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**USE OF YOUR**

**RE.MACRO-AUTO-TOPCOR**

**f/3.5 58mm**

**TOKYO KOGAKU KIKAI K.K.**  
**(TOKYO OPTICAL CO., LTD.)**

## CONTENTS

RE. Macro-Auto-Topcor f/3.5 58 mm .....	1
SPECIFICATIONS .....	3
USE .....	4
CONSTRUCTION .....	5
OPERATION .....	7
( 1 ) Attachment .....	7
( 2 ) Focusing .....	8
( 3 ) Magnification Scale .....	8
( 4 ) Aperture Setting .....	8
( 5 ) Depth of Field Scale .....	9
( 6 ) Exposure Adjustment .....	9
RE. AUTO-RING .....	13
MACROPHOTOGRAPHY .....	15
REVERSE-ADAPTER RING .....	16
IMPORTANT .....	17
TOPCON ACCESSORIES .....	18

## **RE. Macro-Auto-Topcor f/3.5 58 mm**

The RE. Macro-Auto-Topcor f/3.5 58 mm lens, for use with the TOPCON RE Super and RE-2 cameras, has been specially designed to give optimum lens performance at close focusing distances and in macrophotography, as opposed to the 58 mm standard lenses which have been designed for giving optimum performance at infinity.

The Xenotar type lens, of five elements in 4 groups, has been designed to give distortion-free images of the highest resolution, with full illumination from edge to edge, and with best results obtained at the magnification  $0.1\times$ , while, at the same time, equalling the normal standard lens in performance at infinity.

The focusing ring provides continuous helical focusing from infinity to 26 centimeters (10 inches) or magnification  $0.5\times$ . In the close-up focusing range, the magnification scale, with magnifications  $0.1\times$  to  $0.5\times$ , may also be used.

Further continuous focusing, from magnification  $0.5\times$  to  $1\times$  (or life-size) can be obtained by simply using the TOPCON RE. Auto-Ring between the lens and body, which will, at the same time, couple the automatic lens diaphragm mechanism of the lens and the body.

The lens has fully automatic lens diaphragm action, the same as all RE. Auto-Topcor lenses; and, therefore, the Thru-The-Lens Mirror-Meter is used at the full aperture, thus providing fast, automatic action, equal to the normal lenses.

Furthermore, because the Thru-The-Lens Mirror-Meter can be utilized fully, there are absolutely

no exposure complications, with the Mirror-Meter taking exposure readings of the actual light intensity reaching the film plane through the lens.

Because the barrel length is a very short 48 mm, in spite of its 58 mm focal length, the working distance from the front end of the lens barrel to the subject is longer than with the normal standard lens in close-up focusing, or 13 centimeters (5-1/8 inches) at magnification 0.5 $\times$ , which means that it is much easier to handle.

As with normal lenses, the RE. Macro-Auto-Topcor f/3.5 58 mm lens can be used with the Model IV Bellows, for providing further continuous lens extensions, although there will be no connection of the automatic lens diaphragm action, in this case.

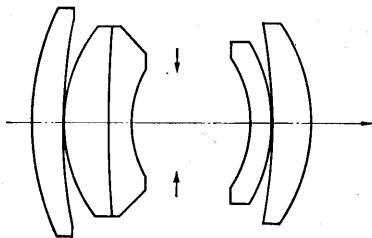
The 49 mm Reverse-Adapter Ring and filters can be used, in common with many TOPCOR interchangeable lenses, because of the 49 mm screw-in filter mount of the lens. Reversing the lens is recommended for macrophotography over 1 $\times$  because of the more superior optical performance which is then obtained.

