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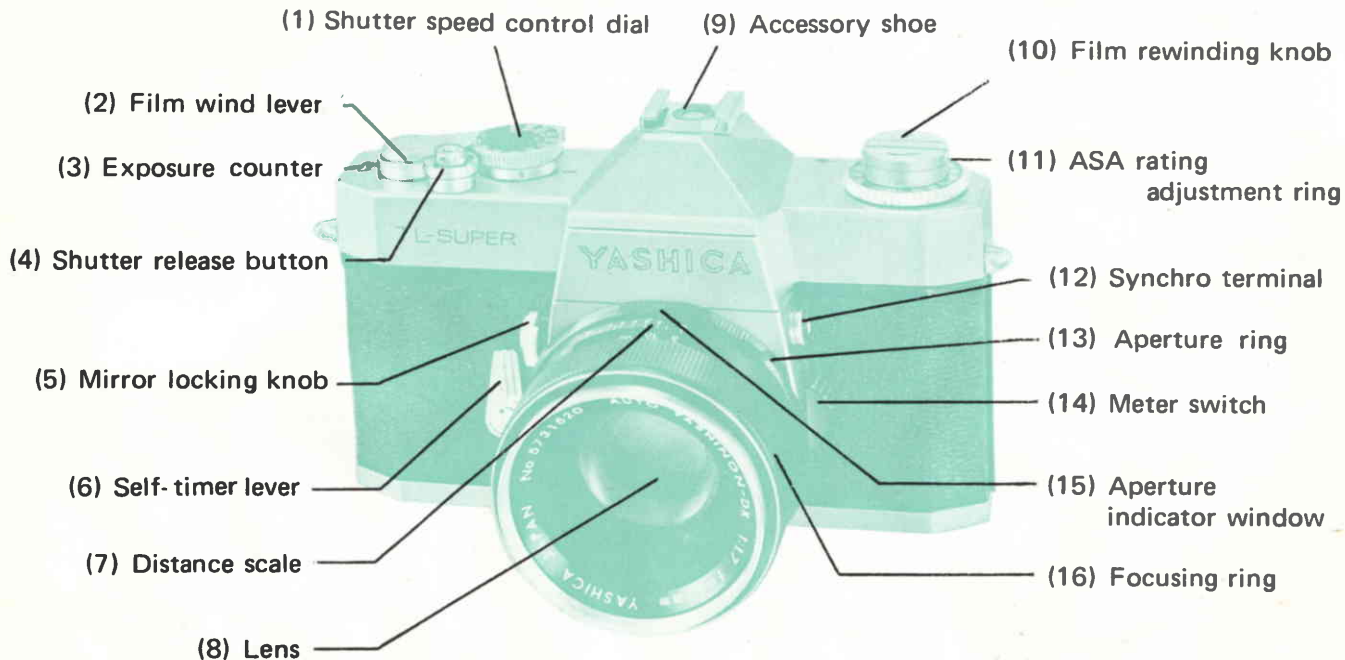
YASHICA

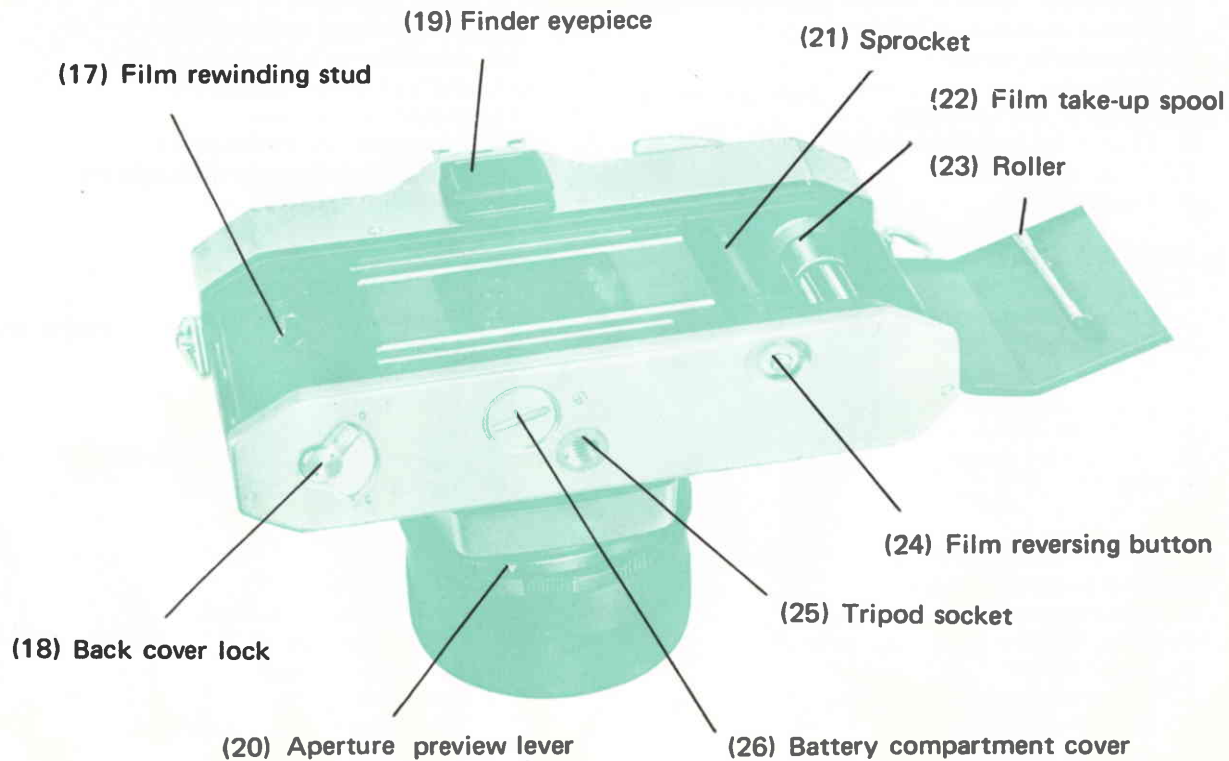
TL Super
TL Super
TL-Super

INSTRUCTION BOOKLET GEBRAUCHSANWEISUNG
MODE D'EMPLOI FOLLETO DE INSTRUCCIONES

35

DESCRIPTION





INSTALLING THE BATTERY



The Yashica TL-Super is the first camera in the world that uses the new silver oxide battery which provides higher performance than the ordinary battery.

It accepts the following types:

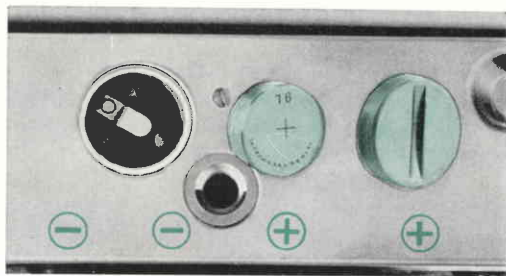
Mallory MS 675H 1.5V

Eveready S-76-E 1.5V

Ray-o-vac RS 76-G 1.5V



Remove the battery compartment cover by turning it in the direction of the arrow with the edge of a coin.



Place the battery in the compartment, making sure that (—) side faces inside (See Fig.). If the battery is installed in a reverse position, the exposure meter will not function. After installing the battery, close the battery compartment cover securely.

