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LUBITEL UNIVERSAL

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OPERATION MANUAL

LUBITEL 166

"UNIVERSAL CAMERA"

CONTENTS

	<i>page</i>
1. General instructions	3
2. Technical data	6
3. Complete set	7
4. Camera design and operation	8
5. Camera operation procedures	17
5.1 Loading the camera	17
5.2 Taking pictures	18
5.3 Unloading the camera	19
6. Maintenance	20

1. GENERAL INSTRUCTIONS

The "LUBITEL 166-UNIVERSAL" (Fig. 1) is an up-to-date and simple to operate camera intended for use by a wide range of amateur photographers.

The camera incorporates a coated lens, two viewfinders (optical and frame), diaphragm shutter with wide range of speeds, self-timer and flash synchronizer. It assures precise focusing, operation with two picture sizes (6×6 and 4.5×6cm), daylight reloading and exterior shooting on tripod and hand-held shooting.

When the reflex viewfinder is opened, a large and distinct image can be seen in the ground glass at any illumination, it allows the camera position to be adjusted when the object has already been chosen, or to find a new subject.

Image focusing is performed by slight rotation of a lens knurled mount.

Scales of distance, diaphragms and exposures and all the control units are easily located to assure speed and convenient operation.

Frame counting is performed through the window according to values on light protective paper of the film.

Due to reflex viewfinder it is possible to take pictures at high level by holding the camera above head height as well as turning it horizontally at a right angle.

The viewfinder lens is $f/28$, i.e. considerably higher than the photographic lens, thus has a higher sensitivity of focusing.

For taking picture at eye level (shots have then a more natural perspective) the frame viewfinder is used, that is more convenient when there is experience in estimating distances by eye and in correct focusing according to distance scale.

The "LUBITEL 166-UNIVERSAL" is a daylight loading camera. For convenience the back is hinged.

The camera is rated for work in the temperature range from -15°C to $+45^{\circ}\text{C}$ without direct affect of solar radiation and atmospheric precipitation.



Fig. 1

1. TECHNICAL DATA

Film accepted, mm	61.5
Picture size, cm	6×6 & 4.5×6
Picture number	12 or 16
Photographic lens - coated three-element anastigmat T-22:	
focal length, cm	7.5
relative aperture	f/4.5
Viewfinder lens relative aperture	f/2.8
Automatic shutter speeds, s	1/250, 1/125, 1/60, 1/30, 1/15
(With shutter set to 'B' any manual-control shutter speeds are obtainable).	
Diaphragm scale	from 4.5 to 22
Distance scale, m	from 1.3 to ∞ (infinity)
Self-timer operation time, s	7-15
Thread dimensions for the light filter mount, mm	40.5×0.6

3. COMPLETE SET

3.1	Camera "LUBITEL 166-UNIVERSAL"	1
3.2	Film rewinding spool	1
3.3	Cable release	1
3.4	Shoulder strap	1
3.5	Lens cap	1
3.6	Film gate limiting frame	1
3.7	Frame finder washer	1
3.8	Accessories box	1
3.9	Casing	1
3.10	Storage box	1
3.11	Operation manual	1

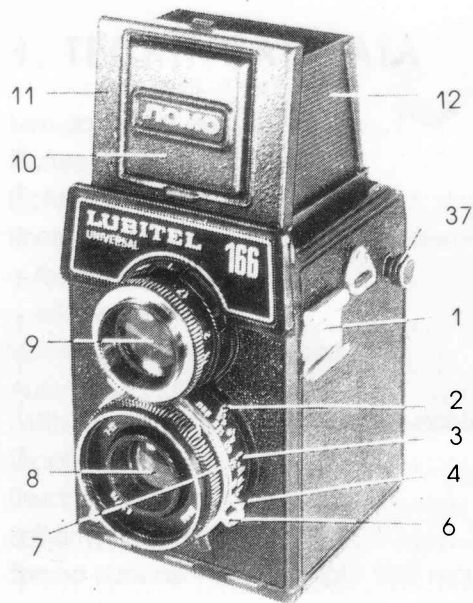


Fig. 2

4. CAMERA DESIGN AND OPERATION

Figs. 2-8 show main camera parts.

1. block for fixing accessories.
2. diaphragm scale indicator.
3. diaphragm scale.
4. flash shoe.
5. dog of the shutter speed adjusting ring.
6. self-timer lever.
7. exposure scale.
8. photographic lens.
9. viewfinder lens.

- 10. plate.
- 11. front frame.
- 12. light protective hood.
- 13. shutter release lever.
- 14. cable release socket.
- 15. shutter cocking level.
- 16. distance scale.
- 17. reminder dial.
- 18. film rewind knob.
- 19. sling swivel.
- 20. diaphragm control lever.
- 21. tripod nut.
- 22. field lens.