**Table 1      SPECIFICATIONS**

Type	Xenontar type
Nominal focal length	58 mm
Maximum aperture	1 : 3.5
Lens construction	5 elements in 4 groups
Angle of field	41°
F/numbers	3.5 to 22
Focusing ring scale	Infinity to 0.26 meter (10 in.)
Maximum lens extension	30 mm
Magnification scale	0.1× to 0.5×
Lens diaphragm	Fully automatic instant re-opening action
Meter coupling	Full aperture exposure reading system
Filter screw mount	49 mm diameter; P=0.75
Dimensions	68 mm diameter × 48 mm (2-11/16 × 1-29/32 in.)
Weight	260 grams (9 oz.)

**Table 2      USE**

Combination	Scales of Reproduction	Maximum Extension	Focusing Distance
Camera + Lens	$\frac{1}{\infty}$ to $0.5\times$	30 mm	$\infty$ to 254 mm
Camera + RE. Auto-Ring + Lens	$0.5\times$ to $1\times$	59 mm	254 mm to 225 mm
Camera + Model IV Bellows + Reverse-Adapter Ring + Lens + Automatic Diaphragm Tube	$1\times$ to $3.6\times$	209 mm	225 mm to 334 mm



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- ① Lens mount red dot —for aligning with red dot on camera body flange in attachment/detachment.
- ② Bayonet mount —for attachment to the camera body bayonet mount.
- ③ Lens locking pin —engages the lens locking mechanism of the camera body, when the lens is rotated a quarter turn.
- ④ Diaphragm coupling pin —couples with the built-in Mirror-Meter of the camera.
- ⑤ Automatic lens diaphragm coupling bar —couples with the automatic lens diaphragm mechanism of the camera; thus lens diaphragm is always at full aperture but closes down automatically with shutter release.
- ⑥ Aperture ring —is rotated and set to the green-colored aperture index, with click-stop action.
- ⑦ Aperture scale —F/numbers 3.5, 5.6, 8, 11, 16 and 22.
- ⑧ Aperture/distance index —green-colored index line.
- ⑨ Depth of field scale
- ⑩ Infrared index —infrared R mark is also the depth of field scale index for  $f/4$ .
- ⑪ Distance scale
- ⑫ Focusing ring —rotated to focus the lens.
- ⑬ Magnification scale —magnifications  $0.1\times$ ,  $0.2\times$ ,  $0.25\times$ ,  $0.3\times$ ,  $0.4\times$  and  $0.5\times$  are set, by aligning the edge of the distance scale ring to the line on top of the magnification figures.
- ⑭ Filter mount —screw-in mount for attaching filters, reverse-adapter ring, etc.
- ⑮ Pin for preventing mis-attachment of lens

## **OPERATION**

The RE. Macro-Auto-Topcor f/3.5 58 mm lens is handled and used for close-up shooting in the same manner as normal lenses are used for general photography, and, thus, it is a very convenient lens.

In fact, it can be used for general photography without any difference from the RE. Auto-Topcor 58 mm standard lenses, as far as lens attachment and detachment, focusing and exposure setting (setting ASA film speed, shutter speed and aperture) are concerned, and, therefore, the instructions for the camera should be read once more.

In close-ups and macro-shooting, however, some changes should be made in operational procedures.

### **(1) Attachment**

Align the red dot on the lens mount with the red dot on the camera body, insert the lens until it is well-seated in the camera and then rotate a quarter-turn in the clockwise direction, until a full stop is made and the lens locking lever catches with an audible clicking sound.

To detach the lens, simply press the lens locking lever, on the camera body, in towards the optical center of the lens, which will disengage the lens locking pin on the lens barrel. Then rotate the lens counter-clockwise until the red dots are aligned, while maintain-

ing pressure on the lens locking lever. Lift the lens carefully out of the camera body.

## **(2) Focusing**

Simply rotate the focusing ring, in either directions, until the focusing screen image is seen clearly and distinctly. The focused distance is found on the distance scale against the green-colored index line, and is the distance from the subject to the film plane, as indicated by the film plane indicator on the top deck of the camera.