ADVANTAGES OF SILVER OXIDE BATTERY

It is small in size and yet provides high mW/h output.

It functions efficiently in extremely low temperature of even -20°C (In case of mercury battery, the limit is about 0°C).

It is ideal as power source for exposure meters because it maintains a constant voltage level.

It features low internal resistance and therefore provides constant performance in discharge. It permits ready storage and functions satisfactorily even when stored for two years.

Do not disassemble the silver oxide battery.

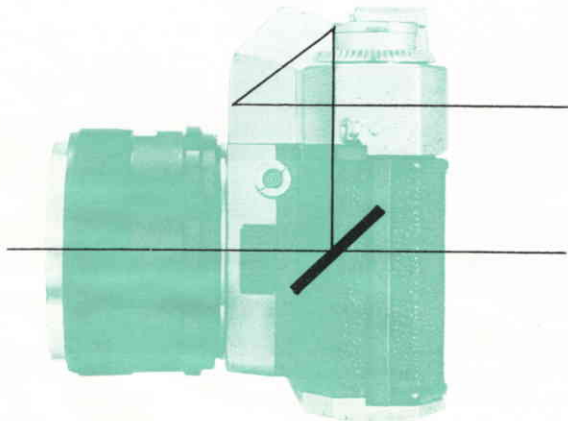
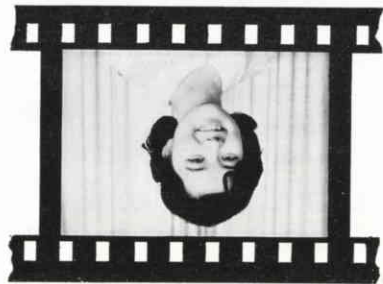
Do not throw any used silver oxide battery into a fire or where children can get hold of it.

FINDER AND PICTURE COMPOSITION

The Yashica TL-Super is a pentaprism type single-lens reflex camera; therefore, its finder shows images exactly as they will appear on the film plane. You can compose your picture precisely by sighting through the finder, without worrying about parallax problems.



The fully automatic diaphragm system assures maximum brilliance of the image at all times.



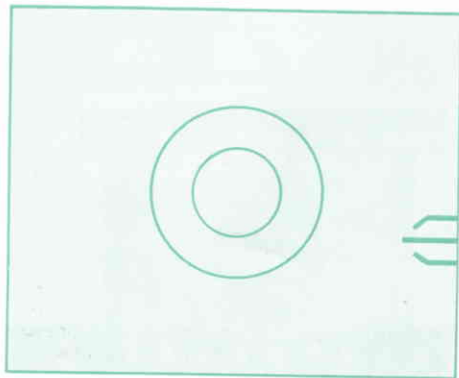
FOCUSING



The Yashica TL-Super features fully automatic diaphragm system which permits focusing and composing through the finder at full lens opening.

To secure focus peep through the finder eyepiece and turn the focusing ring until the image on the focusing screen appears clear and crisp.

The microscreen focusing spot enables most accurate and efficient focusing.





FOCUSED

Precise focus is secured when the subject appears clear and crisp on the focusing screen.



OUT OF FOCUS

When the subject is out of focus, the image on the screen appears blurred. The blurring of the image can be noted most conspicuously on the micro-screen focusing spot.

The same efficient method of focusing is employed even when the camera is mounted with any type of interchangeable lens or close-up lens.

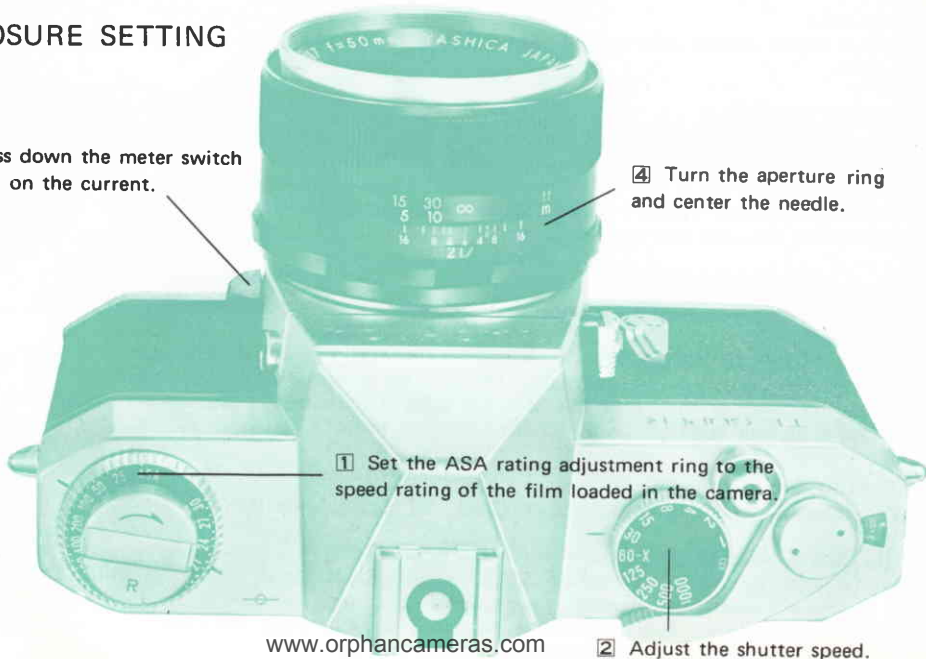
EXPOSURE SETTING

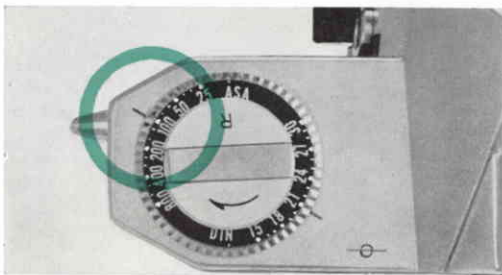
③ Press down the meter switch to turn on the current.

④ Turn the aperture ring and center the needle.

① Set the ASA rating adjustment ring to the speed rating of the film loaded in the camera.

② Adjust the shutter speed.





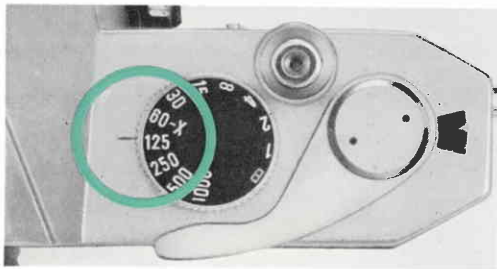
1 Setting the ASA speed rating.

Turn the ASA rating adjustment ring and align the figure denoting the speed rating of the film loaded in the camera with the index mark. Correct exposure cannot be obtained unless the camera is set for the proper ASA rating.

- The ASA rating denotes the degree of light sensitivity of the film emulsion and is clearly indicated on the box or the instruction which comes with the film.
- The lines between the settings on the ASA rating dial indicate intermediate speeds (See ASA-DIN conversion table for details on intermediate speeds).

The figure shows two color calibration charts, ASA and DIN, used for color calibration. Each chart consists of a series of color patches (black, white, and various shades of gray) arranged in a row. The ASA chart has 10 patches, and the DIN chart has 10 patches. The density values for each patch are listed below the patches.

