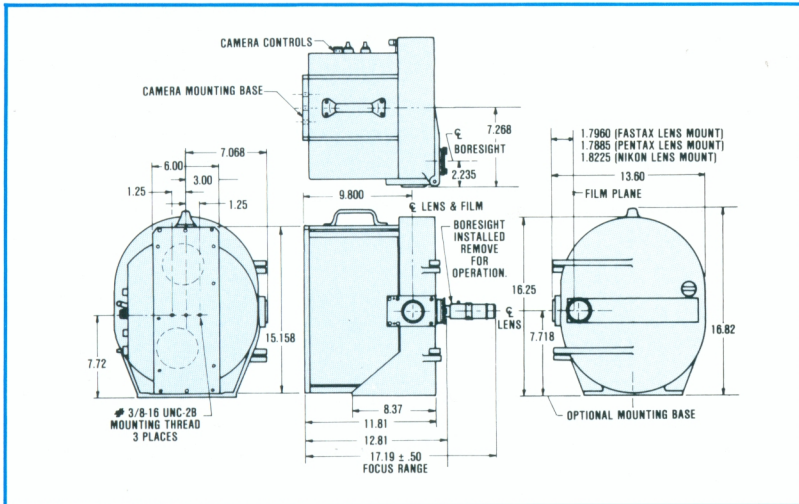
The camera is positioned so that the film is transported parallel to the motion of the subject but in the opposite direction. As the subject crosses the camera field of view, the subject's image moves in the opposite direction at a velocity proportional to the reduction in image size. When film velocity matches image velocity, the effects of linear motion are cancelled. The resulting pictures have the high resolution associated with recording still subjects.

Any fixed objects within the slit field are recorded as continuous straight streaks. If the moving subject has any degree of transverse motion or rotation, the image resolution will be slightly degraded. In most cases, the effect is minimal and the resulting record is still valuable for evaluation.

Although used primarily for recording projectile movement, the camera's capabilities are equally adaptable to high speed linear motion found in industrial applications. Examples include the study of chain drives, belt conveyers, extrusion operations, continuous coating processes, piston or plunger strokes, peripheral motion of wheels or rollers, and impact at a point of contact.

The Hytax II camera can provide performance data from high velocity objects with continuous recording and 100% time resolution. Full image compensation is available in one direction with image size limited only by film width or user requirements.

HYTAX® II 400 Specifications



OPTICAL SYSTEM: Streak type system, no internal optics, with interchangeable slits of 0.005, 0.010, 0.020, 0.030, 0.040 and 0.050 inch.

FILM TRANSPORT: 35mm continuous flow over drive sprocket. Two motor drive-bi-directional film movement on Model 61.

FILM TYPE: 35mm ASA standard, perforated two sides.

FILM CAPACITY: 35mm x 400' acetate base or 35mm x 500' polyester.

SPEED RANGE: Models 61-0001 and 61-0002, 15 to 250 feet per second.

SPEED SELECTOR: Thumbwheel speed selector switch self-locking at each position. Provides settability in 1 ft/sec. increments.

SPEED CONTROL: Electronic servo control provides regulation over entire speed range.

SPEED REGULATION: ±1% or 1 ft/sec., whichever is greater after reaching set speed.

ACCELERATION (typical): .85 sec to 125 ft/sec. Uses 70' of film to this speed (nominal).

EVENT SYNCHRONIZATION: Thumbwheel selector 4 to 396 feet in 4 foot increments. Provides switch closure or opening when selected film footage is reached. Accuracy is ±5% or better.

LENS PLATES: FASTAX, Pentax or Nikon mounts available. Specify when ordering.

ELECTRICAL CONNECTORS: Power- MS-3102A-14S-7PX-639 (Bendix MS type). Signal- PTOOE-10-6P (Bendix Bayonet type). Remote- PTOOA-10-6P (Bendix Bayonet type).

POWER REQUIREMENTS: 115 VAC ±10 volts. Camera has (2) 25 ampere circuits fused at 25 AMPS each.

