TOPCON

# TOPCON RETINAL CAMERA
# Model TRC-JE

Topcon Retinal Camera Model TRC-JE Instruction Manual
(Also applicable to models TRC-FE and TRC-FE3)

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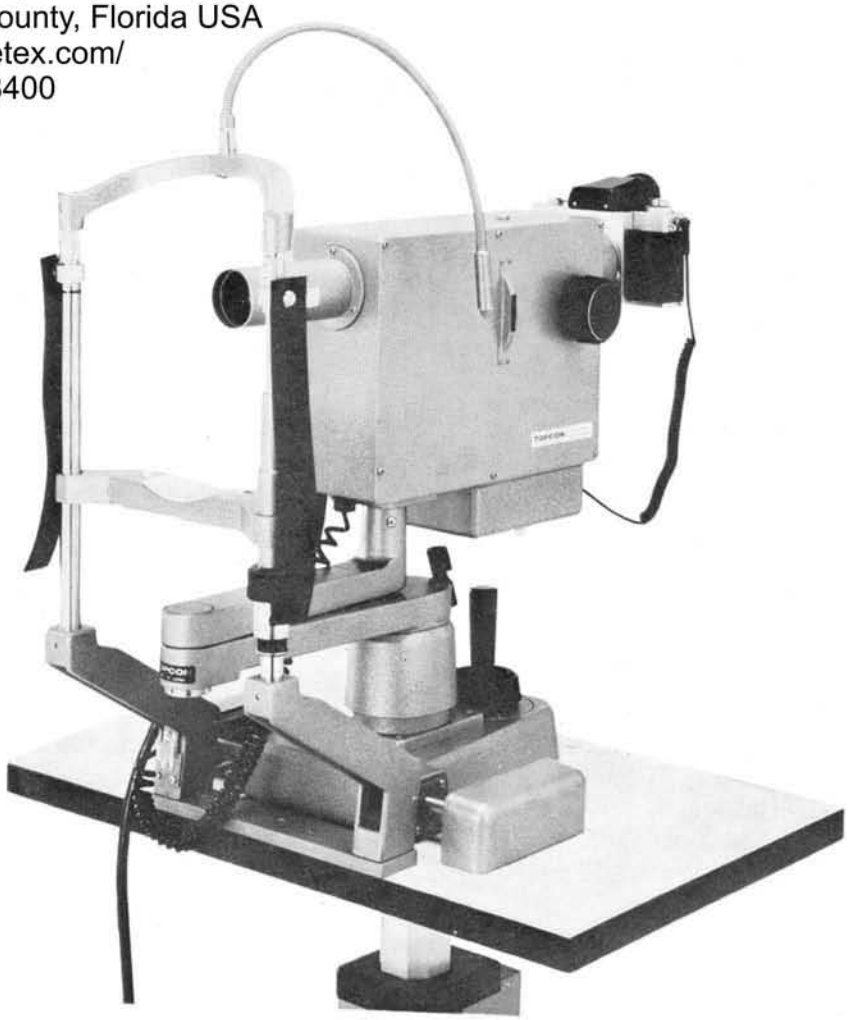

Congratulations on your choice of the TOPCON Retinal Camera, Model TRC-JE, which has been designed as an economical diagnostic tool for group examinations of the retinal area for the purpose of obtaining quick and positive data leading to the early discovery and diagnosis of ailments to the ocular area and/or for clarifying physiological conditions. Thus, it can be considered a very important diagnostic tool for the ophthalmologist, the optometrist as well as the internist.

It will be possible to take photographs of the ocular fundus, including the papilla and macula lutea, as well as the ocular anterior, or, in other words, all kinds of retinal photographs with 35 mm film, both black-and-white and color.

At the same time, a full range of optional accessories are also available for use with the Model TRC-JE, such as the Type II Polaroid Camera Attachment, Stereo Photographic Attachment, Sighting Mirror Attachment, Magnifying Attachment Set, Phantom Eye and the Model AIT-2 or AIT-3 Adjustable Instrument Table.

