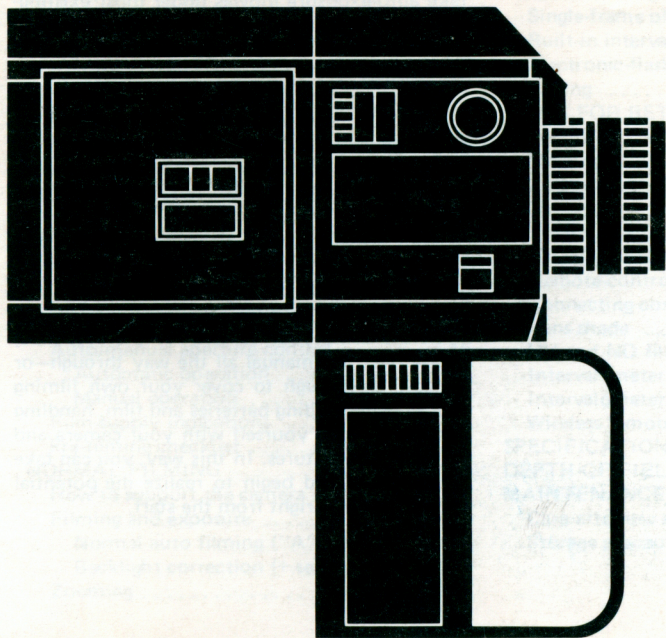


MINOLTA XL-400



OWNER'S MANUAL



With your compact Minolta XL-400 you can take auto-exposure movies under most existing-light conditions without any special lighting equipment, while enjoying the usual Super-8 advantages.

Besides these, however, you enjoy many further advanced Minolta features outlined on the following two pages. Among these are 4X zoom, macro capability, a built-in intervalometer, and bright, clear reflex viewing and focusing.

Your XL-400 has an electromagnetic shutter release and can be used with a number of Minolta Autopak-8 D system accessories for even greater versatility.

Before using your camera for the first time, please read this manual all the way through—or at least far enough to cover your own filming needs—while loading batteries and film, handling and acquainting yourself with your camera and its parts and features. In this way, you can take good movies and begin to realize the potential of your XL-400 right from the start.

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MAIN FEATURES

Top-convenience Super-8 type

The Minolta XL-400 gives you the familiar Super-8 system advantages: Simply clicking the film cartridge into position loads the camera and automatically sets it for proper exposure with ASA 25/100 and 40/160 film. You get much sharper, brighter movies with none of the bother of old double 8mm.

Dim existing-light (XL) capability

Your XL-400 lets you enjoy the fun and ease of movies without special lighting equipment under conditions where they were impossible before. The bright F1.2 lens, wide 220°-sector shutter, and special light-saving meter and finder systems team up with high-speed film for striking results. Ordinary room light or streets or lighted signs at night, stage scenes, twilight views—yes, even candle-lit birthday parties—etc., become exciting subjects to record, quite effortlessly.

Four-times power/manual zoom

At the touch of your finger, the coated Rokkor Lens zooms four full diameters between wideangle 8.5 and tele 34mm. This is the world's greatest zoom ratio for an XL-type

camera today and further increases the exciting possibilities with the XL-400.

Macro-filming capability

Besides focusing closer than most XL-camera lenses, which aids working at close quarters and taking interesting portraits, titles, etc., your XL-400 makes striking extreme close-ups. The simple flick of a switch enables focusing down to the surface of the lens itself for screen-filling photomicrographs of subjects as small as a postage stamp.

Built-in intervalometer

In addition to ordinary single-frame capability, the XL-400 contains a variable timer that will make unmanned single-frame exposures at intervals from 0.5 to 60 sec. This feature allows fascinating time-lapse sequences of flowers opening, etc., as well as time/movement studies and comic effects. And built-in X sync. enables doing these also with electronic flash.

TTA metering with adjustable fully automatic or manual exposure control

Whether in dim existing illumination, with movie lights, or in bright outdoor conditions,

the XL-400 will control exposure for you automatically. A sensitive CdS cell meters scene brightness through the lens aperture for greatest accuracy, and the exposure-control mechanism adjusts the aperture continuously to provide correct exposure. A switch allows giving one stop extra exposure automatically for back-lighted situations, etc. Aperture can also be selected manually by means of a dial.

Bright, clear reflex viewing and focusing

Thanks to your XL-400's reflex viewfinder, you see the subject as it is clear and bright through the camera's taking lens, with none of the parallax problems of separate viewfinders. Focusing is clear and positive with a split-image spot in the center of the viewfield. Eyepiece adjusts to suit your vision.

Information-center viewfinder

Besides parallax-free field and focus, an over-/underexposure warning, film safe-run signal, and a manual-setting signal are visible as you look through the finder. All necessary filming information is thus at your disposal without taking your eye from the eyepiece.

Lightest, most compact of its kind

Besides all its other features to make versatile filming easier than ever, the XL-400 is lighter and more compact than any other camera in its class.

Advanced electromagnetic shutter release for added versatility

The XL-400's electromagnetic shutter release permits using the camera with the optional remote-control cord, with such Minolta Auto-pak-8 D system accessories as intervalometers and the wireless remote-control unit, and eliminates annoying "white frames."

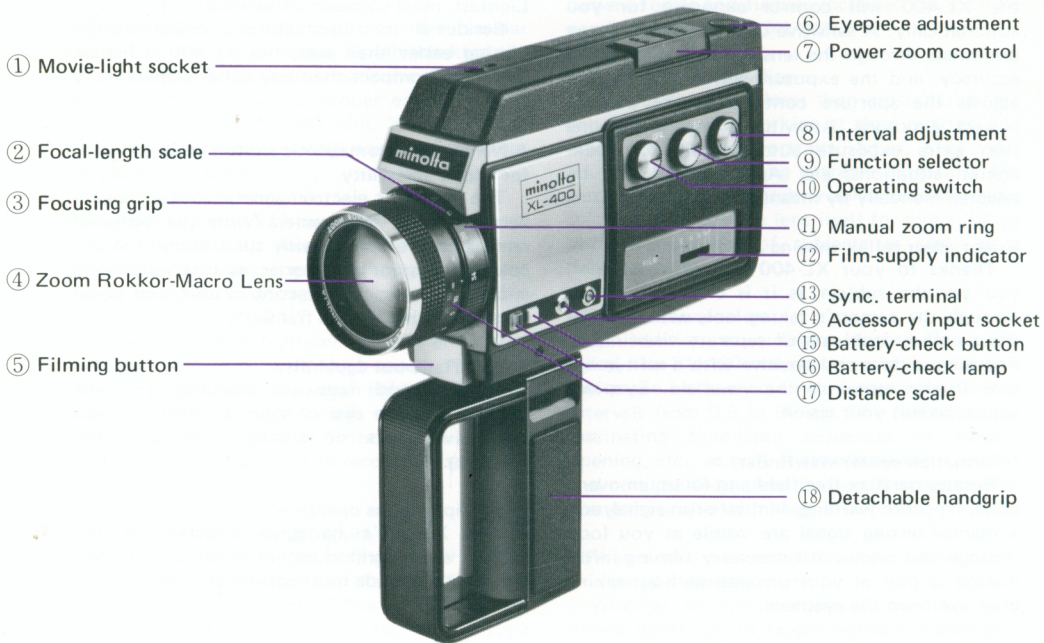
Fade-in/fade-out capability

Fade-ins and fade-outs possible with the manual aperture dial of your XL-400 give you impressive ways of ending, beginning, and changing scenes.

