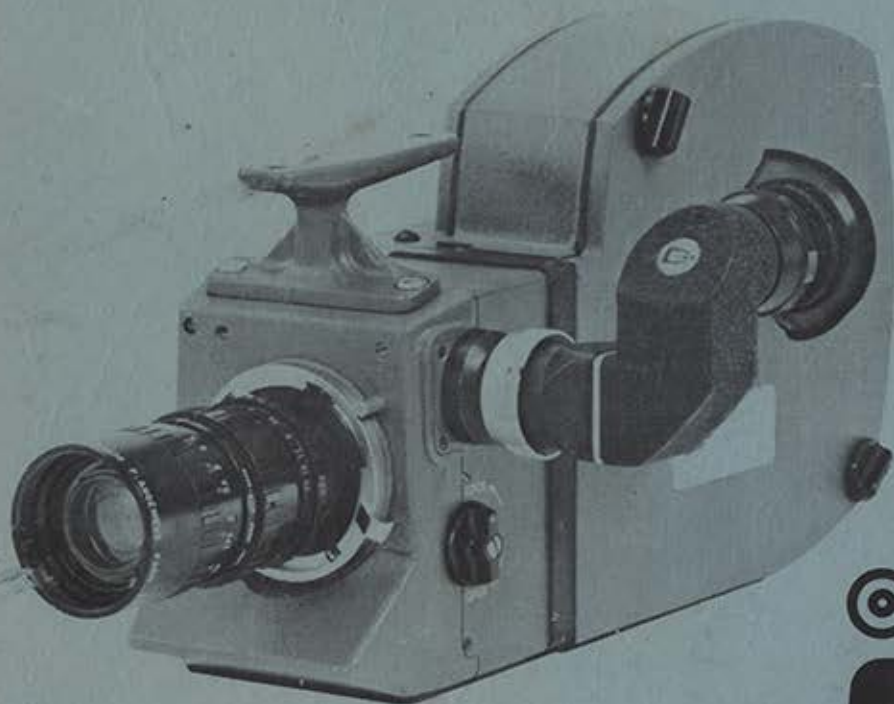


GSMO

16mm CAMERA SYSTEM

OPERATORS MANUAL



CINEMA



*Technology in The
Service Of Creativity*

products
CORPORATION

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NOVEMBER 1980

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GSMO
16mm Camera System
OPERATORS MANUAL

INTRODUCTION

The GSMO Operators Manual is intended to meet the needs of GSMO camera operators and assistants. Complete descriptions of all GSMO camera models and accessories are provided. An Operations and Maintenance Manual is available from your dealer or the factory which covers service and parts replacements which are beyond the scope of this manual.

Authorized Service Centers

Authorized GSMO service centers are located throughout the U.S.A. and abroad. These service centers are well stocked with critical replacement parts, and are staffed by factory-trained technicians fully qualified to service all GSMO camera models. Warranty-covered repairs should be made only through authorized GSMO service centers. Contact Cinema Products' Sales Department for an up-to-date listing of authorized service centers.

Maintenance Training Seminars

Cinema Products conducts periodic GSMO Maintenance Training Seminars which are usually held at the factory in Los Angeles. The seminar/workshops, conducted by Cinema Products factory personnel, provide in-depth information and demonstrations on the care and maintenance of GSMO camera systems, with emphasis on preventive care and effective troubleshooting in the field. We recommend that all GSMO camera operators (and maintenance technicians who service GSMO cameras) attend these seminar/workshops. Contact the GSMO Maintenance Training Seminar Coordinator for application forms and detailed information on the next scheduled seminar.

Something to remember!

If you have any further questions concerning the operation and maintenance of your GSMO camera, do not hesitate to call the factory Service Department directly. We'll do our best to help you.



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SECTION 1 – DESCRIPTION

GENERAL

Cinema Products' GSMO (figure 1-1) is an ultrasilent, ultralightweight and extremely compact professional 16mm reflex motion picture camera system.

The GSMO features a 180-degree shutter, quick-change cassette-type coaxial magazine, and a full range of options and accessories. Designed for ease of operation and simple maintenance, the rugged and dependable GSMO is an ideal double-system sound production camera for all phases of 16mm cinematography.



Figure 1-1. Typical GSMO Camera System

SPECIFICATIONS

Film Size:	16mm single or double perforated, B wind, core load or daylight load.
Film Capacity:	Quick-change, cassette-type coaxial magazines designed to accept: 30m (100') – daylight load 120m (400') – core load or daylight load
Rotating Mirror Shutter:	Single-blade, full-speed belt-driven mirror shutter set at 45-degree angle; stops automatically in viewing position.
Shutter Opening:	180 degrees
Shutter Speed:	1/48 second @ 24 fps (1/50 second @ 25 fps)
Aperture Opening:	7.46mm x 10.41mm (0.294" x 0.410")
Frame Line Accuracy:	±0.05 mm (0.002 in.)

Picture Steadiness:	±0.0127 mm (0.0005 in.)
Viewfinder (standard):	Positive lock, 12X magnification. Provides greater than full-field viewing through fiber optics viewing screen. (Orientable viewfinder system optional.)
Warning Indicators in Viewfinder:	When illuminated, "S" indicates camera speed is not at preselected speed, or "out of sync." "B" indicates low battery.
Lens Mount:	CP bayonet mount, with a positive-locking ring. Accepts any reflex-type lens that fits on any of the existing Arriflex and Eclair cameras (with proper CP mount adapter).
Dimensions:	GSMO camera with 30m (100') magazine: 12.9 cm wide x 11.8 cm high x 21.3 cm long (5.06" x 4.63" x 8.4") GSMO camera with 120m (400') magazine: 12.9 cm wide x 18.3 cm high x 30.8 cm long (5.06" x 7.18" x 12.12")
Weights:	GSMO camera head only, with CP standard 12X viewfinder and NC-4 battery pack, less lens: 2.5kg (5 lbs 7 oz) Magazine weights: 30m (100') magazine: 0.9kg (2 lbs) 120m (400') magazine: 2.3kg (5 lbs)
Power Supply:	The GSMO is powered by the standard CP NC-4 nicad plug-in battery pack, which can drive 500 meters (up to 1600') of film through the camera on one charge.
Tripod Sockets:	1/4"-20 and 3/8"-16 tripod mount sockets.
Digital Footage Counter:	Reads in feet (full feet and tenths of feet) or meters (full meters and tenths of meters) as desired.
Sync-Sound Speed:	Crystal-controlled 24 fps or 25 fps.
Camera Speed Range:	Crystal-controlled step-variable speeds of 12, 16, 24, 25, 32, 48, and 64 fps.
Speed Accuracy:	±30 ppm over a temperature range of -18° to 60°C (0 to 140°F) for all crystal-controlled step-variable speeds from 12 to 64 fps.
Sound Level:	30 dB maximum measured at 1m (3') from film plane on the weighted A scale.

CAMERA HEAD (Fig. 1-2)

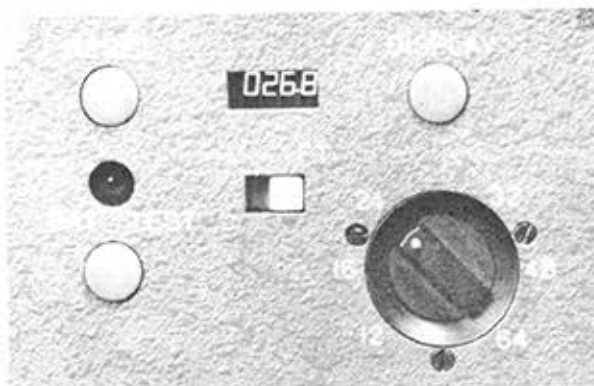
The GSMO camera head is an assembly consisting of the body (1), side cover (2) with battery mount (3), and control panel (8) film transport movement (10), reflex viewfinder (4), lens mount (5) and cavity cap (6), carrying handle (7), switch panel (9), tripod sockets (11), magazine lock (12), release latch (13), battery release (14), and fuse (15).

CONTROL PANEL (Fig. 1-3)

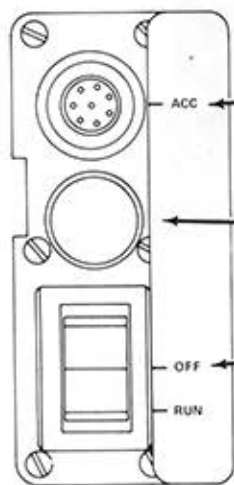
The control panel contains operating controls and indicators as follows:

- RESET switch** When pressed simultaneously with display switch, resets footage counter to zero. Footage readout must be visible.
- Digital footage counter** Displays film used since last reset in feet or meters, depending on position of M/FT switch.
- DISPLAY switch** When pressed, lights digital footage counter.
- BAT TEST switch and indicator** When pressed, lights indicator lamp if battery is still in usable condition.
- M/FT switch** Selects units for display on footage counter: whole feet or meters and tenths.
NOTE: Set to desired units, then press RESET switch. Counter will not convert from feet to meters, or vice versa.
- Speed selector switch** Selects camera speed in steps of 12, 16, 24, 25, 32, 48, or 64 frames per second.

Figure 1-3. Control Panel



SWITCH PANEL (Fig. 1-4)



The switch panel contains the following:

- ACCY (accessory) connector** Permits interconnection to remove camera start/stop, speed control, or recorder pilotone circuit.
- FILM SPEED selector** Used to set film speed ASA/DIN number into cameras with semi- or fully automatic exposure control (page 3-3).
- RUN switch** On cameras with exposure control, this is a three-position switch: AEC ON/OFF/RUN. In AEC ON or RUN position, t-stop correction is displayed on viewfinder.