# CONTENTS

# IMPORTANT

1. Read the instruction manual through once before touching the TOPCON Retinal Camera, Model TRC-JE. Otherwise, mis-handling can lead to serious troubles.
2. Use the lowest possible illumination which is permissible for observation. Increasing the brightness of the illumination may prove blinding to the patient and, therefore, should not be done unless the field of view is too dark for distinct viewing.
3. Do not switch the light on and off when it is not necessary, as such action will simply shorten the lamp-life.
4. Do not change the flash control switch setting while the Xenon flash lamp is discharging or while it is charging.
   Either action will lead to troubles in the power supply unit.
5. Always switch OFF the power switch on the power supply unit and disconnect the power cord before connecting other cords or exchanging lamps or fuse.
   Make it a practice to switch OFF electricity to the instrument with the power switch at the end of the day and disconnect the power cord when not using the instrument for long periods.
   Wait five minutes after switching OFF the power switch before disconnecting the power cord from the power supply unit.
6. The power cord on the primary side should always be grounded, as specified by your local electrical regulations, because of the high voltage in the power supply unit.
   Furthermore, never tamper with the power supply unit or take off its cover.
7. Please check the voltage selector and confirm the actual input voltage of the instrument, although it should be adjusted to match the A.C. current, based on your instructions. If unsuitable, please adjust.
   The instrument can be used with a line voltage within $\pm 5$ percent of rating.
8. A longer recycling time will be needed when the primary voltage is below rating. Therefore, raise the primary voltage to the rating, whenever possible.
9. Do not touch the lens surface with your fingers or with any hard object. Always keep the objective lens covered with its cap, as protection against inquisitive fingers.
   Clean it with the rubber-ball air blower, or a clean, soft camel hair brush but never with any kind of cloth.
10. The instrument actually delivered may be slightly different in minor respects to the instrument covered in this manual, due to improvements which have been made subsequently. However, if there are no serious operational differences, in this case, such minor changes may not be covered by additional instructions.
11. Always switch off the power switch when the instrument is not being used. Always press the shutter release button before storing the instrument or when it is planned not to use it for a long period, as otherwise the springs inside the body will be kept tensioned.
12. "Polaroid" and "Polacolor" are registered trademarks of the Polaroid Corporation, Cambridge, Mass., U.S.A.

