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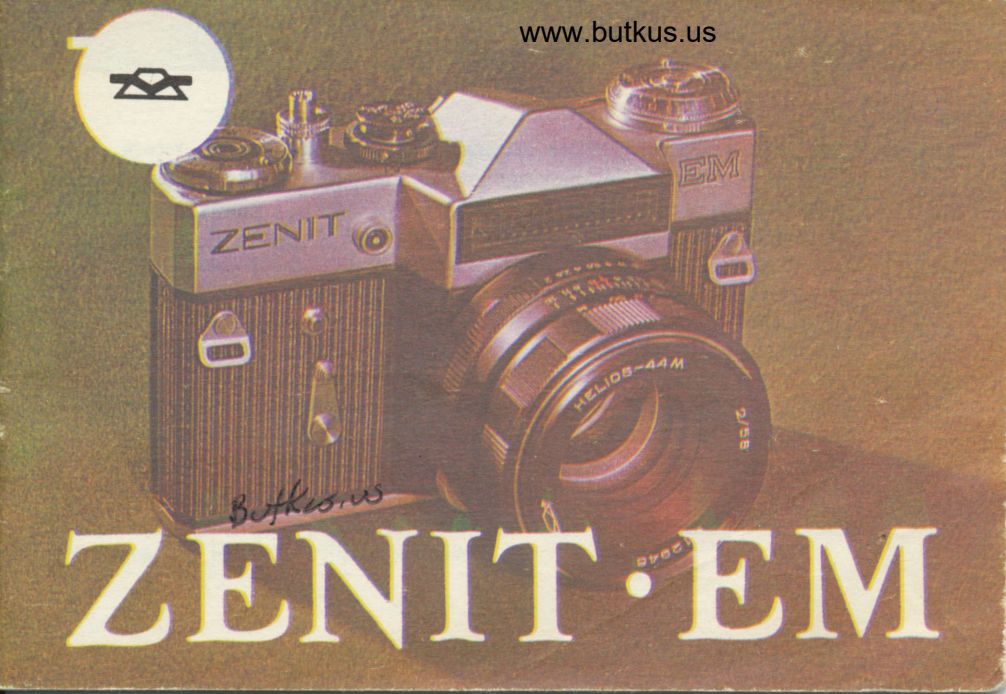


ZENIT·EM

PURPOSE

ZENIT-EM is a 35 mm reflex camera fitted with an instant return mirror. It is designed for making various amateur and special kinds of shooting on black-and-white or color films.

The camera has a built-in exposure meter using a photocell, a self-timer, a shutter setting lever, a synchronizing device for flash bulbs and electronic flash. The camera accepts interchangeable lenses with M42×1 thread and mechanical back focal distance of 45.5 mm.

With the help of extension tubes ZENIT-EM camera may be used for reproduction works. It allows to take pictures of small-size objects with large magnification and at short distances (macrophotography) as well as to take pictures with the help of a microscope (microphotography).

ADVANTAGES

ZENIT-EM camera has a number of certain advantages over the previous models:

— the camera and HELIOS-44M lens are provided with a mechanism of automatic pre-set diaphragm. The shutter release button being pressed, the diaphragm automatically closes to the pre-set value;

— Fresnel lens and diaphragm, fully open at the moment of viewing, ensure uniform image brightness of the object to be photographed in the viewfinder; micropyramids in the centre provide for perfect image sharpness;

— exposed film is rewound with the shutter disengaging bush being fixed;

— a new kind of a take-up spool simplifies the process of film loading;

— the back door lock latches automatically;

— the carrying strap, attached to the camera eyes, makes the camera possible to carry without its case.

