H16 EL
Instructions for Use
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## Description

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### Left-hand side
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26. Power pack release button
27. Cover opening knob
General

The H16 EL camera takes 100 ft spools of single or double perforated 16 mm film*, and up to 400 ft of film with the 400 ft magazine supplied as an extra.

* (Films with a single row of perforations are used when a magnetic track is to be added to the original film.)

Technical specifications

Nominal capacity: all 16 mm films on 100 ft spools.

Possibility of mounting an accessory 400 ft magazine.

Electric motor, electronically controlled by impulses, for optimum use of the power of the battery and perfectly constant film speeds.

Fimling speeds of 10, 12, 18, 20, 24, 25, 32, 40 and 50 p.s. + single-frame.

24 and 25 p.s. film speed in accordance with sync pulse standards.

Possibility of exact synchronization with crystal control accessory at 24 and 25 p.s.; maximum deviation for 400 ft of film: less than one frame.

Camera stops with shutter closed for all film speeds.

Practically instant start and stop, with no noticeable overexposure of the first or last frame of a take.

Unlimited reverse running.

170° rotary shutter mechanism.

Automatic film threading; spool eater; spool former.

Powered by SAFT Ni-CD battery with low internal resistance, nominal voltage 13 V-DC (attenuating current excluded, for fear of destroying elements); choice of two power packs:

- 12 V/24.5 Ah, mounted on the camera lid; capacity about 600 ft of film at +20°C and 25 p.s.:
- 12 V/1.2 Ah, carried slung over the shoulder or in a pocket; capacity about 2000 ft of film at +20°C and 25 p.s.

Both power packs are equipped for rapid refreshing (temperature probes and safety thermostat); all SAFT VR-type Ni-CD ele-

ments are also provided with a safety valve as protection against excessive pressure. Two battery chargers are available:

- standard charger: recharges either power pack in about 12 hours;
- rapid charger: recharges the 12 V/24.5 Ah power pack in about 30 minutes and the 12 V/2.5 Ah power pack in about 1 hour and 20 minutes.

Reflex viewfinder with light captured through swivelling prism mounted in front of the shutter.

Misalignment-proof ground glass on prism itself.

Adjustable eyepiece: ± 5 diopters.

Magnification: 13 x.

Dinocentric rubber eyepiece that can be folded over.

Viewfinder light trap.

Field of view corresponding to standard 16 mm projection field.

Extremely rugged bayonet lens mount, with built-in filter holder.

Beaching on three small tongues.

Centering diameter: 60 mm.

Distance between bearing plane of tongues and lens focal plane: 23.2 mm.

Most "C" mount lenses easily adapted.

High performance, built-in light meter.

Through-the-lens measurement of the level by a cell which fits in front of the framing aperture while the diaphragm is being set.

Instant reset, linear characteristic silicon cell, for electronic processing of the data; film sensitivity, film speed, lighting of the

cell; it is practically proof against dazzle, variations in temperature, and age.

Sensitivity range: 10 to 630 ASA (11 to 29 DIN) with automatic coupling at all filming speeds. The silicon cell is "adapted" to the spectral sensitivity of the film by an optical filter.

Measurement of the light in the center of the field of view over about 35% of the picture area.

Manual operation of the diaphragm setting ring, the correct opening being set by bal-

ancing the brilliance of two light-emitting diodes located in the viewfinder; possibility of detecting an over- or under-exposure of 1 stop.

Sync pulse socket for sync pulse and automatic starting, for connecting a crystal accessory.

Built-in release switch controlling all functions: forward and reverse motion, single- frame operation, Safety lock, prevents the accidental operation of the camera; also makes it possible to lock the release in the "release" position for continuous operation.

Frame counter up to 1000 frames.

Footage counter.

Remote-control socket.
Reflex viewfinder

The reflex prism deflects the light passed through the lens, allowing the photographer to view the subject through the eyepiece. The eyepiece is adjustable to accommodate different eye positions.