Handgrip/gripless operation

The XL-400's handgrip attaches to the camera via the tripod socket or can be detached entirely to provide most convenient use.

NAMES OF PARTS





①9 Filter switch

②0 Aperture-scale window

②1 Auto/manual aperture control

②2 Film-chamber latch

②3 Finder eyepiece

②4 Normal/macro switch

②5 Film-plane index

②6 Film-data window

②7 Tripod socket

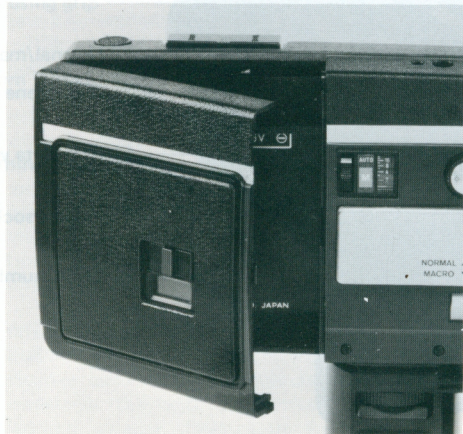
②8 Serial number

PREPARATION

6

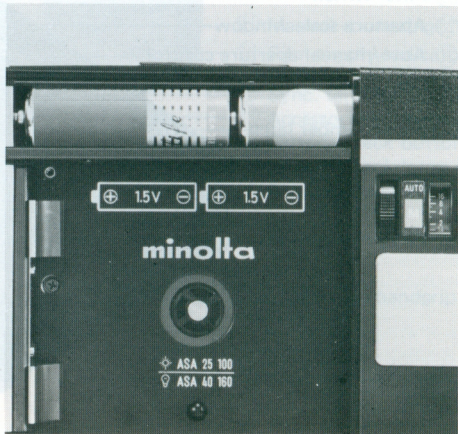
Batteries and power

Your camera's shutter release, film transport, exposure system, and zooming motor are all powered by two 1.5-volt AA-size (penlight) batteries. The alkaline-manganese or sealed carbon-zinc type of battery is recommended. For best results and service life, use fresh batteries of as high quality as possible.



How to install batteries

Slide the latch toward the back of the camera and open the film-compartment cover. Insert both batteries with the positive (+) pole toward the back of the camera as shown in the diagram printed inside the compartment. If the batteries are inserted incorrectly, the camera will not function.



Checking batteries

Battery power should be checked after inserting them and from time to time, particularly before going on trips or taking important movies. To do so, make sure that the operating switch is not in the OFF position and push the battery check button. If the battery check lamp lights, batteries are serviceable.



Approximately seven cartridges can generally be exposed over a relatively short period of time with a fresh set of alkaline batteries at 20°C (68°F). At lower temperatures, over longer periods, or with other battery types, performance will drop considerably.

CAUTION:

Pushing the battery check button while using the intervalometer may cause exposure of an extra frame of film before the proper interval has elapsed.

To conserve battery power, the operating switch should always be kept at OFF when the camera is not in use.

Batteries should be removed when the camera is not to be used for two weeks or longer. This is particularly important in tropical areas.

Inserting and removing film cartridges

To insert

1. Slide the latch away from the lens and open the cover of the film compartment.

2. Angle the cartridge into the camera from the rear as shown. Then push down on the rear edge of the cartridge until it seats flat in the compartment with a click.

3. Close the compartment cover and push on it until it clicks locked. Looking into the film-data window, you can see whether and with what kind of film the camera is loaded.

To remove

Open the cover as above and remove the cartridge by lifting it out of the compartment from the back.



Types of film and lighting

Simply inserting the cartridge sets this camera for proper exposure with the following films:

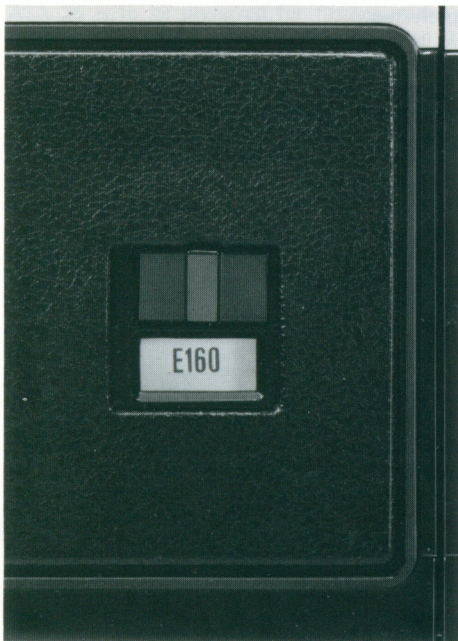
- Type G color film having an exposure-index rating of ASA 160.
- Black-and-white or "Outdoor-Indoor" Type A color film having a daylight rating of ASA 25 or 100* and a tungsten index of ASA 40 or 160, respectively.

Films other than these are not recommended for use with this camera. For best color balance, note important filter-setting information below.


Existing-light filming

"Existing light" indicates the light that is usually present indoors at night in homes and public buildings, at stage shows, etc., outdoors at twilight, after dark on lighted streets, with lighted buildings or signs, and so on. Existing light also includes daylight indoors as well as artificial light present in a scene.




For filming in existing light, make sure your
* (based on exposure through the built-in filter mentioned in the specifications)



XL-400 is loaded with film having a tungsten or unfiltered exposure rating of ASA 160, since dim-light filming is impossible with slower films. You are now ready to film under most existing-light conditions without special movie lights. Simply focus and shoot, after setting the filter switch for best color balance as indicated below:

With Type G film, keep the filter-switch  symbol set to the index. The setting should not be changed according to the light source, since Type G film is intended for use without filtration.

With Type A film, however, you should set the filter switch according to the type of light you are shooting in, as follows:


- If a scene is mainly lighted by ordinary tungsten light bulbs, flames, or other "warm" light sources, set the filter-switch  symbol to the index.
- If the dominant lighting of the scene is from daylight, fluorescent tubes, carbon-arc spot- or floodlights, turn the switch  symbol to the index.
- When the scene is illuminated by more than one type of light and you are not sure which type predominates, the  symbol setting is

preferred.

- If existing-light conditions are too dim for movies and the underexposure signal (see p. 12) appears at the lower left in the finder frame, you can use supplementary lighting as explained next.

Movie-light filming

With Type G or Outdoor-Indoor Type A color film having a tungsten or unfiltered rating of either ASA 40 or 160, your XL-400 automatically provides the correct film-speed setting and color balance (regardless of manual filter-switch setting) when a movie light is properly attached by means of the socket on the top of the camera.

For exposure with movie lights not intended for use on the XL-400 or with most other bright lighting equipment, be sure the filter-switch  symbol is set to the index and use filters over lens or lights if necessary to provide proper balance for the film in use. Type G film generally requires no filtration.