# NOMENCLATURE AND OPERATIONS

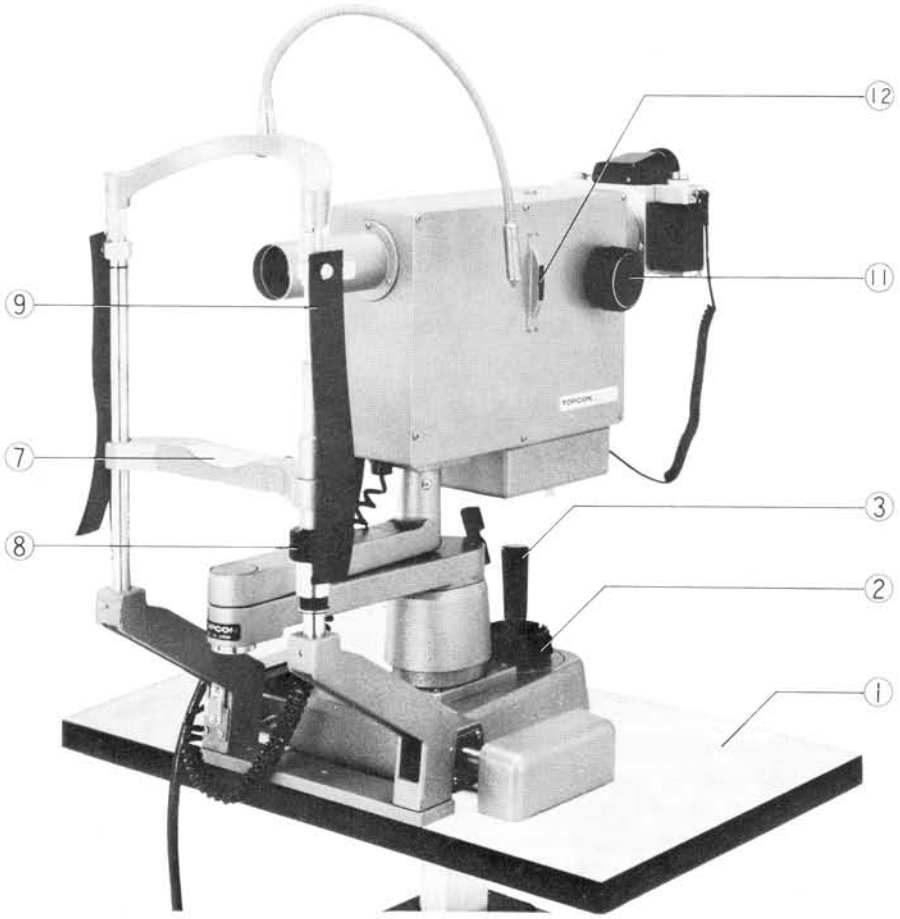


Fig. 1

| | |
|---|---|
| ① Table | |
| ② Elevating wheel | Rotating the wheel elevates or lowers the optical head. |
| ③ Control lever | |
| ④ Optical head fixing knob | Lock optical head from moving and is loosened for swinging the optical head. |
| ⑤ Optical head arm | Can be swung up to 30° in both directions, when optical head fixing knob is loosened. |
| ⑥ Base fixing screw | Prevents base from movement when tightened by clockwise rotation. |
| ⑦ Chin-rest | |
| ⑧ Chin-rest adjusting wheel | |
| ⑨ Head strap | Used for strapping the patient's head to the head-rest for obtaining greater stability in photography. |
| ⑩ Fixation target lamp | |