Figure 1-4. Switch Panel

REFLEX VIEWFINDER (Fig. 1-5)

The standard reflex viewfinder includes an eyecup (1) which is located one inch back of the film plane. The eyecup is equipped with a backlight shutter (dowser) open/close ring control (2). The diopter adjustment (± 5 diopters) is accomplished by loosening the thumbscrew (3) and turning the adjustment barrel (4) until the frame lines on the fiber optics viewing screen (focusing plate) are sharp. Retighten the thumbscrew to prevent the setting from being changed. The viewfinder also incorporates a lockring (5) and pivot (6).

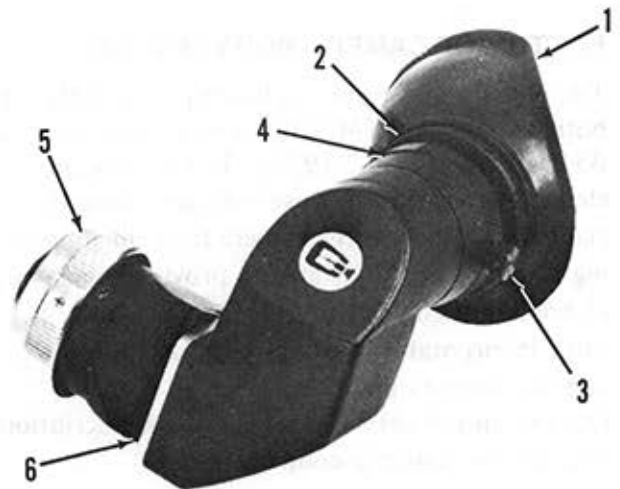


Figure 1-5. Reflex Viewfinder

VIEWING SCREEN (Fig. 1-6)

The image being viewed through the lens is observed on the viewing screen of the reflex viewfinder. Also visible in the reflex viewfinder are the frame markings plated onto the fiber optics viewing screen showing 16mm projector aperture (1) and TV safe-action area (2) plus markings for 35mm blowup (1.85:1) (1.66:1 optional) (3). The information display utilizing light-emitting diodes (LEDs) is also visible across the top of the viewing screen. Its elements are:

S = Out-of-sync warning which lights up when the camera is running "out of sync" (under or over speed)-that is, other than the frame rate selected on the control panel.

NOTE: When the camera is first started, the out-of-sync warning light goes on momentarily until the camera is up to speed. Similarly, when the camera is turned off, the out-of-sync warning light also goes on momentarily. When changing speeds, light will appear momentarily.

B = Low battery warning indicating enough battery charge remains to finish a short take, but the battery must be changed (or recharged) before a new long take is attempted.

-1 -1/2 0 +1/2 +1 + = Exposure indicators which function when the camera is equipped with either semiautomatic or fully automatic exposure control. The center display is a zero, which indicates correct exposure. To the right are +1/2, +1, and + and to the left are -1/2, -1, and -. These are half-stop increments, + and - being out-of-range indicators (i.e., + indicates 1 1/2 stops or more overexposed). Zero and a +1/2 or -1/2 on at the same time indicates 1/8 stop off of "null." See page 3-3 for more details.

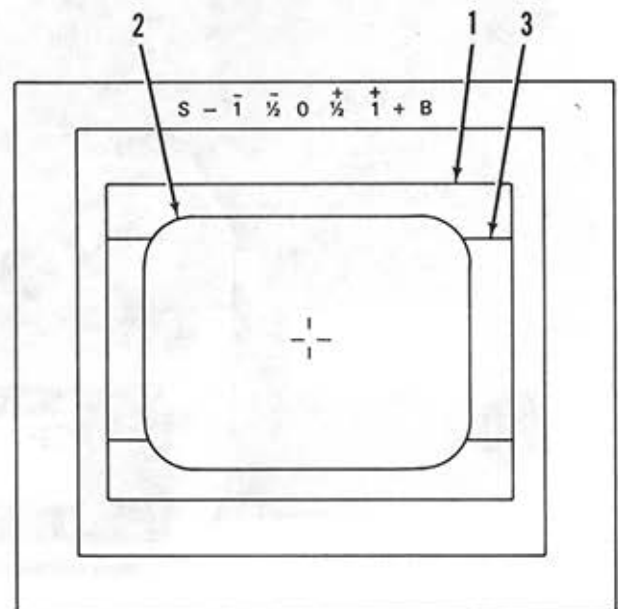


Figure 1-6. Viewing Screen

BOTTOM OF CAMERA BODY (Fig. 1-7)

The bottom of the camera has tripod sockets for both 3/8"-16 and 1/4"-20 screws (conforming to ASA standard PH3.7-1952). It also contains an electrical connector for use with any handgrip. Handgrips attach to the camera through a mounting plate and are adjustable to provide a wide range of holding angles to suit individual preferences. They incorporate a push on/push off switch to control camera operation. Refer to Camera Options and Accessories section for a description of available handgrip controls.

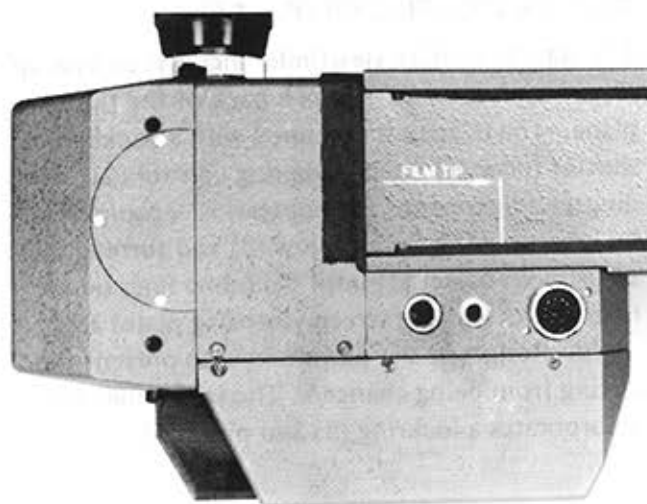


Figure 1-7. Bottom of Camera

SIDE COVER (Fig. 1-8)

The side cover permits access to the inside of the camera and includes a channel for insertion of the NC-4 battery pack. A release latch (1) at the right end of the channel must be depressed to insert or remove the battery pack. Upon insertion, the battery automatically makes electrical connection to the camera.

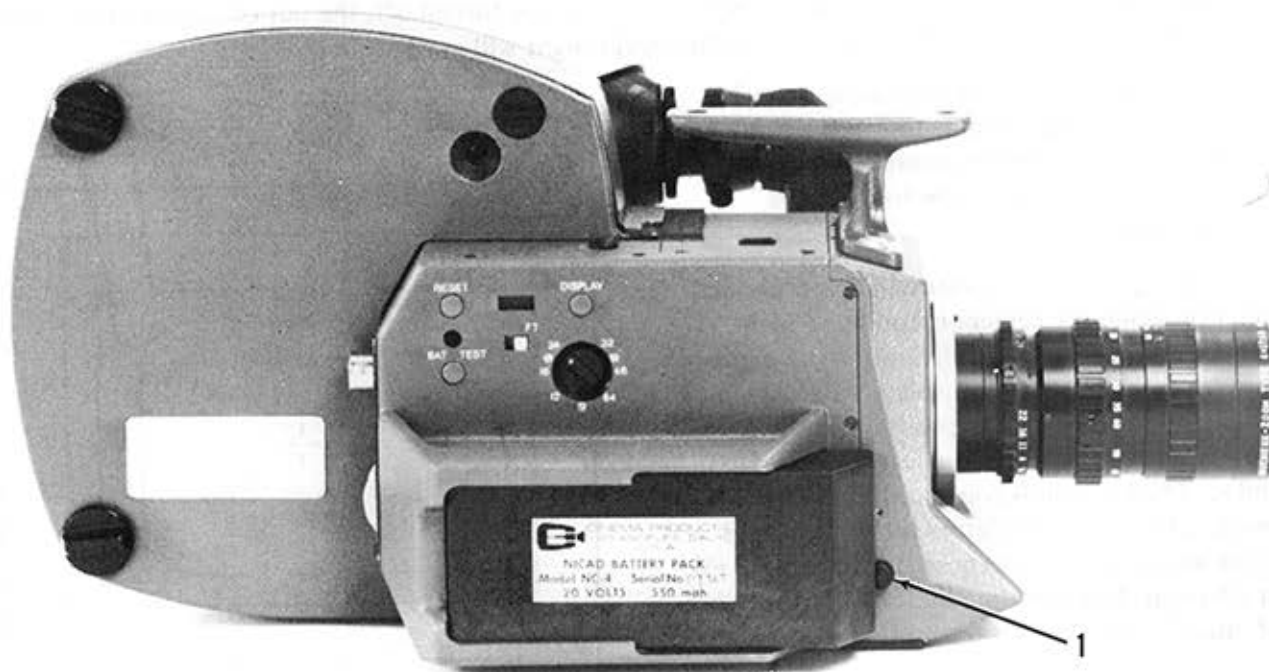
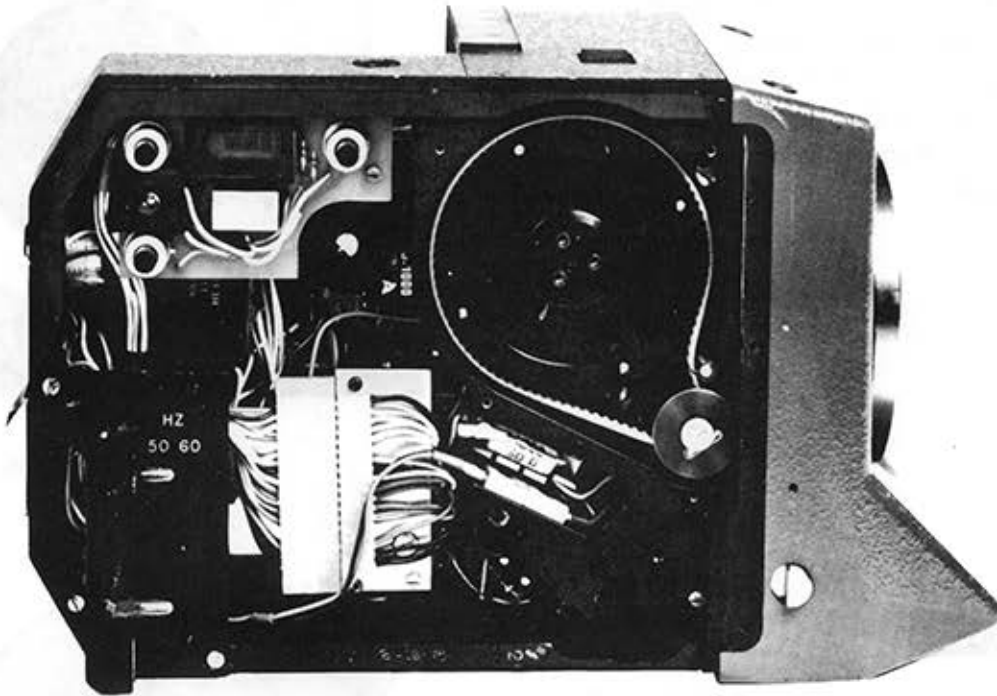