ASA	DIN
25	15
50	18
100	21
200	24
400	27
800	30



② Adjusting the shutter speed.

Turn the shutter speed control dial and align the desired setting with the index mark.

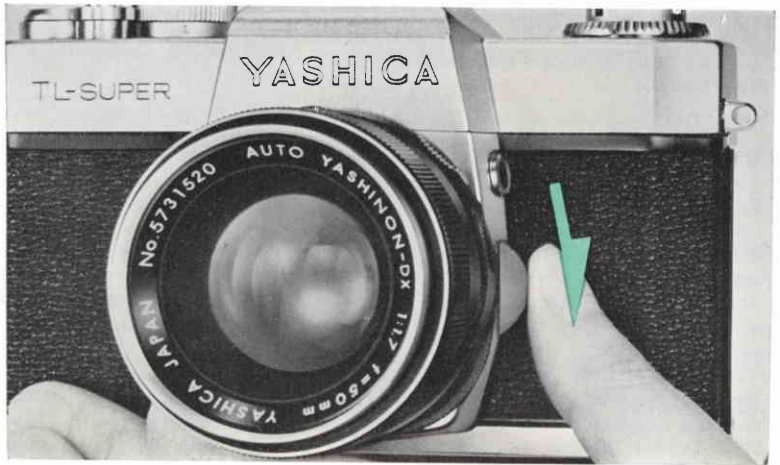
Light condition	Shutter speeds
Fair	1/1000, 1/500, 1/250 sec.
Partly cloudy	1/250, 1/125 sec.
Overcast, rainy	1/60, 1/30 sec.
Indoors	1/30 to 1sec.
Special cases	B

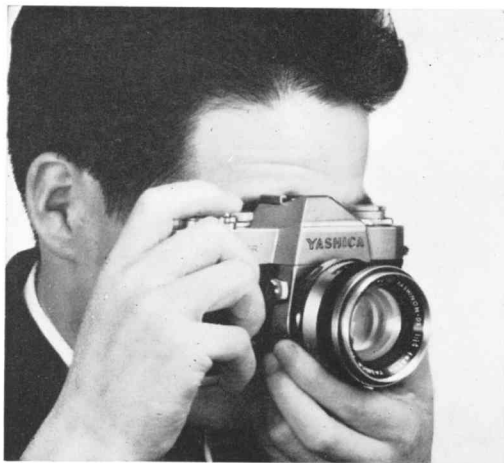
The shutter speed guide is for the benefit of beginners (For shooting under ordinary conditions with ASA 100 film) :

- Set the shutter speed at 1/1000 sec., when shooting fast-moving subjects, such as airplanes, automobiles and sport scenes.
- In case of ordinary moving subjects, shoot at 1/500 sec.

③ Turning on the meter switch.

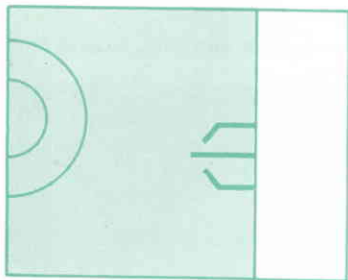
Press down the meter switch to activate, the meter will turn on. The meter needle seen through the finder will then begin to move and, at the same time, the diaphragm will close down.



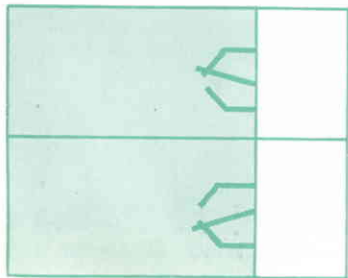


4 Turn the aperture ring and center the needle. If the meter needle fails to center properly even when the aperture ring is rotated, adjust the shutter speed control dial to another setting.

Note: The camera is set for perfect exposure, when the meter needle seen through the finder is centered accurately. Then, push up the meter switch to turn off the current. This will restore the lens opening to full aperture and enable viewing through the finder at maximum brilliance during photography.



Correct exposure is obtained when the meter needle is centered properly. Press the shutter release when the needle is at the center and you will obtain perfect exposure every time.



Readjust the shutter speed if the needle fails to center even when the aperture ring is given a turn.

In case the needle points upward, it signifies over-exposure. Adjust the shutter speed to a faster setting.

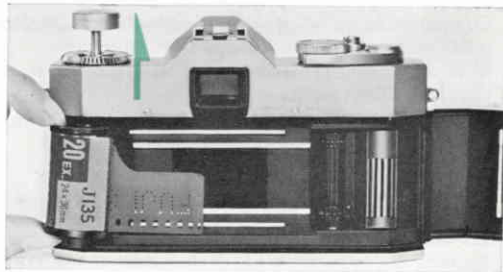
The needle pointing downward indicates under-exposure; therefore, select a slower shutter speed.

FILM LOADING



❶ The back cover will spring open when the back cover lock lever on the base of the camera is shifted to "O" (Open).

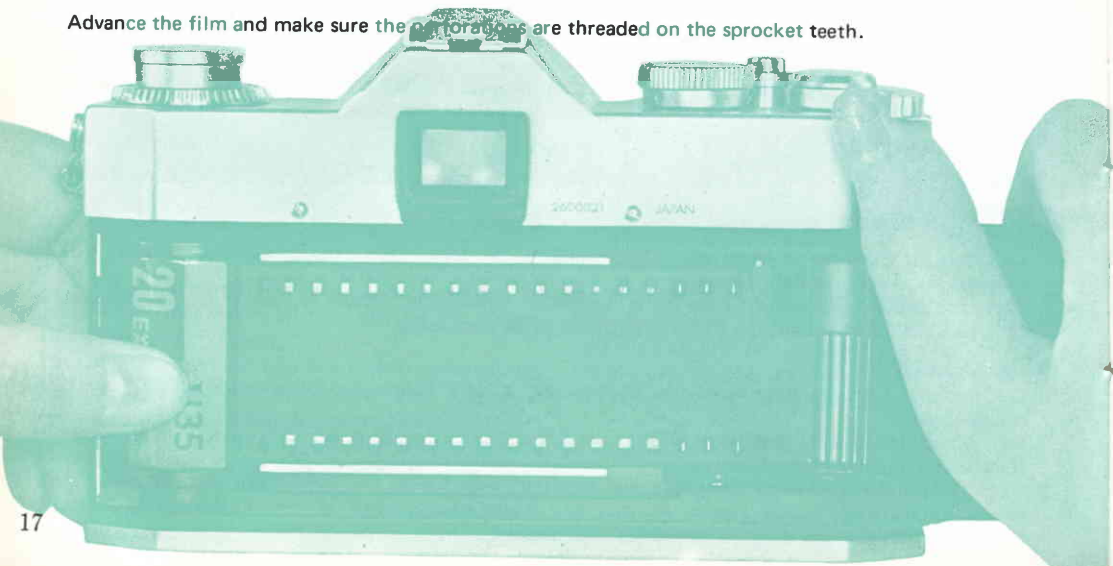
Note: The exposure counter resets automatically to "S" position when the back cover is opened. Always use standard 35mm cassette film.