Adjusting the eyepiece for your eyesight
- Remove the lens.
- Loosen the eyepiece locking screw.
- Point the camera at a well-lit subject (sky, white wall, etc.).
- Turn the milled ring of the eyepiece as far as it will go (+ sign) in a clockwise direction, then turn slowly back until the ground glass appears perfectly sharp.
- Tighten the locking screw.
- Put the lens on again.

If this adjustment is correct, a distant object (about 500 ft) should appear perfectly sharp at full aperture, with the distance-setting ring set to (∞).

Closing the viewfinder
If you do not use the viewfinder while filming, close it by setting the small lever 11 vertical, in order to prevent any light from passing through the eyepiece and fogging the film, or the image of the scene will be recorded on the film.

Optical equipment

The H10 EL camera is designed to take almost all lenses available on the market, whether with Bayonet mount or C-mount with the adapter ring supplied separately.

The presence of the prism capturing light for the viewfinder requires no particular correction of the lenses, whose geometric opening does not exceed f/1.8, except in the case of certain special lenses with remarkably conical emerging pencils of rays.

Attaching bayonet mount lenses
- After pressing down on the locking lever, loosen the milled ring and turn it as far as it will go.
- Remove the protective cover.
- Insert the lens into its housing; when the tongue with the guide mark on it is inserted in the top slot, the lens is in the correct position for turning the rings; but you can also place the tongue with the guide mark in either of the other two slots if you wish.
- Tighten the milled ring.

To remove the lens
- Unscrew the milled ring until stopped by the locking system: the lens cannot fall out.
- Press down on the locking lever and turn the milled ring as far as it will go; you can then take the lens out without any difficulty.

When you remove the lens, do not forget to put the protective cover on again, so as to avoid any dust getting in and being left on the reflex prisms.

Attaching "C" mount lenses
"C" mount lenses can be used by means of an adapter available as an accessory. The lens must be screwed onto the concave side of the adapter. The lens + adapter unit is attached to the lens mount of the camera as described above.
**Focusing adjustment**

Placing a filter behind the lens slightly alters the lens focusing. However, the necessary correction is automatically made when the reflex viewfinder is used.

**Filters**

The H16 EL can be fitted with a gelatine filter holder which screws into the lens mount.

To remove the filter holder from the lens mount:
- Take off the lens.
- Using two fingers, unscrew the filter holder about 1/8 turn and take it out, then screw the filter holder in the reverse order, taking care not to touch the filter itself with your fingers.

To insert or change a gelatine filter:
- Open the filter holder by turning the Couples (three slots) until the three pins are opposite the three slots.
- Using the above model if necessary, cut a disc about 38 mm in diameter (maximum 40 mm) out of the square of gelatine, taking care not to remove the protective sheets; at all costs avoid the paper rubbing against the filter: a scratched filter loss of cleanliness in the picture.

**Camera operation**

**Power**

The H16 EL can be powered by any 12 V battery capable of supplying the necessary current:

- Voltage limits: 10.5 to 13.5 V DC, all functions assured
- 19.5 V DC, limit for not damaging the electronic system,
- Starting current: 10 A, for a fraction of a second
- Normal consumption: 0.8 to 1.2 A, depending on method of operation.

Two power packs, supplied with high quality batteries, are available:

- 12 V/0.45 Ah power pack (part of the standard equipment)
- 12 V/1.2 Ah power pack, which is mounted on the camera lid, provides sufficient power for about 900 ft of film at 25 fps and 20°C.

To remove the power pack from the camera:
- Press on release button 26, and pull the power pack towards the back of the camera.

The cable belonging to the power pack must be plugged into the camera power socket (4-pin socket).

- 12 V/0.45 Ah power pack
- 12 V/1.2 Ah power pack (available as an extra)

Check the state of the power pack by:
- Plugging in the power pack
- Pressing the camera release

The red warning light must come on, then go out immediately. If it remains lit, this means that the voltage is not strong enough and that you are unable to recharge the batteries.