Figure 1-8. Side Cover

CAMERA DRIVE (Fig. 1-9)

The camera is driven by a crystal-controlled motor and geartrain. The motor is embedded in the solid aluminum camera frame for maximum noise attenuation. Drive system electronics are packaged on an extremely compact circuit board using CMOS logic and hybrid electronic circuits. In addition to crystal-controlled step-variable speeds of 12 to 64 fps, the circuit board also provides autoslating and pilotone outputs to an external sound recorder. The circuit board also contains the digital footage counter.



Note: 50/60-Hz selector switch which is normally concealed when battery is in place is visible from outside cover. Use 1/8-inch-blade screwdriver to adjust.

Figure 1-9. Camera Drive

APERTURE PLATE AND FILM TRANSPORT (Fig. 1-10)

The film transport movement consists of a high-precision, single-claw sinusoidal registration movement, with a curved film gate for minimum pull-down time. The interchangeable film gate assembly with its floating pressure plate and hard-chrome-edge film guides is located in the film magazine.

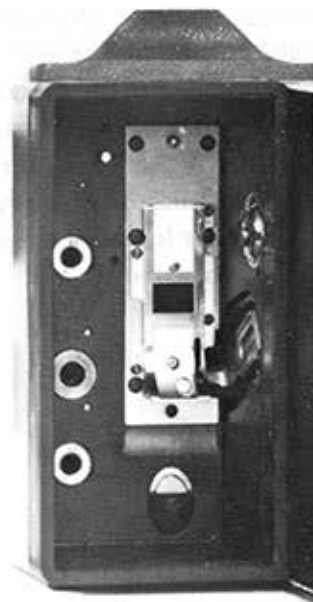


Figure 1-10. Film Transport

LENS MOUNT (Fig. 1-11)

The positive-locking CP lens mount assures perfect alignment with the film transport. The locking provides positive locking against the lens flange so that there is no possibility of lens movement and eliminates lens flange wear, since there is no twisting or torquing motion required. To prevent accidental rotation of the lens, there is a special locating pin (1) installed on the top of the lens mount. Many lenses may be either converted or adapted to fit the CP lens mount.

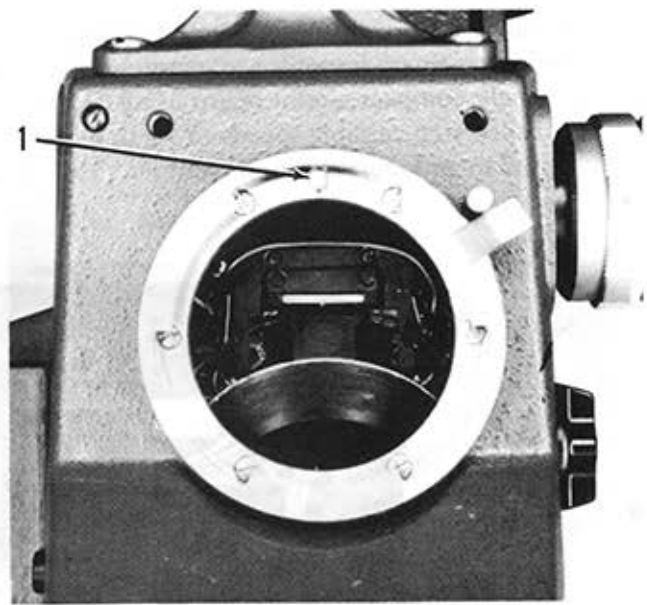


Figure 1-11. Lens Mount

MAGAZINES

Two sizes of magazines are available from Cinema Products for GSMO cameras: the 400 ft (120m) (figure 1-12) and 100 ft (30m). These quick-change, cassette-type coaxial magazines, intended for rugged use, incorporate loop-forming devices for quick and easy loading. Preloaded magazines can be changed instantly. The interchangeable film gate assembly, installed in the magazine, has a removable pressure plate for easy cleaning. The 120m (400 ft) magazine also features a film-remaining manual indicator which reads: "E- $\frac{1}{4}$ - $\frac{1}{2}$ - $\frac{3}{4}$ -F." Magazine door locks (1) are used when loading or unloading magazine.

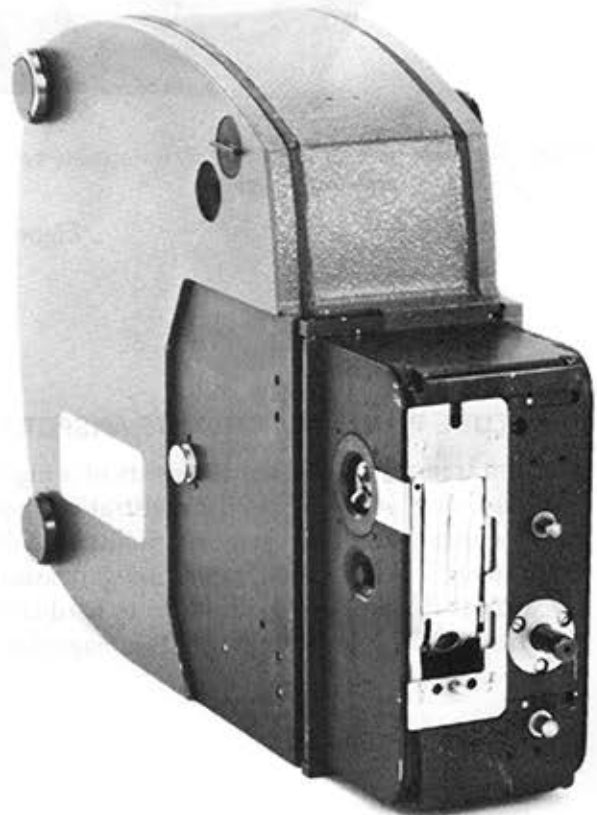


Figure 1-12. 400-Foot Magazine

POWER SUPPLIES

NC-4 BATTERY PACK (Fig. 1-13)

The ultracompact and lightweight NC-4 nicad battery weighs only 16 oz. (454 gr.) and measures 5" long x 1-1/4" high x 2-1/8" wide (12.7 cm x 3.2 cm x 5.5 cm). A fully charged spare NC-4 will easily fit into a shirt pocket. A single NC-4 battery pack supplies all the required power for camera operation.

The NC-4 battery pack automatically makes electrical connection to the camera upon insertion in the battery channel, located on the side of the camera. It is easily and almost instantly clicked into or out of its position in the camera battery channel. The NC-4 casing is made from rugged, high-impact glass-filled Lexan. The NC-4 battery contains a 30-amp fuse to prevent damage or injury in case of a short circuit.



Figure 1-13. Battery Pack

NCC-6 BATTERY CHARGER (Fig. 1-14)

The NCC-6 battery charger charges individual NC-4 battery packs. The NCC-6 features a charging status indicator light and current regulation. Input voltage switchable to 95-130 or 190-260 vac range (60 or 50 Hz, single-phase supply). The NCC-6 fully charges an NC-4 battery in approximately 14 hours.

Note

The NCC-6 charging status indicator light signals that the charger is connected to the battery and is operating correctly. It does not indicate the charge status in the NC-4 battery pack. A warm battery generally indicates a fully charged battery.

Battery rating: 20 volt, 550 mah.

Battery capacity: drives approximately 1600 ft. (500m approx.) 16mm film on a single full charge.

Note

Battery capacities vary depending on temperature extremes. Amount of film driven on a single full charge will also vary, depending on the number of different accessories being powered by the same battery.

Note

To prevent accidental battery power drain when not filming, battery may be inserted into battery channel in reverse position—with identification plate facing inward and contact points facing front of the camera. The battery will click into position as usual.



Figure 1-14. Battery Charger

MBC-6 MULTIPLE BATTERY CHARGER

Charges up to six NC-4 nicad battery packs simultaneously. The MBC-6 multiple battery charger operates, with switch selection, to 115 or 230 VAC, 60 or 50 Hz, single-phase supply.



Figure 1-15. Multiple Battery Charger

BATTERY CHARGER CABLE

For use with multiple battery charger (Model MBC-6) when charging NC-4 nicad batteries.



Figure 1-16. Battery Charger Cable

REMOTE-OPERATION BATTERY CABLE (Fig. 1-17)

Permits removal of the NC-4 nicad battery pack from cameras for placement in the cameraman's pocket (or some other protected area) when filming in extreme cold. A power adapter (dummy battery) is placed in the battery compartment of the camera; the cable connector is attached to the dummy battery.