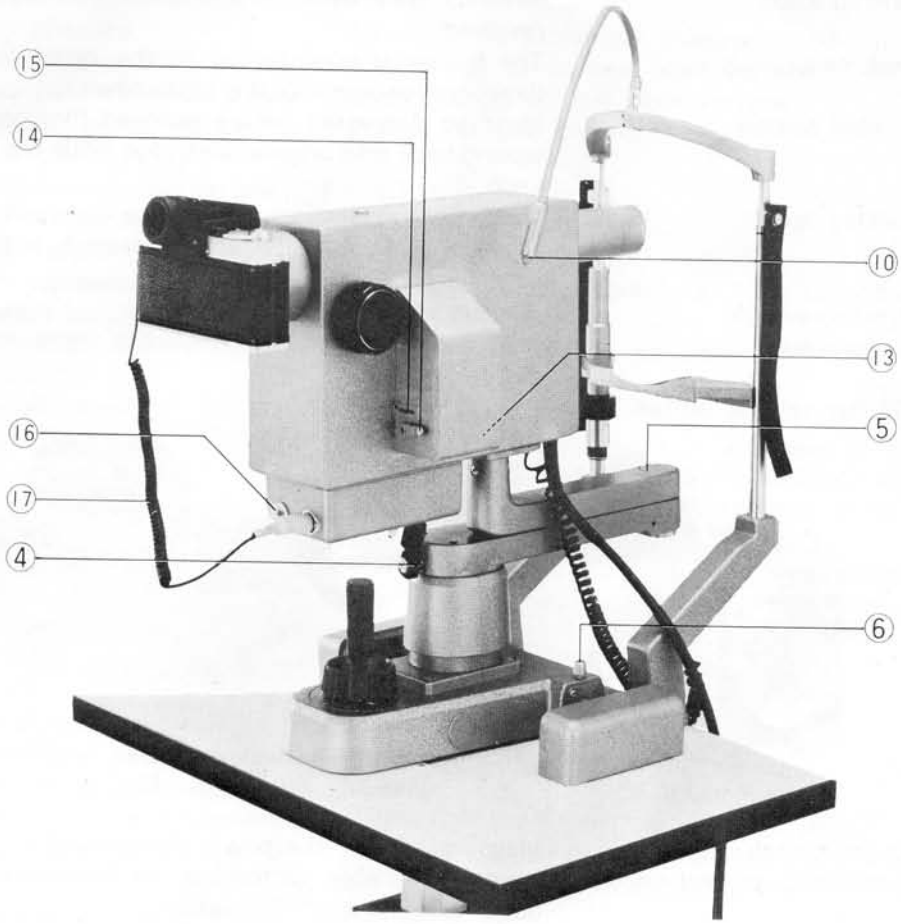


Fig. 2

| | |
|---|---|
| ⑪ Focusing wheel | Rotated for focusing the optical system. |
| ⑫ Diopter compensation plate | Used for inserting a minus compensation lens for the range −10D to −22D, a plus lens for the range +8D to +25D, a lens for photographing the ocular anterior, as well as a blank opening for use with a non-emmetropic eye in the range +8D to −10D. |
| ⑬ Zero resetting knob | Counter-clockwise rotation resets the counter to zero (000). |
| ⑭ Plate insertion slot | Slot for insertion of a white plastic data plate on which the date, name of patient, etc., can be written for photographing together on the same frame. |
| ⑮ Counter advance lever | Used to advance the digits of the counter. |
| ⑯ Ready-light | A charge lamp which lights up when the electronic flash is fully charged and ready for photography. |
| ⑰ Synchro-flash cord | Connects the camera section and the Xenon lamp starter section. |

⑱ Eyepiece adjustment ring — Rotated for adjusting the dioptric power or focus of the finder's eyepiece lens to the user's eyesight.

⑲ Film winding lever — Advances film one frame when stroked until it stops.

⑳ Rewind knob — Rewinds film back into original cartridge when revolved.

㉑ Back cover lock — The button is push-turned in the arrow-indicated direction for opening the back cover.

㉒ Rewind button — Must be depressed before exposed film can be rewound back into original cartridge with the rewind knob.

㉓ Locking lever — Locks camera section securely to the optical head. Must be depressed to unlock camera section for detachment.

㉔ Synchro-switch — Always set to FP setting.

㉕ Finder catch — Must be depressed to detach the fnder from the camera body.

㉖ Shutter release button

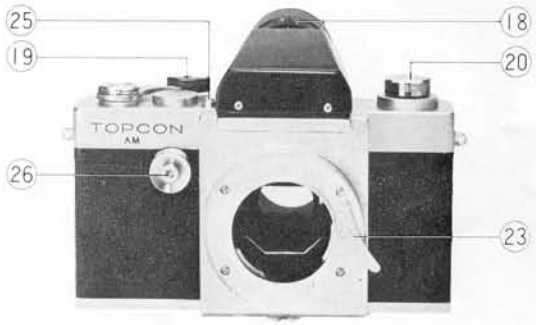


Fig. 3

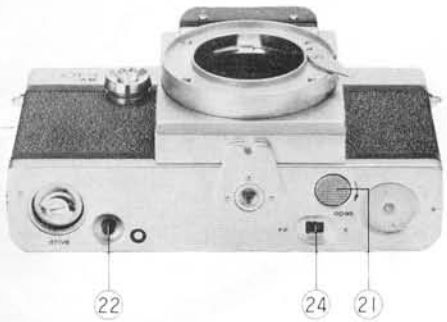


Fig. 4

㉗ Power switch — Main switch for the power supply unit.

㉘ Illumination control switch — Used for variably controlling the brightness of the observation system illumination.

㉙ Flash control switch — Used for controlling the brightness of the electronic flash illumination in four steps or 25WS, 50WS, 75WS and 100WS.