Daylight filming

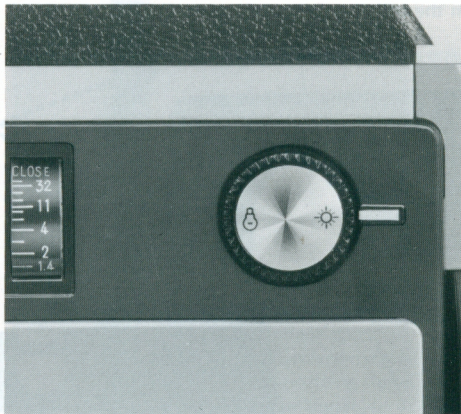
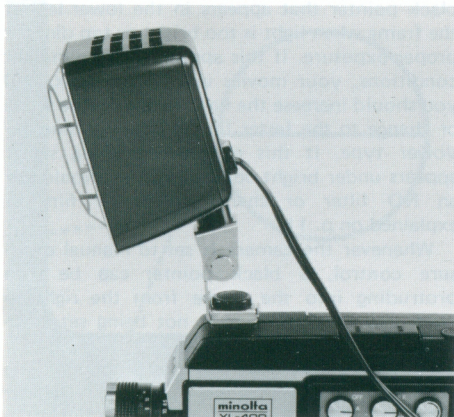
Black-and-white or Outdoor-Indoor Type A color film with a filtered-daylight rating of

ASA 25 is to be preferred for filming in daylight. If necessary, however, ASA 160 Type G film or black-and-white or Type A color film with a filtered-daylight rating of 100 may be used successfully in conditions up to medium brightness, as on cloudy days.

If the overexposure signal (see p. 13) appears in the lower left of the viewfinder frame under brighter conditions, screw the optional

accessory ND filter (see p. 29) on over the camera lens. If the warning signal still appears in the finder, remove the ND filter and change to filtered-daylight ASA 25 black-and-white/Type A color film to avoid overexposure.

Be sure that the filter switch is set at the  symbol for daylight filming with Type G film or at the  symbol with the other films mentioned above.

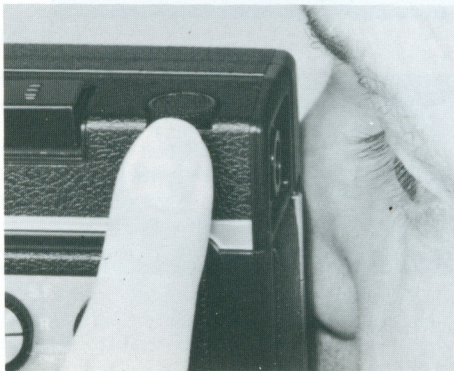


Viewfinder

To adjust the eyepiece

First set the distance scale at infinity (∞) by turning the focusing ring. Then aim the camera at a distant object such as clouds, mountains, or buildings more than .30m (or about 100 feet) away.

Look through the viewfinder and turn the eyepiece adjustment dial until the distant image in the split-image spot appears clearest to you.



Viewfinder indications

Besides giving you a bright, accurate view of your subject, the viewfinder of your XL-400 provides essential filming-control information continuously as you film:

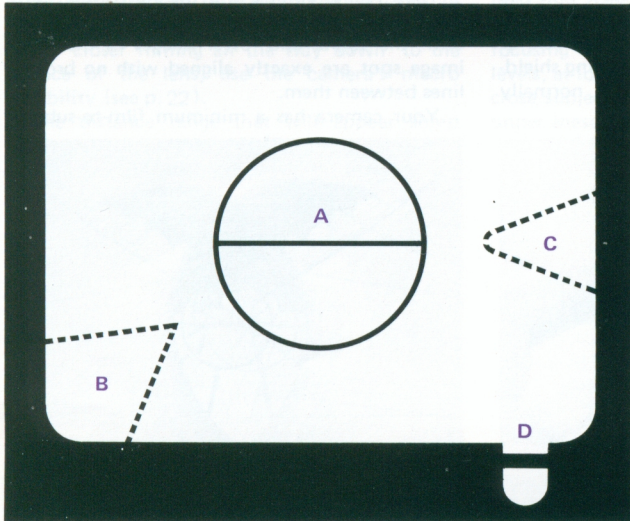
In the center of the finder frame, you can see the split-image spot used for accurate focusing as described on page 14.

Over- or underexposure warning is given by a black pointer that appears in the lower left of the frame when light is too bright or too dim for proper exposure. If this appears under dim light conditions, your movies will be too dark, and you should increase the light falling on the scene or change to the faster film if you are using the slower type. If this exposure warning signal appears under bright conditions, you should use an ND filter or change to slower film as explained on p. 11.

Whenever the camera is set to manual exposure control, a black pointer can be seen protruding into the frame from the right to warn you that exposure is not being set automatically.

At the lower right, there is a notch in the frame containing the safe-run signal. Regular bobbing up and down of the signal in the notch

while filming confirms that film transport is proceeding normally. When the bobbing stops with the film-supply indicator at "F" (see p. 17), film in the cartridge is exhausted.



- A. Split-image spot
- B. Over-/underexposure warning
- C. Manual-setting signal
- D. Safe-run signal

Eyepiece cap

For remote or unmanned operation or when the camera is set on a support and used without viewing, be sure to use the eyepiece cap supplied with the camera to cover the eyepiece. This will prevent unwanted light from entering through the eyepiece and affecting the meter cell or exposure when the eyepiece is not being shielded by the cameraman's head as it normally would be.

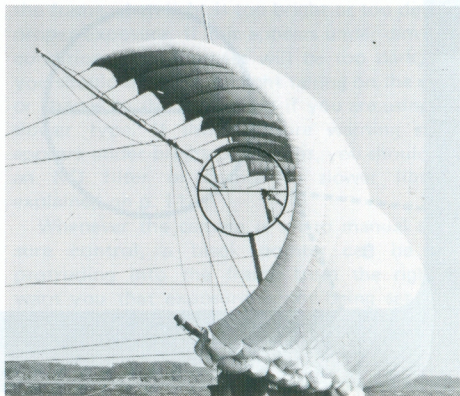


Focusing and depth of field

To focus a subject, zoom the lens toward the tele 34mm focal length until the viewfinder image is relatively large.

Then while looking into the viewfinder, turn the focusing ring clockwise or counterclockwise until the upper and lower images in the split-image spot are exactly aligned with no broken lines between them.

Your camera has a minimum film-to-subject

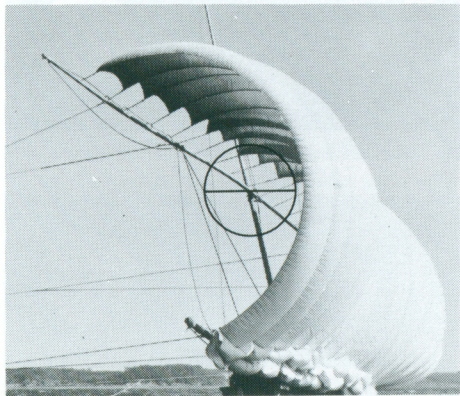


distance of 1.2m (4 ft.) for normal non-macro focusing. When the lens is zoomed to 34mm at this distance, an area about 136 x 185mm (5 $\frac{3}{8}$ x 7 $\frac{1}{4}$ in.) can be photographed. Many titles and other close-ups can thus be filmed very simply without accessories.

For closer filming all the way down to the surface of the lens, use the camera's macro capability (see p. 22).

The distance range that will appear sharp

behind and in front of the focused point is called depth of field and depends upon the distance set, the light conditions, and the focal length the lens is zoomed to. The tables beginning on page 33 indicate depth of field at various focal lengths and apertures. Accurate focusing is particularly important at low light levels, at longer focal lengths, and with relatively close subjects, since depth of field is at its least under these conditions.



Auto/manual aperture control

Automatic operation

The control index is set to AUTO for usual operation. At this setting, the camera's EE system sets the aperture continuously and automatically in accordance with metered light for proper exposure as determined by the operating switch setting (see p. 20); the aperture being automatically set is indicated by the needle in the aperture-scale window.