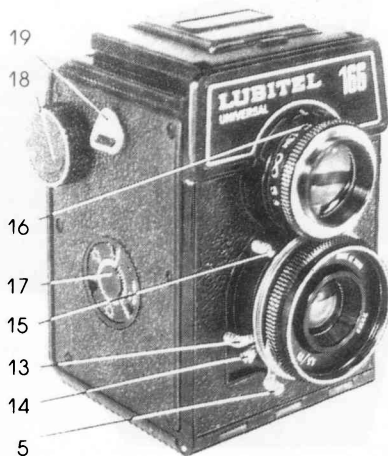


Fig. 3

- 10. plate.
- 11. front frame.
- 12. light protective hood.
- 13. shutter release lever.
- 14. cable release socket.
- 15. shutter cocking level.
- 16. distance scale.
- 17. reminder dial.
- 18. film rewind knob.
- 19. sling swivel.
- 20. diaphragm control lever.
- 21. tripod nut.
- 22. field lens.

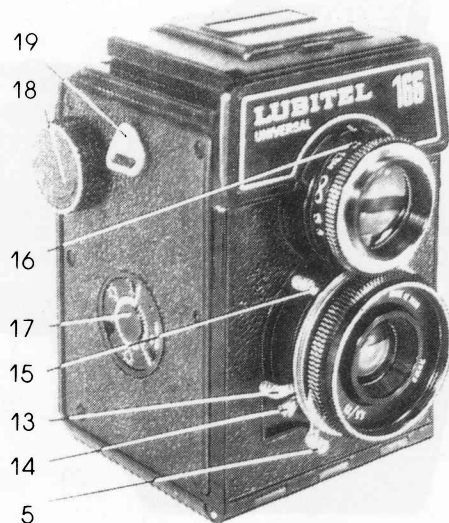


Fig. 3

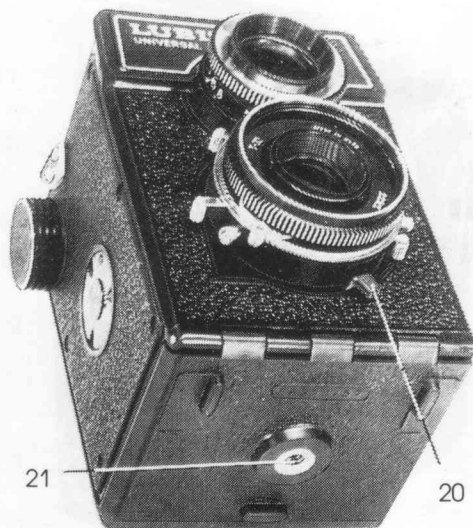


Fig. 4

- 23. 4.5x6cm limiting marks.
- 24. lock index.
- 25. ground glass circle.
- 26. folding focusing magnifier.
- 27. viewfinder cover lock.
- 28. camera back-lock head.
- 29. take-up spool.
- 30. window cover plate head.
- 31. window.
- 32. back.
- 33. turret to adjust windows according to a picture size required.
- 34. window adjustment index.

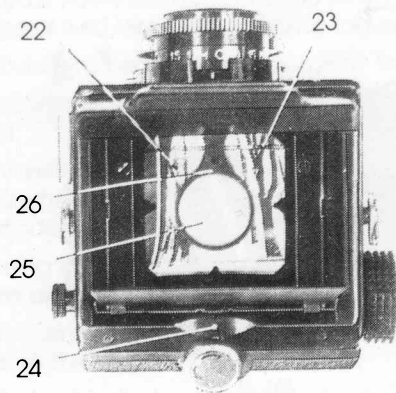


Fig. 5

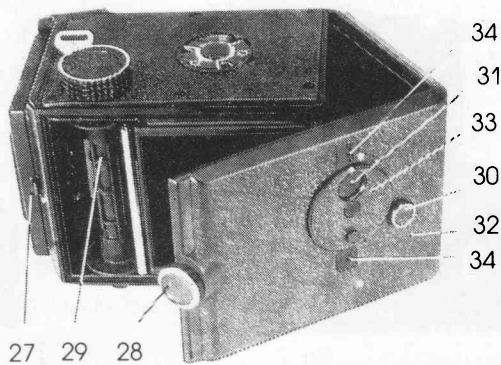


Fig. 6

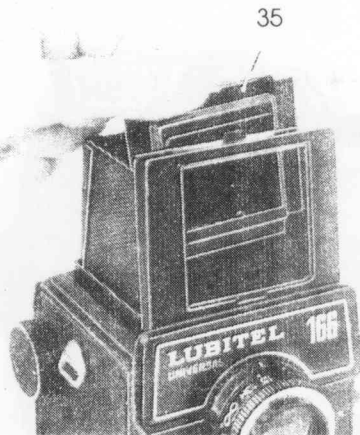


Fig. 7

35. frame finder washer.