SPECIFICATIONS

Picture size	24×36 mm
Width of perforated film	35 mm
Number of frames	36
Shutter speeds	from 1/30 to 1/500 sec (automatic), "B" (by hand) and long exposure time
Viewfinder field of view	20×28 mm
Eyepiece magnification	4.3×

HELIOS-44M LENS

Focal length	58 mm
Aperture scale	f/2 to f/16
Focusing range	0.55 m to "∞"

Mechanical back focal distance	45.5 mm
Light filter mounting thread	52×0.75 mm
Seat for sun shade	∅ 54 mm
Lens mounting thread	M42×1
Tripod socket thread	1/4″
Thread of shutter button bush for cable release	КФ 3.5×0.5
Overall dimensions	141×100×93 mm
Mass	1.1 kg

Certificates of authorship of "Zenit-EM": 366447 of 14 June 1972; 150360 of 18 December 1961; 153652 of 26 February 1952; 102683 of 7 February 1951.

ATTENTION!

The present Instruction Manual contains the basic characteristics and essential operating principles of ZENIT-EM camera, but it can not be regarded as a hand-book on photography.

Before using the camera make thorough study of its handling rules given in the present Manual.

Due to ever-advancing development in camera construction, minor differences may occur between the text and your camera.

Load and unload the camera in subdued light avoiding direct sun rays.

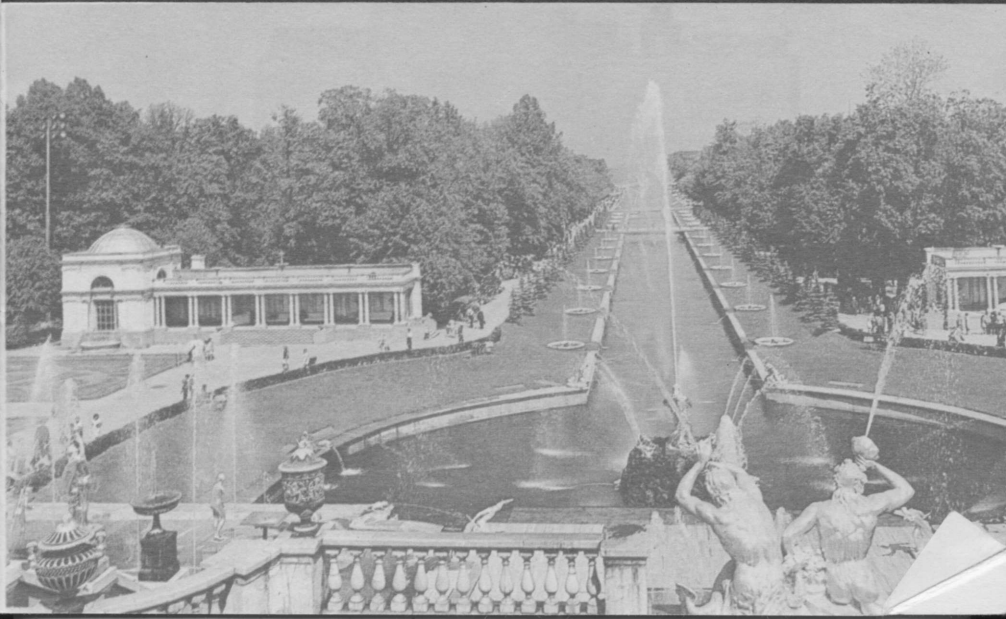
Do not rotate the shutter speed dial within the interval between "B" and "500".