WEIGHT: 61 pounds, less lens and film.

FINISH: Tough epoxy paint, light and medium tan. White finish is optional.

OPERATIONAL ENVIRONMENT: Acceleration/ Shock: 25g's both directions.

CONSTRUCTION: Cast aluminum with integral midrib and hinged door.

MOUNTING PROVISIONS: Top and side, 3/8"-16 mounting holes (4) with steel inserts.

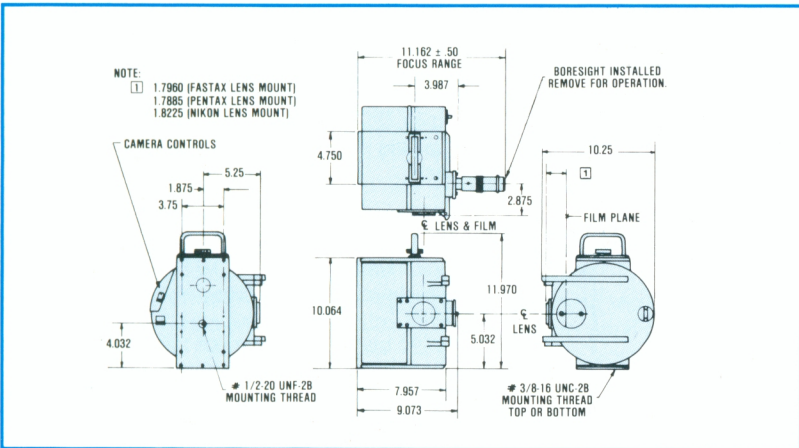
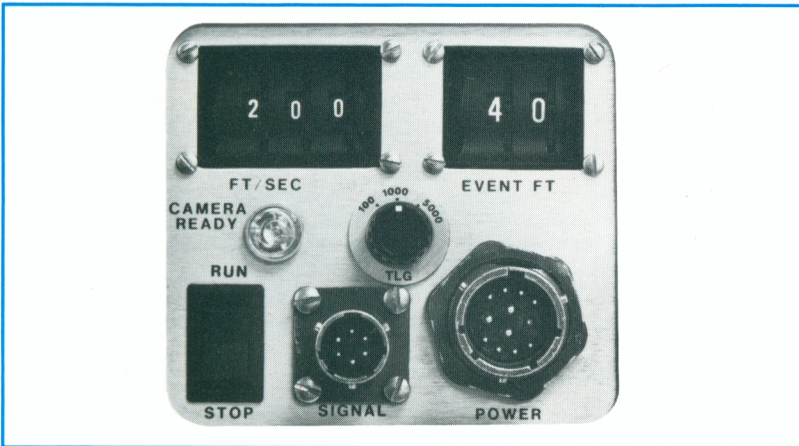
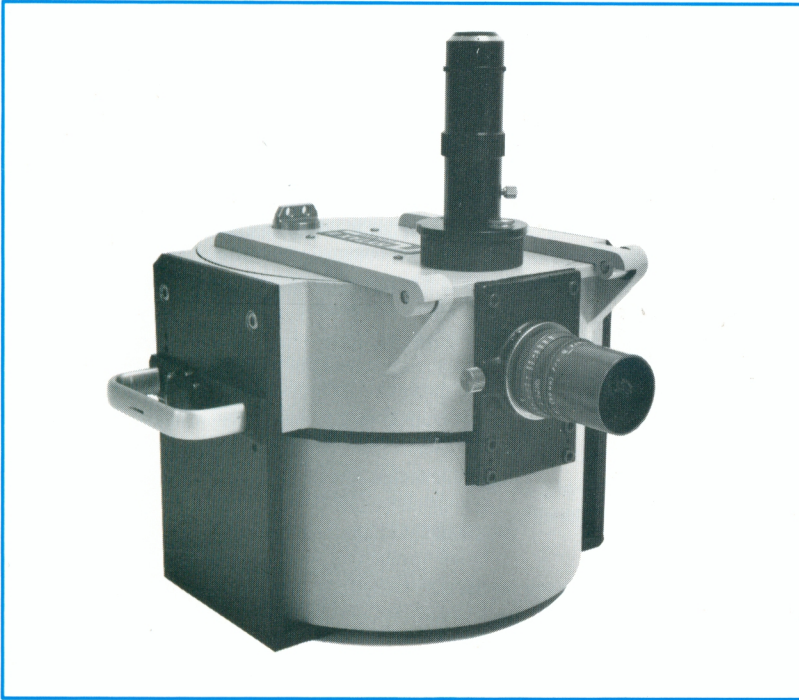
NOTE