Note

When filming in extreme cold while in an airplane, it is possible to connect the remote-operation battery cable (by changing the battery plug) to operate from the typical 24-VDC power sources available on aircraft (up to a maximum of 28 VDC) and to drive the camera from this auxiliary power source. (Other 24-VDC power sources such as dry cells, lantern batteries, etc., may also be used in a similar manner.)

Caution: When operating in this mode, it is extremely important to observe correct polarity.



Figure 1-17. Remote-Operation Battery Cable

USE OF ACCESSORY CONNECTOR

The accessory connector (ACCY) is located at the back of the camera above the RUN/STOP switch (figure 1-4). The mating connector is a T.M.W. R05PB8M(CP stock No. CON-033265). Pin functions and limits are:

Pin	Function	Limit
A	+10 volts	50 ma maximum draw (limited).
B	Switched B+	300 ma maximum draw (fused).
C	GROUND RETURN	500 ma maximum return (unprotected).
D	PILOTONE 50-60 Hz	The tape recorder's pilotone input must have a DC resistance between 1,000 and 27,000 ohms. (See figure 1-9 for location of switch.)
E	External speed	Refer to factory for information.
F	SLATE	Provides a 10V, 10-ma output simultaneously with film mark.
G	SPARE	
H	B+ (20 volts)	300 ma maximum draw (fused)

REMOTE RUN/STOP CONTROL

For remote control of camera RUN/STOP function, connect an external switch as shown in figure 1-18. The DC resistance of this circuit must be less than 2.0 ohms. A 5-foot cable is available from the factory.

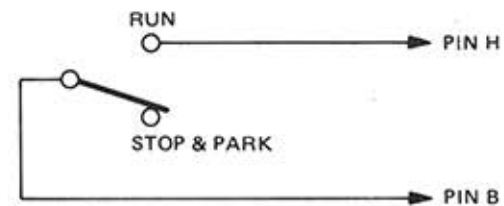


Figure 1-18. Remote RUN/STOP Switch

CONNECTING PILOTONE/AUTOSLATE TO RECORDER

To use the pilotone generated by the camera for control of an associated tape recorder, connect the pilotone signal to the recorder pilotone circuit as shown in figure 1-19. If the pilot input on the tape recorder shows an open with an ohmmeter, install a 10K resistor (R_L) in the connector as shown. Use shielded wire for long runs. Be sure to select 50 or 60 Hz (figure 1-9).

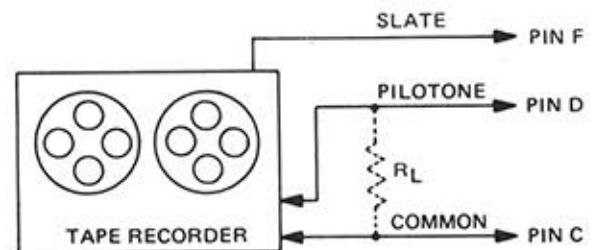


Figure 1-19. Control of Tape Recorder

PILOTONE/AUTOSLATE SEQUENCE (Fig. 1-20)

When the camera is turned on, a lamp inside the camera is lighted for 0.33 second to fog the film and produce a film start mark. Automatically, a "slate" pulse is generated on pin F of the accessory connector to synchronize a recorder so equipped. The pilotone signal appears on pin D (figure 1-20).

NOTE: GSMO will fog film and/or slate recorder only when a recorder or other load is connected to pilotone connection (pin D).

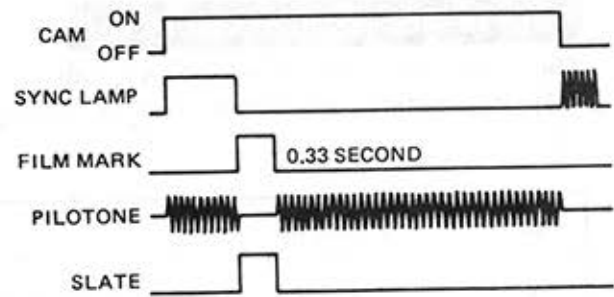


Figure 1-20. Pilotone/Autoslate Sequence

FUSES

A 5-amp fuse is located on the battery connector assembly, covered by the battery. To replace, remove battery and pull out fuse (Littlefuse P/N 276.005, CP stock No. FSE-125045).

A one-inch length of 30 AWG wire is mounted on the rear of the battery connector assembly. It will melt at about 20 amps. If this safety wire melts, look for major short in the motor drive circuit.

SECTION 2 – OPERATION

INTRODUCTION

This section is directed to the camera operator of GSMO cameras. If this section does not answer all questions regarding operation of the camera, please contact the dealer or factory for further information.

RECEIVING THE CAMERA

The factory has shipped the camera after thorough inspection and testing. A test film demonstrating camera movement steadiness and a full checkout report are provided with each camera. Packing is done with care and shipping effected according to customer's instructions. The camera should be carefully unpacked and thoroughly inspected as soon as it is received. (Be sure to remove any loose bits of packing materials that may cling to various parts of the camera.) If any damage is found, file a claim directly with the transportation company and notify your dealer or the factory.

CAMERA CHECKOUT

After inspection, insert a fully charged NC-4 battery pack into the battery channel, push the battery test button on the control panel, and check the battery test light and footage display. Rotate the magazine lock knob to the lock position, then operate the RUN/OFF switch on the switch panel or the trigger button switch on the handgrip. With camera running, inspect mechanism for claw action, mirror shutter and magazine drive for rotation. Note that the red out-of-sync warning "S" lights up briefly in the viewfinder each time the camera starts up from rest, and stops.

ON-OFF SWITCHES: The handgrip trigger on-off button and rear panel RUN/OFF switch are connected in parallel. Both switches must be in the off position in order to stop the camera. Also note that the switch in the on position will override the other switch in the off position. (Note: Camera will not run unless magazine lock knob is in the lock position.)

If any problems are experienced, reference should be made to your dealer or the factory.

LOADING MAGAZINES

Magazine supply side may be loaded in a dark room or in a changing bag.

1. Center Button: Daylight spools and core adapters lock into place by depressing the center button. Also use center button to release core adapter or daylight spool.
2. Remove door on supply side of magazine (in 400-ft magazines, door with film-remaining counter) by loosening two magazine door locks.
3. Place end of film in film cutter (on inside of door, figure 2-1) and clip.

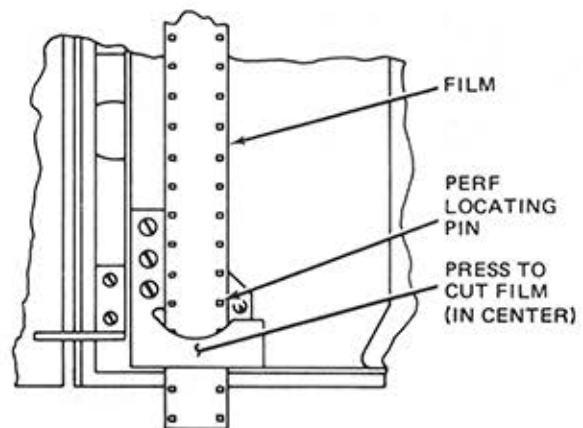


Figure 2-1. Film Cutter

LOADING MAGAZINES (contd.)

4. Insert film into slot above roller with emulsion up (figure 2-2).
 5. Push film through slot until you feel the perforations engaging the teeth on the feed sprocket (figure 2-2).
 6. Rotate feed sprocket counterclockwise and feed film into front compartment of magazine (figure 2-2).
 7. Place remaining roll of film onto magazine core adapter. Recheck center button for correct seating of core adapter or spool. Replace door and lock.
- Note: The remaining steps may be done in subdued light.
8. Remove door from takeup side of camera by loosening two door locks.