If, after allowing a power pack to discharge below the minimum voltage indicated above, the red warning light extinguishes, it means that the batteries are fully charged.

**Normal charging**

The charger supplied as standard equipment makes it possible to charge the power pack fully in about 12 hours.

Charging is carried out at constant current, with automatic switching to 50 mA for the 12 V/0.45 Ah power pack, or 120 mA for the 12 V/1.2 Ah power pack.

Make sure that the charger is set to the voltage corresponding to that of the mains available.
Rapid charging

Both Bolex power packs are equipped for rapid charging (built-in electronic system for charging the temperature and safety thermostat).

A special charger, available as an extra, makes it possible to recharge either power pack quickly up to 80% of its capacity; recharging time:

12V/0.45 Ah power pack — 60 minutes
12V/1.2 Ah power pack — 20 minutes

Equipped with a complex electronic regulating system, which takes the voltage and internal temperature of the battery into account, this charger avoids any risk of overcharging. It automatically switches to normal charging as soon as rapid charging is completed.

Filming speeds and method of operation

The filming speeds and method of operation are controlled by a single knob which has only to be turned to the desired position:

R — reverse speed at 18 fps (not for filming, only for rewinding)
S — single-frame filming
10 — 60 — forward motion at the speed selected, the intermediate positions are not usable.

CRYS (Cronyal) in this position, the motor can be synchronized on a stabilized frequency, supplied by an external crystal available as an extra (see below, page 15).

The motor is electronically controlled. The filming speeds remain stable in the outside conditions (type of film, temperature, etc.). The speeds of 24 and 26 fps are regulated in accordance with the standards in force for synchronized sound recording.

Exposure times (fractions of a second)

In the calculation of the real exposure times allowances have been made for the shutter which opens to 170°.

The "photoelectric" exposures have been obtained by reducing the real exposure times of the camera by 20% in order to allow for the light deflected into the reflex viewer.

Filming speed Exposures real photoelectric
10 fps 1/21 1/28
12 fps 1/25 1/33
18 fps 1/37 1/50
24 fps 1/42 1/50
24 fps 1/42 1/50
32 fps 1/67 1/70
48 fps 1/87 1/70
50 fps 1/106 1/140
5 fps 1/70 1/50

Release

You can operate the mechanism in normal forward motion, single-frame operation, or reverse motion, either by pressing on the built-in release 21, or by means of the remote-control cable plugged into socket 15.

The switch for the remote-control cable as well as the camera's built-in release (lever 25) can be locked in the operating position (Fig IV B).

Relocks

It should be noted that lever 22 may also be used to lock the camera's built-in release in the stopped position, in order to avoid fulling accidentally (safety lock for transport).

Frame counter

By indicating the exact number of frames exposed, the frame counter is invaluable for scientific films, various effects and tricks (drop dissolves, double-exposures, etc.). It is also very useful for single-frame filming.

The upper dial adds the frames in forward motion and subtracts them in reverse motion, from 0 to 50 frames.

The lower dial totals up the frames in forward motion and subtracts them in reverse motion, from 0 to 1000 frames.

You can check easily at any time whether the readings given by the frame counter refer to the first or the second lay, by looking at the footage counter. 1000 frames of 16 mm film correspond to 7.62 m film.

To reset the frame counter to zero, use both knob (a), which controls the upper dial, and at the same time knob (b) which controls the lower "ticks" dial.
Loading and unloading the camera

Both these operations should be carried out on a clean, dust-free place.

**Actual loading**
- Before loading your camera, fit the battery on the lid, plug it in and set the speed.
- To remove the lid, turn knob 27 in the direction indicated by the arrow.
- Make sure that the pressure pad pin (a) is locked, and that the pressure pad cannot open.
- Remove the empty spool from its spindle by pressing on ejector (b) and place the new spool containing the film on the upper shaft (film should run in direction indicated by the arrow).

**Final check**
- Run the camera for a few seconds to make sure that the film is advancing properly and that the loops are forming correctly at both ends of the film gate.
- Put the lid back on and lock it. If it does not lock first time, whatever you do, do not force it! The lid, the spools or the pressure pad may be incorrectly positioned.

