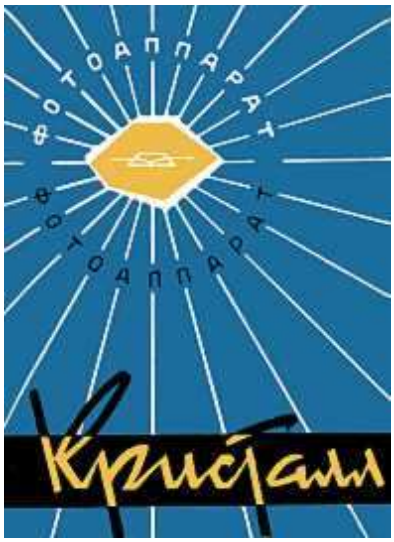
THE KRISTALL CAMERA



TRANSLATION NOTE:

The original URL is `http://www.zenit.istra.ru/mans/kristall/kristall.html`. The original Russian text was translated to English using `http://www.online-translator.com` with subsequent human cleanup. Text with uncertain meaning is marked in magenta.

Note:
The Russian text is identical to the original 1962 - 1963 version of the manual, kindly donated by Konstantin Kondratov (Ukraine), and was specially formatted for HTML in 2004.

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This manual describes the basic features and key rules for using the “Kristall” camera, but it is not a manual on photography.

Before using the camera, carefully study the reference and the operating procedure described herein.

Small divergences between the description and the actual camera are possible owing to technical development of the device’s design.

I. PURPOSE

The “Kristall” camera represents a modern design single-lens reflex (SLR) camera. It is intended for various amateur photography, but can also be used for many kinds of reporting and scientific work.

II. BASIC FEATURES

1. Film width: 35mm
2. Frame format: 24x36mm
3. The camera is issued with one of two lenses, “Industar-50” or “Helios-44,” which have the following characteristics:

	“Industar-50”	“Helios-44”
Focal length	50 mm	58 mm
Maximum relative aperture	1:3.5	1:2
Aperture scale	From 3.5 up to 16	From 2 up to 16
Working distance	45.2 mm	45.2 mm
Minimum focus distance	0.65 m	0.5 m
Lens hood diameter	36 mm	55 mm
Screw-on optical filter size	33x0.5	49x0.5

4. Automatic shutter speed(s): 1/30, 1/60, 1/125, 1/250, 1/500, and “B.”
5. Eyepiece magnification: 5x
6. Cartridge capacity:
   - Film length: 1.6m
   - Number of frames: 36
7. Overall dimensions and mass of the camera:
   - With an “Industar-50” lens: 138x72x93 mm
   - Mass: 675 g
   - With a “Helios-44” lens: 138x100x93 mm
   - Mass: 850 g

III. CAMERA DESIGN

The mirror viewfinder system (fig. 1) works together with the lens 1, and consists of an inclined mirror 2, a matte screen 3 whose flat surface faces down[1], a roof-shaped pentaprism 4, and a three-lens eyepiece 5.

1 Original word: заматирована; all the online translators I tried choked on this word, so I’m guessing based on context and the diagram.

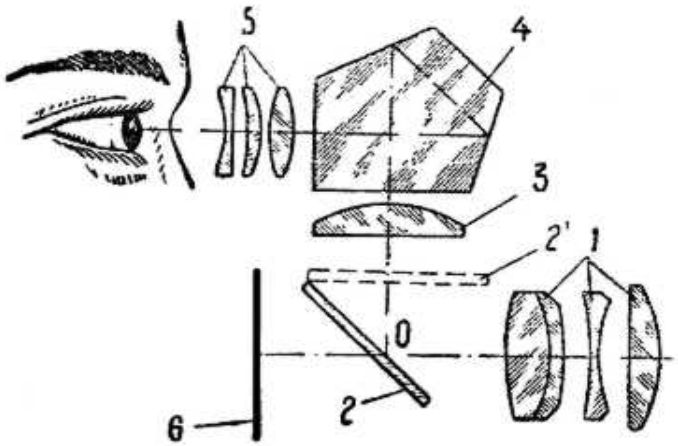


Fig. 1.