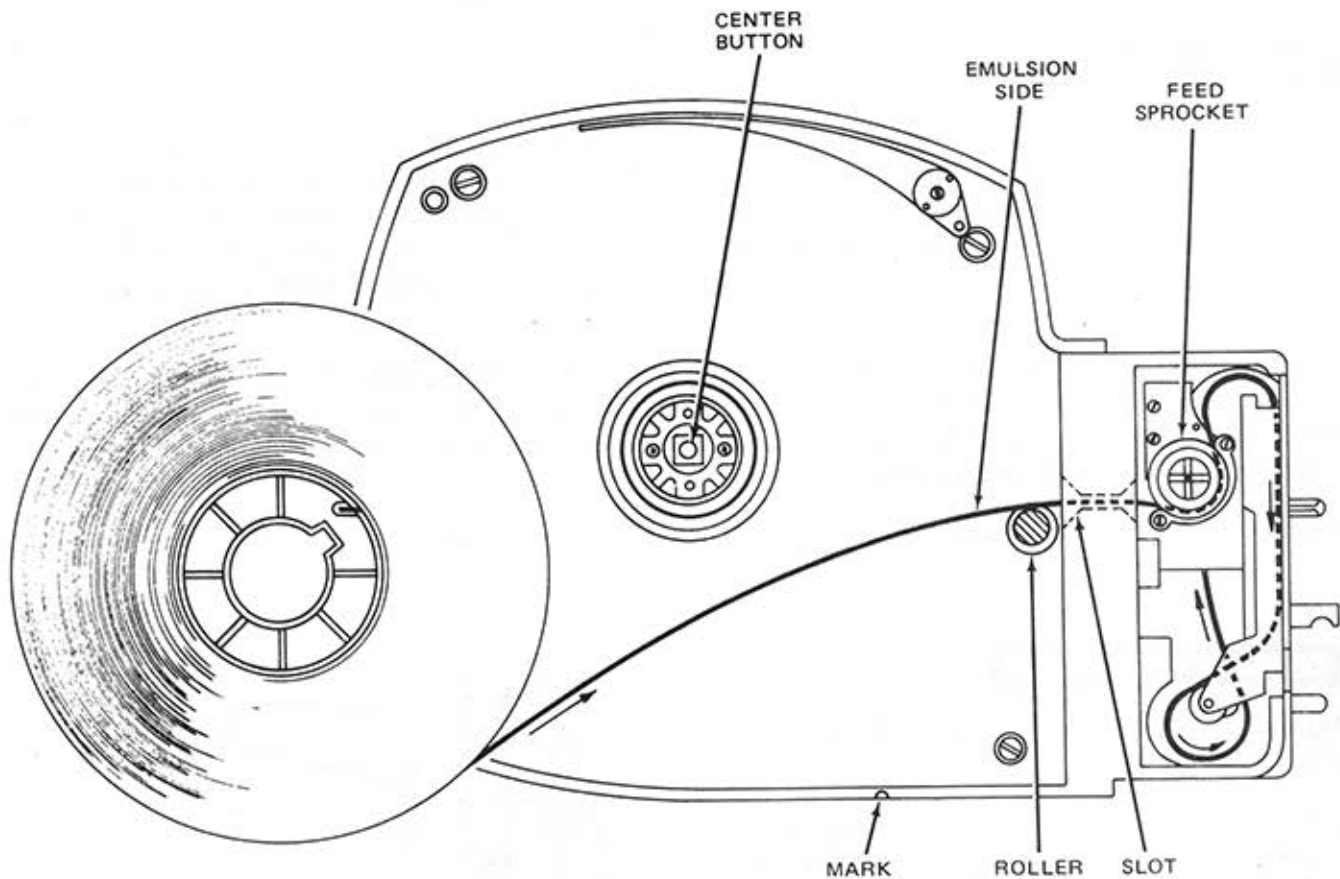


Figure 2-2. Threading Film on Supply Side of Magazine

LOADING MAGAZINES (contd.)

9. Turn takeup sprocket (figure 2-3) clockwise until film appears in gate (figure 2-4).
10. Continue to turn takeup sprocket clockwise to advance film through gate until the cut end reaches the mark on the bottom of the magazine (figure 2-2).
- Caution:** Do not pull the film.
11. Place supply side of magazine down and insert film into lower gate opening. Film will form a spiral loop as shown in figure 2-3.
12. Insert end of film into takeup sprocket (figure 2-3) and turn sprocket clockwise. Push film loop down over film end roller and under guide roller (figure 2-3).
13. Continue to turn takeup sprocket clockwise to advance end of film through light trap and under takeup roller (figure 2-3).
14. Wrap end of film around takeup core (figure 2-3). Check seating of core.
15. Replace door on takeup side of magazine and lock.

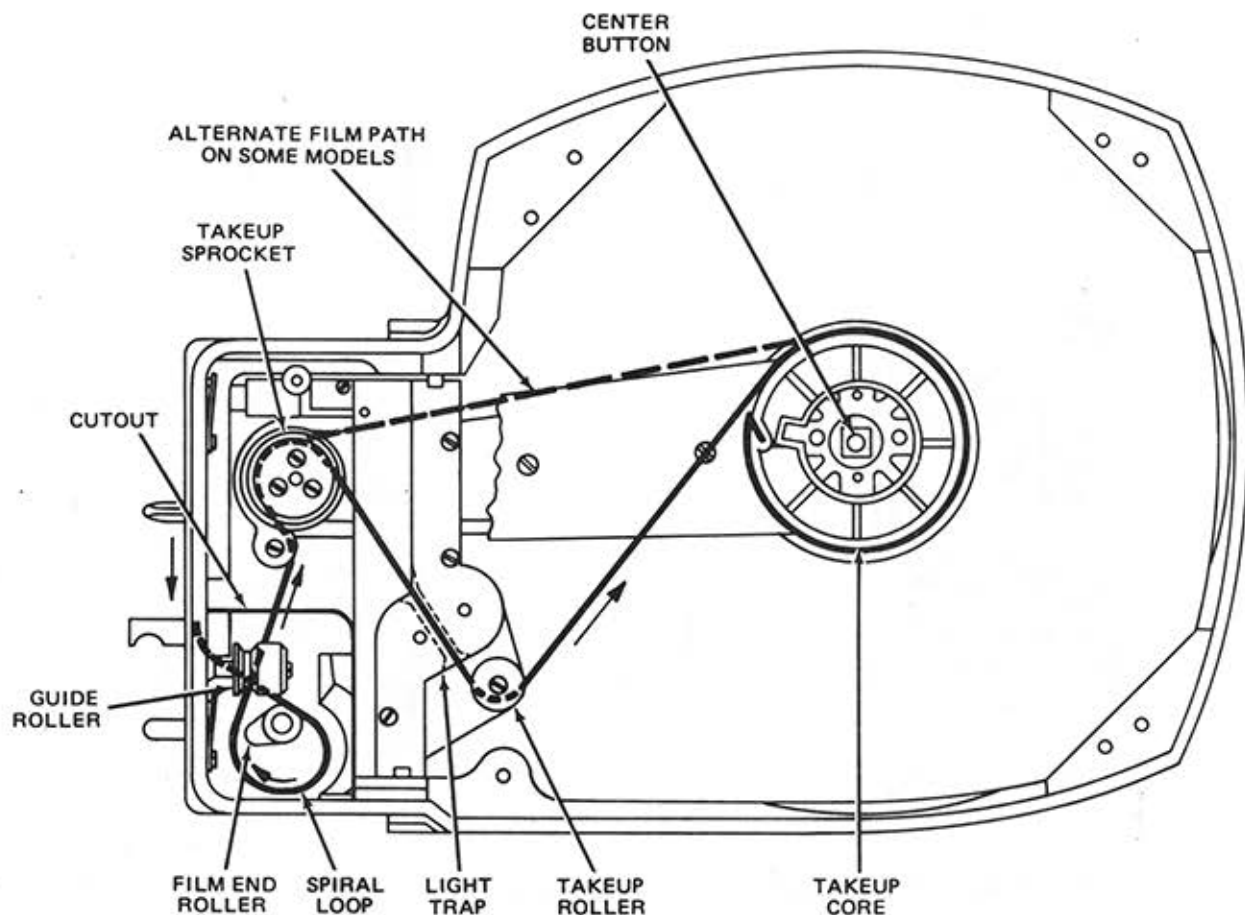


Figure 2-3. Threading Film on Takeup Side of Magazine

LOADING MAGAZINES (contd.)

16. Push the film all the way up in the gate (figure 2-5).
17. Insert magazine into camera and rotate magazine lock (12, figure 1-2) to LOCK position.

Note: When removing magazine from camera, rotate lock (12, figure 1-2) to OPEN and release latch (13, figure 1-2), if necessary.

18. Run one to two feet of film through camera, remove magazine and check exposed film for scratches. If scratches are found, check film gate for cleanliness or burrs.

Note: While filming, check cleanliness of film gate from time to time by:

- a. Removing lens.
 - b. Moving shutter aside by carefully rotating in counterclockwise direction with finger touching black portion only.
 - c. Checking gate through shutter aperture for lint, hair, film pieces, or any other contamination and cleaning as necessary.
19. Verify film is pushed up in gate (figure 2-5) each time magazine is inserted.

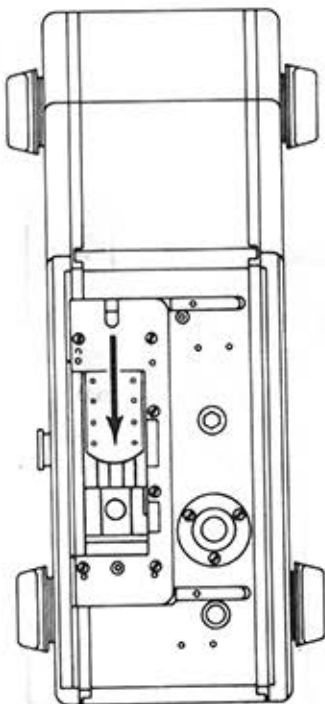


Figure 2-4. Film Projects Through Gate

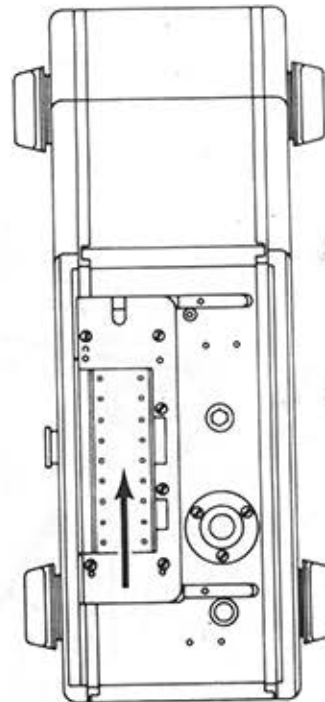


Figure 2-5. Film Pushed Up Properly in Gate

REMOVAL OF MAGAZINE

To remove magazine, rotate lock (12, figure 1-2) fully clockwise to OPEN and slide release latch toward battery (13, figure 1-2). Pull magazine away from camera body.

INSTALLATION OF LENSES

The GSMO has a positive-locking CP lens mount which can accept a wide range of CP-mounted lenses.

To prevent accidental rotation of the lens, there is a special locating pin (1, figure 1-11) installed on the top of the lens mount. Position the lens in the mount, locating the pin key to the top, and tighten the lens lock ring in a clockwise direction until firmly engaged. DO NOT OVERTIGHTEN.

Note: The lens cavity cap should always be in position in the CP lens mount (when not using a lens) to protect camera from dust, etc.