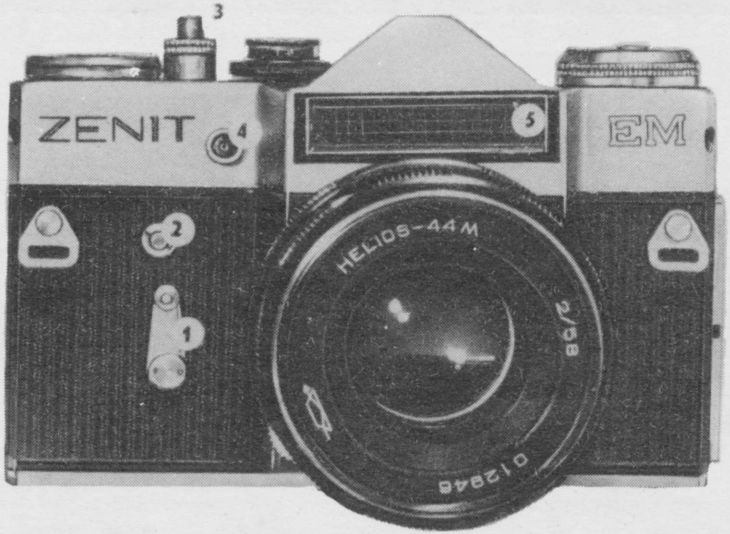
Do not rotate the shutter release button for no reason to avoid disengagement of the shutter cocking mechanism.

Wind the shutter by two-three small turnings of the winding lever until stop to avoid blank exposures.

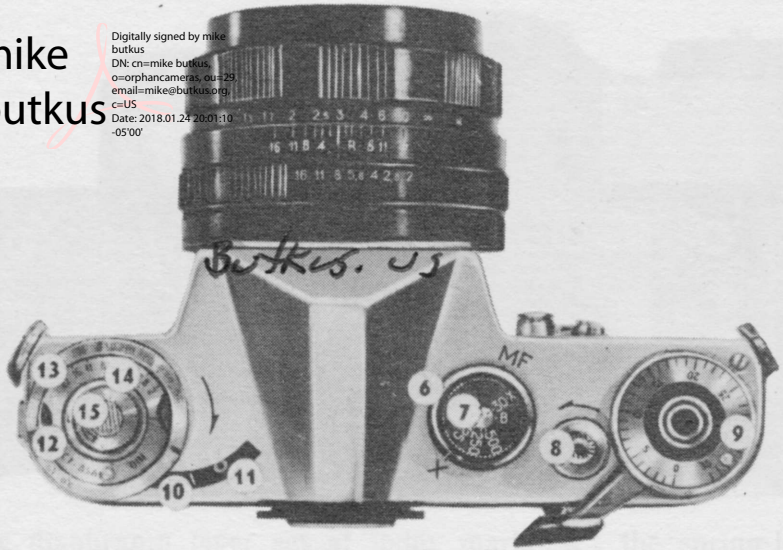
Do not keep the camera for a long period of time with the shutter cocked since this is likely to cause deterioration of the shutter.