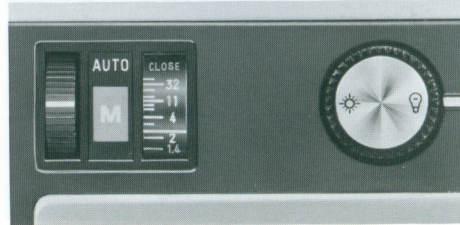
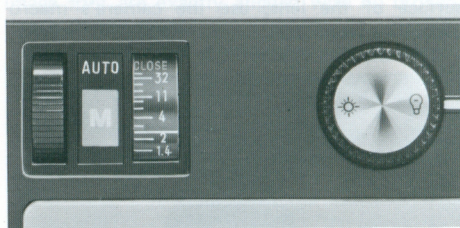
Manual operation

To switch the system over to manual-aperture mode, rotate the control *as far as it will go* toward the bottom of the camera. Any aperture can then be set on the scale by rotating the control upward so that the index is beside the blue area marked with an M.

Manual aperture control is used for electronic flash exposures (see p. 25) and may be useful for special single-frame applications. It may also be used in more advanced filming to override the meter and keep exposure uniform at a given level regardless of changes in background brightness due to zooming or panning, entrance of large bright or dark areas or light sources into the field of view, and so on. Fade-ins/outs are

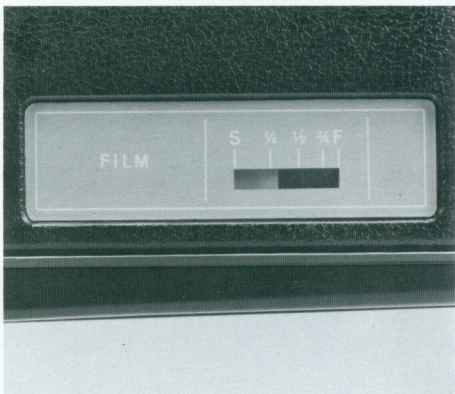
also accomplished by means of this control.

A signal appears in the viewfinder (see p. 12) to remind you when aperture control is set on manual. To resume normal auto-aperture-control filming after manual operation, do not forget to return the control to the AUTO setting.



Film-supply indications

As you film, a red tape will slowly advance across the window of the film-supply indicator from "S" (start) to show how much film you have exposed, 1/4 of a roll, 1/2 a roll, etc. When there is no more unexposed film left, the red tape will reach all the way to "F" (finish) and the safe-run signal in the viewfinder will stop bobbing up and down, accompanied by a change in the sound of the motor.



Pre-filming checklist

For better movies without false starts, run through the following checklist each time you get your camera out for some normal filming:

1. Turn the function control to "R," the operating switch to "A," and use the battery checker to make sure your batteries are all right.
2. Check to be sure you have enough film remaining or load a new cartridge; ASA 160 for existing light, ASA 25 for outdoor operation.
3. Make sure the filter switch is properly set for the dominant lighting on your scene.
4. With the aperture control set at AUTO, move your hand back and forth in front of the lens to confirm that the aperture-scale needle is moving in accordance with brightness changes.
5. If you wish, depress the filming button briefly to see that the shutter is releasing properly.
6. Adjust focal length, visual angle, and focus.
7. Assure that the over-/underexposure signal is not visible in the frame.



NORMAL FILMING

How to support the camera

Since an unsteady camera generally produces unsatisfactory movies, be sure to support your camera positively and properly.

For best results, use of a good tripod intended for movie filming is recommended wherever practicable.

Your XL-400 can also be hand-held with or

without the detachable handgrip. In either case, it should be held in the most comfortable way with both hands and steadied against your face. Generally, one hand will support the bottom of the camera and operate the filming button, while the other will hold the top of the camera and operate the zoom control.



Filming and exposure

When the operating switch index is set to OFF, battery current is switched off, and filming cannot be done. This is the position the switch should be kept in to conserve battery power and prevent accidental filming whenever the camera is not in active use.

Normal auto filming ("A" setting)

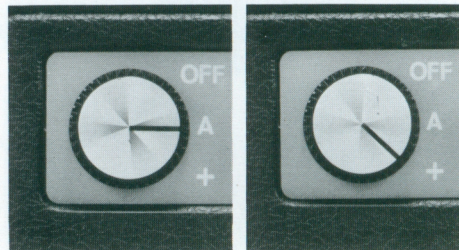
To film with normal automatic exposure control, turn the operating switch to align the index with "A" (automatic), the function selector to "R" (run). If the exposure warning signal protrudes far into the frame at the lower left, the scene is too bright or too dark for proper exposure. You should thus adjust conditions affecting exposure (see pp. 10 and 11) until the pointer withdraws from the frame. If only the extreme tip of the pointer can be seen in the frame, however, you may film if you do not mind slight under- or overexposure. If the finder is clear and the pointer cannot be seen at all in it, the camera will automatically control the aperture for properly exposed movies when you push the filming button.

To avoid fooling the meter cell, producing general underexposure of a scene, keep electric

bulbs and other bright direct points of light out of the picture area. If this is unavoidable, the effect can often be improved by using the backlight correction described below.

Backlight correction (+ setting)

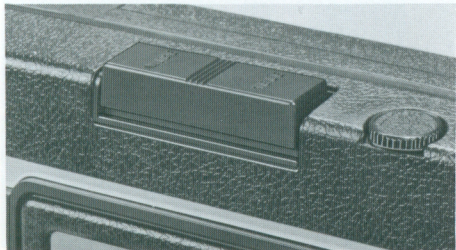
To provide more exposure for shadow areas when filming against the light, turn the operating switch to align the index with the plus (+) sign. This backlight correction adjusts the system to give one stop more than (that is, double) the normal automatically set exposure continuously as you film. Be sure to return the index to the "A" position when you resume filming with normal lighting.



Zooming

The focal length of your camera's Zoom Rokkor-Macro F1.2 lens can be varied continuously between 8.5mm (wideangle) and 34mm (telephoto) for zoom effects up to four diameters. Zooming can be done by motor while filming or manually, and the setting at any time is indicated by the index of the focal-length scale on the manual zoom ring.

The power zoom control is used to zoom by motor power. Pushing the TELE side of this while the motor is running zooms the lens toward the telephoto range, making your subject appear closer, while depressing the WIDE side widens the lens' angle of view, making your subject appear to be farther away.



The manual zoom ring can be used for particularly slow or fast zooms or to set the lens at any focal length desired before starting zooms or for non-zoom scenes.

When planning a zoom scene, it is best to focus at the telephoto extreme before beginning to film it.

Depth of field at the shorter focal lengths (8.5 to 13mm) is relatively great, making it less necessary to set focus distance precisely, particularly under bright conditions.

Remember, however, that the relatively shallow depth of field at longer focal lengths (20 to 34mm) makes accurate focusing essential.

Careful focusing is particularly important under dim existing-light conditions.

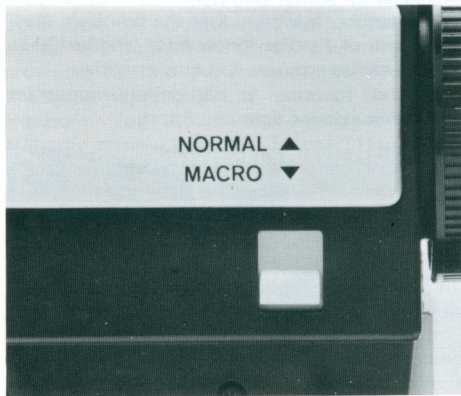


MORE ADVANCED FILMING

Macro filming

Your XL-400 has built-in macro-filming capability which allows focusing and photographing subjects as close as the surface of the lens itself. To use this:

1. Move the normal/macro switch to the position nearer the bottom of the camera.
2. Focus by turning the manual zoom ring until the images in the finder split-image spot are aligned.