IMPORTANT FEATURES TO CHECK BEFORE FILMING

1. Check battery pack by pressing BAT TEST switch and observe that battery indicator comes on. A fully charged NC-4 battery pack can drive approximately 1,600 feet of film. Accessories and/or extreme cold will reduce this footage. (Note: It is a good practice to put the used battery pack on charge as soon as possible after filming.)
2. Check switches. Operate the camera using both the rear RUN/STOP switch and the switch on any handgrip or remote control device in use.
3. Check magazine seating. Magazine lock must be fully counterclockwise to close camera run interlock switch.
4. Check lens installation. Lens must be seated snugly.
5. On cameras with semiautomatic or fully automatic exposure control, set FILM SPEED control to ASA/DIN rating of film.
6. Set frame rate selector to desired frame rate.
7. Set M/FT to M (meters) or F (feet) as desired. Reset counter if desired (page 1-4).
8. Check auxiliary systems carefully.
9. Check film flow with a short burst of a few feet of film.
10. Check exposure indicators in viewfinder. To correct over- or underexposure, rotate lens iris control ring until exposure control information display indicates "0."

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1956

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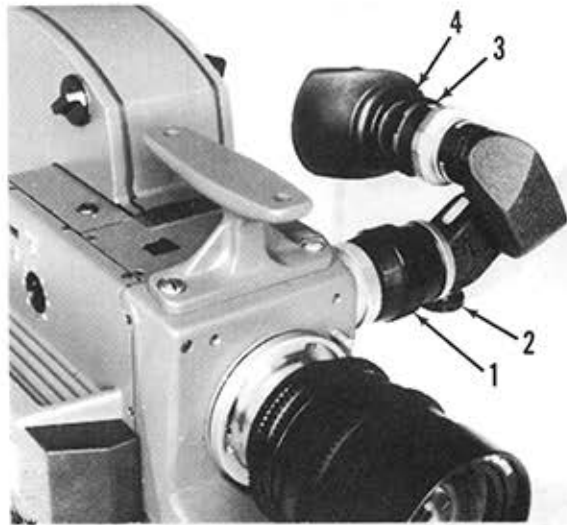
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SECTION 3 – CAMERA ACCESSORIES AND OPTIONS

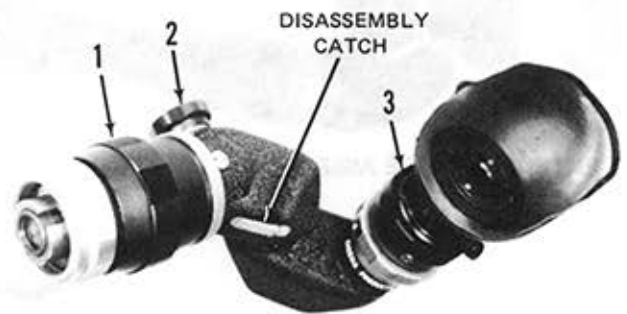
ORIENTABLE VIEWFINDER

The Cinema Products orientable viewfinder (figure 3-1) was designed with a unique optical path in which the optics fold forward so that the eyepiece is approximately 1 inch (25mm) behind the film plane as it is in the standard viewfinder. The CP erect image orientable viewfinder permits left-eye viewing without requiring any additional accessory.



VIEWFINDER IN NORMAL POSITION

- (A) NORMAL POSITION
- (B) EXTENDED POSITION
- (C) TOP VIEWING POSITION



ORIENTABLE VIEWFINDER

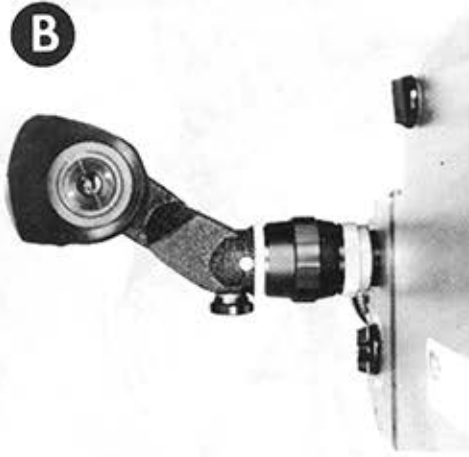
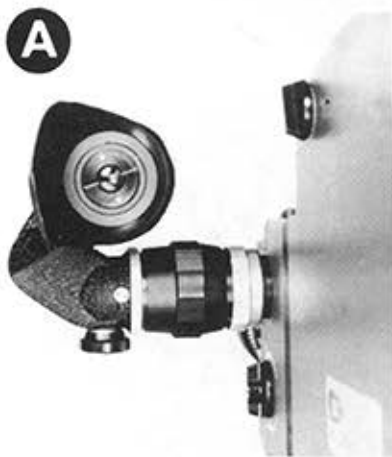


Figure 3-1. Orientable Viewfinder

There are four controls on the orientable viewfinder: the viewing position lock (1, figure 3-1) and the image orientation lock (2), in addition to the eyepiece diopter adjustment ring (3) and eyepiece "dowser" open/close control ring (4). The eyepiece diopter adjustment ring provides ± 5 diopters of adjustment.

Releasing the viewing position lock allows rotation of the viewfinder through a full 360 degrees while the orientation of the image in the eyepiece remains constant. Turn cw to lock, ccw to release.

Releasing the image orientation lock allows the image to tumble as the viewfinder is rotated. This permits the image to be oriented to the operator's viewing position. (The operator may view from any position and still see the image in the correct viewing orientation.)

EXTENSION TUBE ASSEMBLY

The eyepiece of the orientable viewfinder may be removed and an extension tube assembly (figure 3-2) inserted between the viewfinder body and eyepiece.* The extension tube assembly moves the eyepiece approximately 7" (178mm) behind the film plane for more convenient viewing when the camera is mounted on a tripod or dolly.



EXTENSION TUBE ASSEMBLY

*Note: The eyepiece simply unscrews from the body of the orientable viewfinder and screws onto the extension tube assembly. When the extension tube assembly is placed on the orientable viewfinder, the image is automatically rotated 180 degrees. To reverse this image orientation, loosen the image orientation lock and rotate the finder 180 degrees. Tighten the lock and rotate to viewing position.

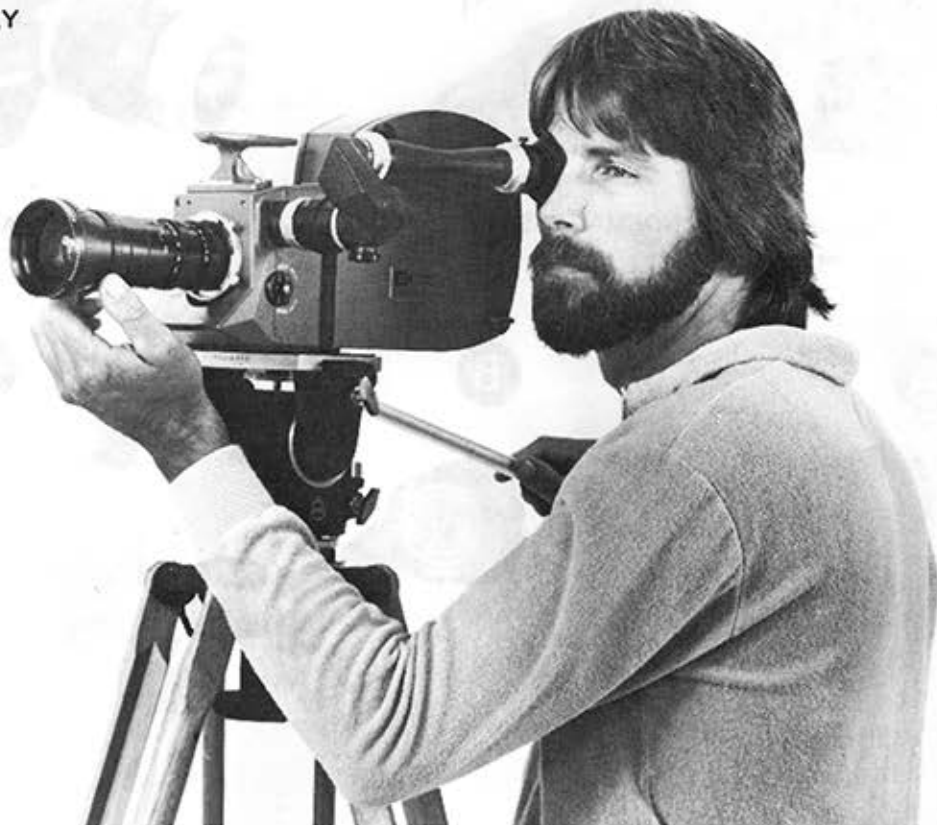


Figure 3-2. Extension Tube in Use on Tripod-Mounted Camera

SEMI-AUTOMATIC EXPOSURE CONTROL

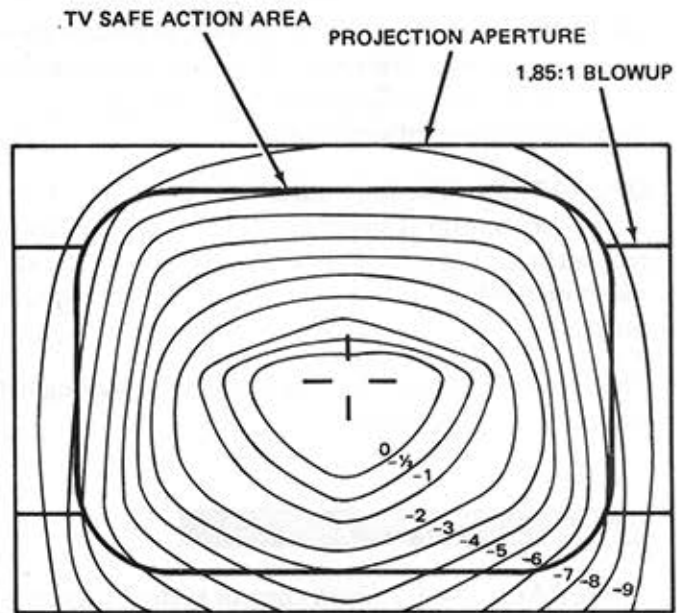
DESCRIPTION. The semiautomatic exposure control is a through-the-lens (TTL) system utilizing a silicon light sensor for fast response at low light levels. The sensor is less responsive to sun, bright skies, and overhead lighting across the upper portion of the film frame, thus emphasizing correct exposure of the subject. Figure 3-3 shows the weighting diagram and explanation. Light is measured in the viewing system, so no light is ever diverted from the film.