MAIN UNITS AND DETAILS

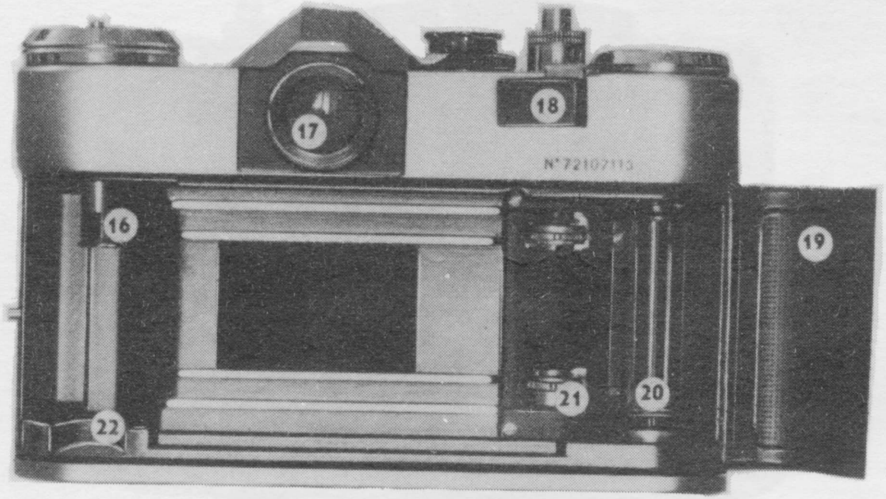




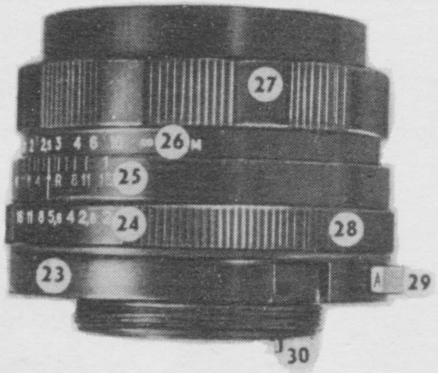
1—self-timer lever; 2—self-timer release button; 3—release button with bush for cable release; 4—flash unit connector socket; 5—photocell



6—synchronization dial; 7—shutter speed dial; 8—shutter disengaging bush; 9—exposure counter dial; 10—exposure meter needle; 11—calculator pointer; 12—film sensitivity scale; 13—calculator shutter speed scale; 14—calculator aperture scale; 15—film rewind knob



16—cassette spool guide; 17—viewfinder eyepiece; 18—shutter cocking lever; 19—folding back door; 20—take-up spool; 21—sprocket; 22—cassette chamber

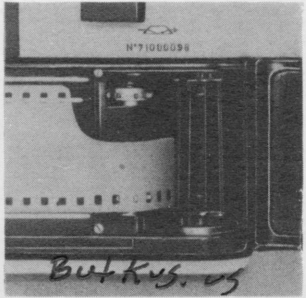


23—lens mounting ring; 24—aperture scale; 25—depth-of-field scale; 26—distance scale; 27—focusing ring; 28—diaphragm setting ring; 29—automatic pre-set diaphragm lever; 30—pusher

With the diaphragm lever set at index mark "A", the spring-loaded diaphragm operates in automatic mode. This device provides for focusing with the diaphragm fully open. At pressing the shutter release button the diaphragm automatically closes to a pre-set value.
To check the depth of field set the diaphragm manually. In such a case bring the automatic diaphragm lever opposite to index mark "M" or press the shutter release button till a definite stop.

PREPARING FOR PICTURE TAKING

LOADING THE CAMERA



The camera should be loaded in the following order:

a) pull the lock latch upward to open the back door;

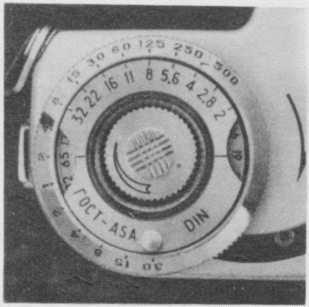
b) pull the film rewind knob up and place the cassette with film in its seat;

c) return the rewind knob to its original position and fix it by turning in the direction of the arrow;

d) pull the film loading end out of the cassette as long as to the camera edge and insert it into the groove of the take-up spool in such a way that a sprocket tooth would enter the film perforation hole;

e) close the back door;

f) cock the shutter by turning the lever as far as it will go and press the shutter release button. As the shutter is cocked, the film is advanced by one exposure. To transport nonexposed film to the film gate, cock the shutter two times, pressing the release button after each cocking.



Should the film be wound tightly in the cassette, the film rewind knob will rotate when the shutter is being cocked. If the film is loose in the cassette, the film rewind knob will fail to rotate at the first frames;

g) bring figure "0" of the exposure counter dial opposite to the index mark. Set the exposure counter only when the shutter is cocked.

SETTING THE FILM SENSITIVITY

On the film sensitivity scale there are figures 16, 32, 65, 130, 250, 500, indicating film sensitivity in ГОСТ-ASA units. The opposite side of the scale carries figures 13, 16, 19, 22, 25, 28, indicating film sensitivity in DIN grades.

To set film sensitivity (for example, 65 ГОСТ-ASA units), turn the diaphragm scale till figure 65 of the film sensitivity scale would appear opposite to the index mark on the diaphragm scale. The film sensitivity is set in the same way if the film is marked in DIN grades.