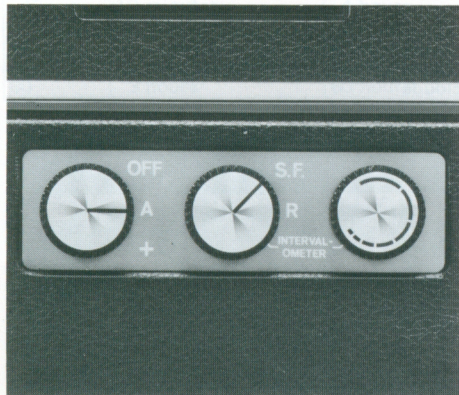
The subject-to-film distance range that can be focused in this way is 9.4cm (lens surface position) to 42.8cm (3 $\frac{1}{8}$ to 16 $\frac{7}{8}$ in.). (The position of the film inside the camera is shown by the film-plane index.) Maximum dimensions of the subject field that can be photographed at the MACRO setting are 58.8 x 79.9mm (2 $\frac{3}{8}$ x 3 $\frac{1}{8}$ in.); the minimum, 16.3 x 22.6mm ($\frac{5}{8}$ x $\frac{7}{8}$ in.).



Single-frame photography

The single-frame provision on your camera enables you to expose just one frame at a time for animated titles, cartoons, etc., time-lapse photography, and trick and special effects. General instructions for S.F. use are:

1. Attach the camera to a tripod or similar firm support.
2. Set the function selector to S.F.
3. Make sure focus and exposure are correct.



4. Release the shutter. This can be done with the filming button, but use of the accessory remote-control cord (see p. 29) instead is strongly recommended to prevent camera movement. The cord is plugged into the accessory input socket for use.

CAUTION:

Be sure to use the eyepiece cap whenever the eyepiece is not being shielded by the cameraman's head as in normal operation (see p. 14).



Built-in intervalometer

This is a miniaturized variable-interval timer that releases the camera shutter at rates from about 0.5 through 60 seconds between single-frame exposures, enabling ultra-slow (for greatly speeded-up action) or time-lapse filming. A variety of applications includes comic effects, work and motion analyses, observation of animals and plants, and recording progress of various operations. To use your XL-400's built-in intervalometer:

1. Preferably with the operating switch at OFF or without film in the camera, set the function selector switch to INTERVALOMETER.

2. Turn the interval adjustment dial to the position that results in the desired interval between exposures. The shortest interval will be produced when the dial is rotated as far as it will go counterclockwise; the longest, when it is turned all the way clockwise. The arcs of various lengths around the dial between these two positions may be used as references for setting intervals desired.

3. Start filming with the intervalometer by turning the operating switch from the OFF position with film in camera.

The following table suggests approximate inter-exposure intervals appropriate to various purposes:

Purpose	Filming interval in seconds	Remarks
Analysis of work	0.5-2	
Blooming of flowers: Morning glory	5	Blooming takes about 15 min.
Dandelion	30	Blooming takes about 60 min.
Surveys of traffic	0.5-30	
Movement of clouds	0.5-15	



The following table indicates filming and projection times when the intervalometer is used:

Filming interval in seconds	Filming time required to produce 10 seconds' projection time at 18 fps	Time required to expose a full 50-foot cartridge of film
0.5	1 minute 30 seconds	30 minutes
1	3 minutes	1 hour
2	6 minutes	2 hours
4	12 minutes	4 hours
8	24 minutes	8 hours
15	45 minutes	15 hours
30	1 hour 30 minutes	30 hours
60	3 hours	60 hours

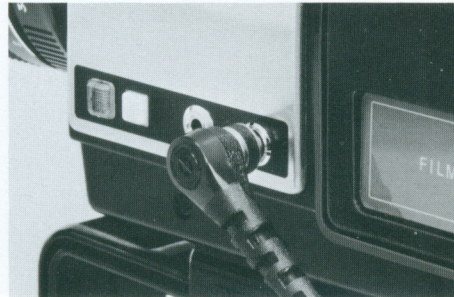
CAUTION:

Be sure to use the eyepiece cap whenever the eyepiece is not being shielded by the cameraman's head as in normal operation (see p.14).

Because of the additional power consumed, only about one film cartridge per set of batteries can be exposed when using the intervalometer to expose it all.

Electronic-flash filming

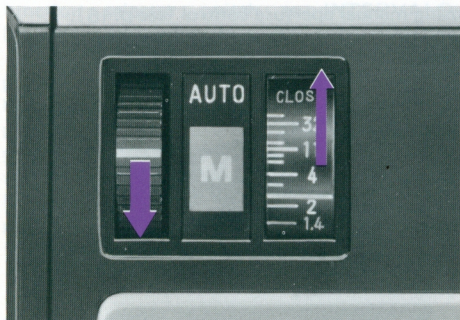
The X-sync. terminal provided on your XL-400 enables you to use electronic-flash ("strobe") lighting for individual single-frame exposures and for time-lapse filming intervals sufficiently long to allow proper recycling between exposures. The flash sync. cord is plugged into the camera's sync. terminal. Automatic aperture control is not suitable for making flash exposures. The proper aperture is generally determined by dividing a guide number for the flash and film in use by the flash-to-subject distance. Then the lens is set at this value by using manual aperture control (see p. 16).



Fading

The aperture of your XL-400 can be opened or closed manually to fade a scene gradually out to black or to fade one in from black. These impressive effects are useful to separate scenes occurring at different times, places, etc.

To fade a scene out, first note the aperture reading for the scene in the scale window with the control set on AUTO*. Then switch the control over to "M" (manual) by turning it all the way toward the bottom of the camera and set the needle to the same F-number on the dial. Next begin filming the scene. When



you wish to fade the scene out, smoothly and slowly turn the aperture control dial as far as it will go toward the bottom of the camera so that the red needle on the scale is all the way to the top of the scale at CLOSE.

To fade a scene in, first carefully note the auto-exposure aperture required to correctly expose the scene from the scale window as above. Then switch the auto/manual aperture control over to manual and rotate it all the way toward the bottom of the camera to close the aperture completely. Next begin filming and rotate the aperture control dial slowly and



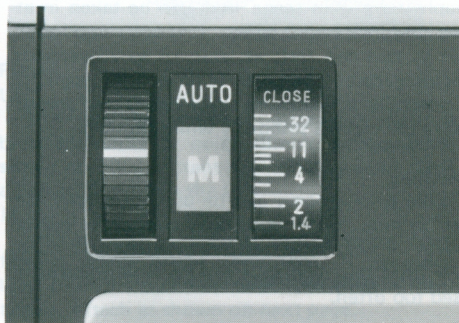
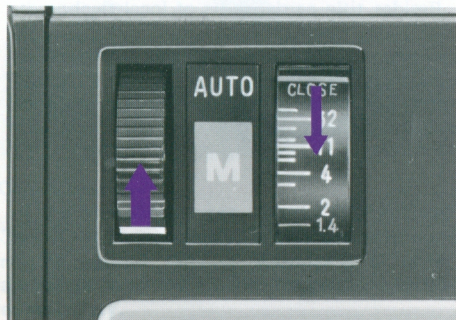
smoothly toward the top of the camera until the needle in the window reaches the correct F-number on the scale**. Continue to film the remainder of the scene at that setting, or fade it out again as above if desired. For auto exposure control, do not forget to reset the dial to AUTO between scenes after fading.