## **(3) Magnification Scale**

For close-up focusing, from  $0.1\times$  (approximately 60 centimeters), the magnification scale may be used in place of the distance scale, if the picture must be taken at a predetermined scale of reproduction. Align the edge of the distance scale ring to the line on top of the required magnification number. As, for example, the lens on page 11 is set to magnification  $0.5\times$ . Then, move the camera back and forth, until the subject is focused sharply on the finder screen.

## **(4) Aperture Setting**

Simply revolve the aperture ring until the required F/number on the aperture scale is set to the green-colored index and the ring clicks-tops into position. The aperture ring can be set to intermediate aperture values between the F/numbers.

## **(5) Depth of Field Scale**

The depth of field for the focused distance is found from the depth of field scale on the lens barrel, which shows the zone of apparent sharpness for any lens opening. Identical pairs of apertures are available on both sides of the distance index, which is also the widest aperture, and these identical pairs of apertures indicate the distances that will be in the zone of apparent sharpness.

The depth of field can also be previewed by pressing the depth of field preview lever down, with the aperture set to the required aperture setting (on the RE Super only). For close-up shots, from magnification  $0.1\times$ , however, the depth of field table should be used because of the shallow depth of field, especially when the subject matter has some height or depth to it, depending on the direction of picture-taking.

## **(6) Exposure Adjustments**

For general photography, it is usual to choose a suitable shutter speed, first of all, and then adjust the aperture ring until the correct exposure adjustment is made, because the aperture ring is moved in the same direction as the movement of the match-point indicator in the pentaprism finder.

However, since it is, more often than not, very important to choose a lens opening providing the greatest depth of field, in the case of macrophotography, the aperture is set, first of all, after which the shutter speed dial is adjusted to set the correct ex-

posure, as indicated by the exposure meter.

While exposure adjustment is very simple with the Mirror-Meter, there may be some preference regarding tone or darkness and, therefore, it is recommended that, besides the indicated exposure setting (shutter speed, in this case) two other shots to taken, one at  $1/2\times$  and the other  $2\times$  the indicated exposure.

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# DEPTH OF FIELD TABLE (distances in feet)

RE. Macro Auto-Topcor  $f=58\text{mm}$  F3.5

1/30mm

Magnification \ F feet		3.5	4	5.6	8	11	16	22
1/∞	∞	∞ ~95.077	∞ ~83.237	∞ ~59.557	∞ ~41.797	∞ ~30.496	∞ ~21.078	∞ ~15.427
0.1 ×	2.280	2.323~2.239	2.329~2.233	2.350 ~2.215	2.381~2.188	2.422~2.156	2.494~2.105	2.587~2.048
0.2 ×	1.348	1.360~1.337	1.361~1.335	1.367 ~1.330	1.375~1.322	1.386~1.313	1.404~1.298	1.426~1.281
0.25 ×	1.167	1.175~1.159	1.176~1.158	1.179 ~1.155	1.185~1.150	1.192~1.144	1.204~1.134	1.218~1.122
0.3 ×	1.050	1.056~1.045	1.056~1.044	1.059 ~1.041	1.063~1.038	1.068~1.033	1.076~1.026	1.087~1.017
0.4 ×	0.910	0.913~0.907	0.914~0.906	0.915 ~0.905	0.918~0.902	0.921~0.900	0.926~0.895	0.932~0.890
0.5 ×	0.834	0.836~0.832	0.837~0.831	0.838 ~0.830	0.839~0.829	0.841~0.827	0.845~0.824	0.849~0.820
1 ×	0.739	0.740~0.738	0.740~0.738	0.740 ~0.738	0.741~0.737	0.742~0.737	0.743~0.735	0.744~0.734