COMPARATIVE TABLE OF FILM SENSITIVITY UNITS

ГОСТ-ASA	16	20	25	32	40	50	65	80	100	130	160	200	250	320	400	500
DIN	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

EXPOSURE DETERMINING

Direct the camera to an object to be photographed. Match the calculator pointer with the needle of the exposure meter by turning the shutter speed scale. Using the scales find a number of combinations of shutter speeds and apertures. Each of these combinations enables to obtain a negative of normal density. Figures from 500 to 2 on the shutter speed scale show shutter speed values in fractions of a second and those from 1 to 30 show whole seconds. Black figures on the shutter speed scale of the calculator correspond to the figures of the shutter speed scale of the shutter. The shutter speed and the appropriate apertures chosen depending on the subject to be photographed should be correspondingly set on the camera and the lens.

For example, figure 125 of the shutter speed scale would match figure 5.6 of the aperture scale. It means that with the aperture of f/5.6 the shutter speed of 1/125 sec should be used; with the aperture of f/4 — the shutter speed should be 1/250 sec; with the aperture of f/8 — 1/60 sec and so on.

If necessary, it is possible to set the required aperture by a selected shutter speed.

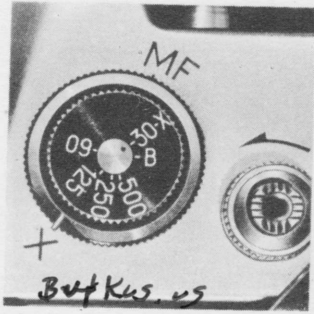
Should the scales fail to match by half an interval, the lens diaphragm ring should be set into a fixed intermediate position in between the corresponding values of the aperture scale.

Cases of sharply heterogeneous illumination of a scene require special attention:

a) the main object of the scene is less illuminated than the background. Such a case usually takes place when taking pictures against snow, sky or water background lighted with the sun.

To obtain the correct exposure of the main (dark) object open the diaphragm 1—2 stops more as compared with the exposure meter system reading;

b) the main object is more illuminated than the background (when photographing an illuminated face of a person against a dark background and so on) In such a case close the diaphragm by 1—2 stops.



BRIGHTNESS MEASUREMENT RANGE OF EXPOSURE METER

Film sensitivity: ГОСТ-ASA	DIN	Shutter speed in sec:
16	13	1/30 to 1/500
32	16	1/30 to 1/500
65	19	1/30 to 1/500
130	22	1/60 to 1/500
250	25	1/125 to 1/500
500	28	1/250 to 1/500

Beyond the indicated range exposure can be determined by calculation tables or in any other way.

SHUTTER SPEED SETTING

Lift the shutter speed dial and turn it round its axis until the required figure is opposite to the

index dot. Release the dial in such a way that it would drop into a fixed position.

Each figure, engraved on the shutter speed dial, corresponds to a certain fraction of a second, and letter "B" indicates a hand-controlled shutter speed. At this shutter speed the shutter stays open till the release button is pressed.

To obtain a long exposure cock the shutter, set the shutter speed dial at "B", press the release button and turn it counter-clockwise as far as it will go. The exposure over, return the button to its normal position.

Long exposures and "B" exposure are recommended to use with the help of a tripod.

STOP SETTING

To obtain a necessary aperture match the index mark with one of the figures (2; 2.8; 4; 5.6; 8; 11; 16), engraved on the diaphragm setting ring. For this purpose rotate the ring until a slight click is heard, which indicates that the ring is in a fixed position.

In so doing you set the value, to which the diaphragm will automatically close, when the shutter release button is pressed (the diaphragm lever should be in the automatic mode position "A"). The diaphragm stays fully open until the moment the shutter release button is pressed.