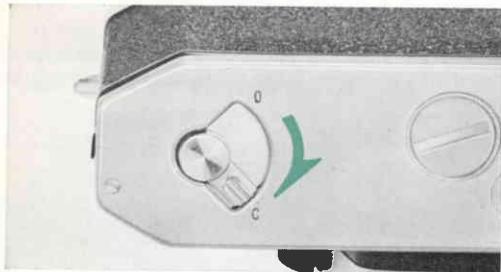


❷ After opening the back cover, pull out the film rewinding knob. Place the film cassette into the film chamber and return the film rewinding knob to its original position. Avoid direct sunlight when loading film into the camera.

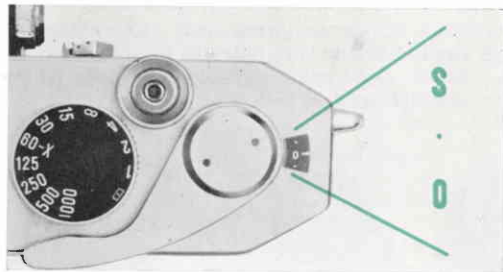
③ Draw out some length of the film from the cassette and insert the film-end into the slot on the take-up spool spindle (Insert it into the most easily accessible slot). Then, gently manipulate the film wind lever.

Advance the film and make sure the perforations are threaded on the sprocket teeth.

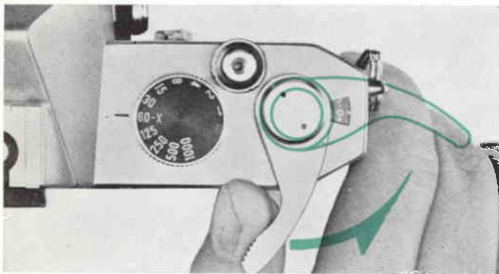




④ The back cover will lock into position when pressed gently after setting the back cover lock lever to "C".

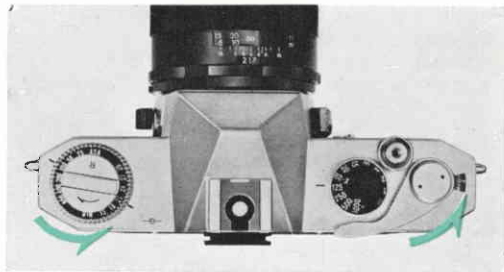


⑤ Because the exposure counter is set at "S" (Start) during the film loading operation, advance the film by alternately depressing the shutter release button and manipulating the film wind lever until it registers the figure "O". The exposure counter will then keep accurate count of the number of exposed frames.



Film wind lever

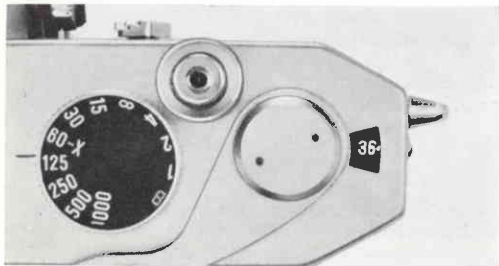
Always see to it that the film wind lever is given a full turn until it goes no further. The lever can be operated in either one sweeping action or several short strokes. A full wind of the lever advances the film and registers count on the exposure counter.



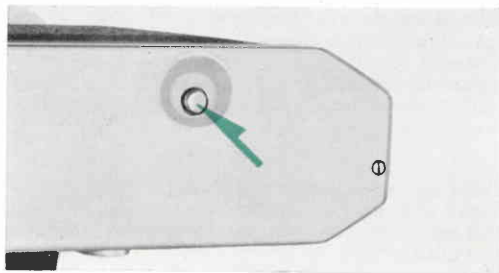
How to check the film advance

- If the film rewinding knob rotates when the film wind lever is given a turn, it means the film is advancing properly.
- The shutter will not function if the film is not fully advanced. In case depression of the shutter release button fails to trip the shutter, manipulate the film wind lever again until it goes no further.

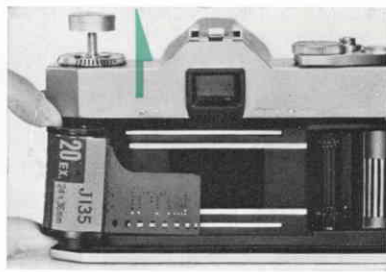
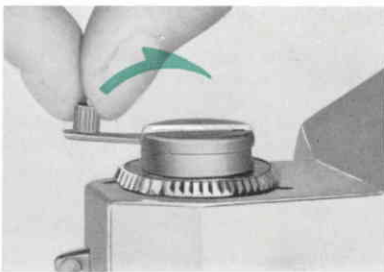
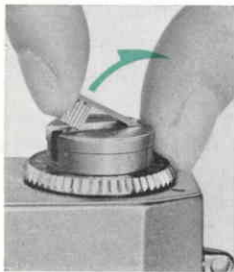
FILM REWINDING



① When the exposure counter registers the figure "36" ("20" in case of a 20 exposure load), it means that the full length of the film has been exposed. Caution: Do not turn the film wind lever forcibly after exposing the entire length of the film. The film may tear or come loose from the spool spindle, making it impossible to rewind the film into the cassette.



② Push the reversing button on the base of the camera. You do not have to keep pressing it all the while during the rewinding operation. The button will pop out and the mechanism automatically reset to advance when the film wind lever is given a turn.



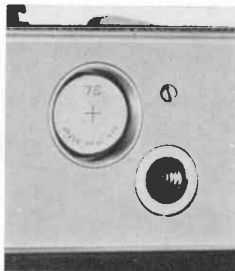
③ Lift the rewinding crank-handle on the film rewinding knob with your fingertip and fold it out. Turn it in the direction of the arrow to rewind the film.

Before the film-end slips off the take-up spool, a slight resistance will be felt, but keep on turning the crank-handle.

④ Stop rewinding when the crank-handle rotates freely. Then, open the back cover and take out the exposed film after pulling out the film rewinding knob.

- Before opening the back cover, make sure that the full length of the film has been returned into the cassette.

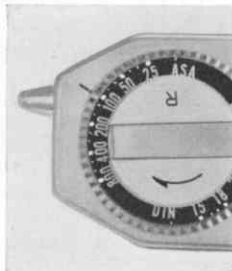
Before shooting



Check whether the silver oxide battery is installed properly.

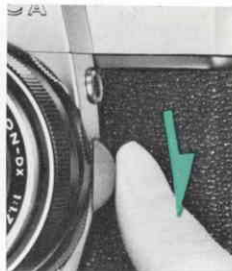
Make sure the (—) side faces the inside.

After installing the battery, screw in the battery compartment cover securely.



Check whether the ASA rating has been set correctly.




Align the figure denoting the ASA rating of the film loaded in the camera precisely with the index mark. Correct exposure cannot be obtained if you fail to make proper ASA rating adjustment.



Check whether the meter switch turns on the current.

When the meter switch is shifted downward, the current powering the meter is turned on and the meter needle seen through the finder will move.