OPERATION. Power for both semiautomatic and fully automatic exposure control systems is controlled by the RUN switch on the switch panel at the rear of the camera as described in figure 1-4.

ASA or DIN film speed is set using the film speed knob on the switch panel at the rear of the camera. Since the sensor measures light through the lens, filter factor exposure compensation is automatic. *Do not* compensate the ASA or DIN setting for the filter being used.

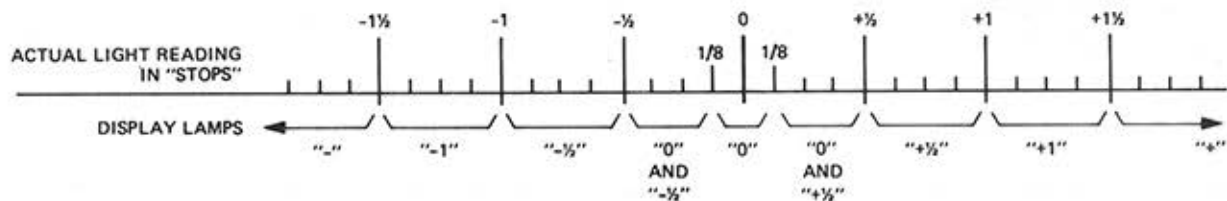
Exposure compensation for camera frame rate is internal and completely automatic for any frame rate even when remote speed control option is used.

Figure 3-3 represents the weighted response of the GSMO exposure control system to images in the camera's picture area as seen on the fiber optic viewing screen. The areas bounded by continuous lines represent values of uniform exposure control system weighting relative to the most sensitive region located at the center of the picture area. The numbers identifying these areas indicate the number of stops (t/ or f/) that a particular area is deweighted.



Note: Figures represent stops relative to central area sensitivity.

Figure 3-3. Exposure System Weighting Diagram



Interpretation of Lights

FULLY AUTOMATIC EXPOSURE CONTROL

DESCRIPTION. The fully automatic exposure control is an option for the semiautomatic exposure control system previously described. A lens-mounted servomotor is connected to the camera via short cable. The motor operates the iris control ring (using gears) until proper exposure is obtained. The viewfinder will display exposure information.

OPERATION. The fully automatic exposure control system is activated when the power switch on the end of the servomotor is switched on. The servomotor will then position the iris control of the lens to the correct setting. The servomotor will "slip clutch" at the extremes of iris control rotation if the light is too much or too little for proper exposure. When this happens, switch off the servomotor to conserve battery power.

The lens may be operated manually by switching off the servomotor. The viewfinder display will continue to show exposure information.

J-5 ZOOM CONTROL SYSTEM

GENERAL. The J-5 zoom control system (figure 3-4) is designed for use with all GSMO camera models. The J-5 zoom control system consists of a silent servo zoom motor and a specially designed J-5 camera handgrip control*, plus appropriate zoom lens gear and motor support bracketry. Special gear and bracketry seats are required when using the J-5 zoom control in conjunction with a camera equipped with fully automatic exposure control.

The J-5 servo feedback system circuitry and thumb-activated direction/proportional speed control are all compactly packaged inside the J-5 camera handgrip. The J-5 handgrip also contains the camera on/off switch.

The silent servo zoom motor delivers full maximum torque at all speeds. The J-5 zoom motor permits a full zoom at maximum speed in 2½ seconds—while providing continuously variable speeds up to maximum speed rating.

OPERATION. Plug one end of the J-5 motor cable into the J-5 zoom motor and plug the other end into the J-5 handgrip control. The coil cable from the camera baseplate plugs into the J-5 handgrip control. The zoom motor attaches to the motor support bracket through an eccentric which allows for adjusting the lens gear mesh for optimum operation.

J-5 lens gear and zoom motor support bracketry sets are available (as specified) for the wide range of zoom lenses which can be used with the GSMO camera system. (Detailed mounting instructions are supplied with each J-5 gear and bracketry set.)

*Note: The J-5 zoom control system utilizes the universal mounting plate. Refer to the shoulder pod/handgrip section on page 3-7 for installation instructions.

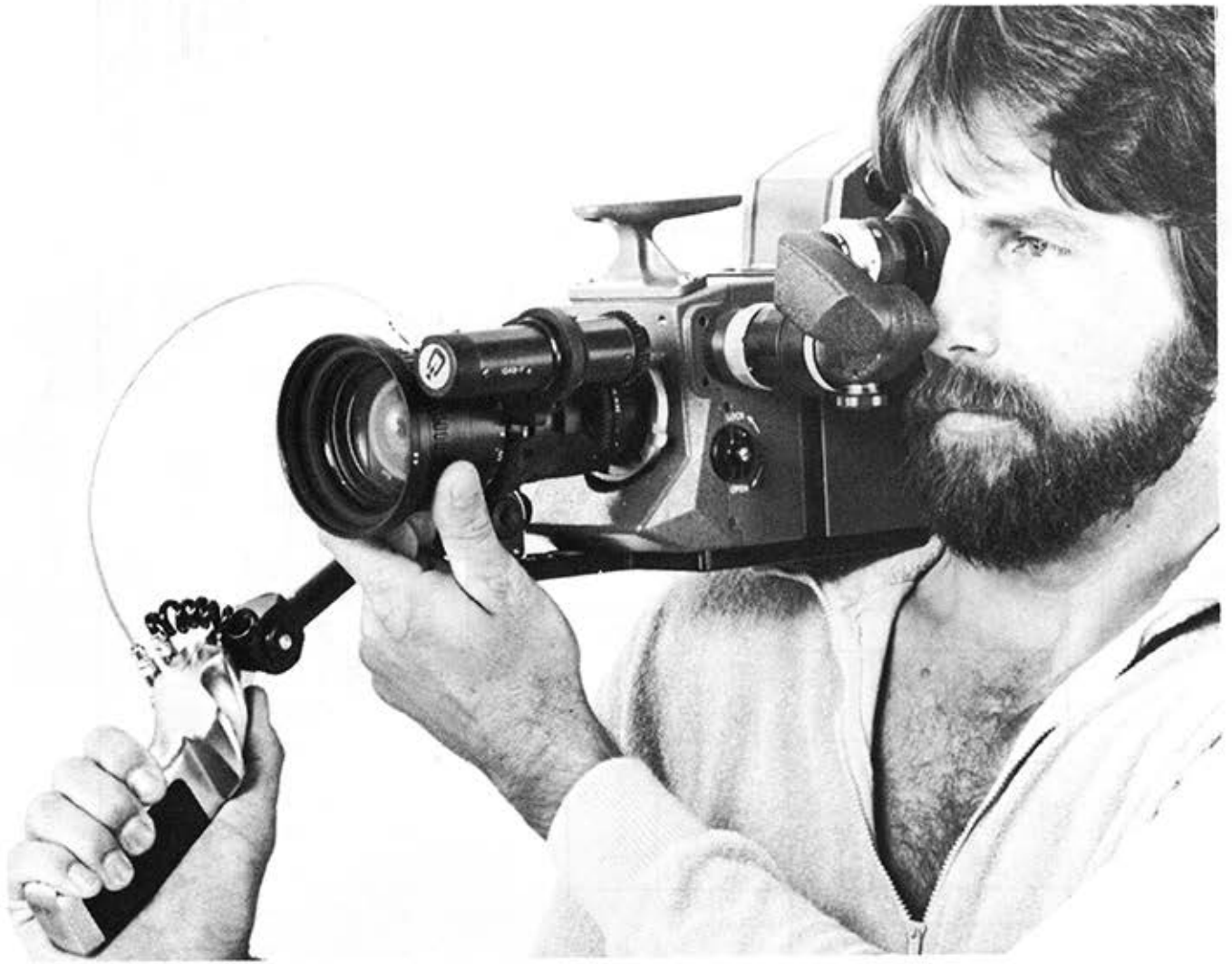
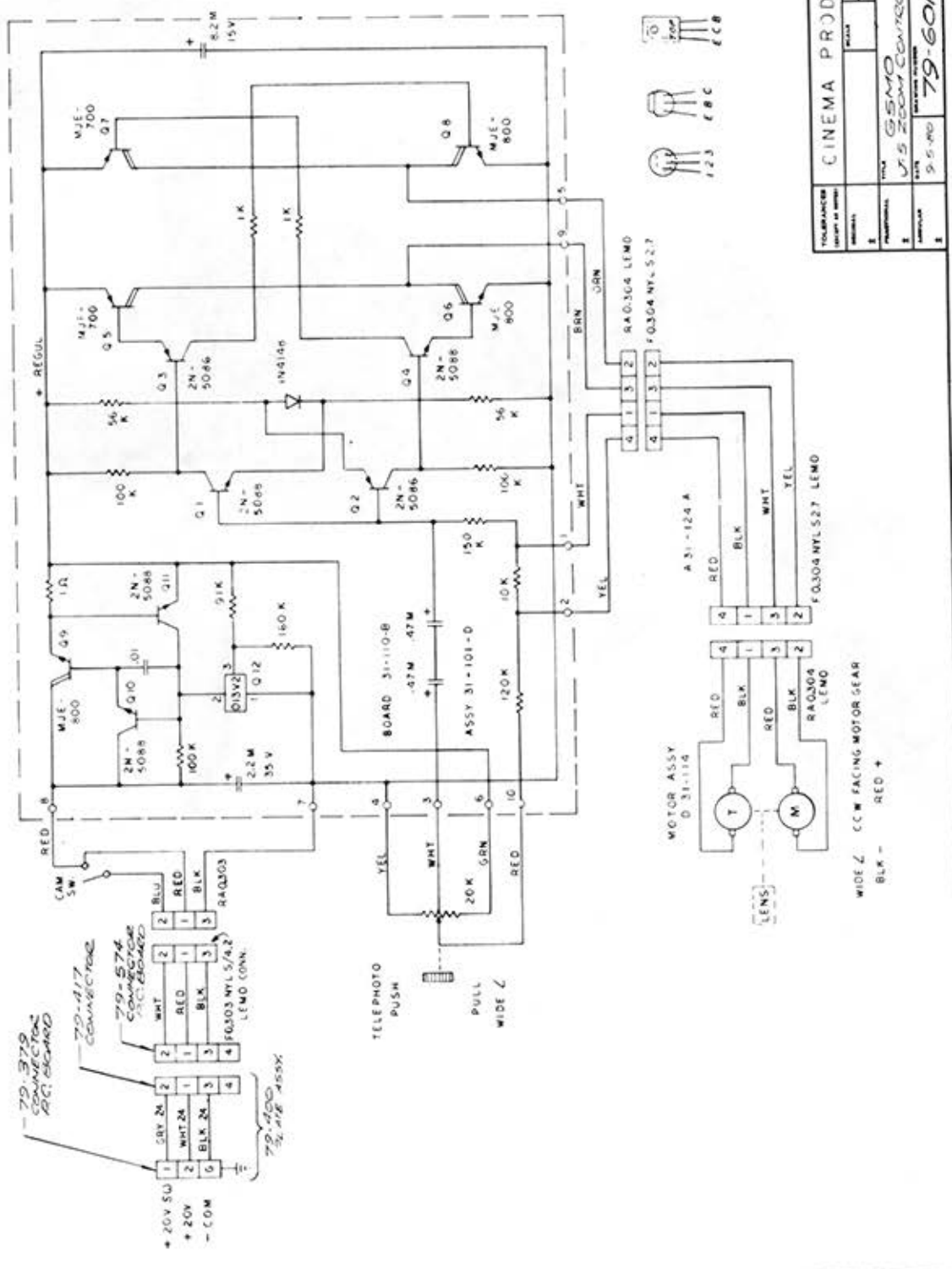