FOCUSING

Focusing the lens as well as its setting by distance scale is performed by turning the lens focusing ring.

In the centre of the viewfinder eyepiece field of view one can see a microraster with a ground glass ring. Turn the lens focusing ring until the image seen in the circle (microraster) and ground glass ring becomes sharp.

In cases where several objects are to be included in the shot and the distances between objects and the camera vary, the depth-of-field scale should be used. The scale consists of the lens aperture numbers repeated on each side of the main index mark.

When the diaphragm is set and the lens is focused, the limits of depth of field can be read against these number pairs on the distance scale.
For example, with the lens focused at 3 m and the aperture set at f/8, the image of objects, placed within the limits from 2.2 m to 4.5 m, will be sharp on the film. Approximate depth of field limits can be determined visually as well.
With the shutter release button pressed till definite stop before the moment the shutter operates, the diaphragm closes to the pre-set value. In this position it is possible to determine what objects are sharp in the viewfinder eyepiece field of view.
When infrared film is used, the red dash with letter "R" serves as the reading index of the lens distance scale. After focusing the lens the distance scale value, set against the usual index mark on the lens, should be set against the red dash with letter "R".

PICTURE TAKING

PICTURE TAKING

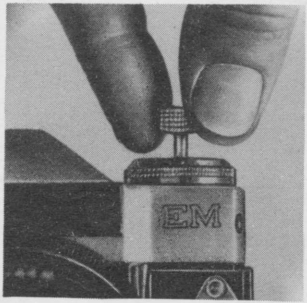
To take a picture cock the shutter, set the shutter speed and the aperture, having brought the automatic diaphragm lever to a required position: "A" — automatic mode or "M" — manual operation. Focus the lens and smoothly press the release button.

UNLOADING THE CAMERA

When the exposure counter dial shows 36 shots, the exposed film should be rewound into the cassette. To do this:

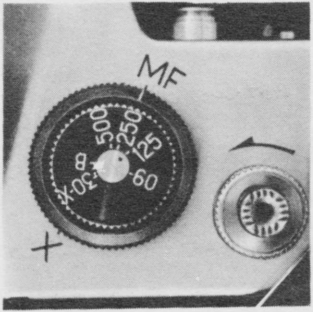
a) press the film rewind knob and turn it against the direction shown by the arrow. In so doing the knob should go out of its seat;

b) disengage the shutter mechanism by turning the shutter disengaging bush in the direction, shown by the arrow;
c) rotate the film rewind knob in the direction shown by the arrow until the feel of the applied force indicates that the end of the film has left the spring of the take-up spool;
d) open the back door of the camera;
e) pull the film rewind knob upwards and remove the cassette.



OPERATING THE SELF-TIMER

To use the self-timer mount the camera on a tripod, cock the shutter and wind the self-timer mechanism by turning its lever until it points straight down. Set the shutter speed and focus the lens. Set the required aperture, having changed preliminarily the diaphragm lever from the position of automatic mode to that of manual operation (from "A" to "M"). Press the self-timer release button till stop and take your place in front of the lens.
The shutter operates in no less than 7 seconds after pressing the button.



OPERATION OF FLASH SYNCHRONIZER

To take pictures in conditions of poor illumination flash bulbs are used. To use a flash bulb set the synchronization dial opposite to letters "MF". When an electronic flash is to be used, set the synchronization dial against letter "X". Setting the synchronization dial see to it that the dial dash is matched with the dash of index "MF" or index "X" with the accuracy of half of a dash thickness.

Only the shutter speed of 1/30 sec. (when gating is full) may be used when photographing with either flash bulbs or an electronic flash.

Hand-controlled exposure "B" is not desirable when using flash bulbs, since a considerable amount of stray light (after flash) gets into the camera and, may result in a blurred image.

N o t e. When operating without flash bulbs, the synchronization dial index mark should be set against the release button.