N.B. Loading the 400 ft magazine is described in a special Instruction Manual.
Footage counter

The footage counter shows how many feet of film have been exposed. Once the film is threaded, the counter reads "0." To wind the leader on, run the camera until the figure "0" appears opposite the white line in the footage counter (in the centre of the red mark). Whenever the camera lid is taken off to load or unload the camera, the counter automatically returns to "0." The mask on the footage counter can be rotated half a turn to show a scale in meters.

N.B. Your film must have a leader of about 8 ft long at the beginning, corresponding to the length of film wound on the take-up spool while the footage counter passes from the indication "0" to the figure "0." Your film must also have a leader of about 3 ft long at the other end. Those lengths of leader are needed to enable the camera to be loaded and unloaded without risk of fogging the emulsion; they are usually destroyed by the laboratory during development.

Unloading

Once the film has been fully exposed (as indicated by the footage counter), run the mechanism for about 10 seconds to wind the end leader completely onto the take-up spool.

A slight pressure on ejector lever (B) allows you to take off both spools.

N.B. When open the camera case forms a sort of bowl and stops the light from getting in between the coil of film and the sides of the spool. To remove the full take-up speed and avoid any risk of fogging the film, you can place the covered tape on before taking the spool out and arrange the metal container so that the spool goes directly into it.

Loading or unloading by hand

(Film loop, mainly with a 400 ft magazine)

- Open the spooling guides (C) and, to keep them in this position, push slide (F).

Synchronous sound recording

The K16EL offers you two possibilities:

- synchronization by air bell;
- synchronization by sync pulse with automatic clapper.

With the former, you avoid the connecting cables between the camera and the tape-recorder, but you need to have a tape-recorder with a synchronous pulse generator. With this method, there is no automatic clapper.

With the second of the two possibilities, the sync pulse is provided by the camera, via a special accessory. This requires a connecting cable between the camera and the tape-recorder, which makes it possible at the same time to transmit the sync signal (automatic clapper).

Crystal control equipment

This equipment, available as an extra, comprises:

1. Crystal Control Unit 24 or 25 ft.p.s.
2. connecting cable 0.5 m long

Sync pulse equipment

This equipment, available as an extra, comprises:

1. Sync Pulse Generator 25 ft.p.s. 50 cycles or 24 ft.p.s. 60 cycles (specify frequency when ordering)
2. clapper lamp mount
3. spiral wound cable for connecting the tape-recorder
4. cable for connection to the camera

The Sync Pulse Generator converts the signal supplied by the camera generator into a standard 50 or 60 cycles alternating sync pulse and conveys a direct current for powering "deep" generator of the tape-recorder while the clapper lamp is on.

Turn the camera filming speed knob to the position "CINE".

Plug the connecting cable into socket 9 on the camera.

The filming speed is then accurately stabilized at 24 or 25 ft.p.s., depending on the crystal used, with a precision such that the maximum deviation after 400 ft of film is less than one frame.

* There are two different Crystal Control Units, one for 24 ft.p.s., the other for 25 ft.p.s.
To connect this equipment to your camera:
- Unplug 33 from the clipper lamp socket and reinsert it.
- Connect the clipper lamp to the socket in the camera for the purpose of:
- Connect camera and accessory by means of the spiral cable supplied with the equipment (7-pin sockets and cable). The connection between the accessory and the clipper lamp is made by means of the spiral cable, whose free end must be previously equipped with a plug fitting the socket on your camera.

**On the Bolex side, the connections are as follows:**

- **Synchronization socket:**
  - Color pin:
  - Sync pin:
  - 12 V pin:
  - 0 V pin:
- **Spiral cable:**

**Operation**
As soon as you press the release, the system works as follows:

- a) the motor starts.
- b) the sync pulse is produced.
- c) the clipper lamp lights up.
- d) 12 V voltage for "beep".