Figure 3-4. J-5 Zoom Control



TOLERANCES UNLESS OTHERWISE SPECIFIED	
RESISTORS	± 5%
CAPACITORS	± 10%
DIMENSIONS UNLESS OTHERWISE SPECIFIED	
FINISHES	AS SHOWN
DESIGNED BY	J. HILL
ENGINEERED BY	
TESTED BY	
DATE	9-5-60
REV	79-601 B

Figure 3-5. J-5 Zoom Control, Electrical Schematic Diagram

HANDGRIPS AND SHOULDER POD/HANDGRIP

GENERAL. Three handgrips and one shoulder pod/handgrip are available for the GSMO. The three handgrips all use the same universal mounting plate and are attached to the camera similarly. The shoulder pod is part of a quick-release system.

DESCRIPTION. The standard handgrip is compact and lightweight and contains a thumb-operated RUN/STOP switch (figure 3-7).

The extension handgrip is similar to the standard handgrip except that it has an adjustable extension for versatility (figure 3-8). A RUN/STOP switch is also provided.

The J-5 power zoom handgrip also has an adjustable extension (figure 3-4). In addition, it has an electronic power zoom control built into the handgrip for operating a lens-mounted servomotor. A RUN/STOP switch is provided. Specific instructions regarding the J-5 are on page 3-4.

The shoulder pod/handgrip (figure 3-6) uses a quick-release plate attached to the bottom of the camera to allow quick interchanging of the camera between shoulder pod and tripod. A curved, padded support and RUN/STOP switch are provided.

INSTALLATION. To attach the universal mounting plate used with the standard, extension, and J-5 handgrips:

1. Remove and save three large screws from black camera baseplate. Set baseplate aside; it will not be used.
2. Align electrical contacts and attach universal mounting plate to bottom of camera using screws removed in step 1.
3. Attach specific handle support knuckle to universal mounting plate with four captive screws in knuckle.
4. Install camera battery, rotate magazine lock to LOCK, and verify proper RUN/STOP switch action.

To attach the shoulder pod/handgrips:

1. Attach quick-release plate to bottom of camera using screw provided. Do not remove camera baseplate.
2. Rotate lock knob on shoulder pod to open position. It will click into position.
3. Position camera so electrical contacts align and lower camera into shoulder pod until lock knob rotates automatically.
4. Snug lock knob and check for a secure fit.
5. Verify RUN/STOP switch as in step 4 above.
6. To remove, rotate lock knob until it clicks into open position. Lift camera from shoulder pod.

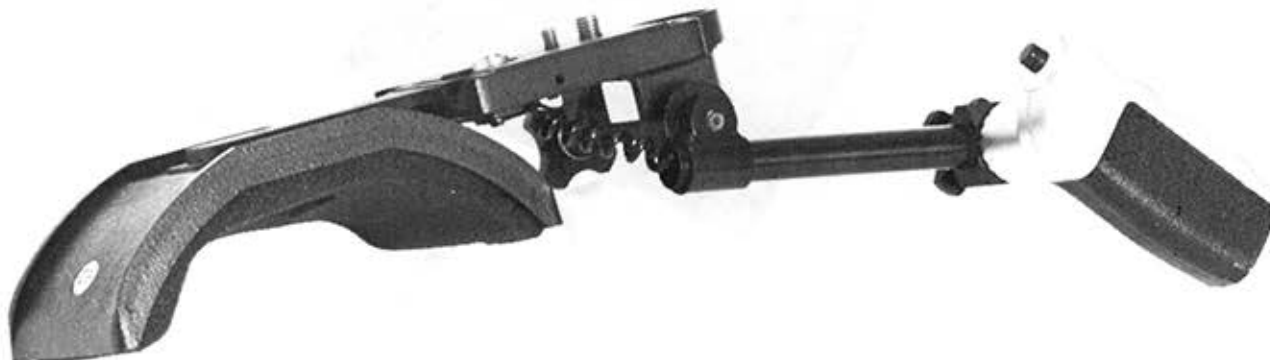


Figure 3-6. Shoulder Pod Handgrip

The snap-latch mounting system may also be used in conjunction with either the compact handgrip (figure 3-8) or the extension handgrip (figure 3-9).

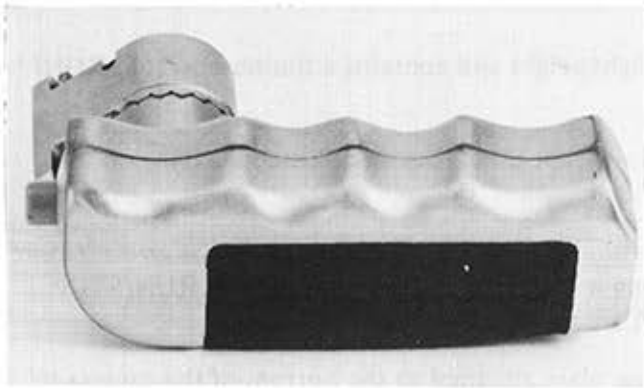


Figure 3-7. Compact Handgrip



Figure 3-8. Extension Handgrip

CARRYING CASE

A specially designed and fitted carrying case to accommodate cameras, magazines, and camera accessories is available from Cinema Products (figure 3-9).



Figure 3-9. Fitted Carrying Case

STEADICAM

The GSMO camera can be used with Cinema Products' Steadicam[®] system (figures 3-10 and 3-11) to permit a broader range of handheld shots than otherwise possible. Steadicam is a camera stabilizing system which permits handheld shots of the steadiness usually found only on dollies or booms, yet it has the flexibility limited only by the cameraman's imagination.

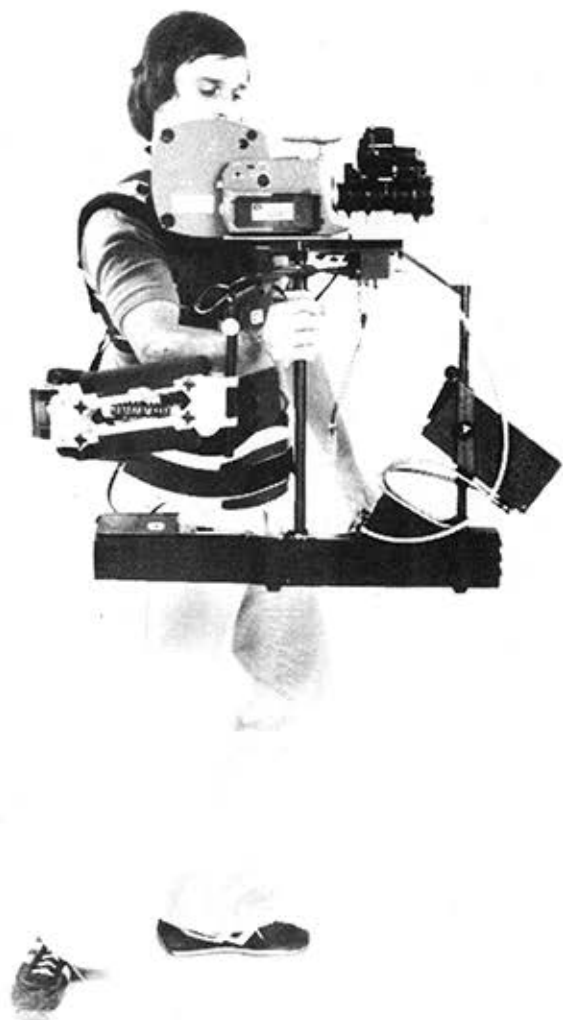


Figure 3-10



Figure 3-11