When the mirror behind the lens swings upwards (position 2'), it projects an upside-down image on the film 6 of the object being photographed. When the mirror is in the lowered position (position 2), the image is projected on the matte screen 3. The distance from point "0" on the mirror to the film is equal to the distance from the same point to the matte screen. Therefore, if the image on the matte screen is sharp it will be sharp on the film. The reversed image of the subject, viewed with the help of the lens, is reversed by the mirror 2 and pentaprism 4. As a result, the image appears right-side-up to the eye.

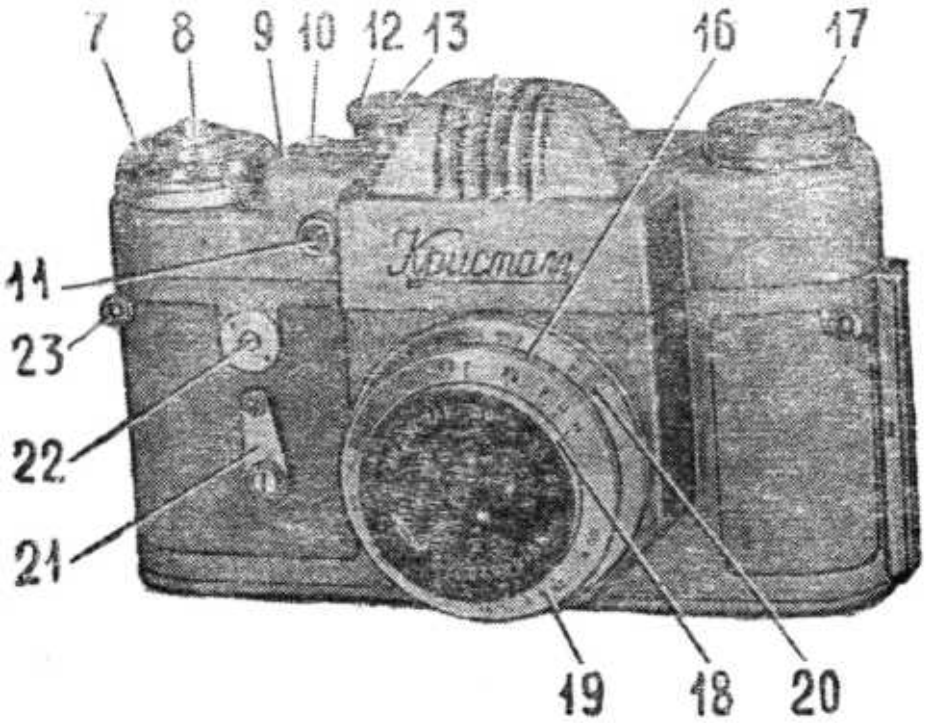


Fig. 2.

Rotating the film advance lever 26 until it stops advances the film one frame, causes the viewfinder mirror to fall downward, and cocks the shutter.

The film frame counter 7 is set to zero by rotating it. The film frame counter may be rotated in any direction. The film frame number appears opposite the black index mark 9 on the top of the camera.

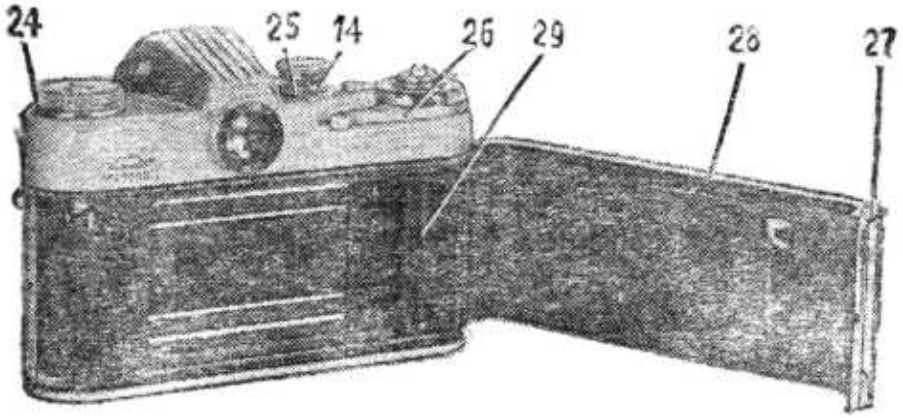


Fig. 3.

You should resetting the frame counter to zero when you lock the camera back.

The trigger button 8 has a standard groove for a remote release cable.