**How to look after your equipment**

**Camera**
The interior of the camera, housing the film drive mechanism, must be kept perfectly clean. Gelatin deposits and dust sometimes accumulate in the film gate and on the pressure pad when the unexposed film is run through the camera.

To clean these parts, proceed as follows:
- Open the pressure pad by lifting its pin;
- Unscrew the shaft and remove the pressure pad by pulling it towards you;
- Gently clean the pressure pad and film gate, especially the aperture, with a clean cloth, wound round the end of a small stick. If the pressure pad is difficult to remove, moisten the cloth slightly and dry thoroughly after cleaning;
- Replace the pressure pad.

**Reflex prism**
To reach the prism situated in front of the film gate, it is sufficient to remove the lens. It is preferable to carry out this operation in a dust-free environment, and the prism can be cleaned even when the camera is loaded (preferably in the shade).

Important! The reflex viewfinder must not be dismantled.
Electrical diagram for accessories

- Power pack
  - The power packs for the H16 EL consist of a set of 10 1.35 V Ni-CD storage batteries connected in series. Under no circumstances must they be allowed to discharge below the minimum voltage indicated by the lighting up of the warning lamp (10.8 V) on the camera. If ever the charge goes below this minimum figure, there is a risk of one of the battery elements becoming reversed and, consequently, the power pack losing a great deal of its power. If this should happen, you can regenerate it to a certain extent by giving it several slow charges lasting about 16 hours.

- Disconnect the power pack whenever you are not going to use the camera for some time.

Sockets diagram
- Sockets seen from outside
  - Syncro anger
  - Signal output for sync pulse accessory 1000 cycles at 25 I.p.s.
  - Input for crystal control 100 cycles at 25 I.p.s.
  - Output tension of the clippick 12 V during the optical dating
  - Power socket
  - Feeding of the electronic part
  - Feeding of the motor
  - Remote control socket
  - Switch for remote control

Replacing the fuse
- In case of faulty connection or a defect of any kind, the fuse of the electronic system controlling the motor may be blown.
- To replace it:
  1. Loosen the four fixing screws on the bottom of the camera.
  2. Replace the burnt-out fuse by one of the spare fuses kept in the plastic insulation tube.
  3. Check that the camera works properly and replace the base.

Precautions to be taken at low temperatures
- Your equipment works perfectly down to -20°C. At this temperature, however, the amount of film that can be shot decreases very quickly. To avoid the battery getting unnecessarily cold, we recommend you to keep it in one of your pockets for as long as possible, inserting it at the last moment just before filming. In this way you will be able to shoot up to 400 ft of film without any difficulty.
- If necessary use two batteries, one on you, the other in the camera.
Lenses

with fixed focal length:
- Kern Switar 10 mm f/1.6
- Kern Micro-Switar 26 mm f/1.1
- Kern Micro-Switar 75 mm f/1.9
- Kern Micro-Switar 150 mm f/3.3

The camera also accepts most lenses with standard mount in combination with an adapter.

zoom type:
- Kern Vanox-Switar 100 PDE 16–100 mm f/1.9
- Kern Vanox-Switar 12.5–100 mm f/2

Kern Vanox-Switar Compact 17–85 mm f/3.5
Angénieux 10–17 C 12–120 mm f/2.2
Angénieux 10–9.6 C 9.5–95 mm f/2.2
Angénieux 10–12 B 0.4 A 12–120 mm f/2.2
Angénieux 6+9.5 C 8.5–57 mm f/1.6–1/2.2
Sopralem Pan-Cinar 83 17–85 mm f/2

Bolex International S.A.
Yverdon/Switzerland

After-sales service
Thanks to our international organization, we offer you impeccable service all over the world. You can entrust your equipment with complete confidence to any Bolex distributor, most of whom employ specially qualified technicians, usually trained in Switzerland. In case of any exchange of correspondence, do not forget to indicate the serial number marked on the bottom of your camera.

Bolex International S.A. reserves the right to modify, without prior notice, the appearance and characteristics of the equipment described in this Instruction Manual.