CAUTION:

Be sure to use the eyepiece cap whenever the eyepiece is not being shielded by the camera-man's head as in normal operation (see p.14).

* Fades can be made most easily and successfully under relatively dim lighting conditions, i.e., at correct-exposure F-numbers that are relatively small. To realize this condition, the use of an optional ND filter is recommended when the subject is bright.

** While fading a scene in, you need to watch the aperture scale. To do this, use of a tripod may be necessary.



HINTS FOR BETTER MOVIES

Length of scenes

While the length of individual scenes will naturally vary with conditions and effects desired, too many short scenes will be difficult to view. For a normal, easy-to-view effect, scenes should not be shorter than five to ten seconds.

Nearly any movie benefits from careful editing, and this can be done more conveniently from longer scenes than from ones that are too short.

Panning

Moving the camera over an angle to photograph more of a scene than can be taken in at one time is called panning. It is most important not to pan too fast; at least 15 to 20 seconds should generally be taken to cover a 90° angle. It is generally advisable to use a cine tripod and to move the camera smoothly while panning.

Zooming

Like pans, zooms can be used to impart life and motion to non-moving scenes or to create useful or impressive effects. Remember, however, that this technique can become tiresome if used too often.

Close-ups

Including portraits and close shots down to about 1.2m (4 ft.) in your films from time to time will add variety and make them more interesting. But don't forget to focus carefully for them and to refocus for normal distances after shooting them.

Using extremely close macro shots, e.g., of flowers, small objects, etc. from time to time can add a striking professional touch to your films.

Titles

Besides title cards, shots of local signboards, road signs, clocks, posters, and other printed materials — particularly close-ups — can serve as titles in your film. These can be used to add humor or interest as well as to set the stage for or identify scenes.

OPTIONAL ACCESSORIES

Remote-control cord

This 3m (10 ft.) cord serves with the electromagnetic shutter release system in place of a cable release as well as for positive, unfailing remote control. It plugs into the socket provided on the camera and is used to avoid camera movement in single-frame and tripod filming. A built-in lock device enables continuous-run filming.



Connecting cords

Long and short types, 30cm (11 $\frac{3}{8}$ in.) and 3m (10 ft.) respectively, enable properly connecting various Minolta Autopak-8 D series accessories with the XL-400 for greatly expanded versatility.

Lens shade

This is effective not only for preventing flare from strong direct light on the lens but also for protecting the lens and front of the barrel from rain or snow.



Filters

UV

This absorbs excessive ultraviolet rays in black-and-white or color filming of mountain, snow, or other distant scenes. It may be kept attached to protect the lens.

ND

This is used to prevent overexposure when filming under bright conditions. It decreases light from the scene by two stops (that is, four times). Attach as shown on next page.



Intervalometer-P

This separate intervalometer is a kind of precision repeating timer that plugs into the remote input socket of the XL-400 via a connecting cord and enables ultra-slow or time-lapse filming at precise preselected intervals from 0.5 to 60 seconds between single-frame exposures. The variety of applications for this accurate, heavy-duty unit includes work and motion analyses, meteorological and other scientific studies.

Intervalometer-S

This is a high-quality unit capable of actuating exposure at a broad range of intervals from 0.2 second to 10 minutes.

More versatile than the Intervalometer-P, this unit can be used for sampling (a series of continuous-run scenes filmed for a certain duration at regular intervals) and indent sampling (a series of time-lapse sequences filmed for a certain duration at regular intervals) as well as time-lapse work and motion analyses, studies of animals and plants, traffic and meteorological studies, etc.

Wireless remote-control unit

This unit consists of a compact battery-powered transmitter and receiver that enable unflinching wireless shutter release with the XL-400 as well as all Minolta Autopak-8 D series cameras. It is used to put the cameraman in the picture, film subjects beyond the range of remote-control cords, operate more than one camera at a time from different angles, or other shutter actuation from a distance.

SPECIFICATIONS

- Camera type: XL-type movie camera using Super-8 film cartridges
- Lens: Zoom Rokkor-Macro F1.2, 13 elements in 12 groups, focal length continuously variable from 8.5 to 34mm (4X) for manual or power zoom; swing-in element enabling photomacrography at film-to-subject distances of 9.4 to 42.8cm (3 $\frac{3}{8}$ to 16 $\frac{3}{8}$ in.); filter thread diam. 46mm
- EE system: Through-the-aperture servo-meter system incorporating high-sensitivity CdS cell, mirror shutter, and bridge circuit, powered by battery-compartment dry cells
- Films usable: Super-8 cartridges of Type G color film having a film-speed rating of ASA 160 or of black-and-white or Outdoor-Indoor Type A color film with daylight ratings of ASA 25 or 100 and tungsten ratings of ASA 40 or 160; film-speed setting automatically made when cartridge loaded.
- Shutter: Rotary type with 220° sector opening and a speed of 1/29.5 sec. at a fixed 18fps and single frame; X sync. at single frame
- Drive system: One electric micromotor for film transport, shutter operation, and power zoom while filming
- Power source: Two AA-size (penlight) 1.5v dry cells, alkaline-manganese (Mallory MN 1500 or equivalent) or sealed carbon-zinc (Mallory M 15 P or equivalent) recommended

- Focusing: 1.2m (4 ft.) to infinity by distance scale or split-image focusing spot in finder; macro range, by manual zoom ring and split-image spot
- Viewfinder: Single-lens-reflex type, with split-image focusing spot; over-/underexposure warning, safe-run, and manual-setting signals visible while viewing; +1 to -4 diopter eyepiece adjustment
- Film-supply indicator: Moving-tape type, automatic return when cartridge removed
- Others: Electromagnetic shutter release actuated by filming button, built-in intervalometer, or remote input to socket provided; built-in No. 85 filter (for using Type A film in daylight) positioned by manual switch but removed from light path automatically when movie-light is screwed into its socket; back-light adjustment to continuously give 1 EV more exposure than the normal auto setting; manual aperture control; handgrip attaches via tripod socket.
- Dimensions: 48 x 103 x 184mm (1 $\frac{7}{8}$ x 4 $\frac{1}{8}$ x 7 in.) without handgrip
- Weight: 650g (22 oz.) without handgrip and batteries
- Accessories available: Lens shade; filters: UV, ND, etc.; remote-control cord; Intervalometer-S, Intervalometer-P; wireless remote-control unit; 30cm (11 $\frac{3}{8}$ in.) connecting cord-S; 3m (10 ft.) connecting cord-L

Depth of field in meters at 8.5mm focal length

F No. D (m)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	4.8	2.9	2.1	1.5	1.1	0.8	0.6	0.4	0.3	0.2
10	3.3	2.3	1.8	1.3	1.0	0.7	0.6	0.4	0.3	0.2
5	2.51	1.89	1.52	1.18	0.92	0.69	0.53	0.39	0.31	0.23
3	7.26 1.91	192.49 1.54	∞ 1.29	∞ 1.04	∞ 0.84	∞ 0.65	∞ 0.51	∞ 0.38	∞ 0.30	∞ 0.23
2	3.20 1.46	5.37 1.24	17.30 1.08	∞ 0.91	∞ 0.75	∞ 0.60	∞ 0.49	∞ 0.37	∞ 0.30	∞ 0.23
1.5	2.05 1.19	2.73 1.04	4.09 0.93	17.29 0.81	∞ 0.69	∞ 0.56	∞ 0.46	∞ 0.36	∞ 0.29	∞ 0.22
1.2	1.51 1.00	1.83 0.90	2.32 0.82	3.95 0.72	88.58 0.63	∞ 0.53	∞ 0.44	∞ 0.35	∞ 0.29	∞ 0.22