OPERATION WITH INTERCHANGEABLE LENSES AND PHOTOGRAPHING AT CLOSE DISTANCE

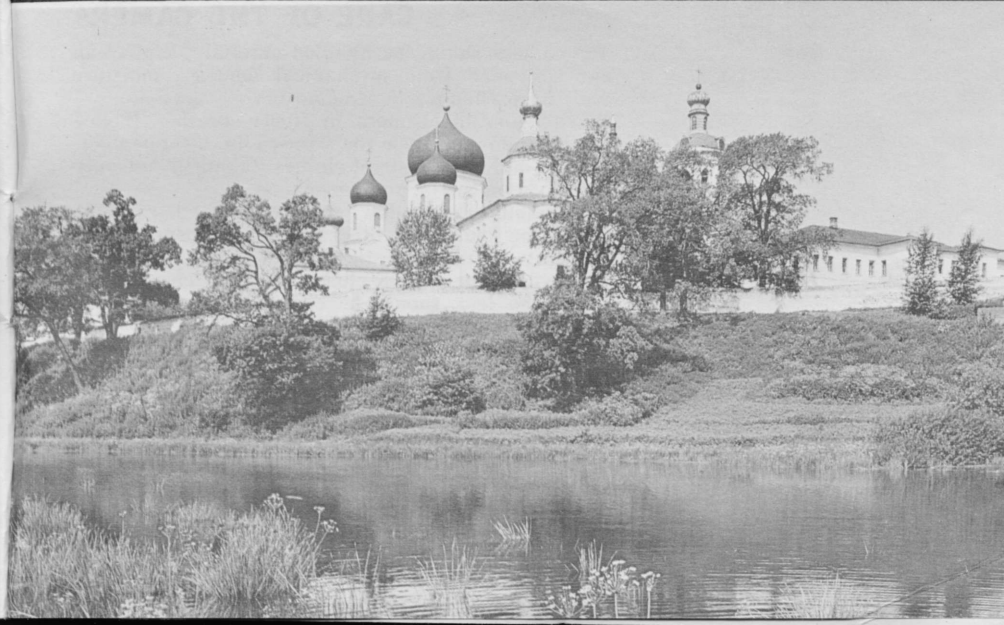
The camera accepts various interchangeable lenses provided with M42×1 mounting thread and mechanical back focal distance of 45.5 mm, which are designed for ZENIT type of cameras with focal plane shutter.

HELIOS-44M lens should be screwed in or out by the lens mounting ring only.

If an interchangeable lens has no automatic diaphragm mechanism, the diaphragm should be handled manually.

When long focus lenses are used, a slight cutting of the left or right edges of the image on negative is likely to take place. When using lenses MTO-500 and MTO-1000 the camera exposure meter can not be used since the outer mount of these lenses overlaps the photocell window.

With the help of a special stand the camera can be used for making reproductions of drawings, manuscripts, photographs and so on. When making reproduction works, use should be made of extension tubes by setting them between the camera body and the lens. In so doing either one tube or a combination of some tubes can be used.
When using extension tubes, the lens diaphragm should be operated manually and the automatic diaphragm lever should be set at index "M".



CARE OF THE CAMERA

The camera should be handled carefully, kept clean and protected from mechanical damage, moisture and sharp changes in temperature.

When using the camera in frosty weather (below —10°C), do not keep the camera in the open air, keep it under your street-clothes, taking it out only for the moment of photographing.

The photocell window requires special care. It should be kept clean otherwise the exposure meter accuracy would be disturbed.

Keep the camera in a closed carrying case. In so doing the lens should be capped and the shutter and self-timer should be released.

Do not touch the optical details with hands since this is likely to damage their coating.

Clean the coated optical surfaces (except for the Fresnel lens which is placed inside the camera) only from outside with a clean soft piece of fabric or cotton, slightly moistened with rectified alcohol or ether.

The Fresnel lens may be cleaned only with an air jet. Using wet means of cleaning is not allowed.