㉚ Voltage selector/fuse holder


Fig. 5

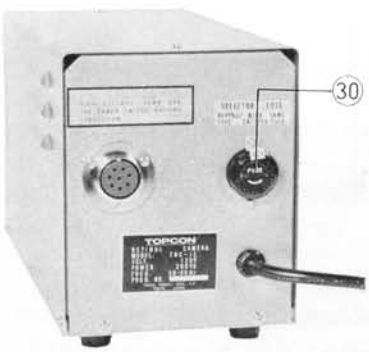


Fig. 6

# SPECIFICATIONS

| | |
|---|---|
| Angle of coverage | 30° (photographed as a 22mm dia. on the 35mm film) |
| Working distance | 45mm (with aspherical objective lens) |
| Effective field of view | 2.2mm dia. on corneal front surface |
| Effective field of illumination | 8mm dia. on corneal front surface |
| Photographic magnification | 2.34× (at zero diopter) |
| Range of photography | |
| Without compensation lens (○) | −10 to +8 diopters |
| With compensation lens (−) | −10 to −22 diopters |
| With compensation lens (+) | +8 to +25 diopters |
| With compensation lens (◎) | Ocular anterior photography at 1.6× magnification |
| Illumination lamps | |
| Observation system | 6V 33W; prefocused; variably adjustable |
| Counter | 6V 3W |
| Fixation target | 1.5V 100mA |
| Xenon flash | 450V 100WS; adjustable in 4 stages or 25WS, 50WS, 75WS and 100WS; minimum recycling time to 10 sec. at 100WS (at 5% of primary rating) |
| Data photography | Frame numbers 000 to 999, in 1 frame increments; manual operations; replaceable with plastic data plate on which data can be hand-written. |
| Camera body | Type AM TOPCON 35mm camera body |
| Movements | |
| Optical head adjustments | 15mm up/15mm down |
| Longitudinal base movement | 70mm |
| Lateral base movement | 90mm |
| Cross-slide fine movement | 10mm |
| Optical head lateral swing | ±30° of the arc (around the center of the optical axis on the corneal front surface) |
| Chin-rest vertical movement | 70mm |
| Power supply unit | |
| Primary input | AC 100, 110, 120, 200, 220 or 240 volts; adjustable with voltage selector; 50/60 Hz |
| Secondary output | AC 6V 5.5A, consecutively variable, for observation lamp.<br>AC 6V 0.5A, for counter illumination lamp.<br>DC 450V, for Xenon flash lamp. |
| Dimensions | |
| Instrument | 550mm high × 630mm long × 330mm wide |
| Power supply unit | 198mm high × 152mm long × 317mm wide |
| Weight | |
| Instrument | 19.0 kgs. |
| Power supply unit | 7.5 kgs. |

Subject to changes in design and/or specifications, without advance notice.

# CHECKING THE PRIMARY VOLTAGE AND THE ELECTRICAL PLUG

Before actually assembling the instrument, first, check the primary voltage of the instrument delivered to you, as well as the electric plug connected to the end of the power cord.

## 1. Checking the Primary Voltage

Check the voltage selector/fuse holder on the power supply unit, which will show the voltage of the instrument.

The primary voltage set to the power supply unit should be seen in the opening on the rim of the voltage selector. If it does not match the main current, detach the fuse holder in the center of the voltage selector. Next, pull out the voltage selector and re-set it so that the required voltage is exposed in the opening of the rim. The instrument can be adjusted for AC 100, 110, 120, 200, 220 or 240 volts.

Normally, the instrument is already adjusted for the required voltage, at the time of final inspection and, therefore, this adjustment should not be required.

If the voltage selector is re-adjusted, in the above manner, please check the fuse in the fuse holder, too. It must be suitable for the voltage set to the instrument or, in other words, a 2.0 ampere fuse should be used with primary voltages 100 to 120 volts and a 1.0 ampere fuse should be used when the primary voltage is from 200 to 240 volts.

## 2. Checking the Electrical Plug

Check whether the electrical plug connected to the end of the power cord matches the receptacle from which power is to be taken. If it is unsuitable, exchange it. Or, the electrical plug may not be connected at all, due to requirements in your region which cannot be met by us. In this case, please connect a suitable plug.

There are three electric wires in the power cord which are usually color-coded black, white and green or blue, brown and a bias-striped green/yellow, depending on destination. The black and white wires or the blue and brown wires should be connected to the A.C. terminals of the plug while the green or green/yellow wire should be grounded or earthed as required by your local regulations. When a three-pin plug is being used, connect the grounding wire to the grounding terminal and cut off the external grounding wire; otherwise, use the external grounding wire for grounding puspose.

# ASSEMBLING THE INSTRUMENT

## 1. Setting up the Cross-Slide Base

Place the cross-slide base section on top of the table, with the outrigger rollers aligned on top of the toothed rails.

Next, fix the roller bars securely in place, over the outrigger rollers, as illustrated. The roller bars are designed to keep the outigger rollers engaged with the toothed rails, even when the optical head is swung to its extremities, in either direction.

Finally, insert the rail covers in place over the rails. Insert the flange, on the base of the cover, in the slight opening between the rail and the table surface.