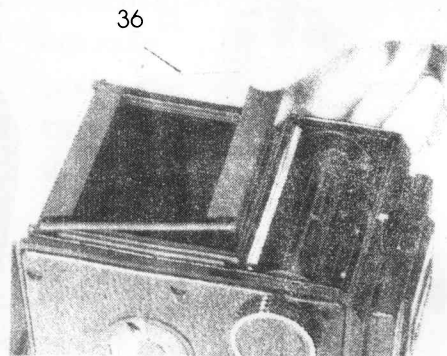


Fig. 8

36. film gate limiting frame.

37. take-up spool spindle head.

The reflex viewfinder consists of the viewfinder itself and a ground glass representing a small circle in the centre of field lens, with a folding focusing magnifier mounted above.

The field lens bears marks which limit the field of picture to 4.5x6cm.

The viewfinder is provided with metal light-protective hoods that open simultaneously when raising the cover.

The viewfinder should be closed by the following procedures: first close the magnifier, then the side hoods, the rear hood with a square window and last the cover until it's front frame lug catches with the viewfinder case lock catch.

Focusing the image on the ground glass circle and in film plane is performed simultaneously as both lenses are coupled with each other with knurled mounts. The nearest focusing distance is 1.3m.

The focusing magnifier is attached to the panel from inside. The magnifier is set to operation by pulling it up from the cover.

The frame viewfinder is formed by the front frame and rear light protective hood with a square window. To open the viewfinder it is necessary to tilt the panel inside so that it catches the rear hood lug. Slightly pulling out the rear hood is enough to close the viewfinder.

A washer is included in the camera delivery set to obtain pictures of 4.5x6cm size. The washer is inserted between the panel and front frame of the finder after the panel catches the rear hood lug.

To determine image limits, the camera should be held at eye level, the object should be observed through the square window in the rear hood keeping the camera at the distance when the window edges coincide with those of the square opening in the front frame. In this case the limits of the viewfinder field will be the image limits.

The distance scale is graduated at viewfinder lens mount in metres.

Diaphragm shutter is automatically giving the following speeds: 1/250, 1/125, 1/60, 1/30, 1/15s. With shutter set to 'B' any manual-control shutter speeds are obtainable.

Selected exposure time is set by rotating the adjusting ring dog 5. (fig. 3) to coincide the ring edge index with required exposure value.

Before shooting it is necessary to cock the shutter by rotating the cocking lever fully downward. Shutter is released by gently pressing the release lever or the knob of the cable release, the camera is provided with a socket for this. With shutter set to 'B' index, it remains open from the moment of pressing the lever until it releases.

To activate the self-timer it is necessary to set the selected automatic exposure, cock the shutter, turn the self-timer lever 6. (fig. 2) fully downward and to press the release lever 15 (fig. 3). In 7-15 seconds the shutter will operate and the picture will be taken.

Remember that with shutter set to 'B' and release lever pressed it is impossible to cock the self-timer lever.

Distance corresponding to scale division, m.	Depth of field in metres with diaphragms					
	1 : 4.5	1 : 5.6	1 : 8	1 : 11	1 : 16	1 : 22
∞	25.59 - ∞	20.57 - ∞	14.40 - ∞	10.47 - ∞	7.20 - ∞	5.24 - ∞
15	9.44 - 35.62	8.74 - 53.75	7.42 - ∞	6.25 - ∞	4.95 - ∞	3.97 - ∞
8	6.14 - 11.51	5.81 - 12.89	5.20 - 17.50	4.60 - 31.71	3.87 - ∞	3.25 - ∞
6	4.22 - 6.15	4.06 - 6.52	3.76 - 7.50	3.44 - 9.25	3.02 - 15.16	2.63 - 66.77
4	3.49 - 4.69	3.38 - 4.90	3.17 - 5.43	2.94 - 6.28	2.63 - 8.51	2.34 - 14.89
3	2.70 - 3.37	2.64 - 3.47	2.52 - 3.72	2.37 - 4.09	2.17 - 4.91	1.97 - 6.49
2.5	2.30 - 2.74	2.25 - 2.81	2.16 - 2.97	2.06 - 3.20	1.90 - 3.67	1.75 - 4.47
2	1.87 - 2.15	1.84 - 2.19	1.79 - 2.28	1.71 - 2.41	1.61 - 2.66	1.50 - 3.05
1.7	1.61 - 1.80	1.59 - 1.83	1.54 - 1.90	1.49 - 1.98	1.41 - 2.14	1.33 - 2.38
1.5	1.43 - 1.58	1.41 - 1.60	1.38 - 1.65	1.34 - 1.71	1.27 - 1.83	1.21 - 1.99
1.3	1.25 - 1.36	1.23 - 1.37	1.21 - 1.41	1.18 - 1.45	1.13 - 1.53	1.07 - 1.64

The flash synchronizer is intended for matching the moment of flash with complete shutter opening.