Setting the shutter speed can be done when the shutter is or is not cocked. To set the shutter speed it is necessary to slightly raise the shutter speed dial 12 and to turn it so that the desired speed is aligned with index mark 13, which is in the middle part of the dial. It is impossible to turn the shutter speed dial between “B” and 500.

To take a picture at long shutter speeds (“B”), it is necessary to press the shutter release button 8 and to turn it counterclockwise until it stops. After exposure the button 8 needs to be turned clockwise to be released.

To rewind exposed film from the take-up spool back into its cartridge, follow this procedure:

1. Release the shutter.
2. Fully depress the film rewind button 10.
3. Rotate the film rewind knob 24 to rewind film into the cartridge.

Reduction of the resistance felt on the film rewind knob 24 indicates that the film is fully rewound.

On the front of the camera there is a synchronization socket 11 for use with any model of flash unit. Setting the flash synchronization is done with handle 14.

To use the self-timer, it is necessary to cock the shutter, to turn the self-timer lever 21 counter-clockwise against the stop, and then press the self-timer button 22 to start the self-timer mechanism. The shutter of the device will release automatically after 8-10 seconds.

The eyepiece 5 is adjusted for normal sight. For those with poor eyesight use of corrective lenses of the correct diopter is recommended. These lenses have a diameter of 16 mm and are inserted into the eyepiece jack and fastened with a special ring.

The camera fastens to a tripod with the help of support nuts with a groove of 3/8". The tripod socket is located on the bottom of the camera and its case.

Eyelets 23 are available on the body for carrying the camera on a strap without a case.

The “Industar-50” Lens

The lens has a ring 16 with a scale of distances which is used for photographing without a range finder*. The focus distance is set using an index which is marked on the index ring 20.

The necessary aperture is set by rotating the forward ring 18 to match an index with one of the figures 3.5, 4, 5.6, 8, 11, or 16. For convenience three aperture scales are marked on the aperture ring 19. Three indexes on ring 18 correspond to them.

Depth-of-field markings at various apertures appear on the index ring 20 beside an index.

The lens is screwed or unscrewed from the camera only by rotating the index ring 20.

Inside ring 18 is a 33x0.5 groove for screwing in optical filters and various caps.

IV. OPENING THE CAMERA

To open the back cover of the camera, follow this procedure:

1. Unscrew the case’s tripod socket nut and remove the camera from its case.
2. Pull the lock 27 upwards and open the camera’s cover.

To close the camera, it is necessary to perform these operations in the reverse order.

V. LOADING THE CARTRIDGE

The “Kristall” camera cartridge (fig. 4) consists of three parts: the case, the sleeve, and the spool.

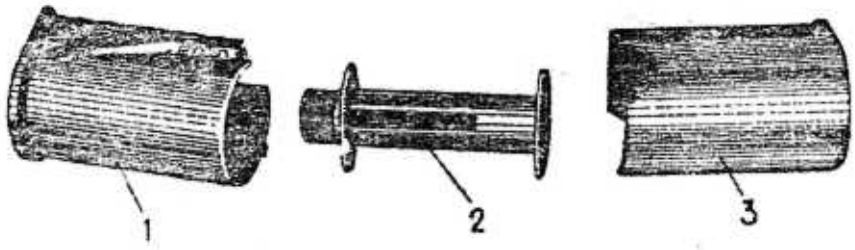
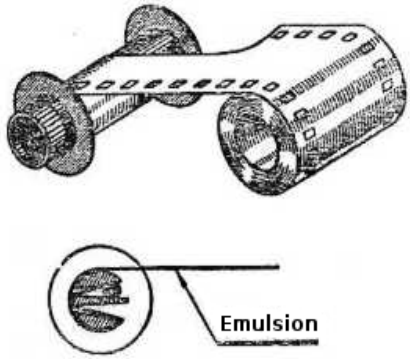


Fig. 4. The “Kristall” camera cartridge: 1—sleeve, 2—spool, 3—holder (the cartridge case).

To load the cartridge, it is necessary to do the following:

1. Detach the sleeve from the case, overcoming the force of the spring.
2. Cut off the end of a film, using the form shown in fig. 5.