The 400 foot series HYTAX II camera is available in three other configurations. These include 230 VAC, 115 VAC and 230 VAC slow speed (5 to 50 FT/SEC). Specifications and model designations are detailed in price schedule and instruction manual.

STANDARD ACCESSORIES

- Dual LED timing lights
- Built-in timing light generator; 100, 1000 and 5000 Hz.
- Bore sight tools: Straight at 90° to optical center line. Swivel rotates 360° in plane parallel to optical centerline.
- Heater: For all models to provide operation down to 0°F.
- Interchangeable aperture slit masks.
- Carrying case
- Lenses: Wide angle to telephoto in FASTAX, Nikon or Pentax mounts.

HYTAX® II 100 Specifications



OPTICAL SYSTEM: Streak type system, no internal optics, with interchangeable slits of 0.005, 0.010, 0.020, 0.030, 0.040 and 0.050 inch.

FILM TRANSPORT: 35mm continuous flow over drive sprocket.

FILM TYPE: 35mm ASA standard, perforated two sides.

FILM CAPACITY: 35mm x 100' acetate base or 35mm x 150' polyester.

SPEED RANGE: Models 60-0001 and 60-0002 and 60-0003 (5 to 175 feet per second).

SPEED SELECTOR: Thumbwheel speed selector switch self-locking at each position. Provides settability in 1 ft/sec. increments.

SPEED CONTROL: Electronic servo control provides regulation over entire speed range.

SPEED REGULATION: ±1% or 1 ft/sec., whichever is greater after reaching set speed.

ACCELERATION (typical): 0.6 sec to 100 ft/sec.

EVENT SYNCHRONIZATION: Thumbwheel selector 1 to 99 feet in 1 foot increments. Provides switch closure or opening when selected film footage is reached. Accuracy is ±5% or better.

LENS PLATES: FASTAX, Pentax or Nikon mounts available. Specify when ordering.

ELECTRICAL CONNECTORS: Power- MS-3102A-14S-7PX-639 (Bendix MS type). Signal- PTOOE-10-6P (Bendix Bayonet type).

POWER REQUIREMENTS: 115 VAC ±10 volts. 50/60 Hz 15 ampere circuit. Camera is fused at 15 amps.

WEIGHT: 24 pounds, less lens and film.

FINISH: Tough epoxy paint, light and medium tan. White finish is optional.

OPERATIONAL ENVIRONMENT: Acceleration/ Shock: 25g's both directions.

CONSTRUCTION: Cast aluminum with integral midrib and hinged door.

MOUNTING PROVISIONS: Top and side, 3/8"-16 mounting holes (4) with steel inserts.

NOTE

The 100 foot series HYTAX II camera is available in two other configurations: 230 VAC and 50/90 volts DC. Specification and model designations are detailed in price schedule and instruction manual.

STANDARD ACCESSORIES

- Dual LED timing lights
- Built-in timing light generator; 100, 1000 and 5000 Hz.
- Boresight tools: Straight at 90° to optical center line. Swivel rotates 360° in plane parallel to optical centerline.
- Heater: For all models to provide operation down to 0°F.
- Interchangeable aperture slit masks.
- Carrying case
- Lenses: Wide angle to telephoto in FASTAX, Nikon or Pentax mounts.