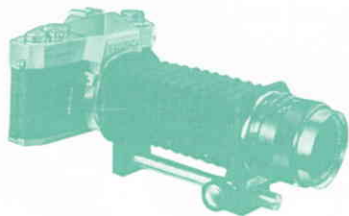
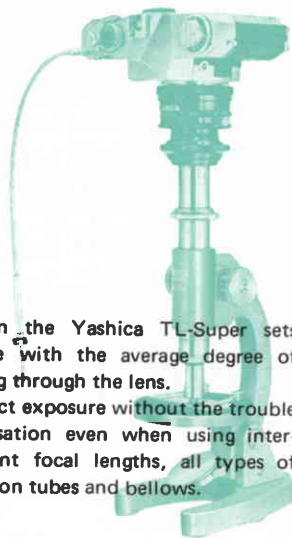
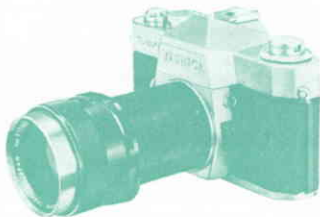
METER NEEDLE

OVER EXPOSURE	
CORRECT EXPOSURE	
UNDER EXPOSURE	

Even under the same light condition, the extent over which the meter needle will move depends upon whether the background of the subject is light or dark. This is because the meter measures the average degree of brightness over the field covered by the lens. In case of light background or when shooting backlighting subjects or snow scenes, give slightly more exposure than that indicated by the needle. On the other hand, make adjustment for a little less exposure when shooting subjects in front of a dark background. Under such situations, measure the exposure by approaching the subject whenever possible.

Correct exposure

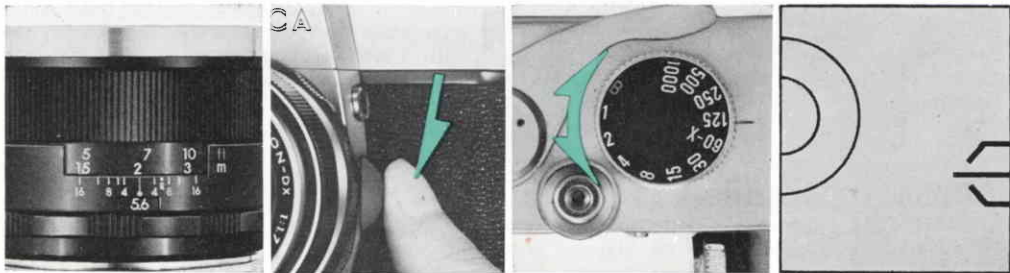
Generally speaking, correct exposure can be obtained by simply centering the meter needle. Before shooting, however, make sure that the shutter-aperture combination is just right for the subject matter.



Exposure factor

The system incorporated in the Yashica TL-Super sets the exposure in accordance with the average degree of brightness of the light entering through the lens. Consequently, it assures perfect exposure without the trouble of exposure factor compensation even when using interchangeable lenses of different focal lengths, all types of filters, close-up lenses, extension tubes and bellows.

EXPOSURE DETERMINATION (APERTURE PRESELECTION)



To blur out the background, shoot the subject by setting the aperture to as wide an opening as possible. When such an effect is desired, preselect the aperture and then adjust the shutter speed according to the light condition.

1. Adjust the aperture ring to the desired setting.
2. Turn on the meter switch.
3. While sighting through the finder, center the meter needle by rotating the shutter speed control dial.

Although the aperture ring may be set anywhere between the clickstops, the shutter speed control dial must not be adjusted to an intermediate setting. Therefore, it is advisable to set the shutter speed first and then to make precise exposure determination by turning the aperture ring.



APERTURE PREVIEW LEVER

To preview the depth-of-field at the preselected aperture, push the aperture preview lever all the way toward "A" (The letter "M" is visible at this setting) and sight through the finder.

Except for previewing the depth-of-field, always keep the lever toward "M" (where "A" is clearly visible). At this setting, the diaphragm remains fully open to assure maximum brilliance of the image in the finder at all times, except for the fraction of a second the exposure is made.

DEPTH-OF-FIELD



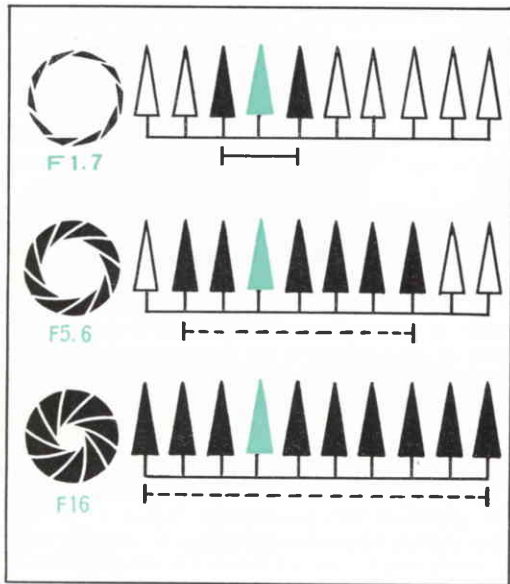
F 1.7



F 16

The area in the foreground and background over which objects appear acceptably sharp when you focus your camera on a subject at a given range is called the depth-of-field.

As shown here, the depth-of-field is more extensive when the lens is stopped down (right photo) than at full aperture (left photo). The depth of field can also be determined by referring to the depth-of-field scale on the lens barrel. If the subject is at a distance of two meters and an aperture setting of $f/16$ is selected, all objects within the range indicated by figures "16" on both sides of the red index mark (approx. 1.5 to 3.2 meters) will appear acceptably sharp in the picture.



The depth-of-field varies with the aperture setting and the camera-to-subject distance. It is employed most effectively in emphasizing the subject at a medium range blurring out the distant background.

For a given lens, the depth of field is more extensive . .

- When the lens is stopped down.
- When you focus your camera on a distant subject.
- In the background than in the foreground.

FLASH PHOTOGRAPHY



Use of flash equipment is recommended when shooting under subdued light conditions.

In case of cordless flash unit, the use of PC cord is unnecessary.

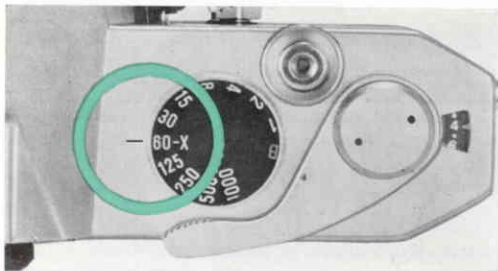
Set the flash unit on the direct contact shoe of the camera.

PLASTIC "HOT SHOE" PLATE

Take out the plastic plate from the accessory shoe before mounting a direct-contact flash gun, or conventional or electronic unit. Return it to its original position when the accessory shoe is not used. This will serve as a protection for the "hot shoe" against accumulation of dust and other foreign particles which may cause poor electrical contact.

Plug the PC cord of the flash equipment into the synchro terminal.

The built-in automatic synchro selector switches the contact from FP to X according to the type of flash used.



For perfect flash synchronization, select the following shutter speeds:

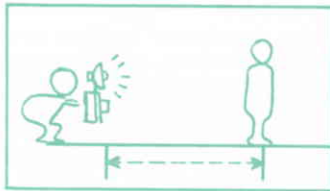
- ⊙ Electronic flash: Synchronizes at 60-X (also from 1/30 to 1 sec. and B).
- ⊙ FP class bulb: Synchronizes at the shutter speeds 1/1000 to 1/125 sec. and 1/15 to 1 sec. and B.
- ⊙ M.F class bulb: Synchronizes at slow shutter speeds of 1/30 sec. or slower and B.