After setting up the cross-slide base, in the above manner, tighten the base fixing screw which will facilitate further assembling work.

Fig. 7

## 2. Attaching the Optical Head Section and Conneting Cord

(1) Swing the optical head to the right or left (actually the lower arm is swung in either direction) which will expose the attachment screwholes on the lower arm.

Next, while supporting the optical head section, locate the end of the lower arm over the short upright column on the cross-slide base and align the four screwholes on the arm with the four screwholes on the column. When properly aligned, fix the arm to the column with four attachment screws, as illustrated.

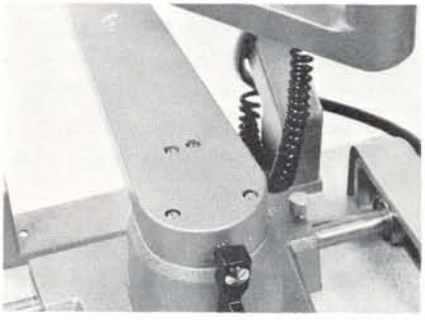

Fig. 8

(2) Insert the 2-pin connector on the end of the spiral or coiled cord extending from the optical head section to the connector at the base of the chin-rest section, as illustrated.

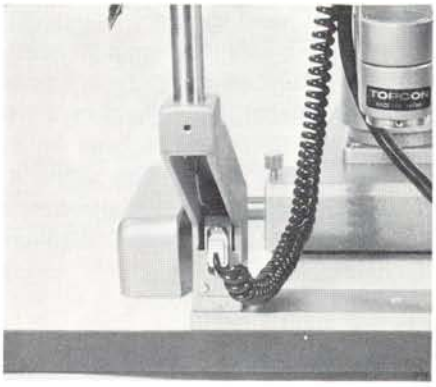


Fig. 9

(3) Connect the 8-pin connector on the cord extending from the optical head to the 8-pin connector on the power supply unit.

Fig. 10

(4) Connect the camera body and the Xenon lamp starter section with the synchro-flash cord, as illustrated.

Fig. 11

### 3. Attaching the Chin-Rest Section

Place the chin-rest section on top of the table, at the end with three screwholes for attachment of the chin-rest section.
Next, fix securely with the three attachment screws.

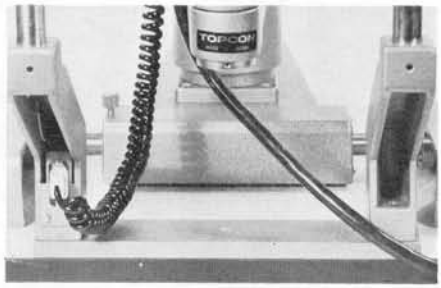

Fig 12

### 4. Attaching the Camera Body to the Optical Head

First, check whether the synchro-switch on the base of the camera body is set to FP-setting or not.
Next, line up the red dot on the camera body flange with a similiar dot on the optical head mount. Insert the camera body mount over the optical head mount and, when well-seated, revolve fully in the clockwise direction. Revolve until the locking lever catches and secures the camera body to the optical head. The camera body can be detached in the reverse order, while depressing the locking lever to release its catch.

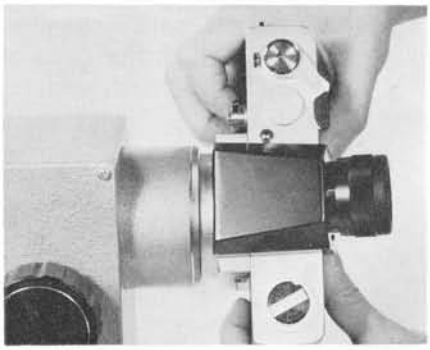

Fig. 13

# BASIC OPERATING PROCEDURES

## 1. Adjustment of the Eyepiece

The eyepiece must be adjusted to the user's eyesight or, in other words, the dioptric power of the finder's eyepiece must be adjusted with the eyepiece adjustment ring for optimum focusing.

Draw out the eyepiece completely, by rotating the adjustment ring in the counter-clockwise direction. The cross-hairs, in the field of view, will appear blurred and indistinct, at this time.