When electronic flash is used the shutter may be set to any automatic exposure, with flash bulbs the shutter should be set to 1/15 or 'B'. On releasing the shutter the synchronizer will act automatically.

The diaphragm serves for the control of light opening diameter. The stopping down is performed by moving the lever 20 (fig. 4) with pointer 2 (fig. 2). The lens is stopped down when increase of the depth of field is desirable or when the available light is too intense. Photographic lens depths of fields with different diaphragms and distances are given in the table on page 15.

At exposure scale every following value is two times the preceding one. The diaphragm (except for first one) is f-numbered in such a manner that the pointer moving to a stop increases or decreases the amount of light for exposure two times. For instance the exposure time 1/60 seconds at f/5.6 and if the lens has been stopped down to f/8 in other equivalent conditions the shutter should be set to 1/30 second.

Exposures and f-numbers carry the denominators only as '15' instead of 1/15, '4.5' instead of 1/4.5 and so on.

The diaphragm scale between values '8' and '11' and distance scale between '8' and '15' are marked with white dots. With diaphragm scale pointer and distance scale index set to these dots all the images of objects at a distance of 4.5m to infinity are obtained sharp.

5. CAMERA OPERATION PROCEDURES

5.1 Loading the Camera

Taking the camera in your left hand, open the camera back by turning lock head 28 (fig. 6) until the index on the head and the dot on the body are matched.

For shooting 4.5x6cm pictures, put limiting frame 36 (fig. 8) on the film gate.

Turning the film rewinding knob 18 (fig. 3), bring the spool slot at position convenient for loading the film protective paper end.

Break the seal of the film protective paper and insert the spool with the film into the body receptacle between the spring and the body wall having pressed the flat spring with your finger.

Unwind the end of the protective paper and on folding it down for about 10mm insert in the slot of the take-up spool. Then holding the spool with the film with your left finger and rotating the film rewinding knob wind 2-3 layers of the protective paper to the take-up spool. Close the camera back ensuring that the paper tension is taut.

Depending on picture size chosen (4.5x6 or 6x6cm), turn turret 33 (fig. 6) until window 31 is adjusted at respective index 34.

Having turned the window cover plate head 30 to the right or to the left, rotate the film rewind knob 18

(fig. 3) until first the signal marks on protective paper and then '1' appears in the window. Close the cover plate.

5.2 Taking Pictures

Before taking pictures take the cover off the lenses by pressing simultaneously on the cover bulges, set the required exposure time and diaphragm. Exposure is set on exposure scale by rotating exposure adjusting ring dog 5 (fig. 3). The required diaphragm value is set by moving the lever 20 (fig. 4) with index along the scale.

Looking to the viewfinder determine the frame limits (for 4.5x6cm picture size, limiting marks 23 (fig. 5) are put down on the field lens) and with the focusing reach the required sharpness at the ground glass circle. If the object image i.e. the part of the picture that needs to be most in focus is at the picture edge, turn the camera so that the object is in the centre and focus accordingly, then return the camera to its original position before releasing the shutter.

With the cocking lever 15 (fig. 3) cock the shutter and release it smoothly.

Pull the film at a picture length (immediately after taking, in order not to forget). To do that open the window cover plate and rotate the film rewinding knob 18 until the following figure appears in the window, then close the cover plate.

5.3 Unloading the Camera

After the last exposure has been made rewind the film protective paper onto the take-up spool. Sometimes when the winding is almost completed the turning of the knob is detained due to the paper jammed in the supply spool slit, however, this should not prevent the camera being unloaded in daylight.

Open the camera back.

Fully pull off the film rewinding knob and take-up spool head.

Carefully take out the spool with the exposed film, seal the protective paper end and keep the film until it is developed.

Take the spool out of supply spool receptacle and insert into that of the take-up spool. Further, slightly turning the film rewind knob, press it and the head of the take-up spool spindle up to the stop.

Close the camera back.

Put cover on the camera lenses. For convenience, adjust their mounts at the same level.

6. MAINTENANCE

Handle the camera with care.

Contaminated lenses deteriorate picture sharpness, so it is necessary to always keep lenses clean. The objective lenses can be wiped from the outside only using a clean cambric or linen cloth or cotton wool.

Never dismantle the camera.

Never wipe the plastic parts of the camera and the field lens with alcohol, acetone or other active solvents.