Aperture setting in flash photography

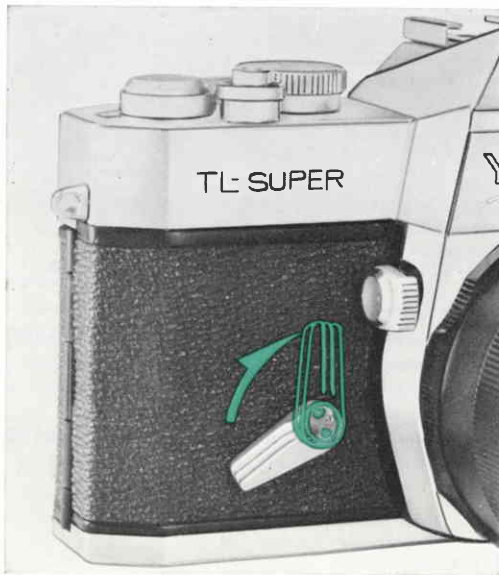
Correct aperture setting for flash exposure is obtained by dividing the guide number of the flash bulb or electronic flash unit by the camera-to-subject distance.

Example: Guide No. 32
Distance 2 meters (6.6 feet)

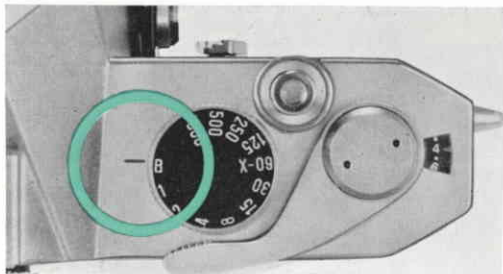
In case the camera-to-subject distance is 2 meters: $32 \div 2 = 16$ (f/16)



SELF-TIMER

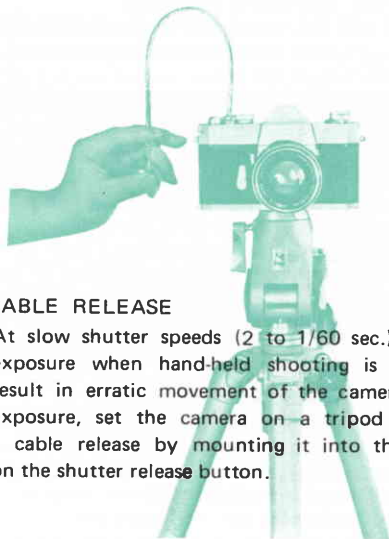


- ① Give the film wind lever a full turn to charge the shutter (The self-timer will not function to trip the shutter unless the shutter is charged).
 - ② Charge the self-timer by shifting the self-timer lever all the way down.
 - ③ The self-timer is activated through depression of the shutter release button and trips the shutter at a delayed action of 9 to 10 seconds.
- If the self-timer is charged and the shutter release button is pressed without charging the shutter, the self-timer will begin to function but will not trip the shutter.



B SETTING

The "B" on shutter speed control dial indicates bulb exposure. At this setting, the shutter remains open over the duration the shutter release button is depressed. It is employed for long exposures under subdued light conditions and for shooting fireworks, etc.



CABLE RELEASE

At slow shutter speeds (2 to 1/60 sec.) or bulb exposure when hand-held shooting is liable to result in erratic movement of the camera during exposure, set the camera on a tripod and use a cable release by mounting it into the socket on the shutter release button.

MIRROR LOCK



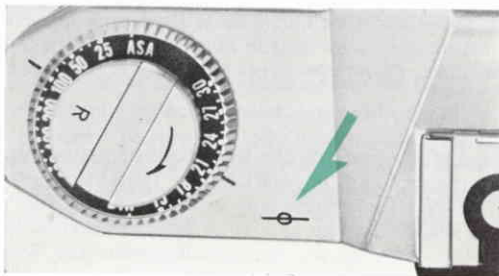
The Yashica TL-Super features a knob for flipping up the mirror manually and locking it in position. Shift the mirror locking knob upward in the direction of the arrow to flip up the mirror and lock it in position. To return it to its original position, push the knob down. The mirror lock can be operated without affecting the function of the shutter or the film wind mechanism. Because the mirror bounce is eliminated when the mirror is locked, it is highly effective in sequence shots in photomicrography, close-ups and copying work. Moreover, this system permits mounting of ultra-wide angle lens.



R mark for infrared ray photography

The red dot (R mark) is employed when using infrared film and filter.

In infrared photography, focus in the ordinary manner and set the distance reading to the R mark.



Film plane mark

The red-mark \oplus on top of the camera indicates the film plane.

- Strictly speaking, the camera-to-subject distance means the range from the film plane to the subject. In close-up work, therefore, measure the range from the film plane mark.

INTERCHANGING OF LENSES



Because the wide variety of interchangeable lenses from wide angle to telephoto features a thread mount, they can be mounted or dismounted most readily.

Whatever lens is mounted on your Yashica TL-Super, its finder will show images exactly as they will appear on the film.



Take the following precautions when the lens is dismounted from the camera body:

- Make sure dust or lint will not infiltrate into the camera body or lens barrel.
- Do not touch any internal part of the camera.
- Do not expose the camera body to direct sunlight.
- Do not scratch or leave fingerprint on the lens surface.



Exclusive accessories of the
Yashica TL-Super

A wide variety of superior quality accessories are available for the Yashica TL-Super. Their use will not affect the convenient method of exposure and will enable the camera to manifest its superb versatility and adaptability in all photographic purposes from close-ups to microphotography.

INTERCHANGEABLE LENSES

1. Auto Yashinon-DX 35mm F2.8
2. Super Yashinon-R 35mm F2.8
3. Auto Yashinon-DX 100mm F2.8
4. Auto Yashinon-DX 135mm F2.8
5. Super Yashinon-R 135mm F2.8
6. Auto Yashinon-DX 200mm F4
7. Super Yashinon-R 200mm F4.5



- 8. Auto Yashinon-DX Zoom 80-160mm F4
- 9. Super Yashinon-R 300mm F5.5
- 10. Super Yashinon-R Zoom 90-190mm
- 11. Super Yashinon-R 400mm F6.3
- 12. Super Yashinon-R 600mm F8
- 13. Super Yashinon-R 800mm F8



⑧



⑨



⑩



⑪



⑫



⑬

AUTO YASHINON-DX ZOOM LENS

80-160mm F4



With this single lens, the focal length range from 80 mm to 160 mm can be covered effectively. When using this zoom lens, set the camera on a tripod because even the slightest movement of the camera may spoil the picture.

Specification

- F4 80-160 mm. Composed of 14 elements in 10 groups. Angle of view of 31°7' to 15°10'. Threaded mount. Fully automatic diaphragm from F4 to F22. 62 mm screw-in type filter mount.

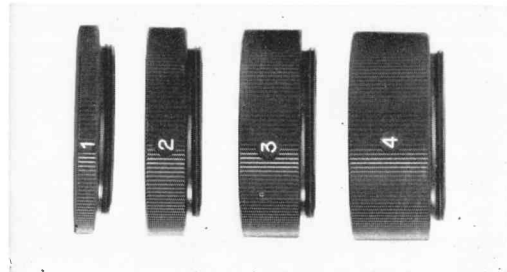
ACCESSORIES



CLOSE-UP LENS

Two types of close-up lenses - No.1 and No.2 are available respectively for the F1.4 and F1.7 lenses of the YASHICA TL-Super.