3. Pass the end of the film into one of the slots of the spool from the wide side (Fig. 5). Bend to the left the opposite (narrow) side of the slot end of the film and you will pass it into the second slot from the narrow side. Then bend and stretch the end of the film three times so that its end is wedged in the slot.
4. Reel up the film on the spool, emulsion side downwards.
5. Enclose the spool with the film in a sleeve so that the head of the spool passes through the opening in the bottom of the sleeve. A film leader 8-10 mm in length should leave the sleeve.
6. Enclose the sleeve with the spool in the case of the cartridge and affix the spring.

All loading operations on film cartridges must be performed in full darkness, but subsequent operations can be done in normal light.

VI. LOADING THE CAMERA

Loading the camera can be done in normal light as follows:

1. Take the cartridge and cut off the end of the film to make it even.
2. Open the back cover 28 of the camera, pull the end of the film and move it under a spring on the take-up spool 29, then insert the cartridge into its compartment. When inserting or removing the cartridge into the camera, the film rewind knob must be pulled upward, while it must be pushed downward once the camera is loaded.
3. Close the back cover of the camera and press the lock downwards.

As a remind of the film you've loaded, an index of film speeds 17 appears on the film rewind knob. To turn this index, press your finger on its top and hold the rim of the film rewind knob 24 with your other hand to prevent its rotating. Establish the designation of the film speed you've loaded against the index.

The image of a bulb and the sun with beams near an inscription "Цветная"[2] means color film balanced for artificial light or daylight. The numbers 11, 22, 45, 90 and 180 designate GOST film speed.

When loading, for example, a black-and-white film, with a speed of GOST 65, set the index between figures 45 and 90.

To advance the film to an unexposed frame, cock the shutter three times, pressing the trigger button 8 (fig. 2) each time after advancing the film. As you advance the film, observe whether the film rewind knob 24 rotates. If the knob does not rotate, it is necessary to check the correct loading of film in the camera. Remember that if the cartridge is loaded with less film than normal, the knob will not rotate for some time until the film is pulled taught on its spool.

Reset the film frame counter to "0" against its index 9 on the upper shield, which is done by depressing and turning the frame counter dial. This concludes the film loading operation.

VII. USE OF FLASH

Use of flashes requires syncronizing the moment of flash with the shutter operation. For this purpose the "Kristall" camera provides a synchronizing device.

2 English translation of inscription: "Color"

When photographing with disposable flashbulbs it is necessary to turn the flash synchronization handle 14 so that the icon of an electric bulb (corresponding to anticipation of 20±4 ms) appears within the handle's index window.

When shooting with a reusable electronic flash, it is necessary to take into account that its inertia is practically equal to zero. Therefore when working with this flash type the flash synchronization handle 14 needs to be set at the lightning sign (fig. 3).

Shooting with flashes (disposable or electronic) with the "Kristall" is possible only at shutter speeds of 1/30 s or "B," i.e. when the shutter fully opens.

VIII. PHOTOGRAPHING

The "Kristall" camera may be used both hand-held and with a tripod, depending on the required shutter speed.

Before shooting it is necessary to do the following:

1. Unfasten and remove the front case cover.
2. Remove the lens cover.
3. If your subject is poorly lit, mount the camera on a tripod and attach a shutter release cable to the trigger button.
4. If shooting conditions demand use of an optical filter, screw it onto the lens.
5. Completely open the lens aperture, by turning the forward ring of the lens 18 counterclockwise against its stop.

To take a picture:

1. Cock the shutter by fully turning the film advance lever 26 (fig. 3).
2. Set the shutter speed on the shutter speed dial 12 (fig. 2).
3. Focus the image by rotating the focus ring 16 (fig. 2). **Warning**: If the image remains sharp over an interval of rotation, set the focus ring 16 in the middle of this interval.
4. Set the required aperture by turning the aperture ring 18.
5. To take the picture, smoothly press the trigger button.

Immediately after shooting:

1. Place the cover on the lens.
2. If carrying the camera in its case, replace the cover and snap it shut. **Warning:** Do not overlook, immediately after shooting, replacing the lens cover and the camera case. This avoids:
   a) Dust and moisture entering the optics and the mechanisms of the camera, which can lead to deterioration of the camera's function and reduction of its lifespan;
   b) Entry into the lens of direct sunlight, which can lead to burning of the shutters*, since the lens is a strong converging lens;
   c) Fogging of the film from long exposure of the unprotected camera to light.