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Depth of field in feet at 8.5mm focal length

F No. D (ft.)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	15' 9"	9' 6"	6' 10"	4' 10"	3' 6"	2' 6"	1' 10"	1' 4"	1' ∞	∞ 9"
50	12' 1"	8' 1"	6' 1"	4' 6"	3' 4"	2' 5"	1' 10"	1' 4"	1' ∞	∞ 9"
20	9'	6' 8"	5' 3"	4'	3' 1"	2' 4"	1' 9"	1' 4"	1' ∞	∞ 9"
10	24' 9 ⁵ / ₈ " 6' 3 ¹¹ / ₁₆ "	∞ 5 ¹⁵ / ₁₆ "	∞ 4' 3 ¹ / ₈ "	∞ 3' 5 ¹ / ₄ "	∞ 2' 9"	∞ 2' 1 ⁹ / ₁₆ "	∞ 1' 8 ¹ / ₈ "	∞ 1' 3 ¹ / ₁₆ "	∞ 11 ¹³ / ₁₆ "	∞ 8 ¹⁵ / ₁₆ "
7	11' 8 ³ / ₁₆ " 5' 3 ³ / ₁₆ "	21' 6 ⁵ / ₈ " 4' 2 ³ / ₄ "	144' 6 ¹ / ₁₆ " 3' 7 ¹⁵ / ₁₆ "	∞ 3' 1 ¹ / ₁₆ "	∞ 2' 6 ³ / ₁₆ "	∞ 2'	∞ 1' 7 ¹ / ₄ "	∞ 1' 2 ¹¹ / ₁₆ "	∞ 11 ⁵ / ₈ "	∞ 8 ⁷ / ₈ "
5	6' 10 ¹ / ₂ " 3' 11 ¹ / ₄ "	9' 2 ¹¹ / ₁₆ " 3' 5 ¹ / ₂ "	14' 1 ¹ / ₈ " 3' 1 ¹ / ₁₆ "	72' 9 ⁹ / ₁₆ " 2' 7 ¹⁵ / ₁₆ "	∞ 2' 3 ¹ / ₈ "	∞ 1' 10 ³ / ₁₆ "	∞ 1' 6 ³ / ₁₆ "	∞ 1' 2 ³ / ₁₆ "	∞ 11 ³ / ₈ "	∞ 8 ¹⁵ / ₁₆ "
4	5' 5 ⁵ / ₈ " 3' 3 ⁹ / ₁₆ "	6' 1 ¹³ / ₁₆ " 2' 11 ¹³ / ₁₆ "	7' 10 ⁹ / ₁₆ " 2' 8 ⁹ / ₁₆ "	13' 9 ⁹ / ₁₆ " 2' 4 ¹¹ / ₁₆ "	∞ 2' 7 ⁷ / ₈ "	∞ 1' 8 ¹³ / ₁₆ "	∞ 1' 5 ³ / ₈ "	∞ 1' 1 ¹³ / ₁₆ "	∞ 11 ³ / ₁₆ "	∞ 8 ³ / ₄ "

Depth of field in meters at 15mm focal length

F No. D(m)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	15.3	9.2	6.6	4.6	3.3	2.3	1.7	1.2	0.8	0.6
10	27.8 6.	4.8	4.0	3.2	2.5	1.9	1.5	1.1	0.8	0.6
5	7.27 3.81	10.43 3.29	18.43 2.90	∞ 2.45	∞ 2.04	∞ 1.63	∞ 1.30	∞ 0.97	∞ 0.75	∞ 0.54
3	3.66 2.54	4.30 2.31	5.20 2.1	7.58 1.87	19.52 1.63	∞ 1.36	∞ 1.13	∞ 0.88	∞ 0.70	∞ 0.52
2	2.26 1.79	2.48 1.68	2.70 1.58	3.26 1.44	4.35 1.30	8.78 1.13	∞ 0.97	∞ 0.79	∞ 0.64	∞ 0.49
1.5	1.64 1.39	1.74 1.32	1.86 1.26	2.07 1.18	2.45 1.08	3.36 0.97	6.29 0.85	∞ 0.71	∞ 0.60	∞ 0.47
1.2	1.28 1.13	1.34 1.09	1.41 1.05	1.52 0.99	1.71 0.93	2.08 0.84	2.87 0.76	7.78 0.65	∞ 0.55	∞ 0.45

Depth of field in feet at 15mm focal length

F No. D(ft.)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	50' 1 ¹⁵ / ₁₆ "	30'1"	21' 6"	15' 1"	10' 9"	7' 7"	5' 6"	3' 9"	2' 9"	1'11"
50	2994' 9" 25' 3"	∞	∞	∞	∞	∞	∞	∞	∞	∞
20	32' 6" 14' 5"	55' 7" 12' 2"	193' 2" 10' 7"	∞	∞	∞	∞	∞	∞	∞
10	12' 3 ¹ / ₁₆ " 8' 5 ⁵ / ₁₆ "	14' 5 ³ / ₁₆ " 7' 7 ¹³ / ₁₆ "	17' 6 ⁹ / ₁₆ " 6'11 ¹⁵ / ₁₆ "	25'11 ⁷ / ₁₆ " 6' 2 ³ / ₈ "	71'11 ⁷ / ₁₆ " 5' 4 ⁹ / ₁₆ "	∞	∞	∞	∞	∞
7	7'11 ¹⁵ / ₁₆ " 6' 2 ¹¹ / ₁₆ "	8' 9 ¹⁵ / ₁₆ " 5' 9 ⁹ / ₁₆ "	9'10 ³ / ₈ " 5' 5 ¹ / ₁₆ "	11'11 ⁹ / ₁₆ " 4'11 ³ / ₈ "	16' 8 ⁹ / ₁₆ " 4' 5 ¹ / ₈ "	41' 3 ⁷ / ₈ " 3' 9 ¹⁵ / ₁₆ "	∞	∞	∞	∞
5	5' 5 ¹ / ₁₆ " 4' 7 ⁵ / ₁₆ "	5' 9 ¹³ / ₁₆ " 4' 4 ⁹ / ₁₆ "	6' 2 ³ / ₄ " 4' 2 ¹¹ / ₁₆ "	6'11 ⁹ / ₁₆ " 3'10 ³ / ₄ "	8' 3 ¹ / ₈ " 3' 7"	11' 5 ¹ / ₁₆ " 3' 2 ⁵ / ₁₆ "	22' 3 ¹³ / ₁₆ " 2' 9 ³ / ₄ "	∞	∞	∞
4	4' 3 ³ / ₁₆ " 3' 9 ¹ / ₁₆ "	4' 5 ³ / ₄ " 3' 7 ¹¹ / ₁₆ "	4' 8 ¹ / ₂ " 3' 5 ¹ / ₁₆ "	5' 1 ³ / ₁₆ " 3' 3 ¹ / ₁₆ "	5' 8 ³ / ₄ " 3' 1 ¹³ / ₁₆ "	7' 3 ³ / ₈ " 2' 9 ¹ / ₂ "	9' 9 ¹⁵ / ₁₆ " 2' 6 ¹ / ₁₆ "	29' 1 ¹ / ₈ " 2' 1 ¹ / ₁₆ "	∞	∞
									1' 9 ¹ / ₈ "	1' 5 ¹ / ₁₆ "