Next, rotate the adjustment ring slowly in the clockwise direction while checking the cross-hair image. Stop when the image is sharply focused as double cross-hairs which will be the proper correction. Should the adjustment ring be rotated past the point of sharpest focus, start all over again, as this will be much easier and faster than moving the ring back and forth around the point thought to be in sharpest focus.

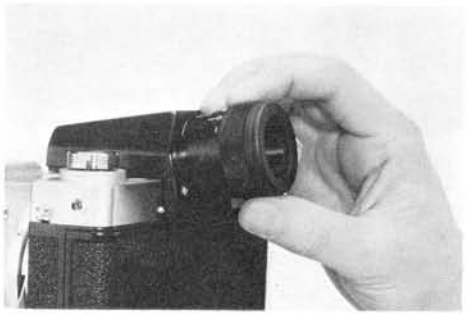

Fig. 14

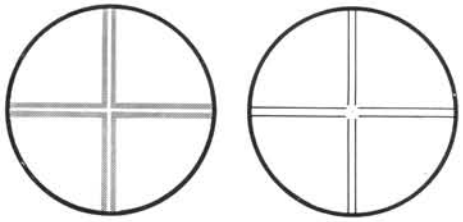

Fig. 15

## 2. Exposure Adjustments

Retinal photographs are taken with the Xenon flash or electronic flash, with exposure controlled by the intensity of the flash illumination. For the normal retina, therefore, the flash control switch should be set at the following intensities when films of these sensitivities are loaded in the camera body.

| Film Sensitivity | Flash Intensity |
|---|---|
| ASA 160 | 25 WS |
| ASA 100 | 50 WS |
| ASA 50 or 64 | 75 WS |
| ASA 75 (Polacolor Type 108) | 100 WS |

The above combination of film sensitivity and flash intensity is based on the average retina and, therefore, may require some adjustment, depending on reflectivity of the retina.

# CARE AND MAINTENANCE

## 1. Optical Parts

Do not touch the surfaces of the objective lens and eyepiece lens with your fingers or any hard objects.

Protect the lens surfaces from scratches, dust, dirt, oil and/or fingerprints, at all times.

Keep the objective lens cap on when the instrument is not being used, as well as the plastic dust cover, to protect it from inquisitive fingers.

Always clean the lens surface with the rubber-ball air blower, first.

If dust or dirt cannot be blown away, in this manner, then use a clean, soft camel hair brush to clean the surface. Try to limit cleaning to blowing and brushing, as the lens surface should not be touched as much as possible.

When absolutely necessary, use a soft lens tissue which may be dipped very lightly in a mixture of ether and alcohol. Wipe but do not rub.

Do not use silicone-treated eyeglass cleaning cloth for this purpose or, for that matter, any type of cleaning cloth, as they could damage the lens surface.

## 2. Reflex Mirror

The reflex mirror inside the camera body needs even more care than the optical parts. Therefore, always keep the body mount cap on when the camera body is not attached to the optical head.

## 3. Storage

Store the instrument very carefully. Use an extra cover, over the plastic dust cover, which should, furthermore, be tied tightly to prevent dust from entering.

Store in a room which is clean, not dusty or drafty, does not heve high temperatures or is wet. The room should be dry and air should circulate freely.

Naturally, the power switch should be switched OFF and the power cord should also be disconnected for storage. Furthermore, the shutter release button should also be depressed.

# EXCHANGE OF LAMPS AND FUSE

## 1. Exchange of the Illumination Lamp and Xenon Flash Lamp

The illumination lamp for the observation system and the Xenon flash lamp can be exchanged in the following manner, when necessary.

(1) First, switch off the power switch.

(2) Next, loosen the starter section attachment screws and pull off the Xenon lamp starter section.

(3) Hold the illumination lamp and rotate in the counter-clockwise direction while pressing down on the head of the lamp at the same time. The lamp will rise straight up when pressure is loosened. Therefore, take it out.

(4) Insert the replacement lamp and rotate in the clockwise direction, while depressing the lamp head at the same time, until it stops.
Always use the specified lamp and attach properly since specially-designed illumination lamps must be used.