The camera is also protected from casual impacts and concussions by use of its case.

IX. UNLOADING THE CAMERA

When the frame counter reaches “36,” it means that the film should be rewound into its cartridge and taken out of the camera.

To do this, follow these steps:

1. Replace the camera’s lens cover.
2. Press the film rewind button 10 and, holding it in the pressed position, rotate the film rewind knob 24 in the direction of the arrow until the end of the film is pulled out from under the spring on the take-up spool. (This can be discerned from the effort which is required for extracting the end of the film).
3. Open the back cover of the camera.
4. Pull the film rewind knob 24 upwards and take out the cartridge from the camera.

X. USING THE DEPTH-OF-FIELD SCALE

The distance between the nearest and the most distant subjects that are sharply focused in a picture is referred to as depth-of-field. In cases when it is necessary to photograph objects of significant depth or a number of subjects located at various distances, it is necessary to use a scale 20 (fig. 2). This scale is near to the scale of distances on the focus ring 16, and has the aperture numbers located on both sides of the index. After focusing, this scale shows the boundaries of depth-of-field for the chosen aperture.

Depth-of-field goes from the aperture number on one side up to the same number on the other side. For example, if the lens is focused at a distance of 4 m with an aperture of f/16, the image will be sharp between 2 m up to ∞. When focussing on the same distance of 4 m with an aperture of f/5.6, the image will be sharp between 3 and 7 m.

As you can see from these examples, depth-of-field is considerably reduced with increased apertures. For the depth-of-field scale on the “Kristall” camera, the permissible range of measurement error is 0.05 mm.

XI. CARE AND HANDLING OF THE LENS AND EYEPIECE

1. The antireflective surfaces of the lens has a special, very thin a film of fluoric magnesium or oxides of silicon and titanium (a thickness about 0.1 microns). This film gives the antireflective surfaces a lilac or blue shade in reflected light.
2. Owing to the thinness of this film, it is possible to spoil it easily (to scratch it) by cleaning it carelessly. In order to preserve the antireflective coating, it is necessary to protect the antireflective surfaces from pollution, so that the lens needs cleaning less frequently.
3. The following methods of cleaning of the antireflective surfaces are recommended:
   a) Dust can be removed with a pure, soft brush, pure (well washed) flannel, cotton or cambric napkin or cotton wool without pressing it against the antireflective surface.
   b) Dirt of fatty and non-fatty origins (fingerprints, condensation tracks, etc.) can be cleaned by wiping without pressing pure (well washed) flannel, cotton or cambric napkin or cotton wool slightly moistened (but not excessively) with distilled alcohol, an ether (petroleum ether or sulfuric) or triple cologne. Possible smudges created by drying solvent can be wiped away with a dry napkin.
   c) Moisture can adversely affect the antireflective surfaces: It can cause spots to appear, and under long adverse conditions of storage and operation can completely spoil the antireflective film. If the camera is brought from the cold into a warm place, do not

open the case and do not expose the optics, to avoid condensation. Enable the camera to warm up in its closed case.

4. If, due to mishandling of the antireflective optics or for any other reasons, the antireflective coating of the lens is damaged, light transmission and picture contrast nevertheless will be higher than usual lenses without an antireflective coating.

Similar rules of handling and care apply to the eyepiece.

GUARANTEE

The factory will repair the camera free-of-charge if a malfunction is discovered within one year from the date of purchase, provided that the camera was not repaired outside of the factory.

The faulty device should be sent to one of the guarantee photoworkshops of the factory or should be sent by parcel with its complete delivery set with the “passport” (on which the shop marks the date of sale) and a description of the malfunctions to the address: Krasnogorsk, Moscow region, Krasnogorsk Mechanical Factory. Attn. checking department.

COMPLETE DELIVERY SET

1. Camera with lens: 1 piece
2. Front lens cover (cap): 1 piece
3. Detachable metal cassette with spool: 1 piece
4. Leather case with shoulder strap: 1 piece
5. Camera manual: 1 piece
6. Passport: 1 copy

Notes:

Quality of illustrations corresponds to the original.

*) - in many places of the manual there are pieces of the text that describe rangfinder techniques. Obviously, the text has been noncritically modified from manuals on cameras such as the “Zorki.”

References:

manual: Zenit - 3M