Screw it in front of the lens and you're ready for close-up shots



EXTENSION TUBES

These are useful for copying and close-up work. No.1 to 4 are available.



EXTENSION BELLOWS

Extension bellows are effective for extreme close-ups and macro-photography. Their use provides magnification of the image up to 2.4X the life-size.

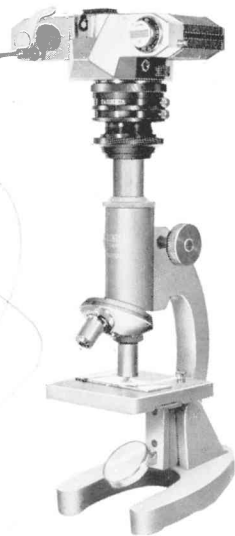
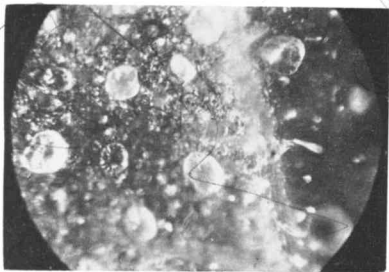


RIGHT-ANGLE FINDER

It is designed for most convenient chest-viewing and focusing.

MICROPHOTOGRAPHY

Use these exclusive adapters in microphotographic work. There is no need for compensation of exposure factor.



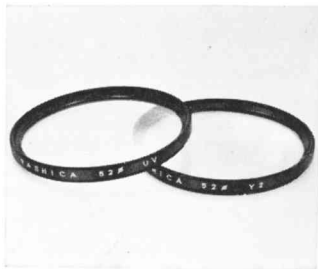


LENS HOOD

(54 mm slip-on type)

Use of a lens hood is recommended when shooting subjects receiving light from the back or side or when shooting sea or snow scenes.

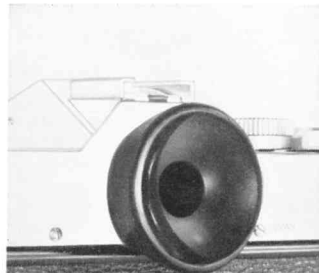
F/1.4 lens-57 mm slip-on



FILTER (52 mm screw-in type)

Better overall results can be obtained through use of a filter when shooting sea or snow scenes under glaring sunlight.

F/1.4 lens-55 mm screw-in



USE RUBBER EYE-CUP

- * When shooting back lighted subject.
- * In situation where strong light is liable to enter from the Finder eyepiece.
- * When wearing eye-glasses.

DEPTH-OF-FIELD TABLE (50mm F / 1.7)

(meter)

R meter		1.7	2	2.8	4	5.6	8	11	16
∞	from to	47.6 ∞	40.5 ∞	28.9 ∞	20.3 ∞	14.5 ∞	10.2 ∞	7.43 ∞	5.14 ∞
10	from to	8.29 12.6	8.05 13.2	7.47 15.2	6.74 19.5	5.97 31.7	5.09 53.6	4.31 ∞	3.44 ∞
5	from to	4.54 5.56	4.47 5.68	4.29 6.00	4.04 6.57	3.76 7.53	3.40 9.63	3.04 14.9	2.58 17.4
3	from to	2.83 3.19	2.81 3.22	2.73 3.32	2.64 3.49	2.51 3.73	2.35 4.17	2.18 4.90	1.94 6.93
2	from to	1.93 2.08	1.91 2.09	1.88 2.13	1.84 2.20	1.78 2.29	1.70 2.44	1.61 2.67	1.48 3.15
1.5	from to	1.46 1.54	1.45 1.55	1.44 1.57	1.41 1.60	1.38 1.65	1.33 1.73	1.28 1.83	1.20 2.04
1.2	from to	1.18 1.23	1.17 1.23	1.16 1.24	1.14 1.26	1.12 1.29	1.09 1.33	1.06 1.39	1.00 1.51
1.0	from to	0.983 1.02	0.980 1.02	0.973 1.03	0.969 1.04	0.947 1.06	0.926 1.09	0.902 1.13	0.864 1.20
0.9	from to	0.887 0.914	0.884 0.916	0.878 0.923	0.870 0.933	0.858 0.947	0.841 0.969	0.821 0.998	0.791 1.05
0.8	from to	0.790 0.810	0.788 0.812	0.783 0.817	0.777 0.825	0.768 0.836	0.755 0.852	0.739 0.874	0.715 0.912
0.7	from to	0.693 0.708	0.691 0.709	0.688 0.713	0.683 0.718	0.676 0.726	0.666 0.738	0.655 0.753	0.637 0.781
0.6	from to	0.595 0.605	0.594 0.606	0.592 0.609	0.588 0.613	0.583 0.618	0.577 0.626	0.568 0.636	0.555 0.654
0.5	from to	0.497 0.503	0.496 0.504	0.495 0.506	0.492 0.508	0.489 0.511	0.485 0.516	0.480 0.523	0.471 0.534

(feet)

R feet		1.7	2	2.8	4	5.6	8	11	16
∞	from to	156' 1" ∞	132' 9" ∞	94' 11" ∞	66' 6" ∞	47' 7" ∞	33' 5" ∞	24' 5" ∞	16' 10" ∞
30	from to	25' 3" 37' 0"	24' 7" 38' 7"	22' 11" 43' 7"	20' 10" 54' 1"	18' 7" 80' 0"	16' 0" 287' 7"	13' 7" ∞	10' 11" ∞
15	from to	13' 9" 16' 6"	13' 6" 16' 10"	13' 0" 17' 8"	12' 4" 19' 2"	11' 6" 21' 7"	10' 6" 26' 8"	9' 5" 37' 11"	8' 1" 130' 2"
10	from to	9' 5" 10' 8"	9' 4" 10' 9"	9' 1" 11' 1"	8' 9" 11' 8"	8' 4" 12' 6"	7' 10" 14' 0"	7' 3" 16' 6"	6' 5" 23' 8"
7	from to	6' 9" 7' 4"	6' 8" 7' 5"	6' 7" 7' 6"	6' 5" 7' 9"	6' 2" 8' 1"	5' 11" 8' 8"	5' 7" 9' 7"	5' 1" 11' 6"
5	from to	4' 10" 5' 2"	4' 10" 5' 2"	4' 9" 5' 3"	4' 8" 5' 4"	4' 7" 5' 6"	4' 5" 5' 9"	4' 3" 6' 2"	4' 0" 6' 10"
	from to	3' 11" 4' 1"	3' 11" 4' 1"	3' 10" 4' 2"	3' 10" 4' 3"	3' 9" 4' 4"	3' 8" 4' 6"	3' 6" 4' 8"	3' 4" 5' 1"
3.5	from to	3' 5" 3' 7"	3' 5" 3' 7"	3' 5" 3' 7"	3' 4" 3' 8"	3' 4" 3' 9"	3' 3" 3' 10"	3' 2" 4' 0"	3' 0" 4' 3"
3	from to	2' 11" 3' 1"	2' 11" 3' 1"	2' 11" 3' 1"	2' 11" 3' 1"	2' 10" 3' 2"	2' 10" 3' 3"	2' 9" 3' 4"	2' 8" 3' 6"
2.5	from to	2' 6" 2' 6"	2' 6" 2' 6"	2' 5" 2' 7"	2' 5" 2' 7"	2' 5" 2' 7"	2' 4" 2' 8"	2' 4" 2' 9"	2' 3" 2' 10"
2.25	from to	2' 3" 2' 3"	2' 3" 2' 3"	2' 3" 2' 3"	2' 2" 2' 4"	2' 2" 2' 4"	2' 2" 2' 4"	2' 1" 2' 5"	2' 1" 2' 6"
2	from to	2' 0" 2' 0"	2' 0" 2' 0"	2' 0" 2' 0"	2' 0" 2' 1"	1' 11" 2' 1"	1' 11" 2' 1"	1' 11" 2' 1"	1' 10" 2' 2"
1.75	from to	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 10"	1' 8" 1' 10"	1' 8" 1' 10"	1' 8" 1' 11"