The Xenon flash lamp can also be exchanged after pulling off the Xenon lamp starter section, in the above manner.

(5) Take a firm grip on the flange of the Xenon flash lamp and pull straight upwards.

(6) Insert the replacement flash lamp by coinciding the pins on the base of the lamp to the sockets on the starter section, while holding the lamp by the flange. When properly aligned, push in strongly.
Never hold the glass bulb but always grip the flange when inserting the new lamp, as fingerprints on the glass surface will effect the light intensity and lamp-life.

(7) To reattach the starter section to the optical head, first, coincide the pins, in the center of the starter section to the openings on the optical head side. When properly aligned, push in the starter section and screw in the starter section attachment screws tightly.

Fig. 16

(8) Finally, switch on the power switch and check whether the replacement lamp works or not.

## 2. Exchange of the Counter Illumination Lamp

Exchange the illumination lamp for the frame counter in the following manner, after switching OFF the power switch, first.

(1) Loosen the fixing screw of the hinged cover, over the zero resetting knob. Then, open the cover which will expose the illumination lamp.

(2) Simply pull out the lamp and insert the replacement lamp.

(3) Finally, check whether the replacement lamp works or not by switching on the power switch.

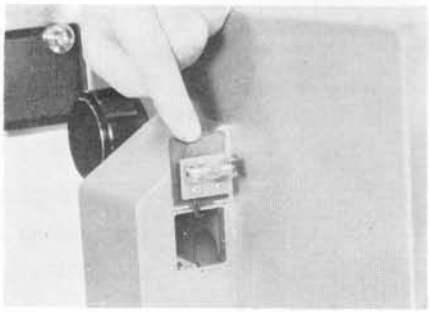

Fig. 17

### 3. Exchange of the Fixation Target Lamp

(1) Unscrew the forward end of the fixation target (about 3/4th of the metal body, including the red plastic cap at the tip) which will expose the lamp inside.

(2) Unscrew the lamp and detach it.

(3) Screw in the replacement lamp and then reattach the fixation target body.

(4) Finally, switch on the power switch and check whether the fixation target lights up or not.

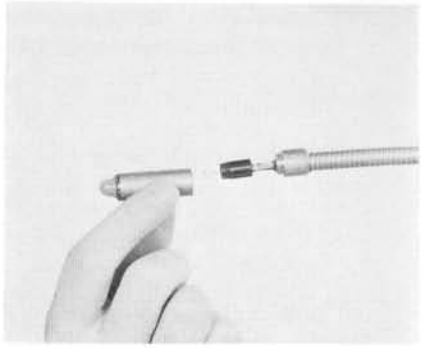

Fig. 18

### 4. Exchange of the Fuse

(1) First, switch OFF the power switch and disconnect the power cord.

(2) Detach one of the holding fixtures of the fuse holder and push it aside. Then, pull out the fuse and replace it with a new one.

(3) After replacing the fuse, reattach the holding fixture.

(4) Finally, connect the power cord and switch ON the power switch.
Check whether electricity is being supplied to the instrument or not, i.e., check whether the lamps light up or not.

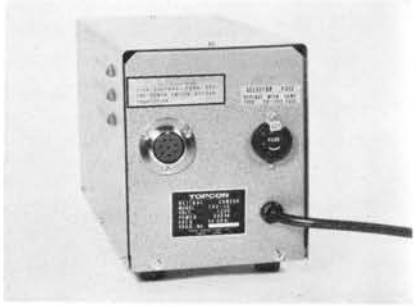

Fig. 19

# SPARE PARTS

When ordering spare parts, such as lamps, etc., please indicate clearly the name of the item, the part number and the quantity required, in your order sheet, as well as indicating that it is required for the Model TRC-JE.

| | |
|---|---|
| 1. Xenon flash lamp | Part No. 4042055240 |
| 2. Illumination lamp | Part No. 4045255020 |
| 3. Fixation target lamp | Part No. 4046310030 |
| 4. Counter illumination lamp | Part No. 4042055260 |
| 5. Fuse 2.0 ampere | Part No. 4042050340 |
| 6. Fuse 1.0 ampere | Part No. |
| 7. Chin-rest tissue pads | Part No. 4031040820 |

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