# DEPTH OF FIELD TABLE (distances in meters)

RE Macro Auto-Topcor  $f=58\text{mm}$  F3.5

1/30mm

Magnification \ F Meters		3.5	4	5.6	8	11	16	22
1 / $\infty$	$\infty$	$\infty \sim 28.929$	$\infty \sim 25.370$	$\infty \sim 18.152$	$\infty \sim 12.739$	$\infty \sim 9.295$	$\infty \sim 6.424$	$\infty \sim 4.702$
0.1 $\times$	0.695	0.708 $\sim$ 0.683	0.710 $\sim$ 0.681	0.717 $\sim$ 0.675	0.726 $\sim$ 0.667	0.739 $\sim$ 0.658	0.761 $\sim$ 0.642	0.789 $\sim$ 0.624
0.2 $\times$	0.411	0.414 $\sim$ 0.407	0.415 $\sim$ 0.407	0.417 $\sim$ 0.405	0.419 $\sim$ 0.403	0.422 $\sim$ 0.400	0.428 $\sim$ 0.396	0.435 $\sim$ 0.390
0.25 $\times$	0.356	0.358 $\sim$ 0.353	0.358 $\sim$ 0.353	0.360 $\sim$ 0.352	0.361 $\sim$ 0.351	0.363 $\sim$ 0.349	0.367 $\sim$ 0.346	0.371 $\sim$ 0.342
0.3 $\times$	0.320	0.322 $\sim$ 0.318	0.322 $\sim$ 0.318	0.323 $\sim$ 0.317	0.324 $\sim$ 0.316	0.325 $\sim$ 0.315	0.328 $\sim$ 0.313	0.331 $\sim$ 0.310
0.4 $\times$	0.277	0.278 $\sim$ 0.276	0.279 $\sim$ 0.276	0.279 $\sim$ 0.276	0.280 $\sim$ 0.275	0.281 $\sim$ 0.274	0.282 $\sim$ 0.273	0.284 $\sim$ 0.271
0.5 $\times$	0.254	0.255 $\sim$ 0.254	0.255 $\sim$ 0.253	0.255 $\sim$ 0.253	0.256 $\sim$ 0.253	0.256 $\sim$ 0.252	0.258 $\sim$ 0.251	0.259 $\sim$ 0.250
1 $\times$	0.225	0.225 $\sim$ 0.225	0.225 $\sim$ 0.225	0.226 $\sim$ 0.225	0.226 $\sim$ 0.225	0.226 $\sim$ 0.224	0.226 $\sim$ 0.224	0.227 $\sim$ 0.224

## RE. AUTO-RING

For close-up shooting at scales of reproduction from 1:2 to 1:1 (or lifesize), or magnifications  $0.5\times$  to  $1\times$ , or focusing from 254 mm (10 in.) to 225 mm (9 in.), the RE. Auto-Ring is a convenient accessory, because it does not disrupt the automatic lens diaphragm coupling action of the RE. Macro-Auto-Topcor lens.

The RE. Auto-Ring, in other words, is simply a 29 mm rigid extension tube, thus providing 29 mm extension to any lens which is attached to it. One side has a male bayonet mount, similar to that found on the lens, and also diaphragm coupling pin, automatic lens diaphragm coupling bar and lens locking pin, while the opposite side has a female bayonet mount and also coupling pins and bars, similar to those found on the camera body side.

The RE. Auto-Ring is, therefore, attached to the camera body, in the same manner that the Topcor lens is attached, and then the RE. Macro-Auto-Topcor lens is attached to the RE. Auto-Ring in similar manner. Except for the fact that the lens will now be extended 29 mm, there will be no other changes; however, the magnification scale, distance scale and depth of field scale on the lens will no longer be effective.

The magnification scale on the RE. Macro-Auto-Topcor lens can be used by simply adding 0.5 to the value indicated, or, in other words, the magnification scale of the lens will now be used for magnifications  $0.6\times$ ,  $0.7\times$ ,  $0.75\times$ ,  $0.8\times$ ,  $0.9\times$  and  $1\times$ .

As can be seen from the Depth of Field Table, there is very little depth of field over



magnification  $0.5\times$  and, therefore, the exact plane should be focused, as much as possible, and the smallest possible aperture used.