DEPTH-OF-FIELD TABLE (50 mm F / 1.4)

(meter)

R meter		1.4	2	2.8	4	5.6	8	11	16	22
∞	from to	57.8 ∞	40.5 ∞	29.0 ∞	20.3 ∞	14.5 ∞	10.2 ∞	7.44 ∞	5.14 ∞	3.77 ∞
10	from to	8.55 12.1	8.05 13.2	7.47 15.2	6.74 19.5	5.97 31.7	5.10 514.	4.31 ∞	3.44 ∞	2.77 ∞
5	from to	4.62 5.46	4.47 5.68	4.29 6.00	4.04 6.57	3.76 7.53	3.40 9.63	3.04 14.9	2.58 172	2.19 ∞
3	from to	2.86 3.15	2.81 3.23	2.73 3.33	2.63 3.49	2.51 3.73	2.35 4.17	2.18 4.90	1.94 6.94	1.72 14.0
2	from to	1.94 2.07	1.91 2.09	1.88 2.13	1.84 2.20	1.78 2.29	1.70 2.44	1.61 2.67	1.48 3.15	1.35 4.05
1.5	from to	1.47 1.54	1.45 1.55	1.43 1.57	1.41 1.60	1.38 1.65	1.33 1.73	1.27 1.83	1.19 2.04	1.11 2.37
1.2	from to	1.18 1.22	1.17 1.23	1.16 1.24	1.14 1.26	1.12 1.29	1.09 1.34	1.06 1.40	1.00 1.51	0.945 1.67
1	from to	0.986 1.01	0.980 1.02	0.973 1.03	0.961 1.04	0.947 1.06	0.926 1.09	0.901 1.13	0.863 1.20	0.822 1.29
0.9	from to	0.889 0.911	0.884 0.916	0.878 0.923	0.869 0.933	0.858 0.947	0.841 0.969	0.821 0.999	0.790 1.05	0.756 1.12
0.8	from to	0.792 0.809	0.788 0.812	0.783 0.818	0.776 0.825	0.767 0.836	0.754 0.853	0.739 0.874	0.714 0.914	0.687 0.966
0.7	from to	0.694 0.706	0.691 0.709	0.688 0.713	0.683 0.719	0.676 0.726	0.666 0.738	0.654 0.754	0.636 0.782	0.615 0.818
0.6	from to	0.596 0.604	0.594 0.606	0.591 0.609	0.588 0.613	0.583 0.618	0.576 0.626	0.568 0.637	0.555 0.655	0.540 0.679
0.55	from to	0.547 0.554	0.545 0.555	0.543 0.557	0.540 0.560	0.536 0.565	0.531 0.571	0.524 0.579	0.513 0.594	0.501 0.613
0.5	from to	0.497 0.503	0.496 0.504	0.495 0.506	0.492 0.508	0.489 0.511	0.485 0.516	0.479 0.523	0.471 0.534	0.461 0.549

(Feet)

R feet		1.4	2	2.8	4	5.6	8	11	16	22
∞	from to	189' 8" ∞	132' 10" ∞	95' 0" ∞	66' 7" ∞	47' 8" ∞	33' 5" ∞	24' 5" ∞	16' 11" ∞	12' 4" ∞
30	from to	26' 0" 35' 6"	24' 7" 38' 7"	22' 11" 43' 7"	20' 10" 54' 1"	18' 7" 79' 11"	16' 0" 285' 9"	13' 7" ∞	10' 11" ∞	8' 11" ∞
15	from to	13' 11" 16' 3"	13' 6" 16' 10"	13' 0" 17' 8"	12' 4" 19' 2"	11' 6" 21' 7"	10' 6" 26' 8"	9' 5" 37' 11"	8' 1" 129' 11"	6' 11" ∞
10	from to	9' 6" 10' 6"	9' 4" 10' 9"	9' 1" 11' 1"	8' 9" 11' 8"	8' 4" 12' 6"	7' 10" 14' 0"	7' 3" 16' 6"	6' 5" 23' 8"	5' 8" 49' 9"
7	from to	6' 9" 7' 3"	6' 8" 7' 4"	6' 7" 7' 6"	6' 5" 7' 9"	6' 2" 8' 1"	5' 11" 8' 8"	5' 7" 9' 7"	5' 1" 11' 6"	4' 7" 15' 4"
5	from to	4' 11" 5' 1"	4' 10" 5' 2"	4' 9" 5' 3"	4' 8" 5' 4"	4' 7" 5' 6"	4' 5" 5' 9"	4' 3" 6' 2"	4' 0" 6' 10"	3' 8" 8' 0"
4	from to	3' 11" 4' 1"	3' 11" 4' 1"	3' 10" 4' 2"	3' 10" 4' 3"	3' 9" 4' 4"	3' 8" 4' 6"	3' 6" 4' 8"	3' 4" 5' 1"	3' 2" 5' 7"
3.5	from to	3' 5" 3' 7"	3' 5" 3' 7"	3' 5" 3' 7"	3' 4" 3' 8"	3' 4" 3' 9"	3' 3" 3' 10"	3' 2" 4' 0"	3' 0" 4' 3"	2' 10" 4' 8"
3	from to	3' 0" 3' 0"	2' 11" 3' 1"	2' 11" 3' 1"	2' 11" 3' 1"	2' 10" 3' 2"	2' 10" 3' 3"	2' 9" 3' 4"	2' 8" 3' 6"	2' 6" 3' 9"
2.5	from to	2' 6" 2' 6"	2' 6" 2' 6"	2' 5" 2' 7"	2' 5" 2' 7"	2' 5" 2' 7"	2' 4" 2' 8"	2' 4" 2' 9"	2' 3" 2' 10"	2' 2" 3' 0"
2.25	from to	2' 3" 2' 3"	2' 3" 2' 3"	2' 3" 2' 3"	2' 2" 2' 4"	2' 2" 2' 4"	2' 2" 2' 4"	2' 1" 2' 5"	2' 1" 2' 6"	2' 0" 2' 7"
2.0	from to	2' 0" 2' 0"	2' 0" 2' 0"	2' 0" 2' 0"	2' 0" 2' 1"	1' 11" 2' 1"	1' 11" 2' 1"	1' 11" 2' 2"	1' 10" 2' 2"	1' 10" 2' 3"
1.75	from to	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 9"	1' 9" 1' 10"	1' 8" 1' 10"	1' 8" 1' 10"	1' 8" 1' 11"	1' 7" 1' 11"