Depth of field in meters at 34mm focal length

F No. D (m)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	∞ 69.6	∞ 41.7	∞ 29.8	∞ 20.8	∞ 14.9	∞ 10.4	∞ 7.5	∞ 5.2	∞ 3.7	∞ 2.5
10	11.6 8.8	13.0 8.1	14.9 7.5	18.7 6.8	28.7 6.0	141.7 5.1	4.4	∞ 3.5	∞ 2.8	∞ 2.1
5	5.37 4.68	5.64 4.49	5.95 4.31	6.48 4.07	7.34 3.78	9.16 3.42	13.26 3.06	51.22 2.59	∞ 2.19	∞ 1.74
3	3.13 2.89	3.21 2.81	3.31 2.74	3.46 2.65	3.68 2.53	4.08 2.37	4.71 2.19	6.31 1.95	10.64 1.72	∞ 1.43
2	2.05 1.95	2.09 1.92	2.13 1.89	2.19 1.84	2.27 1.79	2.41 1.71	2.61 1.62	3.01 1.49	3.70 1.35	5.94 1.18
1.5	1.53 1.47	1.55 1.46	1.57 1.44	1.60 1.41	1.64 1.38	1.71 1.34	1.80 1.28	1.98 1.20	2.24 1.12	2.87 1.00
1.2	1.22 1.18	1.23 1.17	1.24 1.16	1.26 1.15	1.28 1.13	1.32 1.10	1.38 1.06	1.47 1.01	1.61 0.95	1.89 0.85

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Depth of field in feet at 34mm focal length

F No. D (ft.)	1.2	2	2.8	4	5.6	8	11	16	22	32
∞	∞ 228' 4"	∞ 136' 11"	∞ 97' 9"	∞ 68' 4"	∞ 48' 9"	∞ 34' 1"	∞ 24' 9"	∞ 16' 11"	∞ 12' 3"	∞ 8' 4"
50	63' 9" 41' 2"	78' 36' 9"	100' 4" 33' 3"	176' 2" 29' 1"	∞ 24' 10"	∞ 20' 5"	∞ 16' 8"	∞ 12' 9"	∞ 9' 11"	∞ 7' 3"
20	21' 10" 18' 5"	23' 3" 17' 6"	24' 11" 20' 8"	27' 9" 15' 7"	32' 11" 14' 4"	45' 3" 12' 9"	85' 5" 11' 3"	∞ 9' 4"	∞ 7' 9"	∞ 6'
10	10' 5 ¹¹ / ₁₆ " 9' 7 ⁵ / ₁₆ "	10' 8 ¹¹ / ₁₆ " 9' 4 ³ / ₈ "	11' 1 ¹ / ₂ " 9' 1 ¹ / ₂ "	11' 6 ¹¹ / ₁₆ " 8' 9 ⁵ / ₈ "	12' 3 ⁷ / ₈ " 8' 4 ³ / ₄ "	13' 8 ¹ / ₁₆ " 7' 10 ¹ / ₄ "	15' 10 ¹ / ₁₆ " 7' 3 ³ / ₁₆ "	21' 5 ⁷ / ₁₆ " 6' 5 ⁷ / ₁₆ "	37' 1 ¹ / ₁₆ " 5' 8 ³ / ₁₆ "	∞ 4' 8 ³ / ₄ "
7	7' 2 ⁵ / ₁₆ " 6' 9 ¹ / ₁₆ "	7' 4" 6' 8 ⁵ / ₁₆ "	7' 5 ¹¹ / ₁₆ " 6' 7 ⁷ / ₈ "	7' 8 ⁷ / ₁₆ " 6' 4 ⁷ / ₈ "	8' 1 ¹ / ₄ " 6' 2 ³ / ₈ "	8' 6 ¹¹ / ₁₆ " 5' 10 ¹ / ₈ "	9' 3 ⁵ / ₁₆ " 5' 6 ⁵ / ₁₆ "	10' 11 ¹ / ₂ " 5' 1 ³ / ₁₆ "	13' 10 ¹ / ₈ " 4' 7 ⁷ / ₁₆ "	24' 4 ⁹ / ₁₆ " 3' 11 ⁹ / ₁₆ "
5	5' 1 ¹ / ₈ " 4' 10 ³ / ₈ "	5' 1 ⁷ / ₈ " 4' 10 ¹ / ₈ "	5' 2 ¹¹ / ₁₆ " 4' 9 ⁷ / ₁₆ "	5' 3 ⁵ / ₁₆ " 4' 8 ⁷ / ₁₆ "	5' 5 ¹¹ / ₁₆ " 4' 7 ⁷ / ₈ "	5' 8 ¹ / ₂ " 4' 5 ¹ / ₄ "	6' 5 ⁵ / ₁₆ " 4' 3 ¹ / ₁₆ "	6' 7 ⁵ / ₈ " 3' 11 ⁹ / ₁₆ "	7' 6 ¹ / ₂ " 3' 8 ³ / ₈ "	9' 8 ³ / ₄ " 3' 3 ⁹ / ₁₆ "
4	4' 1 ¹ / ₈ " 3' 11 ⁵ / ₁₆ "	4' 1 ¹ / ₈ " 3' 10 ¹³ / ₁₆ "	4' 1 ⁵ / ₈ " 3' 10 ³ / ₈ "	4' 2 ³ / ₈ " 3' 9 ³ / ₄ "	4' 3 ⁷ / ₁₆ " 3' 8 ⁵ / ₁₆ "	4' 5" 3' 7 ³ / ₄ "	4' 7 ³ / ₁₆ " 3' 6 ⁵ / ₁₆ "	4' 11 ³ / ₁₆ " 3' 4 ¹ / ₈ "	5' 4 ³ / ₄ " 3' 1 ³ / ₄ "	6' 4 ⁹ / ₁₆ " 2' 10 ³ / ₈ "

Your camera should be examined and cleaned from time to time in normal use. When it has been exposed to dust, dirt, or corrosive conditions (such as salt spray), it should be cleaned as soon as practicable after such exposure. It should be kept and stored under proper conditions. If you take good care of your camera, it should serve you well for many years.

Care after use and from time to time

Gently whisk dust, salt particles, or other loose, dry matter off the lens and barrel with a ball-bellows lens brush.

If the lens is still not clean, wipe it with a circular motion from the center outward with a soft, clean cotton cloth or special photographic lens tissue.

For stubborn stains, place one drop of lens-cleaning fluid on lens tissue—NOT directly on lens surface—and swab lens gently with the tissue or cotton. When cleaning the lens, never rub hard, and make sure there are no particles of dust or dirt on the lens which could scratch it when wiped.

Other external parts of the camera can be wiped with a silicon-treated cloth.

Clean the film gate with a soft brush from time to time. Dirt on the film gate and aperture may be visible in projected pictures and may cause mechanical malfunctions in the camera.

Storage precautions

Store your camera in its case when not in use. The operating switch should of course be turned off.

When the camera is to be unused for more than two weeks, be sure to remove the batteries from the battery chamber.

Do not store your camera where the temperature or humidity are high or near salts or corrosive chemicals.

When storing your camera for an extended period, it is best to place the case containing it into an airtight container (such as a heavy or double plastic bag) along with a small bag of a drying agent (such as silica gel).

We hope that you'll enjoy your Minolta XL-400.

If you have any questions, ask your Minolta dealer. He is knowledgeable in all aspects of photography, and he can help you with all of your photographic needs.

Specifications subject to change without notice

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MAINTENANCE AND CARE

Minolta

MINOLTA MASTERS PHOTOGRAPHY