The distance from the front edge of the lens to the subject will only be 7.4 centimeters or 3 inches, at  $1\times$  magnification.



## MACROPHOTOGRAPHY

For macrophotography at scales of reproduction 1:1 to 1:3.6, or magnifications  $1\times$  to  $3.6\times$ , or focusing from 225 mm (9 in.) to 334 mm (13 in.), the RE. Macro-Auto-Topcor f/3.5 58 mm lens can be used with the TOPCON Bellow Attachment, Model IV. The lens is mounted in the reverse position, with a Reverse-Adapter Ring used between the bellows and lens, for this purpose.

The lens is set to infinity and the bellows extended or contracted for focusing or for setting to a predetermined scale of reproduction. The lens diaphragm is fully opened for focusing and closed down for exposure adjustments, after the subject is focused.

Read instructions for the Bellow Attachment regarding attachment/detachment, focusing, magnification, exposure adjustment, etc., as well as valuable formulas which will come in handy for macrophotography.

When the RE. Macro-Auto-Topcor lens is attached to the bellows, with the reverse-adapter ring, the fully automatic lens diaphragm action is no longer operative and, therefore, the Automatic Extension Tube should be attached on the bayonet mount of the reversed lens (on the side towards the subject) and the double cable release should be used to obtain semi-automatic lens diaphragm action.

Read instructions provided with the automatic extension tube, regarding operation with the accessory, as well as adjustment of the double cable release, in order to coordinate actions of the lens diaphragm and the focal plane shutter.

## REVERSE-ADAPTER RING

The 49 mm diameter reverse-adapter ring is used for attaching the RE. Macro-Auto-Topcor lens in the reverse position on the bellows, because the reversed lens will give superior optical performance for shooting at scales of reproduction over 1:1 or magnification  $1\times$ . The lens is reversed and attached by its screw-in filter mount to the screw mount of the reverse-adapter ring and then the bayonet mount of the reverse-adapter ring is attached to the bellow attachment. When attaching the bayonet mount, choose the red dot (out of three red dots), which is on the same side as the aperture index of the lens, for alignment with the red dot on the bellows.

When the lens is reversed and attached, adjustment of the normal lens extension is necessary because the principal point of focus shifts in relation to the film plane. In other words, add 57 mm to the extension indicated on the bellows.

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## **IMPORTANT!**

- (1) Since slow shutter speeds are mostly used in close-ups and macrophotography, it is recommended that a sturdy tripod or copying stand be used with a cable release, because it will improve image sharpness.
- (2) The RE. Macro-Auto-Topcor  $f/3.5$  58 mm lens gives best results when used at  $f/5.6$  to  $f/8$ , rather than being stopped down to its smallest opening.
- (3) When photographing deep or high objects, however, shoot with the lens diaphragm stopped down, as much as possible, and use a slower shutter speed.
- (4) The standard No. 1 focusing screen is not recommended for close-up focusing because one of the prism halves will "black-out" at small lens openings. Therefore, exchange for the No. 2, No. 4 or No. 6 focusing screens. If the standard focusing screen is used, however, focus with the groundglass area of the screen and not the split-image rangefinder spot.  
The same is also true of the micoprism focusing screen when used at the small lens openings.

## TOPCON ACCESSORIES

For far greater enjoyment and convenience in close-up shooting and macrophotography, the following TOPCON accessories should be used with the RE. Macro-Auto-Topcor f/3.5 58 mm lens:—

1. **Waist-Level Finder**—exchange with the Pentaprism finder as it is usually more suitable for careful studied composition work, although the image shown on the focusing screen is laterally reversed.

The square magnifier shows the full area of the screen magnified  $4.5\times$  and is suitable for precise focusing.

2. **High Magnification Waist-Level Finder** — use interchangeably with the waist-level finder. It is particularly suited for super-critical focusing because the full screen area is magnified  $6.5\times$  and because fine dioptric adjustments of the eyepiece, from  $+2$  to  $-3$  diopters are possible.

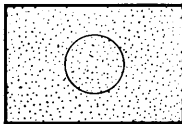


**3. Interchangeable Focusing Screens**—exchange the standard focusing screen for one of the following:—

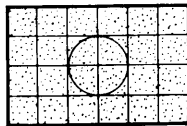
**No. 2**—has full-area groundglass plus fresnel lens, outside a 12 millimeter diameter fine focus spot, with subject focused on the groundglass screen. For use at small lens openings, which are usually the case in macrophotography.

**No. 4**—same as No. 2 screen plus horizontal and vertical lines etched at 6 millimeter intervals in a checkerboard pattern. Checkerboard lines are used for controlling subject placement and alignment of lines.

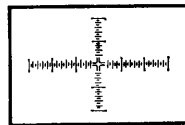
**No. 6**—has full-area clear glass (without fresnel lens), with bisecting scales engraved for 0.5 mm divisions plus center double cross-hairs. Use with high magnification waist-level finder and/or magnifier for focusing of aerial image and recommended for high magnification macrophotography.



No. 2



No. 4



No. 6

**4. Extension Tube Set**—is a set of three different length tubes which provide rigid

extensions of 9 mm, 15 mm and 30 mm. May be used singly or in combinations or with the bellows for additional extension.

5. **Automatic Extension Tube**—a 9 mm extension tube for providing semiautomatic lens diaphragm action to the RE. Macro-Auto-Topcor lens when disconnected from the coupling mechanism of the camera body. Must be used with double cable release.

6. **Double Cable Release**—is used for coordinating actions of the shutter and lens diaphragm, when screwed into the camera shutter release socket and the socket of the automatic extension tube. Also eliminates camera vibration.



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- 7. Copying Stand**—used for providing a steady stand for the camera and lens and thus eliminating vibration which can detract from image sharpness, especially as most macrophotography is done at very slow shutter speeds and any movement will show up magnified.



- 8. Angle View Finder**—is used attached to the eyepiece of the Pentaprism finder, either directly or with an eyepiece adapter, for viewing at right angle to the optical axis of the lens. Shows full screen area enlarged  $1\times$ .

Eyepiece diopter correction lens, magnifier and eyecup are attachable to the accessory.



- 9. Magnifier**—is used attached to the eyepiece of the



Pentaprism finder or eyepiece of the angle view finder or high magnification waist-level finder, for increasing precision of focus. Enlarges 12 millimeter diameter spot of the screen  $2.5\times$ .



**10. Eyepiece Correction Lenses** is screwed into the eyepiece of the Pentaprism finder or angle view finder for providing dioptric powers noted on the lenses. Six lenses for  $-3$ ,  $-2$ ,  $-1$ ,  $+1$ ,  $+2$  and  $+3$  diopters are available. Recommended because improved eyesight will increase focusing accuracy but consult your optician regarding the required dioptric power.

**11. Gray Slide**—is used for taking exposure readings of transilluminated light, such as in slide copying. Inserted in place of the film transparency for taking readings with the half-mirror of 18 percent transmission factor.

**12. Incident Light Receptor** is screwed into the filter mount of the lens and used for taking incident light readings of the light falling on the subject, with the receptor aimed at the picture-taking position. Especially recommended for subjects with extreme contrast in color or lighting or tone.



**13. Rubber Eyecup**—is attached to the eyepiece of the Pentaprism finder or angle view finder, to cut off extraneous light which can effect focusing and meter reading. Shaped to fit the contour of the face and, therefore, will minimize vibration when the camera is hand-held.



The first 3 items, or waist-level finder, high magnification waist-level finder and interchangeable focusing screens, cannot be used with the TOPCON RE-2, although the magnifier and angle view finder can be used, the latter with the eyepiece adapter.